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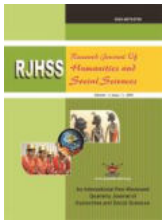

RESEARCH ARTICLE

Technique of making various artifacts with rope (Shun) and wood in Bedia tribe

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ABSTRACT:
The people of bedia tribe are strong, laborious and hygiene oriented people. The bedia tribe people were divided into groups and each group have its own clan (gotra). The (gotra) naming system was based on the name of the animals, fishes and birds. The various gotra used in bedia tribe are bambi (fish), Suiya (small black bird), kacchim (tortoise), Chidra (squirrel), fecha (owl), shankh (shell) etc. Bedia tribe people have their own way of living. They have their own tradition and culture.

KEYWORDS: Technique, artifacts, Shun, wood, Bedia tribe

INTRODUCTION:
The bedia tribe residents of Jharkhand mainly found in South Chotanagpur region in Angara block (Ranchi District) situated in 85.4852° E latitude and 23.4052° N longitude, located 30km towards east from district headquarters Ranchi and 31 km from state capital Ranchi towards west.

The people of bedia tribe are strong, laborious and hygiene oriented people. The bedia tribe people were divided into groups and each group have its own clan (gotra). The (gotra) naming system was based on the name of the animals, fishes and birds. The various gotra used in bedia tribe are bambi (fish), Suiya (small black bird), kacchim (tortoise), Chidra (squirrel), fecha (owl), shankh (shell) etc. Bedia tribe people have their own way of living. They have their own tradition and culture. Like other tribes bedia tribe also has their own occupation mainly based on "**collection of herbs**" and curing various diseases of human beings and cattle. The occupation of herb collection was not for upliftment of economic condition, but for the service to common people. The herbs and the related plants were almost used in all aspects of their life.

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Other than the occupation of herb collection they were fond of hunting and unique craft making. All the hunting and artistic equipment's materials were made of either wood or plants. For making the weapons and craft they used - Lantana Camara (Putus), Shorea robusta (Sakhuwa), Kenaf (kudrum) etc. For hunting and artistic equipment making they mainly used kenaf and Lantana Camara.

As the people of bedia tribe are hygienic and collector of herbs, they knew the medicinal properties of these two plants. So they made things used in daily lives from these two plants. The kenaf was used for making ropes and related material from its unique fiber, processed from its stem to root part. The kenaf fiber is strong and has good absorption property for oil and other liquids. The lantana camara is toxic in nature for cattle, but has medicinal value for human beings as it is antimicrobial, fungicidal, and insecticidal property. Lantana camara is generally used for making furniture's.

Hunting, fishing and artistic equipment's making technique in bedia tribe:
Bedia tribe had their own unique style of hunting the animals and fishes. This tribes mainly hunt the animals like wild boar known as (barah), rabbit (kherha) and field mouse (bhusmusa) and all kind of fishes found in that region. The main strategy of hunting and fishing was

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AGARIA TRIBE : THE CHRONICLES OF MEGALITHIC TRADITION OF IRON SMELTERS OF NORTHERN CHHATTISGARH REGION

Dr. Nitesh Kumar Mishra*
Anshu Mala Tirkey**

ABSTRACT

This research paper mainly represents the iron smelters (Agaria tribe) of northern Chhattisgarh region. The paper will describe the unique primitive ancestral technique of iron smelting, making of iron tools for agriculture and hunting. Iron smelting was the traditional occupation of the people of Agaria tribe and their iron tools were so magnificent that it did not get rusted for longer duration of time. Like the iron trident present on the site of Tanginath Dham and it is interesting to know that this trident was made by the people Agaria tribe and till now there is no rustication on the trident. They melt iron from various materials which will be discussed in this research paper. This paper will also describe the megalithic practices of the Agaria tribe. Basically Menhirs are found in the burial site of the Agaria tribe. Megalithic practices are very expensive ceremony, so many of the tribes stopped the megalithic practices in present day scenario. So in this paper the reason will also be described, thats why the people of Agaria tribe left the megalithic practices among their tribal society. On this research paper there will the detailed information about the burial and megalithic practices among the Agaria tribe. This research paper will also consist of the various new sites related to iron kiln and megalithic sites of Agaria tribe. There will be detailed information about the associated artifacts present on the megalithic and iron kiln sites. This paper will cover the Agaria tribe of the northern Chhattisgarh region. This research will help to enrich the history of the Chhattisgarh region.

Keywords : Agaria, Khetwa, Sahwain, Chatak vani, Jal sembi, Barr Pahari, technique, iron smelters, iron slag, supa, girna, bicchi stone, megalith, kurethiya, tyure, axes, ploughshares, mattocks and sickles

Agaria tribe is one of the most skillful and significant tribe of Chhattisgarh. The people of Agaria tribe are very creative mind; many examples are present as archaeological remains of their creativity. The word Agaria means 'Aag' in Hindi language. The people of Agaria tribe are those people who worked with 'fire'. The Agaria tribe is known as a small "Dravidian caste".[1] The main occupation of the people of Agaria tribe is iron smelting. Like other tribes Agaria tribe also have their particular culture and tradition. The Agaria tribe people have their own language and customs. According to Dalton the appearance of the people of Aagria tribe, are tall, well made, with tawny complexions. They are industrious and intelligent than the generality of the fighting tribe.[2] Some words which are used commonly in their language are 'oil' known as (Chatak vani), 'salt' as (Sahwain), 'fish' as (Jal sembi), 'rice' as (Khetwa) etc. The people of Agaria tribe have gotra system in their community like other tribal communities. Their gotra are derived from the fish, birds, animals, trees and even the daily used things like salt etc. Some gotras of the people Agaria tribe are Trikey means (bird), Minz (fish), Lakra (tiger), Kujur (A Climbing plant), Kerketta (Quail bird), Ekka (tortoise), Xaxa (Crow), Xess (Peddy, Dhaan), Tigga (Monkey), Kindo (Carp fish), Panna (Iron), Besra (A name of Tree), Rawna (Vulture bird), Munjni

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The Ancient Megalithic Practices in Jashpur District (Chhattisgarh Region)

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ABSTRACT:

The northern Chhattisgarh region consists of Jashpur district, Balrampur district, Surajpur district and Sarguja dist Chhattisgarh was the part of Chhota Nagpur region. The name Chhattisgarh is derived from the 36 ancient forts in the a Mahanadi is the main river of Chhattisgarh region. Jashpur region consist of the various evidence of prehistoric ı scattered all over. Jashpur district is very important for the megalithic sites in Chhattisgarh. Prehistoric tools and ı paintings are also present in this region. Jashpur district is one of the regions which consists a large tribal group. The n tribes are Agaria, Gond, Oraon, Kharia Munda etc. These tribal communities practice the megalithic practices in their tr society. Some ethnic group had stopped the megalithic practices but among some ethnic groups, the megalithic pract are still in living tradition. This research paper will mainly consist of the new megalithic sites of various ethnic groups. paper will describe the types of megalith present here. It will give the full detail of the megaliths. In this paper there wil the geography of Jashpur region. Death and the burial practices are also described in this paper.

KEYWORDS: Megalith, Chhota Nagpur, Gaurlata, Death, Menhir, Stone Seats, Ethnic Communities.

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Development, Displacement and Rehabilitation in Tribal Communities (Special Reference to Various Industries and Kelo of Raigarh District, Chhattisgarh)

Kujur Nister[1], Kumar Shailendra[2,*]

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[2]Assistant Professor, School of Studies in Anthropology, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India

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Abstract

In present era, development and displacement like both side of coin. Major development projects like industries, dams, railways roads, army camps required large area of land. In addition, other side Industries required natural resources and labor as industry works. Forest areas are best for this kind of projects. Forest has land, natural resources and labor (displaced/affected tribal peop Above condition, attract government or non-government attention in forest area that is the residential area of tribal communities from long time. The present study conduct of Raigarh district of Chhattisgarh. Raigarh district of Chhattisgarh, known as an indu district because the Raigarh district has fourteen major industries including Jindal and one big dam called kelo. Raigarh district c Chhattisgarh has 14 large and small industries of iron, coal, etc. These industries make huge displacement in these areas and tr groups total 61 villages, and 1406 families are affected by displacement. Total of 1044.436-acre land captures by industrialist for industries and flats of an employee. This study conduct in 31 affected tribal families of 31 villages. This study shows affected fam are leaving their traditional agricultural works because they can't understand the nature of new land structure and because of thi they are in economic trouble. In study area, there are 67.7% family's primary occupations was agriculture and after displacemen there are only 9.7% families engage in agricultural work. There are some other problems also finding out in this study, which are related to fundamental needs. According to affected families, new residences have many fundamental problems, which are prov by government and industrialists. There are no electricity, no regular drinking water resources, satisfied roads and transports are available.

Raigarh district of Chhattisgarh has 14 large and small industries of iron, coal, etc. These industries make huge displacement in these areas and tribal groups total 61 villages, and 1406 families are affected by displacement. Total of 1044.436-acre land capt by industrialist for industries and flats of an employee. This study conduct in 31 affected tribal families of 31villages. This study shows affected families are leaving their traditional agricultural works because they can't understand the nature of new land stru and because of this, they are in economic trouble. In study area, there are 67.7% family's primary occupations was agriculture a after displacement, there are only 9.7% families engage in agricultural work. There are some other problems also finding out in t study, which are related to fundamental needs. According to affected families, new residences have many fundamental problems which are provided by government and industrialists. There are no electricity, no regular drinking water resources, satisfied roads and transports are no available.

Keywords

Development, Displacement, Rehabilitation, Problems of rehabilitation, Tribal groups.

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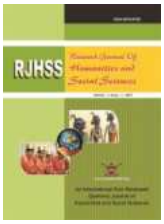

REVIEW ARTICLE

Traditional Political System of Binjhwar Tribe: A Qualitative Research

Shailendra Kumar[1], Ashok Pradhan[2]
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ABSTRACT:
The Bijhwar tribe of Chhattisgarh state is not a Particularly Vulnerable Tribal Group (PVtGs) but their living style is almost followed Particularly Vulnerable Tribal Group (PVtGs). Beachwear tribe is closely related to forest for there all dimensions of life like economy, social-cultural, religious, etc. but in the present era because of modernization, development policies and interaction with non-tribal community they changed in their socio-cultural way. Present research paper is trying to document social-cultural and political dimensions of Bijhwar tribe. The present study is a qualitative study that conducts in Basna blocks of the Mahasamunnd district of Chhattisgarh (India). According to present research paper Bijhwar tribe must follow their political tradition and their political system is directly related to their social-cultural part. But some development policies are affecting their system.

KEYWORDS: Binjhwar tribe, Traditional Political System.

INTRODUCTION:
Binjhwar is a tribal group which is founded in forest area of Chhattisgarh and Madhya Pradesh. Binjhwar tribe has unique culture and cultural traits like art, native knowledge, ethno medicine, etc. like founded in other tribal group. Binjhwar tribe has their own specific social-cultural structure. Binjhwar tribe's culture and society are affected and changed because of industrialization, westernization, urbanization etc. Binjhwar tribe saves their many cultural traits. Present study tried to show the concept of origin of Binjhwar, their social-cultural structure, their political organization and their function, etc. on the base of collecting primary data from fieldwork. Every caste and tribal community have four necessary dimensions for their survival that are economic, socio-cultural, educational (formal and informal) and political. Binjhwar tribe has also above four dimensions in their system, but they followed lots of customary and traditional law for these.

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STUDY AREA AND USED METHODS AND TECHNIQUES:
Binjhwar:
On the basis of life style of Binjhwar tribe we can say Binjhwar tribal cultures and civilization has both taste that are traditional and modern taste. In present era effect of modernization are shown in the whole dimension of their culture, civilization and another dimension. In the present study, whole Binjhwar respondents are divided in two groups, the first groupof older person of Binjhwar which have lots of knowledge about Binjhwar folk-lore, ancient culture elements, origin related tales, etc. and the alive their culture on the basis of the above things and another group is a group of younger Binjhwar, those are effected with the process of modernization and the slowly gone away from their traditional customs.

STUDY AREA AND MTHODS:
Present research work was conducted in the Kalidarha village of basna block, Mahasamund district of Chhattisgarh state. This study was totally based on qualitative methods and their technique like Interview, Case study, Focus group discussion.

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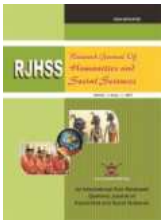

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Isolation and Identification of Novel *Bacillus tequilensis* TB5 from Vegetable Waste and Analyze the Effect of Rudiment Compounds on Bio-Catalytic α-Amylase Production

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Abstract

Amylase is one of the basic components for leather, baking, textiles and paper industries. It hydrolyzes starch into simple productive sugar which reduces the cost of the final desired product. In this work, amylase producing novel Bacillus tequilensis TB5 was isolated from vegetable waste and different chemical compounds were added at different concentration in production medium to analyze its effect on amylase enzyme production. We observed that addition of weight/volume (w/v) of starch 1.5%, yeast extract 1%, ammonium nitrate 0.1%, calcium chloride 0.2% and triton x 100 0.2% in the production medium increases the production of enzyme up to 546.64±0.04 U/ml. Storage time of purified enzyme and activity yield was analysed and found to be 98.4% after 72 h, and reuse efficiency of immobilized enzyme was found to be >90% of efficiency after 5th cycle. Purification fold of enzyme shows increase from 1 to 1.93 and MW of purified enzyme was approximately 53 kDa. Enzyme kinetic studies reveal that the Michaelis constant (Km) was found to be 4.56 mg/ml and the reactions maximum velocity (Vmax) was 23.28 mg/ml/min. In summary, we demonstrate that some rudiment compounds present in production medium play a key role for the enhancement of enzyme production.

Keywords: *α-amylase, enzyme production, Bacillus, media optimization, enzyme kinetics*

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INTRODUCTION

Amylase is the key enzyme for many industries like textile, leather, baking, pharmaceuticals, paper, detergent, etc. It plays an important role to reduce the production cost and increase the quality of the product. Amylase enzyme can be obtained from many sources, like, plants, microbes and from animals. Among them, microbial amylases have enormous applications in various starch based industries [1–6]. The α-amylase enzyme hydrolyzes the starch and converts into simple sugars, glucose, maltose and other mixture of oligosaccharides. Further, α-amylase enzyme acts on α-1,4 glycosidic bonds of starch to form reducing sugar. Presently, the world market for this enzyme is about US$ 2.7 billion and is exponentially increasing with the rate of 4% annually [7]. Amylase covers 65% of enzyme market in the world compared to all other enzymes [8]. Nowadays, mostly amylase enzymes are produced from different *Bacillus* species [9, 10]. Enzyme overproduction can be achieved by media engineering and supplementation of different salts and metal ions, which provide nutrition for good growth of microbes and they produce high amount of enzyme [2]. Therefore, proper optimized medium for the bacterial culture is very important to enhance the production of enzymes [11, 12]. Different carbon sources and other nutrients like organic and inorganic nitrogen sources, and different metal ions are basic needs for the enzyme production. Along with these nutrients, its proper amount is also important for better enzyme production [13–

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Treatment of Oil refinery waste water simultaneously with Bioelectricity production in Mediator-less Microbial Fuel cell using native Gram positive Bacillus sp.

Meshram Reena, Jadhav Shailesh Kumar*
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Online published on 8 August, 2019.

Abstract

Microbial fuel cells standalone effective approach for generating electricity directly from the breakdown of waste organic matter or almost any renewable biomass using diverse metabolic activity of native electrogenic microorganisms. This communication reports effect of various factors on electricity production and efficient treatment of rice bran oil refinery wastewater used as fuel in mediator-less Microbial fuel cells (MFCs). The work represents efficacy of low-cost, simple and easy-to operate microbial fuel cells assisted with isolate WRS-6 for generating electricity to glow LED of 4V using oil refinery wastewater alone; and with combination of starch from cooked rice, sap of rotten fruit, vegetable waste from kitchen for about 10 days.

Top

Keywords

Wastewater treatment, Bioelectricity, electrogenic, Bacillus sp, LED.

Top

Article

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Bioethanol production from *Madhuca latifolia* L. flowers by a newly isolated strain of *Pichia kudriavzevii*

Tripti Agrawal, Afaque Quraishi and Shailesh Kumar Jadhav

Abstract

There is a growing interest worldwide to search new, cheap and non-food biomass source for ethanol production. Bioethanol is a liquid fuel produced from renewable biomass source. In the present study, ethanol production from flowers of *Madhuca latifolia* trees was investigated by yeast strain isolated from milk whey. The isolated yeast was screened for fermentation ability by carbohydrate fermentation test and subjected to fermentation using *M. latifolia* flowers as substrate. The isolated yeast strain was identified as *Pichia kudriavzevii* on the basis of sequencing of D1/D2 domain of rRNA gene through basic local alignment search tool and molecular phylogenetic analysis. Maximum ethanol production, 371 g kg^{-1} from the flowers was achieved via optimizing operational parameters; a fermentation duration of 48 h, temperature 25°C, and pH 5.0. The effect of nitrogen supplements, enzymatic treatment and co-culture on bioethanol production with the optimized conditions revealed that the optimal condition could produce maximum ethanol without any supplementation or treatment. Co-culturing of *P. kudriavzevii* strain with *Pichia stipitis* NCIM 3497 was able to enhance ethanol production. The present study provides baseline information for further scale up of bioethanol production process on industrial level using *M. latifolia* flowers as a cheap and non-food biomass source.

Keywords

Biofuel, biomass, fermentation, yeast, co-culture

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Bioethanol Production from an Agrowaste, Deoiled Rice Bran by *Saccharomyces cerevisiae* MTCC 4780 via Optimization of Fermentation Parameters

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Abstract

Rising fuel prices and declining fossil fuel reserves have compelled to search cheap sources of energy as biofuels. Biofuels like bioethanol reduce reliance on imported petroleum and decrease greenhouse gas emissions. Owing to depleting convention fuel reserves, there is global emphasis on ethanol production by microbial fermentation process. To ensure food security, bioethanol production from biomass which does not compete directly with food, is required. In this perspective, Deoiled rice bran (DORB), an agrowaste product represents a renewable and cheap non-food biomass resource. The present work was emphasized on ethanol production from DORB hydrolysate by *Saccharomyces cerevisiae* MTCC 4780 under optimized fermentation condition by specific gravity method. The result revealed maximum ethanol production of 9.68% at temperature 30°C, fermentation duration of 48 h and pH 6. To the best of our knowledge, this is the first report on ethanol production from deoiled rice bran by yeast *Saccharomyces cerevisiae* MTCC 4780.

Keywords: Agro waste; Biofuel; Biomass; Fermentation; Deoiled rice bran

1. Introduction

The growing demand of bioethanol as an alternative form of fuel has created considerable interest due to the occurrence of global warming predominantly by the combustion of fossil fuels. Bioethanol, the principal fuel used as a conventional gasoline substitute for road transport is mainly produced by the sugar fermentation process. It is a clear colourless liquid, biodegradable, low toxic and causes lesser environmental pollution upon burning due to its high octane number (Schubert, 2006; Chandel *et al*., 2007a). Blending of ethanol with gasoline makes the fuel mixture more oxygenated and leads to complete combustion (Wyman, 1996; Chandel *et al*., 2007b). To meet the current demand of fuel, cheap substrates accompanied with efficient process technology are needed for efficient ethanol production. Current ethanol production processes involves food crops such as sugarcane juice and maize grains for bioethanol production but these substrates are not recommended due to crisis of falling global food stocks and fuel vs food conflict. In this perspective, lignocellulosic feedstock may prove as cheap substrate for ethanol production. Lignocellulosic feedstock such as agro crop residues, fruit and vegetable waste, weeds and forest waste is available in abundance and are cheap sources of fermentable sugars (Lin and Tanaka, 2006; Lynd *et al*., 2005). Rice is an agricultural

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Melatonin, glutathione and thiourea attenuates lead and acid rain-induced deleterious responses by regulating gene expression of antioxidants in *Trigonella foenum graecum* L.

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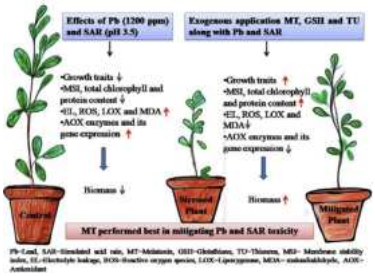
HIGHLIGHTS

- Lead and SAR caused reduced growth, MSI, chlorophyll, and enhanced leakage loss.
- Applied treatments triggered higher ROS, LOX and MDA, and lowering of protein.
- Exogenous MT, GSH and TU improved growth and decreased cytotoxic ROS, LOX and MDA.
- MT, GSH and TU provided stress resistance *via* up-expression of SOD and CAT genes.
- MT was more effective in attenuation of stress responses than the GSH and TU.

GRAPHICAL ABSTRACT



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ABSTRACT

Lead and acid rain are important abiotic stress factors that limit the growth, development, metabolic activity and yield of the crops. Melatonin (MT; an indoleamine molecule), glutathione (GSH; free thiol tripeptide) and thiourea (TU; non physiological thiol based ROS scavenger) have been known to mediate several physiological, biochemical and molecular processes in plants under different kinds of environmental threats. However, the roles of MT, GSH and TU in stress tolerance against combined effect of lead and simulated acid rain (SAR) remains inexpressible. In this study, we investigated the response of *Trigonella foenum graecum* L. (Fenugreek) to combined application of lead (1200 ppm) and SAR (pH 3.5), and the potential roles of MT (50 μM), GSH (1 mM) and TU (3 mM) in enhancing lead and SAR stress tolerance of Fenugreek. The results showed that co-application of each MT, GSH and TU along with lead and SAR improved the growth and development of seedlings. Moreover, MT, GSH and TU treatments stabilized the cell membrane integrity, reduced ROS accumulation [superoxide radical ($O_2^{\bullet-}$) and hydrogen peroxide (H_2O_2)], malondialdehyde (MDA) content, lipoxygenase (LOX) activity and, enhanced protein accumulation and up-regulated the gene expressions of catalase (CAT) and superoxide dismutase (SOD) significantly. Furthermore, the present work provides strong evidence regarding protective roles of MT, GSH and TU against oxidative stress resulted from lead and SAR stress in Fenugreek. Considering these observations, MT, GSH and TU can be utilized as efficient ROS scavengers, for improving growth and increasing antioxidant capacity in lead and SAR stressed seedlings.

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ORIGINAL PAPER

Dimethylthiourea antagonizes oxidative responses by up-regulating expressions of pyrroline-5-carboxylate synthetase and antioxidant genes under arsenic stress

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Abstract
Dimethylthiourea is an important plant growth regulator that mediates various physiological and metabolic processes of the plants. In the present study, role of dimethylthiourea in conferring arsenic stress tolerance to *Cajanus cajan* L. was investigated. Exposure to arsenic resulted in oxidative damage as evidenced by decreased germination percentage, radicle length, biomass accumulation, membrane stability index, protein, glyoxalase I and II, and antioxidants, together with enhanced cell death, reactive oxygen species, lipid peroxidation and activity of lipoxygenase in *C. cajan* L. However, exogenous application of dimethylthiourea along with arsenic decreased the reactive oxygen species and lipoxygenase activity, while increased the membrane stability index and antioxidants activities. Moreover, dimethylthiourea also up-regulated the glyoxalase (I and II) activity and the gene expression of antioxidants under arsenic stress. Also, dimethylthiourea application reduced the arsenic content than that measured in arsenic alone treated samples. Interestingly, treatment of dimethylthiourea uplifted the contents of ascorbic acid and glutathione, together with proline via up-regulating the activity and gene expression of pyrroline-5-carboxylate synthetase, one of the chief enzymes of its biosynthetic pathway. Enlisted findings suggested that dimethylthiourea can improve plant resistance to arsenic toxicity by regulating the gene expression of antioxidants and proline biosynthesizing enzymes, thereby reducing reactive oxygen species, lipid peroxidation and arsenic accumulation.

Keywords *Cajanus cajan* L. · Cell death · Gene expression · Glyoxalase system · Lipoxygenase · Proline · Reactive oxygen species

Introduction

Contamination of arsenic (As) in soil and groundwater has become an environmental concern as it possesses serious threats to living systems (Abbas et al. 2018). Plants growing in contaminated soil or irrigated with polluted water accumulates excess amount of As that results in oxidative stress. Accumulation of As leads to various morphological, physiological and biochemical disorders including reduced seed germination and biomass, stunted growth, reductions in the number of leaves and leaf area thereby pace of photosynthesis, stomatal conductance, rate of transpiration, ATP synthesis, mineral contents, flow of energy and yield responses (Talukdar 2014; Kumari et al. 2018).

Although As is a non-redox metalloid, its exposure provokes generation of reactive oxygen species (ROS) including superoxide ($O_2^{\cdot-}$), hydroxyl radical, hydrogen peroxide (H_2O_2), etc. (Anjum et al. 2016). Under stress condition, another cytotoxic compound, i.e., methylglyoxal (MG) is produced (Hasanuzzaman and Fujita 2013). These ROS and MG are highly reactive and well known to oxidize membrane lipids and proteins. Also, the lipids are peroxidized enzymatically by lipoxygenase (LOX) (Yadu et al. 2017a). This unrestrained deterioration of macromolecules via ROS and their catabolic enzymes leads to cellular damage and cell death eventually (Xalxo and Keshavkant 2017).

To get rid of this deleterious ROS, plant cells are armed with defensive machinery comprising enzymatic {superoxide dismutase (SOD), catalase (CAT), etc.}

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The potential of ROS inhibitors and hydrated storage in improving the storability of recalcitrant *Madhuca latifolia* seeds

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Abstract

The storage of recalcitrant seeds represents a challenge globally, threatening the germplasm conservation of many economically important tropical and sub-tropical species. This study investigated whether inhibitors of reactive oxygen species (ROS), diphenyleneiodonium (DPI) and dimethyl thiourea (DMTU), and hydrated storage can enhance the storability of *Madhuca latifolia* seeds. Treatment of *M. latifolia* seeds with varied concentrations of DPI and DMTU solutions revealed 150 µM and 3000 µM to be ideal concentrations, respectively. Soaking seeds in aqueous solutions of DPI and DMTU, and MilliQ water (MW; control) increased seed water content (WC), so seeds were initially dried back to their original WC, before hydrated storage at 25 and 16°C. A decline in germination (37%) and WC (42%) was observed after 69 days of hydrated storage at 25°C, and complete loss of viability after 120 days. A 50% decline in germination was recorded after just 19 days of hydrated storage at 16°C which is possibly indicative of sensitivity to low temperatures. Even though WC did not decline significantly at 16°C over the entire storage period, all viability was lost after 90 days. The ROS inhibitors did not extend storage lifespan relative to the control but reduced the rate of *in situ* germination during storage, without compromising viability. Hydrated storage at 25°C, coupled with pre-treatment with ROS inhibitors, is recommended for the short- to medium-term storage of *M. latifolia* seeds.

Keywords: desiccation, germination, *Madhuca latifolia*, seed longevity, viability, vigour, water content

Introduction

Seed storage behaviour has been categorised as orthodox and recalcitrant, based on the capacity of seeds to withstand desiccation, *i.e.* tolerant and sensitive, respectively. Recalcitrant seeds do not undergo maturation drying, remaining metabolically active throughout development, and are often sensitive to low temperatures (Walters *et al*., 2013). Even mild dehydration affects recalcitrant seed viability adversely, largely through deteriorative processes mediated by reactive oxygen species (ROS) (Berjak and Pammenter, 2013). In light of this, such seeds cannot be stored under conventional (orthodox) seed

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RESEARCH PAPER

Characterization of arsenic resistant plant-growth promoting indigenous soil bacteria isolated from Center-East regions of India

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Abstract

A total of 45 morphologically distinct arsenic (As)-resistant bacterial strains were isolated from the soils of different regions of Chhattisgarh, India. The minimum inhibitory concentration (MIC) values of these isolates varied widely in the range of 100-500 mM for arsenate [As(V)] and 15-30 mM for arsenite [As(III)]. Out of forty-five, three isolates viz; ARP3, ARRP3, and ADT5 also revealed plant growth-promoting properties, including phosphate solubilization and production of siderophores, indoleacetic acid, ammonia, and exopolysaccharide. Besides all these, the strains not only exhibited significant growth in the presence of As(V)/As(III) but also displayed higher efficiency (87%-94%) of As removal from the growth medium followed by intracellular accumulation (17-19 mg As/g). Hydride generation atomic absorption spectroscopic (HG-AAS) analysis revealed the intracellular accumulation of As, and the structural changes that took place in these isolates were further confirmed by microscopic studies. The 16 S rRNA and phylogenetic analyses unveiled that the isolates ARP3, ARRP3, and ADT5 belonged to genera *Pseudomonas, Exiguobaterium*, and *Microbacterium*, respectively. The conducted study suggested that such beneficial bacterial strains could be conveniently exploited at a commercial level for enhancing plant growth in As-contaminated agricultural fields, thereby improved productivity and enhanced bioremediation of soil having alarming strength of As.

KEYWORDS

arsenic, arsenic removal, bioaccumulation, plant growth promoting bacteria

1 | INTRODUCTION

Arsenic (As) is a ubiquitous toxic metalloid and known human carcinogen which conflicts with the complex cellular processes [1]. It is widely distributed within the terrestrial and subsurface ecosystems through natural geochemical and anthropogenic activities [2], affecting the health of millions of people worldwide. Arsenate [As(V), $H_2AsO_4^-$, and $HAsO_4^{2-}$] and arsenite [As(III), $H_3AsO_3^-$] are the two predominant forms of As, having different magnitudes of toxicity to the living systems. Contamination of As in various ecosystems have crossed boundaries of a number of countries, including India [3]; signifying an immediate consideration for the development of dynamic and cost-effective procedures to tackle this problem.

Research & Reviews: A Journal of Life Sciences (RRJoLS)
1368

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In vitro Antiviral Chemical Treatment to BBTV-Infected Banana Cultures for Production of Virus-Free Plants

Afaque Quraishi, Vikram Singh, Vijaya Koche

Abstract

Obtaining healthy plants from infected germplasm banana stocks is a major problem. Banana bunchy top virus (BBTV) is the most destructive pathogen for the banana crop. Production of virus-free plants is crucial for cultivation, germplasm conservation and their exchanges. In vitro shoot meristem culture is the most common method for producing disease-free planting material. However, BBTV can multiply with in vitro cultures too. Therefore, for eliminating BBTV, the shoot-tip culture was combined with exposure of antiviral drugs. For the purpose, viral infected cultures of Musa acuminata cv 'Grand Naine' were exposed to culture medium containing- ribavirin, acyclovir or adefovir for four weeks at different concentrations. Viral elimination was determined by amplification of viral-gene through a polymerase chain reaction (PCR). Only ribavirin was found effective in eliminating BBTV from banana cultures, to some extent, with sufficient survival rates.

Keywords: Banana bunchy top virus (BBTV), chemotherapy, Musa, ribavirin, adefovir

Cite this Article
Singh V, Koche V, Quraishi A. In vitro antiviral chemical treatment to BBTV-infected banana cultures for production of virus-free plants. Research & Reviews: A Journal of Life Sciences. 2019; 9(3): 28–33p.

Keywords

Banana bunchy top virus; chemotherapy; Musa; ribavirin; adefovir; acylovir

Full Text:

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RESEARCH ARTICLE

Exploring the Efficiency of Native Tree Species Grown at Mine Tailings for Phytoextraction of Lead and Iron

Inderpal Kaur[1] · Sayali Khandwekar[1] · Ravishankar Chauhan[1] · Vikram Singh[2] · S. K. Jadhav[1] · K. L. Tiwari[1] · Afaque Quraishi[1]

Received: 15 December 2017 / Revised: 14 May 2018 / Accepted: 5 July 2018 / Published online: 10 July 2018

Abstract Four (4) prominently growing tropical tree species were screened for their tolerance to heavy metals and evaluated for their suitability for remediation, at a contaminated site. The partitioning of Iron (Fe) and Lead (Pb) between roots and above-ground aerial parts of the trees, bioconcentration factor (BCF) and translocation factor (TF) were used to determine the remediation potential of the studied trees. *Ficus racemosa* recorded the highest BCF for both the metals, Fe and Pb. The maximum TF was recorded in *T. arjuna* for Fe and *F. racemosa* had the highest TF value for Pb. The recorded BCF and TF values suggested that these tropical tree species can be classified as efficient metal trappers for Fe and Pb. The Pb accumulation was much higher in all the four (4) tree species than the described limit for a Pb-hyperaccumulator (0.1%), revealing the hyperaccumulator potency of all the screened trees.

Keywords *Dalbergia sissoo* · *Ficus racemosa* · *Pithecellobium dulce* · Phytoremediation · *Terminalia arjuna*

Significance statement In the current manuscript, *Ficus racemosa* and *Terminalia arjuna* have shown their potential for remediation of lead and iron, respectively and accumulate the respective heavy metal more than the set standards for hyperaccumulator species.

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Introduction

Environmental contamination caused by heavy metals (HMs), is a ubiquitous problem in industrial societies. In any ecosystem, HMs persist in the soil for a much longer time than the other essential components [1]. The reasons for soil contamination due to HMs include metalliferous mining and smelting metallurgical industries, sewage sludge treatment, and waste disposal sites [2]. HMs such as Cadmium (Cd), Lead (Pb), Magnesium (Mn) and Zinc (Zn) are well-known contaminants obtained from mining, which adversely affect the soils [3]. When HMs exceed certain concentrations, they become toxic [4], and pose serious health hazards to humans and animals [5].

HM deposits and minerals such as Alumina, Dolomite and Pyrite are found in the central part of India; including the state of Chhattisgarh [6]. Chhattisgarh also has several thermal power plants for energy production and heavy industries such as steel, aluminum and cement plants that lead to the increased deposition of Pb and other metals into the environment [6]. The district of Raigarh in Chhattisgarh is a center for sponge iron production industries with 22 sponge iron industries in operation and some more units coming up. Other than these industries, a big iron-steel factory, for the last 67 years, has been the mainstay of Bhilai.

Restoring degraded soil in any metal- mined land involves the deployment of many chemical, physical and biological techniques [7]. Phytoremediation, using hyperaccumulator plants, is one of these techniques. It is a practical, economical and environment-friendly way of metal remediation [8]. Due to their ability of growing in soils with very high concentrations of metals, hyperaccumulator plants play a significant role in remediation [9]. Reports suggest that only a few temperate trees such as

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RESEARCH ARTICLE

Exploring the Efficiency of Native Tree Species Grown at Mine Tailings for Phytoextraction of Lead and Iron

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ORIGINAL PAPER

Screening of plant growth promoting attributes and arsenic remediation efficacy of bacteria isolated from agricultural soils of Chhattisgarh

Neha Pandey[1,2,3] · Kiragandur Manjunath[2] · Keshavkant Sahu[1]

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Abstract

Arsenic (As) resistant indigenous bacteria with discrete minimum inhibitory concentration values for arsenate [As(V)] and arsenite [As(III)] were isolated from the paddy fields of different regions of Chhattisgarh, India, following enrichment culture technique. Evaluation of the plant growth promoting (PGP) properties of the isolates revealed that two rod-shaped Gram-positive bacteria viz., ARP2 and ART2 acquired various PGP traits, including phosphate solubilization, production of siderophore, indole acetic acid, ammonia, and exopolysaccharide. Both the isolates significantly increased (40–80%) the root length of *Oryza sativa* L. even under As-exposure. Sequencing of 16S rRNA gene identified these isolates as *Bacillus nealsonii* strain ARP2 and *Bacillus tequilensis* strain ART2, respectively. Isolate ARP2 exhibited arsenate reductase activity thereby rapidly reduced As(V) into As(III), achieving a reduction rate of 37.5 µM min^{-1}. Alike, strain ART2 was capable of oxidizing As(III) into As(V) via arsenite oxidase enzyme, and revealed the oxidation rate of 21.8 µM min^{-1}. Quantitative estimation of As through atomic absorption spectrophotometer revealed that the isolates ARP2 and ART2 removed 93 ± 0.2% and 77 ± 0.14% of As(V) and As(III), respectively, from As-containing culture media. The FTIR analysis showed the interaction of As with the cell membrane and was further confirmed by SEM and TEM techniques, which marked the increase in cell volume owing to successive accumulation of As. The As-resistant and PGP properties of above two isolates demonstrates their potentiality for sustainable bioremediation of As, and establishment of flora in As-rich environment.

Keywords Arsenic resistant bacteria · Arsenite · Arsenate · Oxidation · Plant growth promotion · Bioremediation

Introduction

Arsenic (As) is a metalloid, naturally present in the Earth's crust and is identified as one of the most ruinous threat demanding immediate attention. Environmental contamination of As has gathered worldwide concern due to its many documented menacing effects on almost all the living organisms (Mandal and Suzuki 2002). Arsenic is introduced into the ecosystems through natural- and anthropogenic activities, making its ways to the food chain (Garelick et al. 2008). Several noxious forms of As have been reported, but the inorganic trivalent arsenite [AsO_2^-/As (III)] and the pentavalent arsenate [AsO_4^{-3}/As (V)] are the most prevalent ones (Ascar et al. 2008). Other than the humans and animals, As also extends its deleterious effects on plants by inactivating enzymes and altering metabolic pathways. Once taken up by the cells, both As(V) and As(III) severely inhibit growth by slowing, arresting or disrupting plants metabolism along with impairing reproductive capacity and leading to the loss in production and yield (Zhao et al. 2009).

The toxic properties of As is not only limited to higher life forms but are also conveyed to the lower organisms like microbes (Abbas et al. 2015). This metalloid is known to deliver a number of lethal- and mutagenic effects on variety of microorganisms, nevertheless, they have acquired modes to undermine its toxic effects (Naureen and Rehman

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Alkamides: Multifunctional Bioactive Agents in *Spilanthes* spp.

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Abstract: **Plant bioactives have always been a source of many valuable medicines. Alkamides are a class of pseudoalkalloidbioactives that are distributed among 33 medicinal plant families including Asteraceae (Compositeae). Genus *Spilanthes*ofAsteraceae family is a storehouse of various potent alkamides. Spilanthol is considered as a key compound with its maximum concentration in the flower heads. Alkamides are pungent in taste and show analgesic and anaesthetic properties. These have been reported to exhibit significant larvicidal/insecticidal, antimicrobial, aphrodisiac, antimutagenic, anti-inflammatory and immune-enhancing pharmacological activities. Also, transdermal and transmucosalbehaviour of spilanthol has been well documented. Therefore, alkamide content make this genus a promising medicinal plant with several biological and pharmacological activities. Thus, this review presents an overview of different alkamides in *Spilanthes* with an emphasis on their properties, distribution, pharmacological aspects and mode of administration.**

Index Terms: **Alkamide, Anti-inflammatory, Asteraceae, Bioactive, Insecticidal, Spilanthol.**

I. INTRODUCTION

Medicinal plants have been a source of powerful bioactive agents since time immemorial virtually in all cultures and have provided valuable drugs such as analgesics (morphine), antitussives (codeine), antihypertensives (reserpine), cardiotonics (digoxin), antineoplastics (vinblastine and taxol) and antimalarials (quinine and artemisinin) (Ramawat*et al*., 2009). There are about 2, 50,000 higher plant species on the earth, out of which more than 80,000 are found to possess medicinal value. But due to the lack of proper documentation and scientific validation only a small proportion of the plants are used for their medicinal values (Balunas&Kinghorn, 2005). However, the recent past has witnessed a tremendous revival of interest in the use of medicinal plant products due to the various drawbacks associated with synthetic medicines. Hence, there is a need to review the valuable knowledge regarding medicinal plants with proper investigation of bioactive compounds and their properties.

Plant bioactives are the secondary products of primary metabolism representing an important source of active pharmaceuticals. These have been defined as chemicals that do not appear to have a vital biochemical role in the process of building and maintaining plant cells but apparently function as defence (against herbivores, microbes, viruses or competing plants) and signal compounds (to attract pollinating or seed dispersing animals) (Beran*et al*., 2019; Briskin, 2000; Kaufman *et al*., 1999; Wink &Schimmer, 1999). Such secondary products involved in plant defence through cytotoxicity towards microbial and insect pathogens could prove useful as antimicrobials and insecticidals for human benefits (Benelli*et al*., 2018).

One highly promising class of secondary compounds i.e 'Alkamides' form active constituent of many plant families. Genus *Spilanthes*(Asteraceae)popularly known as Toothache Plant has been found as a storehouse of alkamides. Out of 60 species of the genus scattered all over the tropical areas of the globe (Jansen, 1981), six species *S. acmella*Murr. (syn. *Acmellaciliata*), *S. acmella* L. var. *oleraceae*(syn. *AcmellaoleraceaeL.*), *S. calva* L., *S. paniculata* and *S. mauritiana* L. have been accounted from Chhattisgarh (Tiwari*et al*., 2011), Jharkhand (CSIR, 1989) and Rajasthan regions (Sharma *et al*., 2010) of India. The genus *Spilanthes* has been reported to possess erect or prostrate stems, triangular, dentate and opposite leaves. Flowers grow solitary with long peduncle and have yellow florets with dark red spot in the centre (Tiwari*et al*., 2011).

Out of the severalphytochemicalsreported from *Spilanthes*, alkamides have been considered to be responsible for most of its medicinal properties so far. Presently, alkamide containing extracts of *Spilanthes* are commercially sold as dietary supplements, powerful antiseptics (Dentaforcemouthspray&

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Alkamides: Multifunctional Bioactive Agents in *Spilanthes* spp.

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Abstract: **Plant bioactives have always been a source of many valuable medicines. Alkamides are a class of pseudoalkalloidbioactives that are distributed among 33 medicinal plant families including Asteraceae (Compositeae). Genus *Spilanthes*ofAsteraceae family is a storehouse of various potent alkamides. Spilanthol is considered as a key compound with its maximum concentration in the flower heads. Alkamides are pungent in taste and show analgesic and anaesthetic properties. These have been reported to exhibit significant larvicidal/insecticidal, antimicrobial, aphrodisiac, antimutagenic, anti-inflammatory and immune-enhancing pharmacological activities. Also, transdermal and transmucosalbehaviour of spilanthol has been well documented. Therefore, alkamide content make this genus a promising medicinal plant with several biological and pharmacological activities. Thus, this review presents an overview of different alkamides in *Spilanthes* with an emphasis on their properties, distribution, pharmacological aspects and mode of administration.**

Index Terms: **Alkamide, Anti-inflammatory, Asteraceae, Bioactive, Insecticidal, Spilanthol.**

I. INTRODUCTION

Medicinal plants have been a source of powerful bioactive agents since time immemorial virtually in all cultures and have provided valuable drugs such as analgesics (morphine), antitussives (codeine), antihypertensives (reserpine), cardiotonics (digoxin), antineoplastics (vinblastine and taxol) and antimalarials (quinine and artemisinin) (Ramawat*et al*., 2009). There are about 2, 50,000 higher plant species on the earth, out of which more than 80,000 are found to possess medicinal value. But due to the lack of proper documentation and scientific validation only a small proportion of the plants are used for their medicinal values (Balunas&Kinghorn, 2005). However, the recent past has witnessed a tremendous revival of interest in the use of medicinal plant products due to the various drawbacks associated with synthetic medicines. Hence, there is a need to review the valuable knowledge regarding medicinal plants with proper investigation of bioactive compounds and their properties.

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SHORT COMMUNICATION

Ferret out a Natural Bio-Pesticide: *Ophicordyceps nutans* in Central India and Its Interaction Analysis with Tree Stink Bug

Jai Shankar Paul[1] · S. K. Jadhav[1,2] · Afaque Quraishi[1,2] · M. L. Naik[2]

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Abstract *Ophicordyceps* is a genus of fungi that grow on insects. In this paper we report for the first time the occurrence of *Ophicordyceps nutans* Pat. a species belonging to this entomopathogenic fungi group in Kanger Valley National Park in Bastar District of Chhattisgarh in Central India. The fruiting body or ascocarp of *O. nutans* was found in *Halyomorpha halys*, brown marmorated stink bug—an insect pest. The study highlighted the impact of *O. nutans* on the host insect and the damage it causes in trees and crops. The local people use this fungus in traditional medicine as an immune stimulator and also as a pest-control agent to protect crop and tree from stink bug. Therefore, it appears that *O. nutans* possesses great potential to be developed as natural medicine and bio-pesticide to save the agricultural crops and forest trees.

Keywords *Ophicordyceps nutans* · Entomoparasitic fungi · *Halyomorpha halys* · Bio-pesticide · Stink bug

Introduction

Ophicordyceps are well known parasitic fungi belonging to the ascomycetes group. *Ophicordyceps* sp. are the natural insecticides. They are entomoparasitic in nature. They grow up from different host insects and kill them (Hywel-Jones 1995; Sasaki et al. 2004; Friedrich et al. 2018; Luangsa-ard et al. 2018). *Ophicordyceps* sp. holds immense potential to be used as a biological pest control agent (Sasaki et al. 2008; Friedrich et al. 2018). There are several species of *Ophicordyceps* fungi (*Ophicordyceps sinensis*, *O. forquignonii, O. gracilis, O. militaris, O. coccinea*, etc.) having different medicinal properties (Sasaki et al. 2005). In China, *Ophicordyceps* sp. is traditionally used as medicine in a number of diseases (Hywel-Jones 1995). *Ophicordyceps nutans* Pat. is one of the fungal species, which is parasitic to stink bug insect, belongs to Order of Hemiptera (Karun and Sridhar, 2013). *O. nutans* are host-specific fungi that parasitize stink bug tree sap succulent insect *Halyomorpha halys* which damages several forest trees and agricultural crops. The fungi infect the insect and complete their life cycle in them. In the process, they extract precious nutrition from the insects that ultimately results in death of the insect. The fungal infection in *H. halys* is visible when the fruiting body is developed. In general, the infection spreads when the insects come in contact with each other. In addition, the fungal spores spread in the surrounding after death and degradation of the insect (Sasaki et al. 2008; Friedrich et al. 2018). *O. nutans* fungus has been reported from several Asian countries including Japan, China, New Guinea, Thailand, Taiwan, Nepal and Korea (Hywel-Jones 1995; Sasaki et al. 2004, 2012; Shrestha 2011; Luangsa-ard et al. 2018). In India, it is only found in the Western Ghat region (Karun and Sridhar 2013). However, there are very few studies on *O. nutans* with regards to its structure, behaviour, habitat mode of action, and interaction with host insect. Besides its entomopathogenic nature, the fungus is known to possess several medicinal and bio pesticide properties (Sridhar and Karun 2017; Wen et al. 2017) that warrants further investigation. Against this backdrop, we report for the first time the presence of *Ophicordyceps*

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SHORT COMMUNICATION

Ferret out a Natural Bio-Pesticide: *Ophicordyceps nutans* in Central India and Its Interaction Analysis with Tree Stink Bug

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Introduction

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Airborne *Aspergillus* at some rural areas adjoining to Raipur city (C.G.) India

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ABSTRACT

Increased urbanization and industrialization in recent time has made a significant impact on air quality of the area. The atmosphere is rich in propagule of different fungal species. The investigation on airborne *Aspergillus* contribution was conducted in Periphery of Raipur city from February, 2018 to March, 2019 with the help of gravity petriplate containing PDA (Potato Dextrose Agar) medium. In this study, total 11 species of *Aspergillus* were recorded. The percentage frequency and percentage contribution of different *Aspergillus* species were different in different seasons. *Aspergillus niger* was most frequent throughout the year followed by *Aspergillus fumigatus*, *A. flavus*, and *A. nidulans* etc. While *Aspergillus clavatus*, and *A. versicolor*, *A. aculeatus* were the least frequent species. The result indicated the highest percentage contribution of *Aspergillus niger* (43.29 percent) followed by *A. fumigatus* (9.02percent), *A. flavus* (8.42 percent) while *A. clavatus* (0.21 percent). The objective of the studies was to determine a seasonal variation in concentrations of *Aspergillus* on the basis of meteorological parameters.

Figure : 00 References : 12 Table : 01
KEY WORDS: Airborne, *Aspergillus*, Raipur city, Rural Area.

Introduction

Fungal spores constitute a major component of air-spora. Qualitative and quantitative variations depend on the meterological factors and geographical conditions. Fungal spores that are transported by air currents cause many plant diseases and knowledge of their periodicity is of great value in terms of predicting plant epidemics. *Aspergillus* is a universal fungus. The great majority of species are saprophytes, commonly or occasionally found in soil, decaying vegetation, seeds and grains. The aim of present work was to analyse the behaviour of *Aspergillus* spore type at some rural areas adjoining to Raipur city and to study the relationship between the fungal spore levels and the main environmental factors.

Materials and Methods

In present study, four different sites were selected for sampling Aeromycoflora Chandanidih, Zora, Boriakala, Dhaneli, Baronda, and Dumartarai. The study was carried out during March 2018 to February 2019. The culture plate exposure method was adopted for trapping the mycoflora. PDA (Potato, Dextrose and Agar) was used as culture medium. 10 ml of sterilized PDA medium was aseptically poured in petriplates and allowed to solidify. Five petriplates containing potato dextrose agar (PDA) medium were exposed in the air for 5-10 minutes at 1 meter above the ground level at the above-mentioned sites. The study was conducted at interval of 15 days in every month. The exposed petridishes were sealed and brought to the laboratory and incubated for 3 to 6 days at 26 ± 1°C. After incubation fungal colonies were counted, isolated and identified with the help of literature[1,2]. The results were recorded separately for different sites / season. Percentage frequency and percentage contribution of the fungal flora will be calculated with the help of following formula[8]: -

% Contribution = Total No. of colonies of species in all the observations taken together / Total no. of colonies of all species X 100

Result and Discussion

The investigation of airborne *Aspergillus* concentration was conducted at some rural areas of adjoining to Raipur city, 2019. During present study 377 fungal colonies of 11 species of *Aspergillus* were recorded (Table -1).

DIVERSITY OF SOIL AND LEAF SURFACE MYCOFLORA: A SOURCE OF AEROMYCOFLORA

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Microorganisms are introduced into the air from various sources. The important sources of these microorganisms are soil and vegetation of that area. Microorganisms, which are found on plants' surface either as pathogens or as saprophytes, also get suspended in the air. Man-made actions like digging or ploughing the soil may also release soil-borne microbes into the air. The surrounding atmosphere plays an important role as the sources of organisms in the experimental area. The studies were carried out from February 2006 to March 2007. In the present study, aeromycoflora, mycoflora were observed from soil and plant near the experimental sites as their sources. The Potato Dextrose Agar medium containing plates were used for the isolation of mycoflora from their sources around the Panabaras of Rajnandgaon district. During the present study, a total of 22 fungal species of 120 fungal colonies belonging to 14 genera were reported from the soil. While 24 fungal species of 166 fungal colonies belonging to 16 genera were isolated from the leaf surface. *Aspergillus fumigatus* (10.00%) showed the maximum percentage contribution, followed by *Fusarium oxysporium* and *Khuskia oryzae* (8.33%), *Aspergillus japonicas and Paecilomyces variotii* (7.5%) and *Alternaria radicina, Penicillium notatum* (5.83%) in the soil mycolfora. It is also shown that *Cladosporium cladosporioides* (11.44%) followed by *Aspergillus niger* (9.63%), A. fumigates (6.62%), *Monodictys fluctuata* (6.02%), *Curvularia lunata* (5.42%) and *Aspergillus fumigatus* (4.81%) were the most contributed to leaf surface mycoflora.

Key Words: Fungal diversity, aeromycoflora, sources, soil, leaf surface.

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INTRODUCTION

Fungi are very successful inhabitants of soil due to their high plasticity and their capacity to adopt various forms in response to adverse or unfavorable conditions[1]. The diversity and activity of fungi are regulated by multiple biotic (plants and other organisms) and abiotic (soil pH, moisture, salinity, structure, and temperature) factors[2,3]. Fungi can be found in almost every environment and can live in a wide range of pH and temperature[4]. Fungal populations are strongly influenced by the diversity and composition of the plant community and in return, affect plant growth through mutualism, pathogenicity, and their effect on nutrient availability and cycling[5-7]. The contribution of soil organisms is very significant in many soil functions such as supporting the growth of plants, absorbing, neutralizing and transforming compounds that might otherwise become pollutants in the environment. Soil is a complex habitat for microbial growth and these microbes generally exist as micro-colonies or biofilms on mineral particles, organic matter, and roots. Currently, microorganisms are exploited to get valuable products that include enzymes, secondary metabolites, therapeutic agents and industrial products. Such potential microorganisms are usually isolated from the soil sample. Among such microbes, filamentous fungi dominate our globe as sources of food, plant and animal pathogens, and other worthy products' bio-synthesis.

The phylloplane, the surface of plant leaves, is a complex terrestrial habitat, characterized by a variety of microorganisms, including bacteria, filamentous fungi and yeast. Pathogens, saprobes and epiphytes occur in

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SEASONAL DISTRIBUTION OF AIRBORNE FUNGI AT THE PERIPHERY OF RAIPUR CITY, CHHATTISGARH, INDIA

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Raipur is the capital city of Chhattisgarh state. The city is located centrally in the state of Chhattisgarh. Fungal spores are widely distributed all over the world, which constitute the major component of the air-borne microflora. Various environmental factors affect the distribution of fungi in a particular area. Occurrence and the type of fungal species change with the season and geographical location. Seasonal variation affects the distribution of fungi in a particular area. To investigate this fact, a Survey of air-borne fungi was carried out from March 2018 to February 2019 by using the Gravity petri-plates method containing PDA (Potato Dextrose Agar) medium. The study recorded a total of 35 fungal species belonging to 14 fungal genera. The dominant species noted were *Aspergillus niger, A. flavus, A. fumigatus, A. oryzae, Alternaria alternata, Cladosporium* sp. *Curvularia lunata, Fusarium* sp. and *Phoma pomorum*. It was observed that medical and phytopathological consequences are associated with fungal spores. In that respect, study elucidated the distribution and occurrence of air-borne fungi during the year 2018-2019 at the periphery of Raipur city.

Key Words: Airborne fungi, Seasonal distribution, Phytopathological, Fungal spores.

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INTRODUCTION

Raipur is the capital city of Chhattisgarh state in India. It is situated between 22° 33'N to 21° 14'N Latitude and 82° 6' to 81° 38'E Longitude. The city is located centrally in the state of Chhattisgarh, and now serves as a regional hub for trade and commerce for a variety of local agricultural and forest products. Increased urbanization and industrialization in recent time has made a significant impact on air quality of the area. Seasonal variation affects aero-mycoflora of the area. The microbial population of the atmosphere at any place constitutes its aero-spora. Fungal spores are not equally distributed in the environment; their distribution varies according to geographical location and metrological conditions. The concentration of airborne fungal spores has been linked to wind, humidity, temperature, rainfall, altitude, vegetation and various specific reservoirs of contamination. Also, fungal propagative units may be dispersed in the air by insects[1]. Fungal spores are part of air quality depending on the time of the day, weather, season, climatic conditions, and local source of spores[2]. Based on the microbiological analysis of air samples from inhabited areas, it was reported that airborne fungi are among the most common organisms correlated with the air pollution that have adverse effects on human health as well as causing plant diseases. In light of the above knowledge, the present investigation on airborne fungal flora is essential to understand the deposition and dissemination of fungal spores at the periphery of Raipur city.

MATERIALS AND METHODS

Description of the study site

The study was conducted at the periphery of Raipur city, Chhattisgarh, India. 4 different villages in surrounding of Raipur city, were selected viz. Chandanidih (21° 15'NL and 81° 32'EL), Zora (21°v23'NL and 81° 71'EL), Boriakala (21° 19'NL and 81° 64'EL) and Dhaneli (21° 33'NL and 81° 65'EL). The present study was conducted for a period of one year that is from March 2018 to February 2019.

Sampling and calculation

The culture plate exposure method was adopted for trapping the airborne fungi. PDA (Potato, Dextrose and Agar) was used as a culture medium. 10 ml of sterilized

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Production of biocatalyst α-amylase from agro-waste rice bran by using *Bacillus tequilensis* TB5 and standardizing its production process

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Rice bran

ABSTRACT

Processing (milling, oil extraction) of agricultural products result in accumulation of massive amount of agro-waste residues. A sustainable alternative technique is required to utilize those agro-waste residues through biotechnology to convert them into useful products. α-Amylase is an enzyme of glycoside hydrolases family which hydrolyzes the α-D-(1,4) glycosidic bond. In the present research, *Bacillus tequilensis* TB5 was hired for the α-amylase production through SmF by utilizing agro-waste substrate rice bran. Also, the role of varying Physico-chemical parameters on α-amylase production was evaluated to determine the optimal conditions required for its maximum production. The findings of this research revealed that the optimal conditions for maximum yield (39.736 ± 0.296 U/ml) were found at pH 6.0, temperature 37 °C and incubation period of 72 h. On analyzing influence of various nutritional supplement on enzyme production, it was found that some of the nutrients like; peptone, beef extract, ammonium chloride, ammonium sulphate can enhance enzyme yield at a particular concentration. Purification of α-amylase was also done through ammonium sulphate precipitation method and then molecular weight of 54 kDa was determined by SDS-PAGE. The present research carried strongly supports, that rice bran is an efficient agro-waste substrate can possibilities of the commercial production of α-amylase.

1. Introduction

Enzymes are biocatalyst that are exceptionally fit and explicit under various environmental conditions and that's why they have numerous industrial applications (Pandey et al., 2017). Over the most recent decade many advancement can be seen in enzyme technology. Amylase hydrolyzes the α-1,4-glycosidic bond which occurs in starch, glycogen and various related polysaccharides to release simple sugar like glucose and maltose in an α-anomeric form (Xie et al., 2014; Elumalai et al., 2019; Herrera-Márquez et al., 2019). Amylases are the glycoside hydrolases which are ubiquitous in nature, produced by numerous animals, plants, bacteria, fungi and molds; but the majority applications of α-amylase in a number of modern biotechnological purposes are chiefly derived from bacteria and fungus (Kumar et al., 2013). Various species of Genus *Bacillus* are used for the industrial production of α-amylase (Paul et al., 2017). Commercial application of α-amylase enzyme is in textile, food, detergent, paper, sugar and pharmaceutical industry (Pandey et al., 2017; Asrat and Girma, 2018). Numerous strategies are developing day by day to produce large amount of amylase for industrial purposes and that too by utilizing various cost-effective substrate (Pascoal et al., 2011; Ahmed et al., 2019). Several characteristics of α-amylase enzyme including specificity, stability, optimum pH and temperature influence its performance, economics and feasibility (Finore et al., 2014). For its entire activity an enzyme requires a selected pH, temperature and incubation period (Paul et al., 2017). At present, amylase production covers up to 65% of the enzyme market globally and is constantly increasing (Simair et al., 2017).

Further, the selection of an appropriate substrate is moreover necessary for fermentation processes (Aullybux and Puchooa, 2013). Generally, at commercial scale starch is employed for the amylase production through bacteria. α-Amylase production by using synthetic media through SmF is extremely expensive and uneconomical. To minimize the production cost, utilization of agro-waste residue might be a po-

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ARTICLE

Influence of protein damage and proteasome gene expression on the longevity of recalcitrant *Madhuca latifolia* Roxb. seeds

Jipsi Chandra, Mahima Dubey, and S. Keshavkant

Abstract: Enhanced cellular damage during desiccation is considered to be one of the key factors limiting vigour and viability of seeds. The uncontrolled accumulation of reactive oxygen species and resultant damaging reactions such as the oxidation of lipids and DNA in desiccating seeds of *Madhuca latifolia* (Roxb.) J. F. Macbr. has already been well characterized. However, hydrolytic and (or) oxidative damage to proteins requires further study. This study investigated the desiccation-induced oxidative damage to proteins and proteolytic systems in recalcitrant *M. latifolia* seeds during ambient storage. Seeds experienced a significant drop in seed water content [ca. 1.32 to ca. 0.23 g·(g dry mass)$^{-1}$] during storage resulting in complete loss of viability after 35 days of storage. A considerable decline in total protein content (3.0–3.6 fold) and activity (4.8–13.8 fold) in the gene expressions of proteasome subunits (α, β, and *E2*) were recorded in the embryonic axis of desiccating *M. latifolia* seeds. In contrast, increases in the level of protein carbonyls (2.46 fold), hydroperoxides (2.31 fold), malondialdehyde- and 4-hydroxy-2-nonenal-protein adducts (1.8 and 3.9 fold), and Amadori and Maillard reaction products, along with proteases (14.5–30.4 fold) were observed in desiccating *M. latifolia* seeds. This study revealed that increased oxidation/modification of proteins and proteasome dysfunction are involved in the deterioration of desiccating *M. latifolia* seeds.

Key words: Amadori and Maillard reactions, protease, proteasome, protein oxidation, water content.

Résumé : L'accroissement des dommages cellulaires lors de la dessiccation est considéré comme l'un des principaux facteurs limitant la vigueur et la viabilité des semences. L'accumulation incontrôlée de dérivés réactifs de l'oxygène et les réactions dommageables qui en résultent, comme l'oxydation des lipides et de l'ADN, dans les graines de *Madhuca latifolia* (Roxb.) J. F. Macbr. ont été caractérisées antérieurement. Toutefois, les dommages hydrolytiques ou oxydants aux protéines exigent des études plus poussées. Cette étude s'est penchée sur les dommages oxydants provoqués par la dessiccation aux protéines et aux systèmes protéolytiques des semences récalcitrantes de *M. latifolia* durant un entreposage en conditions non contrôlées. Les semences ont subi une chute significative de leur teneur en eau [d'environ 1,32 à environ 0,23 g·(g de poids sec)$^{-1}$] lors de l'entreposage, donnant lieu à une perte complète de viabilité après 35 jours d'entreposage. Une baisse considérable du contenu total en protéines (3,0 à 3,6 fois), et de l'activité (4,8 à 13,8 fois) ou de l'expression génique des sous-unités du protéasome (α, β et *E2*) a été enregistrée dans l'axe embryonnaire des graines de *M. latifolia* au cours de la dessiccation. Par contre, une augmentation du niveau de résidus carbonyles sur les protéines (2,46 fois), de peroxyde d'hydrogène (2,31 fois), d'adduits de malonaldéhyde et de 4-hydroxy-2-nonénal sur les protéines (1,8 et 3,9 fois), de produits de la réaction d'Amadori et Maillard, de même que de protéases (14,5 à 30,4 fois) a été observée dans les graines de *M. latifolia* durant la dessiccation. Cette étude a révélé qu'une oxydation ou des modifications accrues des protéines et un dysfonctionnement du protéasome sont impliqués dans la détérioration des graines de *M. latifolia* au cours de la dessiccation. [Traduit par la Rédaction]

Mots-clés : réactions d'Amadori et Maillard, protéase, protéasome, oxydation protéique, teneur en eau.

Introduction

Madhuca latifolia (Roxb.) J. F. Macbr. (family Sapotaceae) is a large, gregarious, deciduous tree with short bole, wide girth, large rounded crown and spreading branches, and grows widely under tropical and sub-tropical climate conditions (Chandra and Keshavkant 2018). It is one among 8% of the world's plant species that are reported to produce desiccation intolerant seeds (Wyse and Dickie 2017), and have been characterized as recalcitrant with respect to their storability in gene

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Research article

Carbon dot induces tolerance to arsenic by regulating arsenic uptake, reactive oxygen species detoxification and defense-related gene expression in *Cicer arietinum* L

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ABSTRACT

The scientific and technological applications of one of the nanomaterials *viz.;* carbon dot (C-dots), having extraordinary properties, is becoming an emerging and ongoing research area in recent times. In the present study, we have evaluated the effectiveness of C-dots in reducing arsenic (As) toxicity by analyzing physiological, biochemical and molecular parameters in *Cicer arietinum* L. The results revealed that As decreased the germination rate, growth, biomass, and membrane stability of the cell to a significant extent. Further, As was taken up by the growing seeds which eventually caused cell death. Levels of reactive oxygen species (ROS), stress markers (malondialdehyde), activities of defensive enzymes (glutathione-S-transferase and pyrroline-5-carboxylate synthetase) and non-enzymatic antioxidant contents (proline and glutathione) were increased under As stress. Moreover, As treatment resulted in the up-regulation of expressions of NADPH oxidase and defense-related genes in *Cicer arietinum* L. However, application of C-dots along with As improved the germination and growth of *Cicer arietinum* L. Exogenous application of C-dots, enhanced the expressions of defense-related genes and, contents of proline and glutathione, thereby causing considerable reductions in ROS, and malondialdehyde levels. Overall, this study suggests the possible involvement of C-dots in lowering the toxic effects of As on biomass by reducing As uptake and, inducing the activities/gene expressions and contents of enzymatic and non-enzymatic antioxidants.

Author contribution

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1. Introduction

Arsenic (As) is a non-essential metalloid, which instigates many toxic effects in the living systems (Kidwai et al., 2019). The plant roots absorb As predominantly in its inorganic forms: arsenate (As^{V}) and arsenite (As^{III}). As^{III} is considered to be more toxic to plants, since it permeates the membrane and reacts with the sulfhydryl groups of plant proteins and enzymes, disconcerting energy flow, causing leaking of electrolytes and generating reactive oxygen species (ROS) (Singh et al., 2015). A membrane localized enzyme NADPH oxidase (NOX) is also responsible for the production of ROS in plant cells (Reddy et al., 2015). These ROS oxidize/damage most major cellular bio-polymers such as lipid, protein, *etc*., resulting in the dysfunction, and sometimes death of the cells. A product of lipid peroxidation reaction; malondialdehyde (MDA) leads to disintegration of cellular organelles, oxidation and dysfunction of proteins and nucleic acids (Singh et al., 2015).

To counter the As stress, plants detoxify this metalloid by promptly converting it into As^{III}, in the cytosol, by arsenate reductase. This As^{III} is then expelled outside of the cell or sequestered into the vacuoles

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RESEARCH PAPERS

Aluminium Rhizotoxicity in *Cicer arietinum*

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Abstract—The effects of aluminium (Al)-induced alterations on elongating radicles of *Cicer arietinum* L. were studied in relation to growth and biochemical markers of oxidative stress. Elongating radicles (c. 1 mm) were treated with 0–3 mM aluminium chloride (pH 4.5) for seven days at room temperature (26 ± 2°C). The results indicated that exposure to Al significantly inhibited radicle growth. This growth inhibition was accompanied by excessively high levels of reactive oxygen species (ROS) production. The levels of ROS were significantly positively correlated with Al concentration. Levels of lipid and protein oxidation products increased significantly with an increase in Al concentration, and were significantly positively correlated with ROS levels. On the other hand, Al stress significantly decreased the activities of selected enzymatic antioxidants. Collectively, the results suggest that Al rhizotoxicity in *C. arietinum* is partially mediated by oxidative stress brought about by excessive ROS production and reduced antioxidant scavenging activity.

Keywords: Cicer arietinum, protein oxidation, oxidative stress, lipid peroxidation, biomass, enzymatic antioxidants

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INTRODUCTION

Agriculture in many parts of the world is restricted by acidic soils that contain excessively high concentrations of mineral elements. About 50% of the world's potentially arable soils are thought to be sufficiently acidic to significantly limit crop production [1], largely due to aluminium (Al) toxicity. This is particularly true for developing countries like India, where Al toxicity is one of the most widespread problems in acidic soils [2]. Aluminium, which is one of the most abundant metals in the Earth's crust and is highly soluble in soils at low pH levels, often, brings about root growth inhibition, consequently poor plant nutrient uptake and inefficient water use [2]. The Al^{3+} ion is the most toxic among all. The soluble forms of Al preferentially accumulate in the root tips [3]. This accumulation at the root tip has been reported to bring about rhizotoxicity (inhibition of root elongation), which is widely recognized as one of the primary symptoms of Al phytotoxicity [4].

Though the molecular mechanisms involved in Al toxicity are unclear [5], there is sufficient evidence to suggest that Al-induced rhizotoxicity depends on various factors regulating cell elongation [5]. The binding of Al to the receptors of plasma membranes are a matter of great interest since it can result in membrane dysfunction and oxidative stress, which stimulates defence-related signalling cascades [5]. The oxidative stress arises due to over accumulation of reactive oxygen species (ROS), which can result in oxidation of membrane lipids and proteins, along with the interference in signal transduction mechanisms. Aluminium can also enter the cell by passing through plasma membranes and thereafter bind directly to DNA and RNA [6]. Despite numerous reports on the involvement of oxidative stress in Al toxicity [6, 7], it should be noted that since Al itself is not a transition metal, it couldn't catalyze redox reactions. Rather, Al has a strong affinity for bio-membranes and causes the rigidification of membranes [8], facilitating free radical chain reactions [mediated by Ferrous (Fe) ions] which promote the peroxidation of membrane lipids. This reaction was reported in *Glycine max* roots [9]; however, in radicles of *Pisum sativum*, the peroxidation of lipids was observed in the absence of Fe supplementation. The peroxidation of lipids is also an early symptom of Al toxicity that appears to cause callose production, in

Abbreviations: APX—ascorbate peroxidase; CAT—catalase; GR—glutathione reductase; H_2O_2—hydrogen peroxide; HNE—4-hydroxy-2-nonenal; LOOH—lipid hydroperoxide; $O_2^{\bullet-}$—superoxide radical; PUFAs—polyunsaturated fatty acids; POD—guaiacol peroxidase; SOD—superoxide dismutase.

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ORIGINAL ARTICLE

Growth and antioxidant responses of *Trigonella foenum-graecum* L. seedlings to lead and simulated acid rain exposure

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Abstract
Heavy metal pollution and acid rain are serious global environmental issues. The combined pollution of these two contaminants has become a new environmental issue where both stresses occur simultaneously. These abiotic stresses alter the plant growth and development, various metabolic activities and agricultural yield. However, studies on combined pollution of these remain limited. In the current study, the application of lead (Pb, 1200 mg l^{-1}) and/or simulated acid rain (SAR, pH 3.5) to fenugreek (*Trigonella foenum-graecum* L.) seedlings for 30 days resulted into various physiological and metabolic dysfunctions. Our experimental results revealed that treatments with Pb and/or SAR decreased growth attributes, membrane stability and contents of total chlorophyll and proteins, while enhanced the leakage of electrolytes, accretions of reactive oxygen species (ROS), malondialdehyde and 4-hydroxy-2-nonenal, along with lipoxygenase activity. In addition, in-gel activities of superoxide dismutase, catalase, guaiacol peroxidase and ascorbate peroxidase were seen to be amplified in Pb and/or SAR subjected tissues. Although, the activities of defensive enzymes were enhanced, they appeared to be insufficient for detoxification of overproduced ROS, consequently leading to reduced growth and enhanced oxidative stress in fenugreek seedlings. We also observed that fenugreek leaves were more sensitive to the combined treatment of SAR and Pb. However, the alone application of Pb generated comparatively more damage in roots, while leaves showed more susceptibility to SAR. In conclusion, our data suggested that the extent to which the test indexes decreased/increased in response to the combined treatment of SAR and Pb was relatively higher than in their alone applications.

Keywords Chlorophylls · Defensive enzymes · Fenugreek · Lipid catabolism · Reactive oxygen species

Introduction

In nature, plants are continuously confronted with various abiotic and biotic stresses. Among different abiotic stresses, heavy metal contamination is considered as one of the major threats to the environment due to its high persistence and adverse impacts over both flora and fauna. Even though various regulatory laws have been executed and implemented to control the liberation of heavy metal contaminations in the environment, accumulation of these is still increasing day-by-day (Hou et al. 2018). Lead (Pb) is counted as one among the major heavy metals that contaminate the soil, resulting from various man-made sources like mining, smelting of ores, ignition of coal, discharge from battery industries, automobile exhausts, metal plating, leather tanning, *etc*. (Sharma and Dubey 2005; Gupta et al. 2009). It has been shown to play a dual role in the soil: low soil Pb concentration promotes plant growth, while higher availability causes injuries to plants (Rossato et al. 2012). Lead cannot be degraded chemically or biologically by microorganisms, so it accumulates in the soil continuously (Devi et al. 2013). Publications reveal that soils of several polluted sites contain Pb in the range of 400–500 mg kg^{-1} soil (Devi et al. 2013), while the concentration of more than the 1,000 mg kg^{-1} soil is determined in severely contaminated soils of industrial areas (Hardison et al. 2004; Tawinteung et al. 2005; Gupta et al. 2013). In the soil, Pb concentration above 30 mg kg^{-1} can cause toxicity symptoms in various plant species (Sidhu et al. 2016). Mobilization of Pb in the soil depends upon its concentration, solubility, pH, redox potential and other general characteristics of the soil. Once Pb comes in contact with roots, it is readily transported by CPx-type ATPases, a sub group of P-type ATPase that

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REVIEW ARTICLE

Biological approaches of fluoride remediation: potential for environmental clean-up

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Abstract

Fluoride (F), anion of fluorine which is naturally present in soil and water, behaves as toxic inorganic pollutant even at lower concentration and needs immediate attention. Its interaction with flora, fauna and other forms of life, such as microbes, adversely affect various physiochemical parameters by interfering with several metabolic pathways. Conventional methods of F remediation are time-consuming, laborious and cost intensive, which renders them uneconomical for sustainable agriculture. The solution lies in cracking down this environmental contaminant by adopting economic, eco-friendly, cost-effective and modern technologies. Biological processes, viz. bioremediation involving the use of bacteria, fungi, algae and higher plants that holds promising alternative to manage F pollution, recover contaminated soil and improve vegetation. The efficiency of indigenous natural agents may be enhanced, improved and selected over the hazardous chemicals in sustainable agriculture. This review article emphasizes on various biological approaches for the remediation of F-contaminated environment, and exploring their potential applications in environmental clean-up. It further focuses on thorough systemic study of modern biotechnological approaches such as gene editing and gene manipulation techniques for enhancing the plant-microbe interactions for F degradation, drawing attention towards latest progresses in the field of microbial assisted treatment of F-contaminated ecosystems. Future research and understanding of the molecular mechanisms of F bioremediation would add on to the possibilities of the application of more competent strains showing striking results under diverse ecological conditions.

Keywords Fluoride · Bioremediation · Plant growth promoting bacteria

Introduction

Fluoride (F) is a monoatomic anion of fluorine, which comes under halogen group of gases and accounts for 0.3 g kg^{-1} of the Earth's crust. Being highly electronegative in nature, F exists only in combination with other elements to form compounds and minerals such as fluorspar, cryolite and fluorapatite (Ghosh et al. 2013). Fluoride contamination is a worldwide problem and is anthropogenically added into the environment through airborne as well as non-airborne sources. Airborne industrial sources include aluminium smelters, brick works and phosphate fertilizer factories, while non-airborne causes originates from spraying F-rich fertilizers in the fields and using contaminated water for irrigation (Ali et al. 2016). Fluoride has been reported to be endemic in 20 countries of the world (Messaitfa 2008). The Union Health and Family Welfare Ministry reported that 19 states of India have high F contamination in their ground water, amongst which Rajasthan occupied the topmost position (24 mg L^{-1}) followed by Andhra Pradesh, Telangana, Uttar Pradesh, Karnataka, Madhya Pradesh, Haryana, Bihar, Chhattisgarh, Maharashtra, Assam, West Bengal and Gujarat (Ali et al. 2016).

Fluoride is considered to be an essential micronutrient for animals, plants and human beings; however, it has proved to exert deleterious effects if exists beyond the permitted values. The permissible amount of F in drinking water is set to 1.5 mg L^{-1} by the World Health Organization (Geneva, Switzerland), while 0.8–1.2 mg L^{-1} exerts the maximum benefit and minimum harmful effect (World Health Organisation 2008). Prolong exposure to F generates devastating effects in

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Amelioration of Ageing Associated Alterations and Oxidative Inequity in Seeds of *Cicer arietinum* by Silver Nanoparticles

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Abstract
Metal-based nanoparticles (NPs) have recently been accomplished a great attention worldwide, in various sectors including agriculture due to their beneficial impacts in plant growth, development and stress tolerance. However, it shows dose-dependent response and may vary with type of metal and synthesis procedure followed. Among many, silver nanoparticles (AgNPs) are most frequently used NP in agricultural sector. In the present study, AgNPs were synthesized following both green (gAgNP) and chemical (cAgNP) synthesis processes, characterized by standard methods and were applied to artificially aged *Cicer arietinum* seeds. Initial characterization of synthesized NPs was done by UV–Visible spectroscopy, and concentrations were calculated as 2.7 nmol for gAgNP, while, 5.8 nmol for cAgNP. Furthermore, the presence of different functional groups in synthesized AgNPs was evaluated by fourier transform infrared spectroscopy (1000 and 4000 cm^{-1}). However, the particle size of synthesized AgNPs was estimated by dynamic light scattering/ zetasizer (90–120 nm) and transmission electron microscopy (15–60 nm). Synthesized NPs were then assessed for their ameliorative efficiencies against accelerated ageing-induced injuries in *Cicer arietinum* seeds. Experimental results revealed various physiological and biochemical alterations due to accelerated ageing in seeds of *Cicer arietinum* including the over accumulation of reactive oxygen species and consequent decline in the expressions/ activities of key defensive genes. However, exogenous application of AgNPs provided tolerance against ageing-induced damages by compensating the cellular redox homeostasis via up-regulating the levels/ gene expression of antioxidants in *Cicer arietinum*.

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Perspective

Titanium nanoparticles attenuates arsenic toxicity by up-regulating expressions of defensive genes in *Vigna radiata* L

Priya Katiyar [1], *Bhumika Yadu* [1], *Jyoti Korram* [2], *Manmohan L. Satnami* [2], *Meetul Kumar* [3], *S. Keshavkant* [1,*]

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Vigna radiata L

ABSTRACT

Arsenic (As)-toxicity is recognized as one of the major environmental problems, affecting productivity of crops worldwide, thereby threatening sustainable agriculture and food security. Progression in nanotechnology and its impacts have brought up concerns about the application of engineered nanoparticles (NPs) in various sectors of the economy, including the field of agronomy. Among various NPs, there has been a rising amount of interest regarding the effects of titanium NPs (TiNPs) on plants growth and development, and their fate of abiotic stress tolerance. Hence, the present study was aimed to assess the ameliorative potentialities of chemically and biologically/green synthesized TiNPs to alleviate As-induced toxic responses in *Vigna radiata* L. The results revealed that exposure to As hindered the growth indices (radicle length and biomass) and membrane integrity, while were improved with the application of chemical and green synthesized TiNPs. In addition, treatment of As provoked the accretion of reactive oxygen species (superoxide and hydrogen peroxide) and malondialdehyde (a lipid peroxidized product), but were diminished by the supplementation of chemical and green manufactured TiNPs. The experimental data also signified that exogenous application of chemical and green synthesized TiNPs conferred tolerance to As-induced oxidative injuries *via* perking-up the expressions of antioxidant genes and enzyme systems *viz*; superoxide dismutase and catalase. Therefore, the present study inferred that chemically and green synthesized TiNPs, particularly green manufactured, effectively mitigated the adverse impacts of As by augmenting antioxidant machinery, thereby proving its potentiality in the alleviation of As-toxicity, at least in the *Vignaradiata* L.

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Perspective

Titanium nanoparticles attenuates arsenic toxicity by up-regulating expressions of defensive genes in *Vigna radiata* L

Priya Katiyar [1], *Bhumika Yadu* [1], *Jyoti Korram* [2], *Manmohan L. Satnami* [2], *Meetul Kumar* [3], *S. Keshavkant* [1,*]

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Silica nanoparticle minimizes aluminium imposed injuries by impeding cytotoxic agents and over expressing protective genes in *Cicer arietinum*

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ARTICLE INFO

Keywords:
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Gene expression
Lipid peroxidation
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ABSTRACT

Nanoparticles (NPs) and nano-technological applications in varied economic sectors including agriculture, accomplished great attention in last decades, worldwide. In several instances, NPs has been applied as pre-treatment or toxicant scavenging agent for promoting seed germination/ plant growth responses or for abiotic stress amelioration. In order to promote this propensity, the development of sustainable eco-friendly processes for NP production is of utmost importance. In this study, silica NPs (SiNP) were synthesized following both chemical and biological (green) procedures, and were tested for their ameliorative efficacies against aluminium (Al)-induced toxicity in *Cicer arietinum*. Synthesized NPs were initially characterized following standard methods such as dynamic light scattering/ zetasizer, fourier transform infrared spectroscopy and UV–vis spectroscopy. Experimental results revealed that upon Al-exposure, growth traits and plasma membrane stability of *C. arietinum* were severely repressed along with increased accumulations of reactive oxygen species and malondialdehyde (an outcome of lipid peroxidation reaction), with consequent decline in the activities/ expression profiles of key defensive genes. However, exogenously applied SiNPs provided tolerance to growing *C. arietinum* against Al-toxicity by compensating the cellular redox homeostasis *via* enhancing the levels/ expression patterns of antioxidants genes and reducing cytotoxic products of lipid peroxidation. Both chemical and green manufactured SiNPs were ascertained as efficient ameliorating agents against Al-stress, at least for *C. arietinum*, but the green synthesized were proven to be comparatively more proficient in mitigating injury symptoms, even in relatively low concentration than the chemically manufactured particles.

1. Introduction

Nanotechnology has brought revolution in the field of agriculture and crop productivity by its contribution in the development of new sustainable strategies of crop protection and food production (Fraceto et al., 2016). During the past decade, a number of engineered nano-products incorporating nanoparticels (NPs), nanosensors, nano-fertilizers, nanopesticides, *etc*., have been developed to promote the efficiency and sustainability of agricultural practices, globally (Mahakham et al., 2017). Most of these NPs are synthesized through different physical and chemical methods, which are known to cause numerous environmental and biological hazards in varying intensities (Singh et al., 2016). Therefore, NPs to be applied efficiently in the agricultural sectors should be eco-friendly, economical, non-toxic and biocompatible in nature, and may be synthesized following other than the conventional procedures (Mahakham et al., 2016). The green syntheses of NPs following the use of plant products as reducing agents is an efficient, lucrative, fast and eco-friendly technique (Borase, 2014; Yugandhar and Savithramma, 2016).

In recent past, most of the scientists have adopted green synthesis methods for the production of NPs of calcium (Yugandhar and Savithramma, 2013), copper (Shende et al., 2015), gold (Gopinath et al., 2014), iron (Naseem and Farrukh, 2015), silica (Babu et al., 2018), silver (Yasir et al., 2018) and zinc (Bala et al., 2015) by using extracts of various plants. Among these, silica nanoparticles (SiNPs) are well known in the fields of chemistry, physics and biology due to distinct properties of these (Babu et al., 2018). A number of biological applications of SiNPs were evaluated previously, by different researchers, in the fronts of plant biology and medicine more particularly (Koskimaki et al., 2015).

Silica is considered as a non-essential element for plants growth and development; however, increasing evidence in the literature showed that this metalloid is beneficial to plants, especially under stress conditions (Coskun et al., 2016; Guerriero et al., 2016). Indeed, Si

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RESEARCH NOTE

Effect of exogenous additives on oxidative stress and defense system of a tree: *Zanthoxylum armatum* DC. under in vitro conditions

Gyanmani Ekka[1] · Shailesh Kumar Jadhav[1] · Afaque Quraishi[1]

Received: 6 September 2019 / Accepted: 31 December 2019 / Published online: 21 January 2020

Abstract

Toxicity related to oxidative stress has been a concern for mature, woody tree species with high phenolic content when placed under in vitro conditions, particularly at explant establishment stage. The study of biochemical factors responsible for oxidative stress (lipid peroxidation, reactive oxygen species like hydrogen peroxide) and the defense (antioxidant enzymes and non-enzymatic factors) that the plant offers, in the tree system under in vitro environment requires special consideration. This study focuses on the effect of exogenous additives [polyvinyl pyrrolidone (PVP), citric acid (CC), ascorbic acid (AA)] and initial dark treatment on oxidative stress, defense system, DNA oxidation, total chlorophyll content for the in vitro explant establishment of a medicinal tree *Zanthoxylum armatum* DC., for a duration of 1-month. Exogenous additives and darkness maintained a sustained level of lipid peroxidation hydrogen peroxide, oxidized DNA content and antioxidant enzymes (superoxide dismutase, catalase, and ascorbate peroxidase) in the modified treatment throughout the in vitro experimental period, in comparison to the control. Thus, establishing a relation between exogenous antioxidants and explant oxidative stress-free condition. This can further be utilized to prevent oxidative leaching of explant of mature and woody trees in vitro.

Key message

Explants of *Z. armatum* were able to survive under in vitro conditions for 1 month, with low levels of phenolic leaching and oxidative stress, when additives (2 g L^{-1} PVP, 100 mg L^{-1} CC, 100 mg L^{-1} AA) are added in the medium with initial dark treatment for 72 h.

Keywords Antioxidant · Ascorbic acid · Citric acid · Phenolic-leaching · Poly-vinyl-pyrrolidone · Woody

Abbreviations

PVP	Polyvinyl pyrrolidone
CC	Citric acid
AA	Ascorbic acid
PPFD	Photosynthetic photon flux density
MDA	Malondialdehyde
ROS	Reactive oxygen species
SOD	Superoxide dismutase
CAT	Catalase
APX	Ascorbate peroxidase
CTAB	Cetyl trimethylammonium bromide

Communicated by M. Paula Watt.

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Introduction

To preserve the genetic superiority of mature trees, which includes better wood quality, disease and stress resistance capacity, it is necessary to obtain direct clones from the tree itself, rather than from the seedlings (Quraishi 2013). Thus, nodal explant containing meristematic tissues is a good option for in vitro regeneration. However, under in vitro, the oxidation of explants from mature woody trees is frequent, as their phenolic content is high due to the secondary thickening and lignifications (Singh and Patel 2016). Moreover, the steps during culture initiation i.e. injury response after trimming the explants, surface sterilization, and some components from the micropropagation medium may also elevate this condition and lead to recalcitrance (Benson 2000).

Polyvinyl pyrrolidone (PVP), citric acid (CC), ascorbic acid (AA) and dark conditions have all been utilized to prevent oxidation of phenolic compounds in plants (Quraishi et al. 2017; Khamushi et al. 2019). However, little

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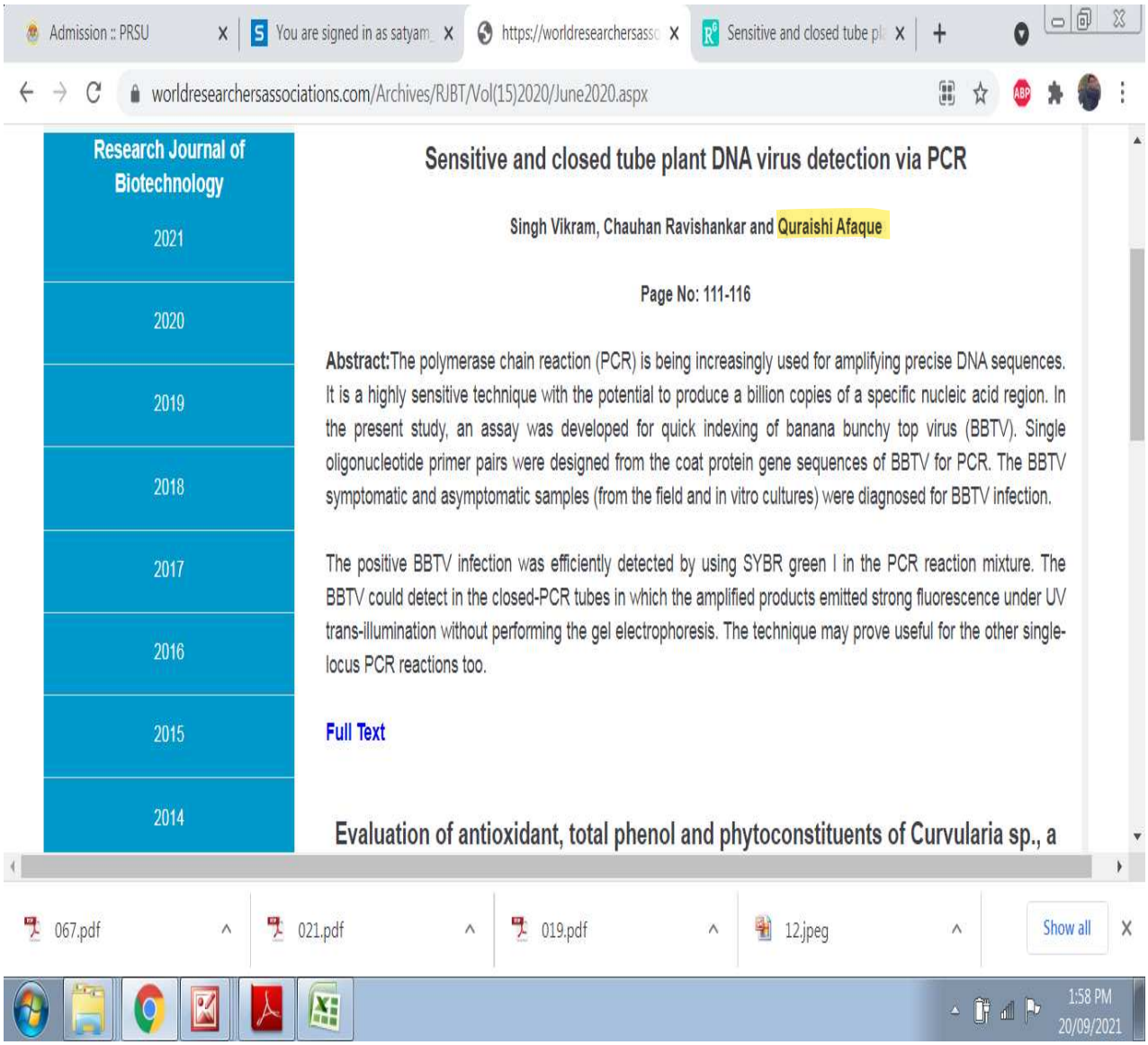
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Sensitive and closed tube plant DNA virus detection via PCR
Singh Vikram, Chauhan Ravishankar and Quraishi Afaque
Page No: 111-116
Abstract:The polymerase chain reaction (PCR) is being increasingly used for amplifying precise DNA sequences. It is a highly sensitive technique with the potential to produce a billion copies of a specific nucleic acid region. In the present study, an assay was developed for quick indexing of banana bunchy top virus (BBTV). Single oligonucleotide primer pairs were designed from the coat protein gene sequences of BBTV for PCR. The BBTV symptomatic and asymptomatic samples (from the field and in vitro cultures) were diagnosed for BBTV infection.
The positive BBTV infection was efficiently detected by using SYBR green I in the PCR reaction mixture. The BBTV could detect in the closed-PCR tubes in which the amplified products emitted strong fluorescence under UV trans-illumination without performing the gel electrophoresis. The technique may prove useful for the other single-locus PCR reactions too.
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Evaluation of antioxidant, total phenol and phytoconstituents of Curvularia sp., a
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Facile and visual detection of acetylcholinesterase inhibitors by carbon quantum dots†

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Sensitive and rapid detection of organophosphate toxicants is highly relevant and important in environmental protection and food safety. Owing to this, a carbon quantum dot (CQD)-based bio-platform was designed for dual detection (fluorometric and colorimetric) of reversible and irreversible inhibitors of enzyme acetylcholinesterase (AChE). The detection strategy is based on the fluorescence quenching and recovery of CQDs through Cu^{2+} ions, AChE and its substrate, acetylthiocholine iodide (ATChI). Initially, enhanced fluorescence of CQDs is effectively quenched by Cu^{2+} ions and later on recovered by catalytic hydrolysis of ATChI *via* the formation of Cu–S bonds by release of thiol compounds. In the presence of inhibitors, the fluorescence of CQDs remains quenched due to the blocked activity of the enzyme but in the presence of oximes the fluorescence is recovered depending upon the ability of the oxime reactivators to regenerate AChE. The fluorescence quenching and recovery is visible with color variations. The sensor facilitates good sensitivity for quick detection of both reversible (CPC, 0.62 ng mL^{-1}; Triton-X; 1.02 ng mL^{-1}) and irreversible (paraoxon, 0.21 ng mL^{-1}; chlorpyrifos, 0.46 ng mL^{-1}) inhibitors. However, strong inhibition of AChE is a major hurdle in practical implementation of biosensors; hence, the system is tested for reactivation of inactivated AChE by monopyridinium oximes and percentage reactivation was also calculated.

1. Introduction

Acetylcholinesterase (AChE) is the most crucial enzyme responsible for the proper functioning of the nervous system in humans, vertebrates and insects. When the amount of this enzyme is reduced below a critical level, nerve impulses to the muscle can no longer be controlled, causing dysfunction and even death from respiratory or cardiac failure.[1,2] Toxic compounds such as pesticides, surfactants, heavy metals *etc.* target this enzyme, and deactivate it through covalent bonding at the serine residue of the active site.[3,4]

Organophosphate pesticides (OPs) are generally used to increase agricultural productivity in developing countries like India.[5,6] Due to their acute toxicity, bioaccumulation and environmental persistence, there always exists a potential risk to human health and the environment. These hydrophobic pesticides are recognized as irreversible inhibitors of AChE and have great affinity towards it.[7,8]

Surfactants are an integral part of routine life and essentially applied for personal hygiene. After use, large amounts of surfactants are discharged into the environment leading to its contamination, preferentially, of water.[9,10] Moreover, surfactants are reported as inhibitors of cholinesterase enzymes in aquatic animals.[11] Keeping all this in view, it is really important to develop suitable, prompt and simple detection methods for effective monitoring of inhibitors of AChE.

In recent years different colorimetric,[12] electrochemical,[13] chemiluminometric[14,15] and fluorometric[16,17] techniques have been developed to detect pesticides through biosensor-based approaches. AChE is widely applied as a biosensor to detect toxic OPs and has attracted much more attention due to several advantages in terms of instant response, simple operation, low cost and sensitivity. The most common and conventional colorimetric detection method uses Ellman's reagent along with the substrate acetylthiocholine iodide (ATChI).[18–21] Another important detection technique involved oxidation of the AChE resulting in the production of choline along with H_2O_2. The hydrolysis process of neurotransmitter acetylcholine (ACh)by AChE is blocked in the presence of inhibitors, and this is reflected by the decreasing fluorescence intensity of the QDs.[22,23] Some fluorescence-based methods have also been designed to screen inhibitors of AChE with better sensitivity.[24–26]

A rising nanomaterial, CQDs, have attracted great attention from researchers worldwide due to their extraordinary tunable

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Antidepressant drug-protein interactions studied by spectroscopic methods based on fluorescent carbon quantum dots

Reshma [a], Sandeep K. Vaishanav [a,b], Toshikee Yadav [a], Srishti Sinha [a], Swapnil Tiwari [a], Manmohan L. Satnami [a], Kallol K. Ghosh [a,*]

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ABSTRACT

A highly sensitive fluorescent carbon quantum dots (CDs) was designed to measure the interaction of antidepressant drugs and serum albumins (SA). In present investigation the interaction of bovine serum albumin (BSA) and human serum albumin (HSA) with antidepressant drugs viz. amitryptiline hydrochloride (AMT), chlorpromazine hydrochloride (CPZ) and desipramine hydrochloride (DSP) bioconjugated on CDs have been studied by different spectroscopic techniques i.e., Fluorescence, UV-Visible, Dynamic light scattering (DLS) and FT-IR. The CDs were prepared by one-pot method using glucose and PEG-200. The developed CDs showed blue luminescence under irradiation with ultra-violet. The Stern-Volmer quenching constant (K_{sv}) indicates the presence of static quenching mechanism. The apparent binding constant K_a between antidepressant drugs with complex of SA-CDs have been determined. These results illustrated that CPZ shows strong binding with HSA. As further analyzed by FT-IR spectroscopy and DLS technique, the results suggested induced conformational changes on SA, thus confirming the experimental and theoretical results. Thus, a thorough knowledge of the energetics of drug-protein affinities in presence of CDs as attempted in this work is vital in giving way for appropriate drug delivery.

1. Introduction

Fluorescent carbon nanodots have received increasing attention in a wide variety of analytical and biomedical applications owing to their outstanding properties such as minimal toxicity, superior biocompatibility, tunable photoluminescence and good water solubility [1, 2, 3, 4]. The binding mechanism of proteins with ligands from last few years have shed light on different areas of research and its important applications in numerous fields of science, such as the development of new biomaterials, biochemistry, food chemistry or pharmaceutical sciences [5, 6, 7, 8, 9, 10]. The nature of interaction between the drug molecule and protein gives new opportunity for the development of new drugs. Since drugs are the compounds which are carried by albumin, it is necessary to study the interaction of new drug with protein [11, 12, 13, 14, 15]. Serum albumins are a model globular protein which play a key role for acting as a carrier for several endogenous compounds. It has proved the most valuable invented globular proteins, used for transportation and metabolism of many biologically active compounds in the body [16, 17, 18].

Serum albumin has a well-established structure, having physicochemical properties, a versatile binding capacity stability and water solubility [19, 20]. In the present scenario bovine serum albumin (BSA) has created an extensive area of research because of its presence in blood plasma of animals. It consist a single polypeptide chain of 583 amino acids and contains 17 cysteine residues (eight disulfide bonds and one free thiol). It is divided into three specific binding sites (I, II and III) for high-affinity of drugs. Every sites is consists of two subdomains (A and B). Human serum albumin (HSA) contributes about 80% of the osmotic pressure of blood [21, 22]. It bears residue of 585 amino acids with molar mass of 66,411 g mol^{-1} having 17 disulfide bridges and free thiol (SH) group. Moreover, HSA consist of single tryptophan (TRP 214) present in subdomain IIA [23, 24, 25]. The theme has a better insight for research fields such as clinical medicine, chemistry and life sciences.

A tricyclic antidepressant drug (TCA) category of drug amitryptiline hydrocloride (N,N-dimethyl-3-(2-tricyclo [9.4.0.03,8]pentadeca-1 (15),3,5,7,11,13-hexaenylidene)propan-1-amine; hydrochloride), desipramine hydrochloride (3-(10,11-dihydro-5H-dibenzo [b,f]azepin-5-yl)-N-methylpropan-1-amine; hydrochloride) achlorpromazine hydrochloride (3-(2-chlorophenothiazin-10-yl)-N,N-dimethylpropan-1-amine;

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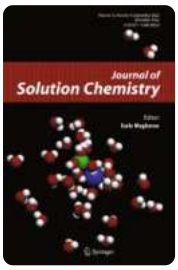

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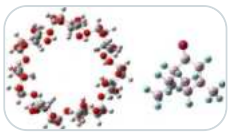

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Interaction of an Acid Functionalized Magnetic Ionic Liquid with Gemini Surfactants

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Abstract

The micellar properties of two Gemini surfactants i.e., butanediyl-1,4-bis(dimethyldodecyl ammonium bromide (C_{12}-4(OH)$_2$-C_{12},2Br$^-$) and butanediyl-1,4-bis(dimethyldohexylammonium bromide) (C_{16}-4-C_{16}, 2Br$^-$) in the presence of an imidazolium based acid functionalized magnetic ionic liquid (IL) i.e., 1-acyl-3-methylimidazolium tetrachloroferrate [AcMIm]$FeCl_4$, are studied using various techniques such as surface tension, conductivity, fluorescence and FT-IR spectroscopy. The surface adsorption parameters and thermodynamic parameters are systematically determined. The critical micelle concentration (CMC) is decreased and surface tension of CMC (γ_{cmc}) values are increased significantly in the presence of different wt% of the added IL, and the values are observed in the order as 0.07 > 0.05 > 0.02 > water. In this study, the Gibbs energy of adsorption (ΔG^o_{ads}) value was found to be greater than the Gibbs energy of micellization (ΔG^o_m), showing that adsorption is more favored in aqueous Gemini surfactant systems. The FT-IR spectral results further confirm the changes produced by the magnetic IL [AcMIm]$FeCl_4$ on aqueous solutions of C_{12}-4(OH)$_2$-C_{12},2Br$^-$ and C_{16}-4-C_{16},2Br$^-$. It is noteworthy that increasing the wt% of [AcMIm]$FeCl_4$ results in an increase in the spontaneity of CMC formation on Gemini surfactants and the IL has more affinity for C_{16}-4-C_{16}, 2Br$^-$ compared to C_{12}-4(OH)$_2$-C_{12},2Br$^-$.

Keywords Gemini surfactant · Acid functionalized magnetic ionic liquid · Micellization behavior · FT-IR

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s10953-020-00990-4) contains supplementary material, which is available to authorized users.

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ARTICLE

Influence of cationic surfactants and inorganic salts on the enzyme kinetic activity of *Mucor javanicus* lipase

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Abstract

In this article, the enzyme kinetic activity of *Mucor javanicus* lipase (MJL) has investigated via hydrolysis of *p*-nitrophenyl acetate (PNPA) in different pH environment, cationic surfactants, and inorganic salts. The influence of hydrophilicity has been studied in the presence of cationic cetyltrimethylammonium bromide (CTAB), cetyltriphenylphosphonium bromide (CTPB), and cetyldimethylethanolammonium bromide (CDMEAB) surfactants. The head group dimensions of surfactants show noteworthy contributions to enhance the catalytic activity of MJL, that is the CDMEAB surfactant, which is more efficient when compared with CTPB and CTAB. The increase in hydrophobicity of alkyltrimethylammonium bromide and alkyltriphenylphosphonium bromide in series dodecyl (C_{12}) < tetradecyl (C_{14}) < cetyl (C_{16}) leads to a marked decrease in the observed enzymatic superactivity, but an opposite trend appears in case of alkyldimethylammonium bromide. The activity of MJL for the hydrolysis of PNPA was higher in the presence of sodium chloride and potassium chloride anion due to specific interactions between the lipase surface and anions of the Hofmeister effect.

KEYWORDS
activity, cationic surfactants, inorganic salts, Mucor javanicus lipase

1 | INTRODUCTION

Lipases are the proteins, containing long-chain acyl glycerols, exhibit great application as nanobiocatalyst in food industry, nutraceuticals preparation, pharmaceutical, and detergent industry. The activity of lipase is very limited, when substrates are dissolved and solubilized in aqueous media than it incorporated and works at micellar interface.[1–3] The necessity of micellar interfaces is partly assumed for those lipases which possess a "lid" that covers the active site. The evidence and spectra obtained from x-ray crystallographic investigation of the structure of lipases from different species displayed the S152, D176, and H263 catalytic triad, which is responsible for enzymatic hydrolysis of lipase.[4–6] The catalytic activity of lipases is interfacial activated, when the enzyme existing on the substrate at micellar interfaces furthers directly enhancing the turnover number with respect to an enzyme concentration scale. Some surface-activated lipase shows conformation from its original structure existence of an enzyme; further, its surface lid travels at the opening of new active site areas. The new energetic active conformation of lipase is more hydrophobic compared to locked enzymes.[7,8]

The enzyme–surfactant interaction is more promising in the interfaces region; therefore, the surface activity of enzymes can be influenced by a surfactant. This

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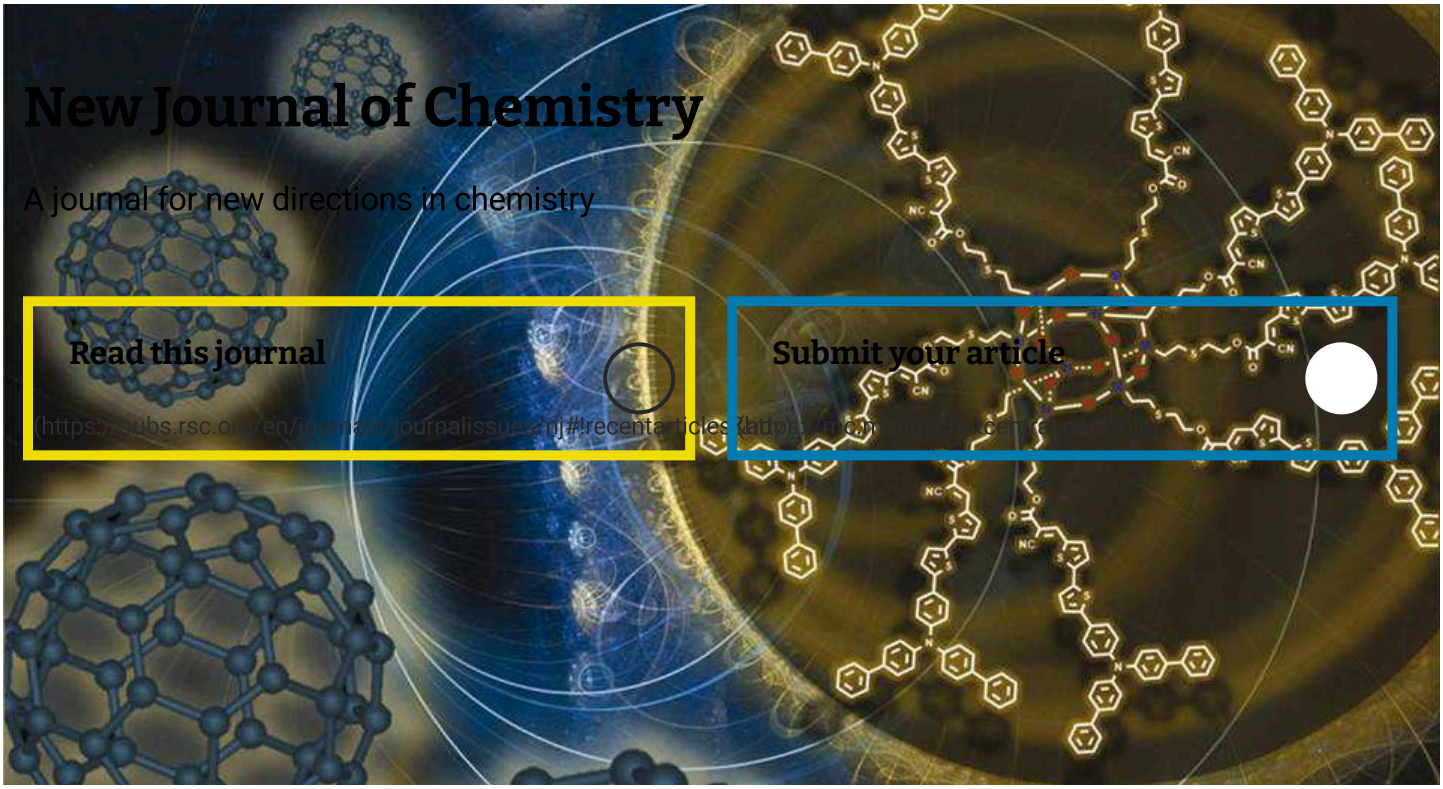

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From the journal:
New Journal of Chemistry

Surface enhanced infra-red spectroscopy with modified silver nanoparticles (AgNPs) for detection of quaternary ammonium cationic surfactants †

Ramsingh Kurrey,[a] Manas Kanti Deb *[a] and Kamlesh Shrivas [a]

Author affiliations

Abstract

A novel surface enhanced infra-red spectroscopy (SEIRS) method with silver nanoparticles (AgNPs) assisted by single drop microextraction (SDME) was developed for detection of total mixed quaternary ammonium cationic surfactants (QACS) in water samples. SDME was used to separate and preconcentrate QACS from water samples into an organic solvent containing citrate-capped AgNPs through the electrostatic and hydrophobic interactions, and we abbreviated this as the "AgNP-SDME/SEIRS" method. Here, the AgNPs served to enhance the signal intensity of QACS through the aggregation of NPs, which resulted in an increase in the hot-spot density for effective absorption of IR radiation. The linearity range obtained for determination of total mixed QACS in water samples was 1–20 μg L^{-1} with a limit of detection (LOD) and limit of quantification (LOQ) of 0.03 μg L^{-1} and 2.0 μg L^{-1}, respectively. The excellent recovery percentage (95.4–109.7%) in domestic wastewater samples showed that the method is found to be selective for the determination of total mixed QACS in complex sample matrices. The advantages of using AgNP-SDME/SEIRS are its simplicity, selectivity and sensitivity towards the analysis of total mixed QACS in various domestic effluent samples.

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Analytical approach on surface active agents in the environment and challenges

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ABSTRACT

Surface active agents (SAAs) are a class of compounds, which is used in variety of products such as detergents, fabric softeners, soaps, paints, adhesives, inks and anti-fogs. After the use of these products containing surfactants are disposed in water reservoirs. The separation and determination of surfactants from complex matrices become challenging for analytical chemists. The fundamentals on separation, preconcentration and analysis of surfactants employing different analytical instrumental techniques for qualitative and quantitative determination of surfactants in environmental samples are discussed. In addition, this compiled work enhanced our knowledge in learning about pathway mechanisms and the degree of their environmental loads. We also discussed the different aspects of method validation in the framework of quality control (QC) and quality assurance (QA). This review provides information on levels of SAAs in various environmental samples including soil, sediments, sewage wastewater, river wastewater and aerosols worldwide.

1. Introduction

Surface active agents (SAAs) or *Surfactants* are the amphiphilic molecules, which are strongly adsorbed at interfaces between two phases [1]. Owing to this characteristic property, they usually have wider applications and are used as emulsifiers, detergents, dispersing agents etc. The characteristic property of surfactant molecules i.e. amphipathy allows them to adsorb at surface interface. The surfactant molecule is composed of non-polar hydrophobic portion and polar hydrophilic part, Fig. 1. Generally, the hydrophobic part is known as tail, which is usually an elongated hydrophobic alkyl moiety. The properties, which surfactant exhibit in aqueous medium are associated with the nature of polar head or hydrophilic group. On the basis of this characteristic behavior these compounds are classified into the following different classes.

Ionic surfactants can be categorized into two main groups, such as cationic and anionic. Cationic surfactants after dissociation in

Abbreviation: AA, Acetic acid; AE, Alcohol ethoxylates; AEOS, Alcohol polyethoxylate; AES, Alkyl Ethoxysulphate; ALS, Ammonium lauryl sulfonate; AOS, Alpha olefin sulfonate; APEC, Alkylphenol ethoxy carboxylates; APEOs, Alkylphenol ethoxylates; APs, Alkyphenol; AS, Alkylsulfates; ASE, Accelerated solvent extraction; BAC, Benzylammonium chloride; BDAB, Dimethylcetylammonium bromide; BDMAC, alkyl benzyl dimethylammonium chloride; BiAS, Bismuth blue active substances; BIS, Bureau of Indian standards; CAN, Acetonitrile; CTAB, Cetyltrimethylammonium bromide; CWA-DVB, Carbowax-divinylbenzene; CWAX-TR, Carbowax-template resin; DATC, Dialkyltetralinsufonates; DATS, Dialkyltetralinsulfonates; DBAS, Disulfine blue active substances; DCM, Dichloromethane; DLLME, Dispersive liquid-liquid micro extraction; DSDMAC, Dioctadecyldimethyl-ammonium chloride; DSDMAC, Dioctadecyldimethyl ammonium chloride; EC, Effective concentration; EMF, Electromotive force; FID, Flame ionization detector; GCB, Graphitized carbon black; IC, Inhibitory concentration; LAES, Linear alkylbenzene ethoxy sulfonates; LOD, Limit of detection; MB, Methylene blue; MBAS, Methylene blue active substances; MeOH, Methanolic; MG, Methylene green; NP, Nonylphenol; NPEC, Nonylphenol ethoxy carboxylates; NPEO, Nonyl phenol ethoxylates; OP, Octylphenol; OPEC, Octylphenol ethoxy; OPEO, Octylphenol ethoxylate; PDMS-TR, Polydimethyl siloxane-template; PFOA, Perfluorooctanoic; QAC, Quaternary ammonium compound; SAA, Surface active compound; SAX, Strong anion exchange; SCX, Strong cation exchange; SDS, Sodium dodecyl sulfate; SFE, Supercritical fluid extraction; SLE, Solid-liquid extraction; SLES, Sodium lauryl ether sulfonate; SLS, Sodium lauryl sulfate; SPE, Solid phase extraction; STPs, Sewage treatment plants; TMAB, Tetramethylammonium chloride; TMAC, Alkyl trimethylammonium chloride; WWTPs, Waste water treatments plants; SPME, Solid phase microextraction; LLME, Liquid-liquid microextraction; DTDMAC, Ditallow dimethyl ammonium chloride; DDAC, Dimethyldioctadecylammonium chloride; TSP, Total suspended particles; PM, Particulate matters; CCN, Cloud condensation nuclei; BIS, Bureau of Indian standards; ISDWS, Indian Standard Drinking Water Specification; UK, United kingdom; USA, United States of America; USEPA, United State environmental protectionagency; QC, Quality control; QA, Quality assurance; IUPAC, International union of pure and applied chemistry; ISO, International Standard Organization; MDL, Method detection limit; MQL, Method quantification limit; SD, Standard deviation; EQ, Environmental Quotient; RME, Reaction Mass Efficiency; CE, Carbon Efficiency; SE, Solvent Efficiency; MI, Mass Intensity; PFOS, Perfluorooctane sulfonate.

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Surface active agents (SAAs) are a class of compounds, which is used in variety of products such as detergents, fabric softeners, soaps, paints, adhesives, inks and anti-fogs. After the use of these products containing surfactants are disposed in water reservoirs. The separation and determination of surfactants from complex matrices become challenging for analytical chemists. The fundamentals on separation, preconcentration and analysis of surfactants employing different analytical instrumental techniques for qualitative and quantitative determination of surfactants in environmental samples are discussed. In addition, this compiled work enhanced our knowledge in learning about pathway mechanisms and the degree of their environmental loads. We also discussed the different aspects of method validation in the framework of quality control (QC) and quality assurance (QA). This review provides information on levels of SAAs in various environmental samples including soil, sediments, sewage wastewater, river wastewater and aerosols worldwide.

1. Introduction

Surface active agents (SAAs) or *Surfactants* are the amphiphilic molecules, which are strongly adsorbed at interfaces between two phases [1]. Owing to this characteristic property, they usually have wider applications and are used as emulsifiers, detergents, dispersing agents etc. The characteristic property of surfactant molecules i.e. amphipathy allows them to adsorb at surface interface. The surfactant molecule is composed of non-polar hydrophobic portion and polar hydrophilic part, Fig. 1. Generally, the hydrophobic part is known as tail, which is usually an elongated hydrophobic alkyl moiety. The properties, which surfactant exhibit in aqueous medium are associated with the nature of polar head or hydrophilic group. On the basis of this characteristic behavior these compounds are classified into the following different classes.

Ionic surfactants can be categorized into two main groups, such as cationic and anionic. Cationic surfactants after dissociation in

Abbreviation: AA, Acetic acid; AE, Alcohol ethoxylates; AEOS, Alcohol polyethoxylate; AES, Alkyl Ethoxysulphate; ALS, Ammonium lauryl sulfonate; AOS, Alpha olefin sulfonate; APEC, Alkylphenol ethoxy carboxylates; APEOs, Alkylphenol ethoxylates; APs, Alkyphenol; AS, Alkylsulfates; ASE, Accelerated solvent extraction; BAC, Benzylammonium chloride; BDAB, Dimethylcetylammonium bromide; BDMAC, alkyl benzyl dimethylammonium chloride; BiAS, Bismuth blue active substances; BIS, Bureau of Indian standards; CAN, Acetonitrile; CTAB, Cetyltrimethylammonium bromide; CWA-DVB, Carbowax-divinylbenzene; CWAX-TR, Carbowax-template resin; DATC, Dialkyltetralinsufonates; DATS, Dialkyltetralinsulfonates; DBAS, Disulfine blue active substances; DCM, Dichloromethane; DLLME, Dispersive liquid-liquid micro extraction; DSDMAC, Dioctadecyldimethyl-ammonium chloride; DSDMAC, Dioctadecyldimethyl ammonium chloride; EC, Effective concentration; EMF, Electromotive force; FID, Flame ionization detector; GCB, Graphitized carbon black; IC, Inhibitory concentration; LAES, Linear alkylbenzene ethoxy sulfonates; LOD, Limit of detection; MB, Methylene blue; MBAS, Methylene blue active substances; MeOH, Methanolic; MG, Methylene green; NP, Nonylphenol; NPEC, Nonylphenol ethoxy carboxylates; NPEO, Nonyl phenol ethoxylates; OP, Octylphenol; OPEC, Octylphenol ethoxy; OPEO, Octylphenol ethoxylate; PDMS-TR, Polydimethyl siloxane-template; PFOA, Perfluorooctanoic; QAC, Quaternary ammonium compound; SAA, Surface active compound; SAX, Strong anion exchange; SCX, Strong cation exchange; SDS, Sodium dodecyl sulfate; SFE, Supercritical fluid extraction; SLE, Solid-liquid extraction; SLES, Sodium lauryl ether sulfonate; SLS, Sodium lauryl sulfate; SPE, Solid phase extraction; STPs, Sewage treatment plants; TMAB, Tetramethylammonium chloride; TMAC, Alkyl trimethylammonium chloride; WWTPs, Waste water treatments plants; SPME, Solid phase microextraction; LLME, Liquid-liquid microextraction; DTDMAC, Ditallow dimethyl ammonium chloride; DDAC, Dimethyldioctadecylammonium chloride; TSP, Total suspended particles; PM, Particulate matters; CCN, Cloud condensation nuclei; BIS, Bureau of Indian standards; ISDWS, Indian Standard Drinking Water Specification; UK, United kingdom; USA, United States of America; USEPA, United State environmental protectionagency; QC, Quality control; QA, Quality assurance; IUPAC, International union of pure and applied chemistry; ISO, International Standard Organization; MDL, Method detection limit; MQL, Method quantification limit; SD, Standard deviation; EQ, Environmental Quotient; RME, Reaction Mass Efficiency; CE, Carbon Efficiency; SE, Solvent Efficiency; MI, Mass Intensity; PFOS, Perfluorooctane sulfonate.

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From the journal:
New Journal of Chemistry

Surface enhanced infra-red spectroscopy with modified silver nanoparticles (AgNPs) for detection of quaternary ammonium cationic surfactants †

Ramsingh Kurrey,[a] Manas Kanti Deb*[a] and Kamlesh Shrivas[a]

Author affiliations

Abstract

A novel surface enhanced infra-red spectroscopy (SEIRS) method with silver nanoparticles (AgNPs) assisted by single drop microextraction (SDME) was developed for detection of total mixed quaternary ammonium cationic surfactants (QACS) in water samples. SDME was used to separate and preconcentrate QACS from water samples into an organic solvent containing citrate-capped AgNPs through the electrostatic and hydrophobic interactions, and we abbreviated this as the "AgNP-SDME/SEIRS" method. Here, the AgNPs served to enhance the signal intensity of QACS through the aggregation of NPs, which resulted in an increase in the hot-spot density for effective absorption of IR radiation. The linearity range obtained for determination of total mixed QACS in water samples was 1–20 μg L^{-1} with a limit of detection (LOD) and limit of quantification (LOQ) of 0.03 μg L^{-1} and 2.0 μg L^{-1}, respectively. The excellent recovery percentage (95.4–109.7%) in domestic wastewater samples showed that the method is found to be selective for the determination of total mixed QACS in complex sample matrices. The advantages of using AgNP-SDME/SEIRS are its simplicity, selectivity and sensitivity towards the analysis of total mixed QACS in various domestic effluent samples.

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Analytical Methods

A direct DRS-FTIR probe for rapid detection and quantification of fluoroquinolone antibiotics in poultry egg-yolk

Ramsingh Kurrey[a], Mithlesh Mahilang[a], Manas Kanti Deb[a,*], Jayant Nirmalkar[b], Kamlesh Shrivas[a], Shamsh Pervez[a], Manish Kumar Rai[a], Joyce Rai[c]

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ABSTRACT

We report a novel diffuse reflectance-Fourier transforms infrared (DRS-FTIR) spectral monitoring of fluoroquinolone antibiotics such as ciprofloxacin (CIP) and norfloxacin (NOR) for their quantification in poultry egg-yolks. To the best of our knowledge, this is the first report to describe the rapid quantitative determination of fluoroquinolone antibiotics in poultry egg samples using DRS-FTIR. The characteristic absorption peaks obtained at 1627 and 1026 cm^{-1} were used for optimization and determination of CIP and NOR, respectively. The linearity range obtained for the determination of CIP and NOR in egg samples was 0.05–0.50 ng mL^{-1} with limit of detection and limit of quantification of 0.032 and 1.551 ng mL^{-1} and 0.028 and 0.194 ng mL^{-1}, respectively. Good recoveries were obtained in the range of 83.1–102.3% from poultry eggs samples using DRS-FTIR method. The advantages of the DRS-FTIR method are its simplicity, sensitivity and suitability for high-throughput analysis towards the food samples.

1. Introduction

Antibiotics, also called antibacterials, are a type of antimicrobial drugs used in the treatment and prevention of bacterial infection (Carlucci, 1998). Quinolone class of antibiotics encompass an interesting group of antimicrobial drugs whose primary target is to destroy bacterial DNA gyrase and topoisomerase IV (Carlucci, 1998; Chang, Jasmine, Pollock-Dove, & Patrick, 2017). This modified drug, named as fluoroquinolone group, is found active against the gram positive and gram negative organisms of bacterial infections (Hooper, 2001). The fluoroquinolone antibiotics have a fluorine atom attached to the 6th position of the central ring system such as ciprofloxacin (CIP) and norfloxacin (NOR). CIP hydrochloride, 1-cyclopropyl-6-fluoro-1, 4- dihydro-4-oxo-7 (1-piperazinyl)-3 quinoline carboxilic acid, a broad spectrum fluoroquinolone antibacterial agent is used for the treatment of various bacterial infections. Fluoroquinolone antibiotics are used in poultry farming as therapeutic and prophylactic agents for treatment and prevention of disease as well as growth promoters for increased growth rate and productivity (Huet et al., 2006; Mitchell, 2000). Antibiotics can transfer to human bodies through consumption of egg and meat, which cause various diseases such as diarrhea, typhoid fever and infections of lower respiratory tract, skin, bone and bone joint. The excess intakes of fluoroquinolone antibiotics through poultry eggs and meat may cause major human health problem such as increased allergic reaction and antibiotics resistance (Bansal, Guleria, & Acharya, 2013; Dincel, Yildirim, Caglayan, & Bozkurt, 2005; Lebel, 1988; Pan et al., 2018; Piatkowka, Jedziniak, & Zmudzki, 2016).

In order to ensure food safety, different regulations have been established for this class of antibiotics in poultry in the world such as (EC) No. 854/2004, (EEC) No. 2377/90, and (EC) No. 96/23/EC (Andree, Jira, Schwind, Wagner, & Schwagele, 2010; De Souza, 2005; Hao et al., 2014). Under these regulations, specific rules for the organized control on products of animals' origin intended for human consumption is established and a new procedure for determination of antibiotics residue in different sources, e.g., foodstuff of animal's origin including meat and eggs is recommended. The United State Food and Drug Administration (USFDA) has banned antibiotics such as fluoroquinolone, tetracyclines and penicillins in livestock feed and other sources. Food Safety and Standard Authority of India (FSSAI) have been established under Food Safety and Standard act (FSS Act), 2006 and Food Adulteration Act, 1954 etc. for articles of food and regulate their manufacture, storage, distribution and sale point of safe and wholesome food for human consumption. According to Food Safety and Standard (Contaminants, Toxins, and Residue) regulation, 2011 the tolerance limit has been set

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Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2): a global pandemic and treatment strategies

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ABSTRACT

The emergence and rapid spread of coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), a potentially fatal disease, is swiftly leading to public health crises worldwide. The origin of SARS-CoV-2 infection was first reported in people exposed to a seafood market in Wuhan City, China in December 2019. It has been suggested that the infection is likely to be of zoonotic origin and transmitted to humans through a not-yet-known intermediary. As of 22 May 2020, the World Health Organization reported that there were approximately 4,995,996 confirmed cases and 327,821 deaths. SARS-CoV-2 is transmitted via inhalation or direct contact with droplets from infected people. It has an incubation period ranging from 2 to ≥14 days. The rate of spread of SARS-CoV-2 is greater than that for severe acute respiratory syndrome coronavirus and Middle East respiratory coronavirus. The symptoms are similar to influenza (i.e. breathlessness, sore throat and fatigue) and infected cases are isolated and treated. Infection is mild in most cases, but in elderly (>50 years) patients and those with cardiac and respiratory disorders, it may progress to pneumonia, acute respiratory distress syndrome and multi-organ failure. People with strong immunity or those who have developed herd immunity are asymptomatic. The fatality rate ranges from 3% to 4%. Recommended methods for diagnosis of COVID-19 are molecular tests (e.g. polymerase chain reaction) on respiratory secretions, chest scan and common laboratory diagnosis. Currently, treatment is essentially supportive, and the role of antiviral agents is yet to be established as a vaccine is not yet available. This review will focus on epidemiology, symptoms, transmission, pathogenesis, ongoing available treatments and future perspectives of SARS-CoV-2.

1. Introduction

Since the 19th Century, pathogenic viral outbreaks and their complex interactions with humans and animals (species jump) have resulted in cross-species transmission, posing a great threat to human health and safety [1,2]. With rapid globalization and human activities, pathogenic transmission across continents has escalated and resulted in several pandemics, especially viral pandemics [3,4]. Over the last two decades, there has been an upsurge in newly identified coronaviruses, such as Middle East respiratory syndrome coronavirus (MERS-CoV) in Saudi Arabia [5], haemorrhagic fever viruses (Lassa, Ebola) in West Africa, and novel coronaviruses including severe acute respiratory syndrome coronavirus (SARS-CoV) and highly pathogenic influenza (avian influenza A H7N9, pandemic H1N1) in China [4,6]. These viral pandemics have resulted in substantial numbers of deaths. For example, SARS-CoV originated in bats and crossed over to humans via palm civets (host) in Guangdong Province, China; there were 8422 reported cases including 916 deaths (mortality rate 11%) in 26 countries [7]. MERS-CoV also originated in bats, with dromedary camels as the intermediate host; there were 2494 reported cases including 858 deaths (mortality rate 34%) in 27 countries [8]. Similarly, 28,637 cases of Ebola infection were notified including 11,315 deaths (mortality rate ≤40%) [9]. These pandemic situations have caused significant mortality and economic losses, and it is critical to prevent the spread of emerging viruses. This review sheds light on the current SARS-CoV-2 pandemic, epidemiology, global status and possible treatment strategies with future potential.

Coronaviruses (subfamily Coronavirinae, order Nidovirales) are common human pathogens. They are enveloped, positive-sense,

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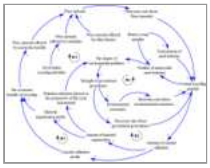

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Research article

L-cysteine modified silver nanoparticles for selective and sensitive colorimetric detection of vitamin B1 in food and water samples

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ABSTRACT

The use of L-cysteine modified silver nanoparticles (Cys-capped AgNPs) as a colorimetric probe for determination of vitamin B1 (thiamine) is described in the present work. This method is based on the measurement of red shift of localized surface plasmon resonance (LSPR) band of Cys-capped AgNPs in the region of 200–800 nm. The color of Cys-capped AgNPs was changed from yellow to colorless by the addition of vitamin B1. The mechanism for detection of vitamin B1 is based on the electrostatic interaction between positively charged vitamin B1, which causes the red shift of LSPR band from 390 nm to 580 nm. The interaction between Cys-capped AgNPs and vitamin B1 was theoretically explored by density function theory (DFT) using LANL2DZ basis sets with help of Gaussian 09 (C.01) program. The morphology, size distribution and optical properties of Cys-capped AgNPs were characterized by transmission electron microscope (TEM), UV-Visible spectrophotometry, Fourier transform infrared spectroscopy (FTIR) and dynamic light scattering (DLS) techniques. The method is linear in the range of 25–500 μg mL^{-1} with correlation coefficient (R^2) 0.992 and limit of detection of 7.0 μg mL^{-1}. The advantages of using Cys-capped AgNPs as a chemical sensor in colorimetry assay are being simple, low cost and selective for detection of vitamin B1 from food (peas, grapes and tomato) and environmental (river, sewage and pond) water samples.

1. Introduction

Vitamin B1 is a water-soluble organic compound that is used in biological and pharmaceutical fields [1, 2]. The chemical name of vitamin B1 is 3-[(4-Amino –2–methylpyrimidin-5–yl)methyl]-5-(2-hydroxyethyl)-4-methylthiazolium chloride hydrochloride ($C_{12}H_{17}ClN_4OS$, HCl), which contains an amino pyrimidine ring and a thiazole ring with hydroxyl ethyl and methyl side chains connected by a methylene bridge. Vitamins are a varied group of organic compounds, which are essential ingredients of food required for normal development, maintenance and functioning of human and animal bodies [3, 4]. On the basis of these characteristic behaviours these compounds are classified into two important groups such as water soluble groups (vitamins B and C) and fat soluble groups (vitamin A,E,D and K) [5]. Vitamin B1 (thiamine), a water-soluble compound, was first isolated in 1926 from rice bran [6, 7]. Vitamin B1 is coenzyme precursor, which involves in major cellular function such as degradation of carbon skeleton, sugar, carbohydrate metabolism process of cell, tissue maintenance, neuronal communication, cell membrane-dynamics and activation of immune system. It is used for treatment of beriberi and different forms of polyneuritis [8, 9, 10, 11, 12, 13]. Vitamin B1 is widely distributed in different foods such as pulse, meat, legumes (beans, peas), cereal products (whole grains cereals, oatmeal, wheat bran) as well as nuts, and milk [14, 15]. The human diet regularly does not contain the appropriate amount of vitamins needed for the normal development and maintenance of body functions [16, 17]. Therefore, due to the critical role of vitamin B1 in food, qualitative and quantitative analyses are major problems and a challenging work for food manufacturers [18, 19]. The determination of vitamins B1 in various food samples is slightly difficult due to the chemical instability and difficulty of matrices in which they generally exist. Thus, the development of new analytical method for the determination of vitamin B1 in food and environmental water samples is necessary. There have been various techniques reported for determination of vitamin B1 such as conventional colorimetry [1, 20], polarography/voltametry [21, 22, 23], high

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Ramsingh Kurrey[a], Mithlesh Mahilang[a], Manas Kanti Deb[a,*], Jayant Nirmalkar[b], Kamlesh Shrivas[a], Shamsh Pervez[a], Manish Kumar Rai[a], Joyce Rai[c]

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In order to ensure food safety, different regulations have been established for this class of antibiotics in poultry in the world such as (EC) No. 854/2004, (EEC) No. 2377/90, and (EC) No. 96/23/EC (Andree, Jira, Schwind, Wagner, & Schwagele, 2010; De Souza, 2005; Hao et al., 2014). Under these regulations, specific rules for the organized control on products of animals' origin intended for human consumption is established and a new procedure for determination of antibiotics residue in different sources, e.g., foodstuff of animal's origin including meat and eggs is recommended. The United State Food and Drug Administration (USFDA) has banned antibiotics such as fluoroquinolone, tetracyclines and penicillins in livestock feed and other sources. Food Safety and Standard Authority of India (FSSAI) have been established under Food Safety and Standard act (FSS Act), 2006 and Food Adulteration Act, 1954 etc. for articles of food and regulate their manufacture, storage, distribution and sale point of safe and wholesome food for human consumption. According to Food Safety and Standard (Contaminants, Toxins, and Residue) regulation, 2011 the tolerance limit has been set

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A KBr-impregnated paper substrate as a sample probe for the enhanced ATR-FTIR signal strength of anionic and non-ionic surfactants in an aqueous medium†

Ramsingh Kurrey,*[a] Manas Kanti Deb,*[a] Kamlesh Shrivas,[a] Jayant Nirmalkar,[b] Bhupendra Kumar Sen,[c] Mithlesh Mahilang[a] and Vikas Kumar Jain[d]

Herein, we report a KBr-impregnated paper substrate as a sample probe to enhance the attenuated total reflection-Fourier transform infrared (ATR-FTIR) signal strength of anionic surfactants (AS) and non-ionic surfactants (NS) in an aqueous solution. The mechanism for the sensing of AS and NS is based on the strong interaction of surfactants with the silicate groups (SiO_4^{4-}) of the KBr-impregnated paper substrate. The role of SiO_4^{4-} on the surface of the paper is to enhance the adsorption of AS and NS, resulting in improved IR signal intensities for the target analytes. The improved signal intensity at 1253 cm^{-1} (SO_4^{2-}, symmetric stretching) for AS and 1114 cm^{-1} (C–O–C, stretching vibration) for NS were selected for quantification. SEM-EDX was employed to determine the elemental compositions of pre- and post-adsorbed AS and NS on glass fibre filter paper (GFF). The linear range for the determination of AS and NS was 10–100 μg L^{-1} with a method detection limit (MDL) of 4 μg L^{-1} and method quantification limit (MQL) of 12 μg L^{-1}. The good relative recovery of 71.4–109.7% and the interference studies showed the selectivity of the method for the determination of AS and NS in environmental water and commodity samples. The advantages of this method include its cost-effectiveness, enhanced sensitivity, disposability and accessibility of the paper substrate.

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Introduction

Surfactants are surface active compounds that reduce the surface tension between two interfaces, and thus used as detergents, foaming agents, dispersants, emulsifiers and wetting agents.[1] Surfactants are generally amphiphilic in nature, containing both hydrophobic tail (water-insoluble) and hydrophilic head (water-soluble) groups. Based on their characteristic behavior, these compounds can be classified as anionic, cationic, non-ionic and amphoteric surfactants. Anionic surfactants (AS) are comprised of molecules such as soap (aliphatic carboxylic acid), alkyl sulphates, alkyl sulfonates, and alkyl benzene sulfonates. Non-ionic surfactants contain no charged groups and can be used to separate grease from clothes, such as household cleaners and dish soap.[2] Furthermore, mixed surfactant systems often also show synergistic behavior such as low critical micelle concentration (CMC) and surface-interfacial tension, resulting in a reduction in the total amount of surfactant used in a particular application, which consequently reduces both their cost and environmental impact.[3] The entry of surfactants into the human body can disrupt the activity of enzymes and normal physiological functions.[4] An earlier work reported that the absorption of anionic and non-ionic surfactants such as linear alkyl benzene sulfonate (LABS) and alkylphenol ethoxylate, respectively, through the skin can cause irritation, liver damage and other chronic symptoms.[5,6] Therefore, the determination of AS and NS in different water (river water, raw water, and sewage water) and commodity samples is important to prevent the entry of these surfactants into the water supply network.

Several spectrophotometric methods using active substances such as methylene blue, disulphine blue, cobalt thiocyanate and bismuth have been reported for the determination of AS and NS in a variety of samples.[7,8] These methods are based on the formation of an ion-pair association complex between surfactants and dyes. The ion-pair complex is then extracted with a toxic solvent such as chloroform, benzene and toluene,

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Analytical Methods

A direct DRS-FTIR probe for rapid detection and quantification of fluoroquinolone antibiotics in poultry egg-yolk

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ABSTRACT

We report a novel diffuse reflectance-Fourier transforms infrared (DRS-FTIR) spectral monitoring of fluoroquinolone antibiotics such as ciprofloxacin (CIP) and norfloxacin (NOR) for their quantification in poultry egg-yolks. To the best of our knowledge, this is the first report to describe the rapid quantitative determination of fluoroquinolone antibiotics in poultry egg samples using DRS-FTIR. The characteristic absorption peaks obtained at 1627 and 1026 cm^{-1} were used for optimization and determination of CIP and NOR, respectively. The linearity range obtained for the determination of CIP and NOR in egg samples was 0.05–0.50 ng mL^{-1} with limit of detection and limit of quantification of 0.032 and 1.551 ng mL^{-1} and 0.028 and 0.194 ng mL^{-1}, respectively. Good recoveries were obtained in the range of 83.1–102.3% from poultry eggs samples using DRS-FTIR method. The advantages of the DRS-FTIR method are its simplicity, sensitivity and suitability for high-throughput analysis towards the food samples.

1. Introduction

Antibiotics, also called antibacterials, are a type of antimicrobial drugs used in the treatment and prevention of bacterial infection (Carlucci, 1998). Quinolone class of antibiotics encompass an interesting group of antimicrobial drugs whose primary target is to destroy bacterial DNA gyrase and topoisomerase IV (Carlucci, 1998; Chang, Jasmine, Pollock-Dove, & Patrick, 2017). This modified drug, named as fluoroquinolone group, is found active against the gram positive and gram negative organisms of bacterial infections (Hooper, 2001). The fluoroquinolone antibiotics have a fluorine atom attached to the 6th position of the central ring system such as ciprofloxacin (CIP) and norfloxacin (NOR). CIP hydrochloride, 1-cyclopropyl-6-fluoro-1, 4- dihydro-4-oxo-7 (1-piperazinyl)-3 quinoline carboxilic acid, a broad spectrum fluoroquinolone antibacterial agent is used for the treatment of various bacterial infections. Fluoroquinolone antibiotics are used in poultry farming as therapeutic and prophylactic agents for treatment and prevention of disease as well as growth promoters for increased growth rate and productivity (Huet et al., 2006; Mitchell, 2000). Antibiotics can transfer to human bodies through consumption of egg and meat, which cause various diseases such as diarrhea, typhoid fever and infections of lower respiratory tract, skin, bone and bone joint. The excess intakes of fluoroquinolone antibiotics through poultry eggs and meat may cause major human health problem such as increased allergic reaction and antibiotics resistance (Bansal, Guleria, & Acharya, 2013; Dincel, Yildirim, Caglayan, & Bozkurt, 2005; Lebel, 1988; Pan et al., 2018; Piatkowka, Jedziniak, & Zmudzki, 2016).

In order to ensure food safety, different regulations have been established for this class of antibiotics in poultry in the world such as (EC) No. 854/2004, (EEC) No. 2377/90, and (EC) No. 96/23/EC (Andree, Jira, Schwind, Wagner, & Schwagele, 2010; De Souza, 2005; Hao et al., 2014). Under these regulations, specific rules for the organized control on products of animals' origin intended for human consumption is established and a new procedure for determination of antibiotics residue in different sources, e.g., foodstuff of animal's origin including meat and eggs is recommended. The United State Food and Drug Administration (USFDA) has banned antibiotics such as fluoroquinolone, tetracyclines and penicillins in livestock feed and other sources. Food Safety and Standard Authority of India (FSSAI) have been established under Food Safety and Standard act (FSS Act), 2006 and Food Adulteration Act, 1954 etc. for articles of food and regulate their manufacture, storage, distribution and sale point of safe and wholesome food for human consumption. According to Food Safety and Standard (Contaminants, Toxins, and Residue) regulation, 2011 the tolerance limit has been set

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Application of functionalized silver nanoparticles as a biochemical sensor for selective detection of lysozyme protein in milk sample

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ABSTRACT

Silver nanoparticles (AgNPs) functionalized with glutamic acid (GA) was used as a biochemical sensing probe in colorimetry for detection of lysozyme protein in milk samples. The method is based on the color change of AgNPs/GA from yellow to reddish-yellow differentiated with naked eyes for qualitative determination and red shift of localized surface plasmon resonance (LSPR) absorption signal intensity of AgNPs/GA in visible region used for quantitative determination of lysozyme. The control experiments were performed to demonstrate the electrostatic force of interactions between AgNPs/GA and protein molecule. A wide linear range of 3-150 nM with limit of detection of 1.5 nM was acquired for quantitative determination of lysozyme using AgNPs/GA as a biochemical sensing probe. The advantages of using AgNPs/GA as a biochemical sensing probe are simple, label-free and economic for determination of lysozyme from milk samples.

1. Introduction

The analysis of proteins and enzymes in biological samples is very important in clinical diagnosis and prevention of diseases. Lysozyme is present in body fluids of mammals that include in tears, saliva, plasma, urine and milk [1,2]. The presence of this protein in human body is to develop an immune system and acts as an excellent bactericide by destroying the cell wall of bacteria when foreign microorganism attacks on the immune system. The concentration level of lysozyme in body fluid is closely related to leukemia as well as bacterial infections such tuberculosis, renal diseases and inflammatory bowel diseases [3–5]. The lysozyme is mostly taken through the various food materials and therefore an adequate analytical method is required for analysis of lysozyme in food samples.

There are several analytical techniques such as thin layer chromatography (TLC) [6], high performance liquid chromatography (HPLC) [7,8], enzyme immunoassay (EIA) [9], capillary electrophoresis (CE) [10], matrix-assisted laser desorption/ionization mass spectrometry (MALDI-MS) [11], surface enhanced Raman spectroscopy (SERS) [12], electrospray ionization mass spectrometry (ESI-MS) [13], cyclic voltammetry (CV) [14] and electrochemical methods [15,16] are reported for determination of lysozyme in variety of samples. Chromatographic and mass spectrometric methods require an expensive pure regents and organic solvents though these methods showed a considerable high detection limits. The enzyme immunoassay (EIA) method is low cost where a specific enzyme labeled antibodies and antigens react with protein to quantify the amount of analyte present in sample [9]. The drawback of EIA is strength of the color change doesn't accurately reflect the amount of analyte present in the sample. The fluorimetric method is highly selective and sensitive for determination of lysozyme from biological samples that require a specific flourophore to react with analyte molecule and re-emit light upon excitation [17]. Li et al. demonstrated the use of CdSe quantum dots (QDs) for quantitative determination of lysozyme from biological samples though the CdSe QDs is toxic in nature [18]. The colorimetric methods are found to be simple, low cost and rapid as well as it can be applied at the sample source for determination of protein [19]. The major drawback of this method is selectivity of chromophoric reagent to react with target analyte and occasionally it reacts with other sample matrix. Lou and Chen groups employed the NPs-based colorimetric chemical sensor for detection of lysozyme in egg sample based on electrostatic force of interactions [20,21]. The use of EIA, fluorimetric and colorimetric methods require

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Silver nanoparticles for selective detection of phosphorus pesticide containing π-conjugated pyrimidine nitrogen and sulfur moieties through non-covalent interactions

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ABSTRACT

Bare silver nanoparticles were employed as a chemical sensor for selective detection of diazinon pesticide in fruit and vegetable samples. The sensing mechanism for detection of diazinon is based on the color change of AgNPs from yellow to pinkish-red followed by the red shift of LSPR absorption band in UV–Vis region after the addition of analyte in to the NPs solution. The color change and shift of LSPR band of AgNPs are observed only with diazinon molecule due to the π-conjugated pyrimidine nitrogen and sulfur moieties as well as specific orientation of diazinon molecule favored the non-covalent interactions with NPs. The control experiments with different pesticides and density functional theory (DFT) studies were also performed to validate the interactions between diazinon with AgNPs. Good linear range of 20–600 ng mL^{-1} with limit of detection of 7 ng mL^{-1} was obtained for determination of diazinon using AgNPs as a chemical sensor. Bare AgNPs was successfully exploited for quantitative determination of diazinon in fruit and vegetable samples (apple, grapes, beans and potato). The advantages of the present method are simple, rapid, selective as well as economic for the detection of pesticide in vegetable and fruit samples.

1. Introduction

Diazinon is a phosphorus containing pesticide used to control the insects on fruit, vegetable, nut and field crops in agriculture. The ingestion and inhalation of pesticide through water, food and breathing may cause harmful effect on human beings. Diazinon may enter into the body through drinking water or food, skin contact or by inhalation [1,2]. Larger exposures can cause muscle spasms or stiffness, muscle weakness or paralysis, rapid heart rate, seizures, convulsions, or coma [3,4]. Therefore, the determination of diazinon in fruit and vegetable samples is very important in order to prevent the entry of this pesticide into the environmental samples.

Many analytical techniques such as gas chromatography (GC) [5], high performance liquid chromatography (HPLC) [6], GC–mass spectrometry (GC–MS) [7], HPLC-MS [8], electrochemical (EC) [9,10], spectrophotometry (colorimetry) [11] and molecularly imprinted polymer sensor [12] are available for determination of diazinon in different type of samples. GC, HPLC, EC, GC–MS and HPLC-MS instruments are found to be tedious and time consuming for sample preparations as well as expensive due to the use of high purity chemicals for detection of pesticide. Among these, colorimetric are found to be very simple and low cost for determination of diazinon. The drawback of colorimetric method is use of chromophoric reagents or dye which forms the colored complex with pesticide. Sometimes these reagents are not found selective and cause the interference at low concentration of analyte. Therefore, a chromophoric reagent-free method is required for selective detection of diazinon pesticide from complex sample matrices.

Recently, noble metals nanomaterials, such as gold (Au) copper (Cu) and silver (Ag) have received a great interest because of their distinctive catalytic, plasmonics, mechanical, electronic and optical properties [13,14]. Recently, the use of AuNPs is demonstrated for selective detection of vitamins, nucleic acid, drug and metal ions using AuNPs as chemical sensors/probes in food, biological and environmental samples [15–19]. AgNPs showed several distinct optical and electronic properties, such as high extinction coefficients, high electrical, thermal conductivity, surface-enhanced Raman scattering and thermal conductivity. Thus, AgNPs have different applications in catalysis, tumor detection, drug delivery, wound healing, diagnostics, detection of pathogens and antimicrobial investigations [20–22]. Localized surface Plasmon resonance (LSPR) is the most important property of AgNPs exploited for colorimetric sensing of variety of analytes in several types of environmental, biological, food and pharmaceutical samples. LSPR is a collective oscillation of free electrons on the metal surface of NPs

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1. Introduction

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Many analytical techniques such as gas chromatography (GC) [5], high performance liquid chromatography (HPLC) [6], GC–mass spectrometry (GC–MS) [7], HPLC-MS [8], electrochemical (EC) [9,10], spectrophotometry (colorimetry) [11] and molecularly imprinted polymer sensor [12] are available for determination of diazinon in different type of samples. GC, HPLC, EC, GC–MS and HPLC-MS instruments are found to be tedious and time consuming for sample preparations as well as expensive due to the use of high purity chemicals for detection of pesticide. Among these, colorimetric are found to be very simple and low cost for determination of diazinon. The drawback of colorimetric method is use of chromophoric reagents or dye which forms the colored complex with pesticide. Sometimes these reagents are not found selective and cause the interference at low concentration of analyte. Therefore, a chromophoric reagent-free method is required for selective detection of diazinon pesticide from complex sample matrices.

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The direct-writing of low cost paper based flexible electrodes and touch pad devices using silver nano-ink and ZnO nanoparticles†

Kamlesh Shrivas, *[ab] Archana Ghosale,[a] Tushar Kant,[b] P. K. Bajpai[c] and Ravi Shankar[d]

We report a novel and simple approach for the synthesis of silver nanoparticles capped with inositol (Ag NPs/Ino) by the reduction of silver salt with ascorbic acid under basic conditions. UV-vis, TEM, FTIR and TGA techniques were used to characterize the Ag NPs/Ino to determine the size, shape and surface modification of the NPs. Stable silver nano-ink was prepared in aqueous solution containing 1% PVP (stabilizer) and glycerol (cosolvent) and was used for the direct-writing of a paper electrode with a roller ball-point pen for electrochemical applications. The solvent, stabilizing agents, concentration of NPs (10%), paper substrate, sintering temperature (40 °C) and sintering time (15 min) were optimized to obtain a uniform coating of Ag NPs on the paper substrate. Further, the synthesis and fabrication of ZnO NPs on a paper substrate was put forward to design a touch pad device based on the piezoelectric effect. The preparation of paper based devices suggests a direction for the development of a simple, low cost and compatible approach for the direct-writing of paper based flexible electrodes and electronics for future applications.

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Introduction

The preparation of functional conductive materials has been widely investigated by several researchers for a variety of applications such as transistors,[1] displays,[2] solar cells,[3] capacitors,[4] and touch pads.[5] Among these, the touch pad is basically made of an input device for sending the signals to an appliance by mechanical touch with a finger. It acts as an interface between the finger of a person and the device. The main phenomenon involved in this process is the piezoelectric effect where the pressure applied on the solid surface will transform the electric current to the device for a desired function.[6] Commonly, substrates used are made of polymeric and plastic materials for preparation of flexible touch pad devices.[7] The disadvantages of using these type of substrate are they are expensive and non-biodegradable. Recently, paper has been used as a substrate for preparation of flexible electronics because it is commercially and easily available with different sizes, width and porosity. It provides the fabrication of functional materials for the preparation of low cost, biodegradable and flexible electronics.[8] Paper is composed of a natural polymer of cellulose with multiple folding and compact 3D structures with pores. Hence, a paper based touch pad is prepared where the flow of piezoelectricity is due to the fabrication of functional nanomaterials on the paper substrate.[9]

The term piezoelectricity is referred to the electricity produced as result of a change in pressure and latent heat. It is derived from the Greek word 'piezein', which means 'to press' or 'to squeeze'. Therefore, piezoelectricity is a flow of electric charge that mounts on certain solid materials due to the applied mechanical stress. Piezoelectricity is a result of linear electromechanical interaction between mechanical and electrical states on crystalline materials with no inversion of symmetry and it is a reversible process.[10] There are various materials that show piezoelectric properties such as certain crystals, ceramics and also some biomolecules (*e.g.* DNA and certain proteins). Nanoparticles (NPs), such as ZnO,[11,12] ZnS,[13] CdS[14] and CdSe[15] also show piezoelectric properties. Among these, ZnO NPs exhibited extraordinary semiconducting and piezoelectric properties with good stability and cost effectiveness. Thus, they are a better choice for the preparation of piezoelectric devices from this type of nanomaterial.

The connectivity of piezoelectric devices is created through plastic wires which are found to be complex and expensive. This can be minimized by the preparation of a fabricated conductive electronic circuit with metal NPs. The fabricated circuit can be made from conductive NPs such as (Au),[16] silver (Ag)[17] and copper (Cu).[18] Among these, Ag NPs showed a better conductive

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Determination of uranium in environmental sample by nanosensor graphene quantum dots

Pradeep Kumar Dewangan[1] · Fahmida Khan[1] · Kamlesh Shrivas[2] · Vinayak Sahu[1]

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Abstract
The unique properties of graphene quantum dots (GQDs) i.e. low toxicity, excellent water solubility, low cost, high photostability, biocompatibility, and small size have attracted tremendous attention for new research prospects in the detection of metal ions. The fluorescence properties of GQDs are used for qualitative and quantitative analysis of U(VI) ion. The fluorescence of GQDs is intensively quenched by uranium. Synthesized GQDs were characterized by UV–visible spectroscopy, FTIR, Transmission electron microscopy, fluorescence spectrophotometry. Results indicate a single layer of GQDs, small size. Optimum pH is 7 for uranium detection and up to 1.5 ppb of U(VI) ion is accurately determined.

Keywords Graphene quantum dots · Uranium ion · Fluorescence spectroscopy · Pyrolysis · Glucose

Introduction

Uranium is a radioactive and chemical toxic substance severely hazardous for health [1]. Permissible limit of uranium in potable water is 30 ppb as standardize by WHO [2]. Exceeding this limit aggravates several health hazards. This may be fatal due to the chronic consumption of such radio contaminated water [3]. Uranium accumulates in skeleton and kidney. Chemical toxicity causes nephritis [4, 5]. Uranium has an estrogenic effect, it is an endocrine disrupter [6, 7]. All radiation is bad for us. There is a linear relationship as more radiation we get, the more chromosome breaks and serious fertility issue [8]. When people are exposed to uranium radionuclides, that are formed during radioactive decay for a long period of time, these are carcinogenic and have an immense effect on living beings due to highly radioactive effect [9]. Enriched uranium enters the environment due to accidental leakage in nuclear power station [10]. So the detection of uranium is important. Many methods such as inductively coupled plasma–optical emission spectrometry and flow injection–inductively coupled plasma mass spectrometry [11, 12]; atomic absorption spectroscopy [13], laser-induced kinetic phosphorimetry [14], electrochemical methods total reflection X-ray fluorescence spectrometry [15], Cathodic adsorptive stripping voltammetry; cold-vapor atomic spectrometry and adsorptive cathodic stripping voltammetry [16, 17] have been employed for detection and determination of U(VI). Adsorption of heavy metals by GO is also reported earlier [18]. These are time-consuming and require sophisticated and costly instruments. Therefore, there is a need to develop a simple procedure for the determination of uranium ion in a water sample for highly sensitive and selective detection. Fluorescence methods for determining U(VI) have attained much attention because of their simplicity, convenience, and high sensitivity.

Graphene quantum dots (GQDs) are the most attracting fluorescence probe as quantum dots system with strong fluorescent properties to be the promising candidate to substitute the traditional semiconductor quantum dots. They have received tremendous attention in nanoscience and nanotechnology, due to their unique luminescent properties, large surface area, photostability against photobleaching and blinking, chemical inertness, eco-friendly and highly tunable photoluminescence properties [18–22]. Graphene is a honeycomb-like two-dimensional (2D) structure, single layered of highly dense carbon atoms [23]. It has excellent chemical, mechanical, electronic, thermal properties, due to quantum confinement and edge effects. Therefore, it is widely used in FET [24], optoelectronics [25], bio-labelling

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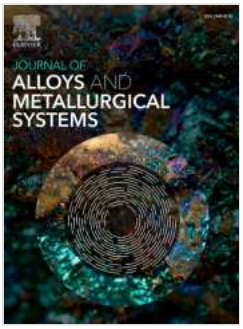

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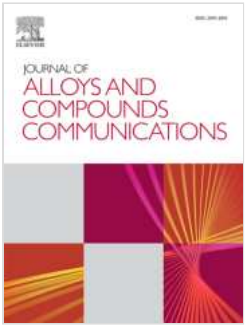

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Role of precursors in controlling the size, shape and morphology in the synthesis of copper sulfide nanoparticles and their application for fluorescence detection

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Morphology

ABSTRACT

Synthesis of well controlled pure phase of CuS with defined shapes and sizes remains a challenge for effective applications. We studied the role of copper and sulfur source precursors in controlling the size, shape and morphology of CuS nanostructures using synthesized refluxing method. CuS nanoparticles are synthesized by varying $Cu(CH_3COO)_2 \cdot H_2O$, $Cu(NO_3)_2 \cdot 3H_2O$, $CuSO_4 \cdot 5H_2O$ as copper precursors and CH_4N_2S, $Na_2S_2O_3 \cdot 5H_2O$, Na_2S as sulfur precursors. As synthesized copper sulfide nanoparticles were characterized by X-ray diffraction (XRD), Field emission scanning electron microscopy (FESEM), transmission electron microscopy (TEM), selected area electron diffraction (SAED), energy dispersive X-ray (EDX), Ultra Violet - visible spectrophotometer (UV–Vis), Fourier transform infrared spectroscopy (FT-IR), and micro Raman spectroscopy. All precursors result into nano-size single phase covellite copper sulfide, except sodium sulfide as a sulfur source which resulted into mixed phases. Morphology of nano-systems varies (hexagonal plate like, tube like, cluster of nanoparticles, plate like and ball like nano-structures) with varying precursors. TEM images show particle size variation (particle size 20–25 nm). Elemental analysis using EDX confirm that stoichiometric ratio of Cu/S is approximately 1:1 which is in good agreement with the starting molar ratio. FT-IR and Raman spectra confirm the absence of Cu_2S and the band width of S-S stretch mode is correlated with particle size. Optical energy band gap varies in the range 1.80–2.31 eV and is also correlated with crystalline size. The release rate of S^{2-} ions in sulfur source and polarization of counter anion in copper source are found to be the deciding factors in controlling the size, shape and morphology.

1. Introduction

Synthesis and characterization of nano-crystalline chalcogenide semiconductors have attracted significant interest and remain the subject of intense investigation owing to their important physical and chemical properties [1]. Among these, synthesis of copper sulfide nanostructures has been followed due to its non-toxic nature and low cost for their use in the field of solar cells [2], lithium ion batteries [3], solar controller [4], nanoscale switches [5], opto-electronic devices [6], photosensor [7] and catalyst etc [8]. At low temperature copper sulfide shows metallic conductivity and transforms into superconducting material at 1.6 K [9]. Formation of phase pure copper sulfide nanoparticles has been a challenge due to their ability to form various non-stoichiometric phases due to the variable valence states of copper forming binary inorganic compositions having general formula Cu_xS_y [10,11]. Cu_xS_y are p-type semiconductors with copper vacancies as acceptor sites ranging from copper rich chalcocite (Cu_2S), djurleite ($Cu_{1.95}S$), digenite ($Cu_{1.8}S$), anilite ($Cu_{1.75}S$) to sulfur rich covellite (CuS) [12]. Copper sulfide has been reported to form a variety of semiconductor nanocrystalline structures with different shapes including nanowires [13], nanotubes [14], nano walls [15], flower-like [16], nanoplates [17], nanoflakes [18], nanowhiskers [19], hollow spheres [20]. However, the effect of precursors in controlling the shape and size of nanoparticles has not been followed systematically, which is required in controlling the morphology of nanostructures.

Several physical and chemical routes have been attempted for the Cu_xS_y synthesis including solid state reaction [21],

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An example of green surfactant systems based on inherently biodegradable IL-derived amphiphilic oximes

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ABSTRACT

Progress in the development of biodegradable ionic liquids (ILs) leads to designing green surfactant formulations for miscellaneous applications. In this work, we present synthesis of a series of novel IL-derived amphiphilic pyridinium oximes composed by octylamide tail linked to the headgroup by means of amide, 4-((hydroxyimino)methyl)-1-(2-(octylamino)-2-oxoethyl)pyridin-1-iumbromide, **4-PyC8**), alanyl ((*S*)-4-((hydroxyimino)methyl)-1-(2-((1-(octylamino)-1-oxopropan-2-yl)amino)-2-oxoethyl) pyridin-1-ium bromide, **4-PyAlaC8**), or phenylalanyl ((*S*)-2-((hydroxyimino)methyl)-1-(2-((1-(octylamino)-1-oxo-3-phenylpropan-2-yl)amino)-2-oxoethyl)pyridin-1-ium bromide, **2-PyPheC8**), *S*)-3-((hydroxyimino)methyl)-1-(2-((1-(octylamino)-1-oxo-3-phenylpropan-2-yl)amino)-2-oxoethyl)pyridin-1-iumbromide, **3-PyPheC8**), and (*S*)-4-((hydroxyimino)methyl)-1-(2-((1-(octylamino)-1-oxo-3-phenylpropan-2yl)amino)-2-oxoethyl) pyridin-1-ium bromide, **4-PyPheC8**) moiety. Their biodegradability examined in the closed bottle test shown the dependence on the amino acid structure and follows the tendency Phe > Ala > amide. Phenylalanine-based oximes demonstrate >30% of degradation in the CBT after 42 days and can be considered as inherently degradable. The acid ionization constant (pK_a) of studied oximes determined by means of UV–vis spectroscopy at 27 °C were found to be in the range from 8.00 to 9.00. The $pK_{a,app}$ values of oximes in the presence of cationic gemini surfactants, 12-4-12- and 16-10-16, change insignificantly whereas they shifted upwards in the presence of anionic surfactant SDS. The nucleophilic cleavage of organophosphorus triester PNPDPP under optimal concentration conditions of **4-PyC8** come about with half-life times 40 s under mild condition (pH 9.00). These results provide new information on control the green microorganized nucleophilic systems for chemical decontamination.

1. Introduction

Ionic liquids (ILs) are increasingly seen nowadays as an integral part of green chemistry applications [1–3] with a particular attention to their biocompatibility and biodegradability [4–7]. An attractive feature of ILs is the ability to refine the structure, to tailor the properties for a desired application. The ILs with long chains are capable to form aggregates in aqueous solutions similar to that of conventional surfactants and are called the surface-active ionic liquids (SAILs) [8,9]. This overlapping between surfactant and IL chemistry causes the increased interest to the synthesis, self-organization, and applications of SAILs, including developing micellar catalytic systems [10,11]. Progress in the development of biodegradable ionic liquids ILs allowed finding sustainable fragments to assist the synthesis of sustainable molecules by means of "benign by design" approach [12,13]. The novel SAILs are expected to combine advanced colloid properties with lowered risk for the environment [14]. We have reported recently a versatile approach towards the synthesis of biodegradable amino acid derived ILs [12,13] to open the opportunities for developing SAILs with optimized environmental toxicity [15] and tunable properties [16] in their self-assembly, antimicrobial activity, and biodegradability. Among the L-phenylalanine (Phe) derived SAILs reported in our recent report [16], the medium chain length (namely, *n*-hexyl and *n*-octyl esters) derivatives bearing pyridinium headgroup were pointed out to be the prospective green alternatives for conventional surfactants and to be considered as the base for miscellaneous applications.

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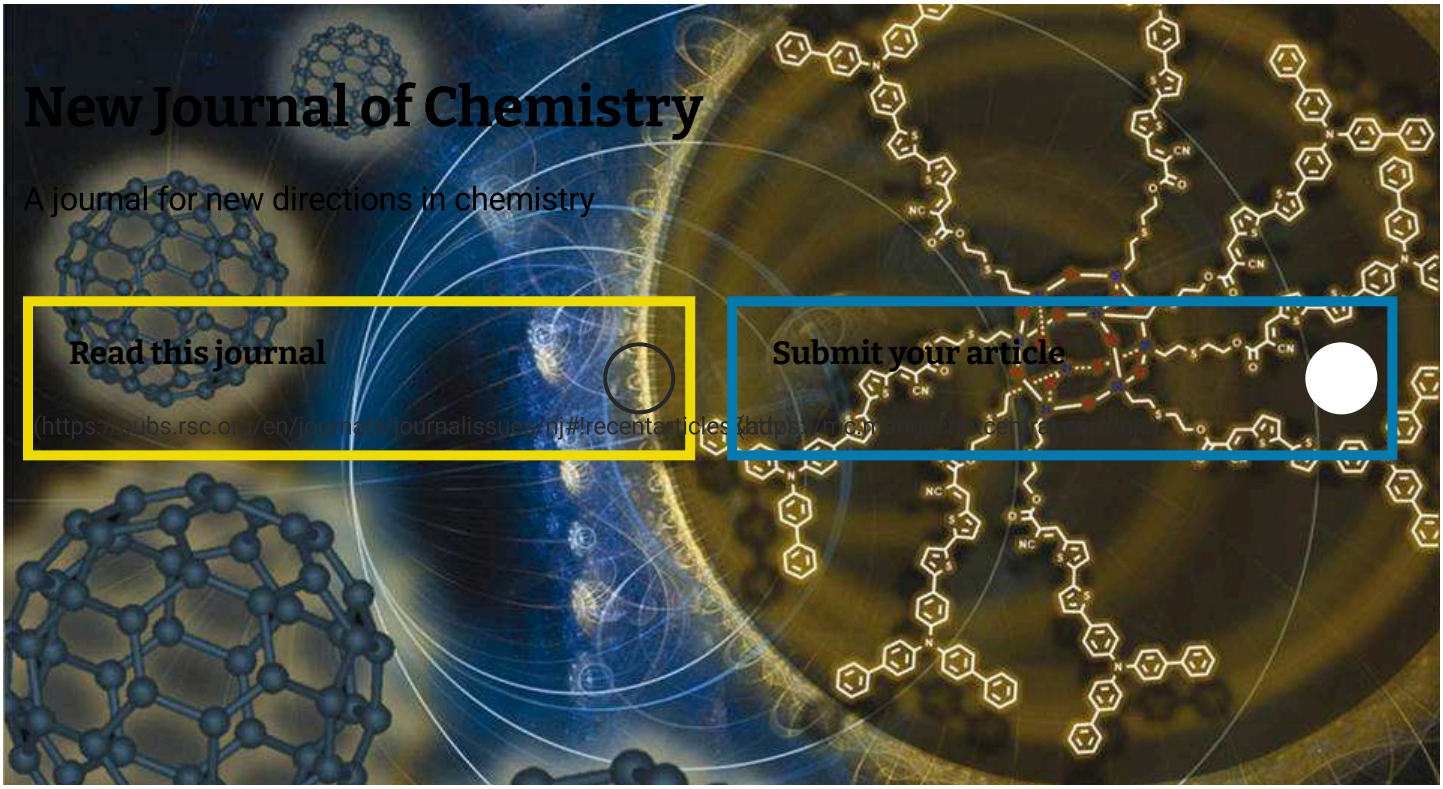

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From the journal:
New Journal of Chemistry

A low-cost paper-based flexible energy storage device using a conducting polymer nanocomposite †

Rama Devi [a], Kavita Tapadia [a], Tushar Kant [b], Archana Ghosale [c], Kamlesh Shrivas [*b], Indrapal Karbhal [b] and Tungabidya Maharana [*a]

Author affiliations

Abstract

Herein, a simple approach is demonstrated for the fabrication of a paper-based flexible symmetrical supercapacitor as an energy saving device with composite functional materials of nickel nanoparticles (Ni NPs) and polypyrrole (PPy). Specifically, an Ni@PPy nanocomposite was synthesized through a two-step process involving the growth of Ni NPs, followed by pyrrole polymerization on a paper substrate. The paper fabricated with Ni@PPy showed an electrical conductivity of 105 S cm^{-1}. The paper-based flexible supercapacitor device configured with Ni@PPy/electrolyte/Ni@PPy was evaluated for electrochemical performance, and it showed a good specific capacitance of 544 F g^{-1} at 1 A g^{-1}. A better specific energy of 48 W h kg^{-1}, specific power of 400 W kg^{-1}, and good cycling stability (68.3% capacitance retention after 3000 cycles at 5 A g^{-1}) were obtained for the paper-based flexible supercapacitor compared with other reported polymer-based nanocomposite materials. The obtained results suggest that the fabricated paper-based supercapacitor is inexpensive, sustainable, highly efficient, portable and flexible for a wide range of electronic applications.

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Flexible printed paper electrode with silver nano-ink for electrochemical applications

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ABSTRACT

Development of low-cost paper based disposable electrodes printed with silver nano-ink using desktop inkjet printer is reported in this work. A stable nano-ink was prepared by dissolving 3% silver nanoparticles (AgNPs) capped with polyvinylpyrrolidone (PVP) in ethanol as a dispersing solvent. Highly stable silver nano-ink with surface tension of 21.1 mN/M and viscosity of 2.6 mPa.S was prepared for printing on photo paper that can be used as an electrode for electrochemical analyses. The fabricated paper electrode was exploited as a counter electrode in cyclic voltammetry (CV) analysis of potassium ferricyanide with better stability and reproducibility (relative standard deviation (RSD) 1.6%) for multiple times of analyses ($n = 60$) and compared with the results of conventional electrodes. Further, the printed paper electrode was demonstrated to be used as a working electrode for analysis of nitrate by CV. The use of paper electrode is found to be simple, rapid, user-friendly and can be applied at the sample source for determination of nitrate from different samples.

1. Introduction

There is always increasing demand for more facile and cost-effective route to prepare the electronic devices that should be flexible, eco-friendly, light weight and disposable. The attention has been drawn in the direction of preparation of flexible printed electronics using metal nanoparticles (NPs) based conductive nano-inks. Recently, different techniques including physical lithography, sputtering, chemical vapor deposition and spin coating have been demonstrated for fabrication of conducting inks on solid surfaces to prepare electronic devices [1,2]. These techniques provide a homogenous and smooth deposition of functional materials on solid surface, but they need controlled temperature and contaminant free environment which are found to be expensive and difficult to maintain. Screen printing is also used for large scale production of electronic devices where mesh is used to fabricate the substrate, which is time consuming and tedious process. To overcome these disadvantages, the improvement of useful and low-cost processing technique is needed to fabricate the conductive materials. There are other alternative simple and low-cost techniques available for fabrication of nanomaterials on solid substrates such as direct writing, roller ball pen, sketching and brush painting [3,4]. The drawbacks of these techniques are formation of non-uniform layer of fabricated materials on solid substrate. Recently, inkjet printing has wide application due to its low cost, rapidity and simplicity in printing the designed digital file. In inkjet printing, the head ejects a very small quantity of ink on to the substrate based on the design of fabrication. Inkjet printing is considered to be an efficient and highly well-designed technique for micro scale patterning of metallic nanomaterial's [5].

Flexible circuit and printed electronic devices are produced by deposition of single or multiple layers of active materials like conductive inks or dielectric inks onto the solid substrates such as plastic, glass, polymers, ceramics, *etc.* [6,7]. The devices made from theses substrates are expensive as well as after the use it is non-biodegradable into the environment. The research and development should always need to decrease the electronic waste as well as it should be biodegradable, flexible and harmless to human beings. Paper substrate is being a better substitute in place of plastics because it is eco-friendly, inexpensive, flexible and sustainable [8]. Paper based devices have been emerging as a recent trend in developing new analytical devices for wide range of applications in the fields such as clinical, food and environmental

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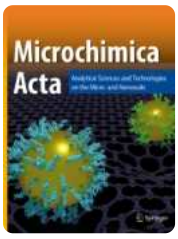

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ORIGINAL PAPER

Colorimetric and smartphone-integrated paper device for on-site determination of arsenic (III) using sucrose modified gold nanoparticles as a nanoprobe

Kamlesh Shrivas[1] · Sanyukta Patel[2] · Deepak Sinha[2] · Santosh Singh Thakur[3] · Tarun Kumar Patle[1] · Tushar Kant[1] · Khemchand Dewangan[4] · Manmohan L. Satnami[1] · Jayant Nirmalkar[5] · Suneel Kumar[6]

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Abstract

An optical colorimetric and smartphone-integrated paper device (SIPD) is demonstrated for determination of As (III) in water and soil samples using sucrose modified gold nanoparticles (AuNPs/Suc) as a nanoprobe. The mechanism for determination of As(III) is experimentally validated by performing UV-Vis, transmission electron microscope (TEM), Fourier transforms infrared spectroscopy (FTIR) and dynamic light scattering (DLS) measurements. The density function theory (DFT) calculations using B3LYP with 6-311G (2d,2p) and LANL2DZ basis sets is used to theoretically prove the mechanism for determination of As(III). In addition, the paper fabricated with AuNPs/SuC was used as a nanoprobe for quantitative determination of As(III) using smartphone and ImageJ software. Calibration plot was linear over 10–800 μgL^{-1} for colorimetric determination of As(III) with limit of detection (LOD) of 4 μgL^{-1} acquired when the absorbance ratio obtained at 594 nm/515 nm. The linearity range of 50–3000 μgL^{-1} with LOD of 20 μgL^{-1} was determined using smartphone-integrated paper device. AuNPs/Suc is successfully employed for determination of As (III) from contaminated water and soil samples in colorimetry and SIPD.

Keywords Arsenic (III) · Colorimetry · Smartphone-paper device · Gold nanoparticles

Introduction

Arsenic is a ubiquitous element with metalloid property. It is distributed in earth crust, soils, rocks and exists in nature in the form of inorganic and organic materials with oxidation state of -III, +III and + V. Arsenic is a one of the most toxic chemical substance present due to its carcinogenic in nature [1, 2]. The presence of arsenic in drinking water may relate to increased risk of diseases such as skin cancer, lungs, bladder, kidney, etc. [3, 4]. Therefore, the monitoring of arsenic present in water sample is an important issue to avoid the entry of this noxious pollutant in environmental samples. There are several techniques such as electrothermal atomic adsorption spectrometry (ET-AAS) [5], inductively coupled plasma-optical emission spectrometry (ICP-OES) [6], voltammetry [7], surface enhanced Raman scattering (SERS) [8], hydride generation-atomic absorption spectrometry (HG-AAS) [9], inductively coupled plasma mass spectrometry (ICP-MS) [10], hydride generation-atomic fluorescence spectroscopy (HG-AFS) [11], x-ray fluorescence (XRF) [12] and spectrophotometry [4] have been reported for the determination of arsenic in different types of samples. Among these, spectrophotometry

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ORIGINAL PAPER

Colorimetric and smartphone-integrated paper device for on-site determination of arsenic (III) using sucrose modified gold nanoparticles as a nanoprobe

Kamlesh Shrivas[1] · Sanyukta Patel[2] · Deepak Sinha[2] · Santosh Singh Thakur[3] · Tarun Kumar Patle[1] · Tushar Kant[1] · Khemchand Dewangan[4] · Manmohan L. Satnami[1] · Jayant Nirmalkar[5] · Suneel Kumar[6]

Received: 26 August 2019 / Accepted: 19 January 2020

Abstract

An optical colorimetric and smartphone-integrated paper device (SIPD) is demonstrated for determination of As (III) in water and soil samples using sucrose modified gold nanoparticles (AuNPs/Suc) as a nanoprobe. The mechanism for determination of As(III) is experimentally validated by performing UV-Vis, transmission electron microscope (TEM), Fourier transforms infrared spectroscopy (FTIR) and dynamic light scattering (DLS) measurements. The density function theory (DFT) calculations using B3LYP with 6-311G (2d,2p) and LANL2DZ basis sets is used to theoretically prove the mechanism for determination of As(III). In addition, the paper fabricated with AuNPs/SuC was used as a nanoprobe for quantitative determination of As(III) using smartphone and ImageJ software. Calibration plot was linear over 10–800 μgL^{-1} for colorimetric determination of As(III) with limit of detection (LOD) of 4 μgL^{-1} acquired when the absorbance ratio obtained at 594 nm/515 nm. The linearity range of 50–3000 μgL^{-1} with LOD of 20 μgL^{-1} was determined using smartphone-integrated paper device. AuNPs/Suc is successfully employed for determination of As (III) from contaminated water and soil samples in colorimetry and SIPD.

Keywords Arsenic (III) · Colorimetry · Smartphone-paper device · Gold nanoparticles

Introduction

Arsenic is a ubiquitous element with metalloid property. It is distributed in earth crust, soils, rocks and exists in nature in the form of inorganic and organic materials with oxidation state of -III, +III and + V. Arsenic is a one of the most toxic chemical substance present due to its carcinogenic in nature [1, 2]. The presence of arsenic in drinking water may relate to increased risk of diseases such as skin cancer, lungs, bladder, kidney, etc. [3, 4]. Therefore, the monitoring of arsenic present in water sample is an important issue to avoid the entry of this noxious pollutant in environmental samples. There are several techniques such as electrothermal atomic adsorption spectrometry (ET-AAS) [5], inductively coupled plasma-optical emission spectrometry (ICP-OES) [6], voltammetry [7], surface enhanced Raman scattering (SERS) [8], hydride generation-atomic absorption spectrometry (HG-AAS) [9], inductively coupled plasma mass spectrometry (ICP-MS) [10], hydride generation-atomic fluorescence spectroscopy (HG-AFS) [11], x-ray fluorescence (XRF) [12] and spectrophotometry [4] have been reported for the determination of arsenic in different types of samples. Among these, spectrophotometry

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From the journal:
New Journal of Chemistry

A low-cost paper-based flexible energy storage device using a conducting polymer nanocomposite †

Rama Devi [a], Kavita Tapadia [a], Tushar Kant [b], Archana Ghosale [c], Kamlesh Shrivas [b], *[b] Indrapal Karbhal [b] and Tungabidya Maharana *[a]

Author affiliations

Abstract

Herein, a simple approach is demonstrated for the fabrication of a paper-based flexible symmetrical supercapacitor as an energy saving device with composite functional materials of nickel nanoparticles (Ni NPs) and polypyrrole (PPy). Specifically, an Ni@PPy nanocomposite was synthesized through a two-step process involving the growth of Ni NPs, followed by pyrrole polymerization on a paper substrate. The paper fabricated with Ni@PPy showed an electrical conductivity of 105 S cm^{-1}. The paper-based flexible supercapacitor device configured with Ni@PPy/electrolyte/Ni@PPy was evaluated for electrochemical performance, and it showed a good specific capacitance of 544 F g^{-1} at 1 A g^{-1}. A better specific energy of 48 W h kg^{-1}, specific power of 400 W kg^{-1}, and good cycling stability (68.3% capacitance retention after 3000 cycles at 5 A g^{-1}) were obtained for the paper-based flexible supercapacitor compared with other reported polymer-based nanocomposite materials. The obtained results suggest that the fabricated paper-based supercapacitor is inexpensive, sustainable, highly efficient, portable and flexible for a wide range of electronic applications.

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RESEARCH PAPER

Smartphone coupled with paper-based chemical sensor for on-site determination of iron(III) in environmental and biological samples

Kamlesh Shrivas[1] · Monisha[1] · Tushar Kant[1] · Indrapal Karbhal[1] · Ramsingh Kurrey[1] · Bhuneshwari Sahu[1] · Deepak Sinha[2] · Goutam Kumar Patra[3] · Manas Kanti Deb[1] · Shamsh Pervez[1]

Received: 1 November 2019 / Revised: 20 December 2019 / Accepted: 30 December 2019

Abstract

We report a smartphone–paper-based sensor impregnated with cetyltrimethylammonium bromide modified silver nanoparticles (AgNPs/CTAB) for determination of Fe^{3+} in water and blood plasma samples. The methodology for determination of Fe^{3+} is based on the change in signal intensity of AgNPs/CTAB fabricated on a paper substrate after the deposition of analyte, using a smartphone followed by processing with ImageJ software. The mechanism of sensing for detection and determination of Fe^{3+} is based on the discoloration of AgNPs which impregnated the paper substrate. The discoloration is attributed to the electron transfer reaction taking place on the surface of NPs in the presence of CTAB. Fe^{3+} was determined when the paper was impregnated with 1 mM AgNPs for 5 min of reaction time and the substrate was kept under acidic conditions. The linear range for determination of total iron in terms of Fe^{3+} was 50–900 μg L^{-1} with a limit of determination (LOD) of 20 μg L^{-1} and coefficient of variation (CV) of 3.2%. The good relative recovery of 91.3–95.0% and interference studies showed the selectivity of the method for determination of total iron in water and blood plasma samples. Smartphone–paper-based sensors have advantages of simplicity, rapidity, user-friendliness, low cost, and miniaturization of the method for on-site determination of total iron compared to methods that require sophisticated analytical instruments.

Keywords Smartphone · Paper sensor · AgNPs/CTAB · ImageJ software · Fe^{3+} · Water and blood samples

Introduction

Iron (Fe) is the most abundant transition metal in the earth's crust, water, and food and vegetable samples. Iron naturally occurs in the forms of Fe^{2+} and Fe^{3+} in water and food samples. The threshold limit value (TLV) of iron (Fe^{2+} and Fe^{3+}) recommended by the World Health Organization (WHO) in drinking water is 0.3 mg L^{-1}. Iron is an essential trace element that plays several roles in biochemical and intracellular processes like electron transport, DNA synthesis, and oxygen transport through hemoglobin [1–4]. Excess intake of iron through food and water may induce the formation of active oxygen species in the body which results in oxidation and damage of proteins, nucleic acids, and lipids. This biochemical process results in conditions like carcinoma, Alzheimer's, Parkinson's, and Huntington's diseases in human beings; however, deficiency of iron may result in anemia, fatigue, and impaired immunity [5–7]. Hence, determination of iron in water and plasma samples is of great interest to ensure public health.

Several analytical methods including spectrophotometry [8–10], voltammetry [11, 12], atomic absorption spectroscopy (AAS) [13, 14], inductive coupled plasma–atomic emission spectroscopy (ICP-AES) [15], and X-ray fluorescence (XRF) [16] have been reported for determination of iron in environmental, vegetable, and biological samples. Most of these techniques such as voltammetry, AAS, ICP-AES, and XRF involve time-consuming and tedious sample preparation procedures before the

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Experimental and theoretical investigations for selective colorimetric recognition and determination of arginine and histidine in vegetable and fruit samples using bare-AgNPs

Kamlesh Shrivas [a,*], Womika Naik [a], Deepak Kumar [b], Dadan Singh [b], Khemchand Dewangan [b,*], Tushar Kant [a], Sanjay Yadav [a], Tikeshwari [a], Nitin Jaiswal [c]

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A B S T R A C T

We demonstrate the use of bare silver nanoparticles (AgNPs) as a nanoprobe for selective recognition and determination of arginine (Arg) and histidine (His) in ultraviolet visible (UV–Vis) spectrophotometry. The method is based on the measurement of hypochromic shift of localized surface plasmon resonance (LSPR) absorption band at 395 nm for Arg and 400 nm for His along with new absorption band at 510 nm in the visible region for both the analytes. Further, transmission electron microscope (TEM), dynamic light scattering (DLS), and Fourier-transform infrared spectroscopy (FTIR) were used to validate the experimental results for selective interaction of target amino acids with AgNPs. The interaction energies between Ag and amino acids were calculated through the optimization of Ag-amino acid complexes using density functional theory (DFT). Experimental results and theoretical calculations provide evidence that the Arg and His bind with guanidinium (—N═) and imidazole (—N═) moieties, respectively which causes the aggregation of AgNPs and color change of sample solution. The linear range for determination of Arg and His was calibrated from 0.5–4.5 to 0.5–3.5 μM, respectively with a limit of detection (LOD) of 0.15 μM. The bare-AgNPs is effectively applied for determination of Arg and His in vegetable and fruit samples.

1. Introduction

Amino acids are fundamental units of a major structural and operative part of the cell which control protein synthesis, metabolic pathways, growth, development, and reproduction of life [1]. Among them, arginine (Arg) is a semi-essential amino acid in humans and plays a significant role in many biological functions like cell division, gene expression, nutrient metabolism, healing of wounds, hormone secretion, tissue integrity, as well as a precursor for the synthesis of nitric oxide, urea, polyamides, etc. [2–6]. Likewise, histidine (His) is a non-essential amino acid in adults because it can be synthesized in human body. His is required as neurotransmitter in central nervous system as well as growth and repair of tissues and abnormal levels of His in human shows symptoms of several chronic diseases [7–12]. Amino acids are present in vegetables and fruits and only few literatures are showing the methods for selective determination of specific amino acids. The determination of Arg and His from vegetables and fruits will helpful in knowing the intake of these amino acids for proper growth and development of the body. In addition, the imbalance of these amino acids in fruit and vegetable will give the valuable information in correcting the deficiency of particular amino acid by providing an external supplements of food [13,14]. Thus, the quantitative measurement of these amino acids in fruit and vegetable samples are very important. There are several analytical techniques such as high performance liquid chromatography (HPLC) [15], gas chromatography [16], capillary electrophoresis (CE) [17], amperometry [18] electrospray ionization-mass spectrometry (ESI-MS) [19], potentiometry [20] and spectrophotometry [21] are employed for determination of Arg and His in different types of samples. However, chromatographic techniques require derivation for the separation of compound mixture which is time consuming and complex sample preparations prior to analysis. Amperometric and potentiometric methods require the modification of electrode for the detection of amino acids from the sample solution. Among theses, ESI-MS is rapid and sensitive technique though this instrument is expensive and trained personnel is needed for determination of amino acids. In contrast, spectrophotometric methods are simple and inexpensive though it requires the derivation process as well as the use of chromophoric reagents to measure in the visible region. Therefore, it is essential to develop a

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Seasonal variation and health implications of long-range transported and provincial size distributed aerosols at eastern central India

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Size distributed aerosols are collected from October 2016 to July 2017 at eastern central India. This work for the first time investigates the possibilities of long-range transport and inhalation dose of particulate matters in different size at study site. During winter the aerosols were enriched in fine mode particles size however, they are more enriched in coarse mode during summer and post-monsoon season. Significant loading of particulate matters was observed during summer season. Crop residues are burnt in large scale which increases fine particles in the atmosphere. Strong correlation between the fine size fraction were observed in summer and winter season which must be due to the strong biomass burning. The percentage loading of upper respiratory tract, respiratory tract and lungs were obtained to be 30, 69 and 52%, respectively during winter. High value of inhalation dose over entire study period which may responsible for severe health implications.

Keywords: Size-distribution, inhalation dose, seasonal variation, biomass burning, eastern central India.

Introduction

Aerosols are suspended small liquid droplets and solid particles in air (except cloud particles) with size ranges from 10^{-2} to 10^{2} μm[1,2]. Atmospheric aerosols have adverse effect on human health and plays important role in atmospheric chemistry. They have some optical properties due to which they interact with incoming solar radiation and significantly affect Earth's climate and participates as cloud condensation nuclei (CCN), amending cloud formation and albedo. Particle size, shape, life time and chemical components are the properties that can be useful to predict the quality of air and the extent of pollution[3]. In recent years India has experienced a significant raise in frequency of severe air pollution. In contrast eastern central India has experienced an increase in Particulate Matters. Earlier studies reported that burning events like wildfire, Bourne fire, firecrackers burning and vehicular emission can inject fine and ultrafine particulates in atmosphere, and then these particles can be easily transported by air masses along the Earth because of their long-life time in atmosphere[4–6]. Aerosols have variety of chemical species they might be water-soluble inorganic ions, metals and organic compounds their compositions depend upon the sources from which they originated and atmospheric conditions[7–9]. Regardless of making significant efforts to control air pollution, these problems are growing as emerging issue regionally as well as globally. Recent study reported that approximately 800,000 people per year die due to air pollution hence air pollution control is one of the most relevant matter[10,11].

Size of the particles are the most important properties that decides the approach of the particles to different part of human respiratory system. Particles with size <10 μm are the respirable suspended particulate matters (RSPM), which are more important because of associated health problems in human being. Particles with size 2.5–10 μm ($PM_{2.5–10}$) and 2.5 ($PM_{2.5}$) μm are the coarse and fine particles whereas particles with size < 1 μm are ultrafine particles, smaller the particles have more harmful health effect because their approach to the deeper respiratory regions[12,13]. Wang *et al.* (2019) stated that $PM_{4.4–10}$ can affect nasal and pharynx region whereas $PM_{1.0–4.4}$ and $PM_{<1}$ can enters bronchi and alveoli regions of the lungs, hence more harmful to human health, also these are responsible for mortality, morbidity, asthma attack, exacerbation and cancer[14].

Most of the studies done represents aerosols effects in particular event or particular season, hence reflect aerosols transformation in short duration. Also, many studies have been done that only presents either PM_{10} or $PM_{2.5}$ at a time.

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RESEARCH PAPER

Citrate-capped gold nanoparticles as a sensing probe for determination of cetyltrimethylammonium surfactant using FTIR spectroscopy and colorimetry

Ramsingh Kurrey[1] · Manas Kanti Deb[1] · Kamlesh Shrivas[1] · Beeta Rani Khalkho[1] · Jayant Nirmalkar[2] · Deepak Sinha[3] · Sangeeta Jha[4]

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Abstract

A novel, facile, and low-cost method was developed for determination of cetyltrimethylammonium (CTA^+) cationic surfactant in water samples using diffuse reflectance Fourier transform IR (FTIR) spectroscopy and colorimetry. Cetyltrimethylammonium bromide was chosen as a model compound to demonstrate the optimization of the method for determination of CTA^+ in water samples. The absorption peak at 3015.96 cm^{-1} (for CTA^+) was enhanced when gold nanoparticles were used as a chemical sensor in diffuse reflectance FTIR spectroscopy, and this absorption peak was used for determination of CTA^+. Alternatively, the color change from wine red (525 nm) to blue (740 nm) and the redshift of the localized surface plasmon resonance band in the visible region were used as a sensing probe for determination of CTA^+. A linear calibration curve for determination in water samples was obtained in the range from 10 to 100 ng mL^{-1} with a limit of detection of 3 ng mL^{-1} by diffuse reflectance FTIR spectroscopy and in the range from 20 to 400 ng mL^{-1} with a limit of detection of 7 ng mL^{-1} by colorimetry. The advantageous features of the methods are their simplicity, rapidity, and sensitivity for the determination of CTA^+ in water samples.

Keywords Cetyltrimethylammonium cationic surfactant · Gold nanoparticles · Diffuse reflectance Fourier transform infrared spectroscopy and colorimetry · Water samples

Introduction

Cetyltrimethylammonium bromide (CTAB), a cationic surfactant, is a surface-active substance containing one hydrophobic alkyl chain and a hydrophilic group carrying a positive charge and it exists as an ionic form (CTA^+) in water [1, 2]. CTA^+ is widely used in detergents, hair conditioners, and textile softeners in industrial and commercial products [3]. Detergents and hair conditioners usually contain 0.5–2% cetyltrimethylammonium surfactants [4]. The factory-claimed major ingredients of detergents and hair conditioners includes stearyl alcohol, amodimethicone, paraffin, glycerin, methylparaben, cetyl palmitate, and propylparaben in addition to CTA^+ [5]. CTA^+ is long-persisting organic chemical present in the environment, and entry of this chemical into the environment in river water, sewage, groundwater, and pond water causes water pollution. The ingestion of CTA^+ through drinking water may cause nausea, diarrhea, vomiting, dermal necrosis, lung complications, hypotension, and corneal damage [6, 7]. Therefore, the monitoring of CTA^+ present in environmental water samples will be helpful to find the entry route of this pollutant in different surface and underground water reservoirs.

The methods most commonly used for the determination of CTA^+ in environmental, cosmetic, and pharmaceutical

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s00216-019-02067-8) contains supplementary material, which is available to authorized users.

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RESEARCH PAPER

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Modified silver nanoparticles-enhanced single drop microextraction of tartrazine in food samples coupled with diffuse reflectance Fourier transform infrared spectroscopic analysis†

Swapnil Tiwari and Manas Kanti Deb *

The use of tartrazine as an ingredient in foodstuffs is a general practice; tartrazine is added for reasons such as enhancing the color of food and making it attractive and appetizing. Despite food safety standards set by various countries, the evidence of links between tartrazine and hazardous health effects has fostered the necessity to regularly monitor tartrazine levels. In the present work, a new method is demonstrated for the determination of tartrazine in food samples. Modified silver nanoparticles have been used for the extraction of tartrazine in a single drop prior to analysis by diffuse reflectance Fourier transform infrared (DRS-FTIR) spectroscopy. AgNPs were modified with a hydrophobic ligand, and tartrazine was extracted through a single drop microextraction (SDME) mode. The different parameters affecting the extraction efficiency were optimized. Under standard conditions, linear calibrations in the range of 1 to 160 ng mL^{-1} were achieved with a correlation coefficient of 0.987. The LoD and LoQ were found to be 2.44 and 8.15 ng mL^{-1}, respectively. Good precision was evaluated, with a standard deviation of 0.14 ng mL^{-1} and relative standard deviations of 1.76% (intraday) and 2.12% (interday) at 10 ng mL^{-1} for 6 replicate measurements. The applicability of the method to marketed foodstuffs was demonstrated successfully, and recoveries in the range of 90% to 109% were obtained by spiking real samples.

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1. Introduction

The regular assessment of food safety and food monitoring is one of the most remarkable areas of research at the global level. Food colorants are among the most commonly used food additives; they are considered to be an integral part of food.[1] In the past three decades, the use of food additives in the form of colorants has established a dominant presence as a major constituent of food because these colorants enhance appearance and flavor. Currently, synthetic food colorants are used extensively to recover the lost natural color of food, which is degraded during processing and storage.[2] Food colorants form a major and significant class of food additives. Food additives can be defined as complex chemical compounds that are normally consumed as foods themselves or used as typical ingredients in food and that may cause changes in the nature of the food or its byproducts.[3] Based on origin, food colorants are divided into two major classes, *viz.* natural or synthetic colorants. Synthetic food colorants have replaced traditional natural colorants because they display certain advantages over the latter, such as high temperature stability, color consistency, and pH resistance.[4] These are further classified into five major classes: (a) azo group compounds, (b) chemical colorants containing a triarylmethane group as the principal moiety, (c) quinolone group colorants, (d) colorants containing xanthene as their primary structure and (e) indigoid colorants.[5] Tartrazine (E102; Acid yellow 23; FD & C) is an orange azo colorant containing an azo group (–N=N–) as a chromophore in its chemical structure. It has been used extensively as a food colorant, in pharmaceuticals, and in drug industries. The azo functional groups present in colorants are potentially toxic and detrimental to human health.[6–8] Table 1 displays some major azo colorants used in the food industry. The major use of tartrazine in food and beverage industries is in the form of a food colorant. It has been reported that the presence of high amounts of tartrazine can cause allergic responses, hyperactivity in infants and asthmatic disorder in adults. Hence, controlled use of tartrazine is of utmost importance, especially in foodstuffs.[8–10] Tartrazine possesses two sulfonic acid groups along with one acetate and one azo group. The pK_a value of tartrazine is 9.4. The chemical structure of tartrazine is given in Fig. 1.

A literature survey indicates that in recent years, numerous techniques have been employed for tartrazine detection. A variety of analytical investigations that depend upon complex matrices have been carried out. Some noteworthy reported techniques are voltammetric techniques,[11,12] electrochemical

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Original scientific paper

Assessment and evaluation of ambient $PM_{2.5}$ in relation to its health effects in mineral-based coal-fired areas

Shamsh Pervez[1], Rakesh Kumar Sahu[1], Mamta Tripathi[1], Shahina Bano[1], Jeevan Lal Matawle[2], Suresh Tiwari[3], Manas Kanti Deb[1] and Yasmeen Fatima Pervez[4]

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Atmospheric $PM_{2.5}$ pollution, has shown potential impact on the human health in general, thus it requires to look into the chemical characteristics of $PM_{2.5}$ masses for designing effective policies to reduce health risks amongst public under exposure. The study carried out, here, has presented the ambient $PM_{2.5}$ concentrations, concentrations of chemical components and associated health risks over rural and urban environments in the area of mineral based coal-fired industrial areas of central India for a period of one year (2015–16). Overall 260 $PM_{2.5}$ samples, collected from rural, urban and industrial sites, were analyzed for various elements Al, As, Ca, Hg, Cr, Co, Cu, Fe, Mn, K, Cd, Mo, Ni, Pb, Se, Sb, Na, Mg, K, V and Zn, ions such as Na^+, Mg^{2+}, K^+, Ca^{2+}, F^-, Cl^-, NH_4^+, NO_3^-, SO_4^{2-} and carbonaceous matter. The annual average $PM_{2.5}$ mass concentrations were found to be ~2 to ~6 folds higher than the annual National Ambient Air Quality standard (40 $\mu g\,m^{-3}$). Further this study also evaluates, carcinogenic and non-carcinogenic health risks associated with ambient $PM_{2.5}$ exposures (via ingestion, inhalation and dermal). The elemental species that have shown non-carcinogenic risks for both children and adults of all three sites are: Co, Mn, Ni (rural), As, Cd, Cr, Mn, Ni, V (urban and industrial sites). Similarly, the excess carcinogenic risks, in total, from Cd, Co, Cr, Ni, Pb was found to be higher than acceptable limits (10^{-6} to 10^{-4}).

Keywords: ambient $PM_{2.5}$, chemical characteristics, ion balance, mass reconstruction, health risks

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Research paper

Spatiotemporal variability and source apportionment of the ionic components of groundwater of a mineral-rich tribal belt in Bastar, India

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ABSTRACT

This study illustrates the spatiotemporal variability pattern and source-routes of major ionic contaminants of groundwater in mineral-rich tribal belt of Bastar, India. Around 160 groundwater samples from 95 sampling sites were collected during the pre- and post-monsoon periods using a pooled study design. These samples were then chemically analyzed for pH, TDS, EC, TH, Mg^{2+}, Ca^{2+}, Na^{+}, K^{+}, HCO^{3-}, F^{-}, $NO_{\bar{3}}$, Cl^{-}, and SO_4^{2-}. Ionic species exhibited distinct spatial variability patterns at the temporal scale of pre- and post-monsoon periods. Two source apportionment modeling techniques (PCA and PMF 5.0), based on factor analysis, were applied to investigate the source-routes of ionic components in groundwater. Three major contributing source-routes were identified for the ionic components: 1) mineral dissolution (~25%), 2) agricultural activities (30–36%), and 3) rainwater percolation (40–45%). The suitability of groundwater for irrigation purposes was also evaluated by analyzing the electrical conductivity, sodium percentage, and sodium adsorption ratio. The study will serve as an important reference for understanding groundwater chemistry and improving sustainable groundwater management planning in the tribal belt of the Bastar region.

1. Introduction

A majority of the population in the rural and remote areas of India still rely on groundwater channels to fulfill the basic necessity of clean water for drinking and various household purposes (Clarke et al., 1996; Ahada and Suthar, 2018). Geochemical processes have emerged as a key factor for the spatiotemporal variation of groundwater chemistry (Narany et al., 2014; Panneer et al., 2017). Rock–water interaction, anthropogenic activities, industrial wastewater, and agricultural activities are the primary sources responsible for groundwater contamination (Duong et al., 2015; Boateng et al., 2016; Bouderbala and Gharbi, 2017). Various efforts have been made to investigate the quality of groundwater in India; these efforts have mainly involved the physicochemical characterization of samples and determination of relationships between the chemical characteristics of groundwater and hydrogeochemical processes (Prasad and Mondal, 2008; Puthiyasekar et al., 2010; Magesh and Chandrasekar, 2013; Masih et al., 2014; Varghese and Jaya, 2014; Bhowmik et al., 2015; Bhutiani et al., 2016; Krishna et al., 2009; Mahato et al., 2016; Saravanan et al., 2016; Loh et al., 2020; Owamah, 2020).

According to various reports, ionic components are of greater concern compared to other contaminants because the relative strengths of ions in groundwater reflect various aspects of hydrogeochemical processes as well as indicate sources of groundwater contamination (Singh et al., 2013; Belkhiri and Narany, 2015; Nematollahi et al., 2016; Sethy et al., 2016; Sharifi et al., 2016; Selvamkumar et al., 2017; Beyene et al., 2019; Ismail et al., 2020).

Agriculture is the principal economic activity of the population in the study region. In many places, surface water is scarce, and groundwater serves as the only substitute source of irrigation water. Nearly 35% of irrigation water has been reported to be sourced from groundwater. Considering the above issue, the present work focuses on gaining a deeper understanding of the spatiotemporal variability and sources of major ionic species in groundwater samples collected from tribal belt of Bastar, India.

To identify possible sources of groundwater contamination and apportion the source contribution, principal component analysis (PCA) and positive matrix factorization (PMF 5.0) modeling approaches were applied to database of sampled groundwater (Helena et al., 2000; Guo et al., 2004; Dhanasekarapandian et al., 2016; Gholizadeh et al., 2016). PCA is a technique that provides information according to the most

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Atmospheric $PM_{2.5}$ pollution, has shown potential impact on the human health in general, thus it requires to look into the chemical characteristics of $PM_{2.5}$ masses for designing effective policies to reduce health risks amongst public under exposure. The study carried out, here, has presented the ambient $PM_{2.5}$ concentrations, concentrations of chemical components and associated health risks over rural and urban environments in the area of mineral based coal-fired industrial areas of central India for a period of one year (2015–16). Overall 260 $PM_{2.5}$ samples, collected from rural, urban and industrial sites, were analyzed for various elements Al, As, Ca, Hg, Cr, Co, Cu, Fe, Mn, K, Cd, Mo, Ni, Pb, Se, Sb, Na, Mg, K, V and Zn, ions such as Na^+, Mg^{2+}, K^+, Ca^{2+}, F^-, Cl^-, NH_4^+, NO_3^-, SO_4^{2-} and carbonaceous matter. The annual average $PM_{2.5}$ mass concentrations were found to be ~2 to ~6 folds higher than the annual National Ambient Air Quality standard (40 $\mu g\,m^{-3}$). Further this study also evaluates, carcinogenic and non-carcinogenic health risks associated with ambient $PM_{2.5}$ exposures (via ingestion, inhalation and dermal). The elemental species that have shown non-carcinogenic risks for both children and adults of all three sites are: Co, Mn, Ni (rural), As, Cd, Cr, Mn, Ni, V (urban and industrial sites). Similarly, the excess carcinogenic risks, in total, from Cd, Co, Cr, Ni, Pb was found to be higher than acceptable limits (10^{-6} to 10^{-4}).

Keywords: ambient $PM_{2.5}$, chemical characteristics, ion balance, mass reconstruction, health risks

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Original scientific paper

Assessment and evaluation of ambient $PM_{2.5}$ in relation to its health effects in mineral-based coal-fired areas

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simultaneous determination of five cephalosporins in spiked human plasma: Application to lean six sigma thinking hats and antimicrobial activity

Mohamed E.M. Hassouna, Mahmoud A. Mohamed

Article 104161

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Abstract | Graphical abstract

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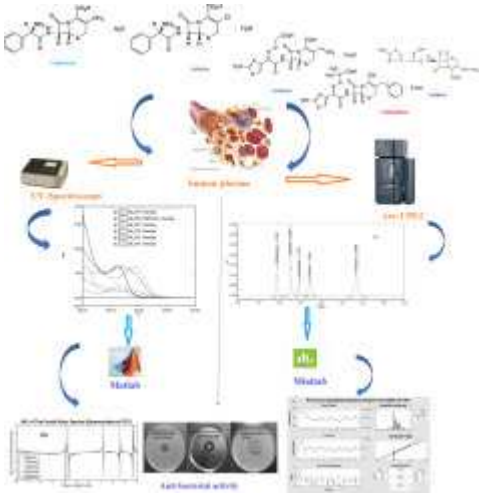

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Colorimetric and paper-based detection of lead using PVA capped silver nanoparticles: Experimental and theoretical approach

Kamlesh Shrivas[a,*], Bhuneshwari Sahu[a], Manas Kanti Deb[a,*], Santosh Singh Thakur[b], Sushama Sahu[a], Ramsingh Kurrey[a], Tushar Kant[a], Tarun Kumar Patle[a], Rajendra Jangde[c]

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ABSTRACT

We report a plasmonic colorimetric sensing strategy using polyvinyl alcohol (PVA) modified silver nanoparticles (AgNPs) and paper-based analytical devices (PADs) for selective detection of lead (Pb). Method is based on the measurement of red shift of localized surface plasmon resonance (LSPR) absorption band of AgNPs/PVA in visible region after the addition of Pb(II) using UV–Vis spectrophotometry and color intensity of PADs was recorded with Smartphone followed by the processing in ImageJ software. The mechanism of color change and red shift ($\Delta\lambda$) of LSPR band from 410 nm to 550 nm is due to the interaction of Pb(II) ions towards the PVA through strong ion-dipole interaction perturbing the stability AgNPs which further directed the aggregation of particles. The density functional theory (DFT) using Gaussian (C.01) program assisted by experimental data was used to elucidate the plausible mechanism for selective detection of analyte. The calibration curve gave a good linearity in the range of 20–1000 μgL^{-1} with limit of detection (LOD) of 8 μgL^{-1} by colorimetry and 50–1000 μgL^{-1} with LOD value of 20 μgL^{-1} using PADs. In addition, the results obtained with UV–Vis and PADs were compared with ICP-AES for quantitative determination of Pb(II) in different water samples. The advantages of using AgNPs/PVA as plasmonic colorimetric probe and PADs found to be simple, low cost and selective for determination of lead from surface water and industrial waste water samples.

1. Introduction

Lead (Pb) is a bluish-gray metal found in the earth crust. The anthropogenic activities such as burning of fossil fuels, leaded gasoline and mining release a large quantity of waste into the environment that containing lead. Its widespread use causes the extensive contamination of soil, water, vegetation and foods [1–3]. Lead has a number of side effects on human beings such as disruption of nervous system, depression, learning disability, negative reproductive effects, such as damage of sperm and chance of miscarriage and premature birth [4,5]. Thus, the determination of lead is necessary to avoid the entry of this chemical in to environmental samples.

There are several analytical techniques such as inductively coupled plasma-atomic emission spectrometry (ICP-AES) [6], graphite furnace-atomic absorption spectrometry (GF-AAS) [7], ICP-mass spectrometry (MS) [8], atomic fluorescence spectrometry (AFS) [9], X-ray fluorescence (XRF) [10], cyclic voltammetry (CV) [11] and UV–Vis spectrophotometry [12–14] have been reported for determination of lead in variety of samples. The sophisticated instruments like ICP-MS, GF-AAS, ICP-MS, AFS, XRF and CV are found to expensive, tedious and time consuming for preparation of sample to determine the lead from complex sample matrixes. UV–Vis is simple and rapid technique for determination of lead though the selectivity of the method is poor due to the use of chromophoric reagents. Therefore, an alternative method is required that should be simple, selective, label-free and low cost for determination of lead from different types of samples.

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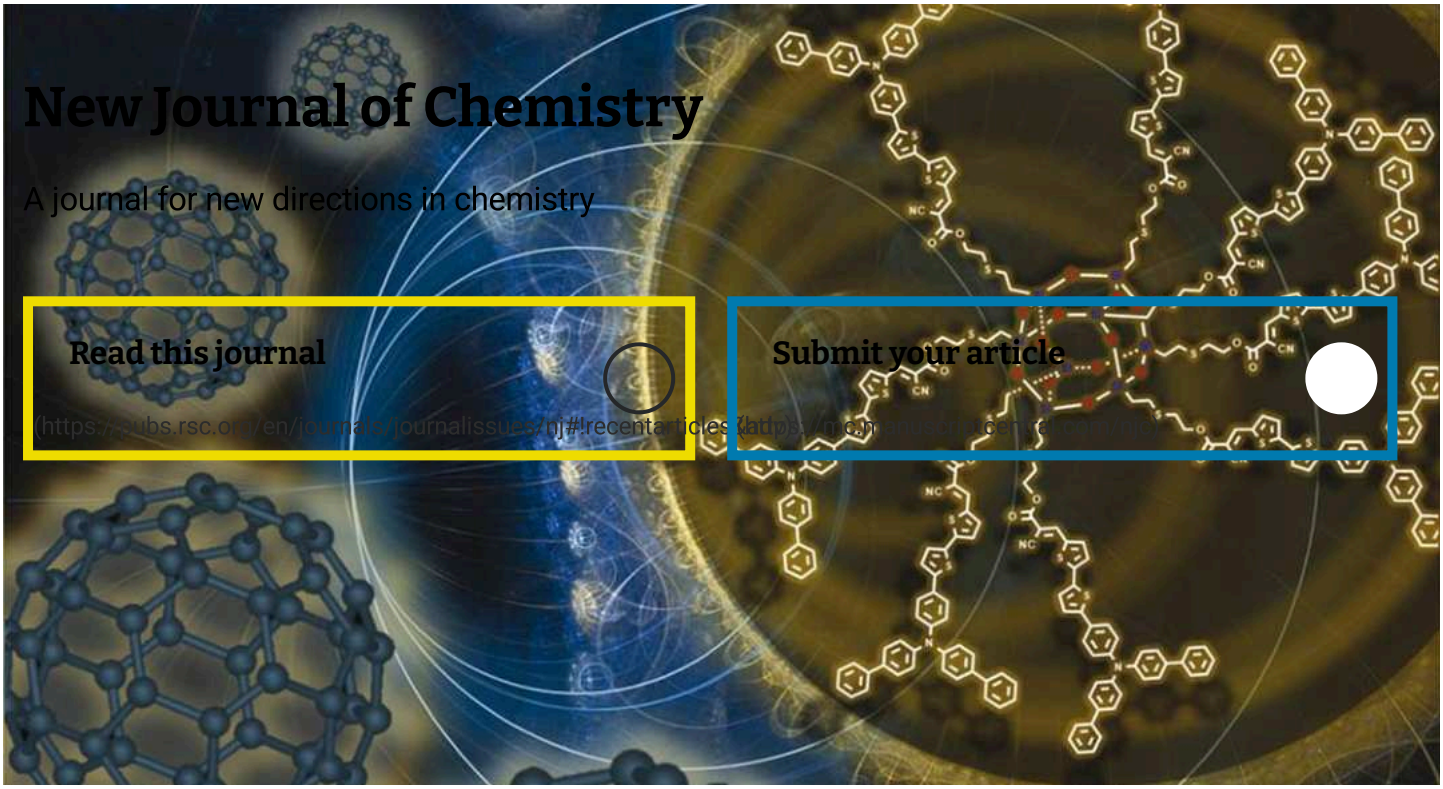

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Carbon Quantum Dot-Gold Nanoparticle System as Probe for Inhibition and Reactivation of Acetylcholinesterase: Detection of Pesticides

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Abstract

In this work, fluorescence (FL) quenching (turn-off) and recovery (turn-on) of carbon quantum dots (CQDs) in the presence of dispersed and aggregated gold nanoparticles (AuNPs) was used as probe for monitoring inhibition and reactivation of acetylcholinesterase (AChE). The FL of CQD is quenched due to fluorescence resonance energy transfer (FRET) between CQD donor and AuNP acceptor. The catalytic hydrolysis of acetylthiocholine (ATCh) by AChE produces thiocholine which induce aggregation of AuNPs. The turn-off FL signals of CQDs were measured in the presence of pesticides due to inhibition of catalytic activity of AChE. The activity of AChE was recovered using oximate (1-dodecyl-4-((hydroxyimino) methyl) pyridinium bromide (4-C_{12}-PyOx$^-$) reactivator, and turn-on FL signal of CQD was measured. The % inhibition and % reactivation of AChE by pesticides and reactivator have been obtained. The inhibitory protocols have been utilized for detection of pesticides with the limit of detection i.e. 0.05nM (paraoxon), 0.10nM (malathion), 0.12nM (methamidophos), 0.13nM (carbaryl) were obtained. This method has been successfully applied for detection of pesticides in real water samples (tap water, river water) and apple juice samples. Further, we investigated CQDs-AuNPs sensing method with logic gates (INHIBIT and OR) that simply optimize the system.

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Ningning Wang, Shuai Zeng, Hong Yuan, Jin Huang

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Wenchan Deng, Jordan R.M. Schofield, X. Chris Le, Xing-Fang Li

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Perspective

Titanium nanoparticles attenuates arsenic toxicity by up-regulating expressions of defensive genes in *Vigna radiata* L

Priya Katiyar [1], *Bhumika Yadu* [1], *Jyoti Korram* [2], *Manmohan L. Satnami* [2], *Meetul Kumar* [3], *S. Keshavkant* [1,*]

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ABSTRACT

Arsenic (As)-toxicity is recognized as one of the major environmental problems, affecting productivity of crops worldwide, thereby threatening sustainable agriculture and food security. Progression in nanotechnology and its impacts have brought up concerns about the application of engineered nanoparticles (NPs) in various sectors of the economy, including the field of agronomy. Among various NPs, there has been a rising amount of interest regarding the effects of titanium NPs (TiNPs) on plants growth and development, and their fate of abiotic stress tolerance. Hence, the present study was aimed to assess the ameliorative potentialities of chemically and biologically/green synthesized TiNPs to alleviate As-induced toxic responses in *Vigna radiata* L. The results revealed that exposure to As hindered the growth indices (radicle length and biomass) and membrane integrity, while were improved with the application of chemical and green synthesized TiNPs. In addition, treatment of As provoked the accretion of reactive oxygen species (superoxide and hydrogen peroxide) and malondialdehyde (a lipid peroxidized product), but were diminished by the supplementation of chemical and green manufactured TiNPs. The experimental data also signified that exogenous application of chemical and green synthesized TiNPs conferred tolerance to As-induced oxidative injuries *via* perking-up the expressions of antioxidant genes and enzyme systems *viz*; superoxide dismutase and catalase. Therefore, the present study inferred that chemically and green synthesized TiNPs, particularly green manufactured, effectively mitigated the adverse impacts of As by augmenting antioxidant machinery, thereby proving its potentiality in the alleviation of As-toxicity, at least in the *Vignaradiata* L.

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Perspective

Titanium nanoparticles attenuates arsenic toxicity by up-regulating expressions of defensive genes in *Vigna radiata* L

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ABSTRACT

Arsenic (As)-toxicity is recognized as one of the major environmental problems, affecting productivity of crops worldwide, thereby threatening sustainable agriculture and food security. Progression in nanotechnology and its impacts have brought up concerns about the application of engineered nanoparticles (NPs) in various sectors of the economy, including the field of agronomy. Among various NPs, there has been a rising amount of interest regarding the effects of titanium NPs (TiNPs) on plants growth and development, and their fate of abiotic stress tolerance. Hence, the present study was aimed to assess the ameliorative potentialities of chemically and biologically/green synthesized TiNPs to alleviate As-induced toxic responses in *Vigna radiata* L. The results revealed that exposure to As hindered the growth indices (radicle length and biomass) and membrane integrity, while were improved with the application of chemical and green synthesized TiNPs. In addition, treatment of As provoked the accretion of reactive oxygen species (superoxide and hydrogen peroxide) and malondialdehyde (a lipid peroxidized product), but were diminished by the supplementation of chemical and green manufactured TiNPs. The experimental data also signified that exogenous application of chemical and green synthesized TiNPs conferred tolerance to As-induced oxidative injuries *via* perking-up the expressions of antioxidant genes and enzyme systems *viz*; superoxide dismutase and catalase. Therefore, the present study inferred that chemically and green synthesized TiNPs, particularly green manufactured, effectively mitigated the adverse impacts of As by augmenting antioxidant machinery, thereby proving its potentiality in the alleviation of As-toxicity, at least in the *Vignaradiata* L.

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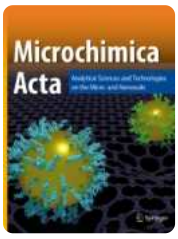

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ORIGINAL PAPER

Colorimetric and smartphone-integrated paper device for on-site determination of arsenic (III) using sucrose modified gold nanoparticles as a nanoprobe

Kamlesh Shrivas[1] · Sanyukta Patel[2] · Deepak Sinha[2] · Santosh Singh Thakur[3] · Tarun Kumar Patle[1] · Tushar Kant[1] · Khemchand Dewangan[4] · Manmohan L. Satnami[1] · Jayant Nirmalkar[5] · Suneel Kumar[6]

Received: 26 August 2019 / Accepted: 19 January 2020

Abstract

An optical colorimetric and smartphone-integrated paper device (SIPD) is demonstrated for determination of As (III) in water and soil samples using sucrose modified gold nanoparticles (AuNPs/Suc) as a nanoprobe. The mechanism for determination of As(III) is experimentally validated by performing UV-Vis, transmission electron microscope (TEM), Fourier transforms infrared spectroscopy (FTIR) and dynamic light scattering (DLS) measurements. The density function theory (DFT) calculations using B3LYP with 6-311G (2d,2p) and LANL2DZ basis sets is used to theoretically prove the mechanism for determination of As(III). In addition, the paper fabricated with AuNPs/SuC was used as a nanoprobe for quantitative determination of As(III) using smartphone and ImageJ software. Calibration plot was linear over 10–800 μgL^{-1} for colorimetric determination of As(III) with limit of detection (LOD) of 4 μgL^{-1} acquired when the absorbance ratio obtained at 594 nm/515 nm. The linearity range of 50–3000 μgL^{-1} with LOD of 20 μgL^{-1} was determined using smartphone-integrated paper device. AuNPs/Suc is successfully employed for determination of As (III) from contaminated water and soil samples in colorimetry and SIPD.

Keywords Arsenic (III) · Colorimetry · Smartphone-paper device · Gold nanoparticles

Introduction

Arsenic is a ubiquitous element with metalloid property. It is distributed in earth crust, soils, rocks and exists in nature in the form of inorganic and organic materials with oxidation state of -III, +III and + V. Arsenic is a one of the most toxic chemical substance present due to its carcinogenic in nature [1, 2]. The presence of arsenic in drinking water may relate to increased risk of diseases such as skin cancer, lungs, bladder, kidney, etc. [3, 4]. Therefore, the monitoring of arsenic present in water sample is an important issue to avoid the entry of this noxious pollutant in environmental samples. There are several techniques such as electrothermal atomic adsorption spectrometry (ET-AAS) [5], inductively coupled plasma-optical emission spectrometry (ICP-OES) [6], voltammetry [7], surface enhanced Raman scattering (SERS) [8], hydride generation-atomic absorption spectrometry (HG-AAS) [9], inductively coupled plasma mass spectrometry (ICP-MS) [10], hydride generation-atomic fluorescence spectroscopy (HG-AFS) [11], x-ray fluorescence (XRF) [12] and spectrophotometry [4] have been reported for the determination of arsenic in different types of samples. Among these, spectrophotometry

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Silica nanoparticle minimizes aluminium imposed injuries by impeding cytotoxic agents and over expressing protective genes in *Cicer arietinum*

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Keywords:
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ABSTRACT

Nanoparticles (NPs) and nano-technological applications in varied economic sectors including agriculture, accomplished great attention in last decades, worldwide. In several instances, NPs has been applied as pre-treatment or toxicant scavenging agent for promoting seed germination/ plant growth responses or for abiotic stress amelioration. In order to promote this propensity, the development of sustainable eco-friendly processes for NP production is of utmost importance. In this study, silica NPs (SiNP) were synthesized following both chemical and biological (green) procedures, and were tested for their ameliorative efficacies against aluminium (Al)-induced toxicity in *Cicer arietinum*. Synthesized NPs were initially characterized following standard methods such as dynamic light scattering/ zetasizer, fourier transform infrared spectroscopy and UV–vis spectroscopy. Experimental results revealed that upon Al-exposure, growth traits and plasma membrane stability of *C. arietinum* were severely repressed along with increased accumulations of reactive oxygen species and malondialdehyde (an outcome of lipid peroxidation reaction), with consequent decline in the activities/ expression profiles of key defensive genes. However, exogenously applied SiNPs provided tolerance to growing *C. arietinum* against Al-toxicity by compensating the cellular redox homeostasis *via* enhancing the levels/ expression patterns of antioxidants genes and reducing cytotoxic products of lipid peroxidation. Both chemical and green manufactured SiNPs were ascertained as efficient ameliorating agents against Al-stress, at least for *C. arietinum*, but the green synthesized were proven to be comparatively more proficient in mitigating injury symptoms, even in relatively low concentration than the chemically manufactured particles.

1. Introduction

Nanotechnology has brought revolution in the field of agriculture and crop productivity by its contribution in the development of new sustainable strategies of crop protection and food production (Fraceto et al., 2016). During the past decade, a number of engineered nano-products incorporating nanoparticels (NPs), nanosensors, nano-fertilizers, nanopesticides, *etc*., have been developed to promote the efficiency and sustainability of agricultural practices, globally (Mahakham et al., 2017). Most of these NPs are synthesized through different physical and chemical methods, which are known to cause numerous environmental and biological hazards in varying intensities (Singh et al., 2016). Therefore, NPs to be applied efficiently in the agricultural sectors should be eco-friendly, economical, non-toxic and biocompatible in nature, and may be synthesized following other than the conventional procedures (Mahakham et al., 2016). The green syntheses of NPs following the use of plant products as reducing agents is an efficient, lucrative, fast and eco-friendly technique (Borase, 2014; Yugandhar and Savithramma, 2016).

In recent past, most of the scientists have adopted green synthesis methods for the production of NPs of calcium (Yugandhar and Savithramma, 2013), copper (Shende et al., 2015), gold (Gopinath et al., 2014), iron (Naseem and Farrukh, 2015), silica (Babu et al., 2018), silver (Yasir et al., 2018) and zinc (Bala et al., 2015) by using extracts of various plants. Among these, silica nanoparticles (SiNPs) are well known in the fields of chemistry, physics and biology due to distinct properties of these (Babu et al., 2018). A number of biological applications of SiNPs were evaluated previously, by different researchers, in the fronts of plant biology and medicine more particularly (Koskimaki et al., 2015).

Silica is considered as a non-essential element for plants growth and development; however, increasing evidence in the literature showed that this metalloid is beneficial to plants, especially under stress conditions (Coskun et al., 2016; Guerriero et al., 2016). Indeed, Si

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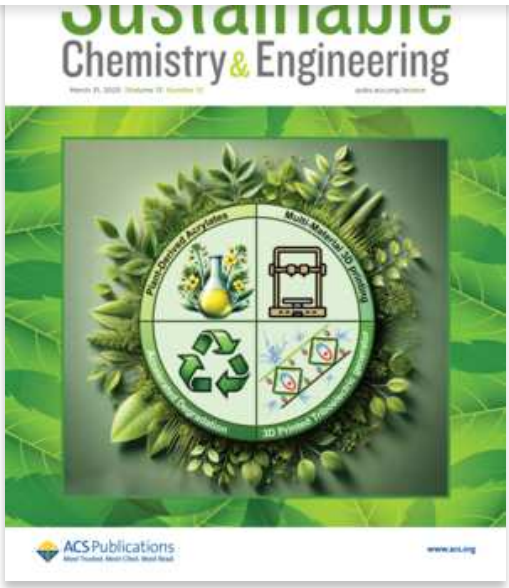

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Interaction of Ionic Liquid with Silver Nanoparticles: Potential Application in Induced Structural Changes of Globular Proteins

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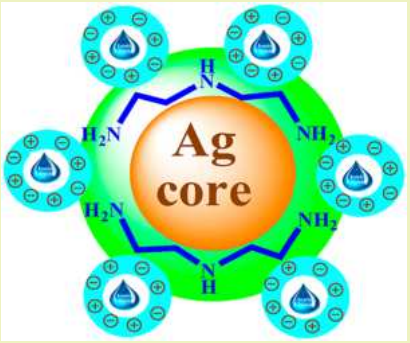
Supporting Information

ABSTRACT: Silver nanoparticles (AgNPs) show immense application potential in many fields including biomedical sciences owing to their advanced antimicrobial property (antibacterial, antifungal and anti-inflammatory). Ionic liquids (ILs) known as designer solvents with a melting point below 100 °C are a new class of compounds with exclusive properties and great chemical variety. Since the past decade, ILs are vastly used in interdisciplinary research including the synthesis and stabilization of metal nanoparticles. In the present work, we have studied the interaction between IL 1-butyl-3-methylimidazolium octylsulfate [Bmim][OS] and AgNPs using a simple and sensitive UV−visible spectroscopic method via the response obtained from the surface plasmon resonance (SPR) band of AgNPs. The analysis of the SPR band at the 400−425 nm range and the Fourier transform infrared (FT-IR) spectral results show a transfer of N−H stretching frequency from 3367 to 3228 cm^{-1}, which clearly suggests the formation of nanoparticles. FT-IR spectroscopy is systematically applied to explore information about the intermolecular interactions taking place within AgNPs-[Bmim][OS] micellar solutions. The critical micelle concentration (CMC) of [Bmim][OS] is determined using conductivity and UV−visible spectroscopy, and the size of micellar aggregates is obtained using dynamic light scattering (DLS) technique. Further, the above system is also utilized to consider the structural modify of human serum albumin (HSA) and bovine serum albumin (BSA). UV−vis, fluorescence, FT-IR, ^1H nuclear magnetic resonance and DLS spectroscopic investigations reveal some interesting outcomes. It is observed that modification in the structures of both the globular proteins HSA and BSA takes place within the system, thus indicating significant IL−protein binding. Further, it is noticed that HSA shows more binding affinity toward [Bmim][OS] than compared to BSA.



KEYWORDS: *Silver nanoparticles, Ionic liquid, Serum albumins, Spectroscopy*

INTRODUCTION

The vast application of metallic nanoparticles (NPs) has brought curiosity among researchers in many research fields, viz., plasmonics, photonics, biological and chemical sensors, cell electrodes, optical devices and antimicrobial activities because of their characteristic optical, chemical and physical properties.[1−3] More importantly, silver nanoparticles (AgNPs) have shown widespread application potential based upon properties that have defined their shape, size, configuration and crystal orientations.[4,5] AgNPs possess a high surface-to-volume ratio with exclusive optical, electrical and thermal properties for novel applications, such as pharmaceuticals, biological sciences, mechanics, packaging, food science, electronic device and information technology, etc.[6,7] These NPs are very useful in the field of biomedical science owing to their superb antimicrobial properties.[8] AgNPs can be effectively used for reducing bacterial adhesion to dental implant surfaces and preventing biofilm formation. Apart from their antibacterial activities, AgNPs also possess antifungal and anti-inflammatory properties and are widely used as sore curative agents leading to their application in industrial antimicrobial covering.[9−12] AgNPs have been reported by many researchers as the most efficient antimicrobial agent of choice against the development of antibiotics-resistant strains of microorganisms.[13−15] In recent times, synergetic antibiotics of penicillin G, vancomycin, ampicillin, erythromycin, amoxicillin, clindamycin, chloramphenicol and kanamycin containing AgNPs have been reported.[16−18] The antimicrobial activities of AgNPs are seen to be dependent upon the concentration of NPs in the medium and NPs shapes and sizes.[19,20] Hence, it is of great importance

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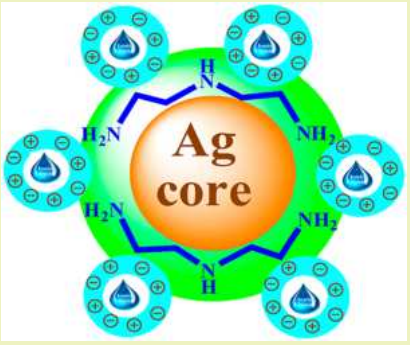
Supporting Information

ABSTRACT: Silver nanoparticles (AgNPs) show immense application potential in many fields including biomedical sciences owing to their advanced antimicrobial property (antibacterial, antifungal and anti-inflammatory). Ionic liquids (ILs) known as designer solvents with a melting point below 100 °C are a new class of compounds with exclusive properties and great chemical variety. Since the past decade, ILs are vastly used in interdisciplinary research including the synthesis and stabilization of metal nanoparticles. In the present work, we have studied the interaction between IL 1-butyl-3-methylimidazolium octylsulfate [Bmim][OS] and AgNPs using a simple and sensitive UV−visible spectroscopic method via the response obtained from the surface plasmon resonance (SPR) band of AgNPs. The analysis of the SPR band at the 400−425 nm range and the Fourier transform infrared (FT-IR) spectral results show a transfer of N−H stretching frequency from 3367 to 3228 cm^{-1}, which clearly suggests the formation of nanoparticles. FT-IR spectroscopy is systematically applied to explore information about the intermolecular interactions taking place within AgNPs-[Bmim][OS] micellar solutions. The critical micelle concentration (CMC) of [Bmim][OS] is determined using conductivity and UV−visible spectroscopy, and the size of micellar aggregates is obtained using dynamic light scattering (DLS) technique. Further, the above system is also utilized to consider the structural modify of human serum albumin (HSA) and bovine serum albumin (BSA). UV−vis, fluorescence, FT-IR, ^1H nuclear magnetic resonance and DLS spectroscopic investigations reveal some interesting outcomes. It is observed that modification in the structures of both the globular proteins HSA and BSA takes place within the system, thus indicating significant IL−protein binding. Further, it is noticed that HSA shows more binding affinity toward [Bmim][OS] than compared to BSA.



KEYWORDS: *Silver nanoparticles, Ionic liquid, Serum albumins, Spectroscopy*

INTRODUCTION

The vast application of metallic nanoparticles (NPs) has brought curiosity among researchers in many research fields, viz., plasmonics, photonics, biological and chemical sensors, cell electrodes, optical devices and antimicrobial activities because of their characteristic optical, chemical and physical properties.[1−3] More importantly, silver nanoparticles (AgNPs) have shown widespread application potential based upon properties that have defined their shape, size, configuration and crystal orientations.[4,5] AgNPs possess a high surface-to-volume ratio with exclusive optical, electrical and thermal properties for novel applications, such as pharmaceuticals, biological sciences, mechanics, packaging, food science, electronic device and information technology, etc.[6,7] These NPs are very useful in the field of biomedical science owing to their superb antimicrobial properties.[8] AgNPs can be effectively used for reducing bacterial adhesion to dental implant surfaces and preventing biofilm formation. Apart from their antibacterial activities, AgNPs also possess antifungal and anti-inflammatory properties and are widely used as sore curative agents leading to their application in industrial antimicrobial covering.[9−12] AgNPs have been reported by many researchers as the most efficient antimicrobial agent of choice against the development of antibiotics-resistant strains of microorganisms.[13−15] In recent times, synergetic antibiotics of penicillin G, vancomycin, ampicillin, erythromycin, amoxicillin, clindamycin, chloramphenicol and kanamycin containing AgNPs have been reported.[16−18] The antimicrobial activities of AgNPs are seen to be dependent upon the concentration of NPs in the medium and NPs shapes and sizes.[19,20] Hence, it is of great importance

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A colorimetric nanoprobe based on enzyme-immobilized silver nanoparticles for the efficient detection of cholesterol

Lakshita Dewangan,[a] Jyoti Korram,[a] Indrapal Karbhal,[a] Rekha Nagwanshi,[b] Vinod K. Jena[c] and Manmohan L. Satnami *[a]

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A large number of cardiovascular diseases have recently become of serious concern throughout the world. Herein, we developed a colorimetric probe based on functionalized silver nanoparticles (AgNPs) for the efficient sensing of cholesterol, an important cardiovascular risk marker. A simple sodium borohydride reduction method was employed to synthesize the AgNPs. The cholesterol oxidase (ChOx)-immobilized AgNPs interact with free cholesterol to produce H_2O_2 in proportion to the concentration of cholesterol, resulting in decreased AgNP absorbance (turn-off) at 400 nm due to electron transfer between the AgNPs and H_2O_2. The response of the sensor can also be observed visually. The absorption intensity of the AgNPs is recovered (turn-on) upon the addition of sodium dodecyl sulfate due to the inhibition of ChOx. This on–off mechanism was effectively applied to detect cholesterol within the concentration range 10–250 nM with a low detection limit of approximately 0.014 nM. Moreover, the selectivity of the sensor toward cholesterol was analyzed in the presence of a range of interfering organic substances such as glucose, urea, and sucrose. Finally, the potential of the proposed sensor was evaluated using real samples.

1. Introduction

Cholesterol is an important component of cell membranes that is transported *via* blood plasma in mammals. Abnormal levels of cholesterol can lead to atherosclerosis, hypertension, stroke, and other issues. Furthermore, high levels of cholesterol in the blood and body tissues have perilous effects such as coronary heart and peripheral arterial diseases, diabetes, hypertension, cardiac arrest, and anemia.[1–4] Therefore, in medical diagnostics and therapeutics, the accurate monitoring of cholesterol levels in blood plasma is important.[1,5–7] Recently, hypercholesterolemia has been identified as the main reason for human death. Thus, controlling blood cholesterol level has become a global challenge. Most cholesterol biosensors involve the enzymatic oxidation of cholesterol by cholesterol oxidase (ChOx).[1,5] Consequently, the production of hydrogen peroxide (H_2O_2) is quantified by various procedures.[8–14] Low levels of cholesterol may be associated with medical conditions such as cancer, depression, anxiety, hopelessness, nervousness, confusion, agitation, and hypocholesterolemia. Total cholesterol levels below 160 mg dL^{-1} are classified as hypocholesterolemia. Therefore, it is essential to detect both high and low levels of cholesterol.[15]

Various methods such as electrochemical sensing[16–22] fluorometric analysis,[23–25] chromatographic analysis,[26–28] molecular imprinting,[29] surface plasmon resonance,[30] field-effect transistor sensors,[31] chemiluminescence,[32] and colorimetric methods[33,34] have been reported to detect cholesterol and H_2O_2. Among these methods, colorimetric detection is of great interest due to its simplicity, low cost, high sensitivity, and good selectivity.[14,35–38] H_2O_2 is generated during the catalytic oxidation of substrates by ChOx, glucose oxidase, and xanthine oxidase, among others. Therefore, the accurate determination of H_2O_2 is useful for indirectly measuring the levels of target molecules such as glucose, cholesterol, and xanthine. Recently, Zhang *et al.*[39] reported a MXene-Ti_3C_2/CuS nanocomposite for the colorimetric determination of cholesterol with a linear range of 10–100 μM and a limit of detection (LOD) of 1.9 μM. Li *et al.*[40] developed a Förster resonance energy transfer-based sensor for the determination of cholesterol. They obtained a linear range of 10–210 μM L^{-1} with a LOD of 343.48 nM L^{-1}. Cholesterol was also detected using an electrochemical technique with a LOD of 0.03 μM and a linear range of 0.06–15 μM.[41] The sensor developed in this study improves upon the above detection methods in terms of its cost-effectiveness, low limit of detection (~0.014 nM), and linearity in the cholesterol concentration range of 10–250 nM.

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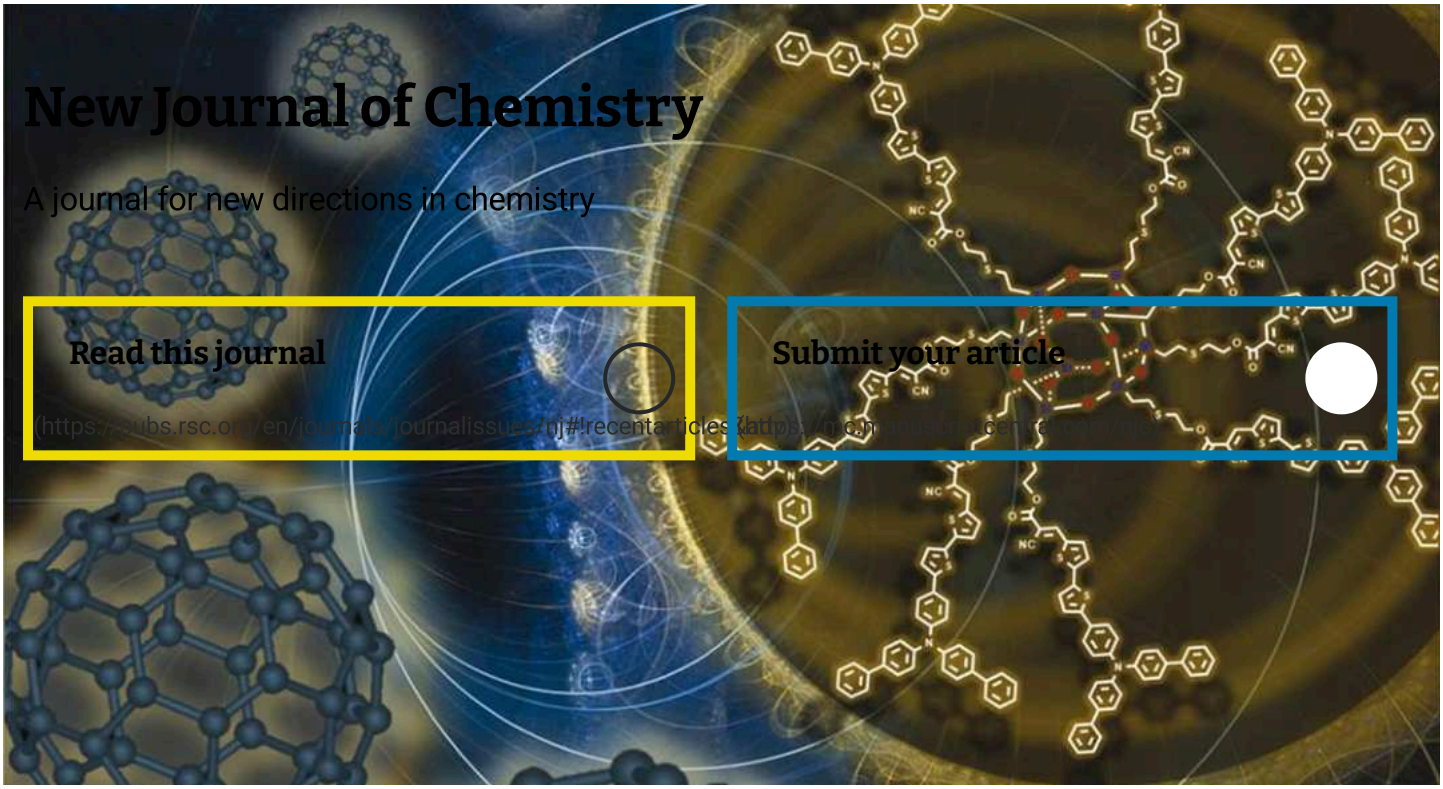

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From the journal:
New Journal of Chemistry

A low-cost paper-based flexible energy storage device using a conducting polymer nanocomposite †

Rama Devi [a], Kavita Tapadia [a], Tushar Kant [b], Archana Ghosale [c], Kamlesh Shrivas [*b], Indrapal Karbhal [b] and Tungabidya Maharana [*a]

Author affiliations

Abstract

Herein, a simple approach is demonstrated for the fabrication of a paper-based flexible symmetrical supercapacitor as an energy saving device with composite functional materials of nickel nanoparticles (Ni NPs) and polypyrrole (PPy). Specifically, an Ni@PPy nanocomposite was synthesized through a two-step process involving the growth of Ni NPs, followed by pyrrole polymerization on a paper substrate. The paper fabricated with Ni@PPy showed an electrical conductivity of 105 S cm^{-1}. The paper-based flexible supercapacitor device configured with Ni@PPy/electrolyte/Ni@PPy was evaluated for electrochemical performance, and it showed a good specific capacitance of 544 F g^{-1} at 1 A g^{-1}. A better specific energy of 48 W h kg^{-1}, specific power of 400 W kg^{-1}, and good cycling stability (68.3% capacitance retention after 3000 cycles at 5 A g^{-1}) were obtained for the paper-based flexible supercapacitor compared with other reported polymer-based nanocomposite materials. The obtained results suggest that the fabricated paper-based supercapacitor is inexpensive, sustainable, highly efficient, portable and flexible for a wide range of electronic applications.

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HUMAN DEVELOPMENT INDEX IN CHHATTISGARH STATE : AN ANALYTICAL STUDY

B. L. Sonekar*

The economic progress and prosperity of any country depends on progress and innovations of various technologies occurred in the field of production. With this point of view, the assessment of development and prosperity of Indian Economy depends on proper and skillful use of human resources. Human resource and Natural Resource are like two wheels of a cart, which are mandatory for an economic development of any country. A part from this, there is a direct relation between human resource and economic development, because there is a specific importance of technical knowledge, education, new inventions, technical use etc. in economic development, which are related with human resource unless the labour power available in the country. Development will be incomplete because the precious capital is that which are to be appropriated to the human only. Under Human resources, not only the size of population is studied, but population growth rate, literacy, sex-ratio, anticipation of life, professional distributions etc. are also studied. The aim of this study is to study human resource and economic development on above said factors.

Keywords: *Human resource, Economic development Skill Development Programme*

INTRODUCTION

The importance of Physical Assets along with human assets does exist in the economic development of any country or state. In practice the enhancement of capital stock depends on human capital building up to the sufficient limit, which is a process of enhancement of knowledge, skillfulness and capacities of all the before of the country. "The development of human resources is a process of enhancement of knowledge, skillfulness and capacities of persons of society, knowledge and abilities." The development of human resources is a process of enhancement of knowledge, ability and working capability of persons of society. In economic point of view it may be said that this is a collection of human assets, which are appropriated effectively in the development of economy the development of human resources is much more in developing countries and in semi-developed countries, because it is possible to utilize natural resources and physical assets rapid by in development works by human assets only.

It has been mentioned in Human Development Report of U.N.D.P. (1997), while explaining the concept of human development, that "this is such a process through which alternatives of common people are expanded and through this improved level of their welfare is achieved. This only is the origin of presumption of human development. Such principles are neither limited nor static. But keeping in view the level of development, the common people have three alternatives: to pass a long and healthy life, to gain knowledge and to enhance its approach towards requisite resources for its approach towards requisite resources for achieving a good live standard.

It has been mentioned in Human Development Report (1997) in this context that "The income is only alternative, which the people would like to obtain, thong it may be much important, but this is not the gist of their entire life. The income is a mean, whereas the human development is a goal."In

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A Comparative Study on Western Humanism & Indian Humanism

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Abstract: A typical humanist is a believer in the dignity of man, and is averse to advocating man's dependence on God either for worldly gains or spiritual upliftment. Modern humanists of the west are basically atheists, e.g., Corliss Lamont, have declared their positions to be frankly naturalistic or even materialistic. But the essence of Indian humanism is the proclamation – Ayomatma Brahman - the human self is big or great or cosmic. Post-modernism aspires at sub-altern empowerment ,i.e, to empower the neglected sections of the people like the Dalits, Tribals, Minorities , women and children who are the most vulnerable sections of the human race. Western humanism is basically materialistic and consumeristic where as Indian humanism is the perfect blending of both materialism and spiritualism.Indian humanism is also known as Integral humanism where all phenomena of Nature are intergrated with a common thread known 'Chiti', the principle of unison, the vital force that restores harmony in the Universe.Western concept of 'Man' is merely a biological entity having rationality. But Indian concept of 'Man' is a spiritual entity having a body meant for cultivating the sublime goal,i.e., to know the thyself " Atmareba Are Dristwa".

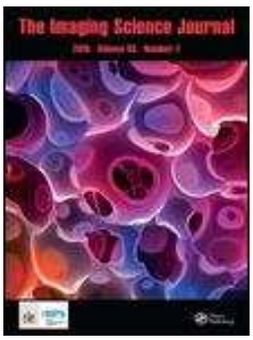
Date of Submission: 19-07-2019 Date of acceptance: 05-08-2019

I. INTRODUCTION

Humanism is an attitude towards human life and human values that entails the harmony of natural phenomena. It is also characterized by the interest in 'Man', concern for man , and faith in man's reason, conscience for discriminating perception of truth and goodness keeping in view of self-realisation. But a typical humanist as a believer in the dignity of man, and is averse to advocating Man's dependence on God either for worldly gains or spiritual uprising .In modern times a humanist is basically atheist , e.g, Corliss Lamont, have declared their position to be frankly naturalistic or even materialistic . To cite another instance dialectic materialism of Marx is typical pedigree of humanism. Likewise the atheistic existentialism of Jean Paul Sartre is also claimed to be a humanistic as it considers a philosophical creed opposes not only to supernaturalism and the religious world view but also religion as way of life. But the essence of Indian Humanism is the proclamation- Ayamatma Brahma – the human self is big or great or cosmic.1 It means the self is Brahman. Brahman realization is self-realization.

Western Humanism : The Hellenic thought presents a kind of classical humanism as it is claimed to be an oldest humanism of the west. But Hellenic thought is limited to its principal adherents , namely, Plato advocated communism of family in eccentric manner and Aristotle eulogize the institution of slavery. Whatsoever in the west humanism grows in the form of Renaissance in Italy in the fourteenth century, like the combination of circumstances that galvanized Industrial revolution and reformation in Europe . It was predicated that the intellectuals dealt with specific problems of man rather than religious dogmas of Church. It is a fact that the church has assumed a pivotal position then, and the self-centred the ruling class has affirmed the divine right theory. Renaissance humanism was concerned with the tangible problems of Man and not any supernatural existence . It really emerged out of the excessive interference of the church in state administration. Thus humanism is a term generally applied to the predominant social philosophy, intellectual and literally currents of the period from 1400AD to 1650 A.D .

Nineteenth century Utilitarian Humanism presented the doctrine of humanism in egoistic manner which had its own perversion. . Such a type of humanism completely neglected the factor of social good which in turn virtually gave rise to legitimacy of capitalism. Communism surfaced out of the reaction of Capitalism Claiming humanistic fervour by promising bread to proletarians but it snatched away their rights and liberties and crushed Man as Slave. In the 20th Century ecological humanism came in the tune with the Indian humanism but the hooligan tendency of the U.S.A its allies it turned flat.



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A novel robust feature extraction with GSO-optimized extreme learning for age-invariant face recognition

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A novel robust feature extraction with GSO-optimized extreme learning for age-invariant face recognition

Sonu Agrawal[a], Sushil Kumar[b], Sanjay Kumar[c] and Ani Thomas[d]

[a]Research Scholar, Department of CSE, BIT Durg, Durg, Chhattisgarh, India; [b]Principal, SRIT, Raipur, Chhattisgarh, India; [c]Professor, Pt. RSU, Raipur, Chhattisgarh, India; [d]Professor, BIT Durg, Durg, Chhattisgarh, India

ABSTRACT

This paper presents a novel age function modelling technique on the basis of the fusion of local features obtained by local texture descriptors. Initially, image normalization is performed and a feature extraction process is carried out. The age estimation performances of new texture descriptors Local Phase Quantization, Weber Local Descriptor and the familiar texture descriptor Local Binary Patterns, which are not examined thoroughly for age estimation modelling, are analysed in this paper. Then the feature fusion process is taken place for investigating the age estimation precisions of various concatenation of the local texture descriptors. By using PCA, dimensionality reduction is implemented for reducing the dimensions of the images. Extreme Learning Machine (ELM) classifier is applied to evaluate the output images for the corresponding input images. Because of the mild optimization restrictions, ELM can be simple for execution and normally attains the finer generalization performance. The outcomes display that, when compared with the earlier techniques, the age function modelling accuracy of the developed system is better.

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KEYWORDS
Age invariant face recognition; principal component analysis; extreme learning machine; galactic swarm optimization

Introduction

The sub-division of Machine Learning is the recognition of pattern which mostly concentrates on the recognition of pattern and consistencies in the data [1]. The patterns are described inaccurately as an object or conception which can be given a call like human face features pattern, handwriting pattern, pattern of a sequence of DNA or vocal signal patterns, fingerprint pattern [2]. Commonly, this technique is classified as a machine-learning method which can induce the machine to comprehend the surrounding and diverse designs of interest emerged in that surrounding [3]. Moreover, for every pattern classification, it is employed to make more precise and appropriate selections and strategies [4]. Usually, it is faraway classified based on the kind of learning process which is used to produce the output value [5].

For the recognition of pattern, three kinds of learning methods are used: unsupervised, semi-supervised and supervised learning. The first kind is the supervised learning which provides the training data for the process [6]. The next kind is the unsupervised learning that makes an effort to discover the innate patterns in the information without providing training data to detect the patterns [7]. The last category is the semi-supervised learning which uses an integration of labelled and unlabelled data for the pattern classification [8]. The biometric recognition is a method which is used for automatically recognizing or checking a person by a physical feature or own mannerism [9]. The word 'automatically' signifies the biometric recognition method that should detect or authenticate a human feature or quality rapidly with little or no interference from the user [10].

The facial recognition is considered as a highly effective method for human observation. The face recognition system is a nonintrusive method which signifies that it enables the user to be discovered by simply walking past a camera [11]. Human beings can be easily identified by each other because of their distinctive facial features. The automatic facial recognition uses some facial features as well that are distinctive in creation [12]. As a problematic subject on face recognition, considering the age-invariant face recognition and recovery, an individual can considerably display the diverse presence at different stages that rise the recognition intricacy [13]. The intricacies consist of huge intra-subject difference and large inter-subject comparison [14]. Certain selective methodologies are suggested to address this problem. For designing a suitable characteristic representation and a proficient comparing structure, the efforts are made by various methods [15].

For the age-invariant recognition, a number of current methods, such as Elastic Graph Bunch Mapping system [16], joined auto-encoder networks (CAN) model [17], CNN-based techniques and an identity-inference model [18] and texture and shape information-based face recognition technique, are used. In

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A novel robust feature extraction with GSO-optimized extreme learning for age-invariant face recognition

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ABSTRACT

This paper presents a novel age function modelling technique on the basis of the fusion of local features obtained by local texture descriptors. Initially, image normalization is performed and a feature extraction process is carried out. The age estimation performances of new texture descriptors Local Phase Quantization, Weber Local Descriptor and the familiar texture descriptor Local Binary Patterns, which are not examined thoroughly for age estimation modelling, are analysed in this paper. Then the feature fusion process is taken place for investigating the age estimation precisions of various concatenation of the local texture descriptors. By using PCA, dimensionality reduction is implemented for reducing the dimensions of the images. Extreme Learning Machine (ELM) classifier is applied to evaluate the output images for the corresponding input images. Because of the mild optimization restrictions, ELM can be simple for execution and normally attains the finer generalization performance. The outcomes display that, when compared with the earlier techniques, the age function modelling accuracy of the developed system is better.

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KEYWORDS
Age invariant face recognition; principal component analysis; extreme learning machine; galactic swarm optimization

Introduction

The sub-division of Machine Learning is the recognition of pattern which mostly concentrates on the recognition of pattern and consistencies in the data [1]. The patterns are described inaccurately as an object or conception which can be given a call like human face features pattern, handwriting pattern, pattern of a sequence of DNA or vocal signal patterns, fingerprint pattern [2]. Commonly, this technique is classified as a machine-learning method which can induce the machine to comprehend the surrounding and diverse designs of interest emerged in that surrounding [3]. Moreover, for every pattern classification, it is employed to make more precise and appropriate selections and strategies [4]. Usually, it is faraway classified based on the kind of learning process which is used to produce the output value [5].

For the recognition of pattern, three kinds of learning methods are used: unsupervised, semi-supervised and supervised learning. The first kind is the supervised learning which provides the training data for the process [6]. The next kind is the unsupervised learning that makes an effort to discover the innate patterns in the information without providing training data to detect the patterns [7]. The last category is the semi-supervised learning which uses an integration of labelled and unlabelled data for the pattern classification [8]. The biometric recognition is a method which is used for automatically recognizing or checking a person by a physical feature or own mannerism [9]. The word 'automatically' signifies the biometric recognition method that should detect or authenticate a human feature or quality rapidly with little or no interference from the user [10].

The facial recognition is considered as a highly effective method for human observation. The face recognition system is a nonintrusive method which signifies that it enables the user to be discovered by simply walking past a camera [11]. Human beings can be easily identified by each other because of their distinctive facial features. The automatic facial recognition uses some facial features as well that are distinctive in creation [12]. As a problematic subject on face recognition, considering the age-invariant face recognition and recovery, an individual can considerably display the diverse presence at different stages that rise the recognition intricacy [13]. The intricacies consist of huge intra-subject difference and large inter-subject comparison [14]. Certain selective methodologies are suggested to address this problem. For designing a suitable characteristic representation and a proficient comparing structure, the efforts are made by various methods [15].

For the age-invariant recognition, a number of current methods, such as Elastic Graph Bunch Mapping system [16], joined auto-encoder networks (CAN) model [17], CNN-based techniques and an identity-inference model [18] and texture and shape information-based face recognition technique, are used. In

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REVIEW ARTICLE

Cache Replacement and Allocation Technology in Multicore System: A study of Security Issue

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ABSTRACT:
Multicore processor is a single processor which contains number of cores on a chip. The cores are functional units made up of computation units and caches. In multicore System cache allocation technology helps address shared resource concerns by providing software control of where data is allocated into the cache, enabling isolation and prioritization of key applications. In this paper, cache replacement policies and cache allocation technology are discussed. A cache allocation technology keeps performance up of processor and protects form timing attacks where replacement policies determine which data blocks should be removed from the cache when a new data block is added. We also analyses the performance of L1 instruction and Data caches with different replacement policies such as LRU (Least Recently Used), FIFO (First In First Out), RANDOM, PLRU (Pseudo Least Recently Used) on the performance of L1 instruction and Data caches.

KEYWORDS: Cache memory, CAT, Replacement Policy.

I. INTRODUCTION:
Caches are generally the top level of the memory hierarchy and are made of SRAM (Static Random access Memory). The main organizational difference between a cache and other level in the memory hierarchy is that caches use hardware to find memory addresses whereas other memories use software or a combination of software and hardware. Cache memories are small fast memories used to temporarily hold the contents of portions of main memory that are (believed to be) likely to be used. Today caches have become an integral part of all processors. Performance improvement of microprocessors historically comes from both increasing the speed or frequency at which the processors run and by increasing the amount of task performed in each cycle. The increasing number of transistors on a chip has led to different ways of increasing parallelism [1]. Intel organization design a new cache Allocation Technology (CAT) which helps address shared resource concerns by providing software control of where data is allocated into the last-level cache, enabling separation and prioritization of key applications [2]. The locality concept is classified into three part i.e. temporal locality, spatial locality and sequential locality. Temporal locality is often known as look backward. That is an instruction sequence such as a loop will reuse instructions. Spatial locality is often known as look forward. In this locality, portions of address space near the current location of reference are likely to be referenced in near feature [3]. In sequential locality next referenced will be the immediate successor of the present reference. This locality principle is important to recognized access pattern of data as well as instruction flow.

Security Issues on Cloud Based Internet of Things

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Abstract: *Cloud computing is the modern technology of using a network of remote servers hosted on the Internet to store, manage and process data instead of a local server or personal computer. IoT, on the other hand, is an Internet network of physical devices incorporated with electronics, software, sensors and data exchange. In the past, only cell phones and computers were connected to the Internet, but with the advent of new technologies in the new era, other things like security cameras, microwaves, cars and industrial equipment are now connected to the Internet. This network of things is called the Internet of Things. The main objective of interaction and cooperation between things and objects sent over wireless networks is the fixed objective as a combined entity. The IOT enables billions of applications, people and services to connect with others and exchange information. Due to the accumulated use of IOT devices, IOT networks are subject to various security attacks. The dissemination of effective security and privacy protocols over IOT networks is extremely necessary to ensure confidentiality, authentication, access control and integrity, among others. This research present a study of IOT and cloud computing with an emphasis on the security issues of the two technologies. More precisely, we combine two technologies (i.e., cloud computing and IOT) and present the contribution of cloud computing to IOT technology. Finally, we look at the security challenges of integrating IOT and cloud computing.*

Keywords: *Cloud Computing, Threats, Security Attacks, Internet of Things.*

1. Introduction:

IOT is the phenomenon that connects a variety of things. The Internet of Things allows people and things to connect anytime, anywhere, with anything and anyone, ideally using any path / network and any service. Internet technology that connects devices, machines and tools to the Internet means wireless technologies. More than 9 billion things connected to the Internet. So the Internet of Things is about networks of integrated physical objects. The term Internet of Things (IOT), also known as the Internet of Things, refers to the network interconnection of everyday objects [2].

Today, the human race depends entirely on the information provided on the Internet, which is captured when taking photos or through human participation, i.e. people have limited time and less accuracy, which leads to incorrect and inconsistent data. . Therefore, such a system is needed that can automatically acquire the data and transfer it to the Internet without human interaction with the mechanism.

Fig.1 Cloud Computing [4]

The term Cloud refers to a network or the Internet, on the other hand, Cloud Computing refers to the manipulation, and configuration and access to online applications offers online storage, infrastructure and application of data. Cloud computing is the outsourcing of data storage and processing. Information hosted by a user resides in the global data center network rather than on a local server. It is a subscription service where the user has to pay

Parallel Implementation of RSA Algorithm using OpenMP and Analysis of Speedup

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ABSTRACT:
Nowadays data driven and digitally connected world, in computer science security is most importance era. The computer security relies on cryptographic security techniques for protection of data. RSA is one of the most used cryptographic algorithms, that based on asymmetric encryption algorithm used to maintain confidentiality and integrity of data. which can be speed up using parallelization of RSA encryption and decryption. This paper focuses on parallel implementation of RSA using OpenMP programming (OMP) Model. parallel implementations of the RSA algorithm. The parallel implementation utilizes the OpenMP library in a high-performance computing environment, To provide a robust analysis, the study makes use of a High Performance Computing environment to depict results for different Size in terms of sequential and parallel processing. Through experimental analysis, the implementation is shown to have greatly improved execution times when compared against sequential implementation. Then, the results are analyzed mainly for the speed up.

KEYWORDS: Multi core, RSA, Encryption, Decryption, Key, OpenMP, Parallel, Cipher.

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REVIEW ARTICLE

Security Issue in IoT Based Architecture for Health Care System

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ABSTRACT:
Internet of Things provides the mixing of various physical objects which communicate together automatically with intelligence. Nowadays, these IoT objects are connected through internet to supply services in various field like smart home, smart cities, smart transportation, smart healthcare etc. Health care and IoT are complimenting one another and it faces major challenging issues as compare to traditional scenario. IoT architecture-based Health care system uses smart equipment, smart sensors that track physical body in each fraction of seconds which is useful for human to watch and analyze health. Security issues and avoidance has become very significant research topic within the area of Internet of Things enables healthcare services. This paper study various IoT enabled health care services and also provides existing security issues within the IoT architecture.

KEYWORDS: IoT, Health Care System, Security Issue, IoT Architecture.

I. INTRODUCTION:
IoT is nothing but it's a system of interrelated computing devices which are connected through internet. IoT is inclined for brand spanking new time it'll legitimately affect business by delivering IoT gadgets and its parts. IoT provide very attractive and straight forward to use application for health care. Presently everyday citizens are likewise utilizing healthcare services gadgets for observing health like smart watches. IoT devices are capable to supply more accurate result by monitor data which makes it widely and really useful. IoT can make it possible to offer much medical application for critical disease with accuracy. IoT health care devices also useful for those that want to watch their health reception. Even now there are several IoT devices which is employed by healthcare system. IoT devices are expected to scale back the value of health care or health treatment and improve the treatment experience.

From previous couple of year IoT in health attracts to researcher. There are such a big number of sensor accessible in human services which makes IoT gadgets simple to execute and straightforward to regulate. People are attracting to practical in new ways with new ideas for various disease detection or monitoring system. The sensor gadgets in Internet of things innovation can get data of urban region in time without labor watch. The technology of Internet of things is formed from a spread of data sensing devices, like frequency identification devices, sensor nodes, GPS, laser scanner, embedded communication module, camera then on. the knowledge obtained from the physical world is transmitted to the centralized information science and application platform through the transmission of the communication network. During this way, the web of things innovation can understand multi-source incorporation of sign insight and movie video knowledge in urban condition.

Security is very important in health care system. To maintain privacy and integrity is to be main aim before developing any kind of technology especially when it is about a person's personal issues are there. Health care industry continuously growing with new technologies and improving day by day. This change makes it very useful and reliable also it is cost effective but medical data is sensitive and vulnerable data in which security is very important for it[1].

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REVIEW ARTICLE

Energy Optimization Technique in Wireless Network for Internet of Things

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ABSTRACT:
The Internet of Things (IoT) enables the worldwide connectivity of a large variety of heterogeneous physical objects in accordance to serve people in a collaborative way without human intervention. Collaboration of typical wireless networks is rising the way towards new supportive platforms for IoT. The energy consumption is challenging issues in IoT. Therefore efficient design of routing protocol is required to optimize energy. In this research paper, an Energy Optimization Technique (EOT) is proposed for optimize energy consumption. EOT mechanism compared with various routing protocols to check out energy consumption of proposed mechanism. The simulation work is used to analyze the performance of routing protocols. The simulation results showed that all routing protocols perform relatively similar for various IoT devices in wireless scenarios and proposed mechanism optimizes the energy as compare to other routing protocols.

KEYWORDS: IoT, WSN, MANET, Routing Protocols, Energy Optimization.

I. INTRODUCTION:
Today, energy saving methods has become a hot topic in the Internet of Things (IoT) space. By embedding restricted transceivers on multiple devices, IoT creates new ways of interacting between people and objects, and between objects themselves as shown in Fig.1. IoT nodes are made up of a sensor or processor sensor. Nodes in the system should be wise to synchronize dynamic location updates and find the network route. Currently any standard regarding the IoT protocol has not yet emerged. It is very important to get an efficient IoT protocol.

The Wireless Sensor and Ad hoc network consist of a group of mobile sites that are dynamically distributed without fixed infrastructure. Each node in the network can act as a host and router, and participate in the network in the same way and is free to travel in any direction [1]. Various types of tunnels have been exploited in order to communicate effectively with other areas. Node mobility, bandwidth, power and physical security are all taken into description for the routing protocol [2] [3]. In collaboration with IoT and WSN, great similarities can be found in node systems and distributed ecosystems. So it is possible to use wireless sensor networks and Ad Hoc network in the IoT environment. And it is very important to analyze the effectiveness of existing Ad Hoc protocols for the use of the IoT environment [4] [5].

ARTICLE/ 21

An Analytical Study on Saving Pattern of Women Self-help Group Members through Co-operative Banks in Chhattisgarh State

Geetanjali Pankaj, Sunil Kumeti & Ranu Agrawal

INRTODUCTION

The empowerment of women is crucial for the economic development of a nation and at the world level in Millennium Development Goals were also eight international goals including to eradicate extreme poverty and hunger including promote gender equality and empowerment in women. At a gathering to launch the international year for micro-credit that access to micro finance could enable poor families to earn more build up assets and better protect themselves against unexpected setbacks and losses (Annan Koffi, 2004). The international year 2005 should encourage Government, Banks and Donors to build on extraordinary knowledge and experience already gained in the field of micro credit to reach out to the poor. In India, women constitute around half of the total population and thus very important human resource for the nation's development.

The participation of women in the country's GDP is as low 8 percent through their work participation was 19.7 percent in 1981. Over the few last decades, women have come forward to establish their own enterprises. Self Help Group first emerged in MYRADA in 1985. NABARD has defined micro finance is all about provision of thrift, credit and other financial services and products of very small amount to the declared the year 2005 as year of microcredit. The microfinance movement through SHGs across India is to make women manage themselves for social mobilization, to create self confidence, rise their self esteem through participation in socio-economic and political life. SHGs are brainchild of the Grameen Bank of Bangladesh which was founded by Prof. Mohammed Yunus of Chittagong University Bangladesh in the year 1975. SHGs started during 1992 with the small beginning as pilot program launched by NABARD by linking 255 SHGs with banks in this year. This program has reached to linking of 69.5 lakh saving linked and 48.5 lakh credit linked SHGs and it covers 9.7 Crore household are involved. Self Help Group provided financial securities and come in directly contact with the lending agencies members.

It is a small group of individual members who voluntarily come together and form an association for achieving a common objective. SHGs concept based on the homogeneity

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हिंदी सेवी विदेशी विद्वान और जार्ज अब्राहम ग्रियर्सन

डॉ० गिरिजा शंकर गौतम

भारत बोलियों का अजायब घर है, हमारे यहाँ कोस-कोस में पानी बदले, चार कोस में बानी' बदलती है। हम इस पर गौरव करते हैं। घाट-घाट का पानी पीना मुहावरा शायद इसी लोकप्रियता से प्रचलन में आया होगा। भाषावार प्रांत गठन के बाद अब हम आपस में कभी-कभार झगड़ते भीहैं। आज हिंदी की तमाम बोलियाँ अपना वर्चस्व स्थापित करना चाहती हैं। यदि समग्रता में बात हिंदी की की जाय तो विनम्रता के साथ स्वीकार करना पड़ता है कि हिंदी की जितनी सेवा हिंदीतर भाषी रचनाकारों ने की है उतनी सेवा हिंदी भाषी लोगों ने शायद ही की हो।

इसी प्रकार विदेशी, विदेशी मूल के लोगों ने यहाँ आकर न केवल भाषा-बोली सीखी वरन् इन पर शोध और अनुवाद कार्य भी किये। जान जेशुआ केटलेर सत्रहवीं शताब्दी के उत्तरार्ध में भारत आये। गुजरात के सूरत शहर में व्यवसाय के दौरान इन्होंने हिंदी सीखी तथा व्यावसायिक दृष्टिकोण से उच्च भाषी थे। इन्होंने हिंदुस्तानी भाषा का व्याकरण लैटिन भाषा में लिखा। जार्ज हैडले ने १७४५ में व्याकरण ग्रंथ लिखा जिसे आधुनिक व्याकरण परंपरा में मील का पत्थर माना जाता है।

जॉन बार्थविक गिलक्राइस्ट (१८००) फोर्ट विलियम कॉलेज कोलकाता में हिंदुस्तानी विभाग के संस्थापक अध्यक्ष थे इन्होंने हिंदुस्तानी ग्रामर' लिखा। इंग्लिश-हिंदुस्तानी डिक्सनरी में इन्होंने शब्दों का संकलन किया। हिंदी में अध्ययन-अध्यापन के लिए सामग्री तैयार करने का सार्थक प्रयास, लल्लूलाल आदि उन्नायकों की इन्होंने सहायता की।

गार्सा-द-तासी (१८३९) प्रथम विदेशी विद्वान हैं। जिन्होंने हिंदी-साहित्य का इतिहास लेखन किया। इनके द्वारा फ्रेंच भाषा में लिखा गया 'इस्त्वार द ला लित्येत्यूर ऐंदुई-ए-ऐंदुस्तानी' बहुचर्चित साहित्यिक इतिहास ग्रंथ है। इस ग्रंथ का प्रकाशन पेरिस से हुआ।

इतालवी भाषी डॉ. तेस्सीतेरी अग्रणी विदेशी शोधकर्ता हैं जिन्होंने हिंदी

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'एक और पंचवटी' उपन्यास में अंतर्द्वंद्व

निर्देशक : डॉ. गिरिजा शंकर गौतम / शोधार्थी : जीवंतिका ठाकुर

जब दो या दो से अधिक परस्पर विरोधी या भिन्न आवश्यकताएँ या लक्ष्य व्यक्ति में उत्पन्न हो, जिनमें एक की पूर्ति दूसरे की पूर्ति में बाधा डाले तो इस स्थिति को अंतर्द्वंद्व कहा जाता हैं। अंतर्द्वंद्व मनुष्य की जाग्रत चेतना के कारण उत्पन्न होता है, जिसका प्रभाव मनुष्य के जीवन पर पड़ता हैं।

अंतर्द्वंद्व के कारण आपस में मतभेद होता है, जिसमें दो या अधिक इच्छाएँ, आवेग, प्रवृत्तियों अथवा उद्देश्य इस रुप में उपस्थिति होते है, जिनमें एक साथ उनकी संतुष्टि संभव नहीं हो पाती, एक की पूर्ति दूसरे की संतुष्टि मे बाधक बनती है। अंतर्द्वंद्व में निहित परस्पर विरोधी आवश्यकताएँ लगभग समान शक्ति तथा महत्व की होती है, इससे व्यक्ति में निश्चयहीनता तिथी असमंजस उत्पन्न होता है, क्योंकि वह यह निश्चय नहीं कर पाता कि अमुक कार्य करे या ना करे। यह अनिश्चय की अवस्था व्यक्ति के लिए अत्यधिक तनावपूर्ण होती है। इससे मुक्ति पाने के लिए वह तर्क-वितर्क के आधार पर एक इच्छा या लक्ष्य को छोड़ देता है, परंतु ऐसा निर्णय सरलता से नहीं किया जाता है। कभी-कभी व्यक्ति दोनों लक्ष्यों का विचार छोड़ देता है या कभी-कभी यूँ ही मनमाना निर्णय ले लेता है। प्रत्येक स्थिति में अंतर्द्वंद्व से व्यक्ति की मानसिक शक्ति का व्यर्थ में क्षय होता है। प्रत्येक स्थिति का व्यर्थ में क्षय होता है। प्रत्येक स्थिति में व्यक्ति विभिन्न अंतर्द्वंद्व के प्रति जागरुक ही रहता है। दो विरोधी आवश्यकताओं या लक्ष्यों में से व्यक्ति दोनों के प्रति जागरुक हो सकता है, या दोनो में से एक के प्रति या फिर दोनों के प्रति वह जागरुक नहीं होता। इस प्रकार एनेक अंतर्द्वंद्व अचेतन स्तर पर उपस्थिति होते हैं।

जिनके संबंध में व्यक्ति को जानकारी नहीं होती। अनेक अवदमित विरोधी इच्छाओं तथा इड, अहं और सुपरईगो के मध्य भी अंतर्द्वंद्व बना रहता है। इससे व्यक्ति में तनाव तथा चिंता व्याप्त रहती है। अंतर्द्वंद्व क्षेत्र पर्याप्त व्यापक एवं सूक्ष्म है। अंतर्द्वंद्व दो मूलभूत आवश्कताओं अथवा दो तात्कालिक इच्छाओं अथवा तात्कालिक एवं दूरगामी आवश्यकताओं अथवा दो आदर्शों एवं महत्वाकांक्षाओं अथवा कर्त्तव्य एवं किसी आवेग एवं नैतिक मूल्यों अथवा दो विरोधी विश्वासों के मध्य उपस्थित हो सकता है।

मनुष्य एक सामाजिक प्राणी है। समाज में रहकर उसने बहुत कुछ सीखा है। प्राचीन समय में मनुष्य अकेला रहता था, वह स्वयं के प्रति ईमानदार, सत्यनिष्ठ और एकाग्रचित था। धीरे धीरे उसमें रक्षा करने की तत्पश्चात संग्रह करने की प्रवृत्ति ने जन्म लिया। मनुष्य के मन में द्वंद्व उत्पन्न होने लगा।

अंतर्द्वंद्व का अर्थ और परिभाषा.

जब दो या दो से अधिक परस्पर विरोधी प्रकृति की इच्छाएँ या आवश्यकताएँ व्यक्ति में उत्पन्न हों तथा एक की पूर्ति दूसरे की पूर्ति में बाधा डाले तो ऐसी अवस्था को अंतर्द्वंद्व कहते है।

द्वंद्व या संघर्ष का प्रयोग हम अपने प्रतिदिन के जीवन में अनेक बार अनेक रुपों में करते हैं। कहा भी गया है जीवन संघर्ष है। द्वंद्व अंग्रेजी के 'Dialectic' पर्याय है, जो मीलत: यूनानी शब्द 'Didlgo' से बना है, जिसका अर्थ हैा दो आदमियों की बातचीत। आगे यह भौतिक जगत के विभिन्न क्षेत्रों में द्वंद्व के पर्याय में प्रयुक्त होने लगा, व्यक्ति के अतिरिक्त सामाजिक, आर्थिक, वैचारिक आदि क्षेत्रों में ।

अंतर्द्वंद्व में विफलता की आशंका विदित रहती है। अनेक स्थितियों में विफलता का कारण अंतर्द्वंद्व होता है, जिससे दो या अधिक इच्छाएँ आवेग, प्रवृत्तियाँ अथवा उद्देश्य इस रुप में उपस्थित होते है, जिनमें एक साथ उनकी संतुष्टि संभव नहीं हो पाती। एक की पूर्ति दूसरे की संतुष्टि में बाधक बनती है। अंतर्द्वंद्व में निहित प्रखर विरोधी आवश्यकताएँ लगभग समाग शक्ति तथा महत्व की होती है। इससे व्यक्ति में निश्चयहीनता तथा असमंजस उत्पन्न होता है, क्योकि वह यह निश्चय नहीं कर पाता कि अनुकूल कार्य करे या न करे। यह अनिश्चय की अवस्था व्यक्ति के लिए अत्यधिक तनावपूर्ण होती है। इससे मुक्ति पाने के लिए वह तर्क-वितर्क के आधार पर एक इच्छा या लक्ष्य को छोड़ देता है, परंतु ऐसा निर्णय सरलता से नहीं किया जाता। कभी-कभी व्यक्ति दोनों लक्ष्यों का विचार छोड़ देता है या कभी-कभी यूँ ही मनमाना निर्णय ले लेता है।

फ्रायड के अनुसार-"जीवन अंतर्द्वंद्व की श्रृंखला से मिलकर बना है।" यही कारण है फ्रायड ने सभी शक्तियों का आधारभूत स्त्रोत अंतर्द्वंद्व को ही माना है। संघर्ष के कारण ही व्यक्तित्व का विकास होता है। उसमें गतिशीलता आती है। यही कारण है कि आज प्रत्येक व्यक्ति किसी न किसी रुप में संघर्ष का शिकार है। संघर्ष के माध्यम से व्यक्ति में अहं 'EgO' परम अहं 'Super Ego' वास्तविकता 'Reality' तथा नैतिक आदर्श 'Moral ideals' आदि से संबंधित गुणों का जन्म एवं विकास होता है। संघर्ष के माध्यम से ही व्यक्ति यह अच्छा है या बुरा है का अनुभव करता है।"

मनोविश्लेषकों के अंतर्द्वंद्व की विशेषता इस प्रकार की है-"अंतर्द्वंद्व वह अवस्था है जब दो इच्छाएँ इतनी विरोधी होती हैं कि एक-दूसरे की तृप्ति में बाधा उत्पन्न करती है।"

बोरिंग लैड फील्ड एवं वेल्ड के अनुसार-"अंतर्द्वंद्व एक ऐसी अवस्था है जिसमें दो या दो से अधिक विरोधी प्रेरणाएँ उत्पन्न हो जाती है, जिसकी एक साथ तृप्ति करना असंभव है।"

सी.एफ. हेनर तथा पी.ए. ब्राउन के अनुसार-व्यक्ति के सामने प्रस्तुत

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ECONOMY OF CHHATTISGARH

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Special Issue, Conference 2019

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INTRODUCTION

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Among 17 goals mentioned by United Nations in 2015 under 'The 2030 Agenda for Sustainable Development', some goals indicate health issues. It tells us that if we want development, health is an important factor. Agendas like good health, well-being, clean water & and sanitation, gender equality and zero hunger talks about health only. For the development of economy, health of the people living in economy contributes the same as other factors. Healthy people means healthy economy. The present research paper is factually a discussion paper, based on secondary data from national and state resources which discusses on the nature of health expenditure and relation with economic development. The paper is divided into 5 parts. First part is introduction of the paper. Second part tells about objective, third part deals with methodology, fourth part deals with analysis of study and fifth part is presenting conclusion and suggestions of the paper. It is an attempt to know the nature

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Current Pharmaceutical Design, 2020, *26*, 3281-3299

REVIEW ARTICLE

Intranasal Lipid Particulate Drug Delivery Systems: An Update on Clinical Challenges and Biodistribution Studies of Cerebroactive Drugs in Alzheimer's Disease

Deepshi Arora[1], Shailendra Bhatt[2], Manish Kumar[2], Hari D.C. Vattikonda[3], Yugam Taneja[4], Vishal Jain[5], Veenu Joshi[6] and Chaitanya C. Gali[7,*]

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Abstract: ***Background*:** Alzheimer's is the primary cause of death in the various countries that affect wide strata of the population. The treatment of it is restricted to a few conventional oral medications that act only superficially. It is evident that the delivery of a drug to the brain across the blood-brain barrier is challenging as the BBB is armed with several efflux transporters like the P-glycoprotein as well as nasal mucociliary clearance adds up leading to decreased concentration and reduced therapeutic efficacy. Considering these, the intranasal IN route of drug administration is emerging as an alternative route for the systemic delivery of a drug to the brain. The intranasal (IN) administration of lipid nanoparticles loaded with cerebroactive drugs showed promise in treating various neurodegenerative diseases, since the nasal route allows the direct nose to brain delivery by means of solid lipid nanoparticles (SLN's). The tailoring of intranasal lipid particulate drug delivery systems is a pleasing approach to facilitate uptake of therapeutic agents at the desired site of action, particularly when a free drug has poor pharmacokinetics/ biodistribution (PK/BD) or significant off-site toxicities.

***Objectives*:** 1) In this review, key challenges and physiological mechanisms regulating intranasal brain delivery in Alzheimer's disease, *ex vivo* studies, pharmacokinetics parameters including brain uptake and histopathological studies are thoroughly discussed.

2) A thorough understanding of the *in vivo* behaviour of the intranasal drug carriers will be the elusive goal.

3) The article emphasizes to drag the attention of the research community working in the intranasal field towards the challenges and hurdles of the practical applicability of intranasal delivery of cerebroactive drugs.

***Method*:** Various electronic databases, journals like nanotechnology and nanoscience, dove press are reviewed for the collection and compilation of data.

***Results*:** From *in vivo* biodistribution studies, pharmacokinetics parameters, and gamma scintigraphy images of various drugs, it is speculated that intranasal lipid particulates drug delivery system shows better brain targeting efficiency for various CNS disorders in comparison to other routes.

***Conclusion*:** Various routes are explored for the delivery of drugs to increase bioavailability in the brain for CNS disorders but the intranasal route shows better results that pave the way for success in the future if properly explored.

ARTICLE HISTORY

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1. INTRODUCTION

Alzheimer's disease (AD) is a chronic progressive neuropathological disease, which originates in the temporal region of the hippocampus and entorhinal complex, and spreads all over the brain and is associated with degeneration of neurons. It leads to mortality as the disease progresses due to various changes such as loss of neuronal conductivity, synaptic deregulation, and formation of abnormal tau protein aggregates. The most common early symptom of AD is short-term memory loss [1]. With the increased risk of disease, a person feels alone and disconnects themselves from relatives, family, *etc* [2]. Stages of AD and associated symptoms are shown in (Table **1**) [2]. Several longitudinal studies and statistical correlations highlight the fact that around 47 million people across the globe suffer from dementia, out of which 37 million are suffering from AD. The report published by AD Association (2019) highlights that in the United States of America (USA) alone approximately 5.8 million people live with AD originated dementia and is considered to be the 6th leading cause of death among older adults in the USA. Although India falls at the bottom of the list with the least incidences of AD when compared with the USA, awareness of AD among the Indian rural and urban communities is sparse or limited.

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Occupational and Human Rights Issues of Migrant Workers – A Study on Informal Construction in Chhattisgarh

Archana Sethi & B.L. Sonekar

INTRODUCTION

In many developing countries migration has become a pivotal policy issue depending on the condition of national economy and employment situation. The main reason behind the migration of people from rural to urban areas are mainly because of poverty, population pressure, absence of infrastructure facilities, natural calamities etc. in today's globalised world various researches has gained momentum in the issues related to migration. The researcher's focuses less on the immigrates as compared to emigrants and thus it becomes a high priority of the research agenda. Globalization increased the migration of unskilled labors as their needs hiked up in the construction sector and as such they lack union membership& do not receive any security benefit from the government.

Migration is a complex phenomena .It is multidimensional and differs according to class and group of people in developing countries. Migration process is frequently fluctuating particularly in today's globalization era. The United Nations multi lingual demographic dictionary defines migration as a form of geographical unit and another, generally involves change of residence from origin place to place of arrivals. This is due to the fact that population started moving in search of better education and better job opportunities. However, labor migration was speeded up and popularized. Now a day's appropriate data on migration is very difficult to obtain because many migrants to obtain because many migrants workers lack official status. According to an estimation of UN department of economics and Social affairs in 2010, there were as many as around 200 million international migrant workers& families in the world.

There is a growing concern about the laws regarding migration. The welfare scheme is snatched away from the labours.It is an urgent need of the hour to better off the situation of these migrants by understanding their problems and conditions .Hence the present study concerns on occupational &human right issues of migrants of informal construction sector of Chhattisgarh state.

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Occupational and Human Rights Issues of Migrant Workers – A Study on Informal Construction in Chhattisgarh

Archana Sethi & B.L. Sonekar

INTRODUCTION

In many developing countries migration has become a pivotal policy issue depending on the condition of national economy and employment situation. The main reason behind the migration of people from rural to urban areas are mainly because of poverty, population pressure, absence of infrastructure facilities, natural calamities etc. in today's globalised world various researches has gained momentum in the issues related to migration. The researcher's focuses less on the immigrates as compared to emigrants and thus it becomes a high priority of the research agenda. Globalization increased the migration of unskilled labors as their needs hiked up in the construction sector and as such they lack union membership& do not receive any security benefit from the government.

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RESEARCH ARTICLE

अनुसूचित जनजातियों की जनांकिकीय प्रवृत्तियां एवं आर्थिक विकास पर प्रभाव

डॉ अर्चना सेठी

सहायक प्राध्यापक, अर्थशास्त्र अध्ययनशाला, पं रविशंकरशुक्ल विश्वविद्यालय, रायपुर
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ABSTRACT:
आर्थिक विकास अनेक तत्वों से प्रभावित होता है जनसंख्या उनमें से प्रमुख तत्व है। जनांकिकीय प्रवृतियां किसी भी देश की विकास को प्रभावित करता है। जनांकिकीय प्रवृतियां किसी देश के शासकीय नीतियों को प्रभावित करता है तथा स्वयं प्रभावित भी होता है। क्षेत्रीय विकास के साथ जनसंख्या उस ओर आकर्शित होती है जहां औद्योगीकरण एवं नगरीकरण होता है। जनसंख्या के वितरण प्रतिरूप पर सामाजिक आर्थिक कारण लिंगानुपात जन्म दर मृत्यु दर एवं प्रवास प्रभाव डालते है। जलवायु, भैगोलिक स्थिति, उच्चावचन, फसलों की प्रकृति, मिट्टी की उर्वरता आदि भी जनसंख्या वितरण को प्रभावित करते है। लिंगानुपात से किसी क्षेत्र के विकास के स्तर का ज्ञान हो सकता है, अधिक विकसित देशों में लिंगानुपात अधिक होती है, तथा पिछड़े देशों में लिंगानुपात कम होती है।जनसंख्या घनत्व एवं आर्थिक विकास में कोई सीधा संबंध नहीं है। मैदानी क्षेत्र में जनसंख्या घनत्व अधिक एवं पहाडी तथा वन क्षेत्र में जनसंख्या घनत्व कम है।मैदानी क्षेत्र में औद्योगीकरण अधिक होना भी अधिक घनत्व का कारण है। भारत की 8.6 प्रतिशत जनसंख्या जनजाति है। भारत का विकास तब तक नहीं हो सकता जब तक जनजातियों का विकास न हो। भारत की आर्थिक और सामाजिक प्रगति में जनजातियों को बराबरी का हक नहीं मिल सका।इसके लिए सरकार की नीतियों को ही दोष नही दे सकते इसके लिए जनजातियों की अलग रहने की प्रवृति एवं अपनी विशिष्ट संस्कृति है। विश्व बैंक के अनुसार बेहतर स्वास्थ्य केवल बीमारी एवं कुपोषण से मुक्ति से प्राप्त नहीं होगा बल्कि शारीरिक मानसिक एवं सामाजिक उन्नति से प्राप्त होगा।जनजाति समाज जंगल में निवास करता है। जनसंख्या शिक्षा गरीबी के आंकडों से यह स्पष्ट है कि मानव विकास में जनजाति समाज बहुत पिछडा हुआ है जनजाति जनसंख्या की दृश्टि से अफ्रीका के बाद भारत दूसरा बडा देश है। देश की कुल आबादी में जनसंख्या आयोग 2011 के अनुसार जनजाति जनसंख्या का प्रतिशत 8.2 है। अकेले छत्तीसगढ में जनजाति जनसंख्या का 32 प्रतिशत निवास करती है। किसी समाज के विकास एवं सामाजिक संरचना का सबसे बडा पैमाना स्त्री पुरुष अनुपात होता है। इस मामले में जनजाति समाज प्रगतिशील है जनगणना 2011 के अनुसार देश के स्त्री पुरुष अनुपात 940 की तुलना में जनजातियों में स्त्री पुरुष अनुपात 990 है।

KEYWORDS: जनजाति, आर्थिक विकास, जनसंख्या घनत्व, लिंगानुपात

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REVIEW ARTICLE

Recent Advances in Lipid-based Nanodrug Delivery Systems in Cancer Therapy

Buddhadev Layek[1], Bina Gidwani[2], Sakshi Tiwari[3], Veenu Joshi[4], Vishal Jain[3] and Amber Vyas[3,*]

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Abstract: Cancer is the second leading cause of death globally, with every sixth death being attributable to cancer. Nevertheless, the efficacy of conventional chemotherapeutic drugs is often limited due to their poor solubility, unfavorable pharmacokinetic profile, and lack of tumor selectivity. The use of nanotechnology provides an opportunity to enhance the efficacy of a chemotherapeutic drug by improving its bioavailability and pharmacokinetic profile while facilitating preferential accumulation at the tumor tissue. To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among different nanocarriers, lipid-based delivery systems have been extensively used in oncology because of their biocompatibility, biodegradability, ability to encapsulate diverse drug molecules, high temporal and thermal stability, and offer prolonged and controlled drug release. This review discusses the current status of the lipid-based nanocarriers and their applications in cancer treatment as well as an overview of the different liposomal formulations commercially available for cancer therapy.

Keywords: Cancer, chemotherapeutics, drug delivery, liposomes, nanostructured lipid carriers, solid lipid nanoparticles, targeted drug delivery.

1. INTRODUCTION

Cancer is the second leading cause of death globally, with one in every six deaths attributable to cancer [1]. According to GLOBOCAN 2018, an estimated 18.1 million new cancer cases and 9.6 million cancer deaths occurred in 2018 [2]. By 2040, the estimated global burden is expected to rise to 27.5 million new cancer cases and 16.3 million cancer deaths. Current cancer therapies include surgical resection of tumors, radiation therapy, and chemotherapy. Among different strategies, chemotherapy has been extensively applied in clinics, particularly in the treatment of advanced cancer cases. However, most of the chemotherapeutic drugs suffer from poor solubility, low bioavailability, and unfavorable pharmacokinetic profile [3]. Furthermore, conventional chemotherapeutics lack sufficient cancer selectivity and inevitably kill both cancer cells and rapidly proliferating healthy cells, causing unwanted adverse effects. Hence, there is an urgent need to develop suitable drug delivery systems capable of achieving high accumulation in tumor tissues while sparing the surrounding healthy tissues [4].

Nanotechnology can serve as a useful tool to circumvent the limitations stated above and enhance the outcome of cancer treatment. Nanocarriers are submicron colloidal drug carrier system with a size range of 10–1000 nm (typically <500 nm) [5, 6]. In general, the drug molecule is dissolved, adsorbed, entrapped, encapsulated, or attached to a nanomatrix. Nanocarriers, owing to their nanoscale sizes and high surface area to volume ratio, can alter the basic properties and bioactivity of its payload [7]. Over the past few decades, nanocarriers have been extensively used in cancer therapy because of their ability to improve the bioavailability and pharmacokinetics of chemotherapeutic drugs while facilitating preferential accumulation at the tumor tissue [8-10].

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Tumor-selective accumulation of nanomedicines is primarily relying on the passive targeting of solid tumors through enhanced permeability and retention (EPR) effect, as illustrated in Fig. **1**. Unlike small-molecule drugs, nanocarriers cannot pass through the tight endothelial cell junctions of normal blood vessels. However, solid tumors are often characterized by abnormal vascular networks and exhibit leaky blood vessels (endothelial pores of 40 to 1000 nm) compared to those of healthy tissue (≤8 nm) [11]. Thus, nanoparticles can extravasate into tumor tissues through the leaky vasculature [12]. As the lymphatic system in tumors is mostly absent or dysfunctional, the inefficient drainage facilitates the retention of nanoparticles in the tumor tissues [13-15]. Furthermore, the physicochemical properties of nanocarriers can be fine-tuned by altering their sizes, shapes, compositions, and surface properties. For instance, rationally designed nanocarriers with specific dimensions and suitable surface properties (*e.g.*, zwitterionic or neutral PEG) display longer residence time in systemic circulation without opsonization and preferentially accumulate in tumor tissues [16-18].

To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among the nanocarriers, lipid-based formulations such as liposomes, solid lipid nanoparticles (SLN), nanostructured lipid carriers (NLC), and lipid-polymer hybrid nanoparticles have received considerable attention in cancer treatment due to their distinct advantages over other colloidal nanocarriers. Lipid-based nanocarriers made up of biocompatible and biodegradable lipids, such as phospholipids, cholesterol, and triglycerides, and hence these systems are less toxic as compared to other nanocarriers, such as polymeric nanoparticles [19, 20]. They can encapsulate both the hydrophilic and hydrophobic drugs with high loading capacity, display high temporal and thermal stability, and offer prolonged and controlled drug release profile [21, 22]. Further, surface modification with polyethylene glycol (PEG) enables lipid-based nanocarriers to evade mononuclear phagocyte system (MPS) and ameliorate circulation half-life for better thera-

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ARTICLE/ 22

Women Entrepreneurs in Informal Sector of Chhattisgarh

Archana Sethi and B.L. Sonekar

Introduction

Last many decades, the female entrepreneur has been exaggerated in handing the societies and their activities are fully grown up we have a tendency to all recognize. As restricted resources and in depth necessities of person create this resources to enhance incessantly,in recent years, women entrepreneurs have attended structure entrepreneurship with accenting on turning into efficient; and therefore they do provided the causes of sustainable development . In recent years, women entrepreneurship has been exaggerated thanks to environmental changes and thanks to these changes women have faced with several issues that need proper measure both and economically and ideologically.

A large number of females around the globe have created and managed their own businesses. For these women it had been a tough task to succeed in business .They had to face loads of difficulties and overcome numerous barriers to become successful in their ventures. They had to cope up with discriminations and stand up to the unbelief of society and put more efforts than men to prove their qualities to others. Economic globalisation has inspired the growth of feminine business possession.

Conceptual Background of Female Entrepreneurs

Female entrepreneurs may be defined as the women or a group of women who initiate, organize and operate a business enterprise. Government of India has described female Enterpreneurs as an enterprise owned and controlled by a women having a minion financial interest of 51% of the capital and giving at least 51% of employment has many functions. They should explore the prospects of began a new enterprise; undertaking risks, introduction of recent innovation, coordination, administration and management of business and providing effective leadership altogether in business.

Characteristic features of female Entrepreneurs; Women Entrepreneurs tend to be extremely motivated and self directed. They additionally exhibits a high internal locus of management and action .Researchers contended that female business owners exhibits some specific characteristics that promote their creative thinking and generate new ideas and ways in which things would be done. Some of them are as follows:-

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Glycosylated-imidazole aldoximes as reactivators of pesticides inhibited AChE: Synthesis and *in-vitro* reactivation study

Rahul Sharma [a b], Kapil Upadhyaya [c], Bhanushree Gupta [d], Kallol K. Ghosh [a], Rama P. Tripathi [e], Kamil Musilek [f], Kamil Kuca [f g]

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Highlights

- A series of glycosylated imidazolium aldoximes were synthesized.
- Analysis of physicochemical properties of prepared oximes was done.
- Synthesized oximes were evaluated against paraoxon-ethyl and paraoxon-methyl inhibited AChE.
- Quaternization of sugar-imidazolium aldoxime showed lower pK_a value resulted in better reactivity.

Abstract

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A review on perovskite solar cells: Evolution of architecture, fabrication techniques, commercialization issues and status

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ABSTRACT

Perovskite Solar Cells (PSCs) have grabbed the attention of the researchers worldwide owing to their outstanding Photovoltaic (PV) performance. PSCs are the future of the PV technology as they are capable of generating power with performance being comparable with the leading Silicon solar cells, with the cost being lower than Silicon solar cells. The enormous potential of PSCs is evident from the fact that the efficiency of these cells has risen from 3.8% to 25.2% within a decade, and it is continuously rising to date. We discuss the features making PSCs superior to contemporary PV technologies. The description of the evolution of efficiency and various architectures used to date has been presented. The perovskite film fabrication techniques with some large scale perovskite solar cell manufacturing techniques are discussed. Despite positive traits, the PSCs have faced some issues, such as degradation in the presence of moisture, oxygen, and UV, toxicity, etc. The impact of these factors with various remedies adopted by researchers has been discussed. However, the instability issue raised by toxicity is not of much concern is supported in this paper. These issues creating obstacles in the path of commercialization of PSCs along with the commercialization road map are discussed thoroughly.

1. Introduction

For last so many years, the mankind has been looking for a source of energy that is not only environmentally sustainable but is commercially viable as well. Current global power demand is about 16TW, and it is estimated that the power demand would increase beyond 30TW by 2050. Therefore, rigorous research is being carried out to get an efficient power generation system, as the traditional technique of burning fossil fuel would not be able to meet the hike in the power requirement. The renewable energy sources, such as tidal, hydrothermal, geothermal, wind, solar, etc. will act as a savior in the energy crises. Among the various sources of energy, solar energy is believed to be the most promising and efficient one due to its availability in abundance. The uniqueness of solar energy can also be inferred from the fact that one hour of continuous illumination of solar energy is capable of fulfilling our annual power demands, if all the incident solar energy is converted into electricity. So, using PV solar cells for power generation seems to be a promising way as they convert the sunlight directly into electricity.

In 1839, Edmund Becquerel was the first to convert sunlight into electricity. In 1873, Willoughby Smith discovered photoconductivity (PC) in selenium. In 1883, Charles Fritts proposed the first design of PV cell, which was based on the Selenium wafers. The theory of photoelectric effect proposed by Albert Einstein in 1905 explained how light knocks out the electron from the metal surface. Later for this work, he was awarded with the Nobel Prize. In 1918, Jan Czochralski laid the foundation of Silicon (Si) based solar cells by developing a technique to grow single-crystal silicon (Si) (The History of Solar Energy, 2013). In 1954, the birth of PV occurred, when the crystalline silicon-based solar cell was developed in Bell lab, USA that had power conversion efficiency (PCE) of 4.5% (Chapin et al., 1954). Since then, researchers have been actively searching for a low-cost device structure and some new materials exhibiting the PV effect. As a result, second-generation solar cells came into existence. These cells were basically based upon III-V device structure, GaAs, CdTe, InP, and CIGs solar cells were introduced in the field of solar photovoltaics (Green et al., 2018). The early 1990s came up with the third generation of solar cells with Dye-sensitized structure. In 2000s Organic Photovoltaic cells (OPV) were introduced. With growing interest in nanomaterials, intensive research work is being carried out for finding new materials in the field of solar devices, which are not only cheap but requires low-cost processing conditions as well. Currently, crystalline silicon solar cells dominate the market, but the factors, such as the requirement of the expensive manufacturing process and costly raw materials are urging researchers to come up with a new PV technology that has the combination of both high efficiency and low-cost manufacturing. The perovskite materials are gaining huge interest among the researchers because of their brilliant PV

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Recent Progress in Organic Light-Emitting Diodes

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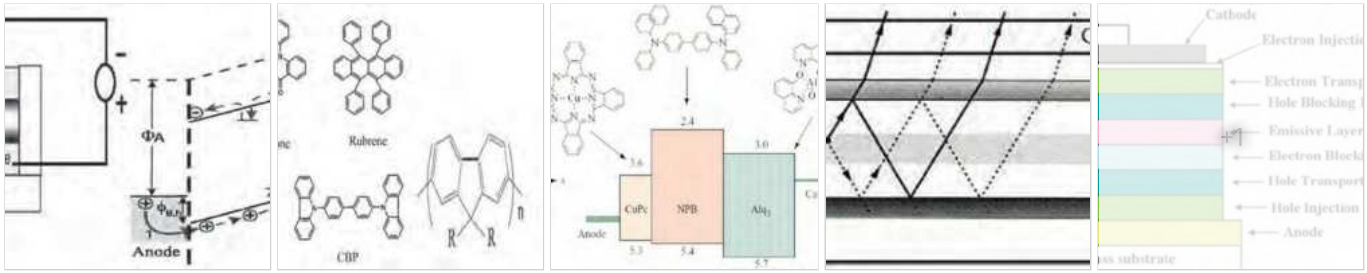
Sanjay Tiwari · Mohua Singh · S. K. Mishra · A. K. Shrivastava

Figures



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Theoretical Approach to ITO/PVK/Dye/Inga Organic Light Emitting Diodes for Different Thickness of PVK Layer

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Abstract: *In this work, organic light emitting diodes were fabricated using a double layer device with the general structure ITO/PVK/dye/InGa. Three different dyes were used, namely: Rhodamine B, Crystal violet, and Bromophenol blue. Three different PVK layer thicknesses were used with each dye. The double layer system was sandwiched between indium tin oxide (ITO) and Indium-Gallium alloy (InGa) as anode and cathode, respectively. The J-V characteristic curves were investigated in details with the PVK layer thickness. The conduction mechanisms were also studied.*

Keywords: *PVK, organic light emitting diode, electroluminescence, SCLC, Mott Gurney Law, Quasi ohmic*

1. INTRODUCTION

Organic light emitting diode (OLED) is a thin-film optoelectronic device consisting of a single layer, double layer or multilayer of organic materials sandwiched between two electrodes, at least one of which is transparent or semi-transparent for the transmission of light. Organic light emitting diodes have been the focus of intense study since the late 1980s, when the low voltage organic electroluminescence in small organic molecules such as Alq_3, and large organic molecules such as polymers (PPV), were reported [1, 2]. Since that time, research has continued to demonstrate the potential of OLEDs as viable systems for displays and eco-friendly lighting applications. The recent rapid development of organic light-emitting diodes (OLEDs) has resulted in the commercialization of simple dot-matrix OLED displays. The great success of OLED devices has also introduced many new organic semiconductors. From a fundamental perspective, these devices work by injection of charge carriers (holes and electrons) from metal electrodes into organic semiconducting layers which transport through the device and recombine to form excited states (excitons) that emit light upon relaxation. Many OLED displays have been commercialized and now, the researchers are trying hard to commercialize the OLED-based solid state lighting devices.

Organic materials have previously been considered for the fabrication of electroluminescent devices. The primary reason is that a large number of organic materials are known to have extremely high florescence quantum efficiencies in visible spectrum, including blue region. The first observations of electroluminescence (EL) in organic materials were made in the early 1950s by Andre Bernanose and co-workers [3-5] at the Nancy University, France. They applied high voltage alternating current fields in air to materials such as acridine orange, either deposited on or dissolved in cellulose or cellophane thin films. The proposed mechanism was either direct excitation of the dye molecules or excitation of electrons. Although they insisted on the similar excitation and emission mechanisms that had been established in inorganic EL in those days, it was understood by Short and Hercules et al. [6] that the emission was induced from the secondary ultraviolet light by a glow discharge between two electrodes.

In the 1960s, research moved towards the carrier-injection type of electroluminescence, namely OLED, in which a highly purified condensed aromatic single crystal, especially an anthracene was used. Martin Pope and co-workers at New York University [7, 8] and W. Helfrich and Schneider [9, 10], in particular, performed experiment related to carrier recombination and the emission mechanism, and the physical interpretation proposed by them is still considered very useful today. While a highly purified zone-

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Phenolic and Mineral Characteristics of Seed Coats and Kernels from 24 Species from Raipur Area, India

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Authors' contributions

The sample collections, processing and analysis of proximate parameters and polyphenols were performed by authors PKS, SC and MKD. The mineral contents of seed coats and kernels were quantified by author EKT with use of the XRF technique. The paper was written and edited by authors KSP and PMR. All authors read the paper and approved its publication.

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ABSTRACT

Aims: The objective of the present work is the investigation of the physicochemical characteristics of seed coats and kernels from 24 species with medicinal and food applications.
Methodology: Seeds from 24 species (2 herbs, 11 vines and 11 trees), belonging to 13 families, were sampled in Raipur (India) in 2017. The collected seeds were dried and weighed, after which seed coats were manually peeled and separately weighed. Phenolic and mineral contents in the seed coats and kernels were analyzed by spectrophotometric and X-ray fluorescence (XRF) techniques, respectively.

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Nutritional and Spectral Characteristics of *Terminalia* Plants

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Authors' contributions

The present work was carried out in collaboration among all authors. Author KSP designed the research study and supervised the whole research work. Author SC collected the plant samples and performed experimental work. Author KPR managed the literature and statistical work. Author EKT generated the mineral data. Author JMG collected the FTIR spectra. Author PMR wrote the and revised manuscript. All the Authors read and approved the final manuscript.

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ABSTRACT

Aims: *Terminalia* spp. is medicinal plants that belong to Combretaceae family, widely used in traditional Ayurvedic medicine. In this work, the nutritional constituents of the leaves, seed kernel and seed coat from four *Terminalia* species (*T. arjuna*, *T. bellirica*, *T. catappa* and *T. chebula*) are reported.

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Evaluation of the Phytochemical and Mineral Characteristics of Some Selected Sapotaceae Plants

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Authors' contributions

This work was carried out in collaboration among all authors. Author SC collected the plant samples, prepared and preserved them, and analyzed the starch, polyphenol, flavonoid and oil contents. Author MKD collected the surface soil samples and measured their physical parameters. Author KSP designed the investigation and coordinated the analyses and paper writing. Author EKT conducted the XRF measurements. Authors JMG and PMR carried out the FTIR characterization and thermal analyses of the samples. Authors KSP and PMR wrote the original draft. Author PMR took care of the manuscript review and editing. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To study the spectral and thermal characteristics, and the oil, starch, polyphenol and mineral contents of seeds and leaves from three Sapotaceae species, provided that trees and shrubs of this family are an important source of nutritional and functional products.

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Evaluation of the Phytochemical and Mineral Characteristics of Some Selected Sapotaceae Plants

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This work was carried out in collaboration among all authors. Author SC collected the plant samples, prepared and preserved them, and analyzed the starch, polyphenol, flavonoid and oil contents. Author MKD collected the surface soil samples and measured their physical parameters. Author KSP designed the investigation and coordinated the analyses and paper writing. Author EKT conducted the XRF measurements. Authors JMG and PMR carried out the FTIR characterization and thermal analyses of the samples. Authors KSP and PMR wrote the original draft. Author PMR took care of the manuscript review and editing. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To study the spectral and thermal characteristics, and the oil, starch, polyphenol and mineral contents of seeds and leaves from three Sapotaceae species, provided that trees and shrubs of this family are an important source of nutritional and functional products.

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Chemical Composition of Caesalpinioideae Seeds

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Authors' contributions

This work was carried out in collaboration among all authors. Author SC collected, dried, preserved and prepared the plant and soil samples for the analysis, analyzed the polyphenol, oil and starch contents. Author KSP designed the study and coordinated the analyses and paper writing. Author EKT determined the mineral content of the seeds and soils by XRF. Authors JMG and PMR collected and interpreted the FTIR spectra and thermograms. Authors KSP and PMR wrote the original draft. Author PMR took care of the Ms. revision. All the authors read and approved the final manuscript.

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ABSTRACT

Aims: Caesalpinioideae species have important medicinal and food values. In this study, six Caesalpinioideae species that grow abundantly in central India were selected for chemical investigation: *Delonix regia, Entada gigas, Leucaena leucocephala, Mimosa pudica, Parkia javanica* and *Senna siamea*. The objective of the present work is to describe the phytochemical and mineral composition and the bioaccumulation potentialities of the seeds from aforementioned species.

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Case Study

Winter Particulate Pollution over Raipur, India

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Abstract: Particulate air pollution during the winter season in the urban regions of India is severe due to substantial fuel and mineral combustion in adverse climatic conditions. In this work, chemical characteristics and sources of coarse particulate matter (PM_{10}) and particulates associated chemicals during winter period of years 2006–2013 in the polluted city of Raipur, Chhattisgarh, India, are reported. The ambient air coarse particulate (PM_{10}) concentration during the winter period of 2006–2007 ranged from 221 to 760 $\mu g\,m^{-3}$. The major fraction of the PM_{10} was composed of organic carbon, elemental carbon, iron, calcium, and sulfate. Their concentrations were remarkably reduced in the rainy season due to high wind speeds (around 10 kmh^{-1}) and removal with rain. The concentration variations and sources of PM and associated chemical species (i.e., carbons, ions, and metals) in the ambient air are discussed. **DOI: 10.1061/(ASCE)HZ.2153-5515.0000444.** © *2019 American Society of Civil Engineers.*

Author keywords: Particulate matters; Carbons; Metals; Ions; Sources.

Introduction

Particulate matter (PM) is composed of a wide variety of airborne materials (i.e., dust, smoke, and soot, among others), which are directly emitted into the air or result from the transformation of gaseous pollutants due to natural and anthropogenic sources (WHO 2006). PM has been reported as criteria pollutants by the USEPA (USEPA 2010). PM (≤10 μm) is of most concern for its effects on human health, i.e., chronic lung disease and asthma, lung cancer, heart attacks, exacerbation of chronic obstructive pulmonary disease (COPD), premature death, preterm birth, and low birth weight, among other (Ferrante et al. 2015). Some metals interact with enzymes, cell components, or DNA, for example, to cause adverse health effects (Fortoul et al. 2015). The optically active components (e.g., elemental and organic carbon and sulfate) of the particulates affect precipitation and cloud-cover events (Bell and Holloway 2007). High particulate concentrations in ambient air have caused synoptic weather in several parts of the world (Awad and Mashat 2016; Ding et al. 2016; Han et al. 2015; Sati and Mohan 2014; Guttikunda et al. 2013). The distribution, composition, and origins of particulates in ambient air of several regions have been reported (Zeb et al. 2018; Ding et al. 2016; Pan et al. 2015; Xu et al. 2015; Tao et al. 2014; Satsangi et al. 2013; Singh et al. 2013; Yadav and Satsangi 2013; Khillare and Sarkar 2012; Kulshrestha et al. 2009; Lakhani et al. 2008; Gupta et al. 2007; Yttri et al. 2007; Begum et al. 2006; Mouli et al. 2006; Oanh et al. 2006; Gupta and Kumar 2006; Duan et al. 2005; Sillanpaa et al. 2005). The aerosol dynamics (i.e., distribution, composition, sources, and impacts) in developing countries like India are complicated due to scarce aerosol data, high emissions, and severe health hazards. In this work, concentration variations, composition, and sources of the chemical species associated with ambient particulates in the most polluted city, Raipur, during the winter season of years 2006–2013 are described.

Materials and Methods

Study Area

The capital city of the Indian state of Chhattisgarh, Raipur (21°24′N; 81°63′ E) is surrounded by coal- and mineral-based industries and was therefore selected for the proposed investigation. The Urla industrial area is spread over around 300 ha in the northeast direction, with installation of wide range of various industries. Another industrial area, Silrara, is spread over around 900 ha in the east direction and is home to industries such as sponge iron units and ferroalloy plants, among others. Similarly, many cement plants are located in the east direction of the city within an approximate 70-km radius. The largest steel plant (Bhilai) is located around 20 km away in the northwest direction from Raipur. The Borai, Durg industrial area (around 192 ha) is located approximately 40 km away from Raipur in the north–south direction. At least 300 rice mills are running in neighboring cities such as Durg,

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Chemical Composition of *Abrus precatorius* L. Seeds

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Authors' contributions

This work was carried out in collaboration between all authors. Author SC collected the plant samples, prepared and preserved them and analyzed the starch, polyphenol, flavonoid and oil contents. Author KSP designed the investigation and coordinated the analyses. Author EKT conducted the XRF measurements. Author AG collected the thermograms. Authors KSP and PMR wrote the original draft. Author PMR took care of the manuscript revision. All authors read and approved the final manuscript.

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ABSTRACT

Aims: *A. precatorius* seed powder is traditionally used in Ayurveda, Siddha and Unani medicine. The objective of present work is to describe the oil, starch, protein, polyphenol and mineral composition of *A. precatorius* seeds.
Methodology: Legumes from *A. precatorius* were collected, and seeds were manually separated. Dried seeds in powder form were employed for the various analyses: solvent extraction was used

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Case Study

Distribution, Sources, and Hazards of Ambient Carbonaceous Particulates in Central India

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Abstract: Complex environmental and health issues are on the rise in India because of the country's huge emissions of carbonaceous particulates. The aim of this study was to describe concentration variation, segregation, composition, and sources of carbonaceous particulates—elemental carbon (EC) [also known as black carbon (BC)], organic carbon (OC), and carbonate carbon (CC) associated with coarse (PM_{10}) and fine particulate matter ($PM_{2.5}$)—from 2005 to 2013 in India's most polluted city, Raipur. Raipur, located in central India, is surrounded by coal-based heavy industry. Annual ambient air concentrations ($n = 40$) of $EC_{2.5}$, $OC_{2.5}$, and $CC_{2.5}$ varied 0.5–64.7, 0.1–52.1, and 0–9.1 $\mu g\,m^{-3}$, respectively, during the study period. EC_{10}, OC_{10}, and CC_{10} concentrations were higher than $C_{2.5}$ concentrations and ranged 0.9–74.9, 2.2–56, and 0–29.8 $\mu g\,m^{-3}$, respectively. The composition and segregation of particulate matter are discussed here. The potential source contribution function (PSCF) analysis model was used for apportioning distant carbon sources. **DOI: 10.1061/(ASCE)HZ.2153-5515.0000447.** © *2019 American Society of Civil Engineers.*

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Introduction

Carbonaceous particles are a major combustion by-product of particulate matter (PM) in the air and are recognized to play a crucial role in radiative transfer, air quality, and human health because of their micrometric nature (Brunekreef and Holgate 2002; Ramanathan and Carmichael 2008). They exert a negative radiative force with cooling effects, causing numerous health hazards such as coughing and shortness of breath, asthma, chronic obstructive pulmonary disease, congestive and ischemic heart disease, and increased risk of premature death. (Bond et al. 2013; Matsui et al. 2018; Verma et al. 2013; Vineis et al. 2006). PM comprises a large number of chemical constituents—organics, elemental carbon (EC), carbonate, sulphate, nitrate, ammonia, chloride, minerals, and metals (Cao et al. 2003; Giri et al. 2013; Wang et al. 2005). Total carbonaceous matter is a large contributor to the particulate burden in the urban atmosphere and in heavily industrialized areas (Cao et al. 2003; Wang et al. 2005).

Organic carbon (OC) containing polycyclic aromatic hydrocarbons and other components generated during combustion processes may cause mutagenic and carcinogenic effects (Ruchirawat et al. 2006). It is emitted directly from different sources (primary OC) or produced from atmospheric reactions involving gaseous organic precursors (secondary OC) that influence the properties and impacts of particulate matter (PM) on human health, regional visibility, and global climate (Pandis et al. 1992; Pang et al. 2006; Turpin and Huntzicker 1995). EC is a pure carbon, linked in several geometric forms, that causes human morbidity and premature mortality (Jacobson 2001). It is the second most important component of global warming in terms of direct forcing after CO_2 (Anenberg et al. 2012; Menon et al. 2002). They absorb and reflect incoming sunlight by exerting a regional cooling influence on Earth's surface that is approximately three times greater than the warming effect of greenhouse gases (Deepshikha et al. 2005). Airborne carbonate (CO_3^{2-}) in ambient aerosol particles is of great importance because of its role in atmospheric chemistry, global climate, and radiative forcing (Li et al. 2000). Emissions of carbonaceous particles are large in Asian countries because of the use of solid fuels such as wood, field residue, animal dung, and coal for cooking and heating (Oanh et al. 2006; Tiwari et al. 2015). Concentrations and emission sources of carbonaceous aerosol, including black and organic carbon particles, have been studied in various parts of the world (Babu and Moorthy 2002; Begum et al. 2012; Bisht et al. 2015; Briggs and Long 2016; Cheng et al. 2013, 2014; Dan et al. 2004; Duan et al. 2005; Gong et al. 2016; Gramsch et al. 2014; Guha et al. 2015; Helin et al. 2018; Hernández-Mena et al. 2011; Kim et al. 1999, 2006; Klompmaker et al. 2015; Latha and Badarinath 2003, 2005; Li et al. 2006; Lin and Tai 2001; Liu et al. 2018; Moloi et al. 2002; Ozdemir et al. 2014; Parashar et al. 2005;

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Nutritional, Spectral and Thermal Characteristic of Lamiaceae Seeds

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Authors' contributions

This work was carried out in collaboration among all authors. Authors PKS and SC collected and prepared the seed and soil samples for the analyses and analyzed the polyphenol, oil and starch contents. Author KSP designed the study and coordinated the analyses and paper writing. Author EKT determined the mineral content of the seeds and soils by XRF. Authors JMG and PMR collected and interpreted the FTIR spectra and thermograms. Authors KSP and PMR wrote the original draft. Author PMR took care of the Ms. revision. All the authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Aims: Species of the family Lamiaceae possess a rich tradition of use for flavoring and medicinal purposes. This paper focusses on the nutritional and thermal characteristics of the seeds from eight species belonging to this family: *Gmelina arborea* Roxb. ex Sm., *Hyptis suaveolens* (L.) Poit., *Leonotis nepetifolia* (L.) R.Br., *Ocimum americanum* L., *Ocimum sanctum* L. (Rama Tulsi), *Ocimum*

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Case Study

Contamination, Sources, and Environmental Hazards of Groundwater in Bemetara District, Chhattisgarh, Central India

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Abstract: The groundwater of the the Bemetara district of Chhattisgarh in central India over a large area is hard in nature due to its high mineral content. An elevated concentration of Na^+, Mg^{2+}, Ca^{2+}, and SO_4^{2-} in the groundwater has been observed, falling within the ranges ($n = 16$) 30–437, 43–341, 169–660, and 254–2,330 mg L^{-1} with a mean value of 107 ± 93, 117 ± 69, 387 ± 171, and $1{,}059 \pm 595$ mg L^{-1}, respectively. The temporal and spatial variations in the groundwater concentration of species, i.e., SO_4^{2-}, Cl^-, NO_3^-, Na^+, K^+, Mg^{2+}, Ca^{2+}, Al, and Fe, during the period 2010–2016 are described. The sources of the contaminants and quality of the groundwater are discussed. The environmental hazards of the contaminated water, i.e., land degradation, rusting of buildings and pipes, physiological drought, and ill health of aquatics, birds, and animals, in the Bemetara area are discussed. **DOI: 10.1061/(ASCE)HZ.2153-5515.0000474.**

Author keywords: Groundwater quality; Gypsum; Mineralization; Environmental hazard.

Introduction

Sulfates occur naturally in numerous minerals, including gypsum ($CaSO_4 \cdot 2H_2O$), epsomite ($MgSO_4 \cdot 7H_2O$), and barite ($BaSO_4$), and their dissolved minerals contribute to the mineral content of many drinking waters (Greenwood and Earnshaw 1984). Sulfur is important for humans because it is part of the amino acid methionine, which is an absolute dietary requirement. The permissible limit of SO_4^{2-} in water is 150 mg L^{-1}. Sulfates can contribute to an undesirable taste in water, and intake of sulfate-contaminated drinking water has effects on human health, for example, neurological effects and behavioral changes, disturbance of blood circulation, heart damage, effects on eyes and eyesight, reproductive failure, damage to the immune system, stomach and gastrointestinal disorders, damage to liver and kidney function, hearing defects, disturbance of the hormonal metabolism, dermatological effects, and suffocation and lung embolism (Backer 2008; Burgess et al. 2010). Sulfate solution in contact with concrete can cause chemical changes to the cement, which can lead to significant microstructural effects, resulting in a weakening of the cement binder (Atasoy and Yesilnacar 2010; Lorente et al. 2011; Pradhan 2014). Naturally occurring sulfate-contaminated water has been reported in some regions of the world (Seller and Canter 1980; MDH 2008; Horst et al. 2011; Mubarak et al. 2015; Han et al. 2016; Stanton et al. 2017). Similarly, groundwater containing high concentrations of Cl^-, Na, Mg, and Ca in other locations of the world has been observed (Kukillaya et al. 2004; Hajalilou and Khaleghi 2009; van Weert et al. 2009; Yamakanamardi et al. 2011; Razowska-Jaworek 2014; Bhandary et al. 2018).

In the Bemetara district of central India, there is a high incidence of gastrointestinal disorders in humans and livestock, together with serious impacts on wet and bush land ecosystems and a marked corrosion of materials (e.g., houses, pipelines, buildings, roads, water supply systems), all attributable to water pollution. Nonetheless, a detailed investigation of the mineral contamination of water in this region has not been reported to date. In this work, the contamination variations, sources, and toxicity of groundwater from this region of central India are discussed.

Materials and Methods

Study Area

The Bemetara district in the Indian state of Chhattisgarh (21.70° N 81.53° E) was selected for the proposed investigation owing to the high salt content in the water (Fig. 1). The district consists of four blocks, Bemetara, Nawagarh, Saja, and Berla. The area is occupied by mesoproterozoic sedimentary hard rocks over approximately 2.8×10^3 km^2, with a population of around 1 million

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ORIGINAL PAPER

Profiling of the bioactive components of safflower seeds and seed oil: cultivated (*Carthamus tinctorius* L.) vs. wild (*Carthamus oxyacantha* M. Bieb.)

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Abstract

The composition of lipophilic and hydrophilic components in cultivated (*C. tinctorius*) and wild (*C. oxyacantha*) safflower seed oils was studied. By LC–HRMS/MS^2, a total of seven highly abundant bioactive compounds with hydrophilic nature, a lignan glycoside (tracheloside), two flavonoids (acacetin–glucuronide pentoside and acacetin-7-*O*-D-glucuronide), and four alkaloids (N-coumaroylserotonin glucoside, N-feruloylserotonin glucoside, N-coumaroylserotonin, and N-feruloylserotonin), in seeds of both species, were identified. Only a minor part of the hydrophilic compounds (≤0.05%) present in the seeds was transferred into the seed oil during the extraction. The linoleic (~78%), oleic (~15%), palmitic (~5%), and stearic (~2%) acids—constituted 99% of all detected fatty acids in both species. α-Tocopherol was a main form of tocochromanols (over 94%) in both safflower seed oils. β-Sitosterol was the predominate form (over 36%) of phytosterols, while high levels were also recorded for gramisterol (17.1%) and avenasterol (19.6%) in *C. oxyacantha* and *C. tinctorius* seed oils, respectively. Zeaxanthin was a predominated form of carotenoids (over 37%), while high levels were recorded for lutein and β-carotene 15 and 25%, mainly in *C. oxyacantha.* The total amount of minor lipophilic compounds such as tocochromanols, carotenoids and sterols in *C. oxyacantha* vs. *C. tinctorius* seed oil was 57.9 vs. 58.2, 0.76 vs. 0.5, and 185.5 vs. 274 mg/100 g oil, respectively. The presence of squalene was detected only in *C. oxyacantha* (10.4 mg/100 g oil). Despite the similar composition and levels of fatty acids and tocochromanols, species differed by the phytosterols, carotenoids, and bioactive compounds with hydrophilic nature.

Keywords Fatty acids · Tocopherols · Phytosterols · Carotenoids · Squalene · Lignan glycosides · Flavonoids · Alkaloids

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Abbreviations

AOCS	American Oil Chemists' Society
DW	Dry weight basis
FID	Flame ionization detector
GC	Gas chromatography
HPLC	High-performance liquid chromatography
PFP	Pentafluorophenyl
RP	Reverse phase
SFC	Supercritical fluid chromatography
T	Tocopherol
T3	Tocotrienol

Introduction

The genus *Carthamus* (Asteraceae) includes thistle-like plants cultivated and wild grown in the Mediterranean region, and central as well as western Asia. *Carthamus*

SHORT COMMUNICATION

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Fatty Acids, Tocopherols, Tocotrienols, Phytosterols, Carotenoids, and Squalene in Seed Oils of *Hyptis suaveolens*, *Leonotis nepetifolia*, and *Ocimum sanctum*

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The oil yield and composition of fatty acids, tocopherols, tocotrienols, sterols, carotenoids, and squalene in the seeds of three species—*Hyptis suaveolens*, *Leonotis nepetifolia*, *Ocimum sanctum*—belonging to the Lamiaceae family, are studied. The oil yields are 12.1%, 16.1%, and 29.0% in *O. sanctum*, *H. suaveolens*, and *L. nepetifolia*, respectively. The unsaturated fatty acids are a predominant group (86.8–92.1%) in all three investigated plants; however, the profile for each species is unique. The main fatty acid differs as follows: *H. suaveolens*—linoleic acid (85.8%), *L. nepetifolia*—oleic acid (58.3%), and *O. sanctum*—α-linolenic (48.6%). γ-Tocopherol accounts for over 97%, 90%, and 93% of the total tocochromanol content (sum of tocopherols and tocotrienols) in *H. suaveolens*, *L. nepetifolia*, and *O. sanctum*, respectively. Two tocotrienol homologues, α and γ, are detected only in *L. nepetifolia*. β-Sitosterol is the main detected sterol (38–59%) in all three species. High levels of campesterol (18–20%), Δ5-stigmasterol (9–21%), and Δ5-avenasterol (7–12%) are also detected. Squalene is detected only in *O. sanctum* (45.8 mg/100 g oil). The content of sterols, tocochromanols, and carotenoids in the investigated Lamiaceae plant seed oils ranges between 279.5–576.3, 54.5–66.7, and 0.3–3.1 mg/100 g oil, respectively.

Practical Applications: **Lamiaceae plants are of medicinal interest due to the presence of a broad spectrum of bioactive molecules. The present study demonstrates that seeds of the species *H. suaveolens*, *L. nepetifolia*, and *O. sanctum* are rich sources of bioactive compounds of lipophilic nature. There is limited knowledge associated with the composition of tocopherols, tocotrienols, sterols, carotenoids, and squalene. The results of the studied medicinal plants may enhance future targeted applications in various sectors.**

1. Introduction

Several plant species, including *Hyptis suaveolens*, *Leonotis nepetifolia*, and *Ocimum sanctum*, from the Lamiaceae family have important properties applicable for industrial sectors that include but are not limited to horticultural, culinary, medicinal, pharmaceutical, and cosmetics. For example, the essential oils extracted from Lamiaceae plants have demonstrated antifungal activity.[1] Additionally, *H. suaveolens* seeds were proposed as a good source of dietary protein,[2] neutral oligo- and polysaccharides with prebiotic potential,[3] and seed oil with antimicrobial properties.[4] *L. nepetifolia* seed oil was reported to be a source of laballenic acid (5,6-octadecadienoic acid).[5] *O. sanctum* seeds were found to be a source of gum with functional properties,[6] while the seed oil was characterized with antidiabetic, antihypercholesterolemic, and antioxidative activity.[7] The fatty acid composition for those three species is well known;[4,5,8] however, the information about the profile and content of minor lipophilic bioactive compounds in those seed oils is still limited. To the best of our knowledge, the minor lipophilic compounds (tocopherols, tocotrienols, carotenoids, sterols, and squalene) in the species *L. nepetifolia*, *H. suaveolens* and *O. sanctum* have not yet been reported. The determination

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Case Study

Assessment of Arsenic and Heavy Metal Pollution in Chhattisgarh, India

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Abstract: Natural contamination of arsenic (As) and heavy metals (HMs) poses a health threat in many regions. Ambagarh Tehsil, Rajnandgaon, Central India, is a heavily polluted area due to mineralization of geogenic As and HMs in the environment, i.e., water, plants, and soil. In this work, contamination extents and sources of As and HMs (Cr, Mn, Cu, Zn, and Pb) in water, soil, and common plants were investigated to understand the main entry route of these toxic elements in human and domestic animals. The mean concentrations of total As in surface water, groundwater, surface soil, plant leaves, and animal stool samples of 0.031 ± 0.009 mg mL^{-1}, 0.360 ± 0.114 mg mL^{-1}, 192 ± 65 mg kg^{-1}, 5.61 ± 4.78 mg kg^{-1}, and 51.0 ± 7.6 mg kg^{-1}, respectively, were found. The speciation, sources, enrichment, and toxicities of the As and other HMs are discussed, together with some associated health hazards, exemplified in domestic animals exposed to the contaminated water and food. **DOI: 10.1061/(ASCE)HZ.2153-5515.0000478.** © *2019 American Society of Civil Engineers.*

Introduction

Arsenic and other elements are widely distributed in the Earth's crust. Among them, As is a carcinogenic environmental and occupational pollutant, known to be very hazardous to health (Hong et al. 2014). Several countries of the world are reported to be most affected by arsenic contaminations (Chaurasia et al. 2012; Mukherjee et al. 2006). Many countries' surface water (SW) and groundwater (GW) are severely contaminated with As (Ahoulé et al. 2015; Shankar et al. 2014). The As contamination of soils and its impact on ecosystem have been reported in many countries (Middleton et al. 2017; Gillispie et al. 2015; Shrivastava et al. 2015; Moreno-Jiménez et al. 2012; Casentini et al. 2011; Belluck et al. 2003; Smith et al. 1998). Arsenic contamination in foods, for example, rice, wheat, pulses, and vegetables, in various regions has been identified (Shrestha et al. 2017; Bandaru et al. 2016; Karimi and Alavi 2016; Rahman and Hasegawa 2011; Bhattacharya et al. 2010; Jean et al. 2010; Roychowdhury 2008; She and Kheng 1992; Smith et al. 2006). Arsenic hazards to humans, plants, and animals from gold mining has been observed (Eisler 2004). DNA methylation from As exposure was reported by Lambrou et al. (2012).

In the case of Central India, arsenic contamination has been reported at hazardous levels over an area of 3,000 km^2 in Rajnandgaon District (Chhattisgarh), and it has been shown to cause serious health hazards due to polluted water and food consumption (Patel et al. 2005; Pandey et al. 2002). The contamination appears to derive mainly from geogenic sources (Acharyya et al. 2005).

The contamination of As and other HMs are spreading over various environmental compartments due to human activities. Arsenic can get into the human body through drinking water as well as eating contaminated foods. Arsenic in drinking water and contaminated food are absorbed through the intestine into the bloodstream through which it reaches the various organs. Continuous injection of contaminated water and food lead to Arsenicosis through inhibition of essential enzymes, which ultimately leads to death from multi-system organ failure. The objective of this study is to consolidate the information and database on the water and plant leaves resources for exploitation of As and HMs for safe drinking water and plant food in the affected areas of Rajnandgaon district, Central India. Hence, in this work, environmental contamination with elements i.e., As Cr, Mn, Cu, Zn and Pb has been investigated in which is believed to be the most contaminated site in this region (Ambagarh *tehsil*) by monitoring the concentrations of these pollutants in water, soil, plants and animals. In the latter, since excess metals are excreted out through urine and stool, hence, stool samples have been used as bio-indicators (Gupta 2013).

Materials and Methods

Study Area

Ambagarh Tehsil of Rajnandgaon district is densely covered with forest and has a total population of 108,334 as per the 2011 census. The area is severely contaminated by toxic elements such as

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Determination of Fenpyroximate Acaricide in Vegetables, Soil and Water Samples using UV-Visible Spectroscopy

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Modern agriculture makes use of chemical pesticides to increase the crop productivity so as to meet the daily needs of uncontrolled population growth. These increase the productivity neglecting the fertility of soil and food quality, hence risking the health of human beings including animals. Fenpyroximate is a kind of acaricide which attacks and kills mites and decreases the growth of larvae. A method is established for the detection of fenpyroximate and stop excessive use of pesticide. After performing several tests on various wavelengths, the λ_{max} for the detection of fenpyroximate was 435 nm for azo dye. Limit of detection (LOD) and limit of quantification (LOQ) was found to be 0.687 μg mL^{-1} and 2.083 μg mL^{-1}, respectively. Furthermore, molar absorptivity, Sandell's sensitivity were calculated to be 2.3×10^{-7} mol^{-1} cm^{-1} and 1×10^{-5} μg cm^{-2}, respectively. The azo dye follows Beer's law in the range 5 μg to 14 μg in 10 mL that can be easily detected by using spectrophotometric analysis. This method is very sensitive, low cost and less time consuming. The present method is applied successfully in various vegetables (*i.e.* apple, cucumber, potato, spinach, *etc.*) soil and water samples.

Keywords: Pesticides, Fenpyroximate, UV-Vis spectrophotometry.

INTRODUCTION

Pesticides such as acaricides, insecticides and herbicides are used to improve the production of crops by killing the pests, mosquitoes, mice and rats [1-6]. Fenpyroximate is pyrazole acaricide chemically known as *tert*-butyl 4-[[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methylideneamino]oxymethyl]benzoate [7] and first synthesized in the laboratory by Halvorsen *et al.* [8]. Fenpyroximate is widely used to prevents acaricides and effective against mites and it also inhibits the growth of nymph, larva [9]. Fenpyroximate target site is mitochondrial of mite and stops feeding of mites [10]. It is basically used to control mites in apple, orange, pears, tomato, spinach, cucumber, potato, *etc*. [11,12] and widely used in China [13]. The toxic effect of fenpyroximate in the human body is very low by dermal but it effects moderately by inhalation [14,15] and causes irritation of eyes and skin [16,17].

Due to the adverse effect of pesticides many techniques were developed to determine the presence of pesticides in different environmental samples. The techniques such as nuclear magnetic resonance (NMR) [18], gas chromatography (GC) [19], high-performance liquid chromatography (HPLC), Fourier transforms infrared spectroscopy (FTIR) [20,21], *etc*. which are time-consuming and very expensive. Al-Rahman *et al.* [22] determined fenpyroximate acaricide in citrus fruits, grapes and apples by HPLC techniques. Hammad [23] determined fenpyroximate residue in grapes using HPLC and photodiode array. Kim and Myung [24] performed an experiment in different types of honey by tandem mass spectroscopy and liquid chromatography and used solid-phase extraction. Ma *et al.* [25] have reported the determination of pyrazole fenpyroximate by SPE using HPLC in different environmental water samples. In the present work, low cost, highly sensitive, simple and selective method was developed. In this method, a coupling reaction with fenpyroximate is performed by using *p*-dimethylamino benzaldehyde reagent as a coupling agent with sodium nitrate and hydrochloric acid. The present method is applied

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Original Article

Studies on Composition of Stool Samples in Korba Area

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Abstract: The ecosystem of Korba basin is contaminated with fluoride and other toxic elements due to coal burning. There contaminated water and food are taken by domestic animals. The clinical sample such as urine and stool are bio indicator for contamination of water and food. In this work stool of domestic animals such as cattle and buffalo were analyzed to investigate the content of pH, EC, F^-, Na^+, K^+, and Cl^- the range of 6.02 – 6.77, 411 – 622 µs/cm, 160 – 225 mg/kg, 375 – 675 mg/kg, 2125 – 3500 mg/kg, and 2625 – 4025 mg/kg.
Keywords. *Stools samples, fluorosis, fluoride pollution.*

1. Introduction

Industrialization, urbanization, and modern civilization have lead to fast degradation of our natural resources like water, soil, and air mainly. Plants and animals are dependents on the soil for the supply of nitrogen and mineral elements. The composition of plants and animals is also influenced by presence of a wide range of essential and non-essential element present in the soil [1-9]. Soil type and the plants and crops grown on them are highly variable. Many nutrients tend to be over applied and highly generated wastes and pollution resulting in imbalance in the animal's body and harmful effects on the environment. An excess of nitrogen, flurried and other elements can cause leaching, March 2019. The population of this area was 583,338 according to Census 2012 [19]. Korba District falls under the hot temperature dry climate zone. The industry. Apart from the power plants, Korba is surrounded by two sites hills and forest. Other sides are flats and soil profile mainly sandy.

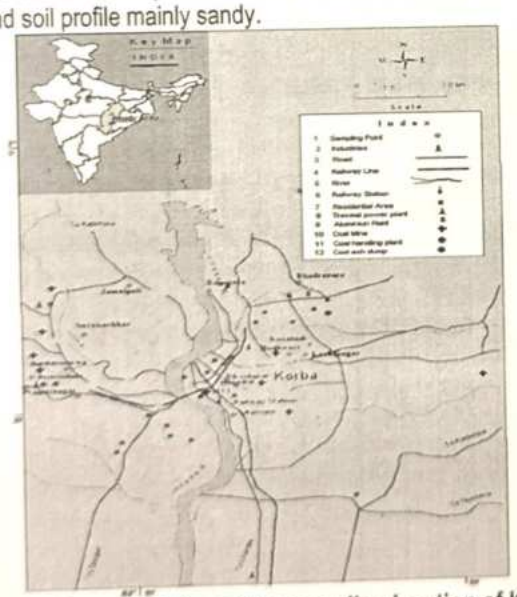

Figure 1: Representation of the sampling location of Korba region

groundwater, air, and soil contamination. Low values of cation and anion which suggest minimal pollution due to geogenic and anthropogenic sources in this study [10-18].

1.1. Materials and Method

1.2. Study Area

The Korba (22⁰ 21' N, 82⁰ 42' E) area was selected for study of stool chemical and physical parameters by stool analysis during

1.3. Sample Collection

Total 10 stool samples were collected from Korba area in March 2019.The fresh samples of cattle and buffalo stool were collected. The samples should be placed in clean, labeled container or leak-proof plastic bags [20-21]. Figure 2 and Table 1

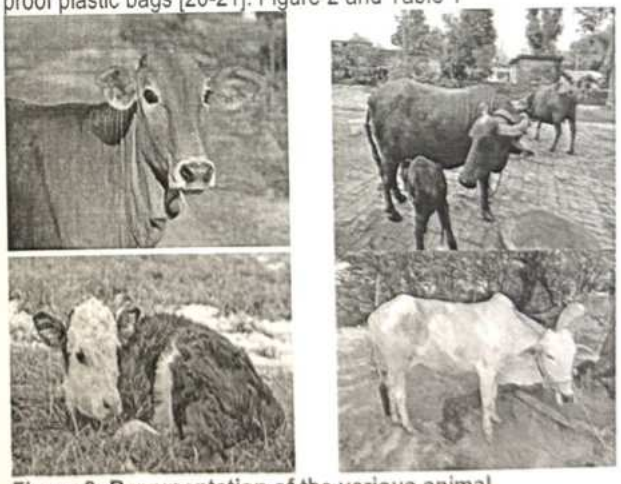

Figure 2: Representation of the various animal

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Novel coronavirus disease 2019 (COVID-19) pandemic: Considerations for the biomedical waste sector in India

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ARTICLE INFO

Keywords:
COVID-19
Coronavirus
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Biomedical waste

ABSTRACT

In late December 2019, the world woke to a truth of a pandemic of Coronavirus Disease (COVID-19), inspired by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which has a place with a gathering of beta-coronavirus. As of July 21 India is still fighting to survive against the SARS-CoV-2 as called coronavirus disease. The contaminations, first constrained in the Kerala state, have inevitably spread to every single other area. The possibility to cause dangerous respiratory disappointment and quick transmission puts COVID-19 in the rundown of the Public Health Emergency of International Concern (PHEIC). There is a flow overall break out of the novel coronavirus Covid-19, which started from Wuhan in China and has now spread to more than 212 countries including 14,753,034 cases, as of 12:20 AM on July 21, 2020. Governments are feeling the squeeze to prevent the outbreak from spiralling into a worldwide wellbeing crisis. At this stage, readiness, straightforwardness, and sharing of data are vital to hazard evaluations and starting explosion control exercises. Since the episode of serious intense respiratory disorder (SARS) 18 years back, an enormous number of SARS-related coronaviruses (SARSr-CoVs) have been found in their regular repository have, bats.

During this epidemic condition, expulsion of biomedical waste created from crisis facilities treating COVID-19 patients in like manner demands unprecedented thought as they can be potential bearers of the disease SARS-CoV-2. This article discusses the potential consequences of the COVID-19 pandemic on biomedical waste administrations, concentrating on basic focuses where option working methodology or extra moderation measures might be fitting.

1. Introduction

A third of the global population is on coronavirus lockdown, as of May, 2020. Another coronavirus malady, formally named COVID-19 by the World Health Organization (WHO), has caused a worldwide pandemic with significant changes in numerous parts of human life. On 11 February 2020, the International Committee on Taxonomy of Viruses declared serious intense respiratory disorder coronavirus (SARS-CoV-2) as the name of the new infection [1]. The main instance of the novel coronavirus was accounted for on December 30, 2019, in Wuhan city, 2 Hubei regions, P.R. China. Quick moves were made by the Centre for Disease Control and Prevention (CDC), Chinese wellbeing specialists, and analysts. The WHO briefly named these pathogen 2019 novel coronavirus (2019-nCoV) [2]. During December 2019, a novel Beta-coronavirus temporarily named 2019 novel coronavirus (2019-nCoV), and along these lines authoritatively renamed extreme intense respiratory disorder coronavirus 2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses (ICTV), causing coronavirus ailment 2019 (or COVID-19), was related with a group of respiratory tract diseases in Wuhan, Hubei Province, China and has quickly spread across main land's [3].

The family Coronaviridae incorporates a wide range of creatures and human infections, all portrayed by an unmistakable morphology. Virions are encompassed and round (coronaviruses) or plate, kidney, or pole molded (toroviruses). Every molecule is encircled by a periphery or "crown" speaking to the bulbous distal parts of the bargains glycoproteins [4].

In India, the principal research centre affirmed instance of COVID-19 was accounted for from Kerala on January 30, 2020. As of July 21, 2020, an aggregate of 11,118,206 confirmed cases, 700,087 recovered cases and 27,497 passing were accounted for in India. As per data available on various websites regarding COVID-19 infections worldwide, the cases are increasing exponentially. On July 21, 2020, there were 14,753,034

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RESEARCH ARTICLE

छत्तीसगढ़ में कंवर जनजातिः एक सामान्य अध्ययन

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ABSTRACT:
प्रस्तुत अध्ययन छत्तीसगढ़ राज्य में कंवर जनजाति का सामान्य अध्ययन से संबंधित है। इस अध्ययन का उद्देश्य कंवर जनजाति का छत्तीसगढ़ में स्थान, क्षेत्र व बसाहट, गोत्र, जनसंख्या – लिंगानुपात व साक्षरता तथा बार नृत्य का सामान्य अध्ययन करना है। प्रस्तुत अध्ययन अन्वेषणात्मक सह विवरणात्मक अनुसंधान एवं द्वितीय आँकड़ों पर आधारित है। छत्तीसगढ़ के 42 अनुसुचित जनजातियों की सूची में यह क्रमांक 22 पर सूचीबद्ध है। इस जनजाति में कुल 200 से ज्यादा गोत्र हैं। आदिवासी संस्कृति के अनुसार ही गोत्र– पशु, पक्षी, पेड–पौधे, वस्तु, कार्य आदि के टोटम पर आधारित होती है। 887477 (94 प्रतिशत) जनसंख्या छत्तीसगढ़ राज्य में तथा 59195 (6 प्रतिशत) जनसंख्या मध्यप्रदेश, झारखंड, उडीसा एवं महाराष्ट्र में है। राज्य की पांच प्रमुख जनजातियों में यह दूसरी तथा पूरे भारत में 20 वीं बडी जनजाति है। इस जनजाति की राज्य में ग्रामीण जनसंख्या 94.65 प्रतिशत, लिंगानुपात 1011 तथा साक्षरता दर 67 प्रतिशत है। राज्य के कुल भौगोलिक (135133 वर्ग किमी.) क्षेत्रफल से अनुसूचित क्षेत्र (81862 वर्ग किमी.) 60.6 प्रतिशत है। बार नृत्य इस जनजाति की प्रमुख नृत्य है।

KEYWORDS: कंवर, जनजाति, गोत्र, बार नृत्य, टोटम

प्रस्तावना:

हमारे देश में कई जाति तथा धर्म के लोग निवास करते हैं। इनमें से कुछ वनाचलों में रहते हैं। इन लोगों की नगरीय समाज से इनका सम्पर्क सीमित होता है। सुदूर जंगलों में इनका निवास होने से तथा विशिष्ट जीवन शैली होने के कारण इनहे कई जातियों के नाम से भी जाना जाता है। छत्तीसगढ़ अंचल वन बहुल क्षेत्र है तथा इसमें यहां के मूल निवासी जनजाति लोग हैं।

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इस जाति के लोग प्रकृति की गोद में सरल जीवन व्यतीत करते हैं। इनकी अपनी जीवन शैली, भाषा, संस्कृति तथा परम्पराएँ है। इस जनजाति लोगों की खास विशेषता है– इनका सामूहिक जीवन, सामूहिक उत्तरदायित्व और भावात्मक संबंध है। सामूहिक जीवन की चेतना तथा परस्पर के प्रति रक्षात्मक जुडाव ये दोनों बातें इतनी एकाकर हो गई है कि ये लोग अकेले जीवन या परिवार की सोच नहीं सकते हैं। यही कारण है कि वे परस्पर निःस्वार्थ व स्वभाविक रूप से मदद करते हैं। इस समाज में अपने मूल रूप में कभी व्यापारिक लेन–देन, ब्याज, साहूकार आदि की प्रथा नहीं रही है। जैसे– खेती के लिए बीज व मदद चाहिए रहता है तो सब मिलकर उसे पूरा कर लेते हैं एवं जब फसल हो जाती है,

SHODH SAMAGAM

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लिटिल अण्डमान के शैक्षणिक संस्थाओं में कार्यरत् शिक्षकों के कार्य संतुष्टि पर एक अध्ययन

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ORIGINAL ARTICLE


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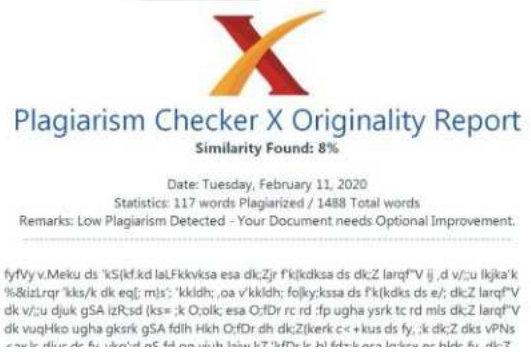
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सारांश :–

प्रस्तुत शोध का मुख्य उद्देश्य शासकीय एवं अशासकीय विद्यालयों के शिक्षको के मध्य कार्य संतुष्टि का अध्ययन करना है। प्रत्येक क्षेत्र या व्यवसाय में व्यक्ति तब तक रूचि नहीं लेता जब तक उसे कार्य संतुष्टि का अनुभव नहीं होता है। किसी भी व्यक्ति की कार्यक्षमता बढ़ाने के लिए या कार्य को अच्छे ढंग से करने के लिए आवश्यक है कि वह अपनी संपूर्ण शक्ति से इस क्रिया में सहयोग दे इसके लिए कार्य संतुष्टि एक विशेष कारक माना गया है। प्रस्तुत अध्ययन हेतु लिटिल अण्डमान के शासकीय एवं अशासकीय विद्यालयों में कार्यरत महिला एवं पुरूष शिक्षको का चयन संभाव्य न्यादर्श विधि द्वारा किया गया है। शिक्षको के कार्य संतुष्टि मापन के लिए डा. मीरा दीक्षित द्वारा निर्मित कार्य संतुष्टि मापन स्केल का प्रयोग किया गया है। प्राप्त आंकड़ो के सांख्यिकीय विष्लेशण हेतु मध्यमान, प्रामाणिक विचलन एवं टी –परीक्षण का प्रयोग किया गया है। अध्ययन के परिणामस्वरूप निष्कर्ष प्राप्त हुआ कि शासकीय एवं अशासकीय विद्यालयों में कार्यरत शिक्षको के कार्य संतुष्टि में सार्थक अन्तर है।

मुख्य शब्द :–

शासकीय एवं अशासकीय विद्यालय, शिक्षक, कार्य संतुष्टि।

प्रस्तावना :–

लिटिल अण्डमान जो ओन्गी भाषा में गऊबोलाम्बे (Goubolambe) कहलाता है, भारत के अण्डमान निकोबार द्वीप समूह के अण्डमान द्वीपसमूह

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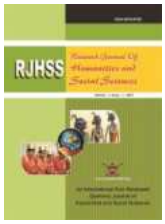

RESEARCH ARTICLE

Cropping Intensity and Agricultural Efficiency Patterns in North- Eastern Region of Chhattisgarh: A Geographical Study

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ABSTRACT:
Agriculture is the basic function for economy, settlement, and socio-cultural activities in North Eastern Region of Chhattisgarh. From the ancient to the modern period, the dignity of agriculture has remained unchanged. The agriculture of the state is depends on monsoon for which the farmers have to suffer damage of crops due to irregular and uncertain rainfall pattern. Crop productivity is basically related to irrigation, despite all efforts, the pure irrigated area from all sources of total agricultural land is 11.3%, which is the cause of high land, pat region and plateau. Through analysis, it is known that the distribution of tehsil wise crop intensity and agricultural efficiency in the state is uneven. That is why it is necessary to increase the crop intensity due to increasing population and increasing land pressure. Since agricultural efficiency is a profound relationship with agricultural productivity. So in addition to the physical background, the crop intensity and agricultural efficiency of the state can be increased through the addition of HYV seeds, fertilizers, mechanization, farming training, mixed crop system, land improvement etc. At present it is possible to increase the area irrigated by canal, tube well, well, pond, reservoirs and rivers, but the study area is prevalent from dense forests and primitive tribes. Primitive tribes still adopt traditional farming methods so that production is relatively low.

KEYWORDS: Land use, crop pattern, crop Intensity and crop efficiency

INTRODUCTION:
North Eastern Region of Chhattisgarh being based on the tropical monsoon climate, due to this irregularities and uncertainty of the rain has adverse effects on production, which also affects the HYV seeds, fertilizers and agricultural equipment and the sources of irrigation. The region having Excess of tropical deciduous vegetation, the Pat and plateaus region found in the state. The red yellow and laterite soil broadly distributed in the region which is comes under infertile soil category, due to the uncertainty of rainfall, 10.38 percent of the total area is under the real area. Area 11.23 of the area is irrigated, while the highest irrigated area is the highest of 6.5 the part is in Raigarh district which is under the Mahanadi River and Mand par area.

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Agriculture is of particular importance in human economies. Agricultural productivity under farming is the measure of agricultural efficiency. It is related to the production of per hectare which is the link between the relationship between the physical and the human work and the interconnection. Agricultural efficiency reveals the maximum yield of any land in natural and cultural environments. Crop Intensification The crop frequency is the area where crops are produced in a year on a certain agricultural area, because the crop intensification of the area is special because the study area Due to being more than tribal and primitive tribes, traditional agriculture has been adopted.

Keeping these facts in mind, the researcher has tried to compute the crop intensity index and agricultural efficiency index of crops produced by the primitive tribe "hill Korwa" of the remote area of North-East of Chhattisgarh.

Issue 25, 2019

Previous Next

From the journal:
New Journal of Chemistry

Facile and visual detection of acetylcholinesterase inhibitors by carbon quantum dots†

Reshma,[a] Bhanushree Gupta,[b] Rahul Sharma[c] and Kallol K. Ghosh *[a]

Author affiliations

Abstract

Sensitive and rapid detection of organophosphate toxicants is highly relevant and important in environmental protection and food safety. Owing to this, a carbon quantum dot (CQD)-based bio-platform was designed for dual detection (fluorometric and colorimetric) of reversible and irreversible inhibitors of enzyme acetylcholinesterase (AChE). The detection strategy is based on the fluorescence quenching and recovery of CQDs through Cu^{2+} ions, AChE and its substrate, acetylthiocholine iodide (ATChI). Initially,

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Glycosylated-imidazole aldoximes as reactivators of pesticides inhibited AChE: Synthesis and *in-vitro* reactivation study

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Highlights

- A series of glycosylated imidazolium aldoximes were synthesized.
- Analysis of physicochemical properties of prepared oximes was done.
- Synthesized oximes were evaluated against paraoxon-ethyl and paraoxon-methyl inhibited AChE.
- Quaternization of sugar-imidazolium aldoxime showed lower pK_a value resulted in better reactivity.

Abstract

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Emerging Laws for Cyber-crime and Cyber security in India: Information Technology Act, 2000

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Abstract

This paper basically deals with the concept, background and the emerging laws enacted in the field of cyber-crime and cyber security in India. The paper specifically focuses on the key feature of the laws, reason for the cyber-crime and also the institution that made under the Act to handle with this type of crime. With the improvement of the technology, cyber-crime also increasing day by day, and to control this new type of crime all the government institution should have to be more equipped than the criminal. In spite of this, people should also have to be attentive and careful in this matter.

Now adays everybody is at risk of becoming the victim of the cyber-crime. Cyber space offerschances for cyber criminals to cause injuries to innocent people.To defend this form of crime, India give due consideration as countrywho enact IT Act, 2000. This Act is generally protected commercial and economic crimes which are precisely mentioned in the preamble of the Act. However,for the proper implementation of this Act it is necessary to strictly follow the procedure as per law and punish the criminal accordingly.

I. Introduction

The Dependency on Computer in modern life is the root cause of origin of Cyber crime. The cyber crime is slightlydissimilar from the conservativeforms of crime. Due to misuse of the computer different kinds of the cyber-crime come into existence that isgiven in the "ITAct, 2000". The definition of the Cyber Crime is waste because it isnot only covering the "act that are punishable under the Information Technology Act,2000 but also covers the offence punishable under the Indian Penal Code,1860. Cyber crimes can be plainly define as "Crimes directed at a computer or computer system" But the complex nature of cyber crimes cannot be sufficiently expressed in such simple and limited term.[1] The Organization for Economic Co-operation and Development (OECD) suggested the working definition of cyber crime "computer related crime is considered as any illegal, unethical or unauthorized behavior relating to the automatic processing and the transmission of data."[2]

II. History and Development

In 1820, the first cyber crime was recorded. Later on,various kinds of cyber-attack evolved from the "Morris worm" to "cyber warfare" came in to existence. To control and stop such types of the cyber-crime many countries including India, working continuously in the arena of computer technology. Cyber crime initiated in 1997 by attack through Viruses that includes "Morris worm" and others, then in 2004 attack of malicious

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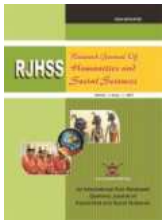

RESEARCH ARTICLE

Analysis of Section 498A of IPC in the Light of Judgments of the Apex Court and High Court

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ABSTRACT:
This law was mainly aimed to protect married women from being harassed or subjected to cruelty by husbands and/or their relatives and curbing dowry harassment. Unfortunately, this law has been misused to harass men and their families rather than protect genuine female victims of harassment. The paper shows the analytical study of the Section 498A their application, scope and extent in today perspective. The paper also gives suggestion to government for the proper implementation of the law. The relevant case laws of the Apex Court and various High Courts related to 498A are also laid down.

KEYWORDS: Constitutional, Matrimonial, Cruelty, Divorce, Maintenance, Supreme Court, Harassment, Dowry, Marriage, Bailable, Compoundable, Cognizable, Jeopardy, Perjury.

INTRODUCTION:
After India gained independence, the constitution makers and the national leaders not only recognized the unequal social position of the women but saw it to that woman would get equal rights with the men. Keeping this in mind, the concept of equality has been enshrined in the constitution which gives honour to the women who once the most neglected and subjugated section of the society. With the spread of women's education in India and due to impact of the Western country, the Indian women rose against the cruelties of the male. They opposed the system of polygamy, sought right to divorce, claimed equality and demanded restriction on dowry. On the account of this demand several legislation has been enacted by the legislature to improve the condition of the women in the country.

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Some of the legislation are Hindu marriage Act,1956, The Hindu Adoption and Maintenance Act, 1956, The Hindu Minority and Guardianship Act,1956, the Dowry Prohibition Act,1984, the Immoral Traffic prevention Act, 1956, the Protection of women from Domestic Violence Act,2005, The Child Marriage Restraint Act,1989 etc.

In the Political field also women enjoy equal status in post Independence India. The committee on the status of women 1974 provided the first comprehensive study on the right and status of Indian women. Recently the department of women and child development has drawn up a national perspective plan for women 1988. Also 'women studies' as a discipline is being encouraged in many universities, as well as by the UGC several pre women laws have been passed, to protect their rights. However, these do not seem to be enough. In the 198o's the incidence of the dowry deaths were steadily rising in India. A dowry death is murder of young women committed by the in laws when she was unable to fulfill their coercive demand for money articles or property categorized as dowry. Organization across the country pressurized and urged the government to provide the legislative protection to women against the domestic

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STUDY MAGNITUDE OF SUBSTANCE USE IN INDIA

Dr. A.K. Sahu*

Abstract

The study said that 14.6 per cent Indians were found to be alcohol users while 5.2 per cent wanted help. Close to 1.6 crore people in Uttar Pradesh have been found to suffer from alcohol dependence or consumed it in a harmful way. In Bengal, 27 lakh people have consumed alcohol while the figure for Odisha stands at 21 lakhs. The number assigned to a state is the extrapolated figure to match the population share of the state. Hence Utter Pradesh is found to have the highest number of harmful and dependent users of alcohol and other substances. Tripura (13.7 per cent), Arunachal Pradesh (7.2 per cent) and Chhattisgarh, Punjab and Andhra Pradesh (around 6 per cent each) were the states with highest prevalence of alcohol dependence. The survey found that alcohol dependence is lesser in states where prohibition in in force. For example, only 0.9 per cent of the population in Bihar and 3.9 in Gujarat were found to be alcohol users. According to the study, cannabis users number around 3.1 crore; opioid users 2.25 crore; sedative users 1.18 crore; hallucinogen users 12.6 lakh and cocaine users 10 lakh. The states which have recorded use of cannabis more than the national average include Uttar Pradesh, Delhi, Sikkim, Chhattisgarh, and Punjab. In terms of percentage of population affected, the top states in the country are those in the Northeast — Mizoram, Nagaland, Arunachal Pradesh, Sikkim, Manipur.The current survey also points that heroin use prevalence is higher than 2004 and has, in fact, surpassed the opium use. Currently, the prevalence of heroin use is twice as much of opium use in total population. Nationally, it is estimated that there are about 8.5 lakh people who inject drugs. Analysis of Report Magnitude of Substance use in India of National Drug Dependence Treatment Centre in India (NDDTC) of the All India Institute of Medical Sciences (AIIMS), New Delhi submitted its Report "Magnitude of Substance Use in India" sponsored by the Ministry of Social Justice and Empowerment. The Ministry of Social Justice and Empowerment has conducted a "National Survey on Extent and Pattern of Substance Use in India" through the NDDTC of AIIMS, New Delhi during 2018 which provides data at the National level as well as at the State level.

Keyword: NDDTC - National Dependence Treatment centre), ALLMS - All India medical Sciences, PWID - People who insect drugs, IMFL - Indian Made Foreign Liquor

Major findings of this Survey at the National level as well as at the State level are as follows :

A. Alcohol:

i. At the national level, about 14.6% of people (among 10-75 year old) are current users of alcohol, i.e. about 16 Crore people. Prevalence is 17 times higher among men than women.

ii. Among people consuming alcohol in India, Country liquor ('desi') (about 30%) and spirits (IMFL - Indian Made Foreign Liquor) (about 30%) are the predominantly consumed beverages.

iii. About 5.2% of Indians (more than 5.7 crore people) are estimated to be affected by harmful or dependent alcohol use. In other words, every third alcohol user in India needs help for alcohol related problems.

iv. States with the high prevalence of alcohol use are Chhattisgarh, Tripura, Punjab, Arunachal Pradesh and Goa.

v. States with high prevalence (more than 10%) of alcohol use disorders are: Tripura, Andhra Pradesh, Punjab, Chhattisgarh, and Arunachal Pradesh.

b) **Cannabis :**

i. About 2.8% of Indians (3.1 Crore individuals) report having used any cannabis product within past 12 months (Bhang 2% or 2.2 crore people; Ganja/Charas - 1.2% or 1.3 Crore people).

ii. About 0.66% of Indian (or approximately 72 lakh individuals) need help for their cannabis use problems.

* Asst. Professor (Law)

Minimum Wage Rules Problem & Solution in Chhattisgarh

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MINIMUM WAGE RULES PROBLEM AND SOLUTION IN CHHATTISGARH

Brijesh Kant Barman* & Dr. A.K. Sahu**

Abstract

Wages are a payment for the service of labour, whether mental or physical. Though in an ordinary language an office executive a minister or a teacher is said to receive a salary, a lawyer or a doctor a fee, and a skilled or unskilled worker a wage, yet in economics no such distinctions are made for different services and all of them are said to receive a wage.

In other words, wages include fees, commissions and salaries. It is another thing that some may be receiving more in the form of real wages and less in terms of money wages and vice versa. Wages may be paid weekly, fortnightly or monthly and partly at the end of the year in the form of bonus.

These are time wages. But the bonus may be a last wage if a work is finished within a specified period or before that. Wages are also paid in accordance with the amount of work done, say in a shoe factory or a tailoring department as per one pair or parts manufactured.

Introduction

The Chhattisgarh government has implemented the Minimum Wages Rules for the proper administration and monitoring of the Minimum Wages Act, 1948. The Chhattisgarh Minimum Wage Rules establish the rules and principles that businesses in Chhattisgarh must follow in the scheduled employment scenario. It is commonly referred to as "rules" and is based on the "Act," the Minimum Wage Act of 1948.

- The Act applies to the work schedule for which minimum wages are set or revised
- Every employer must pay the minimum wage for the scheduled jobs under this Act. In addition, there is a provision for establishing work hours, overtime, and overtime pay
- The variable DA is set depending on the prior calendar year's consumer price index
- In Chhattisgarh, minimum wages are set at the suggestion of the Chhattisgarh Minimum Wage Advisory Board

The document is divided into seven parts, each of which covers a different component of the planned employment, such as:

- Wages
- Men's, women's, children's, and teenagers' work hours
- Weekly offs and relaxation periods or intervals
- Wages for overtime
- Employers are responsible for keeping inspection registers

However, the following points are only a summary of the whole set of regulations under the Act. All businesses must learn and apply these concepts to ensure a favorable and healthy working environment.

The text emphasizes the need to maintain a healthy environment at the workplace so that no employee feels abused or demoralized by their earnings. The act's goal is to ensure that all employees, regardless of gender, receive the right and proportional salaries, thus guaranteeing social harmony.

Table for Latest Minimum Wage in Chhattisgarh.

The latest minimum wage came into effect on October 1, 2021. Here is the updated list of the minimum wage in Chhattisgarh:

Class of Employment	Zone	Basic Per Day	Basic Per Month	VDA per Day	VDA Per Month	Total Per Day	Total Per Month
Unskilled	Zone A	320.00	8320.00	56.92	1480.00	376.92	9800.00
Unskilled	Zone B	310.00	8060.00	56.92	1480.00	366.92	9540.00
Unskilled	Zone	300.00	7800.00	56.92	1480.00	356.92	9280.00

* PTRSU Raipur (C.G.)
** (PTRSU Raipur)

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भारत में न्याय में विलंब पर अन्य देशों से तुलनात्मक अध्ययन

डॉ.ए.के.साहू* & लीना बेडगे**

सारांश

संसदीय बहसों में देश की लंबित न्यायिक मामलों के लिए कानून मंत्री का दिया गया बयान चिंतनीय है एवं किसी देश की परम न्याय प्रणाली पर सोचनीय है। देशभर की अदालतो में लंबित मामलों की संख्या में लगातार बढ़ोतरी हो रही है 2023 के संसद सत्र में संसद में ये मुद्दा उठा, जहां शीतकालीन सत्र के दौरान कानून मंत्री अर्जुनराम मेघवाल ने लोकसभा में बताया कि देश की अदालतों में फिलहाल 5 करोड़ से ज्यादा मामले लंबित पड़े हैं. सिर्फ सुप्रीम कोर्ट में लंबित मामलों की संख्या 80 हजार है।

संसद में एक सवाल के जवाब में मेघवाल ने बताया कि 1 दिसंबर तक अदालतों में 5,08,85,856 मामले लंबित हैं इनमें से 61 लाख से ज्यादा मामले उच्च न्यायालयों की स्तर पर हैं वहीं जिला और अधीनस्थ अदालतों में लंबित मामलों की संख्या 4.46 करोड़ से ज्यादा है। ऐसे में अवश्य हमें न्याय प्राप्ति के लिए चिंतित होना पड़ेगा, एवं शीघ्रत्तर न्याय प्रदान करनें वाली देशों से हमारे न्याय प्रदान करनें वाली प्रणाली से तुलनात्मक अध्ययन करके उन देशों के न्याय प्रणाली को अपनाना होगा हमारे देश की न्याय को बिलंबित करने वाली समस्याओं को चिन्हाकित कर इसके हल ढूंढ़ने होंगे तथा न्याय में एक वस्तुनिष्ठ जांच परख व्यवस्था, निष्पक्ष विश्लेषण एवं समान न्याय प्रणाली लाने हेतु विधिक प्रयास किये जाने होंगे। इसके लिए सरकार को कठोर एवं शीघ्रत्तर उपाय खोजने होंगे। देश की न्याय प्रणाली सुधार व्यवस्था में शासन एवं अदालतों में एक भय मुक्त वातावरण विकसीत कर पीड़ितों को एक न्यायिक अभिनेता के रूप में स्थापित करने होंगे। इस विश्वास की प्रप्ति तभी संभव है जहां शीघ्रत्तर न्याय प्रदान प्रणाली की उच्चतर मानक को हम स्थापित कर पायेगें। न्याय व्यवस्था तथ्यात्मक

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* (सहायक प्राध्यापक)
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International Journal of
Reviews and Research in Social Sciences

RESEARCH ARTICLE

Cyber Crime and Related Laws in India

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ABSTRACT:
Crime means a legal wrong. Initially it is somewhere the religions wrong when the religious institutions were powerful. There were no difference between sin and crime. However, along with the development of State, the concept of sin was diluted and the sin or wrongful act term in to a wrongful act. This wrongful act now turns in to the concept of crime or offence. According to Granville Williams, crime or offence is a legal wrong that can be followed by criminal proceeding, which may result into punishment.

KEYWORDS: Cyber, crimes, hacking, Computer, technology, Punishment, information, Authorities.

• INTRODUCTION:

In initial period, the crime is quite different and depends on the will of the sovereign authority. Now a days the crime is a social and political phenomenon and it is as old as the human society.[1] Along with the development, the concept of the crime is legal and back by sanction. Now crime means a legal wrong. Initially it is somewhere the religions wrong when the religious institutions were powerful. There were no difference between sin and crime. However, along with the development of State, the concept of sin was diluted and the sin or wrongful act term in to a wrongful act. This wrongful act now turns in to the concept of crime or offence. According to Granville Williams, crime or offence is a legal wrong that can be followed by criminal proceeding, which may result into punishment. The basic thing in criminality is that, it is a violation of criminal law. As per Lord Atkin "the criminal quality of an act cannot be discovered by reference to any slandered but: is the act prohibited with penal consequences."[2]

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A crime is said to be any act or omission accompanied which law prohibits. If anyone performs this conduct is amount to the breach of law and he is subject to punishment.

• What is Cyber crime?:

Cybercrime is the latest and perhaps the most complicated problem for the cyber world. The Indian Law has not given any definition to the term 'cybercrime'. In fact, the Indian Penal Code does not use the term 'cybercrime' at any point even after its amendment by the Information Technology (amendment) Act 2008, the Indian Cyber law. "Cyber terrorism is the premeditated, politically motivated attack against information, computer systems, computer programs, and data which result in violence against property, government and people at large." OR "Acts those are punishable by the Information Technology Act". In India Information Technology Act, 2000 deals with the cybercrime problems.it covers following areas— commercial transactions online, use digital signatures defined various cybercrimes, electronic commerce.[3]

A computer crime defined by the U S department of Justice's "As an illegal act requiring knowledge of

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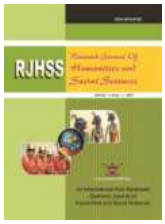

RESEARCH ARTICLE

Indian Prison Sysytem: Structure, Problem and Reforms

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ABSTRACT:
The paper concerned with the structure of Indian prison system and the problem that are faced by the prisoner and the policies that has been started for the reformation of the prisoners, so that they may become part of the society. The prisons are no more the institutions designed to achieve only the retributive and deterrent aspects of punishment. Prisons are now the places, where the inmates are lodged not as a forgotten or forsaking members of the society but as human beings who have to go out in to their surroundings as well behaving as reformed persons.

KEYWORDS: Prison,Convicts, Under-trials, social reform, human rights.

INTRODUCTION:
The role of prisons has radically changed over the years and now They are no longer regarded as mere custodial institutions. The Emphasis has thus shifted from custody to training and re-education of prisoners. The Prison is an age old institution. The word "Prison" connotes "to seize" and "cage". The oxford English dictionary defines "Prison is a place, properly arranged and equipped for the reception of persons who by legal process, are committed to it for safe custody while in trial or for punishment". The Prison administration of a country is a function of several variables pertaining to socio-economic conditions and practical considerations. The socio-economic conditions vary from one country to another and have immense influence on the plans, programs and policies of a country's prison administration.

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The purposes of a country's prison administration are determined from its financial capabilities and by social and moral consciousness of the community concerned. Originally, Prison was conceived as a place of detention to keep offenders pending trials and ultimate punishment. In course of time what was thought of as transit point become a terminus, and imprisonment was regarded as an end in itself. Lord Macaulay, in his famous 'Minutes of 1835' described that "Imprisonment is the punishment to which we must chiefly trust". He pleaded for the establishment of such regulations, at the same time, prevented it from being attended by any circumstances shocking to humanity. In addition to custodial functions the prison became a penal agency, the chief aim of which was to destroy the so called criminal streak among convicted offenders. A retributive-cum-deterrent philosophy, had been the underlying policy of prison administration in India. To these ends, prisons have had a torment-cum-terror regime with significant repressive features like isolation, cells and unproductive rigorous labour. Contemporarily, the repressive-punitive policy is giving way to a philosophy of correction and rehabilitation of offenders.

The Universal impact of this thinking is reflected in the United Nations convention adopted by the General Assembly on December 18,1966 Act 10(3) of the

Analysis of Diabetes Research Literature in India during 2019: A Scientometric Study

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ABSTRACT

This study analyses the research output in diabetes literature in India during 2019 indexed on Web of Science database on several aspects includes growth, rank and global publication and share of international collaborative papers. It also analyses the most productive authors, top journals, on-year wise distribution, country wise distribution and authorship pattern of contribution. The highest number of scientific outputs belongs to USA, UK, Netherland, India followed by other countries which considerably had a lower rate of publication. Among all authors globally V. Mohan contributed 75 articles on Diabetes literature. From this study it was concluded that the publication on Diabetes literature was increased and more participation should be needed for the growth of Diabetes literature nationally throughout countries.

Keywords: Scientometric analysis, Diabetes literature, Authorship pattern, Publication output, India.

1. Introduction

Diabetes is a chronic disease that occurs when the pancreas is no longer able to make insulin, or when the body cannot make good use of the insulin it produces. Diabetes occurs when blood glucose, also called blood sugar, is too high. Blood glucose is main source of energy and comes from the food. Insulin, a hormone made by the pancreas, helps glucose from food get into cells to be used for energy. Sometimes body doesn't make enough or any insulin or doesn't use insulin well. Glucose then stays in blood and doesn't reach cells. Over time, having too much glucose in blood can cause health problems. Although diabetes has no cure, few steps can be taken to manage diabetes and stay healthy

Over time, having too much glucose in your blood can cause health problems, such as heart disease, nerve damage, eye problems, and kidney disease. You can take steps to prevent diabetes or manage it.

An estimated 30.3 million people in the United States, or 9.4 percent of the population, have diabetes. About one in four people with diabetes don't know they have the disease. An estimated 84.1 million Americans aged 18 years or older have prediabetes.

International Diabetes Federation (IDF) estimates that worldwide, 415 million people have diabetes, 91% of whom have type 2 diabetes mellitus (T2DM) [1]. People with diabetes comprise 8.8% of the world's population, and IDF predicts that the number of cases of diabetes will rise to 642 million by 2040 [1].(Einarson et al.)

Scientometrics

The Scientometric study is the most prominent methods for identifying the quality and productivity of a particular subject or the nature of the scientific output. The paper deeply analysed on Diabetes articles indexed by a Web of Science database during the year 2019.The term "Diabetes" is used for data collection and also additionally used the term "India" for location. The results shows 156 articles were published during the year. Each article has published by different authors.

Nalimov and Mulchenko (1971) coined the Russian equivalent of the term "scientometrics" in 1969, and defined it as the quantitative study of various kinds of intelligence process in the development of science.

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Use of E-Resources by the Students of Arts and Science Colleges

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The significant demand of this generation users towards use of e-resources, space problems in libraries and also reducing staff

E-resources, Internet, ICT, Indian libraries, e-infrastructure, Raipur.

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Comparative Bibliometric Analysis of Annals and Pearl Journal o

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This study focuses on the various aspects of Bibliometrics Study. Bibliometrics Study is the quantitative analysis of literature. T

Bibliometrics analysis, LIS journals, Annals of library and information studies, PEARL, Authorship pattern.

ग्रंथालय व्यवसायिकों में व्यवसायिक विकास एवं कार्य संतुष्टि :

रायपुर क्षेत्र के विशेष संदर्भ में

अदिति जोशी*एवं डॉ. हरीश कुमार साहू**

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सार (Abstract) –

अध्ययन रायपुर क्षेत्र के ग्रंथालय व्यवसायिकों के मध्य सतत व्यवसायिक विकास एवं कार्य संतुष्टि को ज्ञात करना हैं। कर्मचारियों का प्रशिक्षण संगठन की दक्षता को दर्शाता है इसलिए संगठन के कर्मचारियों का प्रशिक्षण संगठन की एकमात्र जिम्मेदारी होती है जिससे संगठन की सुव्यवस्थित प्रबंधन के लिए कर्मचारी अपने पूर्ण कुशलता का उपयोग कर सकते हैं अतः व्यवसायिकों का प्रशिक्षण व्यवसायिक विकास का अध्ययन महत्वपूर्ण स्थान रखता हैं। अध्ययन में यह पाया गया कि रायपुर क्षेत्र के ग्रंथालय व्यवसायी केवल 60.66% संतुष्ट हैं। योग्यता तथा कार्य की प्रकृति का कार्य संतुष्टि पर कोई प्रभाव नही पड़ता। सतत व्यवसायिक विकास के अंर्तगत सहमति का माध्य अधिक प्राप्त हुआ अतः सतत व्यवसायिक विकास की ग्रंथालय व्यवसायी के लिए आवश्यक हैं। रिफ्रेशर कोर्स, सेमिनारों, संगोष्ठियों, कार्यशालाओं आदि में भाग लेने के लिए ग्रंथालय व्यावसायिकों को प्रोत्साहित करना होगा जो तकनीकी क्षमता और दक्षता को बढ़ाएंगे। इस प्रकार सतत व्यावसायिक विकास विश्वविद्यालय का बहुत महत्वपूर्ण हिस्सा है, विश्वविद्यालय के पुस्तकालयों में काम करने वाले पुस्तकालय व्यावसायिकों को निरंतर प्रशिक्षण प्रदान करना चाहिए जो उन्हें विभिन्न प्रकार के व्यावसायिक कौशल, ज्ञान और दक्षताओं को सीखने, सुधारने, विकसित करने के लिए तैयार कर आजकल के ग्रंथपाल को बदली भूमिका में आगे आने का अवसर प्रदान करता हैं।

शब्द संकेत (Keyword) :– ग्रंथालय, ग्रंथालय व्यवसायिकों, व्यवसायिक विकास, कार्य संतुष्टि।

1. परिचय (Introduction) :–

कार्य किसी व्यक्ति के जीवन का एक महत्वपूर्ण पहलू है किसी अन्य गतिविधि की तुलना में कार्य में व्यक्ति अधिकतम समय व्यतीत करता हैं। कार्य किसी व्यक्ति को जीवन की वित्तीय सहायता प्रदान करता हैं। संतुष्टि से तात्पर्य उस व्यक्ति की व्यवसाय के संबंध में घटनाओं पुरस्कारों लोगों के संबंध खुशी की सीमा के बारे में महसूस की जाती हैं। किसी कार्य पर कर्मचारियों का व्यवहार एवं एकाग्रता संगठन के विकास का महत्वपूर्ण पहलू है। कार्य की संतुष्टि किसी व्यवसाय या कार्य के अनुभव के मूल्यांकन से उत्पन्न एक आत्म सकारात्मक स्थिति हैं। कार्य संतुष्टि कार्य के विभिन्न पहलुओं जैसे दक्षता, उत्पादकता, कर्मचारी की अनुपस्थिति, संस्थागत टर्नओवर दरें तथा कार्य से त्यागपत्र आदि पर निर्भर करती है। कार्य संतुष्टि उन भावनाओं एवं विश्वासों का संग्रह है, जो व्यवसायी को उनके वर्तमान कार्य के बारे में होती है। संतुष्टि का स्तर संतुष्टि की पराकाष्ठा से असंतुष्टि की पराकाष्ठा तक होती है। कोई भी संगठन अपने कार्य की गुणवत्ता तथा ईमानदारी पर ध्यान केंद्रित करता है। कर्मचारियों द्वारा अपने कार्य के प्रदर्शन के लिए कड़ी मेहनत की जाती है, जिससे कार्य को स्वीकार करना तथा उसमें रहने का निर्णय लिया जाता हैं कार्य एक व्यवसाई कार्य है जो व्यक्ति द्वारा वेतन के रूप में पुरस्कार के बदले दिया जाता हैं।

विभिन्न व्यक्तियों के बीच ग्रंथालय व्यवसायी का कार्य एक महत्वपूर्ण व्यवसायिक कार्य है। डिजिटल युग में शैक्षणिक पुस्तकालय अभी एक हाइब्रिड स्थिति से गुजर रहे हैं जो कि पुराने पारंपरिक प्रलेखों को संभालने के लिए अथक प्रयास कर रहे हैं। ऑनलाइन सेवाओं के उपयोग को उपयोगकर्ता तक पहुंच प्रदान कर रहे हैं ग्रंथालय के उपयोगकर्ताओं को नेटवर्क में लाना तथा उनके आवश्यकता के अनुसार सेवाएं प्रदान करना, निरंतर व्यवसायी लिए चुनौतीपूर्ण कार्य हैं। पुस्तकालय व्यवसाय की कार्य की संतुष्टि तभी हो सकती है जब कभी पुस्तकालय उपयोगकर्ताओं को संतुष्टि के साथ ही साथ अपने ग्रंथालयिन कार्य के प्रति जिम्मेदारियों का निर्वहन करने में सक्षम हो। शैक्षणिक ग्रंथालय परंपरागत प्रलेखों एवं ऑनलाइन सूचना दोनों को बनाये रखकर हाईब्रिड अवस्था से गुजर रहे हैं। एक ग्रंथालय व्यवसायी और इसकी संतुष्टि सुसंगत हो सकती है जब ग्रंथालय उपयोगकर्ता की आवश्यकता की संतुष्टि के लिए अपने कार्य एवं कर्तव्यों के लिए प्रदर्शन करते हैं। इसके लिए वे किस प्रकार अपने कार्यों का सामना करते हैं, यह एक महत्वपूर्ण प्रश्न है।

2.1 कार्य संतुष्टि के कारक (Factors of Job Satisfaction) :–

विभिन्न विद्वानों ने कार्य संतुष्टि के कारण को निम्नानुसार बताया हैं:–

हर्जबर्ग (1966) ने कार्य के वातावरण के महत्व को स्पष्ट किया। कार्य की देखरेख, कार्य की प्रकृति, वेतन, कार्य की स्थिति, कार्य का मूल्यांकन, पदोन्नति, सहकर्मियों के दृश्टिकोण, कार्य चुनौतियॉं, पूर्णता आदि कार्य संतुष्टि को प्रभावित करते हैं। **हेकमैन और होल्डहैम** (1975) ने भी एक क्लासिक मॉडल तैयार किया है जो कार्य के वातावरण में प्रभावित करने वाले कारकों की पहचान कर कार्य संतुष्टि का निर्धारण करता है। आंतरिक कारक जैसे कार्य की सामग्री, कार्य की विविधता, संतुष्टि में योगदान देते हैं जबकि बाहरी कारक जैसे कि वेतन और नौकरी की सुरक्षा भी संतुष्टि में योगदान देते हैं। बाहरी कारक संस्था का नाम, कर्मचारियों के निजी, पर्यवेक्षण, प्रबंधन प्रक्रिया, मूल्यांकन, पदोन्नति, नीतियॉं, प्रथायें, अनुकुल कार्य की स्थिति, संगठनात्मक वातावरण, सहायक कार्यकर्ता और संगठनात्मक नीति होते हैं। जबकि आंतरिक कारक आत्म

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(Information Need of Users of All India Institute of Medical Sciences, Raipur: A Study)

भूषण लाल देवांगन

डॉ. हरीश कुमार साहू

[अखिल भारतीय आयुर्विज्ञान संस्थान, ग्रन्थालय रायपुर के उपयोगकर्ताओं की सूचना आवश्यकता का अध्ययन करता है। अध्ययन के उद्देश्य, क्षेत्र, शोध प्रविधि का वर्णन करते हुए आंकड़ों का विश्लेषण प्रस्तुत करता है।]

1. प्रस्तावना (Introduction)

अखिल भारतीय आयुर्विज्ञान संस्थान रायपुर, प्रधानमंत्री स्वास्थ्य सुरक्षा योजना के अन्तर्गत भारत सरकार के स्वास्थ्य और परिवार कल्याण मंत्रालय द्वारा स्थापित अखिल भारतीय आयुर्विज्ञान संस्थान स्वास्थ्य सेवा संस्थानों में से एक है। देश में गुणवत्ता वाले तृतीयक स्तर की स्वास्थ्य सेवा में क्षेत्रीय असंतुलन को सुधारने के उद्देश्य से और स्नातक और स्नातकोत्तर चिकित्सा शिक्षा में आत्मनिर्भरता प्राप्त करने और प्रशिक्षण के लिए प्रधानमंत्री स्वास्थ्य सुरक्षा योजना ने नए अखिल भारतीय आयुर्विज्ञान संस्थान (एम्स) को स्थापित करने की योजना बनाई है।

अखिल भारतीय आयुर्विज्ञान संस्थान रायपुर सार्वजनिक आयुर्विज्ञान महाविद्यालय का समूह है। इसकी स्थापना सन् 2012 में छत्तीसगढ़ की राजधानी रायपुर में की गई। यह एक संसद के अधिनियम के माध्यम से एक स्वायत्त संस्थान के रूप में स्वास्थ्य देखभाल के सभी पक्षों में उत्कृष्टता को पोषण देने के केन्द्र के रूप में कार्य करने हेतु स्थापित किया गया है।

अखिल भारतीय आयुर्विज्ञान संस्थान का मुख्य उद्देश्य मेडिकल शिक्षा, प्रशिक्षण, स्वास्थ्य देखभाल और वैज्ञानिक संस्कृति से प्रभावित अनुसंधान, बीमार लोगों के लिए करुणा और सेवा प्रदान करने लिए प्रतिबद्धता में उत्कृष्टता का केन्द्र स्थापित करना है।

2. सूचना आवश्यकता (Information need)

सूचना से समाज को बदला जा सकता है। सूचना सार्वभौमिक है और समाज का कोई भी व्यक्ति इसे एकत्रित कर सकता है।

सूचना मानव मस्तिष्क का परिणाम है और यह मूर्त या अमूर्त हो सकता है। सूचना समाज के प्रगति का एक महत्वपूर्ण कारक बन गया है क्योंकि इसे हर क्षेत्र में स्वीकार किया गया है। सूचना एक शक्ति है अर्थात जिसके पास सूचना है वह किसी भी कार्य को कर सकता है। बिना सूचना के मानव शक्तिहीन है। चिकित्सा विज्ञान में भी सूचना का विशेष महत्व है। चिकित्सा के क्षेत्र में विश्व दिन प्रतिदिन प्रगति कर रहा है। चिकित्सा विज्ञान के छात्र-छात्राएं अपनी चिकित्सा जानकारी को अद्यतन करने के लिए विभिन्न प्रकार की सूचनाओं का उपयोग करते हैं। चिकित्सा के क्षेत्र में आये दिन नई-नई प्रकार के बीमारियों उत्पन्न होती रहती हैं, जिनके निवारण के लिए इस क्षेत्र के वैज्ञानिक दिन प्रतिदिन नये नये आविष्कार करने के लिए विभिन्न प्रकार की सूचनाएं एकत्रित करते हैं तथा प्रयोग करते रहते हैं जिससे इन बीमारियों की रोकथाम कर सकें। इस प्रकार देखा जाएँ तो सभी वर्ग के लिए सूचना महत्वपूर्ण स्थान रखती है।

3. अध्ययन का उद्देश्य (Objective of Study)

किसी भी शोध कार्य की सम्पन्नता उद्देश्य पर निर्भर करती है। प्रस्तुत अध्ययन का भी उद्देश्य है, जिसमें अखिल भारतीय आयुर्विज्ञान संस्थान, रायपुर के उपयोगकर्ताओं की सूचना आवश्यकता का अध्ययन किया गया है। यहां शोध अध्ययन के उद्देश्य निम्नलिखित हैं :

Research Productivity and Degree of Collaboration in Indian Journal of Information Sources and Services during 2013-2017

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ABSTRACT:

This study research productivity and degree of collaboration in Indian journal of Information Sources and Services during 2013-2017. For the study data were downloaded and collected from www.trp.org.in/ijiss. In this study distribution of articles, references distribution, country-wise articles contributions, page length of articles contributions, institution wise research contributions, authorship patterns, single and multi authors contributions, degree of collaboration and most productive authors. The study has found that the contributions of research articles to Indian journal of Information Sources and Services were not only from in India but also from foreign countries. For the analysis of the study 03-07 volumes containing 10 issues and 90 research articles have been taken up. The maximum number of research articles 25 (27.77%) articles was published in 2014. The average degree of collaboration is **0.788**.

KEYWORDS: Bibliometrics, Indian journal of Information Sources and Services, distribution of articles, references distribution, country-wise articles contributions, page length of articles contributions, institution wise research contributions, authorship patterns and degree of collaboration.

ग्रंथालय व्यवसायिकों में व्यवसायिक विकास एवं कार्य संतुष्टि :

रायपुर क्षेत्र के विशेष संदर्भ में

अदिति जोशी*एवं डॉ. हरीश कुमार साहू**

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सार (Abstract) –

अध्ययन रायपुर क्षेत्र के ग्रंथालय व्यवसायिकों के मध्य सतत व्यवसायिक विकास एवं कार्य संतुष्टि को ज्ञात करना हैं। कर्मचारियों का प्रशिक्षण संगठन की दक्षता को दर्शाता है इसलिए संगठन के कर्मचारियों का प्रशिक्षण संगठन की एकमात्र जिम्मेदारी होती है जिससे संगठन की सुव्यवस्थित प्रबंधन के लिए कर्मचारी अपने पूर्ण कुशलता का उपयोग कर सकते हैं अतः व्यवसायिकों का प्रशिक्षण व्यवसायिक विकास का अध्ययन महत्वपूर्ण स्थान रखता हैं। अध्ययन में यह पाया गया कि रायपुर क्षेत्र के ग्रंथालय व्यवसायी केवल 60.66% संतुष्ट हैं। योग्यता तथा कार्य की प्रकृति का कार्य संतुष्टि पर कोई प्रभाव नही पड़ता। सतत व्यवसायिक विकास के अंर्तगत सहमति का माध्य अधिक प्राप्त हुआ अतः सतत व्यवसायिक विकास की ग्रंथालय व्यवसायी के लिए आवश्यक हैं। रिफ्रेशर कोर्स, सेमिनारों, संगोष्ठियों, कार्यशालाओं आदि में भाग लेने के लिए ग्रंथालय व्यावसायिकों को प्रोत्साहित करना होगा जो तकनीकी क्षमता और दक्षता को बढ़ाएंगे। इस प्रकार सतत व्यावसायिक विकास विश्वविद्यालय का बहुत महत्वपूर्ण हिस्सा है, विश्वविद्यालय के पुस्तकालयों में काम करने वाले पुस्तकालय व्यावसायिकों को निरंतर प्रशिक्षण प्रदान करना चाहिए जो उन्हें विभिन्न प्रकार के व्यावसायिक कौशल, ज्ञान और दक्षताओं को सीखने, सुधारने, विकसित करने के लिए तैयार कर आजकल के ग्रंथपाल को बदली भूमिका में आगे आने का अवसर प्रदान करता हैं।

शब्द संकेत (Keyword) :– ग्रंथालय, ग्रंथालय व्यवसायिकों, व्यवसायिक विकास, कार्य संतुष्टि।

1. परिचय (Introduction) :–

कार्य किसी व्यक्ति के जीवन का एक महत्वपूर्ण पहलू है किसी अन्य गतिविधि की तुलना में कार्य में व्यक्ति अधिकतम समय व्यतीत करता हैं। कार्य किसी व्यक्ति को जीवन की वित्तीय सहायता प्रदान करता हैं। संतुष्टि से तात्पर्य उस व्यक्ति की व्यवसाय के संबंध में घटनाओं पुरस्कारों लोगों के संबंध खुशी की सीमा के बारे में महसूस की जाती हैं। किसी कार्य पर कर्मचारियों का व्यवहार एवं एकाग्रता संगठन के विकास का महत्वपूर्ण पहलू है। कार्य की संतुष्टि किसी व्यवसाय या कार्य के अनुभव के मूल्यांकन से उत्पन्न एक आत्म सकारात्मक स्थिति हैं। कार्य संतुष्टि कार्य के विभिन्न पहलुओं जैसे दक्षता, उत्पादकता, कर्मचारी की अनुपस्थिति, संस्थागत टर्नओवर दरें तथा कार्य से त्यागपत्र आदि पर निर्भर करती है। कार्य संतुष्टि उन भावनाओं एवं विश्वासों का संग्रह है, जो व्यवसायी को उनके वर्तमान कार्य के बारे में होती है। संतुष्टि का स्तर संतुष्टि की पराकाष्ठा से असंतुष्टि की पराकाष्ठा तक होती है। कोई भी संगठन अपने कार्य की गुणवत्ता तथा ईमानदारी पर ध्यान केंद्रित करता है। कर्मचारियों द्वारा अपने कार्य के प्रदर्शन के लिए कड़ी मेहनत की जाती है, जिससे कार्य को स्वीकार करना तथा उसमें रहने का निर्णय लिया जाता हैं कार्य एक व्यवसाई कार्य है जो व्यक्ति द्वारा वेतन के रूप में पुरस्कार के बदले दिया जाता हैं।

विभिन्न व्यक्तियों के बीच ग्रंथालय व्यवसायी का कार्य एक महत्वपूर्ण व्यवसायिक कार्य है। डिजिटल युग में शैक्षणिक पुस्तकालय अभी एक हाइब्रिड स्थिति से गुजर रहे हैं जो कि पुराने पारंपरिक प्रलेखों को संभालने के लिए अथक प्रयास कर रहे हैं। ऑनलाइन सेवाओं के उपयोग को उपयोगकर्ता तक पहुंच प्रदान कर रहे हैं ग्रंथालय के उपयोगकर्ताओं को नेटवर्क में लाना तथा उनके आवश्यकता के अनुसार सेवाएं प्रदान करना, निरंतर व्यवसायी लिए चुनौतीपूर्ण कार्य हैं। पुस्तकालय व्यवसाय की कार्य की संतुष्टि तभी हो सकती है जब कभी पुस्तकालय उपयोगकर्ताओं को संतुष्टि के साथ ही साथ अपने ग्रंथालयिन कार्य के प्रति जिम्मेदारियों का निर्वहन करने में सक्षम हो। शैक्षणिक ग्रंथालय परंपरागत प्रलेखों एवं ऑनलाइन सूचना दोनों को बनाये रखकर हाईब्रिड अवस्था से गुजर रहे हैं। एक ग्रंथालय व्यवसायी और इसकी संतुष्टि सुसंगत हो सकती है जब ग्रंथालय उपयोगकर्ता की आवश्यकता की संतुष्टि के लिए अपने कार्य एवं कर्तव्यों के लिए प्रदर्शन करते हैं। इसके लिए वे किस प्रकार अपने कार्यों का सामना करते हैं, यह एक महत्वपूर्ण प्रश्न है।

2.1 कार्य संतुष्टि के कारक (Factors of Job Satisfaction) :–

विभिन्न विद्वानों ने कार्य संतुष्टि के कारण को निम्नानुसार बताया हैं:–

हर्जबर्ग (1966) ने कार्य के वातावरण के महत्व को स्पष्ट किया। कार्य की देखरेख, कार्य की प्रकृति, वेतन, कार्य की स्थिति, कार्य का मूल्यांकन, पदोन्नति, सहकर्मियों के दृश्टिकोण, कार्य चुनौतियॉं, पूर्णता आदि कार्य संतुष्टि को प्रभावित करते हैं। **हेकमैन और होल्डहैम** (1975) ने भी एक क्लासिक मॉडल तैयार किया है जो कार्य के वातावरण में प्रभावित करने वाले कारकों की पहचान कर कार्य संतुष्टि का निर्धारण करता है। आंतरिक कारक जैसे कार्य की सामग्री, कार्य की विविधता, संतुष्टि में योगदान देते हैं जबकि बाहरी कारक जैसे कि वेतन और नौकरी की सुरक्षा भी संतुष्टि में योगदान देते हैं। बाहरी कारक संस्था का नाम, कर्मचारियों के निजी, पर्यवेक्षण, प्रबंधन प्रक्रिया, मूल्यांकन, पदोन्नति, नीतियॉं, प्रथायें, अनुकुल कार्य की स्थिति, संगठनात्मक वातावरण, सहायक कार्यकर्ता और संगठनात्मक नीति होते हैं। जबकि आंतरिक कारक आत्म

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Characterization of Phosphate solubilizing Microorganism isolate

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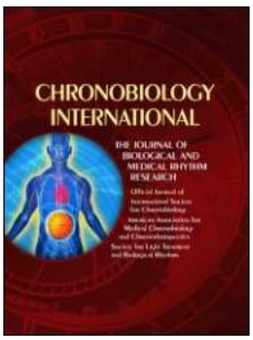
Phosphorus (P) is one of the most essential macro-elements required for growth and development of plants (including photosyn

Aspergillus, Biofertilizer, *Penicillium*, Phosphate solubilizing fungi and Solubilization.



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Circadian rhythm in behavioral activities and diurnal abundance of stray street dogs in the city of Sambalpur, Odisha, India

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Circadian rhythm in behavioral activities and diurnal abundance of stray street dogs in the city of Sambalpur, Odisha, India

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ABSTRACT

This is the first research article that documents circadian variability in behavioral variables, namely resting (Rt) and standing (St) in stray street dogs of Sambalpur city, India. We also estimated the abundance as a function of time of the day and gender in a population of stray dog inhabiting streets of the city. In addition, we determined the association between the behavioral variables and the environmental variables, such as light intensity, sound intensity, temperature and humidity. We determined the abundance of street dogs at 10 hotspots using the photographic capture-recapture technique and Lincoln index equation. In another study, we determined dogs' density along the three randomly selected routes that connect the beginning (Dhanupali) and end (P.C. Bridge) of the city precincts. We recorded the resting and standing activities of the stray street dogs using still and video cameras at four times of the day continuously over a longitudinal timescale of 72 hours. This study was conducted at four randomly selected dog hotspots. Subjecting the log-transformed time series data to the Cosinor rhythmometry we obtained three different rhythm parameters, such as mesor (M), amplitude (A) and acrophase (Ø) of the rhythm in resting and standing behavior of stray street dogs. We found out both spatial and temporal variability in the behavior of street dogs. The sightings of dogs were always more during the evening and nighttime irrespective of the investigated routes and hotspots. Further, we also observed that the abundance of male dogs was always significantly more as compared with the bitches. A lack of association between two attributes the time of the day and gender apropos the number of sightings of the street dogs was validated by the Fisher's exact test. Using Pearson's correlation analysis technique we found a negative relationship between light intensity and resting activity. In addition, we also found a negative association between standing activity and ambient environmental temperature. These findings were complimentary to the observed circadian variability in the resting and standing behavior of the stray street dogs. In conclusion, despite a few limitations, this study documents a statistically significant circadian rhythm in activities of stray street dogs. It also highlights spatial variability in the abundance of dogs on the streets and hotspot localities of the urban Sambalpur. We do have a hunch. It is likely that similar phenomenamight be of common occurrence in many urban areas of the world. These data might also help in addressing street dog menace – one of the major problems the people and administrative authorities of most of the Indian cities and elsewhere worldwide are experiencing since quite long.

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KEYWORDS
Circadian rhythm; resting activity; standing activity; abundance; stray street dogs; dog menace; urban spaces

Introduction

In many underdeveloped and developing countries, including those from the EU, the street dog menace has escalated into a catastrophe of gigantic proportions. Indian cities are no exception. The population of stray street dogs in Indian cities is increasing in tandem with the rapid strides in urbanization. It has been estimated that about 35 million stray dogs live in India's cities and towns (Dhiman and Dixit 2019; Singh 2018). This is a challenging issue and has been linked to many public health and safety problems. The rising population of street dogs in India has been unequivocally attributed to inadequate garbage disposal system (Majumder et al. 2014). Globally, the street dog menace has given rise to many problems, notably to an increase in the cases of (a) rabies, (b) dog bites to human, (c) stray dog-related road accidents, (d) fecal pollution and (e) predatory attacks on farm animals.

In South East Asia region, about 25000 people die of rabies each year (Sudarshan 2007; WHO 2009). This number constitutes 45% of the total death cases due to rabies infection throughout the world. Out of this

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Spatiotemporal variability in activity patterns of urban street cattle as function of environmental factors

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ABSTRACT

In the current study, we studied behavioral patterns, such as foraging, activity, standing, and laying in a population of cattle wandering on streets of Raipur city. We also determined the effects of four environmental factors (temperature, humidity, light, and noise intensities) on these behaviors. We recorded all four behavioral variables at four time points each day over a period of three consecutive days at 10 randomly selected locations using on-site human observation method, digital video, and still camera. We used Cosinor rhythmometry to analyze the time series data on all four behavioral variables. One-way ANOVA was performed to determine the impact of the factor "time of the day" on all observed behavioral variables. Pearson correlation was also employed to evaluate the relationship between the environmental and behavioral variables. Cosinor analyses revealed statistically significant 24-h rhythms in all observed behavioral variables, at the group level, with peaks of foraging, activity, standing, and laying located at 11.54 h, 14.54 h, 18.66 h, and 23.88 h, respectively. Factor "time of the day" had statistically significant effect on all observed behavioral variables. Foraging and activity were found to be positively correlated with temperature, light, and noise intensities; and negatively correlated with humidity. The laying behavior was found to be negatively associated with temperature, light, and noise intensities; and positively correlated with humidity. The findings of this study might be helpful in the management of cattle menace that has become an annoying phenomenon on the streets and highways of almost all Indian cities.

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Street cattle; foraging; activity; standing; laying; rhythmic pattern; cattle menace

Introduction

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Increased urbanization led to overexploitation and shrinkage of grassland. Both government and private sectors are often held responsible for this change. Changes in behavior of animals are attributed to urbanization (Mueller et al. 2018; Potratz et al. 2019; Santini et al. 2019). In recent time, non-human animals, such as cattle and canine species have occupied Indian urban spaces and are sharing public places, like temples, markets, bus stands, railway platforms with humans (Arya et al. 2019; Jaiswal 2019). Cattle are venerable in India for time immemorial. Nowadays in most of the Indian cities, one can easily observe cattle wandering and foraging on the streets (Arya et al. 2019; Jaiswal 2019). Many people in the urban area do not prefer to keep domesticated cows in their houses, because of space crunch. Those who keep cows, they abandon the male calves onto the street. The male calves gradually become bulls and roam around urban streets freely. Many people keep cows, but release them on the streets on daily basis and take them home

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Purification and characterization of fructosyltransferase: A low molecular weight enzyme from *Aspergillus niger* NFCCI2736

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Abstract

A novel transfructosylating enzyme derived from A. niger NFCCI2736 was purified 7.99-fold by ammonium sulphate precipitation (30–80%) followed by DEAE-cellulose ion exchange chromatography. The minimum molecular mass of the purified enzyme was 45 kDa by SDS-PAGE. The K_m for fructosyltransferase was 333 mM of sucrose and V_{max} was 1.25 x10^3 mM/ mg/ min. The optimum enzyme activity of the purified enzyme was at 5.5 and the maximum stability of the enzyme was at pH 5.00.

The optimum temperature for enzyme activity and enzyme stability coincided at 55 °C. The ammonium ions enhanced the activity of the purified enzyme whereas sodium and manganese ions decreased the activity of purified Ftase.

Keywords: *Aspergillus niger*, fructooligosaccharides, fructosyltransferase and sucrose.

Introduction

Fructo-oligosaccharides (FOS) are slowly developing immense importance by attracting attention of health-conscious consumers. FOS are vitally recognised in health market due to their low caloric, non-carcinogenic nature and bifidus promoting effect in the intestine[3,6,20,26-28].

FOS are produced by the action of Ftase (fructosyltransferase) enzyme on sucrose by simple transfer reaction. Depending on the number of fructose units, FOS are classified as 1-kestose (GF2), nystose (GF3) and 1F--fructofuranosyl nystose (GF4) having one, two and three fructose molecules respectively[8]. Microbial sources have been reported to be potent producers of Ftase enzyme. The most exploited group of microbes are fungi and bacteria[29]. As previously reported, during screening of new potent producers of enzymes showing transfructosylating activities, new strain designated as *Aspergillus niger* was isolated from soil during previous study[2]. The extracellular (Ftase) exhibited a substrate specificity towards sucrose. The purification and characterization of the enzyme were studied in detail.

Material and Methods

Chemicals: The food-grade sucrose was used as substrate while other chemicals were of reagent grade of Hi-media. The DEAE-cellulose (D 6418) and the molecular mass markers for sodium do- decyl sulfate-polyacrylamide gel electrophoresis (SDS- PAGE) were of Sigma. Cellulose dialysis tubing (MW cut off 12 KDa) is of Hi-media.

Enzyme production: *A. niger NFCCI2736* was grown aerobically in a batch culture. The medium contained (per litre of distilled water) sucrose 80.0 g, yeast extract 15.0g, $MgSO_4.7H_2O$ 1.0 g, Carboxyl methyl cellulose 1.0 g and pH was adjusted to 5.50 before sterilization. The spore suspension of *A. niger NFCCI2736* was added aseptically to the sterilized medium in 250 ml Erlenmeyer flask and kept in shaking incubator at 30°C for 4 days at 240 rpm.

Crude enzyme preparation: The mycelium was separated after fermentation by filtration and the filtrate was centrifuged at 10000 rpm for 30 min at 4°C. The supernatant was used as source of crude enzyme for salt precipitation by ammonium sulphate. The enzyme activity was measured after each step of purification.

Column Characteristics: The glass column used was of 3 x 18 cm dimension.

Assay of fructosyltransferase enzyme: Quantitative assay of fructosyltransferase was based on the procedure used by Yun et al.[30] The filtrate was taken as a crude enzyme with 50% sucrose solution as a substrate at pH 5.50 (0.1M sodium acetate buffer). The mixture was incubated for 1 h at 60°C. The reducing sugars were estimated by Dinitro-salicylic acid reagent (Miller). The enzymatic reaction was terminated by keeping the test tube at 100°C in a water bath for 10 min. One unit of enzyme activity was defined as the amount of enzyme producing 1 µmol of glucose under experimental conditions.

Determination of protein concentration: The protein content was determined following Lowry et al[18]

Analytical methods: Thin layer chromatography (TLC) is used for qualitative analysis of the reaction products. TLC plates were prepared by coating glass plates with Silica gel and developed with the solvent systems: iso-propyl alcohol: ethyl acetate: water (2:2:1 v/v). The carbohydrates samples loaded in the plates were visualized by heating the plates at 100°C after spraying phenol- sulfuric acid.

Enzyme purification: All operations for enzyme purification were performed at 4°C and centrifugation was

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Probiotics and Antimicrobial Proteins
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Actinomycin-Producing Endophytic *Streptomyces parvulus* Associated with Root of *Aloe vera* and Optimization of Conditions for Antibiotic Production

Sandhya Chandrakar[1] · Ashwini Kumar Gupta[1]

Abstract
Endophytic actinomycetes are a rich source of novel antimicrobial compounds. The aim of this study was to evaluate the production of antimicrobial compound by endophytic *Streptomyces* sp. Av-R5 associated with root of *Aloe vera* against multidrug-resistant human pathogens. The 16S rRNA sequence of the isolate Av-R5 has been identified as *Streptomyces parvulus* NBRC 13193^T (AB184326) and the sequence was submitted to the National Center for Biotechnology Information (NCBI) GenBank database (accession number KY771080). *Streptomyces parvulus* Av-R5 grown under submerged fermentation condition optimized by central composite design (glucose 11.16 g/L, soybean meal 10.25 g/L, sodium chloride 11.18 g/L, calcium carbonate 1.32 g/L at pH 7.19 at 31.42 °C with 6.04% seed inoculum for 10 days of incubation) exhibited the highest activity against multidrug-resistant *Staphylococcus aureus* JNMC-3, *Staphylococcus epidermidis* JNMC-4, *Klebsiella pneumoniae* MTCC-3384, *Klebsiella pneumoniae* JNMC-6, *Pseudomonas aeruginosa* MTCC-741, *Proteus vulgaris* JNMC-7, *Candida albicans* MTCC-183, and *Aspergillus niger* MTCC-872. The structures of the active compounds were elucidated by UV-Vis spectroscopy, ^{1}H and ^{13}C NMR, FT-IR, and ESIMS. Actinomycin D and actinomycin $X_{0\beta}$ were detected in crude extracts and major components were eluted by HPLC at 10.96 and 6.81 min, respectively. In this case, a high yield of actinomycin D and actinomycin $X_{0\beta}$ (400 mg/L) was achieved with *Streptomyces parvulus* Av-R5, fermented in glucose soybean meal broth media, which can be used in industrial fermentation process to obtain high yields.

Keywords Endophytic actinomycetes · *Streptomyces parvulus* · Antimicrobial activity · Optimization · Multidrug-resistant pathogens

Introduction

Antibiotic resistance among the microorganisms has become a major challenge to the treatment of infectious diseases. Severe infections caused by bacteria that are resistant to commonly used antibiotics have become a major global healthcare problem in the twenty-first century [1]. It has been reported that endophytic actinomycetes are potential sources of novel natural products like antibiotics, antimycotics, antivirals, immunosuppressant, antioxidants, anticancer compounds, and plant growth hormones which have useful application in medicine, agriculture, and industry [2–4]. Endophytic *Streptomyces* spp. are known to produce different novel antibiotics namely cedarmycin A and B from *Streptomyces* sp. TP-A0456 associated with a twig of *Cryptomeria japonica*. Cedarmycin A exhibited antifungal activity against *Candida glabrata* [5]. Two novel broad-spectrum antibiotics munumbicins E-4 and E-5 have been reported from endophytic *Streptomyces* NRRL 3052 associated with *Kennedia nigriscans*. Both compounds exhibited activity against gram-positive and gram-negative bacteria and malarial parasite, *Plasmodium falciparum* [6]. The intimate association of endophytic actinomycetes with their host plants benefitted the host plant by the production of antimicrobial compounds.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s12602-018-9451-6) contains supplementary material, which is available to authorized users.

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Antioxidant Activity and Phytochemical Content of *Clerodendrum serratum* L. from Different Provinces of Chhattisgarh State, India

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Clerodendrum serratum **L. is one of the important medicinal plant found in Chhattisgarh state of India. Its over-exploitation for medicinal value made it a threatened species according to Chhattisgarh Medicinal Plant Board. It is being used in Ayurveda from ancient times for many diseases like asthma, body ache, bronchitis, cholera, dropsy, eye diseases, fever, inflammations, malaria, ophthalmia, rheumatism, snakebite, tuberculosis, ulcers and wounds. Present study aimed to compare the phytochemical contents and antioxidant activity of a medicinally important plant *C. serratum* L. collected from different provinces of Chhattisgarh state (India). Plants were collected from three districts of Chhattisgarh (Jagdalpur, Bilaspur and Raipur). Aerial and underground parts were separated and subjected for extraction by using different solvents of different polarity. These extracts were evaluated for phytochemical profiling, phytochemical content (total phenolic and flavonoids content) and antioxidant activity. Methanolic extract shows highest antioxidant activity and phenolic and flavonoids content among all the extracts. When the plants of different regions were compared, it was found that plants of Jagdalpur district is a potent source of phytochemical and showing highest antioxidant activity. Further, the correlation study showed that phenolics and flavonoids mainly account for antioxidant activity. It may be possible that some different groups of phytochemical act synergistically together with the phenolics and flavonoids and provide antioxidant effect.**

Keywords: ***Clerodendrum serratum*** **L., Phenolics, Flavonoids, Antioxidant activity.**

INTRODUCTION

Medicinal plants are playing a crucial role in the development of traditional medicinal system all over the world. Around 1400 plants are currently being used in varied Ayurvedic medicines preparation. From a ancient time, plants have been used as an important source of new therapeutic drugs and many plant species have been screened for identification of therapeutic substances. *Clerodendrum* is a huge genus and it contains varied plants. Five hundred and eighty species of this genus have been reported till now and are widely distributed in Asia, Australia, Africa and America [1]. It is native of East India and Malaysia and consists of shrub, small trees and occasionally herbs. Genus *clerodendrum* was earlier kept in the family verbenaceae but after the phylogenetic study on chloroplast DNA some of the genus of this family including *Clerodendrum serratum* was shifted to the lamiaceae family and renamed as *Rotheca serrata* L. [2]. In Chhattisgarh state (India), only two species of this genus have been reported *i.e. C. serratum* and *C. indicum*. Both the species shows diverse pharmacological properties and used in Ayurvedic medicine. *Clerodendrum serratum* L. is one of the threatened species according to Chhattisgarh Medicinal Plant Board.

Clerodendrum serratum is being used in Ayurvedic medicine since ancient time. It's Sanskrit name is Bharangi literally means that which is glorious. In Samhita kala this drug was widely used for many diseases mainly for shwasa (breathlessness), kasa (cough), vrana (wound), shotha (swelling) and many vataja disorders (neurological disorders) [1]. The leaf and root of this plant have much medicinal value. According to the traditional knowledge roots of this plant are the good source of drugs for diseases like asthma, bodyache, bronchitis, cholera, dropsy, eye diseases, inflammations, ophthalmia, rheumatism, malaria, fever, snakebite, tuberculosis, ulcers and wounds [3]. Leaves of *Clerodendrum serratum* are used to increase appetite and as expectorant. Its leaves, young shoots and flowers are

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SHORT COMMUNICATION

Circadian Rhythm of Nitrate Reductase Activity in *Jatropha curcas* Under Different Photoregimens

Suneeta Patra[1] · Yamini Mishra[1] · Babita Pande[2] · Atanu Kumar Pati[2,3]

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Abstract Our knowledge on the circadian phenomenon in *Jatropha curcas* is limited. Therefore, we studied the activity of nitrate reductase (NR) in leaves of *J. curcas* under light and dark cycles (LD 12:12), continuous light (LL) and constant darkness (DD). We observed a statistically significant circadian rhythm in NR activity in LD. Unlike in DD, the circadian oscillation in NR activity persisted in continuous light, irrespective of different light intensities (LL 2 lx and 15 lx). The peak activity of NR appeared in the morning in LL 15 lx and forenoon in LD, while it reached a peak at night in LL 2 lx. This shows that rhythm in NR activity in *J. curcas* could be endogenous and that the light intensity might modulate acrophase of NR activity. *Jatropha curcas* could be considered as an ideal higher plant model for teaching NR activity rhythm to undergraduate and postgraduate students of biology streams.

Keywords *Jatropha curcas* · Nitrate reductase · Circadian rhythm · LD 12:12 · Continuous light (LL) · Constant darkness (DD)

Significance statement The circadian rhythm in activity of nitrate reductase (NR) enzyme, essential for assimilation of nitrogen, in leaf of *Jatropha curcas* could be utilized as an ideal model to teach light-controlled NR activity rhythm in plants to students of biology. The endogenous circadian phase could be manipulated to time the nitrogen supplementation.

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Plants exhibit circadian rhythms in many physiological variables, such as movement of leaves [1], flowering [2] and production of nectar in flowers [3]. The activity of the enzyme "nitrate reductase (NR, EC 1.6.6.1)" along with the associated protein and its transcript levels also exhibit circadian variation [4]. Nitrate reductase is one of the enzymes in the nitrogen assimilation process in plants that catalyzes the conversion of nitrate to nitrite [5]. Light is the prominent factor that enhances the NR activity [6–8] during the photophase of the light–dark cycle.

Our knowledge on the circadian phenomenon in *Jatropha curcas* is limited. Therefore, we studied the activity of nitrate reductase (NR) in leaves of *J. curcas* under light and dark cycles (LD 12:12), continuous light (LL) and constant darkness (DD). Low light intensities are normally preferred to study circadian rhythm in the absence of any entraining agents, namely LD cycle [9]. The plants in nature encounter low light intensities during light–dark transition from night to day [dawn] and day to night [dusk]. The dawn and the dusk play a prominent role as synchronizer of circadian clocks [10, 11].

The *J. curcas* seeds accessions of Chhattisgarh origin were procured from nursery of the Forest Department, Government of Chhattisgarh, Raipur, India. Five seeds/pot planted in earthen pots (having mixture of sand and soil in

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Circannual production rhythms of seven commercially important fishes in the Chilika lagoon

Prasanti Mishra, Amita Kumari Mohanty, Rakesh Kumar Swain, Arti Parganiha & Atanu Kumar Pati

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ORIGINAL REPORT

Circannual production rhythms of seven commercially important fishes in the Chilika lagoon

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ABSTRACT

The main objective of this investigation was to delineate spatiotemporal patterns in annual production of seven species of fishes inhabiting the famous Chilika lagoon. The data were collected from 19 landing centers located across four different geographical sectors of the lagoon over a period of two consecutive years. Using Cosinor rhythmometry, statistically significant circannual rhythms of production in all seven species of fishes were validated at the group level either at one or multiple landing centers of the lagoon. The peaks of the circannual rhythms were subjected to Bray–Curtis cluster analysis and similarities among the landing centers apropos the peak timings of the circannual rhythms in production of fish species was determined. Three distinct clusters were witnessed apropos the peaks at different time of the year and at different sectors of the lagoon. This spatiotemporal relationship reflects how temporal abundance of fish species is distributed to avoid conflicts and competitions among themselves along the annual time scale. The findings reported here might help in making strategy to maximize annual fish yield. That will also help in the management of biodiversity of the lagoon.

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Spatiotemporal variability; circannual rhythms in fish; production; biodiversity management; chilika lagoon

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SHORT COMMUNICATION

Ultradian, circadian, and circaseptan rhythms in the patterns of usage of Facebook messenger

Ananya Diwan[a], Rakesh Kumar Swain[b], Sarojini Minz[b], Arti Parganiha[c] and Atanu Kumar Pati[b,c,d]

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ABSTRACT

The Facebook Messenger (FBM) is one of the most popular instant messaging social apps, launched by Facebook in 2010. As of October 2019, there were about 1.3 billion FBM users worldwide. In this study, we analyzed periodicities in the online activity patterns of users in FBM. We did not recruit any subjects in this study; rather four of us used our own FBM accounts to reveal the presence of any rhythms with $\tau = 12$ h or $\tau = 24$ h or $\tau = 168$ h in the patterns FBM usage among our FB friends. We log-transformed the time series data and subjected those to Cosinor rhythmometry. The peaks in the daily pattern of FBM usages, revealed from Cosinor analyses, and harmonics curve fittings validated the presence of multi-frequency rhythms in the longitudinal time-series data captured over a period of 16 days. The underlying basis of the observed multi-frequency rhythms could be attributed to the phenomenon of social synchronization. The current findings might bear commercial applications with special reference to targeted content advertising (TCA).

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Circannual production rhythms of seven commercially important fishes in the Chilika lagoon

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ORIGINAL REPORT

Circannual production rhythms of seven commercially important fishes in the Chilika lagoon

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Clinical Phytoscience

ORIGINAL CONTRIBUTION Open Access

Comparative assessment of antimicrobial and antioxidant activity between whole plant and parts of *Sphaeranthus indicus* Linn. (Asteraceae)

Dhananjay Tandon* and A. K. Gupta

Abstract

Background: *Sphaeranthus indicus* is an important medicinal plant, which is used to cure various illnesses. The present study is the first investigation of the antimicrobial, antioxidant and phytochemical analysis of *Sphaeranthus indicus* from Chhattisgarh, India.

Methods: The whole plant and plant parts were extracted with polar and non-polar solvents such as water, methanol, ethyl acetate and hexane to assess various bioactivities. The antimicrobial and antioxidant activities were performed by ager well diffusion method and ferrous reducing capacity, respectively; However free radical scavenging activity was analyzed using DMPD and DPPH scavenging assay. The DMPD and DPPH assay were performed in a time dependent manner. Qualitative and quantitative analysis were performed for the total phytochemicals present in the plant extracts. The total content of phenols, flavonoids and terpenoids was analyzed by colorimetric methods.

Results: Ethyl acetate and hexane extract of plant inflorescence and stem exhibited significant antibacterial activity against tested bacterial pathogens. The clinically isolated gram positive pathogenic bacteria responded better as compared to clinically isolated gram negative bacteria as well as pathogenic gram positive and negative bacteria acquired from Microbial Type Culture Collection, India. The leaf and inflorescence exhibited potent antioxidant activity. The polar fraction of leaf methanol extract exhibited the highest reducing power capacity. The aqueous extract of inflorescence exhibited highest inhibition against DMPD and DPPH radicals. The whole plant aqueous extract showed maximum inhibition while aqueous extract of inflorescence exhibited high inhibition among different plant parts. Qualitative phytochemical analysis revealed the presence of terpenoids, phenols, flavonoids, tannins and cardiac glycosides in plant parts. Total terpenoid content was found to be highest in polar fraction of stem methanol extract and ethyl acetate extract of inflorescence. However, total phenol was found to be highest in polar fraction of leaf methanol extract, similarly highest flavonoid content was observed in aqueous extract of leaf.

Conclusion: The results suggest that biological activities of plant parts depend on content of active phytochemicals. The inflorescence could be a potential source of antimicrobial and antioxidant compound. Further, investigation pertaining isolation and characterization of active ingredient may provide an insight regarding its phytochemical activity.

Keywords: *Sphaeranthus indicus* L., Solvent extraction, Antibacterial activity, Antioxidant property

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BIOPROSPECTING CELLULOLYTIC FUNGI ASSOCIATED WITH TEXTILE WASTE AND INVITRO OPTIMIZATION OF CELLULASE PRODUCTION BY *Aspergillus flavus* NFCCI-4154

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ABSTRACT

This study aimed to explore the diversity as well as cellulolytic ability of fungal isolates inhabiting textile waste. Out of 88 fungal cultures isolated seasonally from nine samples of three site-s which included waste threads, 11 genera were identified *viz*., *Aspergillus, Chaetomium, Cladosporium, Curvularia, Fusarium, Humicola, Mucor, Penicillium, Phoma, Rhizopus, Trichoderma,* and Mycelia sterilia. *Aspergillus* was found to be the most dominant genera in all three seasons. Cellulase producing potential of fungal isolates was detected by qualitative and quantitative estimation of enzyme using carboxy methyl cellulose as a substrate. *Aspergillus flavus* (RTM 3) Spere NFCCI-4154 [Gene bank accession number MK036350], exhibited the highest cellulase activity and was subjected to different physical and nutritional parameters to draw out optimal conditions for enhanced CMCase production. Physical parameters for optimum CMCase recovery were identified on the 8th day of incubation period with, 28^{o}C incubation temperature at pH 5.50, the inoculum of five mycelial disc of 10 mm diameter and agitation at 100 rpm influenced the production significantly. However, it was evident from the results, that ammonium chloride (0.3%) was the major nitrogen source, 1.5% CMC was prime substrate and avicel (2%) along with 0.04% sodium deoxycholate was observed to be major supplementary carbon source and additive under submerged fermentation. This study enhanced CMCase production by 2.88 fold when compared to the control.

Keywords: *Aspergillus*, Fungal Diversity, CMCase, Submerged Fermentation, Textile

INTRODUCTION

In the past few years, textile waste management and its disposal have escalated worldwide apprehensions. Textile waste includes waste produced by industries and from human consumption. These wastes are usually dumped as non-compostable waste in the environment and are collected in waste stations for land filling and incineration.[1] Increasing population and living standards have raised energy demands in the society, hence biofuel production from low-cost substrates have become an imperative issue. As a substitute for fossil fuel and lignocellulosic biomass, textile waste contributes 30-45% of cellulose which can be used as a possible raw stock for the production of biofuels.[2] The crucial parameter is conversion of cellulosic feedstock into fermentable sugars, which is achieved by collaborative action of three enzymes endoglucanase [E.C.3.2.1.4], exoglucanases [E.C.3.2.1.91] and β-glucosidase [E.C.3.2.1.21] together termed as cellulases. Among these endoglucanase acts randomly on cellulose chains; exoglucanase reacts with reducing and non-reducing ends of cellulose and produces cellobiose and β-glucosidase acts on cellobiose to produce glucose. These enzymes are part of glycosyl hydrolases family responsible for hydrolyzing β-1., 4 glycosidic bonds present in polysaccharides.[3-6]

Cellulases are the third major class of enzymes having a wide range of industrial applications. These are extracellular enzymes produced in large quantities hence, they are economically important. The biotechnology of cellulases is phenomenal and capturing global recognition. Currently, cellulases are used in industries like textile and laundry, paper and pulp, brewery, wine, food and feed besides research and

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EFFECT OF LED LIGHT ON ACETYLCHOLINESTERASE ACTIVITY IN BRAIN AND MUSCLES TISSUES OF ZEBRAFISH (*DANIO RERIO*)

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ABSTRACT : Acetylcholinesterase is important for neuromuscular nerve impulse transmission. Several environmental contaminants and light regimen have been reported to affect AChE activity. Recently, LED lights have invaded almost in every sphere of society and have become integral part of living. The present study is an attempt to measure the Acetylcholinesterase enzyme (AchE) activity in brain and muscles tissues of adult Zebrafish exposed to LED light 5 lx, 10 Lx and 15 Lx, intensities of the wavelength of 630 nm (red), 450nm (blue), 530nm (green) and white light (full spectra). Estimation of the AChE activity revealed that enzyme activity increases with the increase in the intensity irrespective of the color of the light. Further, it was also noticed that the activity of this enzyme is significantly higher in white light as compared to any of the other individual wavelength light in different intensity. Whereas white light have been reported to significantly reduce acetylcholinesterase activity in earthworm. Results of the present study suggest that activity of this enzyme in white light may vary as a function of habitat. Hence, it would be interesting to study and test this hypothesis among other hypogeal fauna living in the dark environment. Detection of minimum enzyme activity in Zebrafish kept under red LED light could be an indication that dampening of acetyl cholinesterase in Red light is common across the species living in different habitats.

Key words : Acetylcholinesterase, zebrafish, light intensity, LED lights.

INTRODUCTION

Acetylcholinesterase (AChE) is an enzyme, a glycoprotein, catalyzes the hydrolysis of neurotransmitters acetylcholine into choline and acetate at the nerve synapse and neuromuscular junction. Its action serves to terminate synaptic transmission (Bainy *et al*, 2006). In cholinergic system, AChE maintains a number of biological functions such as cognitive processes, autonomic regulation and movements with the use of nicotinic and muscarinic receptors (Bazalakova *et al*, 2007). AChE is also required for neuronal and muscular development (Behra *et al*, 2002) in early embryonic stages of zebrafish development. AChE being essential for maintaining body homeostasis, it is a potent target to some of the toxins like insecticides and chemical weapon (Millard and Broomfield, 1995). Besides this, environmental contaminants such as heavy metals (Senger *et al*, 2006) like copper (Haverroth *et al*, 2015), aluminum (Senger *et al*, 2011), chemicals such as carbamate insecticides (Yi *et al*, 2006) methanol (Rico *et al*, 2006), ethanol (Rico *et al*, 2007), 4-methylbenzylidene camphor found in sunscreen (Li *et al*, 2016) and light (Wood and Rose, 1979) have been reported to alter the activity of acetylcholinesterase. However, surprisingly cadmium and zinc were failed to affect AChE activity in Zebrafish brain (Senger *et al*, 2006). Further, reports on the impact of light on AChE activity are also contradictory. In complete darkness activity of AChE in the retina of rat was found to decrease (Glow and Rose, 1964), on the other hand Mishra *et al* (2019) reported an increase in AChE activity in earthworm over a time period in darkness. A variation in the activity of this enzyme has also been reported under different spectra of LED light.

In the recent past, the white light emitting diode (LED) with its different variants like red, blue and green has almost replaced earlier yellow sodium lamps globally (Pawson and Bader, 2014). In addition to this, use of LED in animal husbandry including fisheries has been suggested as an efficient light source (Shin *et al*, 2012). However, information on the impact of these non-ionizing radiations on different physiological variables in living organism is limited. The present work is an attempt to study the effect of LED and other color variants red (630nm), blue (450), green (530nm) and white (control) LED on the activity of acetylcholinesterase enzyme in brain and muscles tissues of adult zebrafish.

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Morningness–eveningness preference, sleep quality and behavioral sleep patterns in humans – a mini review

Sarojini Minz & Atanu Kumar Pati

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REVIEW ARTICLE

Morningness–eveningness preference, sleep quality and behavioral sleep patterns in humans – a mini review

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ABSTRACT

The sleep requirement of humans varies as a function of the country they live in, and their chronotype, gender, ethnicity, physiological state, and lifestyle. An interaction between the circadian clock (process C) and the sleep-wake homeostasis (process S) regulates sleep in humans. The Suprachiasmatic nuclei (SCN) – the master clock, measures the length of the solar day and through appropriate neuroendocrine mechanisms promotes sleep in the night. In this mini-review, we made an attempt to summarize findings of earlier studies dealing with the distribution pattern of chronotypes, sleep quality, and behavioral sleep patterns in human populations. The review is based on 203 relevant papers that we picked up from the databases, such as PubMed, Scopus, and Google Scholar. The review reveals the paucity of information on sleep behavior in humans in densely populated countries, like China and India. In addition, a clear message emerged from the review of the literature, i.e. the studies on the distribution of chronotypes and their problems associated with sleep quality, the behavioral sleep pattern, and diseases are critically limited and are far from complete. We recommend that this is the area that needs to be investigated extensively and intensively.

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KEYWORDS
Chronotype; morningness-eveningness; sleep quality; behavioral sleep pattern; humans

1. Introduction

The genus *Homo* evolved circa 2.5 million years BP and *Homo sapiens* evolved in the East Africa about 200,000 years BP. Since their evolution, they continued to sleep in the night and wake up in the morning. They were and still are diurnal. It is not known how many hours they slept everyday in the beginning. It is also not known how many were morning active or evening active then. However, it is well known that sleep length in humans is diminishing gradually. Now, it has become a matter of global concern.

Not only humans, almost all living organisms do sleep. The mammals and birds definitely sleep. The reptiles, amphibians and fish also sleep. In these cases, resting period is considered as sleep. Plants also sleep. Look at the daily movement in the leaves

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Circannual rhythm in the production patterns of three economically important Brachyuran species of crabs

Dillip Kumar Sahoo, Rakesh Kumar Swain & Atanu Kumar Pati

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ARTICLE

Circannual rhythm in the production patterns of three economically important Brachyuran species of crabs

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ABSTRACT

We studied the patterns in production of three species of Brachyuran crabs, namely *Scylla serrata, Scylla tranquebarica*, and *Portunus pelagicus* inhabiting the famous Chilika lagoon. We collected data from 3–7 landing centers located in 2–3 different geographical sectors of the lagoon over a period of two consecutive years. Thereafter, we computed monthly averages of production using log-transformed data and performed Cosinor rhythmometry with a fixed time window (τ = 365.25 d) to obtain rhythm parameters, such as Mesor, amplitude, and the peak. The results revealed statistically significant circannual rhythms in the landing biomass of all three species. The circannual rhythm parameters varied across space and time. Of all the landing centers, the *Satapada* located in the outer channel sector registered the highest production, irrespective of species, although at different times of the year. The spatial and temporal differences observed in the production rhythms between *Scylla* species and *P. pelagicus* might be a reflection of optimization of coexistence in their shared niche. This spatiotemporal information on production of the three species of Brachyuran crabs are certainly valuable for building strategies and plans to be implemented during harvesting of those economically very important species that are considered as great Chilika delicacies.

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KEYWORDS
Brachyuran crabs; *Scylla serrata*; *Scylla tranquebarica*; *Portunus pelagicus*; circannual rhythm; production; Spatiotemporal variability

1. Introduction

The brachyuran crabs are one of the most dominant faunal components in the estuarine, marine, mangrove, and coral reef ecosystems in the world. Crabs play important roles in the ecosystem/habitat they live in. The feces of the crabs are good sources of nutrition for many sympatric and other species sharing the same or overlapping niches (Kraeuter 1976). The crabs also promotes growth of plantlets in the banks of the lagoon as their burrowing habit aerates the soil and augments the water supply to the soil strata in the periphery of the lagoon. They also help in the process of microbe-initiated organic decomposition in swamps (Diemont and van Wijngarden 1975). Many predatory species thrive on the crabs. The crabs themselves as predators consume molluscs, small

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Use of social networking sites (SNSs) and its repercussions on sleep quality, psychosocial behavior, academic performance and circadian rhythm of humans – a brief review

Rakesh Kumar Swain & Atanu Kumar Pati

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REVIEW ARTICLE

Use of social networking sites (SNSs) and its repercussions on sleep quality, psychosocial behavior, academic performance and circadian rhythm of humans – a brief review

Rakesh Kumar Swain [a] and Atanu Kumar Pati [a,b,c]

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ABSTRACT

Social networking sites (SNSs) confer countless benefits to mankind through increased communication and connection between and among millions of people on the globe. Do the detrimental effects of SNSs outweigh its benefits? We have tried to answer this question through reviewing the relevant literature on the repercussions of use of SNSs on sleep quality, psychosocial behavior, academic performance and circadian rhythm in humans. Literature on the subject underscores the adverse effects of SNSs usage on sleep resulting in poor sleep quality, delayed sleep onset, shortening of sleep length, excessive daytime sleepiness (EDS), insomnia, apnea and nightmare. The students addicted to social media suffer from psychiatric distress, anxiety, depression, low self-esteem, suicidal ideation, procrastination and poor academic attainment. There is, however, a paucity of literature on the effects of overuse of SNSs on the functioning of circadian clocks in humans. It emerged that the adolescents and young adults are the most vulnerable to the ill effects of excessive use of the SNSs. We recommend that more researches on the effects of SNSs on human health should be carried out and effective awareness campaigns should be launched to educate the people about the darker side of the excessive use of SNSs.

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KEYWORDS
Social networking sites; sleep quality; academic performance; circadian rhythm; chronotype

1. Introduction

The *Homo sapiens* are innovators. They developed various tools and techniques for themselves and also for the welfare of society. All tools and techniques are collectively called as technology. The lifestyle of today's man is technology dependent. The technologies play an important role in several sectors, such as industry, health care, education, business, trade and day-to-day life of an individual. One of the technologies, the "Internet" was developed just a few years back. It started playing a crucial role in human life and at this moment it solves many of their problems. The smartphone is one of the

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RESEARCH ARTICLE

छत्तीसगढ़ी एवं भोजपुरी भाषा की शब्द–रचना

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ABSTRACT:
भारत एक बहुभाषी देश है। इनमें से कई भाषाएँ साहित्यिक एवं रूप–रचना की दृष्टि से अति संपन्न हैं। भारत की सभी प्रमुख भाषाओं में भाषिक स्तर पर समानता हिंदी और भारतीय भाषाओं के अंतर्संबंधों की व्याख्या करती है। इसी के अंतर्गत छत्तीसगढ़ी एवं भोजपुरी भाषा भी एक मधुर भाषा है।

KEYWORDS: छत्तीसगढ़ी, भोजपुरी, भाषा, शब्द–रचना

प्रस्तावना :–
छत्तीसगढ़ी जनभाषा हिंदी की दक्षिण–पूर्वी रूप है, जो मुख्यतः छत्तीसगढ़ में बोली जाती है। भोजपुरी, पूर्वी अथवा मागधी परिवार की पश्चिमी बोली है। इस बोली का विस्तार उत्तर में हिमालय की तराई से लेकर दक्षिण में सरगुजा रियासत तक है। छत्तीसगढ़ी एवं भोजपुरी भाषा की शब्द–रचना में प्रमुखतः मूल शब्द एवं मिश्र शब्द का अपना अलग ही अस्तित्व है।

मूल शब्द
मूल शब्द वे हैं जिन्हें हम और छोटे भागों में बाँट नहीं सकते अर्थात् उपसर्ग एवं प्रत्यय रहित सार्थक शब्द को मूल अथवा प्रतिपादक कहते हैं। छत्तीसगढ़ और भोजपुरी के अधिकांश प्रतिपादकों का विकास संस्कृत से हुआ है। यह मूल शब्द मध्यकालीन भारतीय आर्य भाषाओं में होते हुए छत्तीसगढ़ी एवं भोजपुरी में आए हैं, जैसे–

छत्तीसगढ़ी	भोजपुरी	हिंदी
अँगठा (सं.पु.)	अँगठा	अँगूठा
अँजोर (सं.पु.)	अंजोर	उजाला
इरसा / इरखा (सं.)	इरखा / इरसा	ईर्ष्या
कचरा (सं.पु.)	कचरा	कूड़ा–करकट
कच्चा (वि.)	काच्च / कच्चा	कच्चा (अधपका, बिना पका)
काँटा (सं.)	काँटा	काँटा
किरिया (सं.स्त्री.)	किरिया	सौगंध

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''जज्बा से जज्बात तक'' – जया जादवानी

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जया जादवानी की कहानियों में चरित्रांकन जहां नवीन भाव–बोध प्रस्फुटित करती है वही उनके संवाद कविता की भाषा में रोमांच पैदा कर देता है। उनकी कहानियों के पात्र जब घुप्प के इस पार आते हैं तब जीवन और जगत के कठिन प्रश्नों का, अंतर्मन की विरल यात्राओं का तथा प्रेम की अनश्वरता का अनुभव कराते हैं और यहीं से ऐसा प्रतीत होता है कि जया जादवानी समाज में नारी के लिए स्थापित मानकों के विरुद्ध घोष करती हुई एक दखल की तरह उपस्थित होती है। साथ ही आधुनिक नारी के बनावटी जीवन–शैली तथा मन के विचलन एवं व्यक्ति से वस्तु बनते जाने की त्रासदी को बहुत खूबसूरती से अनुभव की पराकाष्ठा तक ले जाती है।

स्त्री के अंतःमन में पनप रहे विचारों के धुंध को मनोवैज्ञानिक विश्लेषण कर बड़ी बेबाकी से प्रस्तुत करने में महिला हिंदी गद्य साहित्यकारों में 'जया जादवानी' का नाम विशेष रूप से उल्लेखनीय है। कोई भी साहित्यकार रचना की धरातल का निर्माण दो दृष्टि से करता है। पहली दृष्टि स्वयं की होती है तथा दूसरी दृष्टि किसी और की होती है, जिसका वह उपयोग करता है। स्वयं की दृष्टि से तात्पर्य है कि वे जज्बात जिनको वह रचना का आकार दे रही है अथवा केंद्र वह स्वयं को बनाता है अर्थात् स्वयं पर बीती हुई घटनाओं का यथार्थ चित्रण करता है तथा दूसरी दृष्टि जो किसी और की होती है अर्थात् परान्त होती है जिसे साहित्यकार देख–सुनकर उसका चित्रांकन करता है। एक में जज्बात है, तो दूसरे में जज्बा है। जज्बात् है कि मेरे अंतःमन की व्यथा–कथा है और जज्बा है किसी और के अंतःमन के व्यथा–कथा को स्वानुभूति की सतह तक ले जाकर हृदय के मर्म को उद्घाटित करना। दोनों ही परिस्थितियों में लेखिकीय दृष्टि स्वान्तः से परान्तः तथा परान्तः से स्वान्तः तक का सफर है। इस प्रकार का मनोवैज्ञानिक विश्लेषण कर स्वपीड़ा व परपीड़ा को साहित्यिक रूप देने में जया जादवानी सिद्धहस्त है। हाँ! आप कह सकते हैं कि जया जादवानी सब के समझ में नहीं आती! तो मेरा कहना है कि साहब वह सब के समझ में आने वाली चीज नहीं है। अंतःमन में उठ रहे धुंध को साफ–साफ देख पाना और उसी साफगोई से सुधी समाज के लिए चित्रित कर देने की शक्ति सब में नहीं होती है। हाँ, इच्छाशक्ति हो सकती है जिसे वह कला के रूप में चित्रित कर देती है। कई बार उन इच्छाशक्तियों को कला का रूप देने में हिचक होती है। ऐसा प्रतीत होता है कि मर्यादाओं का उल्लंघन हो रहा है और ऐसी विषम परिस्थितियों में इच्छाशक्तियों का दमन करना पड़ता है। मगर जया जादवानी पराजित होने का भाव नहीं रखती। इसलिए उनका साहित्य भी उनके नाम के अनुरूप जया है।

जया जादवानी की रचनाओं में नारी चेतना का मनोविश्लेषणात्मक स्वरूप सर्वत्र दिखाई पड़ता है। नारी से संबंधित समस्याओं के विश्लेषण का विविध रूप जैसे सामाजिक समस्याएं, पारिवारिक समस्याएं, मनोवैज्ञानिक समस्याएं आदि उनकी रचनाओं का आधार है। उपयुक्त समस्याओं को भी इन्होंने विविध प्रकार से प्रस्तुत करने की चेष्टा की है। सामजिक समस्याओं के अंतर्गत स्त्रियों की उपेक्षा, परावलंबन की स्थिति, असुरक्षा की भावना, परंपरागत एवं रूढ़िगत समस्याएं, शिक्षा संबंधी समस्याएं, समर्पण का भाव–कर्त्तव्य या विवशता, विधवा स्त्रियों का जीवन संघर्ष तथा स्त्रियों के अस्तित्व पर संकट आदि को समाज के द्वारा बनाए प्रतिमानों से कुछ अलग हटकर सोचने की क्षमता का चित्रण अपनी कहानियों में किया है। इनकी कहानियों को पढ़कर ऐसा लगता है कि इनके पात्र बने बनाए सामाजिक प्रतिमानों को तोड़ते हुए से प्रतीत होते हैं। वे कहीं उत्श्रृंखल हो जाते हैं तो कहीं विद्रोही। जो कुछ भी हो जया जादवानी के कहानी के पात्र समाज में अपनी यथार्थ उपस्थिति को प्रतिबिंबित करते हैं। इसी प्रकार पारिवारिक समस्याओं के अंतर्गत परिवार में हो रहे विघटन के कारण तथा परिवार में महिलाओं की स्थिति का चित्रण जब करती है तो कदापि ऐसा नहीं लगता है कि वह पीड़ा परान्तः है। परिवार

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एकांत श्रीवास्तव की कविताओं में आम आदमी

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समकालीन कविता अपनी विकास-यात्रा में, संश्लिष्ट भाव-बोध सम्बन्धी अभिव्यक्ति में मानवीय चेतना के रूपांतरण की कविता है। यह अपने व्यापक रूप में अभिजात्य वर्ग-बोध की अपेक्षा आम जनता के रूपांतरण-कर्म से जुड़ी कविता है। सामान्य मनुष्य के लिए गहरी चिंता, लगाव तथा देश के वर्तमान और भविष्य को लेकर अपनी गंभीर रचनात्मक पहल के साथ नवें दशक के अत्यन्त महत्वपूर्ण कवि एकांत श्रीवास्तव वर्तमान काव्य-परिदृश्य पर पूरी सक्रियता से और अपने समय-समाज के प्रति सजग दृष्टि के साथ उपस्थित हैं। उनकी कविता का स्वभाव जन-पक्षधर और लोकधर्मी है, जिसके केन्द्र में संघर्षशील आम आदमी है।

एकांत श्रीवास्तव की कविता पारिभाषिक अर्थ में प्रतिरोधी कविता नहीं है, पर प्रतिरोध उसका एक मुख्य स्वर है। राजनीतिक, सामाजिक, सांस्कृतिक, भ्रष्टाचार जैसी विद्रूपताओं का और यथास्थिति का वह दृढ़ता से मुकाबला करती है। वह युगीन यथार्थ को जनता के कोण से उठाती है। एकांत श्रीवास्तव मानवीय अस्मिता, जिजीविषा और मुक्ति-संघर्ष को अपनी कविता में स्वर देते हैं-

"हाशिए पर ढकेल दिये गये हमारे स्वप्न
हमारे दिन रक्त और आँसुओं में भीग गये
मंच पर आये हत्यारे और शासक
हमारी कहानी नेपथ्य से उठती चीखों
और सिसकियों की कहानी है।"[1]

अपने समय, समाज और देश की संपूर्ण धड़कन कवि की कविताओं में उपस्थित है। वर्तमान की जटिल क्रूरताओं में जीवन की सरल कोमलताओं के मनोरम जनपद को अतिक्रमित कर संवेदना के पूरे संसार को ही शरणार्थी बना दिया है। लोकतांत्रिक व्यवस्था की स्थापना के बावजूद मेहनतकश आम आदमी मौलिक अधिकार, विकास के अवसर, सामाजिक न्याय, सुरक्षा इन सबसे वंचित ही रहा। विकासोन्मुखी घोषणाओं के बावजूद स्वतंत्र भारत का साधारण मनुष्य जनतांत्रिक व्यवस्था में हाशिये में रहता आ रहा है। उसकी मेहनत मूल्यहीन है। वर्तमान भूमण्डलीकरण के दौर में आम आदमी सुविधाओं से वंचित ही नहीं त्रस्त भी है। उदारीकरण, निजीकरण, बाजारीकरण, बहुराष्ट्रीय कंपनियों का गठन इन सबने किसानों, मजदूरों के अस्तित्व की समस्या को बढ़ा दिया है, जिसको वोट डालने का अधिकार है पर अन्न का अधिकार नहीं है-

"यह एक देश था
और ये उसके नागरिक थे
जो कतार में खड़े थे
इन्हें अन्न का अधिकार नहीं था
वोट डालने का अधिकार था।"[2]

प्रतिष्ठित कवि बद्रीनारायण कहते हैं- "आधुनिकता के दबाव में ग्रामीण समाजों में बढ़ रही 'भावों की गरीबी' को उन्होंने बखूबी अपनी कविताओं में जगह दी है। न केवल लोक के मानवीय भाव, बल्कि धीरे-धीरे भारतीय समाज में हो रहे ग्रामीण

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Customer Relationship Management Through Social Media: Opportunities and Challenges

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ABSTRACT

The Internet has changed our lives forever. It has given rise to Web 2.0 technologies, commonly known as Social Media. The consolidation of Customer Relationship Management (CRM) with social media generates an opportunity for businesses to engage customers on social networkingsites and monitor them for gaining insight into their preferences. Consequently, Customer Relationship Management through Social Media is emerging as a new business strategy to build stronger customer relationships in today's global competitive market. Social CRM is a very powerful weapon for businesses and has immense scope for research. This study attempts to analyze the integration of Social Media with CRM practices. It presents the opportunities and challenges of Social CRM as a management practice by systematically reviewing the relevant and extant scholarly literature.

Keywords: *Management Practice, Customer Relationship Management (CRM), Social Customer Relationship Management, Social Media, Opportunities, Challenges.*

INTRODUCTION

Customer Relationship Management (CRM) is a strategy to manage the interaction of a business with its current and potential customers to improve relationships with customers, by focusing on customer retention to achieve sales growth and profitability. From a business's perspective, this relationship encompasses of interactions with customers, such as sales, service, forecasting and analysis of customer trends and behaviors to enhance the overall experience of customer. CRM is a continuously evolving domain and internet technology has revolutionized the way businesses and consumers interact.

Internet has changed the life of everyone. An increasing number of people are leveraging the internet in every aspect of their lives today. The availability of high-speed internet and multimedia-enabled mobile devices allows us to communicate and engage in global conversations that inform, assist and advise us. Internet has empowered the development of Information and Communication Technology (ICT) which has given rise to Web 2.0 Technologies, commonly called as online Social Media. The Social Media identified

Corporate Social Responsibility: Insights from Literature Review

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Abstract

Corporate social Responsibility has become a buzz word in recent times. Its worldwide acceptance due to the social consciousness of enterprises coupled with legal orientation in developing countries like India has made it one of the most researched issue for researchers across continents. This paper is an attempt to review the development in the core concepts and theories which have been put forwarded by different researchers during the time period of 2010-2018. The paper undergoes a time series analysis for the selected period evaluating the evolution and impact assessment of CSR on core managerial concepts like marketing, finance and Human Resource management. The researchers after time series analysis have concluded that CSR is age long practice which has changed its orientation with the changes in objectives of business. It can be easily classified in three conceptual eras on the basis of its objectives. In the initial era it was a self-driven practice mainly influenced by the values of promoters of business. In the later stages it can be related with a business strategy of gaining goodwill. In the present era corporates have understood the value of societal obligation and it has again become a self-driven exercise. Further the impact of CSR has coupled with almost all functions of management which can be easily understood from the host of studies conducted during the selected period. The selected studies indicate that CSR has been instrumental in increasing net worth, customer satisfaction and employee retention.

Keywords: Corporate Social Responsibility, discretionary practices, philanthropy, sustainable development (SD)

INTRODUCTION

According to Hill et al. (2007) "*Corporate social responsibility is the economic, legal, moral benevolent actions taken by the firms to improve the living standards of all its stakeholders*." The concept of corporate social responsibility has become an instrumental tool in developing corporate mind-set and practices for sustainable development. The societal renaissance of business enterprises which was earlier evident in small glimpses have now become the centre and front runner of almost every activity. Corporate social responsibility coupled with corporate consciousness of their social obligations is bringing about wide spread changes in the ways and means the enterprise conduct the affairs of business. Caroll (2015) indicated that CSR is an age old practise which came into existence after the World War II when the industries contributed actively in saving the world economy from the great depression by increasing production and generating employment. Therefore the practice of CSR by enterprises has spanned over a century and has undergone sea changers with respect to conceptual development and implementation. The wide time span has given a host of definition to corporate social responsibility. Therefore the researchers over the years have used various constructs to define the practice of CSR. Various researchers like Silberhorn and Warren (2007) and Weber (2008) have openly cited that it is very difficult to describe the concept of CSR as the objectives of corporates practising CSR has changed over the years which ultimately changed the conceptual definition. The researchers have made an attempt to analyse the various constructs used by researchers over the years to define the concept of CSR. Table 1.1 presents a snapshot of various constructs used by researchers to define CSR over various decades beginning from 1950.

Table 1.1 Construct of CSR

Decade	Constructs Used by Researchers	Researcher
1950-1959	Social responsibility- Obligatory policies desirable by society	Bowen (1953) Selekman's (1959) Eells' (1956)
1960-1969	Managerial context of CSR – long run economic gain of business	Davis (1960)
	Compete socio-economic welfare of society	Frederick (1960)
	CSR as extension of economic and legal obligation	McGuire (1963)
	Social system approach of CSR	Davis & Blomstrom (1966)
	Ethical consequences of one's Act	Davis (1967)

Article

Technology Readiness and Likelihood to Use Self-Checkout Services Using Smartphone in Retail Grocery Stores: Empirical Evidences from Hyderabad, India

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Abstract

Present study is an attempt to measure technology readiness of Indian customers towards self checkout service (SCS) through mobile app at retail stores at Hyderabad, India. Self-checkout services (SCS), a key offering of self service technology (SST), 'is the technological enablement of customers to make payments and complete a checkout, after shopping, with little or no interaction with a service employee.' Researchers also studied correlations between technology readiness, perceived usefulness, perceived ease of use, and likelihood to use SCS. For the purpose of the study TRI 2.0 developed by Parasuraman and Colby (2015) was used along with items of perceived usefulness and perceived ease of use, adapted from Davis (1989), and items of 'likelihood to use' adapted from Bitner, Ostrom and Meuter (2002). The findings of the study reveal that respondents' technology readiness was moderate with respect to mobile based SCS. Significant positive correlations were found between: technology readiness and perceived ease of use, perceived ease of use and perceived usefulness, perceived ease of use and likelihood to use, perceived usefulness and likelihood to use. Further the respondents were categorised in to five technology segments as sceptics, explorers, pioneers, avoiders and hesitators.

Keywords

Self-checkout services, self-service technology, technology readiness, perceived usefulness, perceived ease of use, likelihood to use

Introduction

Retailing in India is expected to grow at 17.94 percent to an estimated size of US$1,300 billion in 2020 from US$672 billion market in 2016, and online retail is projected to grow to US$70 billion in 2020 (India

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Impact of celebrity endorsement on purchase intention of consumers towards sports apparel

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Impact of celebrity endorsement on purchase intention of consumers towards sports apparel

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Abstract

This purpose of this paper is to derive the relationship between celebrity endorsement and purchase intention of consumers of sports apparel. Researcher adopted a survey method approach for collection of data. Questionnaire is used as an instrument for collection of data. Data were analyzed using chi-square to test the hypotheses at 0.05 alpha level of significance using SPSS version 16. Results derived from this study shows that celebrity endorsement and purchase intention of consumers of sports apparel are dependent on each other.

Keywords-Sports Apparel, Purchase intention, Celebrity

1.Introduction

Our market is flooded with completely different variety of brands attempting to carve out house for itself within the minds of shoppers each firm is attempting to seek out a hook in their brands that may connect quicker to the viewers. Therefore, the challenge before the trafficker is to induct all potential measures to influence, encourage and instill needs amongst the client through an efficient advertising campaign. Most of the individuals daily come across through lots of advertisements by the media so individuals become passionless towards all the promotional material practices. Its marketers and advertisers are trying to discover a knob which will grasp the consumer's thought. In today's era, individuals usually neglect all those advertisements thar are displayed in Tv, newspapers, magazines etc..Therefore they are trying to use Endorsement as promotional material to catch the attention of people.

According to oxford Dictionary Endorsement means "the act of giving one's public approval" Endorsements are a form of advertising that uses famous personalities or celebrities who command a high degree of acceptance, faith, recognition or acquaintance amongst the people. Such individuals make a use of their names or images to promote a product or service. Therefore Indian Companies are making use of celebrities of various areas , for example Cricketers, Bollywood celebrities and other sports persons to endorse their brands.

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A Dynamic ID Based Authenticated Group Key Agreement Protocol from Pairing

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Abstract

In this paper we present an identity (ID) based dynamic authenticated group key agreement protocol. Our protocol satisfies all the required security attributes and also provide forward and backward confidentiality. The security of our protocol is based on the bilinear Diffie-Hellman(DH) assumption. We extend Lee *et al.* ID based authenticated key agreement protocol from two party to a group of users by using bilinear pairing.

Keywords: Backward Confidentiality; Bilinear Pairing; Dynamic; Forward Confidentiality; Group Key Agreement Protocol

1 Introduction

The most striking development in the history of cryptography was happened in 1976, when Diffie *et al.* [12] proposed their revolutionary concept of two party key agreement protocol whose security was based on the discrete logarithm problem. But this protocol was not suitable for group of users. Then in 1982, Ingemarsson *et al.* [16] proposed the first group key exchange protocol, but both of these schemes were vulnerable to the man in the middle attack because they did not authenticate the involved parties.

A key agreement protocol is said to provide key authentication, if each entity involved in the exchange is assured that no other entity can learn the shared secret key. A key agreement protocol which provides such a property is called an authenticated key agreement protocol (AKE) [21].

An authentication protocol allows a sender to send messages to a receiver through an insecure communication channel in such a way that the receiver can be convinced that the messages are indeed coming from the intended sender and them messages have not been modified by any adversary sitting in the middle of the communication channel. In short the aim of this type of protocols is to establish an authenticated link from the sender to the receiver. Authentication is a term which is used in a very broad sense. It is a service related to identification [21].

In 1984, Shamir [26] suggested the concept of Identity based cryptosystems where user's identities(such as email address, phone numbers, office location etc.), could be used as the public keys. Since then many identity based key agreement protocols [6, 11, 27, 29, 30, 34] have been proposed.

In the history of key agreement, a major breakthrough was happened, in 2000 when Joux [17] introduced his simple and elegant single round tripartite non-identibased key agreement protocol which makes use of bilinear pairing on elliptic curves. This was the first positive application of pairings in cryptography [13].

In 2001, Bohen *et al.* [3] proposed, a first identity based encryption scheme using weil pairing. Since then many ID based cryptographic scheme using pairing have been proposed in cryptography and is currently an area of very active research [13].

1.1 Literature Review

Based on weil and Tate pairing techniques, Smart [30] in 2002, Chen *et al.* [6] in 2003, Scott [27] in 2002, Shim [29] in 2003, Cullagh [11] in 2004, Lee *et al.* [20] in 2005 designed identity based and authenticated two party key agreement protocols. Cheng *et al.* [8] pointed out that Chen *et al.* [6] protocol is not secure against unknown key share attack. The protocol of Scott [27] is not secure against man in the middle attack. Sun *et al.* [33] showed that the protocol of Shim [29] is insecure against key compromise impersonation attack or man-in-the-middle attack. Also Choo [10] showed that protocol of Cullagh *et al.* [11] is insecure against key revealing attacks.

Since the protocol of Joux [17] was a unauthenticated

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Privacy-Preserved, Provable Secure, Mutually Authenticated Key Agreement Protocol for Healthcare in a Smart City Environment

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ABSTRACT Smart home systems can provide health care services for people with special needs in their own homes. Briefly defined, such a smart home has special electronics to enable the remote control of automated devices specifically designed for remote health care to ensure the safety of the patient at home and the supervision of their health status. These sensors are linked to a local intelligence unit responsible for analyzing sensor data, detecting emergency situations, and interfacing between the patient at home and a set of people involved in their health care, such as doctors, nurses, emergency services, and paramedics. Smart homes can improve the patient's quality of life and safety through the innovative use of advanced technologies. Telemedicine and telecare are driving forces behind the adoption of smart homes. The telecare medicine information system (TMIS) has drawn worldwide attention for the past 20 years, as modern technologies have made remote delivery of healthcare a reality. TMIS using multidisciplinary research and application involves advanced technologies in information processing, telecommunications, bio-sensing, and artificial intelligence including smart technologies. TMIS leverages the latest mobile and wireless communication technologies and widely available internet infrastructure to deliver quality services to home patients enabling them to remotely access information about their health and obtain telemedical services. TMIS delivers capabilities to remotely provide 24 $\times$ 7 health care facilities to patients. Its purpose is to provide patients with convenient and expedited remote health care services, greatly improving the quality and efficiency of health care services. However, the open and insecure nature of the internet poses a number of security threats to patient secrecy and privacy. Security design for TMIS is not trivial. Essential security and privacy are provided by mutual authentication and key agreement protocols. This paper proposes an efficient and secure, bilinear pairing-based, unlink-able, mutual authentication and key agreement protocol for TMIS. The proposed protocol adopts a fuzzy extractor for the identification of patients using the biometric data. The security of the proposed protocol is based on the hardness of the elliptic curve discrete logarithm problem (ECDLP) and elliptic curve computational Diffie–Hellman problem (ECCDHP) to preserve the privacy of the user. The detailed security analysis is discussed, and the results of comparison are provided.

INDEX TERMS Smart city, telecare medicine information systems (TMIS), mutual authentication, key agreement protocol, bilinear pairing, fuzzy extractor.

Review Article

Skin Targeting Approaches in Cosmetics

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ABSTRACT

Objective: To emphasize and summarize the main component of skin and approaches to target them. **Methods:** Skin targeting approaches in cosmetics is a review of all the relevant papers known to the author was conducted. **Results:** The exhaustive review on the basis of the previously reported paper revealed that the skin is a complicated and intact structure having vast of targeting component such as Keratin, Elastin fibres, ECM, MMPs, collagen, Hyaluronic Acid etc and apart from that the receptor and signalling pathway mediated skin targeting is also a promising approach to deliver bioactive at specific site of skin by the help of Surface engineered nanocarriers. Receptors like Epidermal Growth Factor Receptor (EGFr), interleukin-1 receptor (IL-1r), Tumor Necrosis Factor Receptor (TNFr), Platelet-Derived Growth Factor Receptor (PDGFr) and Platelet-Activating Factor Receptor (PAF-r) are the types of receptor present in skin cells. These receptors are targeted by nanocarriers which are surface engineered by conjugating them ligands which show the specific affinity towards receptor present in the skin cells.

Key words: Skin, Targeting, ECM, MMPs, Collagen, EGFr, IL-1r, TNFr, PDGFr, PAF-r, Nanocarriers.

INTRODUCTION

Skin the outer covering or coat of human body also known as the integument serves as a link or interface between the body and environment. The most superficial organs of skin are prone and sensitive for interactions with the outside surrounding world. These may be either physical exposure like the sensation, defense etc. and/or psychological including inter or intrapersonal, societal etc. Cosmetics are used by humans from time immemorial. The cosmetic preparations and formulations are not only for superficial effect on skin, but they possess therapeutic and pharmacological activity which helps to keep the skin and its deeper layers safe and effective throughout the life. The market throughout the world is changing and demand for products such as Cosmeceuticals/skin products (like wrinkle fighters, anti-acne/anti-ageing and similar products), is ever increasing. Nutriceuticals and Cosmeceuticals together with vitamin supplements helps to nourish the skin and represents a link between nutrition and pharmaceuticals in the case of Nutriceuticals and cosmetics and pharmaceuticals in the case of Cosmeceuticals.[1,2]

The topical administration of drugs encapsulated into micro/nanocarriers is an innovative interesting alternative for reducing side effects and for increasing the therapeutic benefits. The major challenge associated with this approach is to increase the rate of penetration into deeper layer of skin. In modern era, with the advancement in technology it is now to develop formulations using modified techniques to overcome the skin barriers successfully and to reach penetration into the deep layers of the skin epidermis. Moreover, the use of ligands for targeting and as penetration enhancers is the easiest and one of the simplest strategies, causing temporary and reversible disruption of the *stratum corneum* bilayers leading to increased penetration of drug.[3,4]

Recent research have developed nutracosmetics which are amalgamation of health

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DEVELOPMENT AND CHARACTERIZATION OF MANNOSYLATED QUERCETIN LOADED LIPOSOMES FOR SKIN CARCINOMA

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ABSTRACT: The solar UV radiation is the major trigger factor that causes skin cancer. Nearly 65% of cases of melanoma occurs dues to high exposure to the UV radiation. It also accounts for 90% of the nonmelanoma skin cancers also referred to as NMSC also including the cases of basal cell carcinoma (BCC) and the squamous cell carcinoma (SCC). The rate of malignancy in other cases has seemed to get reduced but this is not the situation in case of NMSC, which seemed to have increased and also affect people of younger ages. Cases of NMSC can be accounted for 15,000 deaths in the USA alone. This is surely one of the major health concerns of the nation also. In order to find a solution to this problem a new form of drug delivery system using the specific ligand that has receptor on the surface or the target cells is being proposed. The current discussion deals with the making of the mannosylated quercetin loaded liposomes that can be used for targeting cancerous cells. The methods of transmission electron microscopy (TEM) used for the surface morphology. The MTT assay was done against two different cell lines so that their cancer-preventive or curative properties can be assured. The research, hence establishes the fruitful development of Mannosylated Quercetin loaded liposomes (MA-QuLps) for the targeting of the skin cancer cells.

INTRODUCTION: Skin cancer is an ailment that has attained different types in the last years. The most common type of skin carcinoma is keratinocyte carcinoma. The most common type of malignancy is skin carcinoma worldwide and as deadly as other forms of cancer. Skin cancer is considered as a significant health-related issue which is prominently found in white-skinned population and around 1 million new cases reported of skin cancer in 2018 [1, 2]. The cutaneous malignancies are represented by nonmelanoma type of skin cancer, and the basal cell and squamous cell carcinoma are collectively known as nonmelanoma skin cancer [3, 4].

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The major cause of photocarcinogenesis is the severe exposure of ultraviolet radiation, which can leading onset of the prevalent forms of skin carcinoma, basal and squamous cell carcinomas, commonly known as nonmelanoma skin cancers [5, 6, 7]. Ultraviolet radiation is considered as a major factor for the induction of permanent alterations in DNA which leads to several modifications on signaling pathways [8, 9].

There are different forms of drug delivery systems have been tried in the past years so that the drug can be applied and delivered to the targeted area that has been affected. However, this has been hindered by various factors like the different mechanisms and tearing at the layers of the skin containing keratin, the interference of the enzymes, and the lipophilicity of the membranes [10, 11]. The accuracy and the efficacy of the treatment for skin cancer will depend on the ability of the drug delivery system to reach the affected area that has been cancerous in the skin.

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Review article

Recent strategies and advances in the fabrication of nano lipid carriers and their application towards brain targeting

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ABSTRACT

In last two decades, the lipid nanocarriers have been extensively investigated for their drug targeting efficiency towards the critical areas of the human body like CNS, cardiac region, tumor cells, *etc.* Owing to the flexibility and biocompatibility, the lipid-based nanocarriers, including nanoemulsion, liposomes, SLN, NLC *etc.* have gained much attention among various other nanocarrier systems for brain targeting of bioactives. Across different lipid nanocarriers, NLC remains to be the safest, stable, biocompatible and cost-effective drug carrier system with high encapsulation efficiency. Drug delivery to the brain always remains a challenging issue for scientists due to the complex structure and various barrier mechanisms surrounding the brain. The application of a suitable nanocarrier system and the use of any alternative route of drug administration like nose-to-brain drug

Abbreviation: 16HBE14o-, Human Bronchial Epithelial cell line; 2D-PAGE, 2-dimetioal polyacrylamide gel electrophoresis; ACh, Acetyl choline; AChE, Acetyl choline esterase; AD, Alzheimer's disease; ApoE, Apolipoprotein E; APP, Amyloid precursor protein; ARM, Artemether; BBB, Blood-brain barrier; β-CD, β-cyclodextrin; BCECs, Brain capillary endothelial cells; BCS, Biological classification system; CD, Cyclodextrin; ChEIs, Cholinesterase inhibitors; CNS, Central nervous system; CPP, Cell penetrating peptide; CS, Chitosan; CSF, Cerebrospinal fluid; Cyt, Cytarabine; CZ, Clonazepam; DAA, Diacetyl apomorphine; DALYs, Disability-Adjusted Life Years; DBZ, Tashniol Borneol ester; DDI, Didanosine; DIA, Diisobutyryl apomorphine; DLX, Duloxetine; DMF, Dimethyl fumarate; DNA, Deoxyribonucleic acid; DRG, *Delonix regia* gum; EE, Entrapment efficiency; EGCG, Epigallocatechin-3-gallate; FE, Forestall; GABA, Gamma amino butyric acid; GBD, Global burden of disease; GBM, Glioblastoma Multiforme; GDNF, Glial Cell Derived Neurotropic Factor; GDS, Glyceryl distearate; GIT, Gastro intestinal track; GLUT, Glucose transporter; GMS, Glyceryl monostearate; hIGF-I, Human Insulin like Growth Factor-I; HIV, Human immune deficiency virus; HPH, High-pressure homogenization; HP-β-CD, HP-β-cyclodextrin; IDB, Idebenone; ILO, Iloperidone; i.n., Intranasal route; IP, Intraperitonial; IRI, Ischemia reperfusion injury; ITZ, Itraconazole; i.v., Intravenous; LDL, Low density lipoprotein; Lf, Lactoferrin; LMT, Lamotrigine; MDA, Malondialdehyde; MDD, Major depressive disorder; mNLC, Mucoadhesive NLC; MnO, Manganese oxide; MPTP, 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine; MS, Multiple sclerosis; MWM, Morris water maze; NGF, Nerve growth factor; NLC, Nano-lipid carrier; NMD, Nimodipine; NMDA, N-Methyl-D-aspartic acid; NSAID, Non-steroidal anti-inflammatory drug; O/F/W, Oil-in-solid fat-in-water; OHDA, 6-hydroxydopamine; OLZ, Olanzapine; OND, Ondansetron; OX26, Transferrin receptor monoclonal antibody OX26; PBCA, Poly(butylcyanoacrylate); PEG-DSPE, 1,2-distearoyl-sn-glycero-3-phosphoethanolamine; PD, Parkinson's disease; PEG, Polyethylene glycol; PF68, Pluronic F68; P-gp, P-glycoprotein; PLA, Poly(lactic acid); PLGA, Poly(lactic-*co*-glycolic acid); PS80, Polysorbate 80; PTX, Paclitaxel; PVA, Polyvinyl alcohol; RA, Radioactivity; RDS, Ropinirole-dextran sulphate; RES, Reticuloendothelial system; RGD, Arginine-glycine-aspartic acid peptide; RHT, Rivastigmine hydrogen tartrate; RNA, Ribonucleic acid; ROS, Reactive oxygen species; r-tPA, Recombinant tissue plasminogen activator; Sal B, Salvianolic acid B; SiO_2, Silicon dioxide; SDS, Sodium dodecyl sulphate; SDC, Sodium dodecyl cholate; SLN, Solid lipid nanoparticle; SPC, Soy phosphatidylcholine; SPION, Super paramagnetic iron oxide nanoparticle; S100-COOH, Carboxylated polyethylene glycol 100 monostearate; VA, Valproic acid; VT, Vincristine; TA, Tartaric acid; TAT, Trans activator of transcription peptide; Tf, Transferrin; TFM, Triflunomide; THLE, Tonic hind limb extension; TMC, *N,N,N*-Trimethyl chitosan; TMZ, Temozolomide; TPGS, D-α-Tocopherol polyethylene glycol 1000 succinate; UDMH, Unsymmetrical dimethylhydrazine; USFDA, United states food and drug administration

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Keywords:

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ABSTRACT: The solar UV radiation is the major trigger factor that causes skin cancer. Nearly 65% of cases of melanoma occurs dues to high exposure to the UV radiation. It also accounts for 90% of the nonmelanoma skin cancers also referred to as NMSC also including the cases of basal cell carcinoma (BCC) and the squamous cell carcinoma (SCC). The rate of malignancy in other cases has seemed to get reduced but this is not the situation in case of NMSC, which seemed to have increased and also affect people of younger ages. Cases of NMSC can be accounted for 15,000 deaths in the USA alone. This is surely one of the major health concerns of the nation also. In order to find a solution to this problem a new form of drug delivery system using the specific ligand that has receptor on the surface or the target cells is being proposed. The current discussion deals with the making of the mannosylated quercetin loaded liposomes that can be used for targeting cancerous cells. The methods of transmission electron microscopy (TEM) used for the surface morphology. The MTT assay was done against two different cell lines so that their cancer-preventive or curative properties can be assured. The research, hence establishes the fruitful development of Mannosylated Quercetin loaded liposomes (MA-QuLps) for the targeting of the skin cancer cells.

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There are different forms of drug delivery systems have been tried in the past years so that the drug can be applied and delivered to the targeted area that has been affected. However, this has been hindered by various factors like the different mechanisms and tearing at the layers of the skin containing keratin, the interference of the enzymes, and the lipophilicity of the membranes [10, 11]. The accuracy and the efficacy of the treatment for skin cancer will depend on the ability of the drug delivery system to reach the affected area that has been cancerous in the skin.

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Review article

Insulin mediated novel therapies for the treatment of Alzheimer's disease

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ABSTRACT

Alzheimer's disease, a progressive neurodegenerative disorder, is one of the leading causes of death in the USA, along with cancer and cardiac disorders. AD is characterized by various neurological factors like amyloid plaques, tau hyperphosphorylation, mitochondrial dysfunction, acetylcholine deficiency, etc. Together, impaired insulin signaling in the brain is also observed as essential factor to be considered in AD pathophysiology. Hence, currently researchers focused on studying the effect of brain insulin metabolism and relation of diabetes with AD. Based on the investigations, AD is also considered as type 3 or brain diabetes. Besides the traditional view of correlating AD with aging, a better understanding of various pathological factors and effects of other physical ailments is necessary to develop a promising therapeutic approach. There is a vast scope of studying the relation of systemic insulin level, insulin signaling, its neuroprotective potency and effect of diabetes on AD progression. The present work describes worldwide status of AD and its relation with diabetes mellitus and insulin metabolism; pathophysiology of AD; different metabolic pathways associating insulin metabolism with AD; insulin receptor and signaling in the brain; glucose metabolism; insulin resistance; and various preclinical and clinical studies reported insulin-based therapies to treat AD via systemic route and through direct intranasal delivery to the brain.

1. Introduction

Alzheimer's disease, a progressive neurodegenerative disease affecting approximately about 50 million people worldwide, which is supposed to affect around 75 million people by 2030, and 131.5 million by 2050 [1,2]. The American Alzheimer's Association states that about 5.7 million people are found to have Alzheimer's, with almost one person per 65 s generating AD.[1] The disease has become the 6th leading cause of death in America [3,4]. It leads to a progressive decline in cognitive functions and memory (declarative memory) along with behavioral and personality changes [5–7]. The main reason for neurocognition is the impaired activity of acetylcholine in the forebrain [1,8]. Also, impaired glucose metabolism and insulin activity add up to cognitive impairment [8]. The familial AD is generally supposed to occur because of chromosomal mutation. In recent years, AD is seen to share a link with Diabetes and studies reveal that people who have diabetes are at high risk of acquiring AD [9]. Diabetes, in return, is found to cause neurodegeneration by impairment of normal cellular functions, cerebral blood supply, and neuronal structure due to aberrant insulin signaling and glucose metabolism. It causes hyperphosphorylation of tau protein, the structural unit of the microtubule, results in the formation of neurofibrillary tangles. At the same time, it also stimulates the aggregation of beta-amyloid peptide or Aβ plaque formation which causes neurodegeneration and increases the risk of AD [10,11]. Due to the association of Ad with insulin impairment and abnormal glucose metabolism, some scientists also consider AD as 'type

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Recent avenues in Novel Patient-Friendly Techniques for the Treatment of Diabetes

Sunil Kumar Dubey [1], Amit Alexander [2], K Sai Pradhyut [1], Mukta Agrawal [2], Rupesh Jain [1], Ranendra Narayana Saha [3], Gautam Singhvi [1], Swarnlata Saraf [4], Shailendra Saraf [4]

Affiliations
PMID: 31692441 DOI: 10.2174/1567201816666191106102020

Abstract

Background: Diabetes is one of the most common chronic metabolic disorders which affect the quality of human life worldwide. As per the WHO report, between 1980 to 2014, the number of diabetes patients increases from 108 million to 422 million, with a global prevalence rate of 8.5% per year. Diabetes is the prime reason behind various other diseases like kidney failure, stroke, heart disorders, glaucoma, etc. It is recognized as the seventh leading cause of death throughout the world. The available therapies are painful (insulin injections) and inconvenient due to higher dosing frequency. Thus, to find out a promising and convenient treatment, extensive investigations are carried out globally by combining novel carrier system (like microparticle, microneedle, nanocarrier, microbeads etc.) and delivery devices (insulin pump, stimuli-responsive device, inhalation system, bioadhesive patch, insulin pen etc.) for more precise diagnosis and painless or less invasive treatment of disease.

Objective: The review article is made with an objective to compile information about various upcoming and existing modern technologies developed to provide greater patient compliance and reduce the undesirable side effect of the drug. These devices evade the necessity of daily insulin injection and offer a rapid onset of action, which sustained for a prolonged duration of time to achieve a better therapeutic effect.

Conclusion: Despite numerous advantages, various commercialized approaches, like Afrezza (inhalation insulin) have been a failure in recent years. Such results call for more potential work to develop a promising system. The novel approaches range from the delivery of non-insulin blood glucose lowering agents to insulin-based therapy with minimal invasion are highly desirable.

Keywords: Diabetes; Novel drug delivery; insulin; insulin pen; microparticle; non-invasive..

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ABSTRACT

Alzheimer's disease, a progressive neurodegenerative disorder, is one of the leading causes of death in the USA, along with cancer and cardiac disorders. AD is characterized by various neurological factors like amyloid plaques, tau hyperphosphorylation, mitochondrial dysfunction, acetylcholine deficiency, etc. Together, impaired insulin signaling in the brain is also observed as essential factor to be considered in AD pathophysiology. Hence, currently researchers focused on studying the effect of brain insulin metabolism and relation of diabetes with AD. Based on the investigations, AD is also considered as type 3 or brain diabetes. Besides the traditional view of correlating AD with aging, a better understanding of various pathological factors and effects of other physical ailments is necessary to develop a promising therapeutic approach. There is a vast scope of studying the relation of systemic insulin level, insulin signaling, its neuroprotective potency and effect of diabetes on AD progression. The present work describes worldwide status of AD and its relation with diabetes mellitus and insulin metabolism; pathophysiology of AD; different metabolic pathways associating insulin metabolism with AD; insulin receptor and signaling in the brain; glucose metabolism; insulin resistance; and various preclinical and clinical studies reported insulin-based therapies to treat AD via systemic route and through direct intranasal delivery to the brain.

1. Introduction

Alzheimer's disease, a progressive neurodegenerative disease affecting approximately about 50 million people worldwide, which is supposed to affect around 75 million people by 2030, and 131.5 million by 2050 [1,2]. The American Alzheimer's Association states that about 5.7 million people are found to have Alzheimer's, with almost one person per 65 s generating AD.[1] The disease has become the 6th leading cause of death in America [3,4]. It leads to a progressive decline in cognitive functions and memory (declarative memory) along with behavioral and personality changes [5–7]. The main reason for neurocognition is the impaired activity of acetylcholine in the forebrain [1,8]. Also, impaired glucose metabolism and insulin activity add up to cognitive impairment [8]. The familial AD is generally supposed to occur because of chromosomal mutation. In recent years, AD is seen to share a link with Diabetes and studies reveal that people who have diabetes are at high risk of acquiring AD [9]. Diabetes, in return, is found to cause neurodegeneration by impairment of normal cellular functions, cerebral blood supply, and neuronal structure due to aberrant insulin signaling and glucose metabolism. It causes hyperphosphorylation of tau protein, the structural unit of the microtubule, results in the formation of neurofibrillary tangles. At the same time, it also stimulates the aggregation of beta-amyloid peptide or Aβ plaque formation which causes neurodegeneration and increases the risk of AD [10,11]. Due to the association of Ad with insulin impairment and abnormal glucose metabolism, some scientists also consider AD as 'type

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Nano-Lipidic Carriers as a Tool for Drug Targeting to the Pilosebaceous Units

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Abstract

The pilosebaceous unit is the triad comprising of hair follicle, arrector pilli muscle, and sebaceous gland. Drug delivery to and through the hair follicles has garnered much attention of the researchers and the hair follicles represent an attractive target site via topical applications. They are bordered by capillaries and antigenpresenting cells, connected to the sebaceous glands and the bulge region of the hair follicle anchors the stem cells. The nano lipid carriers have the propensity to penetrate through the skin via transcellular route, intracellular route and follicular route. It has been established that nano lipid carriers have the potential for follicular drug delivery and provide some advantages over conventional pathways, including improved bioavailability, enhanced penetration depth, fast transport into the skin, tissue targeting and form a drug reservoir for prolonged release. This review describes the pilosebaceous unit (PSU) and related diseases and the recent lipid-based nanotechnology approaches for drug delivery to the follicular unit as well as related issues. Different types of nano lipid carriers, including ethosomes, liposomes, nanoparticles, solid lipid nanoparticles (SLNs), and nano lipid carriers (NLCs) have been reported for follicular drug delivery. Targeted drug delivery with nano-lipid carriers has the potential to augment the efficacy of drugs/bioactives to treat diseases of PSU. This review systematically introduces the activities of different formulations and the use of nano lipid carriers in treating PSU related disorders like alopecia, acne, and hirsutism.

Keywords: Hair follicles; drug delivery; lipids; nanocarrier; skin; skin disease; targeting; topical.

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ORIGINAL PAPER

Physicochemical properties and in-vitro release study of CFLE-chitosan microsphere beads

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Abstract

Chitosan is a natural heteropolysaccharide smart biodegradable polymer which is biocompatible, nontoxic, bioactive, non-immunogenic and non-carcinogenic. Chitosan has diversified biomedical applications, such as controlled drug delivery, tissue engineering and gene therapy. Encapsulation of various drug molecules as well as herbal extracts is of current interest. However, *Cassia fistula* plant extract, containing important agents having antioxidant, anti-inflammatory, antitussive and antifungal properties has not been encapsulated till date for its controlled release. Further, the potential of *Cassia fistula* and its extensive use was limited by its hydrophobicity and poor bioavailability. Hence, in the present investigation, a novel encapsulated material containing herbal extract has been developed in which *Cassia fistula* leaf extract (CFLE) has been encapsulated into chitosan. Thus, the present investigation is focused on the development of *Cassia fistula* leaf extract loaded chitosan (CFLE-CS) microsphere beads. The prepared CFLE-CS beads has been characterized by using FT-IR, NMR, TGA/DTA/DSC, XRD, SEM, and further, the drug release behavior was studied at two different pH (2.0 and 7.4), at 37 °C using UV-Visible spectroscopy.

Keywords Chitosan · *Cassia fistula* leaf extract · Controlled drug release · Encapsulation

Introduction

Chitosan, consisting of β-(1–4) linked 2-amino-2-deoxy D-glucosamine units, is produced by deacetylation of chitin. It exhibits interesting admirable chemical, physical, biological and mechanical properties [1] such as biodegradable, hemo and histo compatible [2], sustainable, non-toxic bio sorbent [3], biocompatibility, antibacterial and antifungal, immune stimulation of suppression of tumor growth, lower cholesterol effect, mucoadhesive and wound healing, pharmaceutical (cosmetic, biomedicine) [4], high reactivity, chemical stability, outstanding selectivity against aromatic composite and metals [5], drug delivery [6] etc.

Chitosan has been used for the encapsulation of various synthetic drugs as well as herbal extracts. The herbal extracts such as *Ilex paraguariensis* [7], Henna leaf [8], broadleaf holly leaf [9], saponin [10] etc. has been encapsulated in chitosan and their release study as well as various characterization and applications has been studied. However, there is no such report available on the encapsulation of *Cassia fistula* leaf extracts, although it has lots of biomedical applications and has been used a lot in ayurvedic preparations also. Thus, in the present study *Cassia fistula* plant has been chosen as the herbal part for its encapsulation onto chitosan.

Cassia fistula L., a semi-wild Indian Labernum also known as Amaltas, Aragwadha (disease killer), or Golden Shower tree is highly valuable medicinal plant in Ayurveda and has antipyretic, analgesic, antifungal, antibacterial, anti-dysentery, antitussive, antimicrobial, anti-glycaemic, anti-diarrheal, anti-obesity, strong laxative and hepatoprotective properties. *Cassia fistula* also shows antioxidant, anti-inflammatory, anti-tumor, anti-diabetic, anti-infertility, immunomodulatory, wound healing, larvicidal, ovicidal activity etc. These properties have been mainly accredited to the presence of alkaloids, carbohydrates, glycosides, protein, triterpene derivatives, anthraquinone derivatives, amino acids, saponins, triterpenoids tannins and polyphenolics comprising of flavonoids,

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Preliminary Phytochemical Screening and HPTLC Fingerprinting of Extracts of *Thuja occidentalis*

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ABSTRACT:
Objective: To establish the fingerprint profile of *Thuja occidentalis* using high performance thin layer chromatography (HPTLC) technique. *Methods:* Preliminary phytochemical screening was done and HPTLC studies were carried out. CAMAG HPTLC system equipped with Linomat V applicator, TLC scanner 3 and visionCATS software were used. *Results:* Preliminary phytochemical screening of the extract showed the presence of alkaloids, triterpenes, tannins, saponins, glycosides, phenolic compounds and flavonoids. HPTLC finger printing of methanol extract of plant with Rf values at 0.5. *Conclusions:* It can be concluded that HPTLC fingerprint analysis of extract of *Thuja occidentalis* can be used as a diagnostic tool for the correct identification of the plant and it is useful as a phytochemical marker.

KEYWORDS: *Thuja occidentalis*, Phytochemical Screening, HPTLC Fingerprinting.

1. INTRODUCTION:

Thuja occidentalis Linn. (Cupressaceae) is known as white cedar, arbor vitae or tree of life[1]. It is widely distributed to North America and is grown as ornamental tree in Europe[2]. In folk medicine, *Thuja occidentalis* has been used to treat bronchial catarrh, enuresis, cystitis, psoriasis, uterine carcinomas, amenorrhea and rheumatism. Today, it is mainly used in homeopathy as mother tincture or dilution[3]. The mother tincture (MT) diluted or hydro-alcoholic have been widely used in homeopathy and human and veterinary phytotherapy, one of the main uses being the treatment of acute and chronic infections of the upper respiratory tract, and as an adjuvant to antibiotics for severe bacterial infections, such as bronchitis, angina, pharyngitis, otitis media and sinusitis[4]. The preliminary phytochemical screening of the ethanolic extracts of leaves of *Thuja occidentalis* revealed the presence of alkaloids, glycoside, carbohydrates, flavonoid, phenolic compounds, saponins, steroids, protein and diterpenoids. The bioactive compounds have many pharmacological activities, which may be beneficial for chronic diseases.

In instance, Alkaloids look after against chronic disease. Saponins protect against hypercholesterolemia and have antibiotic properties[5]. Steroids and triterpenoids illustrate the analgesic properties. The Steroids and saponins were liable for central nervous system activities, flavonoids have been referred to as nature's biological response modifiers and they possess anti-allergic, anti-inflammatory, anti-microbial and anti-cancer activities[6]. In the present-day betterment of chromatographic and spectral fingerprints plays an important role in the quality control of complex herbal medicines[7]. High Performance Thin Layer Chromatography has become a conventional analytical techniq tification of analytes at micro and even in nanogram levels and cost effectiven ing analysis time and cost per analysis. Thin Layer Chromatography has be compounds. Another major advantage of TLC is the capability to detect more matography, although the resolution is poorer. On the contrary, the compounds

2. MATERIALS AND METHODS:

2.1 Plant material:

The plant specimens for the proposed study were collected f authenticated by Prof. N.K. Dubey, Department of Botany, Fac

2.2 Preparation and Extraction of Plant Material:

An accurately weighed 50g powdered of aerial parts of *Thuja* and about 100 ml of methanol was added. The flask was refluxed for 1 hr on heating water bath and filtered through Whatman filter paper. This procedure was repeated three times to get complete extraction from each powder. Each powder extracts were combined individually and evaporated to dryness to get the residue.

2.3 Phytochemical Screening:

The phytochemical investigation of the methanolic extracts of *Thuja occidentalis* was carried out with standard protocol. The

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Review

Scleroderma: An insight into causes, pathogenesis and treatment strategies

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ABSTRACT

Scleroderma is an autoimmune disorder, characterized by morphological changes in skin followed by visceral organs. The pathogenesis of scleroderma involves immune imbalance and generation of auto antibodies. The major causes of scleroderma include multitude of factors such as immune imbalance, oxidative stress, genetics and environment factors. A constant effort has been made to treat scleroderma through different approaches and necessitates life time administration of drugs for maintenance of a good quality life. It has been reported more in women compared to men. Traditional treatment strategies are restricted by limited therapeutic capability due to associated side effects. Advancement in development of novel drug delivery approaches has opened a newer avenue for efficient therapy. Current review is an effort to reflect scleroderma in provisions of its pathogenesis, causative factors, and therapeutic approaches, with concern to mode of action, pharmacokinetics, marketed products, and side effects of drugs.

Contents

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HPTLC Method Development and Validation for Quantification of Quercetin in *Thuja occidentalis* Mother tincture

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ABSTRACT:
The present study aims to develop analytical method of methanolic extract of *Thuja occidentalis* Linn. Estimation of quercetin by TLC densitometric method can be used as one of the appropriate analytical method. The separation was performed on TLC aluminium plates precoated with silica gel 60 F_{254}. Good separation was achieved in mobile phase using Chloroform: Ethyl acetate: Methanol: Glacial acetic acid (5:2:1.5:0.02% v/v). Determination and quantitation were performed by densitometric scanning at 420 nm in reflection/absorbance mode. This method gave compact spots at Rf 0.5 corresponding to quercetin. The method was validated using parameters such as linearity, accuracy, precision, limit of detection, limit of quantification and recovery as per ICH guidelines. The linear equation in the range of 10-60 µg/ml with y=4.139x + 623.5, and r^2 = 0.9981. The accuracy was found to be 98.13-99.42% recovery and interday and intraday precision was found to be 0.20-0.25 % RSD and 0.15-0.38% RSD. The LOD and LOQ value was 23.05 and 69.87ng/ml. The proposed method can be used for the reliable quantification of active marker compound in methanolic extract of *Thuja occidentalis* L.

KEYWORDS: Quercetin, *Thuja occidentalis*, Cupressaceae.

1. INTRODUCTION:

Thuja occidentalis belongs to the family Cupressaceae known as the tree of life[1]. It is mostly known as arbor vitae or white cedar and is widely distributed to North America and is grown as ornamental tree in Europe[2]. The mother tincture diluted or hydroalcoholic have been widely used in homeopathy. *Thuja occidentalis* used for the treatment of acute and chronic infections of the upper respiratory tract and as an adjuvant to antibiotics for bacterial infections such as bronchitis, angina, pharyngitis etc. In the form of tincture, it is widely used for the treatment of warts, papillomas, condylomas[3]. The plant contains wide range of active compounds including α-thujone, β-thujone, fenchone, occidentalol, α-pinene, quercetin, rutin, δ-3-carene, α-cedrol, caryophyllene, α-humulene, limonene, α-terpinolene, α-terpinyl acetate and thujone which may be responsible for its widespread activity[1,4,5].

Traditionally, the leaves of this plant have been used for treatment of variety of ailments and well known for its hemostatic and wound healing properties. Medicinal plant has been found to possess pharmacological activities such as antioxidant, antimicrobial activity, neuropharmacological activity of *Thuja occidentalis* and in-vitro studies, hypolipidaemic activity, anticancer activity[6-10]. In recent year advancement of chromatographic and spectral fingerprints plays an important role in the quality control of complex herbal medicines[11].

High Performance Thin Layer Chromatography has become a routine analytical technique due to its advantages of reliability in quantification of analytes at micro and even in nanogram levels and cost effectiveness. The major advantage of HPTLC is in reducing analysis time and cost per analysis. Thin Layer Chromatography has been known as the fast tool for the detection of compounds. Another advantage of TLC is the capability to detect more compounds than High Performance Liquid Chromatography, although the resolution is poorer. In this regard, the compounds which cannot be eluted still can be detected. Furthermore, HPTLC image provides extra intuitive parameters of visible colour and/or fluorescence and unlike HPLC and GC, HPTLC can simultaneously determine different samples on the same plate. Such an approach causes the HPTLC method to maintain its innate advantage as well as get over a limitation of developing distance and plate efficiency. The analytical method can be analysed by some techniques such as HS-SPME, GC-MS, NMR[12-14]. The determination of quercetin and rutin in selected herbs and pharmaceutical preparations by UV spectrophotometry and HPLC are reported[15].

Literature survey revealed that no method has been reported for quantitation of quercetin from aerial parts extracts of *T. occidentalis*. Qualitative and quantitative standardization of quercetin was performed using HPTLC but not from this plant. Hence a densitometric HPTLC method has been developed in the present work for quantitation of quercetin from methanolic extract of aerial parts of *T. occidentalis*. The method was found suitable for rapid screening of plant material for their quantitative assessment and can be performed without any special sample pre-treatment and can be validated as per ICH Guidelines[16,17].

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REVIEW ARTICLE

Extensive review on the analytical methods for the estimation of *Thuja occidentalis* homeopathic mother tincture

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ABSTRACT:
Thuja occidentalis, known as western red-cedar or arbor vitae, belongs to the family Cupressaceae. It is also known as ornamental tree. It is used in homeopathic medication and it was procured from plants. The active constituents or marker present having both as major constituents α-thujone, beyerene, sabinene and camphor. It is used in the treatment of various diseases as a folk medicine such as rheumatism, gout, dermatitis, and diarrhoea. The plant has been exhibited extensively biological activities including antiepileptic, antiinflammatory, hair growth-promoting, antiviral, antiallergic, antibacterial, antioxidant, molluscicidal and antifungal activities. A very few literatures describe chromatographic and spectrometric methods for thuja in homeopathy medicine were reported. In this review, the analytical methods for estimation of *Thuja occidentalis* in homeopathic mother tincture are presented. Since the application of thuja in homeopathy is very broad according to the activity.

KEYWORDS: *Thuja occidentalis*, Cupressaceae, homeopathic mother tincture.

1. INTRODUCTION:

Homeopathic system of medicine is a medical discipline whose primary prominence is on therapeutics. It is a low-cost system which is employed for non-toxic drugs. The word Homeopathy is derived from the two Greek words Homoios (like) and Pathos (treatment). This system of medicine is a comprehensive approach that takes into consideration the whole person and the relation of lifestyle to disease. Its aim is to bring back the lost equilibrium of the sick individual by stimulating and strengthening the immune response. Homeopathy emerged as an important therapeutic technique during the next half of the nineteenth century and has undergone periods of expansion and then decline. It has been serving the humanity for over two centuries, having passed through sudden change of time and has emerged as a time-tested therapy. In India, the importance of homeopathy has become increasingly essential due to the safety of its medicine and gentleness of its cure. For more than a century and a half, homeopathy is now practiced in India [1].

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2. REGULATION OF HOMEOPATHIC REMEDIES:

Homeopathic remedies have been in use in the United States since 1835, but these remedies were not included in the Food, Drug and Cosmetic act of 1906 [2]. This was clarified when the act was revised in 1938. At present, more than 2500 substances from plant, animal and mineral sources are used in preparing homeopathic remedies [3]. The FDA regulates homeopathic remedies in significantly different ways. Homeopathic remedies delayed to submit new drug application to the FDA and their manufacturing processes are released from good manufacturing practice requirements for pharmaceutical companies [4].

3. *THUJA*

Thuja is commonly known as eastern arbor vitae or white cedar is indigenous to North Europe as an ornamental tree in parks and churchyards [5, 6].

3.1. Biological source

Thuja koraiensis Nakai - Korean thuja - Jilin, Korea
Thuja occidentalis L. - Eastern arborvitae, northern whitecedar - E Canada (Manitoba to Nova Scotia), E United States (primarily Northeast, Great Lakes, Appalachians)

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Review

Scleroderma: An insight into causes, pathogenesis and treatment strategies

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ABSTRACT

Scleroderma is an autoimmune disorder, characterized by morphological changes in skin followed by visceral organs. The pathogenesis of scleroderma involves immune imbalance and generation of auto antibodies. The major causes of scleroderma include multitude of factors such as immune imbalance, oxidative stress, genetics and environment factors. A constant effort has been made to treat scleroderma through different approaches and necessitates life time administration of drugs for maintenance of a good quality life. It has been reported more in women compared to men. Traditional treatment strategies are restricted by limited therapeutic capability due to associated side effects. Advancement in development of novel drug delivery approaches has opened a newer avenue for efficient therapy. Current review is an effort to reflect scleroderma in provisions of its pathogenesis, causative factors, and therapeutic approaches, with concern to mode of action, pharmacokinetics, marketed products, and side effects of drugs.

Contents

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Recent Advances in Lipid-based Nanodrug Delivery Systems in Cancer Therapy

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Abstract

Cancer is the second leading cause of death globally, with every sixth death being attributable to cancer. Nevertheless, the efficacy of conventional chemotherapeutic drugs is often limited due to their poor solubility, unfavorable pharmacokinetic profile, and lack of tumor selectivity. The use of nanotechnology provides an opportunity to enhance the efficacy of a chemotherapeutic drug by improving its bioavailability and pharmacokinetic profile while facilitating preferential accumulation at the tumor tissue. To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among different nanocarriers, lipid-based delivery systems have been extensively used in oncology because of their biocompatibility, biodegradability, ability to encapsulate diverse drug molecules, high temporal and thermal stability, and offer prolonged and controlled drug release. This review discusses the current status of the lipid-based nanocarriers and their applications in cancer treatment as well as an overview of the different liposomal formulations commercially available for cancer therapy.

Keywords: Cancer; chemotherapeutics; drug delivery; liposomes; nanostructured lipid carriers; solid lipid nanoparticles; targeted drug delivery.

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Phytochemical and pharmacological screening of leaf of *Lannea coromandelica Linn.*

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ABSTRACT:

WHO is highly recommended the customary exploitation of traditional therapeutics of medicinal plants and is consequently in pipeline for development of monograph and exploring their uncultivated pharmacological properties. Presently, correct identification of medicinal plants by phytochemical fingerprints is a speedy tool to ensure reproducible quality of herbal drugs. In our study, the ethyl acetate and methanol extract of leaves of *Lannea coromandelica (L. coromandelica)* was subjected for chemical fingerprint as well therapeutic aid as antifilarial agents. High performance thin layer chromatography (HPTLC) was employed to develop chemical fingerprint and filariciadal activity was assessed by motility inhibition and MTT reduction assay with concentrations range 1000 to 25µg/ml. The HPTLC analysis of ethyl acetate and methanol extract was carried out using hexane: ethyl acetate: formic acid: methanol (5:4:1:0.5 v/v/v/v) for fingerprinting and quantification ellagic acid and quercetin. The HPTLC method was found to give compact spots for Rf = 0.54 and 0.51 ellagic acid; Rf = 0.91 and 0.87 quercetin for ethyl acetate and methanol extract respectively. The HPTLC method was validated as per the ICH guidelines. Inhibitory concentration (IC_{50}) for the ethyl acetate extract was found to be 284.5µg/ml. In motility assay, complete inhibition of motility was observed for all concentrations. Hence, our study could be valuable for inventing strategies for quality control parameter and justifies the ethnic uses of plant in folkloric medicines.

KEYWORDS: WHO, *Lannea coromandelica*, HPTLC, filariciadal activity.

1. INTRODUCTION:

Natural sources are dealing presently to treat various disease since past to present. In future it needs proper justification of claimed traditional uses. At present innumerable antifilarial drugs DEC, albandazole, Ivermactin and other combination of drugs are not capable to control the filaria disease. So in the present day several medicinal plants have been used as therapeutic aid as antifilarial agents. Experiments on antifilarial activities of various such phytochemicals are coming up with the constant effort made by the researcher from various parts of the world [1].

One of the important methods for identifying leads for drug development is to screen medicinal plants for the antifilarial activity [2]. *Lannea coromandelica* Houtt. (Anacardiaceae) commonly known Jingini, is deciduous large trees, upto 15-20 m tall. Bark & leaves of *Lannea coromandelica* is commonly used in ulcerative stomatitis, dyspepsia, general debility, gout, cholera, dysentery, sore eyes, leprosy, sprains and bruises, wound, elephantiasis, snakebite, stomachache and nerve muscle inhibition [3]. It contains triterpenoids, tannin, alkaloids [4], phenolics, flavonoids [5]. Literature survey of its activities revealed that there was no studied for its in-vitro anti-filarial activity and phyto-chemical analysis with sophisticated instruments. Hence the objective of our experiment is to quantify phyto-constituents and evaluate antifilarial effect of ethyl acetate and methanolic extract of *Lannea coromandelica* leaves against Setaria cervi in-vitro.

2. EXPERIMENTAL METHODS:

2.1. Collection of plant material

Leaves of plant *Lannea coromandelica* were collected from Barnawapara forest near Raipur managed by Government of Chhattisgarh State Forest Division. The collected plant wa[illegible] specimen (CNH/Tech.II/2014/70/139) was submitted to the Central National Her[illegible]

2.2 Preparation of extract

Shade dried *Lannea coromandelica* leaf was powdered (50 gm) and e[illegible] ethanol. The supernatant were evaporated to dryness. The crude dry extract (5%v/v) was then suspended in 2% acetic acid and partitioned with ethyl acetate (30 ml X 4). The pooled ethyl acetate fractions were then evaporated to get dry powder (2.8 g) and stored at 4ºC for further use. All the chemicals are the analytical grade purchased from Hi-media, Merck India.

2.3. Chromatographic analysis

2.3.1. Preparation of standard solution

Accurately weighed 10 mg of ellagic acid standard was dissolve i[illegible] solution of 100µg/mL. In the same way quercetin stock solution v[illegible] prepare the concentration range of 200-800 µg/mL by serial dilution method.

2.3.2. Preparation of sample solution

Ellagic acids from four different sources were extracted by hydrolysis of 10 g of the sample with 30 ml of methanol, refluxed for 1 hour. Extract obtained was filtered using Whatman filter paper No 42. 10 mL of distilled water was added to the filtrate and evaporated to a volume of 10 mL. Samples were analyzed immediately after extraction in order to avoid possible chemical degradation. The experiments were carried out in triplicate [6].

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REVIEW ARTICLE

Aromatase Inhibitors for the Treatment of Breast Cancer: A Journey from the Scratch

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Abstract: ***Background*:** Estrogens are essential for the growth of breast cancer in the case of premenopausal as well as in postmenopausal women. However, most of the breast cancer incidences are reported in postmenopausal women and the concurrent risk surges with an increase in age. Since the enzyme aromatase catalyses essential steps in estrogen biosynthesis, Aromatase Inhibitors (AIs) are effective targeted therapy in patients with Estrogen Receptor positive (ER^+) breast cancer. AIs are more effective than Selective Estrogen Receptor Modulators (SERMs) because they block both the genomic and nongenomic activities of ER. Till date, first, second and third-generation AIs have been approved by the FDA. The third-generation AIs, *viz.* Letrozole, Anastrozole, Exemestane, are currently used in the standard treatment for postmenopausal breast cancer.

***Methods*:** Data were collected from Medline, PubMed, Google Scholar, Science Direct through searching of keywords: 'aromatase', 'aromatase inhibitors', 'breast cancer', 'steroidal aromatase inhibitors', 'non-steroidal inhibitors' and 'generations of aromatase inhibitors'.

***Results*:** In the current scenario of breast cancer chemotherapy, AIs are the most widely used agents which reveal optimum efficacy along with the least side effects. Keeping in view the prominence of AIs in breast cancer therapy**,** this review covered the detailed description of aromatase including its role in the biosynthesis of estrogen, biochemistry, gene expression, 3D-structure, and information of reported AIs along with their role in breast cancer treatment.

***Conclusion*:** AIs are the mainstream solution of the ER^+ breast cancer treatment regimen with the continuous improvement of human understanding of the importance of a healthy life of women suffering from breast cancer.

Keywords: Aromatase, breast cancer, estrogen biosynthesis, aromatase inhibitors, steroidal aromatase inhibitors, non-steroidal aromatase inhibitors.

1. INTRODUCTION

Aromatase (Estrogen synthetase or Estrogen synthase, E.C. 1.14.14.1) is a microsomal member of the cytochrome P450 (*CYP450*) super-family associated with gene *CYP19* or *CYP19A* located on chromosome 15 [1, 2]. This P450 gene super-family is very vast, having about 480 members belonging to 74 different families, out of which cytochrome $P450_{arom}$ is the core member of family 19. *CYP450* are heme-containing enzymes, accountable for the binding of C-19 androgenic steroid substrate and activating a series of reactions leading to the formation of the phenolic ring (A) (Fig. **1**) present in estrogen [3]. Aromatase is extremely specific for its substrate *viz.* androgens. In estrogen biosynthesis or steroidogenesis, aromatase plays a major role by catalysing the rate-determining and concluding steps. The steroidogenesis process involves three successive oxidative steps and estrogen is obtained as the end product. The first two steps are accompanied by *CYP450* and the third step is aromatization that results in the synthesis of estrogen [4]. The role of aromatase and steroid sulfatase in the synthesis of estrogen is depicted in Fig. (**2**). Aromatase is found in many tissues, including gonads (granulosa cells), brain, adipose tissue, placenta, blood vessels, skin and bone [1]. It is an important factor in sexual development *via* producing female sex hormone, estrogen, which helps to fuel the growth of hormone receptor-positive breast cancer.

A numbers of *in vitro* as well as *in vivo* studies have been performed for aromatase that showed the aromatase expression is maximum in or around breast tumour sites [5]. The site specific presence makes aromatase as a legitimate target for the management of breast cancer [6]. There are several environmental factors that alter the activity of the aromatase enzyme, such as age, obesity, gonodotropins, insulin, alcohol and smoking, which increase the activity of aromatase; in contrast, proloactin, anti-mullerian hormone and the common herbicide glyphosate tend to decrease aromatase activity [7]. Aromatase excess syndrome in boys can cause gynecomastia and in girls precocious puberty and gigantomastia. In both sexes, early epiphyseal closure leads to short stature. This is due to mutations in the *CYP19A1* gene encoding for aromatase and is inherited in an autosomal dominant fashion [7]. Mutation of gene *CYP19* causes aromatase deficiency syndrome, which is inherited in an autosomal recessive way [8]. Accumulations of androgens during pregnancy may lead to virilization of a female at birth (males are not affected). Females will have primary amenorrhea. Individuals of both sexes will be tall, as lack of estrogen does not bring the epiphyseal lines to the closure [8, 9]. The non-aromatase factors

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Recent Advances in Lipid-based Nanodrug Delivery Systems in Cancer Therapy

Buddhadev Layek [1], Bina Gidwani [2], Sakshi Tiwari [3], Veenu Joshi [4], Vishal Jain [3], Amber Vyas [3]

Affiliations

PMID: 32568015 DOI: 10.2174/1381612826666200622133407

Abstract

Cancer is the second leading cause of death globally, with every sixth death being attributable to cancer. Nevertheless, the efficacy of conventional chemotherapeutic drugs is often limited due to their poor solubility, unfavorable pharmacokinetic profile, and lack of tumor selectivity. The use of nanotechnology provides an opportunity to enhance the efficacy of a chemotherapeutic drug by improving its bioavailability and pharmacokinetic profile while facilitating preferential accumulation at the tumor tissue. To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among different nanocarriers, lipid-based delivery systems have been extensively used in oncology because of their biocompatibility, biodegradability, ability to encapsulate diverse drug molecules, high temporal and thermal stability, and offer prolonged and controlled drug release. This review discusses the current status of the lipid-based nanocarriers and their applications in cancer treatment as well as an overview of the different liposomal formulations commercially available for cancer therapy.

Keywords: Cancer; chemotherapeutics; drug delivery; liposomes; nanostructured lipid carriers; solid lipid nanoparticles; targeted drug delivery.

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Research Article

Development of Bioanalytical Standardization Parameters of *Alocasia indica* Tuber by High-Performance Thin Layer Chromatography Technique

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ABSTRACT

Alocasia indica is perennial herb growing widely and used as traditional medicine in India, China, and Bangladesh. The divine herb has potent medicinal values for the treatment of different types of illnesses. The High-Performance Thin Layer Chromatography (HPTLC) techniques were used to separate active components from ethanolic extract of tuber part of *A. indica*. This examination was intended to designed a HPTLC fingerprint profile of crude extract of the plant in ethanol. A HPTLC method for the isolation of various active constituents in *A. indica* ethanolic extract has been developed, and solvent system for quercetin the mobile phase used was toluene:ethyl acetate:formic acid (5:2:1) and for analysis of β-sitosterol the mobile phase used was chloroform:ethyl acetate:formic acid (6:4:1). In the present investigation, HPTLC fingerprint of extract of dried tuber part of *A. indica* have been performed and the results demonstrated that important information for standardization. The HPTLC system for routine quality control of present species can be used for ethanolic extract and serve in qualitative, quantitative, and was appropriate for standardization of the plant.

INTRODUCTION

Herbal and ethnic medicines having great importance in Chinese, *Ayurvedic*, Kampoian, Korean, and Unani medicinal system as these have been proficiently used in all over the world and blooming into orderly-regulated systems of medicine.[1] Medicinal plants have been playing a significant role in improving human health due to the existence of several active phyto-metabolites.

There are generally two metabolic forms, primary metabolites and secondary metabolites, found in plants, in which generally secondary metabolites showing some important pharmacological activities. Primary metabolites continuously synthesize and utilizing, whereas secondary ones are store up in tissues. Secondary metabolites are accountable for valuable medicinal effects, either alone or with a combination of other metabolites.

In nature, three major secondary metabolites alkaloids (major group) followed by terpenoids and phenolic. Plant phenolic has an ancient history of scientific investigation and stands for the majority plentiful and the widely represented class of plant natural products.[2] The *A. indica* is nutritionally found to contain varying amounts of proteins, ash, crude fiber, carbohydrate, starch, ascorbic acid, oxalates, proteases, nitrate, and tannin. It is cultivated edible aroid in India.

A. indica distributed in Sri Lanka, Bangladesh, India, South Africa, and China. It is generally grown in India and Bangladesh.[3] *A. indica* Schott. is an indigenous herb belonging to family Araceae. Different plant parts are conventionally used in inflammation and in abdomen diseases and spleen diseases. The leaves juice is used as a diuretic, digestive, astringent, laxative, and in management

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Phytochemical and pharmacological screening of leaf of *Lannea coromandelica Linn.*

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ABSTRACT:

WHO is highly recommended the customary exploitation of traditional therapeutics of medicinal plants and is consequently in pipeline for development of monograph and exploring their uncultivated pharmacological properties. Presently, correct identification of medicinal plants by phytochemical fingerprints is a speedy tool to ensure reproducible quality of herbal drugs. In our study, the ethyl acetate and methanol extract of leaves of *Lannea coromandelica (L. coromandelica)* was subjected for chemical fingerprint as well therapeutic aid as antifilarial agents. High performance thin layer chromatography (HPTLC) was employed to develop chemical fingerprint and filariciadal activity was assessed by motility inhibition and MTT reduction assay with concentrations range 1000 to 25µg/ml. The HPTLC analysis of ethyl acetate and methanol extract was carried out using hexane: ethyl acetate: formic acid: methanol (5:4:1:0.5 v/v/v/v) for fingerprinting and quantification ellagic acid and quercetin. The HPTLC method was found to give compact spots for Rf = 0.54 and 0.51 ellagic acid; Rf = 0.91 and 0.87 quercetin for ethyl acetate and methanol extract respectively. The HPTLC method was validated as per the ICH guidelines. Inhibitory concentration (IC_{50}) for the ethyl acetate extract was found to be 284.5µg/ml. In motility assay, complete inhibition of motility was observed for all concentrations. Hence, our study could be valuable for inventing strategies for quality control parameter and justifies the ethnic uses of plant in folkloric medicines.

KEYWORDS: WHO, *Lannea coromandelica*, HPTLC, filariciadal activity.

1. INTRODUCTION:

Natural sources are dealing presently to treat various disease since past to present. In future it needs proper justification of claimed traditional uses. At present innumerable antifilarial drugs DEC, albandazole, Ivermactin and other combination of drugs are not capable to control the filaria disease. So in the present day several medicinal plants have been used as therapeutic aid as antifilarial agents. Experiments on antifilarial activities of various such phytochemicals are coming up with the constant effort made by the researcher from various parts of the world [1].

One of the important methods for identifying leads for drug development is to screen medicinal plants for the antifilarial activity [2]. *Lannea coromandelica* Houtt. (Anacardiaceae) commonly known Jingini, is deciduous large trees, upto 15-20 m tall. Bark & leaves of *Lannea coromandelica* is commonly used in ulcerative stomatitis, dyspepsia, general debility, gout, cholera, dysentery, sore eyes, leprosy, sprains and bruises, wound, elephantiasis, snakebite, stomachache and nerve muscle inhibition [3]. It contains triterpenoids, tannin, alkaloids [4], phenolics, flavonoids [5]. Literature survey of its activities revealed that there was no studied for its in-vitro anti-filarial activity and phyto-chemical analysis with sophisticated instruments. Hence the objective of our experiment is to quantify phyto-constituents and evaluate antifilarial effect of ethyl acetate and methanolic extract of *Lannea coromandelica* leaves against Setaria cervi in-vitro.

2. EXPERIMENTAL METHODS:

2.1. Collection of plant material

Leaves of plant *Lannea coromandelica* were collected from Barnawapara forest near Raipur managed by Government of Chhattisgarh State Forest Division. The collected plant wa[illegible] specimen (CNH/Tech.II/2014/70/139) was submitted to the Central National Her[illegible]

2.2 Preparation of extract

Shade dried *Lannea coromandelica* leaf was powdered (50 gm) and e[illegible] ethanol. The supernatant were evaporated to dryness. The crude dry extract (5%v/v) was then suspended in 2% acetic acid and partitioned with ethyl acetate (30 ml X 4). The pooled ethyl acetate fractions were then evaporated to get dry powder (2.8 g) and stored at 4ºC for further use. All the chemicals are the analytical grade purchased from Hi-media, Merck India.

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Ellagic acids from four different sources were extracted by hydrolysis of 10 g of the sample with 30 ml of methanol, refluxed for 1 hour. Extract obtained was filtered using Whatman filter paper No 42. 10 mL of distilled water was added to the filtrate and evaporated to a volume of 10 mL. Samples were analyzed immediately after extraction in order to avoid possible chemical degradation. The experiments were carried out in triplicate [6].

An Updated scenario and prospective overview on wound healing

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Abstract- Skin assumes a key part in shielding the body from the assault of pathogens and poisons our lifetime; along these lines, out of need, fast repair system that rapidly connects any openings to this essential organ. Upon damage, an arrangement of exceptionally planned covering occasions, that incorporate incendiary, expansion and improvement stages, result in the hurried conclusion of the injury and rebuilding of skin propriety. Fruitful injury mind includes advancing patient neighborhood and fundamental conditions in conjunction with a perfect injury recuperating condition. Various items have been created to impact this injury condition to give a sense pathogen, secured, and sudden territory for mending to happen. More up to date items are at present being utilized to supplant or expand different substrates in the injury mending course. In this survey, we feature current ideas in cutaneous injury repair also, recommend that a large number of these advancing ideal models may underlie regenerative procedures crosswise over assorted organ frameworks.
Keywords: Wounds, Wound healing, Hemostatis and Inflammation

I. INTRODUCTION

1.1. Wound

A wound as a defect or a end in the skin, resulting from material and thermal break or as a consequence of the apparition of the underlying health or physiological condition[1]. A wound is outlined as damage or disruption to the usual anatomical constitution and function. This can range from a simple damage in the epithelial integrity of dermis or it may be deeper extending into subcutaneous tissue with injury to different structures similar to tendons, muscles groups, vessels, nerves, parenchymal organs and even bone [2-3]. According to wound curing high society "a wound is the effect of 'disruption of standard anatomic put together and function'. Additionally, there are variations between tissues in terms of the time required to entire regeneration. Wound healing time may also be numerous and some wound may just take up to a year or extra to heal entirely [4- 6]. A thoroughly healed wound is defined as one who has been lower back to an anatomical structure, operate and look of the tissue within a cheap period of time. Most wound are more often than not the effect of straight forward accidents; however some wounds do not heal in well timed and orderly method. Multiple systemic and neighborhood reasons may sluggish the course of wound treatment by inflicting disturbances in the finely balanced restore approaches ,leading to continual non medication wound.

1.2. Types of wounds

1.2.1. Acute Wounds

These are commonly handkerchief injuries that cure completely, within the likely time frame, usually 8-12 weeks [7]. The central causes of acute wounds embrace factors such as cuts and tears which are caused by friction connection between skin and fast surfaces for example an operation to cast off a gentle tissue tumor located in the dermis and underlying parenchymal can oftentimes outcomes in a tremendous albeit noncom-taminated wound that can't be healed by way of predominant intention, due to the colossal defect within the tissue. Aggravating wounds are additionally normally encountered. They could also be involved handiest the delicate tissues or they possible related to bone fractures [8]. A horrendous injury is ordered by regardless of whether it is clean or chaotic. A surgical injury is either chiseled and suture or exposed to mend by a specialist. The injury breaks the trustworthiness of the skin including the epidermis and dermis. Surgical injuries are ordered in connection to the potential for disease in the injury: they are thought to be either perfect, clean sullied, tainted or grimy. Surgical injuries which are polluted or contaminated are some of the time left open post surgery while the disease resolves and after that they are sutured shut. This is known as 'postponed essential conclusion'. Premature essential conclusion in these occasions can be adverse to a fruitful result. Administration of an extreme horrible injury at first includes crisis strategies; revival and rebuilding of the dissemination to the partial appendage. The blood supply must be improved, any necrotic tissue debridement away as this can go about as a point of convergence for microorganisms and the injury flooded. Antimicrobials and lockjaw are typically given prophylactically.

1.2.2. Chronic Wounds

On the other way it comes out from several tissue damages that healed slowly, it does not healed beyond 2 weeks and in general reoccur [9]. Such wounds fail to heal due to repeated damages insults or underlying physiological

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Recent Advances in Lipid-based Nanodrug Delivery Systems in Cancer Therapy

Buddhadev Layek [1], Bina Gidwani [2], Sakshi Tiwari [3], Veenu Joshi [4], Vishal Jain [3], Amber Vyas [3]

Affiliations

PMID: 32568015 DOI: 10.2174/1381612826666200622133407

Abstract

Cancer is the second leading cause of death globally, with every sixth death being attributable to cancer. Nevertheless, the efficacy of conventional chemotherapeutic drugs is often limited due to their poor solubility, unfavorable pharmacokinetic profile, and lack of tumor selectivity. The use of nanotechnology provides an opportunity to enhance the efficacy of a chemotherapeutic drug by improving its bioavailability and pharmacokinetic profile while facilitating preferential accumulation at the tumor tissue. To date, a variety of platforms have been investigated as nanocarriers in oncology, which include lipid-based, polymer-based, inorganic materials, and even viruses. Among different nanocarriers, lipid-based delivery systems have been extensively used in oncology because of their biocompatibility, biodegradability, ability to encapsulate diverse drug molecules, high temporal and thermal stability, and offer prolonged and controlled drug release. This review discusses the current status of the lipid-based nanocarriers and their applications in cancer treatment as well as an overview of the different liposomal formulations commercially available for cancer therapy.

Keywords: Cancer; chemotherapeutics; drug delivery; liposomes; nanostructured lipid carriers; solid lipid nanoparticles; targeted drug delivery.

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Regulatory Framework Of Herbal Medicine In Mexico

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Abstract

Recently there has been a shift in universal trend from synthetic to herbal medicine, which we can say "Return to Nature". Medicinal plants have been known for millennia and are highly esteemed all over the world as a rich source of therapeutic agents. Botanical medicine represents an important share of the pharmaceutical market. Natural products compounds discovered from medicinal plants (and their analogues thereof) have provided numerous clinically useful drugs in the treatment of chronic and or acute disease and still remain as an essential component in the search for new medicines. So, these traditionally used plants can be explored effectively in order to find New Chemical Entity for the treatment of chronic and acute disease. The herbal industry shares about US $100 billion with good growth potential. Hence this field is having greater future perspectives. Review was performed systematically by review of literature published in journals and websites of different regulatory agencies, then after study of all the literatures which will summaries details related to registration of herbal product in Mexico. It covers legal aspects, procedural details, GMP and labeling requirements. It is very common trend globally to register herbal medicines and Mexico is one the country in that list. So the present work might provide a path for pharmaceutical companies who wise to sell their product in Mexico. This paper gives details about registration of herbal medicines in Mexico.

Keywords:- *Herbal medicines, GMP, Scientific names, Regulatory Agency, Mexico*

1.0 Introduction

Conventional medicines are those which contain traditional knowledge that developed over generations in various cultures. The oldest record of herbal medicine is found in Indian, Chinese, Greek, Roman, Syrian and Egyptian literature science about 5000 years.[1] As per WHO about 80% of world population is using products based on medicinal herbs and Plants and market share of conventional medicine is increasing exponentially.[2] As per the World Bank report there is about 15% growth in the trade of medicinal plants and raw materials. As number of patients seeking alternate and herbal therapy is growing globally However, recent findings indicate that all herbal medicines may not be safe as severe consequences are reported for some herbal drugs.[3] Most herbal products in the market today have not been subjected to drug approval process to demonstrate their safety and effectiveness. So regulatory agencies are also working continuously to set perfect regulatory framework for manufacturing and marketing of herbal products. But transformation of traditional knowledge in to modern regulatory frameworks is a big challenge. The Mexico guidelines on for cultivation and collection of medicinal plants advise local

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ADVANCEMENTS IN SKIN DELIVERY: A TRANSDERMAL SCIENCE

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Keywords:

Recent advancements, Skin barrier, patents on TDDS, Important breakthrough, Clinical research, Transdermal delivery, Transdermal patch

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ABSTRACT: Transdermal drug delivery system (TDDS) provides an alternate safe way of drug delivery compared to other invasive techniques. Documented advancement in transdermal science provides sustainable delivery of drug molecules, improved bioavailability, the better therapeutic efficacy of embedded drug's and ability to deliver the drug at a constant rate and also reduces the adverse effects associated with oral delivery of drugs. Skin provides a formidable barrier for topical delivery of drugs to overcome its various agents have been used. TDDS have received more attention recently due to their unique features such as improve bioavailability, controlled release of medication and better patient compliance. Transdermal patches, which consist of the drug along with other ingredients provide an effective way to overcome this barrier. The present review mainly focuses on the various advancement of transdermal drug delivery, the various available method for preparation of transdermal patches, characterization and assessment tools for transdermal patch preparation, patents filled, clinical trial performed on transdermal compounds along with drug approved and future applications of transdermal drug delivery system.

INTRODUCTION: Transdermal drug delivery system (TDDS) is a method to administer drugs through the skin for the systemic as well as for local distributions [1]. TDDS *via* the skin to the systemic circulation gives as a suitable route of administration for a variety of clinical applications [2]. Transdermal drug delivery has various advantages compared to the oral route. In particular, the first-pass effect that is responsible for the pre-systemic metabolism of drugs can be avoided.

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Besides, it has certain other benefits such as drugs that can be transdermal drug delivery under suitable rate control could minimize the pulse entry into the bloodstream and undesirable side effects particularly seen with peak plasma levels can also be avoided [3]. Depending upon their design, transdermal patches used today are broadly classified into two main categories: reservoir-type and matrix-type patches detailed below in this manuscript. The number of a drug candidate that can be delivered by transdermal patches is still low in spite of recent success.

In order for a drug to be delivered across the skin, it must have three basic characteristics: small molecular mass (<500 Da), high lipophilicity and small dose (up to milligrams). The smallest drug planned in a patch is nicotine (162 Da) and the largest is oxybutynin (359 Da). The transdermal

How the advanced technologies are becoming the first choice for Pharmaceutical competitors: A review on Multi-layered Tablet dosage forms.

S. S. JADIYA, N. UPMANYU AND V. JAIN

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University Institute of Pharmacy, Pt. Ravishankar Shukla University, Raipur, CG.

Abstract:

Nowadays Pharmaceutical companies are developing multi-layered tablets i.e. bi-layer, tri-layer or others, because of multiple therapeutic advantages to reduce multiple dose, and time. Drug administration through Oral route is the most appealing route of the of drug delivery. Tablet is the most preferred dosage form among various dosages forms administered orally, because of its ease of manufacturing, convenience in administration, accurate dosing and better stability compared with oral liquids and because it is more tamper proof than other oral dosage forms. Bi-layer tablet is one such dosage form which meets the needs and shows dual effect for immediate and sustained action. The first layer of the Bi-layer, Tri-layer or Multi-layer tablets is formed as immediate release and other layers may be sustained release with two or more drugs of multiple effects for the treatment of diseases. It is the new and widely acceptable formulation of oral drug delivery system mainly because of easy administration and better patient compliance with multiple benefits. For the layered tablet, the bio-availability of the drug is one critical parameter for determining the efficacy of pharmaceutical formulation but with advancement in technology and modification, newer and more efficient tablet dosage forms can be developed with better bio-availability.

Key-words: Bi-layer, Tri-layer, Multi-layered tablets, Bio-availability.

Introduction:

Multilayer tablet is the recent concept for the successful development of controlled release formulation with multiple features to provide a way of successful drug delivery system. The factors such as repetitive dosing and unpredictable absorption led to the concept of controlled drug delivery systems. There are many expenses and complications involved in the development and marketing of new drug entities; current GMP practice and proper attention are required for the development of sustained or controlled release drug delivery systems. Layered tablets are composed of two or three layers of granulation compressed together. When two or more APIs are to be administered simultaneously and if both APIs are incompatible, the best option is to formulate a multilayered tablet. A single tablet is composed of two or more layers in which each layer is with different color for distinctive appearance.

There are mainly two types of layered tablets used in pharmaceutical industries: Bilayer tablet and Trilayer tablet. Bi-layer tablet is suitable for release of two drugs in combinational form, two incompatible substances can be added in bilayer tablet in which one layer is immediate release as primary dose and second layer is with maintenance dose. Bi-layer tablets have been developed with the use of advanced technologies and are becoming the first choice of Pharmaceutical competitors to achieve controlled delivery of different drugs with predefined release profiles. Since the last decade, Pharmaceutical competitors have been interested in developing a combination of two or more APIs in a single dosage form (bi-layer tablet) for the promoting patient convenience and compliance. Multilayered tablets are mainly used for incompatible substances. Layered tablet makes sustained release preparations with the immediate release quantity in one layer and the slow release portion in the second possible. The third layer for intermediate release may be added. In layered tablet the weight of each layer can be accurately controlled, in contrast to putting one drug of a combination product in a sugar coating. For the separate layers coloring provides unique tablet identity. Analytical work may be simplified by a separation of the layers prior to assay. Since there is no transfer to a second set of punches and dies, as with the dry coating machine, odd shapes (such as triangles, squares, and ovals) present no operating problems except for those common tooling. Bilayer tablets require fewer materials than compression coated tablets and hence contain less weight and may be thinner as compared to compression coated tablets. [1] [2] [3]

Advantages of Multilayered Tablet: [4] [5] [6]

- Lower cost as compared to all other oral dosage form
- Better chemical and microbial stability over all other oral dosage form.
- Unpleasant and bitterness in the odour and taste can be masked with coating techniques.
- Easy to swallow with the least tendency for hang-up.
- Suitable for pilot plant scale up technology.
- For combination therapy these tablets can be used easily.
- Drugs with low half-life, each of the layers of the tablet content a loading dose and maintenance dose respectively that increase the bioavailability of the drug.
- Improved patient compliance.
- Bi-layer execution with optional single-layer conversion kit.

Disadvantage of Multilayered Tablet: [4] [5] [6]

- Layered tablet tends to be more expensive to manufacture than other tablets because of requirements of multiple granulation steps and some presses work at lower speed.
- Chances of cross contamination are high due to usage of multiple drugs.
- In bilayer tablet there is one inter phase between two drug layers so there are chances of interaction at one phase.

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Current Traditional Medicine, 2020, *6*, 300-311 1589

REVIEW ARTICLE

Compendium of *Salvia officinalis*: An Overview

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Abstract: The medicinal plants have enormous commercial potential throughout the globe. In the herbal boom worldwide, it is estimated that high quality phyto-medicinals will provide safe and effective medication. In India, Ayurveda, Siddha, Unani *etc*. consist of large number of herbal remedies, being used from ancient times. Many plant species containing active constituents that have a direct pharmacological action on the body. This plant Sage (*Salvia officinalis* Linn) is historically well known from the early 1960s till now by its therapeutic and culinary applications due to its high economic value. The plant is reported to contain alkaloids, triterpenoid, steroids, Phenolic compounds and essential oils. Sage plant is a rich source of antioxidant properties, for this reason sage has found increasing application in food industry. The core purpose of this review is to emphasize the origin, morphology, Phytochemistry and pharmacological aspects of Sage (*Salvia officinalis* Linn).

Keywords: Tejpaat, sage, terpenoids, flavonoids, essential oils, antimicrobial, anticancer, flavoring agent.

1. INTRODUCTION

The WHO has defined herbal medicines as "finished labeled medicinal products that contain as active ingredients that may be aerial or underground parts of plants or other plant material or combination thereof, whether in the crude state or as plant preparations" [1]. Herbs have been used in a diverse array of purposes, including medicine, nutrition, flavorings, beverages, dying, repellents, fragrances, cosmetics, charms, smoking and industrial uses. Today, herbs are still found in 40% of prescription drugs [2]. Herbal treatment of many diseases is increasing in many countries. India has an ancient heritage of traditional medicine. The Materia Medica of India provides a great deal of information on the folklore practices and traditional aspects therapeutically important natural products [3]. Indian traditional medicine is based on various systems including Ayurveda, Siddha, Unani and Homeopathy. The evaluation of these drugs is primarily based on phytochemical, pharmacological and allied approaches including various instrumental techniques such as chromatography, microscopy and others [4].

With the emerging worldwide interest in adopting and studying traditional systems and exploiting their potential based on different healthcare systems, the evaluation of the rich heritage of traditional medicine is essential. In this regard, one such plant is *Salvia officinalis* L (sage) is an aromatic and ornamental herb, known from Greeks

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REVIEW ARTICLE

Intranasal Lipid Particulate Drug Delivery Systems: An Update on Clinical Challenges and Biodistribution Studies of Cerebroactive Drugs in Alzheimer's Disease

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Abstract: ***Background*:** Alzheimer's is the primary cause of death in the various countries that affect wide strata of the population. The treatment of it is restricted to a few conventional oral medications that act only superficially. It is evident that the delivery of a drug to the brain across the blood-brain barrier is challenging as the BBB is armed with several efflux transporters like the P-glycoprotein as well as nasal mucociliary clearance adds up leading to decreased concentration and reduced therapeutic efficacy. Considering these, the intranasal IN route of drug administration is emerging as an alternative route for the systemic delivery of a drug to the brain. The intranasal (IN) administration of lipid nanoparticles loaded with cerebroactive drugs showed promise in treating various neurodegenerative diseases, since the nasal route allows the direct nose to brain delivery by means of solid lipid nanoparticles (SLN's). The tailoring of intranasal lipid particulate drug delivery systems is a pleasing approach to facilitate uptake of therapeutic agents at the desired site of action, particularly when a free drug has poor pharmacokinetics/ biodistribution (PK/BD) or significant off-site toxicities.

***Objectives*:** 1) In this review, key challenges and physiological mechanisms regulating intranasal brain delivery in Alzheimer's disease, *ex vivo* studies, pharmacokinetics parameters including brain uptake and histopathological studies are thoroughly discussed.

2) A thorough understanding of the *in vivo* behaviour of the intranasal drug carriers will be the elusive goal.

3) The article emphasizes to drag the attention of the research community working in the intranasal field towards the challenges and hurdles of the practical applicability of intranasal delivery of cerebroactive drugs.

***Method*:** Various electronic databases, journals like nanotechnology and nanoscience, dove press are reviewed for the collection and compilation of data.

***Results*:** From *in vivo* biodistribution studies, pharmacokinetics parameters, and gamma scintigraphy images of various drugs, it is speculated that intranasal lipid particulates drug delivery system shows better brain targeting efficiency for various CNS disorders in comparison to other routes.

***Conclusion*:** Various routes are explored for the delivery of drugs to increase bioavailability in the brain for CNS disorders but the intranasal route shows better results that pave the way for success in the future if properly explored.

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Keywords: Intranasal, clinical, Alzheimer, bio-distribution, histopathology, lipid carriers.

1. INTRODUCTION

Alzheimer's disease (AD) is a chronic progressive neuropathological disease, which originates in the temporal region of the hippocampus and entorhinal complex, and spreads all over the brain and is associated with degeneration of neurons. It leads to mortality as the disease progresses due to various changes such as loss of neuronal conductivity, synaptic deregulation, and formation of abnormal tau protein aggregates. The most common early symptom of AD is short-term memory loss [1]. With the increased risk of disease, a person feels alone and disconnects themselves from relatives, family, *etc* [2]. Stages of AD and associated symptoms are shown in (Table **1**) [2]. Several longitudinal studies and statistical correlations highlight the fact that around 47 million people across the globe suffer from dementia, out of which 37 million are suffering from AD. The report published by AD Association (2019) highlights that in the United States of America (USA) alone approximately 5.8 million people live with AD originated dementia and is considered to be the 6th leading cause of death among older adults in the USA. Although India falls at the bottom of the list with the least incidences of AD when compared with the USA, awareness of AD among the Indian rural and urban communities is sparse or limited.

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An Updated scenario and prospective overview on wound healing

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Abstract- Skin assumes a key part in shielding the body from the assault of pathogens and poisons our lifetime; along these lines, out of need, fast repair system that rapidly connects any openings to this essential organ. Upon damage, an arrangement of exceptionally planned covering occasions, that incorporate incendiary, expansion and improvement stages, result in the hurried conclusion of the injury and rebuilding of skin propriety. Fruitful injury mind includes advancing patient neighborhood and fundamental conditions in conjunction with a perfect injury recuperating condition. Various items have been created to impact this injury condition to give a sense pathogen, secured, and sudden territory for mending to happen. More up to date items are at present being utilized to supplant or expand different substrates in the injury mending course. In this survey, we feature current ideas in cutaneous injury repair also, recommend that a large number of these advancing ideal models may underlie regenerative procedures crosswise over assorted organ frameworks.
Keywords: Wounds, Wound healing, Hemostatis and Inflammation

I. INTRODUCTION

1.1. Wound

A wound as a defect or a end in the skin, resulting from material and thermal break or as a consequence of the apparition of the underlying health or physiological condition[1]. A wound is outlined as damage or disruption to the usual anatomical constitution and function. This can range from a simple damage in the epithelial integrity of dermis or it may be deeper extending into subcutaneous tissue with injury to different structures similar to tendons, muscles groups, vessels, nerves, parenchymal organs and even bone [2-3]. According to wound curing high society "a wound is the effect of 'disruption of standard anatomic put together and function'. Additionally, there are variations between tissues in terms of the time required to entire regeneration. Wound healing time may also be numerous and some wound may just take up to a year or extra to heal entirely [4- 6]. A thoroughly healed wound is defined as one who has been lower back to an anatomical structure, operate and look of the tissue within a cheap period of time. Most wound are more often than not the effect of straight forward accidents; however some wounds do not heal in well timed and orderly method. Multiple systemic and neighborhood reasons may sluggish the course of wound treatment by inflicting disturbances in the finely balanced restore approaches ,leading to continual non medication wound.

1.2. Types of wounds

1.2.1. Acute Wounds

These are commonly handkerchief injuries that cure completely, within the likely time frame, usually 8-12 weeks [7]. The central causes of acute wounds embrace factors such as cuts and tears which are caused by friction connection between skin and fast surfaces for example an operation to cast off a gentle tissue tumor located in the dermis and underlying parenchymal can oftentimes outcomes in a tremendous albeit noncom-taminated wound that can't be healed by way of predominant intention, due to the colossal defect within the tissue. Aggravating wounds are additionally normally encountered. They could also be involved handiest the delicate tissues or they possible related to bone fractures [8]. A horrendous injury is ordered by regardless of whether it is clean or chaotic. A surgical injury is either chiseled and suture or exposed to mend by a specialist. The injury breaks the trustworthiness of the skin including the epidermis and dermis. Surgical injuries are ordered in connection to the potential for disease in the injury: they are thought to be either perfect, clean sullied, tainted or grimy. Surgical injuries which are polluted or contaminated are some of the time left open post surgery while the disease resolves and after that they are sutured shut. This is known as 'postponed essential conclusion'. Premature essential conclusion in these occasions can be adverse to a fruitful result. Administration of an extreme horrible injury at first includes crisis strategies; revival and rebuilding of the dissemination to the partial appendage. The blood supply must be improved, any necrotic tissue debridement away as this can go about as a point of convergence for microorganisms and the injury flooded. Antimicrobials and lockjaw are typically given prophylactically.

1.2.2. Chronic Wounds

On the other way it comes out from several tissue damages that healed slowly, it does not healed beyond 2 weeks and in general reoccur [9]. Such wounds fail to heal due to repeated damages insults or underlying physiological

Design and Development of Ciprofloxacin Lipid Polymer Hybrid Nanoparticle by Response Surface Methodology

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ABSTRACT:
Background and Objectives: To develop lipid polymer hybrid nanoparticles by optimization techniques that is pioneering drug delivery systems of ciprofloxacin for using topical infection. **Material and Method:** The formulation mainly prepared by a biodegradable eco-friendly and bioacceptable polymer of chitosan, lipid soya lecithin and can incorporate in the gel using carbopol solvent evaporation method. The experimental factorial design is 3D level of quadratic model is used to optimize the formulation at different ratio. **Results:** The determination of percentage drug entrapment efficiency, particle-size diameter and % loading capacity was studied**.** The optimized LPHNPs have particle size of 204.47 nm, loading efficiency of 74.49% and zeta potential of -4.56 mV was found. Ciprofloxacin released about 80% for 24 hours in vitro. **Conclusion:** In current research, it can be concluded that the relative bioavailability of the drug in LPHNPs was significantly increased and used for the treatment of topical skin infection.

KEYWORDS: Lipid polymer hybrid nanoparticles, chitosan, ciprofloxacin**,** biodegradable eco-friendly, bioacceptable.

INTRODUCTION:

The strategies of hybrid lipid polymeric nanoparticles drug delivery systems to provide bio companionable, firm polymer, lipid hybrid nanoparticles that has various advantages of both state i.e. liquid and solid-state LPNPs ruins in a solid-state at body temperature[1]. Polymer–lipid hybrid nanoparticles are new age nanoparticles which are composed of lipid and polymer. Polymer–lipid hybrid nanoparticles are designed to take the advantage of polymeric as well as lipid nanoparticles in a single particle[2]. The hybrid nanoparticles have good drug loading efficiency. In hybrid nanoparticles the hydrophilic polymeric layer is covered by a lipophilic envelop. Hybrid nanoparticles can also be used for diagnostic purpose[3]. Polymer- lipid hybrid nanoparticles can be used in the targeting organs. Fluoroquinolone derivatives ciprofloxacin hydrochloride has broad-spectrum activity against gram-negative and gram-positive bacteria. Chemically it is 1-cyclopropyl 6– fluoro -1,4–dihydro-4-oxo-7–piperazine -1-yl quinoline-3-carboxylic acid hydrochloride $C_{17}H_{18}FN_3O_3$. HCl. H_2O. Ciprofloxacin inhibits the DNA gyrase enzyme of bacteria which is accountable for the incessant introduction of negative super coils into DNA, so ciprofloxacin is considered as a bactericidal agent[4]. The concentration needed to inhibit gyrase - mediated DNA super coiling is between (0.1–10mg/ml)[3]. fluoroquinolone contains a fluorine atom at position 6 of the 4 – quinolone nucleus hence it having a prolonged spectrum of activity and increased antibacterial potency compar[illegible] acid, oxolinic acid)[5]. Delivery of drugs via the skin is efficient [illegible]lation allied with topical administration[7, 8]. The formulation are administered [illegible] the stratum corneum drug that fails to penetrate the above skin layer[9]. Topica[illegible]es play vital role to deliver drug in such kind of topical infection and disease, due to its controlled and prolonged drug delivery to the surface on the infection, and avoid recurrent application of the medicament to the infected and painful area, hence, lead to boost inpatient compliances[10]. The gel can aid in creating a uniform dispersal of the carriers in the matrix and increase the contact time and deposition of the nitrogen-cooled on the skin [illegible][11] semi-synthetic biocompatible and biodegradable polymers hav[illegible] polymers can potentially enhance the permeation of the drug[illegible] Dispersion of polymer-based nanoparticles in hydrophilic g[illegible] evaporation technique is a very competent system because it [illegible] compounds of lipophilic nature[12,13]. This method also involved is solvent evaporation, which is well recognized amid the different processes for nanoparticles preparation[114]. It is based on the emulsification of an organic solution of a polymer in an aqueous phase followed by the evaporation of the organic solvent [15, 16]. This becomes challenging to predicate the result. However, it is difficult to intend an optimal formulation with all pleasing characteristics for site-specific drug delivery of the Ciprofloxacin hence; an experimental design was used to rise above this problem. The design of the present work is to prepare LPHNPs play vital role to deliver drug in such kind of topical infection due to its controlled and prolonged drug delivery to the

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Research Article

Evaluation of Anthelmintic and Antioxidant Potential of *Solanum melongena linn.* Leaf Extract using *in-vitro* Models and Estimation of Total Flavonoid Content

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ABSTRACT

The objective of this study is to study the anthelmintic and antioxidant activity of the leaf extracts of *Solanum melongena Linn.* (Family: Solanaceae) and to estimate the total flavonoid content. The aqueous (AE) and ethanolic (EE) leaf extracts of *Solanum melongena Linn.* were prepared and these were evaluated for total flavonoid content by aluminium chloride colorimetric method and for determination of anthelmintic activity using Indian earth worm *Pheretima posthuma*. Various extract concentrations i.e. 10, 20, 40, 80 and 100 mg/mL will be made for this study. The extracts were also evaluated for antioxidant activity by superoxide scavenging activity. Anthelmintic activity was showed by all the extracts at concentration of 10 mg/mL. The ethanolic extract of *Solanum melongena Linn* leaf of 100 mg/mL has exhibited a significant effect ($P<0.001$) when compared to aqueous extract. The antioxidant activity of the extracts was quite prominent but it was comparatively lower when compared to the standard significance ($P<0.05$). Total 5.39 mg QE/100 g flavonoid traces observed in the extract. The above analytical study shows that the *Solanum melongena Linn* leaf extract has shown a good anthelmintic and antioxidant activity.

Keywords: Helminthiasis, *Solanum melongena Linn.*, Aluminium chloride colorimetric method, *Pheretima posthuma*.

INTRODUCTION

Helminthic diseases now a day is the major health related concern in all over the world. They affect a large human population in endemic areas and hence can cause life threatening issues. WHO reported that a big number of people around the world suffer from parasitic worm infections[1]. Worms like pinworms, round worms and tapeworms are common parasites which infected the human body parts and responsible for Helminthiasis disease. These worms often reside in gastro intestinal tract as well as target the liver and other organs of human body. Helminth eggs are excreted by infected humans through their faeces and these eggs can contaminate the soil[2]. Drugs that completely kill or remove the infesting worms are termed as anthelmintic drugs. Unfortunately some common side effects like nausea, vomiting, abdominal pain, hair loss, fall in blood pressure decreased, sedation, fever, and body ache are associated with the popular drugs which are available to target these worms[3]. Considering the above problems, it is required do identify new alternative therapies for this helminthes. Plant based herbal treatment will be surely beneficial in this area. Therefore, herbal plant extract based anthelmintic drug development was focused in this research work.

Plants are used by mankind as herbal remedies for several diseases from ancient times. In India Ayurveda, Unani and Sidha systems of medicines are broadly used to treat and curing of many diseases. *Solanum melongena* was significantly used as an effective therapy against various human diseases conditions from the centuries. "Melongene" is the common name of this plant. In most of the regions of Asia, it is called brinjal. In America, Australia and Canada it is known as "eggplant". In Britain and sometimes in Canada it is called "aubergine"[4]. The fruit of this plant is very popular in India for used as vegetable. *Solanum melongena* exhibits many traditional uses and also reported for showing various potent pharmacological actions[5]. Recently the insecticidal activity of *Solanum melongena* is reported, which is of great importance. Ethanolic extract of *Solanum melongena* leaf showed very prominent insecticidal activity against *Sitophylus oryzae*, Carpenter ant Pantry weevil larvae[6].

MATERIALS AND METHODS

Plant material

The fresh leaves of *Solanum melongena* were procured from the rural agricultural land area of Chhattisgarh, India and were authenticated.

Preparation of extract

Leaves of *Solanum melongena* were dried in shade and coarsely powdered. Then this powder was subjected to Soxhlet extraction by water and ethanol using as a solvent for 72 hrs. The extracts were then subjected to distillation for removing the solvent and then the concentrated mass was dried on water bath for further evaporation.

Drugs and chemicals

The XOD (xanthine oxidase), NBT (nitro blue tetrazolium), SOD (superoxide dismutase) were purchased from Sigma Chemical Company, Albendazole (Alkem Laboratories Ltd.) and rest of all chemicals used in the study are of analytical grade.

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Open Access Research Article

In-vitro Screening for Anthelmintic Potential of *Crotalaria retusa* on *Pheretima posthuma*

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ABSTRACT

Objective: Aim of the present study is to evaluate the anthelmintic potential of *Crotalaria retusa* leaf extract on *Pheretima posthuma*.

Methods: Extracts of *Crotalaria retusa* leaves prepared by Soxhlet method. The extracts were screened for phytochemicals such as alkaloid, flavonoid, tannin, steroids, etc. aqueous (AECR) and ethanolic (EECR) extracts were tested for anthelmintic activity using Indian adult earthworm (*Pheretima posthuma*).

Results: The observation showed that EECR gave shorter paralysis and death time at 100 mg/mL as compared to AECR. Mean±SEM values were calculated for both extract and standard. EECR showed anthelmintic activity in a dose-dependent manner taking the shortest time for paralysis.

Conclusion: The result demonstrated that both the investigational extracts showed significant anthelmintic activity ($P<0.05$) for the time taken for paralysis and death when compared to standard drug mebendazole.

Keywords: *Crotalaria retusa*, Anthelmintic, *Pheretima posthuma*, phytochemical.

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1. INTRODUCTION

Helminthiasis is a parasitic infection, mostly affects poor populations of the world[1]. Its prevalence is directly associated with sub-standard housing and lack of proper sanitation [2,3]. Helminthiasis is generally occurred by the transmission of parasitic helminths through ingestion of drinking water, uncooked meat, and contaminated vegetables[4]. Ascaris limbricoides, Ancylostoma duodenale, Trichuris tritura, schistosomes and filarial worms, are common helminths responsible for causing helminthiasis in human[5]. a large variety of chemotherapeutic drugs known as anthelmintic, that used to treat helminthiasis like albendazole, mebendazole, praziquantel[6]. these anthelmintic drugs have some serious problems, which includes drug resistance and severe side effects such as fever, stomache, and urticaria[7,8].

Numerous herbs have been screened for their anthelmintic potential and scientific data confirmed their considerable potential against helminths[9]. Some of the phytoconstituents isolated from herbs and reported for anthelmintic activity such as curcumin, β-sitosterol, Stigmasterol β-D Glucoside, epiisopilosine, alkaloids [10-14].

In the present study, *Crotalaria retusa* (**family: *Fabaceae***) was evaluated for anthelmintic activity. *Crotalaria retusa* (**Figure 1**) is also known as rattle weed (in English)[15]. it is commonly found in India and traditionally used to treat various ailments such as cough, dyspepsia, fever, cardiac disorders, stomatitis, dysentery, and scabies[16]. Some efforts have been done in isolation of active principle of *Crotalaria retusa* seed and few alkaloids were identified such as retusine, retusamine, retronecine N-oxide[17].

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SCREENING FOR PHYTOCHEMICAL, FLAVONOID CONTENT, ANTIOXIDANT AND ANTHELMINTIC POTENTIAL OF *SIDA SPINOSA*

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Keywords:

Anthelmintic, Flavonoid, Antioxidant, *Sida spinosa*

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ABSTRACT: Background: *Sida spinosa* (Family: *Malvaceae*) is a well-known herb, has considerable medicinal significance in the tribal region of Chhattisgarh. Several ethnomedicinal survey reports have been revealed its potential to cure ailments such as skin diseases, diarrhea, gonorrhea, and asthma. **Objective:** The aim of the present study to screen phytochemical, flavonoid content, antioxidant and anthelmintic potential of *Sida spinosa.* **Methods:** Aqueous and ethanolic extracts of *Sida spinosa* leaves were prepared by the Soxhlet method. The extracts were phytochemically analyzed for alkaloid, flavonoid, tannin, carbohydrate, glycoside, and Phytosterols. Extracts were also tested for flavonoid content, antioxidant potential, and anthelmintic activity using Indian adult earthworm (*Pheretima posthuma*). **Results:** The phytochemical screening confirmed the presence of alkaloids, carbohydrates, glycosides, flavonoids, steroids, in the leaves of *Sida spinosa.* The Present study also reported that ethanolic extract has exhibited significant free radical scavenging capacity and anthelmintic activity as compared to aqueous extract. **Conclusion:** The present study has evidenced the prominent antioxidant and anthelmintic action of *Sida spinosa*, which may contribute to the development of an herbal alternative to synthetic drugs for helminthiasis.

INTRODUCTION: Helminthiasis is known as a Neglected Tropical disease, have been affecting economically weaker population by helminths such as *Ascaris limbricoides*, *Ancylostoma duodenale*, *Trichuris tritura*, schistosomes and filarial worms [1, 2]. These helminths can cause various clinical manifestations, which include nutritional deficiency, weariness, stomachache, dysentery, intestinal inflammation, pneumonitis, intestinal obstruction, emesis, constipation, lymphatic edema, blindness, weight loss, anemia, enlargement of liver, and skin problems [3].

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Major problems associated with the treatment of helminthiasis are severe side effects and high cost of anthelmintic drugs [4, 5]. For these problems, there is a great need for new chemical entities with the least side effect and low cost. Scientific data obtained from different countries revealed that herbs and their active principles could play an important role in the development of the new anthelmintic drug.

In the present study, *Sida spinosa* screened for anthelmintic and antioxidant activity. This herb is commonly found in Chhattisgarh, India and has therapeutic significance in the traditional medicinal system of India [6]. *Sida spinosa* (Family: *Malvaceae*) known as prickly sida in English, has been used traditionally to treat various ailments such as asthma, diarrhea, gonorrhea and skin diseases [7, 8, 9].

Impact of Body Mass Index and Age on Mental Health of Adolescents Girls

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Impact of Body Mass Index and Age on Mental Health of Adolescents Girls

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Abstract

Adolescent girls in India may face poor nutritional status due to low access to healthy food and high mental health symptoms attributed to high stress. Total 72% of infants and 52% of married women have anaemia. Researches indicated that malnutrition during pregnancy causes the child to have increased risk of physical retardation and reduce cognitive abilities. The objective of the present study was to investigate the impact of body mass index and age on mental health of adolescent girls. 1000 adolescent girls were selected through stratified random sampling technique from different government school of Raipur, India. Mental health was measured by Mental Health Battery. Anthropometric measurement and age was collected by the standard procedure. Multivariate analysis of variance and post Hoch test were employed to analyze the data. Results revealed that adolescent girls significantly differ in emotional stability, overall adjustment, autonomy, security-insecurity, intelligence and over all mental health with increasing age. Post Hoch test showed that adolescent girls with low body mass index differ significantly on overall adjustment and self concept dimension of mental health in comparison to adolescent girls with normal BMI. It is concluded from the study that adolescent girls of early years (12-14) must be given environment to develop Emotional Stability, Autonomy, Security-Insecurity and Intelligence. Proper nutrition is needed to improve self concept and over all adjustment. Findings of the study draws attention to create awareness related to mental health and nutrition.

Keyword: *Mental health, BMI, Adolescent Girls.*

Introduction

Adolescence is transitional stage of human life cycle with different kind of physiological change. This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioural changes take place [1,2]. Every stage of human growth and development is affected by mental health. The mind and the body are connected[3]; hence affect each other patterns of activity, poor diet, poor sleep habits etc are factors which determine health[4]. Diet can have both significant positive and negative impacts on physical and mental health. Positive associations were observed between mental health problems and menstrual cycle irregularity among adolescent girls[5].

The nutritional status of an individual is influenced by a variety of factors, including: Life stage, environment, food access, and socioeconomic status[6]. In turn, each of these factors can influence mental health[7]. Mental health problems are the highest prevalence of any age group[8].

Malnutrition occurs when there is an imbalance of energy and protein in an individual's diet or body may become unable to absorb the nutrients[9]. Nutritional deficiencies lead various health problems which are found everywhere, and most often go without cures/ treatment. Deficiency of both macro- and micronutrients

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Impact of celebrity endorsement on purchase intention of consumers towards sports apparel

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Abstract

This purpose of this paper is to derive the relationship between celebrity endorsement and purchase intention of consumers of sports apparel. Researcher adopted a survey method approach for collection of data. Questionnaire is used as an instrument for collection of data. Data were analyzed using chi-square to test the hypotheses at 0.05 alpha level of significance using SPSS version 16. Results derived from this study shows that celebrity endorsement and purchase intention of consumers of sports apparel are dependent on each other.

Keywords-Sports Apparel, Purchase intention, Celebrity

1.Introduction

Our market is flooded with completely different variety of brands attempting to carve out house for itself within the minds of shoppers each firm is attempting to seek out a hook in their brands that may connect quicker to the viewers. Therefore, the challenge before the trafficker is to induct all potential measures to influence, encourage and instill needs amongst the client through an efficient advertising campaign. Most of the individuals daily come across through lots of advertisements by the media so individuals become passionless towards all the promotional material practices. Its marketers and advertisers are trying to discover a knob which will grasp the consumer's thought. In today's era, individuals usually neglect all those advertisements thar are displayed in Tv, newspapers, magazines etc..Therefore they are trying to use Endorsement as promotional material to catch the attention of people.

According to oxford Dictionary Endorsement means "the act of giving one's public approval" Endorsements are a form of advertising that uses famous personalities or celebrities who command a high degree of acceptance, faith, recognition or acquaintance amongst the people. Such individuals make a use of their names or images to promote a product or service. Therefore Indian Companies are making use of celebrities of various areas , for example Cricketers, Bollywood celebrities and other sports persons to endorse their brands.

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जीवन शैली के विभिन्न आयामों के आधार पर रक्त शर्करा के जोखिम के अनुमान के लिये तार्किक प्रतिपगमन मॉडल का निर्माण

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संक्षेप

अध्ययन का उद्देश्य जीवन शैली के आधार पर रक्त शर्करा के जोखिम का अनुमान लगाने के लिये तार्किक प्रतिपगमन समीकरण (Logestic Regression Equation) स्थापित करना था। अध्ययन 200 व्यक्तियों पर आयोजित किया गया जिसमें दो समुह थे। प्रत्येक समुह मे 100 व्यक्तियों को लिया गया। 100 व्यक्ति ऐसे थे जिनका भोजन के पूर्व एवं भोजनोपरांत शर्करा का स्तर सामान्य था और 100 व्यक्ति ऐसे थे जिनके भोजन के पूर्व एवं भोजनोपरांत शर्करा का स्तर सामान्य से अधिक था। अध्ययन मे जीवन शैली को स्वतंत्र चर के रूप मे लिया गया और रक्त षर्करा के स्तर का जोखिम को आश्रित चर के रूप मे लिया गया। यह चर डाइकोटोमस (Dichotomous) था जिसका मापन हॉ या ना में किया गया। जीवन शैली का मापन "जीवन शैली मुल्यांकन" वस्तुसूची द्वारा किया गया, इस वस्तु सूची का निर्माण Anspangh Davids, Michael, H. Hamrich and Frank D. Rosato के द्वारा किया गया। जीवन शैली के आधार पर रक्त शर्करा के जोखिम का अनुमान लगाने के लिये तार्किक प्रतिपगमन (Logestic Regression) का उपयोग किया गया। अध्ययन द्वारा रक्त षर्करा के स्तर का जोखिम का अनुमान लगाने के लिये भविष्यवाणी मॉडल (Prediction Model) का निर्माण किया गया जो कि इस प्रकार है : रक्त षर्करा के स्तर का जोखिम (Risk of blood glucose level) = $1/1\text{-}r^{z}$, जहां पर "r", Z के घातकीय कार्य (Exponential Function of Z) को प्रदर्षित करता है । Z= .275+.015 (शारीरिक मुल्यांकन) +.015 (शराब एंव मादक द्रव्य मुल्यांकन) -.031 (पोषण संबंधी मुल्यांकन) -.041 (सामाजिकता संबंधी मुल्यांकन) +.030 (भावुकता संबंधी मुल्यांकन) -.010 (आध्यात्मिकता संबंधी मुल्यांकन) -.018 (तनाव नियंत्रण मुल्यांकन) -.005 (बौध्दिक योग्यता मुल्यांकन)।

प्रस्तावना

वर्तमान युग में शरीर संबंधी समस्याओं का समावेश हो रहा है, जीवन मे विभिन्न व्याधियों के आगमन से जीवन मे नकारात्मकता आ गई है। जीवन के इस नकारात्मकता का मुख्य कारण जीवन शैली में परिवर्तन है। जितनी भी व्याधियों से हमारा जीवन प्रभावित होता है उन सब मे से एक महत्वपुर्ण व्याधि रक्त शर्करा के स्तर मे बढ़ोतरी है। भारत में यह समस्या एक मुख्य समस्या बन चुकी है। प्रत्येक व्यक्ति चाहता है कि रक्त शर्करा के स्तर के जोखिम का हमे पुर्वानुमान हो जिससे इसे अधिक प्रभावशाली तरीके से नियंत्रित किया जा सके। विद्वान और पूर्व में आयोजित शोध कार्य, दोनो ही बताते है कि शर्करा के स्तर मे जीवन शैली का महत्वपुर्ण योगदान है। इसके कारणवष शोधकर्ता ने जीवन शैली के आधार पर रक्त शर्करा के स्तर के जोखिम का अनुमान लगाने के लिए प्रतिपगमन समीकरण स्थापित करने का प्रयास किया है। प्रतिपगमन समीकरण के आधार पर रक्त शर्करा के स्तर के जोखिम का जीवन शैली के आधार पर पर्वानुमान लगाया जा सकता है। जिससे जीवन शैली को आवश्यकता अनुरूप परिर्वतन किया जा सकेगा।

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PROGNOSTICATION OF SETTER PERFORMANCE ON THE BASIS OF SELECTED ANTHROPOMETRIC CHARACTERISTICS

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Abstract:

The study was conducted with an objective to prognosticate the setter's performance on the basis of selected anthropometric characteristics. SP, SH, SW, SAL, SFAL, SUAL, SUAC, SWC, SHC, SLL, SLLL, STC and SCC were observed as independent variables (IV) and setter's performance was selected as dependent variable (DV). To conduct this study, 75 setters were selected as subjects from interuniversity level volleyball tournament in India.. For predicting Dependent Variable (setter's Performance) on the basis of Independent Variables (selected Anthropometric Characteristics), multiple regression equation was applied. Established regression models are: (1) Setter's Performance = -1.304 +.664 X Setter's Calf Circumference and (2) Setter's Performance = 13.400 +1.590 X Setter's Calf Circumference + -.465 X Setter's Leg Length.

***Keywords**: Setter's Performance & Anthropometric Characteristics.*

Introduction:

Anthropometry is the branch of anthropology that is related with the measurement of the human body. Anthropometric measurement is one of the inexpensive and simple method to estimate the human body. Although there are several ways to measure body composition through Anthropometry but this study has taken selected Anthropometric Characteristics. In Volleyball, there are three playing positions of a player named as Spiker, Setter, and Libero. This study is restricted to Setters' performance. Hence, this study is an attempt to prognosticate the setters' performance on the basis of selected anthropometric characteristics of Volleyball players. Anthropometric properties of athletes represent an important prerequisite for successful presence at the same sport affecting athletes' performance and are necessary in order to gain excellent performance of sports skills. Moreover, volleyball players' anthropometric attributes correlate with the game's tactical demands.

Objective of the study:

The objective of the study was to prognosticate of setter's performance on the basis of selected anthropometric characteristics.

Variables of the study:

For the purpose of the present study, setter's performance was selected as dependent variable (DV) and selected anthropometric characteristics i.e. SP (Setter's Performance), SH (Setter's Height), SW (Setter's Weight), SAL (Setter's Arm Length), SFAL (Setter's Fore Arm Length, SUAL (Setter's Upper Arm Length), SUAC (Setter's Upper Arm Circumference), SWC (Setter's waist Circumference), SHC (Setter's Hip Circumference), SLL (Setter's Leg Length), SLLL (Setter's Lower Leg Length), STC (Setter's Thigh Circumference)

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Abstract

Adolescent girls in India may face poor nutritional status due to low access to healthy food and high mental health symptoms attributed to high stress. Total 72% of infants and 52% of married women have anaemia. Researches indicated that malnutrition during pregnancy causes the child to have increased risk of physical retardation and reduce cognitive abilities. The objective of the present study was to investigate the impact of body mass index and age on mental health of adolescent girls. 1000 adolescent girls were selected through stratified random sampling technique from different government school of Raipur, India. Mental health was measured by Mental Health Battery. Anthropometric measurement and age was collected by the standard procedure. Multivariate analysis of variance and post Hoch test were employed to analyze the data. Results revealed that adolescent girls significantly differ in emotional stability, overall adjustment, autonomy, security-insecurity, intelligence and over all mental health with increasing age. Post Hoch test showed that adolescent girls with low body mass index differ significantly on overall adjustment and self concept dimension of mental health in comparison to adolescent girls with normal BMI. It is concluded from the study that adolescent girls of early years (12-14) must be given environment to develop Emotional Stability, Autonomy, Security-Insecurity and Intelligence. Proper nutrition is needed to improve self concept and over all adjustment. Findings of the study draws attention to create awareness related to mental health and nutrition.

Keyword: *Mental health, BMI, Adolescent Girls.*

Introduction

Adolescence is transitional stage of human life cycle with different kind of physiological change. This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioural changes take place [1,2]. Every stage of human growth and development is affected by mental health. The mind and the body are connected[3]; hence affect each other patterns of activity, poor diet, poor sleep habits etc are factors which determine health[4]. Diet can have both significant positive and negative impacts on physical and mental health. Positive associations were observed between mental health problems and menstrual cycle irregularity among adolescent girls[5].

The nutritional status of an individual is influenced by a variety of factors, including: Life stage, environment, food access, and socioeconomic status[6]. In turn, each of these factors can influence mental health[7]. Mental health problems are the highest prevalence of any age group[8].

Malnutrition occurs when there is an imbalance of energy and protein in an individual's diet or body may become unable to absorb the nutrients[9]. Nutritional deficiencies lead various health problems which are found everywhere, and most often go without cures/ treatment. Deficiency of both macro- and micronutrients

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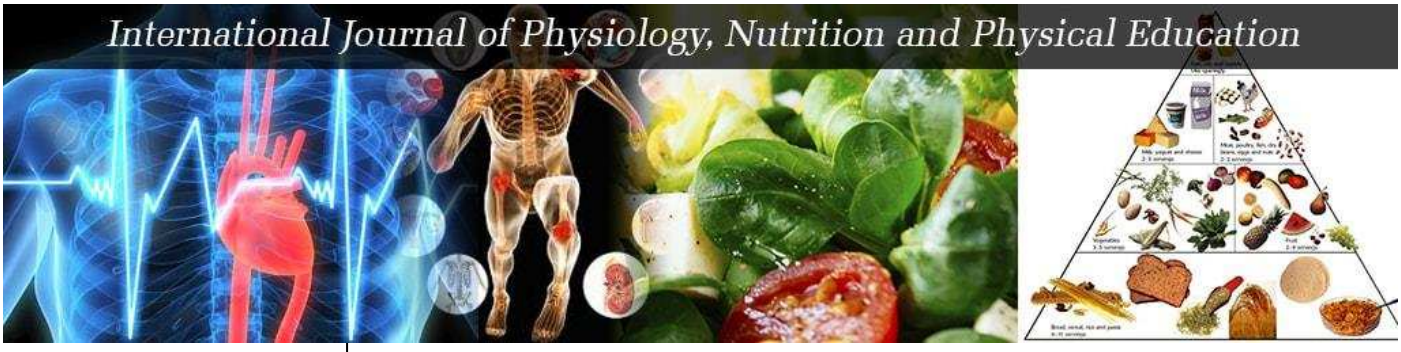

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Effect of soy supplementation on hand grip and back strength of tribal female players

Rashmi Singh, Vasu Verma, Aniksha Varoda and Reeta Venugopal

Abstract
Background: Protein is important for sports person to maintain body mass, repair, maintenance and for performance, hence the aim of the present study was to enhance strength by providing protein supplement in the form of soy ladoos.
Objective: To find out effect of nine months Soy supplement on strength variables, hand grip strength and back strength in female players of tribal area.
Materials and Method: Ninety-six female players from tribal sports campus of (average age = 14.44. height= 150cm, weight = 40.49kg) were selected for the present study. Subjects were randomly divided into experimental group (N = 49) and control group (N = 47). The subjects of experimental group consumed soy ladooof 50gm/day (10.3gm protein) for nine months. Hand grip strength and back strength of all the subjects were measured before the experiment and at every three months of supplementation of soy ladoos. Data was analyzed by SPSS package version.
Results: Significant effect of soy ladoo supplementation was observed (p<0.00) between pre, mid, pre-post and post measures of Hand grip strength and back strength in experimental group. Soy ladoo supplementation significantly improved performance in hand grip strength and back strength of experimental group (respectively P<0.00; F= 44.00; ES = .321, P<0.000; F=23.59, ES = .202}
Conclusion: Consumption of soy ladoo of 50 gm/day (10.3 gm protein) improved hand grip strength and back strength in tribal players.

Keywords: Hand grip strength (HGS), back strength (BS), soy ladoo (SL), tribal female players (TFP), dynamometer

Introduction
Strength is the ability of body to apply force and it relates to various body parts and muscle groups. Hand grip and Back Strength are important screening tool for the measurement of overall strength. Hand grip strength is the amount of force produced by hand, it measures the maximum isometric strength of the hand and fore arm muscles, it is important in sport involving catching, throwing, lifting etc. Back strength measures capacity of a person to sustain external load without injury. It is important in sports involving whole body strength like running, jumping etc.
Soy is high quality complete protein as compared to animal protein. A general thought is that animal protein especially whey are more effective but soy is equally effective in building muscle mass and strength (Vriese De. S 2018) [1]. It consists of large amount of protein (43%), with all the eight essential amino acids, and good amount of fiber, calcium, iron and lecithin, hence it is known "Miracle Bean or Wonder Bean" (Awasthi. A 2014) [2]. It is a good source of protein for vegetarian (Srilakshmi B 2018) [3]. In spite of being a "controversial crop", many researchers found that the soy protein supplementation lead to increased body mass, enhance performance and decreases fatigue in training sessions (Dragan I *et al* 1992) [4-9]. The nutritional status of tribal female players were assessed and it was found that the protein intake is below RDA. Hence, the present study was undertaken to find out the effect of soy supplement on strength of the tribal female players.

Materials and Methods
Selection of the subjects: Ninety-six tribal female players (TFP) age = 14.45 y ± 0.16, weight = 40.49± .64 kg, height =150 ±0.007cm who were resident of sports hostel, Kanker, Bastar,

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Comparative Study of Dietary Nutrition Index of Players of Sports Authority of India (SAI) and Tribal Schools of Kanker Chhattisgarh India

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Abstract

Nutritional assessment of the adolescent is very important, as it provides the status of health. Calculating Dietary Nutrition Index (DNI) is an ideal method to the study nutritional status of any population. In the present study dietary index of the players who are studying in tribal schools of Chhattisgarh and players who are residing in urban area and training under Sports Authority of India was assessed. Total of 200 subjects aged between 14 to 17 years participated in this study. Descriptive statistics and ANOVA were used to compare the nutritional status of different groups. The result of the study revealed that DNI of tribal boys and girls and SAI girls is inadequate. Further it was found that there was a significant difference between the groups. SAI boys and girls showed better values as compared to tribal boys and girls. It is suggested that intervention to meet the dietary requirement of the players should be planned for optimal performance.

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Dietary nutrition index (DNI);
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Sports Authority of India (SAI);
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Introduction

"To eat is a necessity, but to eat intelligently is an art"---La Rochefoucuald. Community nutrition is a big challenge in every country. Education, provisions for individuals or groups to adopt healthy eating habits is to planned for better nutritional status. The availability of fast food and "supersized" items are regarded positively because of their cost and convenience, for example one may bypass a salad or fruits in favour of fries or a soda drink,[1] in urban and affluent population, whereas the rural and tribal population suffers from lack of proper resources

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GROWTH AND NUTRITIONAL STATUS OF THE BAIGA ADOLESCENT GIRLS-A PRIMITIVE TRIBE OF CHHATTISGARH, INDIA

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GROWTH AND NUTRITIONAL STATUS OF THE BAIGA ADOLESCENT GIRLS-A PRIMITIVE TRIBE OF CHHATTISGARH, INDIA

ANIKSHA VARODA, REETA VENUGOPAL, AND MOYNA CHAKRAVARTY

ABSTRACT

Nutritional problems have serious health implications impacting physical development, psychological behavioural and work performance of an individual. Healthy growth and development of a girl through adolescence helps to prepare her for healthy pregnancies during childbearing years. The present study was conducted to assess the nutritional status among the Baiga adolescent girls in three districts of Chhattisgarh. A total of 270 girls of age cohort of 10-18 years were included. The present study aimed to assess the nutritional status among Baiga girls to compare the finding with standard references, i.e. NCHS, WHO and CDC. The study reveals that the highest mean BMI was found to be 18.2 Kgm2 for girls of 16 years of age; whereas the lowest mean BMI was 15.9 Kgm2 for girls of 12 years of age. Present girls have low mean body weight, height and BMI than the reference populations (NCHS). It was found that 26.3% of girls were of normal category, 26.1% girls were categorized under mild thinness, 17.7 % of girls suffered from moderate thinness and 29.7% girls suffered from severe thinness category of malnutrition. The results of the present study indicate that there is a great need for the implementation of health programmes to eliminate gender inequalities and improve health of girls.

Keywords: *Nutritional Status, Baiga tribe, Adolescent girls.*

INTRODUCTION

Growth and development among humans have different and divergent phases, since birth. Adolescence is an important stage, which is characterized by various biological, cognitive , social and emotional changes. In general, the adolescence period begins around 10 to 12years and lasts till 18-21 years of age. This stage has some predictable physical milestones. This is the period when the growth

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A STUDY OF GENDER DIFFERENCE IN MENTAL TOUGHNESS AMONG TRIBAL SPORTSPERSON OF CHHATTISGARH IN INDIA

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ABSTRACT

Performance psychology lay tremendous emphasis on mental toughness. In sports psychology mental toughness techniques are used for peak performance and achieving better results in sports. The term is coined by Loehr and discussed it in a book entitled "The Only Way to Win". Although both men and women actively take part in sports, research on mental toughness of sportsperson on the basis of gender is not vast and the results on role of gender in determining mental toughness are not consistent. The present study belongs to tribal community of Chhattisgarh in which it is aimed to compare mental toughness of tribal male and tribal female sportsperson of Chhattisgarh. The study comprise of 40 tribal national male sportsperson and 40 tribal female national sportsperson. The psychological tool to assess the mental toughness was questionnaire prepared by Tiwari (2007). Independent sample 't' test gives clear indication that mental toughness and and its sub-scale vary among tribal sportsperson on the basis of gender. It was observed that tribal male sportsperson are mentally more strong as compared to tribal female sportsperson of Chhattisgarh. The results are discussed in the light of biological difference and socialization theories and conclusions were drawn accordingly.

Keywords : Gender, Mental toughness, Tribal sportsperson

INTRODUCTION

Doubts and worries about achieving a goal is a major obstacle in sporting success. A sportsperson need to cope up with problematic circumstance while opposing the distracting thoughts so that he/she can achieve the set of goals. This ability is termed as mental toughness in sports psychology. The term mental toughness is used since ages in sports psychology. In sports psychology the academic definition given by Jones *et al.* (2002) states mental toughness in following ways - (1) Mental toughness is inherent or trained ability of sportsperson that gives them

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Prevalence of Anaemia among Adolescent girls of Baiga (PVTGs) of Chhattisgarh, India

A. Varoda[1], M Chakravarty[2], R. Venugopal[3] and A. Kumar[4]

Citation: Varoda A, Chakravarty M, Venugopal R and Kumar A, 2021. Prevalence of Anaemia among Adolescent girls of Baiga (PVTGs) of Chhattisgarh, India. Human Biology Review, 10 (2), 129-139.

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ABSTRACT : *Anaemia is a global health problem which affects the health of the people as well as social & economic development. The status of anaemia among the population shows vauation as per age and sex, similarly, their is a changing pattern reported by many studies viz.(Worldwide prevalence of anaemia, 1993–2005). It can be considered as anaemia among tribal and rural adolescent girls can be attributed to poor nutrition as well as lack of awareness in this regard. UNICEF,(2012) reported that in India all around 56% of adolescent girl and 30% of adolescent boy are anaemic. This scenario is more chronic among adolescent of tribal areas which lead to conduct the present anthropological investigation to assess the prevalence of anaemia among adolescent girls aged 10-18 years of Baiga's of Chhattisgarh, India. To full fil the objectives a total of 360 adolescent girls were purposively selected from three districts Bilaspur, Kabirdham, and Mungeli of Chhattisgarh. The finding reveals that the prevalence of anaemia among Baiga adolescent girls is 94.7% which is lower than the previously studied adolescent girls of different regional area like Jaipur, Andhra Pradesh, and Odisha whereas it was higher than the cluster of studies from Rajasthan, Haryana, Madhya Pradesh, Uttar Pradesh, Maharashtra, Chhattisgarh, and Karnataka. Although, they are also lacking in proper nutrition and suffered many associated health problems which leads to chronical chances for poor level of haemoglobin. It is an alarming indicator and needs to be taken care of to make policies for their children.*

Keywords – Anaemia, Adolescent girls, and Baiga tribe

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A comparative study of acceleration measures of Kabaddi players on clay and synthetic surface: With reference to Raiders

Sourabh Pradhan and CD Agashe

Abstract
The aim of the present study was to assess acceleration measures of raiders on two different playing surfaces. To conduct the study, 100 national/interuniversity Kabaddi players (Average age 25.23 years) were selected. Following the inclusion criteria only raiders from teams were selected purposively as sample. Tracker video motion analysis software was used in the present study to assess acceleration measures of Raiders. A movement puzzle, designed in consultation with Kabaddi experts was used to study directional movement of selected raiders with the help of video motion analysis. It was found that the raiders accelerate faster on synthetic surface (Mean=36.53 m/s^2) as compared to clay surface (Mean = 31.53 m/s^2). The calculated t=4.68 also supports this findings at. 01 level of statistical significance because it is greater than the table value of 2.63 for df=99. It was concluded that the synthetic surface is more helpful in rate of change of velocity of raiders in relation to time as compared to clay surface.

Keywords: Acceleration, raider, synthetic and clay surface

Introduction
Traditionally Kabaddi is played on natural clay surface while recognized national and international tournaments are played on synthetic surface. Scientifically there is a major difference in mechanical properties of clay and synthetic surface. On synthetic surface a player needs to pick his feet up in contrast to clay where a player can slide his feet which is not possible in synthetic surface. Studies have also shown that faster speed and acceleration can be attained on synthetic surface as compared to clay surface. Since majority of European and Asian countries have better infrastructure facilities than India hence it is important to know the impact of playing surface on performance of Indian kabaddi players because India does not have sufficient number of synthetic surfaces to practice and is available only in handful of places. The tournaments organised at local and district levels are still played on clay surface. Thus, it is mandatory to have scientific data on mechanical advantage to kabaddi players on synthetic surface and to what magnitude? A thorough glance at previous studies specify that Krahenbuhla (1974) [3], McMahon and Greene (1979) [5] assessed speed of movement on synthetic and natural grass surface. The impact of The impact of friction on turning movements over different sports surfaces was assessed in a study by Dura and Lozano (1999). Villwock *et al*. (2009) [6] studied the shoe grip on different soccer playing surfaces. Kuganesan (2015) [4], Choi *et al*. (2015) [7] in their studies assessed the impact of different court surfaces on speed and agility of tennis players. Gale-Ansodi *et al*. (2016) [2] comparatively evaluated the acceleration and speed of tennis players on different playing surfaces while Abdul Yamin *et al*. (2017) [1] assessed the ground reaction force while running on different sports surfaces. Research literature in the area of sports surface and its effect on performance related factors and especially on injury pattern is very vast but so far mechanical advantage in terms of acceleration measures to kabaddi players on synthetic surface with special reference to raiders has not been assessed comparatively in the light of clay surface. Thus, this study was conducted.

Objective of the Study
The main objective of the present study is to compare the acceleration of raiders on clay and synthetic surface.

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Facile and visual detection of acetylcholinesterase inhibitors by carbon quantum dots†

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Abstract

Sensitive and rapid detection of organophosphate toxicants is highly relevant and important in environmental protection and food safety. Owing to this, a carbon quantum dot (CQD)-based bio-platform was designed for dual detection (fluorometric and colorimetric) of reversible and irreversible inhibitors of enzyme acetylcholinesterase (AChE). The detection strategy is based on the fluorescence quenching and recovery of CQDs through Cu^{2+} ions, AChE and its substrate, acetylthiocholine iodide (ATChI). Initially,

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A comparative study of athletic coping skills of medal winner male fencers

Dr. Pramod Kumar Yadav and CD Agashe

Abstract
The athletic coping skill is a major area of research in sports psychology. This study was carried out to assess coping skills of medal winner national male fencers of India. To conduct the study 25 medal winner national male fencers (Average age 22.92 years) were selected. For comparative purpose, another set of 25 non-medal winner national fencers (Average age 23.11 years) were also selected. The athletic coping skills inventory of Smith *et al*. (1995) was used to collect data in this study. Results reveal significant difference in coping skills of medal winner national male fencers and non medal winner national male fencers. It was concluded that medal winner national male fencers posses a superior capacity in the form of coping skills as compared to non-medal winner national male fencers.

Keywords: Fencers, coping skills

Introduction
Fencing is sometimes described in the form of playing chess with feet aided by a weapon. It requires excellent coordination between mind and body. To excel in competitive fencing a player need to have confidence in own skills and abilities while factors such as proper self talk, not worrying about outcome of match, peaking under pressure and cope with adverse situation during a match also plays a part. All these factors can be considered coping skills.
In sports coping is widely used psychological terms which refers to cognitive or behavioural efforts made by an athlete to overcome the resistance of a stressor. A number of researchers have scientifically documented the usefulness of coping skills in terms of sports performance. The use of athletic coping skill in predicting performance of a players is not uncommon. Among others Smith and Christensen (1995) [13] used athletic coping skills for prediction of sports performance. Dolbier *et al*. (2001) [6] opined that person becomes anxious if he do not possess good coping skills. They also reported that coping skills allow a person to manage stress and adverse situation with relative ease. Cresswell and Hodge (2004) [3] also reported a meaningful relationship of coping skills with anxiety and self confidence. It was also reported that coping skills are related with positive mood states in sportsperson (Newton and Duda, 1993) [4].
Although a popular Olympic sport the coping skills of medal winner national male Indian fencers has not been assessed. It is worthwhile to note that researchers such as Borysiuk *et al*. (2008) [1], Williams and Waskiewica (2008) [15], Gillet, N. (2009) [7], Hagemann *et al*. (2010) [8], Dintica and Paunescua (2014) [5], Masrur *et al*. (2014) [10] and Chen *et al*. (2017) [2] conducted studies on fencers and evaluated their sports performance in the light of biomechanical, physical and some psychological parameters. Hence the present study was planned to expand the existing knowledge in sports psychology regarding coping skills of medal winner national male fencers.

Objective
The objective of the present study is to comparatively assess the coping skills of medal winner national male fencers.

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Investigation of structural and optical properties of gadolinium modified barium zirconium titanate ceramic

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ABSTRACT

The present study briefs the structural and optical properties of Gd doped $BaZr_{0.05}Ti_{0.95}O_3$ ceramic synthesized via solid-state reaction (SSR) technique. The X-Ray diffraction (XRD) study reveals the formation of single phase of Gd modified $BaZr_{0.05}Ti_{0.95}O_3$ ceramic. The Fourier transform infrared (FTIR) spectra are also presented in support of structural properties. The optical band-gap obtained from the UV-visible study, decreases with an increase in the Gd content. The photoluminescence study shows a broad hump around 560 nm. The studied compositions reveal the major contribution of shallow holes as compared to deep holes within the band-gap.

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KEYWORDS
X-ray techniques; FTIR; UV-visible spectroscopy; photoluminescence

1. Introduction

The present-day technology demands novel material with multiplicity of useful physical properties in a single material. The oxide perovskites (ABO_3) with good dielectric and ferroelectric properties have attracted many researchers owing to their widely known luminescence characteristics [1,2]. Among different oxide perovskites, the optical properties of $BaZr_xTi_{1-x}O_3$ (BZT) have fascinated the scientific community a lot [3–6]. The BZT system plays an important role in the development of various components for microelectronic and optoelectronic devices, for example, multilayer ceramic capacitors, thermistors, actuators, electro-optic modulators, etc. In addition, the development of flat panel displays based on oxide perovskites has seen great interest. In oxide perovskites, the orbital is associated with the electronic transition for photoluminescence (PL) emission are mainly 2p orbital of O atoms in the VB and 3d Ti and 4d Zr orbital's in the CB [7–9]. The Zr/Ti ratio in BZT plays a crucial role in determining the optical and electrical properties. It is reported that $BaZr_{0.05}Ti_{0.95}O_3$ shows excellent dielectric, ferroelectric and piezoelectric properties [10]. Jha et al. reported the optical behaviour of $BaZr_{0.05}Ti_{0.95}O_3$ ferroelectric ceramics [11].

In recent years, extensive investigations have been carried out on luminescent properties and related mechanisms of rare earth (RE^{3+}) ions doped BZT system. The effect of rare earth dopants, namely, Sc^{3+}, La^{3+}, Sm^{3+}, Nd^{3+}, Eu^{3+}, Dy^{3+}, Gd^{3+} and Y^{3+}on different optical and electrical properties is reported [12–15]. Among various RE^{3+} ions, Gd^{3+} plays a different role in improving the structural and electrical properties. The effect of Gd^{3+} ions substitution on structural and electrical properties among $BaTiO_3$ based ce[redacted]

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Influence of Dy^{3+} concentration on spectroscopic behaviour of $Sr_3MgSi_2O_8:Dy^{3+}$ phosphors

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Abstract

White light emitting novel $Sr_3MgSi_2O_8:Dy^{3+}$ were synthesized by solid state reaction (SSR) process. The structural and morphological properties were analyzed by XRD and TEM. XRD pattern confirms presence of monoclinic structure with space group P121/a1. Emission spectra of $Sr_3MgSi_2O_8:Dy^{3+}$ phosphors were studied as a function of Dy^{3+} ion concentration. Emission spectra recorded at 350 nm excitation consist of characteristic blue and yellow emission bands cantered at 480nm, 493 nm and 572 nm , which correspond to $^4F_{9/2}\rightarrow{}^6H_{15/2}$ and $^4F_{9/2}\rightarrow{}^6H_{13/2}$ characteristic transitions of Dy^{3+} ions respectively. Emitted colour of the phosphor was determined by CIE chromaticity graph. $Sr_3MgSi_2O_8:Dy^{3+}$ phosphors are depended upon to find potential applications, for instance, WLEDs and optical feature structure.

Keywords: $Sr_3MgSi_2O_8$; XRD; Photoluminescence; CIE color co-ordinates; white light.

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Influence of Dy^{3+} concentration on spectroscopic behaviour of $Sr_3MgSi_2O_8:Dy^{3+}$ phosphors

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Abstract

White light emitting novel $Sr_3MgSi_2O_8:Dy^{3+}$ were synthesized by solid state reaction (SSR) process. The structural and morphological properties were analyzed by XRD and TEM. XRD pattern confirms presence of monoclinic structure with space group P121/a1. Emission spectra of $Sr_3MgSi_2O_8:Dy^{3+}$ phosphors were studied as a function of Dy^{3+} ion concentration. Emission spectra recorded at 350 nm excitation consist of characteristic blue and yellow emission bands cantered at 480nm, 493 nm and 572 nm , which correspond to $^4F_{9/2}\rightarrow{}^6H_{15/2}$ and $^4F_{9/2}\rightarrow{}^6H_{13/2}$ characteristic transitions of Dy^{3+} ions respectively. Emitted colour of the phosphor was determined by CIE chromaticity graph. $Sr_3MgSi_2O_8:Dy^{3+}$ phosphors are depended upon to find potential applications, for instance, WLEDs and optical feature structure.

Keywords: $Sr_3MgSi_2O_8$; XRD; Photoluminescence; CIE color co-ordinates; white light.

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Oxygen vacancy related conduction behavior in $BaZr_{0.05}Ti_{0.95}O_3$ ceramic

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Abstract. For this study, the microcrystalline powder of $BaZr_{0.05}Ti_{0.95}O_3$ (BZT) was prepared by the conventional solid state reaction method. The sample was calcined at 1200 °C for 4 hours and sintered at 1300 °C. The calcined powder was structurally characterized by X-ray diffraction (XRD), which showed that the specimen has a Perovskite structure having orthorhombic structure. On analyzing the scanning electron microscope (SEM) the calculated crystal size was observed to range between 20- 30 μm. The dielectric study of BZT showed normal phase transition behavior. The conductivity studies as a function of temperature and frequency has been performed to study the role of oxygen vacancies. The results of the frequency dependence of the conductivity suggest that oxygen vacancy hopping processes, due to relaxations in oxygen vacancy-related dipoles, being mainly responsible for the conduction behavior in the studied system.

Keywords: Solid state reaction method, XRD, SEM, Dielectric study, Conductivity

1. Introduction

Barium titanate (BT) is a well known Perovskite structured material, which is known for its high dielectric constant, spontaneous polarization, ferroelectric properties and non linear optical properties. It is given in the open literature that the properties of BT can be enhanced by the substitution at Barium and/or Titanium sites by homovalent or aliovalent ions [1-6]. This lead (Pb) free compound has numerous applications in DRAMs, MLCCs, ultra sonic transducers, optical data storage at high density, sensors, actuators and optoelectronic devices [7-9]. Among the homovalent substituents Zr^{4+} in place of Ti^{4+} has been reported to improve the dielectric properties of BT [10-12]. This ceramic with general formula $BaZr_xTi_{1-x}O3$ shows promising piezoelectric and electrostrictive properties [13, 14]. Better thermal and chemical stability of Zr^{4+} than Ti^{4+} makes Zr^{4+} a best choice as isovalent substituent for substitution at Ti sites [15]. Also, the ionic radius of Zr^{4+} (0.087 nm) is larger than Ti^{4+} (0.068 nm) which expand the unit cell and the possibility of electron hopping between Ti^{4+} ions and Ti^{3+} ions reduces to a large extent [15].

In case of all the oxide Perovskites the oxygen vacancies are the fundamental intrinsic defects that play a very critical impact on the electrical properties. The oxygen vacancies do not lost

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Flexible printed paper electrode with silver nano-ink for electrochemical applications

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Highlights

- Development of low-cost paper based disposable printed electrodes with silver nano-ink using desktop inkjet printer.
- Fabricated paper electrode exploited as a counter electrode in cyclic voltammetry (CV) analysis.
- Printed paper electrode is demonstrated to used as a working electrode for analysis of nitrate in CV.

Abstract

Development of low-cost paper based disposable electrodes printed with silver nano-ink using desktop inkjet printer is reported in this work. A stable nano-ink was prepared by

Synthesis and luminescence behavior of $Ba_2SiO_4:Dy^{3+}$ phosphors in presence of charge compensator ions

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Abstract: A series of dysprosium (Dy^{3+}) doped barium ortho-silicate (Ba_2SiO_4) phosphors were synthesized by conventional Solid State reaction technique. In order to find out the phase purity and crystal structure, characterization of the prepared powder samples was done by X-ray diffraction (XRD) method. FTIR method confirms the presence of all elemental compositions. Photoluminescence (PL) properties were studied. The PL spectra was observed to study the effect of concentration of Dy^{3+} ion and it is found that the prepared phosphors show two strong emission peaks in the blue and yellow region at 478 nm and 573 nm, respectively, when excited by the near-ultraviolet (UV) of wavelength 348 nm. The critical distance between the Dy^{3+} ions was calculated using Blasse's equation. Effect of monovalent ion K^+ was examined as a charge compensator ion and observed that co-doping of charge compensator ion enhances the luminescence intensity. Chromaticity coordinates of the phosphor are found near to white light region, which confirms their applicability in solid state lighting applications; especially in white-LEDs.

Keywords: PL, charge compensator ion, LEDs.

1. Introduction

Phosphor materials play a key role in recent technologies; especially in lighting and display devices. They have outstanding chemical and physical properties as well as a stable crystal structure. Thus, a lot of attention has been drawn towards the study of phosphor materials because of their usefulness in the various fields such as Field Emission Displays (FEDs), sensors, Plasma Display Panels (PDP), X-ray imaging systems, optical fibres and white light emitting diodes (WLEDs). Among all these applications, WLEDs is considered to be the next generation lighting systems over the traditional lamps due to its reliability, long lifetime, high brightness, eco-friendly, and low power consumption properties [1-4]. It has been proved that Ultraviolet (UV) pumped phosphor converted WLEDs exhibit high Color Rendering Index (CRI) as well as high chromatic stability [5]. At the present time,

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Luminescent characterization of $CaMgSiO_4:Dy^{3+}$ phosphor for white light emitting diodes

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Abstract. Different concentration of Dy^{3+} doped calcium magnesium silicate (CMS) phosphors are synthesized via solid state synthesis (SSS) method at high temperature. The structural properties are analyzed by X-ray diffraction (XRD). The surface microstructures are confirmed by scanning electron microscopy (SEM)and energy dispersive X-ray (EDX) spectra. The vibrational properties of the synthesized phosphor are carried out using fourier transform infrared (FT-IR) spectra. The luminescence properties are explained in terms of photoluminescence (PL) and thermoluminescence (TL) characteristics. The PL spectra showed maximum emission intensity peaking at 484 and 578 nm, which are attributed to the $^4F_{9/2} \rightarrow {}^6H_{15/2}$ and $^4F_{9/2} \rightarrow {}^6H_{13/2}$ transitions of Dy^{3+} ion respectively. The PL properties of the prepared phosphors are carried out at room temperature. The maximum PL intensity occurs at 0.5 mol% of doping concentrationof Dy^{3+} ions due to concentration quenching. The glow peak and TL parameters of the prepared phosphors are computed by means of peak shape method. The CIE color co-ordinates are originated (x= 0.3263, y= 0.3451) and correlated color temperature (CCT) are determined to be 5769 K. The results indicate that the prepared phosphor produces cool light in the white region.

1. Introduction

In recent years, research on different rare earths (REs) activated compounds have recognized widespread interest owing to their thermally stability, structural diversity, larger band gap, higher elemental stability, low expenditure and environmental individuality [1-3]. The investigation on silicate phosphor matrix is appropriate to substitute conventional light source in the present years. Silicate based phosphor materials with different REs activated have been enormous interest due to their various applications in field of solid state lighting. In the field of lighting technology, these phosphors can be employed as white light emitting diodes (WLEDs), display devices, optical memories, rewritable copy papers, smart windows and photo-switches [4-6]. It is well known that the $YAG:Ce^{3+}$is a phosphor emitted white light and $BaMgAl_{10}O_{17}:Eu^{2+}$ is phosphor emitted blue light which is available commercially [1]. However these phosphor matrix have the low color rendering index (CRI) and a less luminous efficiency [7-8]. Subsequently it is essential to develop the single rare earth ion doped phosphor matrix by simple preparation method having high efficiency, less electricity consumption, low preparation and production cost. To produce white light, dysprosium (Dy^{3+}) ion is

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Thermoluminescence studies of Dy^{3+}-doped calcium barium orthosilicate codoped with Li^+ ion

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Abstract
Calcium barium orthosilicate ($CaBaSiO_4$) phosphors having different concentrations of Dy^{3+} were prepared by solid-state reaction method, and phase structure of the sample was identified by X-ray diffraction (XRD) characterization. It is observed that the XRD pattern matched well with JCPDS file No. 48-0210. Thermoluminescence (TL) of the UV-irradiated (254 nm) samples was recorded using routine TL set-up Nucleonix TLD reader with constant heating rate 5 °C s^{-1}. It is found that the sample containing 1 mol% of Dy^{3+} and exposed for 27 min gives optimum TL intensity at 130.14 °C and shows single TL glow peak. It order to examine the effect of charge compensator ion, Li^+ ions are introduced and it is found the incorporation of charge compensator enhances the TL output. Samples having 1 mol% of Dy^{3+} and 6 mol% of Li^+ exposed for 30 min to UV exposure show maximum intensity at 118 °C. It is also observed that temperature corresponding to TL peak varies with varying Li concentration (ranging from 105.76 to 123.88 °C). Samples having 1 mol% of Dy^{3+} and 6 mol% of Li^+ exposed for 30 min to UV exposure were selected for further studies, such as activation energy, order of kinetics and frequency factor, and all these parameters were evaluated using peak shape method.

Keywords XRD · TL · Charge compensator ion

Introduction

TL phenomenon is related with the light emission of some solid materials which emit light on heating and are known as phosphors, but it is different from incandescent. Recently, inorganic, crystalline, particulate materials are used as TL materials and are referred to as phosphors due to their behaviour to emitting light in the visible region when excited by suitable wavelength. In the present scenario, silicate-based phosphors are studied as promising luminescence materials due to their interesting and unique characteristics. It is also reported by some authors that silicate materials are highly thermal stable, chemically stable in ambient environment as compared to other materials. They are cheap, easily prepared and show strong absorption in the near UV region, are stable crystal structure and strong water persistence [1–3]. The silicate materials can be considered as photoluminescent or thermoluminescent due to their nature of energy storage and which generate luminescence by either photo- or thermo-stimulation [4, 5]. Thus, among the various silicates the selection of the proper host and activators is an important issue for TL. The combination of host, dopant and the optimum doping percentage of dopants plays the significant role for creating luminescence centres and helps in making sensitive TL phosphors. Commonly, rare-earth elements are selected as dopant known as activators. Among all the rare earths (REs), Dy^{3+} ion is an important rare-earth element. As a dopant to the host on account of their luminescence behaviour such as electronic and optical characters arising from their non-full 4f configuration, sharp line spectra, the remarkable narrowband emission and complication in energy levels various transitions are

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Keywords XRD · TL · Charge compensator ion

Introduction

TL phenomenon is related with the light emission of some solid materials which emit light on heating and are known as phosphors, but it is different from incandescent. Recently, inorganic, crystalline, particulate materials are used as TL materials and are referred to as phosphors due to their behaviour to emitting light in the visible region when excited by suitable wavelength. In the present scenario, silicate-based phosphors are studied as promising luminescence materials due to their interesting and unique characteristics. It is also reported by some authors that silicate materials are highly thermal stable, chemically stable in ambient environment as compared to other materials. They are cheap, easily prepared and show strong absorption in the near UV region, are stable crystal structure and strong water persistence [1–3]. The silicate materials can be considered as photoluminescent or thermoluminescent due to their nature of energy storage and which generate luminescence by either photo- or thermo-stimulation [4, 5]. Thus, among the various silicates the selection of the proper host and activators is an important issue for TL. The combination of host, dopant and the optimum doping percentage of dopants plays the significant role for creating luminescence centres and helps in making sensitive TL phosphors. Commonly, rare-earth elements are selected as dopant known as activators. Among all the rare earths (REs), Dy^{3+} ion is an important rare-earth element. As a dopant to the host on account of their luminescence behaviour such as electronic and optical characters arising from their non-full 4f configuration, sharp line spectra, the remarkable narrowband emission and complication in energy levels various transitions are

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Structural characterization and effects of Dy concentration on luminescent properties of $BaMgSiO_4$ phosphors

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ABSTRACT

A series of barium magnesium silicate (BMS) - based phosphors doped with different concentrations of Dy^{3+} is synthesized by using conventional solid-state reaction technique (SSRT). The prepared phosphors are characterized using X-ray diffraction (XRD), scanning electron microscopy (SEM), energy dispersive X-ray (EDX) analysis, fourier transform infrared (FTIR) spectra, photoluminescence (PL) and thermoluminescence (TL). X-ray diffraction analysis confirms the formation of $BaMgSiO_4$ with hexagonal structure. The excitation spectrum signifies strong 4f–4f transition in the wavelength range from 300 nm to 400 nm. The emission spectra indicate the possibility of excitation of samples by UV light (384 nm) and show strong emission band centered at 577 nm. Analysis of the emission spectra with different Dy^{3+} concentrations leads to the conclusion that the optimum dopant concentration for prepared BMS phosphors is 0.01 of Dy^{3+}. TL kinetic parameters of the prepared phosphors are estimated using peak shape method. The CIE chromatic coordinates indicate the suitability of BMS phosphor for solid state lighting.

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Silicates are efficient luminescent compounds, mainly because of their rigidity, brighter luminosity, high thermal and chemical stability, long time of the phosphorescence, easier synthesis and low cost [1–3]. Most of the silicate materials doped with rare earth (RE) ions, either divalent or trivalent have attracted much attention for their potential applications in the field of illuminations and displays, such as tricolor fluorescent lamps (FLs), cathode-ray tubes (CRTs), field emission displays (FEDs), flat-panel displays (FPDs), plasma displays (PDs), solid-state lasers (SSLs) and solar cells [4–9].

In recent years, light emitting diodes (LEDs) have shown potential applications in the lighting industries based on the advantages of high efficiency, long lifetime, small size, absence of mercury, eco-friendliness and short response times, which are regarded as the fourth generation solid-state lights [10–14]. Dysprosium (Dy^{3+}) ions have dominated this field because of its white light emission [15,16]. Dy^{3+} ion has been emerging as a popular activator ion owing to its potentials to produce white light with high quantum efficiency, thermal and chemical stability correlated color temperature at low cost [17]. Dy^{3+} ion has convoluted f-block energy levels as the transition between these levels result in sharp line spectra with a $^4f_9$ configuration. Dy^{3+} ions have two dominant emission bands (i) in the blue region (470–500 nm) arising from $^4F_{9/2} \rightarrow {}^6H_{15/2}$ transition and (ii) in the yellow region (560–600 nm) arising from the $^4F_{9/2} \rightarrow {}^6H_{13/2}$ transition [18–20]. It is possible to produce white light by adjusting the yellow to blue (Y/B) intensity ratio [21].

In past decades Dy^{3+} ion doped borate phosphors such as $Ca_3B_2O_6$: Dy^{3+} [22], $Sr_3B_2O_6$: Dy^{3+} [23], $K_2Al_2B_2O_7$: Dy^{3+} [24] and $LiSr_4(BO_3)_3$:Dy^{3+} [25] were successfully synthesized, studied for the luminescent characterization and have been reported as single phase light emitting phosphors. The phosphate based Dy^{3+} doped $LiSrPO_4$ phosphors were investigated by Sun et al. [26]. The phosphor upon 350 nm excitation exhibited two intense emission bands centered at 483 nm and 574 nm. The $Sr_3Y(PO_4)_3$:Dy^{3+} phosphor was synthesized by Wang et al. [27] using SSRT. The PL spectra showed two strong peaks centered at 484 nm and 576 nm corresponding to the magnetic dipole $^4F_{9/2} \rightarrow {}^6H_{15/2}$ transition and the electric dipole $^4F_{9/2} \rightarrow {}^6H_{13/2}$ transition respectively. Chen et al. [28]

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Flexible printed paper electrode with silver nano-ink for electrochemical applications

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Highlights

- Development of low-cost paper based disposable printed electrodes with silver nano-ink using desktop inkjet printer.
- Fabricated paper electrode exploited as a counter electrode in cyclic voltammetry (CV) analysis.
- Printed paper electrode is demonstrated to used as a working electrode for analysis of nitrate in CV.

Abstract

Development of low-cost paper based disposable electrodes printed with silver nano-ink using desktop inkjet printer is reported in this work. A stable nano-ink was prepared by

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Stellar Cores in the Sh 2-305 H II Region

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Abstract

Using our deep optical and near-infrared photometry along with multiwavelength archival data, we here present a detailed study of the Galactic H II region Sh 2-305 to understand the star/star-cluster formation. On the basis of excess infrared emission, we have identified 116 young stellar objects (YSOs) within a field of view of $\sim 18\farcm5 \times 18\farcm5$ around Sh 2-305. The average age, mass, and extinction (A_V) for this sample of YSOs are 1.8 Myr, 2.9 $M_\odot$, and 7.1 mag, respectively. The density distribution of stellar sources along with minimal spanning tree calculations on the location of YSOs reveals at least three stellar subclusterings in Sh 2-305. One cluster is seen toward the center (i.e., Mayer 3), while the other two are distributed toward the north and south directions. Two massive O-type stars (VM2 and VM4; ages ~5 Myr) are located at the center of the Sh 2-305 H II region. The analysis of the infrared and radio maps traces the photon-dominant regions (PDRs) in Sh 2-305. The association of the younger generation of stars with the PDRs is also investigated in Sh 2-305. This result suggests that these two massive stars might have influenced the star formation history in Sh 2-305. This argument is also supported by the calculation of various pressures driven by massive stars, the slope of the mass function/K-band luminosity function, star formation efficiency, fraction of Class I sources, and mass of the dense gas toward the subclusterings in Sh 2-305.

Unified Astronomy Thesaurus concepts: Interstellar medium (847); H II regions (694); Open star clusters (1160); Star formation (1569); Star forming regions (1565)

Supporting material: machine-readable tables

1. Introduction

It is believed that most stars form in some sort of cluster or association of various sizes and masses within giant molecular clouds (GMCs; Lada & Lada 2003). Though the smallest groups are more frequent, about 70%–90% of all young stars are however found in embedded young clusters and groups that are found in the largest clusters (Lada & Lada 2003; Allen et al. 2007; Grasha et al. 2017, 2018). This hierarchical distribution of star clusters is governed by the fragmentation of dense gas under the influence of gravitational collapse and/or turbulence, dynamical motions of young stars, and other feedback processes. Hence, the distribution of embedded clusters imprints the fractal structure of the GMCs from which they born (Efremov 1978; Scalo 1986; Elmegreen & Falgarone 1996; Sánchez et al. 2010).

As star clusters form at the densest part of the hierarchy, they can provide a direct observational signature of the star formation process. However, the most important observational constraints in the formation and early evolution of star clusters are the structure of the clusters and the molecular gas, the initial mass function (IMF), and the star formation history. The structure of the clusters may be analyzed through the spatial distribution of the complete and unbiased sample of member stars (Schmeja et al. 2008). The spacing of member stars in young clusters can be characterized by the Jeans scale, which suggests that a Jeans-like fragmentation process is responsible for the formation of a stellar cluster from a massive dense core. Because the density and temperature (which determine the Jeans length and mass) likely vary among regions, variation of the characteristic stellar mass of clusters is also expected. However, the characteristic mass of the stellar IMF seems to be invariant among clusters and even stars in the field, suggesting a mass scale for star formation that is consistent with thermal Jeans fragmentation (Larson 2007). Though the low-mass regime of the IMF has been the subject of numerous observational and theoretical studies over the past decade (see Offner & Arce 2014), the universality of the IMF is a question yet to be answered (Sharma et al. 2008; Bastian 2010; Sharma et al. 2012, 2017).

The feedback processes from young massive stars also affect the evolution of the young embedded clusters by exhausting the remaining dust and gas, thus slowing down further star formation and the gravitational binding energy. This feedback limits the star formation efficiency (SFE) and leaves many embedded clusters unbound, with their member stars likely to disperse (Lada & Lada 2003; Fall et al. 2010; Krumholz et al. 2014; Kim et al. 2018). In our Galaxy, the embedded cluster phase lasts only 2–4 Myr, and the vast majority of young star clusters (YSCs) which form in molecular clouds dissolve within 10 Myr or less of their birth. This early mortality of YSCs is likely a result of the low SFE that characterizes the massive molecular cloud cores within which the clusters form. Hence, observing low to modest final SFEs are key to understanding the early dynamical evolution and infant mortality as well as the mass distribution of member stars of such objects. Evans et al. (2009) found a higher SFE (~30%) for young stellar objects (YSOs) in clusters with higher surface density. However, in the case of the W5 H II region, Koenig et al. (2008) found that the SFE is >10%–17% for high surface density clustering. Two of the best probes of these formation and disruption processes are the comparisons between the mass functions (MFs) of molecular clumps and YSCs. But the similarity of the mass distribution of

Ground-based photometric survey to search for the pulsational variability in Bp, Ap, and Am stars

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Abstract: We present the analysis of time-series of photoelectric data of a Bp star and four new Ap stars observed photoelectrically under the Nainital-Cape survey programme. The project was started about two decades ago, aiming to search for new rapidly oscillating Ap stars. The frequency analysis of the time-series of these stars obtained on multiple nights did not reveal any pulsational variability. In addition to this, we have performed the analysis of time-series differential CCD photometry of the two pulsating Am stars HD 13038 and HD 13079, where we find some evidence of new periods. To expand and strengthen the ongoing survey work, we propose to build-up a tri-national collaboration of astronomers from India, South Africa and Belgium.

Keywords: Survey: Nainital-Cape – Stars: Am, Ap, roAp, δ Scuti – Photometry: high-speed, differential – variability – pulsations.

1 Introduction

Ground-based photometric surveys can be used for the detection and the study of variability in chemically peculiar (CP) stars. One of them is the Nainital-Cape survey (Ashoka et al. 2000), inititated in 1999 to search for new rapidly oscillating Ap (roAp) stars. At that time, only 3 members of this class of pulsating stars were known in the Northern hemisphere. The results obtained from this large ground-based survey are summarized by Martinez et al. (1999, 2001), Girish et al. (2001), Joshi et al. (2003, 2006, 2009, 2010, 2012a, 2012b, 2014, 2016, 2017), and Balona et al. (2013, 2016).

The roAp stars are a subset of cool Ap stars having abnormal abundances of Si and rare earth elements such as Sr, Cr, Eu. They possess a strong global magnetic field of the order of kiloGauss (Hubrig et al. 2012) that supports the formation of patches of various elements around the magnetic poles (Balona et al. 2013). The roAp stars pulsate in high-overtone ($n \geq 20$), low-degree ($\ell \leq 3$), non-radial p-modes (Shibahashi 1983, Balona

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Optical and UV studies of type Ia supernovae SN 2009ig and SN 2012cg

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ABSTRACT

We present an extensive optical–ultraviolet photometry and analysis of a series of optical spectra of type Ia supernovae SN 2009ig and SN 2012cg. The observations range from −15 to +185 d for SN 2009ig and from −14 to 316 d for SN 2012cg, with respect to maximum light in *B* band. Both SN 2009ig and SN 2012cg exhibit similar properties. They have similar decline rate parameter ($\Delta m_{15}(B)_{\rm true} = 0.92 \pm 0.04$ for SN 2009ig and 0.93 ± 0.06 for SN 2012cg) and *B* band peak absolute magnitude (-19.45 ± 0.40 mag for SN 2009ig and -19.50 ± 0.31 mag for SN 2012cg). Their early spectra show high-velocity features in Si II and Ca II lines. The strong Fe III, Si III, and weak Si II λ5972 line during pre-maximum phase are indicative of hot photosphere. The post-maximum velocity evolution shows a plateau like phase with velocities ∼13 000 km s^{-1} for SN 2009ig and ∼10 000 km s^{-1} for SN 2012cg. Both events show spectral evolution similar to normal SNe Ia and fall in LVG and Core Normal subgroup. Both have smaller strength ratio [$\mathcal{R}$(Si II) = 0.17 for SN 2009ig and 0.20 for SN 2012cg] consistent with smaller $\Delta m_{15}(B)$. Peak bolometric luminosities (log $L_{\rm bol}^{\rm max}$) of these events are estimated as 43.17 ± 0.16 and 43.24 ± 0.11 erg s^{-1} suggesting that 0.60 ± 0.20 M$_\odot$ of ^{56}Ni was synthesized in the explosion of SN 2009ig and 0.72 ± 0.31 M$_\odot$ in SN 2012cg.

Key words: supernovae: general – supernovae: individual: SN 2009ig – supernovae: individual: SN 2012cg – galaxies: individual: NGC 1015 – galaxies: individual: NGC 4424.

1 INTRODUCTION

Type Ia supernovae (SNe) are believed to originate from the thermonuclear disruption of a white dwarf (WD) composed of carbon and oxygen (Hoyle & Fowler 1960). Their post-peak decline of the light curve, measured using the decline rate parameter $\Delta m_{15}(B)$, is found to be correlated with the luminosity of these events, making them standardizable candles for cosmological distance measurements. The observed homogeneity in SNe Ia puts a strong constraint on the progenitor models of these events. There are two competing progenitor models: (i) the single degenerate (SD) model (Whelan & Iben 1973) which involves a single WD accreting material from a non-degenerate star and (ii) the double degenerate (DD) model, which involves the merger of C–O WDs (Iben & Tutukov 1984; Webbink 1984). However, binary configuration, conditions for explosion and burning mechanisms are still under investigation (refer Hillebrandt & Niemeyer 2000; Howell 2011; Maoz, Mannucci & Nelemans 2014, for reviews) and there could be diverse progenitor system/multiple path leading to SNe Ia explosion (see Maeda & Terada 2016, for review).

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An early detection and quick follow-up of these events may provide observational signatures to understand the explosion mechanism through cooling of shock heated ejecta, interaction of ejecta with a companion/circumstellar material (CSM) and mixing of ^{56}Ni in the outer ejecta (refer Kasen 2010; Piro, Chang & Weinberg 2010; Rabinak, Livne & Waxman 2012; Dessart et al. 2014; Levanon, Soker & García-Berro 2015; Piro & Morozova 2016; Levanon & Soker 2017; Noebauer et al. 2017; Maeda et al. 2018, for discussion). Such observational signatures have been observed in very few events. The earliest observation of SN 2011fe provided a tight constrain on the size of progenitor star, giving a direct confirmation that the star exploded was a compact star (Nugent et al. 2011; Bloom et al. 2012). Early UV excess emission in a subluminous type Ia event iPTF 14atg was interpreted as due to ejecta companion collision (Cao et al. 2015). Similarly, early blue bump in the light curves of SN 2017cbv was interpreted as ejecta companion interaction (Hosseinzadeh et al. 2017). Early observations of the type Ia supernova iPTF 16abc were explained as a case of interaction with nearby unbound material and/or strong ejecta mixing (Miller et al. 2018). Interestingly, early excess emission in MUSSES1604D (SN 2016jhr) was red (Jiang et al. 2017) instead of blue, hence there may be at least two distinct early populations (Stritzinger et al. 2018) and care must be taken in the interpretation of these features.

Early spectra of several SNe Ia show additional high velocity absorption features along with the photospheric component, which

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Flexible printed paper electrode with silver nano-ink for electrochemical applications

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ABSTRACT

Development of low-cost paper based disposable electrodes printed with silver nano-ink using desktop inkjet printer is reported in this work. A stable nano-ink was prepared by dissolving 3% silver nanoparticles (AgNPs) capped with polyvinylpyrrolidone (PVP) in ethanol as a dispersing solvent. Highly stable silver nano-ink with surface tension of 21.1 mN/M and viscosity of 2.6 mPa.S was prepared for printing on photo paper that can be used as an electrode for electrochemical analyses. The fabricated paper electrode was exploited as a counter electrode in cyclic voltammetry (CV) analysis of potassium ferricyanide with better stability and reproducibility (relative standard deviation (RSD) 1.6%) for multiple times of analyses (n = 60) and compared with the results of conventional electrodes. Further, the printed paper electrode was demonstrated to be used as a working electrode for analysis of nitrate by CV. The use of paper electrode is found to be simple, rapid, user-friendly and can be applied at the sample source for determination of nitrate from different samples.

1. Introduction

There is always increasing demand for more facile and cost-effective route to prepare the electronic devices that should be flexible, eco-friendly, light weight and disposable. The attention has been drawn in the direction of preparation of flexible printed electronics using metal nanoparticles (NPs) based conductive nano-inks. Recently, different techniques including physical lithography, sputtering, chemical vapor deposition and spin coating have been demonstrated for fabrication of conducting inks on solid surfaces to prepare electronic devices [1,2]. These techniques provide a homogenous and smooth deposition of functional materials on solid surface, but they need controlled temperature and contaminant free environment which are found to be expensive and difficult to maintain. Screen printing is also used for large scale production of electronic devices where mesh is used to fabricate the substrate, which is time consuming and tedious process. To overcome these disadvantages, the improvement of useful and low-cost processing technique is needed to fabricate the conductive materials. There are other alternative simple and low-cost techniques available for fabrication of nanomaterials on solid substrates such as direct writing, roller ball pen, sketching and brush painting [3,4]. The drawbacks of these techniques are formation of non-uniform layer of fabricated materials on solid substrate. Recently, inkjet printing has wide application due to its low cost, rapidity and simplicity in printing the designed digital file. In inkjet printing, the head ejects a very small quantity of ink on to the substrate based on the design of fabrication. Inkjet printing is considered to be an efficient and highly well-designed technique for micro scale patterning of metallic nanomaterial's [5].

Flexible circuit and printed electronic devices are produced by deposition of single or multiple layers of active materials like conductive inks or dielectric inks onto the solid substrates such as plastic, glass, polymers, ceramics, *etc.* [6,7]. The devices made from theses substrates are expensive as well as after the use it is non-biodegradable into the environment. The research and development should always need to decrease the electronic waste as well as it should be biodegradable, flexible and harmless to human beings. Paper substrate is being a better substitute in place of plastics because it is eco-friendly, inexpensive, flexible and sustainable [8]. Paper based devices have been emerging as a recent trend in developing new analytical devices for wide range of applications in the fields such as clinical, food and environmental

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Impact of Body Mass Index and Ag Mental Health of Adolescents Gi

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Abstract

Adolescent girls in India may face poor nutritional status due to low access to hea health symptoms attributed to high stress. Total 72% of infants and 52% of marr Researches indicated that malnutrition during pregnancy causes the child to have retardation and reduce cognitive abilities. The objective of the present study wa of body mass index and age on mental health of adolescent girls. 1000 adol through stratified random sampling technique from different government schoo health was measured by Mental Health Battery. Anthropometric measurement the standard procedure. Multivariate analysis of variance and post Hoch test wer data. Results revealed that adolescent girls significantly differ in emotional sta autonomy, security-insecurity, intelligence and over all mental health with incre showed that adolescent girls with low body mass index differ significantly on o concept dimension of mental health in comparison to adolescent girls with nor from the study that adolescent girls of early years (12-14) must be given environr Stability, Autonomy, Security-Insecurity and Intelligence. Proper nutrition is need and over all adjustment. Findings of the study draws attention to create awarene and nutrition.

Keyword: *Mental health, BMI, Adolescent Girls.*

Introduction

Adolescence is transitional stage of human life cycle with different kind of physiological change. This period is very crucial since these are the formative years in the life of an individual when major physical, psychological and behavioural changes take place [1,2]. Every stage of

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The nutritional status by a variety of factors, incl

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PSYCHOLOGICAL FACTORS AS PREDICTORS OF HYPERGLYCEMIA IN TYPE 2 DIABETES MELLITUS

Mahendra Kumar*
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Raksha Singh*****

ABSTRACT

Diabetes is a closely related with the stress and anxiety, which has importance consequence on public health in developing country. There are limited studies to report the psychological risk factor for progression of hyperglycemia in diabetes patients. Thus the objective of the study was to find out the psychological predictors of hyperglycemia in type 2 diabetes patients (T2DP). The present cross-sectional study was conducted on 228 T2DP of 18–72 year-old men and women. To assess the state of stress, Perceived Stress Scale (PSS) and for anxiety status, State Trait Anxiety Inventory (STAI) were used, while the blood glucose level (BGL) for the assessment of hyperglycemia was done with the help of Glucometer. SPSS 16th version and ADANCO was used to analyze the data. There is significant direct effect of state anxiety and stress on BGL. But when stress was considered as mediating variable, it was found that state anxiety has increased effect on BGL. Stress and state anxiety were significant predictors for the progression of the high blood glucose level (hyperglycemia). According to data, state anxiety and stress can effect on control of blood sugar and negative emotions have detrimental effects on glycemic control. Study suggessst that further research is necessary to determine the effects of psychological intervention beside medical interventions on mood, glycemic control and contisol.

Keywords : Stress, Anxiety, Hyperglycemia, Type 2-Diabetes Mellitus,

Introduction

Type 2 Diabetes Mellitus (DM) is a chronic disease where in blood sugar level is abnormal high in the body. The body needs glucose to fuel metabolic processes, but too much of it in the blood is the condition called hyperglycemia is which is the landmark of DM (Sarafino & Smith, 2012).

Diabetes Mellitus is also reported to be a condition with changes in psychiatric and psychosocial aspects besides being a physical disease, and a diabetic patient faces a range of physical, social and sexual problems (Buzlu, 2002). In the general population, anxiety is the most comon mental health disorders (Kumar & Shrivastava, 2018) and its lead to diabetes (Kumar & Shrivastava, 2017).

Anxiety is displeasing feeling of fear and concern (Davison, 2008) characterized by somatic, emotional, and behavioural component (Seligman et al., 2002). It can be detected by the feelings of tension and worrying thoughts. If the anxiety becomes severe or start to impair one's life functioning, it can be categorized as a disorder or illness (Nutt, Miguel & Davies 2008). There are many types of anxiety disorders including separation anxiety disorder, selective mutism, agoraphobia, social phobia, specific phobia, panic disorder and generalized anxiety disorder (GAD) (APA, 2013). Anxiety is considered as one of the greatest problems of current lifestyle worldwide. Though, each of us have varying tendency to

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Factors of Happiness among Indian Adolescents

Priyamvada Shrivastava, Gayatri Jay Mishra, Mahendra Kumar

Abstract

The main objective of the study was to explore the factor of happiness among the adolescent's students the other objective was to formulate the theoretical structure of the happiness for the adolescent's population of Chhattisgarh India. For these purpose 250 adolescents studying in different schools of Chhattisgarh constituted the sample for the study. The students were asked to give an open-ended answer to a question "what makes them happy" analysis was performed for their responses 28 common responses after analyzing the responses were identified. A hypothetical exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) was computed to find out the factors of happiness among adolescents. The results of the EFA revealed 5 factors of happiness for adolescents. The results of CFA reveal a low correlation between the 5 factors.

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A study of social networking (selfie) dependency as a function of personality and gender

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The objective of this research paper is to study social networking (Selfie) dependency as a function of personality and gender. Social networking is the biggest event of our society. Use of social networking site we can begin socialized All over the world 50 car ore people joint together face book "Social media is an umbrella term that defines the various activities that integrate technology, social interaction, and the construction of words and pictures. Social networking gather information on user's social contacts, construct a large interconnected social network and reveal to user's how they are connected to other network. In 1995, the first social networking is innovation came in which successive years of school children have been able to connect together in a mutually virtualized manner. Social networking is an easy and fast tool to connect with society, like under the e-learning 1420 school have been included in Uttaranchal Many tasks ranging from collaboration within and between organizations. This analysis examines whether social network are structured in a way to allow effective local search. This is the survey research during this paper we describe how personality and gender dependent on social networking site selfie.

Keywords: personality, social media, selfie

Definitions of personality

The most essential psychological aspect of a person's life is personality. It comprises our thoughts, feelings, motives, skills and behaviours. The term of personality has been taken from the Latin word 'persona' 'meaning mask'. Mask is a thing that distinguishes a person from the others. Inner self represent the true personality. Personality is a stable set of tendencies and characteristics that determine those similarities and difference in people's psychological behaviour and intension of connection in time and that may not be easily understood as the individual result of person.

Guliford (1897) opined personality as 'A person unique pattern of traits'.

McCrea (1985) 'Personality traits are construed as basic tendencies that are rooted in biology and that interact with external influence, including culture, in shaping the skills, habits, tastes, and values of the individual'.

McCrea and Costa (1990) opined that personality is a biological trait.

Personality the big five factor (OCEAN) according to Costa and McCrae (1992)

The (NEO-PI-R; Costa & McCrae, 1992) revised NEO Personality Inventory is a questionnaire. It is a measure of 30 traits that define the comprehensive five-factor model of personality. Data from police selection, college student, and Hispanic American samples illustrate the psychometric properties of the instrument. In Vocational counselling, the NEO-PI-R can supplement measures of interest and abilities, especially by calling attention to the client's strengths and weaknesses in adjustment and motivation. Use of the NEO job Profiler, a tool designed occupations, is illustrated in the police selection sample. Together, the NEO-PI-R can help determine the optimal match between person and occupation.

Personality is the set of tendencies which are stable and characteristic that determine those commonalities and difference in people's psychological behaviour (thoughts, feelings, & actions) 'The Big Five' model given by Costa and McCrae (1992) the five dimension basedism. The charact robustness of the personality scale includes openness to experience conscientiousness, extraversion, agreeableness, and neuroticeristic of Big Five who have somewhat dissociated from the lexical origin of the Big Five and in their more recent writings propose that the Big Five are not only descriptive terms, but biologically based 'basic tendencies' (e.g., in McCrae, Costa, Ostendorf, Angleitner, & Hrebickova, 2000).

The definition of the term big five personality OCEAN is:-

Openness to experience: This refers to the measure of breath, depth and variability of the imagination for experiences of a person and push for experiences. The openness to experiences is related to intelligence welcoming to new ideas, educational aptitude, and cultural interest and innovation, and the interest in various sensory and cognitive experiences. Open individuals have wide interest and are liberal and drawn towards novelty. According to Costa and McCrae (1992) the lucky people who fell into this category take the best pictures. They were also the most likely to have photos lacking in colour and displaying more negative emotions. Characteristic of openness to experience person are Imaginative, Insightful, Wide verity of interest, Original, Daring, Preference for verity, Clever, Creative, Curious, Perceptive, Intellectual, and Complex.

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Academic Stress in relation to Personality, Locale and Gender

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Abstract: School education is very important part in an individual's life and is also a turning point in their academic life. Stress is a common factor among school students. Academic stress involves mental distress regarding anticipated academic challenges or failure or even the fear of the possibility of academic failure. A student's life is subjected to different kinds of stressors such as the pressure of academics with a requirement of success, uncertain future and difficulties predict for integration into the system. In the present scenario academic stress is major factor that influence the students' performance as well as their personality. The study investigated academic stress in relation to personality, locale and gender among higher secondary school students. A total of four hundred male and female students participated in this study from Baster district of Chhattisgarh. The sample was selected by using stratified random sampling technique. To assess the personality of the subjects, Eysenck's Maudsley Personality Inventory (MPI) and Academic Stress Scale for Students was used. Obtained data were analyzed using descriptive statistics, t-test, and regression analysis. The results show significant difference between academic stress and gender, academic stress and locale, personality and locale of students. No gender difference was found between the personality of male and female students. Results also indicated that boys experienced more academic stress as compared to girls. Similarly, non-tribal students experienced higher level of academic stress as compared to tribal students. The result of regression analysis showed that personality emerged out as a significant predictor of students' academic stress explaining about 30.5% variation.

Keywords: Academic Stress, Extraversion, Neuroticism, Locale, Gender

Introduction

Stress is a word derived from the Latin word *stringier*, meaning to draw tight, and was used in the seventeenth century to demonstrate hardship and trouble. Stress in any situation that evokes negative thoughts and feelings in a person. The same situation is not stressful for each person and all people do not face the same negative thoughts and feelings. Stress is the body's effect to a variation that demands a physical, mental or emotional adjustment or reaction. Lots of stress has main reason lot of irritation and its forced reach's our goal. Wilks (2008) defined academic stress as the product of a combination of academic related demands that exceed the adaptive resources available to an individual, if they are not well managed (Smith, 2000; Stevenson & Harper, 2006). Academic pressure is a significant cause of stress for many students (Hashim, 2003). Students experience psychological and physical effect to stressors when they perceive excessive or negative stress. Severe stress produces physical compromises and it is not unusual to find students trouble with even loss of

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Adolescent girls in India may face poor nutritional status due to low access to hea health symptoms attributed to high stress. Total 72% of infants and 52% of marr Researches indicated that malnutrition during pregnancy causes the child to have retardation and reduce cognitive abilities. The objective of the present study wa of body mass index and age on mental health of adolescent girls. 1000 adol through stratified random sampling technique from different government schoo health was measured by Mental Health Battery. Anthropometric measurement the standard procedure. Multivariate analysis of variance and post Hoch test wer data. Results revealed that adolescent girls significantly differ in emotional sta autonomy, security-insecurity, intelligence and over all mental health with incre showed that adolescent girls with low body mass index differ significantly on o concept dimension of mental health in comparison to adolescent girls with nor from the study that adolescent girls of early years (12-14) must be given environr Stability, Autonomy, Security-Insecurity and Intelligence. Proper nutrition is need and over all adjustment. Findings of the study draws attention to create awarene and nutrition.

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शिक्षा अधिकार अधिनियम के समक्ष चुनौतियां एवं समाधानः अपवंचित विद्यार्थियों के विशेष सन्दर्भ में

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सारांश

प्रारम्भिक शिक्षा के सर्वव्यापीकरण हेतु शिक्षा अधिकार अधिनियम 2009 एक महत्वपूर्ण ऐतिहासिक कदम है। यह अधिकार शिक्षा हासिल करने को हर बच्चें का अधिकार बनाता है। यह अधिकार सभी सम्बन्धित सरकारों के लिए सुनिश्चित करना बाध्यकारी करता है कि हर बच्चा अनिवार्य एवं मुक्त शिक्षा ग्रहण करें। शिक्षा के अधिकार अधिनियम में वंचित वर्ग के बच्चों के लिए विशेष प्रावधान किये गये है। सभी निजी शिक्षण संस्थानों को अपने यहां 25 फीसदी सीटें कमजोर तबके के बच्चों के लिए रखना अनिवार्य किया गया है। इस संवैधानिक सच के उलट वास्तविकता कुछ और बयां करती है। जहां एक ओर बच्चों का विद्यालय से बाहर होना अधिकार अधिनियम पर प्रश्न चिन्ह लगाता है, वही यह भी प्रश्न उठता है कि शिक्षा अधिकार अधिनियम व्यावहारिकता की कसौटी पर खरा क्यों नही उतर पा रहा है? शिक्षा का अधिकार अधिनियम लागू होने के बाद स्कूलों की संख्या और उसमें दाखिलें में भारी बढ़ोत्तरी हुई है, पर शिक्षा की गुणवत्ता में गिरावट हुई है। वंचित वर्ग के बच्चों की स्कूल छोड़ने की दर लगातार जारी है। अधिनियम में उल्लिखित छात्र–शिक्षक अनुपात, गुणवत्तापूर्ण शिक्षा, बीच में स्कूल छोड़ने की स्थिति, सही ढ़ग से अधिनियम का क्रियान्वयन न हो पाना, समुदाय एवं पंचायती राज की निष्क्रिय भागीदारी आदि शिक्षा अधिकार अधिनियम के सफल होने में चुनौतियां बनी हुई है।

मूल शब्दः शिक्षा अधिकार अधिनियम एवं अपवंचित विद्यार्थी।

प्रस्तावना

शिक्षा किसी भी व्यक्ति, समाज एवं राष्ट्र की प्रगति का आधार है। इसी बात को ध्यान में रखते हुए भारतीय संविधान के निर्माताओं ने संविधान के भाग 4, अनुच्छेद 45 में राज्य को सुझाव दिया है कि वह 6 से 14 वर्ष तक के सभी बच्चों के लिए अनिवार्य एवं निःशुल्क शिक्षा की व्यवस्था करें। 26 जनवरी सन् 1950 को संविधान लागू होने के पश्चात् विभिन्न राज्यों ने अनिवार्य प्राथमिक शिक्षा के लिए अलग–अलग प्रयास किये। चूँकि 42वें संविधान संशोधन 1976 से पूर्व शिक्षा राज्य सूची के अन्तर्गत एक विषय था, इसलिये इस विषय पर कोई राष्ट्रीय सहमति नही बन पायी। सन् 1966 में कोठारी आयोग ने देश के सभी बच्चों को अनिवार्य रूप से स्कूली शिक्षा प्रदान करने की सिफारिश की थी। कोठारी आयोग ने कहा था कि सरकार शिक्षा पर खर्च इस तरह बढ़ाये कि आगामी 20 वर्षों में यानी 1986 तक यह सकल घरेलू उत्पाद (जी0डी0पी0) का 6 प्रतिशत हो जाये। जाहिर है यह लक्ष्य हासिल किया गया होता और बरकरार रखा गया होता तो आज तस्वीर कुछ और होती। इसी तरह 1974 में घोषित बाल नीति, 1986 की नई शिक्षा नीति एवं प्रोग्राम ऑफ एक्सन (1992) के तहत प्रयास किये गये किन्तु हर बात दृढ़ राजनीतिक इच्छा शक्ति की कमी आड़े आती रही।

भारत ने 1992 में संयुक्त राष्ट्र के बाल अधिकार चार्टर पर हस्ताक्षर किए थे। इस चार्टर की धारा 8 में प्राथमिक शिक्षा को अनिवार्य और निःशुल्क बनाने की बात कही गयी है। इस चार्टर के मुताबिक 18 वर्ष से कम आयु के सभी व्यक्तियों को बालक/बालिकाएँ माना गया किन्तु हस्ताक्षर करने के बावजूद भारत में इसे लेकर प्रतिबद्धता नही दिखायी गयी।

आज तक भारतीय शिक्षा का सबसे महत्वपूर्ण कदम माना जायेगा 1993 के उच्चतम न्यायालय के जस्टिस उन्नीकृष्णन का फैसला, जिसमें संविधान के अनुच्छेद 45 में निर्देशित 14 साल की उम्र तक के बच्चों की शिक्षा को मौलिक अधिकार का दर्जा देने की बात की गयी थी। इस फैसले के मुताबिक 6 साल से कम उम्र के बच्चों को सन्तुलित पोषण, स्वास्थ्य, सुरक्षित बचपन और पूर्व प्राथमिक शिक्षा (के0जी0 नर्सरी) का मौलिक अधिकार प्रदान किया गया था। इसी तरह 6 से 14 वर्ष के उम्र के सभी बच्चों को 8 साल की पढ़ाई की प्रारमिभक शिक्षा की व्यवस्था का आदेश था। फैसले में यह भी कहा गया था कि अनुच्छेद 41 के अनुसार शिक्षा का अधिकार 14 साल की उम्र के बाद भी बरकरार रहेगा यानी कक्षा 12 तक की माध्यमिक और उसके बाद तकनीकी एवं प्रोफेशनल शिक्षा भी इसके दायर में आयेगी। फर्क सिर्फ इतना है कि जहाँ 14 वर्ष उम्र तक के बच्चों का शिक्षा के मौलिक अधिकार देने में सरकार को पैसे की कमी का बहाना करने की इजाजत नहीं है, वहीं 14 वर्ष के बाद की शिक्षा का अधिकार राज्य की आर्थिक स्थिति एवं विकास के स्तर को ध्यान में रखते हुए सीमित किया जा सकता है।

उन्नीकृष्णन फैसले के फलस्वरूप ही 86वें संविधान संशोधन 2002 में शिक्षा के अधिकार को मौलिक अधिकार के रूप में जीवन के अधिकार के साथ अनुच्छेद 21 क के रूप में जोड़ा गया। इसके अतिरिक्त शिक्षा का अधिकार कानून जो 1 अप्रैल 2010 से लागू हुआ, उन्नीकृष्णन फैसले का प्रतिफल है।

भारतीय समाज में पिछड़े वर्गो में शामिल अनुसूचित जाति व जनजाति दोनों का शिक्षा क्षेत्र में पिछड़ेपन का मुख्य कारण पहुँच का अभाव है। जहां दलित वर्ग सामाजिक के कारण सदियों से अज्ञानता का शिकार रहा वही जनजाति भौगोलिक अलगाव के कारण।

अपवंचित विद्यार्थी/वंचित समूह का बच्चा

इसका अर्थ है वह बच्चा जो उपयुक्त सरकार द्वारा अधिसूचित किसी समूह जैसे अनुसूचित जाति, अनुसूचित जनजाति, सामाजिक और शैक्षिक रूप से पिछड़ा वर्ग, सांस्कृतिक, आर्थिक, भौगोलिक, भाषाई, लैंगिक या इसी तरह के अन्य किसी कारण के कारण असुविधा है, से संबध रखता है। कमजोर वर्ग के बच्चे से तात्पर्य है बच्चे के अभिभावकों मा माता–पिता की वार्षिक

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Comparative Study of Pre Menstrual Syndrome in Sports Women and Non-Sports Women of different age group

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ABSTRACT:

Participation in sports means regular exercise, involvement in physical activity, is a very important habit which helps in maintaining good health.

The purpose of the study was to observe whether sports women and non sports women differ in Pre Menstrual Syndrome(PMS).

In order to compare PMS in sports women &non sports women of Chhattisgarh total 240 women of different age group (25-45 years) were selected. The subjects were assessed for PMS through a structured questionnaire.

PMS assessed through the questionnaire indicated that the mean value obtained for PMS as a whole was higher for NSW as compared to SW, comparative study showed statistical significant difference. When analyzes sub-variables wise it was noted that the two group differed significantly in physical and behavioural symptoms of PMS ,higher mean values recorded for NSW. Further age group wise analysis showed statistically significant difference in total PMS in all the age groups accept 25-30 yrs.

NSW showed higher mean values in over all PMS problems as well as in sub variables of PMS that is physical, psychological and behavioral symptoms.

KEY WORDS : Pre Menstrual Syndrome, Sports Women and Non-Sports Women.

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Behavioral Intervention with Fine Motor Training for Dysgraphia in School Going Children

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ABSTRACT

Aim: The main objective of this study was to examine the effectiveness of Behavioral Intervention with fine motor training on behavioral problems and learning disabilities in children with writing difficulties (dysgraphia).

Materials and Methods: Those school going children who were average IQ, low academic performance and scored less than 50 on diagnostic test of learning disability (DTLD) and less than 5 on Eye-hand Coordination (EHC) subtest of DTLD were identified as subjects with writing difficulties. Subjects were also rated by teachers on behavioural problem checklist in pre-post condition. Seventy children with dysgraphia taken for intervention from the age group of 8-11 years (out of these 14 were dropouts). The quasi-experimental design was used. Hence, 28 subjects were part of the experimental group and the rest of the subjects were included in the placebo group. Three-month intervention (behavioural intervention with fine motor training) with 2 sessions per week was given to the experimental group through group and individual sessions. Placebo group were only involved in daily routine activities. After the intervention, all measurements were again administered. SPSS 16 V. was used for statistical analysis.

Results: The results in eye-hand coordination (Wilcoxon W=28.000;Z=-4.059;p=.000) and diagnostic test of learning disability total score (F=4.656, p=.035) show a significant increase on post-intervention for the experimental group. The results in behavioural problems show a significant decrease in post-intervention for the experimental group (F=40.179; p=.000). Conclusions: Behavioral intervention with activity-based fine motor training to be useful in the classroom. The research empirically proves that activity had a positive effect in enhancing the EHC and overall psychological health with reducing behavioural problems in Children with writing difficulties.

Key Words: Learning disability, Intelligence, Behavioral Problem, Behavioral Intervention, Fine Motor Training

INTRODUCTION

Writing difficulties or dysgraphia is a type of learning disability that frequently interferes with the student's ability to form letters and words when writing. Dysgraphia can affect writing ability and fine motor skills, it can produce illegible writing, misspell words, inaccurately copy words and letters, and write in incoherent sentences. In a survey, more than 1,83,000 children below 14 cannot read and write. Total 37 % children studying in government schools in the age group of 7 to 10 years cannot read simple words and 52 % cannot even recognize numbers[1]. Students with learning disabilities may suffer from emotional problems and behavioural problem[2,3] and associated with psychological co morbidities[4]. Most of the students withdraw from social interaction and involved in drugs or alcohol abused for relief from feelings of low self-worth and approximately 35% of students with learning disorders, drop out from High School[5]. Dyslexic students are highly thinking about to attempt suicide compared to other young people[6]. Youth suffer from poor reading ability were more possibility to suicide attempts or experience suicidal thought and high risk on and more probability to drop out of school than youth with typical reading[7].

The researcher observed in children who were developmentally delayed, a common thread-their cognitive development as well as their fine motor development. Students struggling have poorly developed fine motor skills like poor handwriting, poor cutting and colouring skills, problem copying from the board, low skills in visual-perception, complexity with puzzles and mazes, trouble identifying letters and numerals, as well as poor ability in reading and writing. A student with

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पटियाला हाउस नई दिल्ली पृष्ठ सं० ०१

१२. ड़ॉ हरीश कुमार (२०००) युगपुरूष बाबू जगजीवनराम, प्रकाशन पटना विहार पृष्ठ सं० २७

१३ ड़ॉ. नवीन गिडियान, एवं ड़ॉ. वन्दना गुप्ता (२००९) राष्ट्रीय आन्दोलन और क्षेत्रीय भाषावाद, प्रकाशन ओल्ड पलासिया इन्दौर पृष्ठ सं० ५५

१४ नायक नारायण ज्ञानोवा (२०१०) भारत में राष्ट्रीय चेतना का पादुर्भाव, प्रकाशन जयपुर राज्यस्थान पृष्ठ सं० १२०

१५.डॉ. अचला सोनकर (२०१०) गॉधी जी के आर्थिक विचार और वर्तमान भारत में उनकी उपयागिता, प्रकाशन चॉदपुर बिजनौर उ.प्र पृष्ठ सं० ६५

१६. मोहम्मद जीमल अख्तर (१९९९) आयरन लेडी मायावती, प्रकाशन नई दिल्ली पृष्ठ सं० ०१–२.

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छात्राध्यापक–छात्राध्यापिकाओं की व्यावसायिक अभिवृत्ति एवं स्व–बोध के मध्य सम्बन्ध का अध्ययन

अमितेश कुमार सिंह
असिस्टेंट प्रोफेसर, अध्यापक शिक्षा संस्थान,
पं. रविशंकर शुक्ल विश्वविद्यालय रायपुर (छ.ग.)

सारांश

आज के तकनीकी युग में व्यवसाय की समस्या एक ज्वलन्त मुद्दा है। व्यक्ति यह निर्धारित नहीं कर पाता कि उसे किस प्रकार के व्यवसाय हेतु आगे बढ़ना चाहिए। व्यक्ति का स्व–बोध यह निर्णय नही ले पाता है कि व्यक्ति को किस व्यवसाय की ओर अग्रसर होना चाहिए। व्यक्ति की व्यावसायिक अभिवृत्ति उसके स्व–बोध पर विशेष रूप से निर्भर करती है। प्रस्तुत अध्ययन में छात्राध्यापक एवं छात्राध्यापिकाओं के संदर्भ में व्यावसायिक अभिवृत्ति एवं स्व–बोध के मध्य कोई सह–सम्बन्ध नहीं पाया गया।

शब्द कुन्जी– व्यावसायिक अभिवृत्ति एवं स्व–बोध।

प्रस्तावना

मानवीय जीवन के विभिन्न लक्ष्यों को प्राप्त करने में शिक्षा एक महत्वपूर्ण साधन है। जीवन के लक्ष्यों में विभिन्नता के कारण ही शिक्षा के लक्ष्यों में भिन्नता आती है। आदर्शवादी, यथार्थवादी, प्रकृतिवादी, प्रयोजनवादी तथा अनेक विचारधाराओं का विकास विचार भिन्नता के कारण ही हुआ है। इस संसार में मानव प्राणी अपनी सुरक्षा एवं सुस्थिति के लिए संघर्ष करता है। सभी प्राणियों को जन्म लेने के बाद से ही

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(UGC Care Journal)

Psychotherapeutic Intervention For Anger Management In Women Prisoners: A Single Group Repeated Measures Study With Follow-Up

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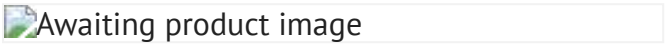
ABSTRACT

Aim: *To evaluate the follow-up effectiveness of CBT for Anger Management in Women Prisoners The purpose of this study was to determine whether this CBT would achieve early benefits in health-related outcomes and whether these improvements would be maintained for 3 months follow-up.* ***Methodology:*** *The subjects of the present research were 23 women prisoners through screening tests were found to be high on anger disorder scale were selected who have committed differed types of crime i.e. Murder, Attempt to Murder, Kidnapping, Drug Supply, and Naxalites were from Central Jail Raipur, Chhattisgarh in India. To examine the problem pre and post-Intervention design with a control group were taken. The Intervention group received twelve weeks of Cognitive Behavioral Therapy. To examine the problem baseline, post and follow-up experimental design opted. The group was received twelve weeks of Cognitive Behavioral Therapy. Who have completed baseline to follow-up their data were analyzed implying GLM Repeated measure analysis of (ANOVA).* ***Results:*** *There were significant improvement in sub six domain of AADS and Participants in the program recorded significant improvements in Impulsiveness Neurological Domain, Behavioural Domain, and Physical/Arousal Domain post-intervention, which were maintained to 3 months follow up.* ***Conclusion:*** *effective role of anger management programmed trough therapeutic intervention in women prisoners.*

Keywords: *Anger Disorder (AD), Adult Anger Disorder Scale (AADS), Cognitive Behavioural Therapy (CBT), Women Prisoners, General Linear Model (GLM).*

INTRODUCTION

Anger is a natural and general human emotion, exceeds routine anger a daily experience and encounters in a number of interpersonal, family, social and occupational situations [2,18]. Anger disorder is known as Intermittent explosive disorder falls in the category of Impulse to Control Disorders, failure to control impulsive Behavioural, Result showed that in serious assaults, property destruction, or in the form of repeated verbal aggression in the form of angry tantrums or tirades. Another person in these behaviors includes threatening or causing the injury and taking a break purposeful object or damage. [17], Intermittent explosive disorder is one of several impulse control disorders characterized by problems controlling emotions and behaviors and results in behavior that violate social norms and the rights of others [9], Characterized by violent rages and destruction of property, persons with IED can cause self to injury and harm others [14]. A person who can be appeared if they have three aggressive outbursts that result in damage to property or physical assault that involves injury within a 12 to month period it diagnosed with IED. In general, outbursts last for less than 30 minutes and are impulsive, not premeditated by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition [1]. Impulsive, repeated violent behavior or angry verbal wrath, is the inclusion of aggressive, sudden episodes, which reaction is out of proportion to



A study of ego virtue hope as a function of locale, culture and gender among college students of Raipur district

~~₹ 202.00~~ **₹ 200.00**

Pages: 1018-1020
Neeti Singh and Meeta Jha (Department of Psychology, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh)

The objective of the study to see the status of ego virtue hope as a function of locale ,culture and gender among college students of Raipur. The sample was selected on stratified incidental basis. It consisted of 400 students; male (100) and female (100) student of tribal culture and male (100) and female (100) students of non-tribal culture (in each group 50 rural 50 urban students respectively). In this present study 2x2x2 factorial design has been used. In this design students divided into two groups of culture tribal and non-tribal culture. Ego virtue hope is dependent variable and culture tribal and non-tribal are independent variable.

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Description

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शिक्षक शिक्षा का निजीकरण एवं व्यवसायीकरण : समीक्षात्मक अध्ययन

अमितेश कुमार सिंह

Abstract

वर्तमान समय में शिक्षक शिक्षा अन्य व्यावसायिक शिक्षा की तरह महंगी एंव निजीकरण की ओर अग्रसर हैं। शिक्षक शिक्षा का निजीकरण अवने आप में अनेक सवाल पैदा कर रही हैं जो शिक्षक शिक्षा के लिए लाभ से ज्यादा हानिकारक साबित हो रही हैं। व्यवसायीकरण ने शिक्षक शिक्षा को बाजार के हवाले कर मुनाफा कमाने का व्यवसाय बन चुका हैं। कुकुरमुत्तो की तरह उग चुके शिक्षक शिक्षा संस्थान निजीकरण एंव व्यवसायीकरण के प्रवाह में अग्रसर हैं जो शिक्षक शिक्षा की गुणवत्ता एंव सार्थकता को प्रभावित कर रहे हैं।

संकेत शब्द- शिक्षक शिक्षा, शिक्षा का निजीकरण, गुणवत्ता एवं शैक्षिक व्यवसायीकरण।

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Socio-Cultural Aspects of Tibetan Refugees with Special Reference to the Settlement of Mainpat, Chhattisgarh

* Sanjiv Kumar Lavania
** L. S. Gajpal

Abstract- This research study is an academic attempt as a part of social sciences' curriculum to understand present socio-cultural nature and practices of Tibetan-refugees by studying this Mainpat settlement in Chhattisgarh. It is an outcome of well organized efforts to draw the information from the refugees restricted to this settlement. This paper talks about type of families found, togetherness and cohesiveness among people, formal and informal set-up in society, practices of rituals, inclusion of modernity in their life style, their perceptions , their beliefs and significance of their religion in their lives and their assimilation with Indian culture. Researchers want to try to explore different dimensions of socio-cultural regime of Tibetan refugees in this settlement. It is not an attempt to highlight their own culture whereas the degree of their incitement to other cultures, especially the culture of host nation and their attachment to the nationality of host nation. There is an assessment of their different kinds of perceptions allied to different spheres of their socio-cultural life.

Key Words- Socio-cultural nature, togetherness and cohesiveness, inclusion of modernity, assimilation with Indian culture, the degree of their incitement.

Introduction: Tibetan people as refugees are living in India for last 60 years, during this period, they have come up with their three generations and availing every moment of their life. Now, they are quite well settled and they have good enough resources for survival and they are receiving almost same treatment in India as other Indian citizens. As refugees, they are found more organized and united and initially when they came to India, they were putting their efforts only for survival but now because of their hard working nature, they are enough competent and availing fair life and they have their acceptability not only in India but also throughout the world as Tibetan refugees with Indian Label. Here, it does not seem to mention the conditions in which

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ग्रामीण महिलाओं के आर्थिक विकास में बिहान योजना की भूमिका

(धमतरी विकासखण्ड के विशेष संदर्भ में)

* कामिन निर्मलकर
**एन. कुजूर

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भारत गांवो के देश है जहां के 79 प्रतिशत आबादी गांवों में निवास करती है। इस बड़ी आबादी का आजीविका का प्रमुख साधन कृषि अर्थव्यवस्था पर निर्भर रहा है। इनमें विशेषकर महिलाओं के प्रत्यक्ष रोजगार की चर्चा करे तो यहां महिलायें कृषि कार्य करती तो है किन्तु इन्हें कृषक की दर्जा भी प्राप्त नहीं रहा है। स्वतंत्र भारत में इन आधी आबादी को रोजगार एवं इन्हें आर्थिक रूप से समक्ष बनाना किसी चुनौति से कम नहीं रहा है। देश की यह आबादी अधिकांश आबादी गरीबी रेखा से नीचे आजीविका करता रहा है। ऐसे में इस आबादी को आर्थिक रूप से संपन्न किए बगैर देश को विकास को गति प्रदान करना संभव नहीं होगा। परिणाम स्वरूप भारत सरकार द्वारा ग्रामीण महिलाओं के आर्थिक स्वालंबन बानने हेतु समय–समय पर कई योजनाओं का क्रियान्वयन किया गया, इसी क्रम में राष्ट्रीय ग्रामीण आजीविका मिशन (एन.आर.एल.एम.) 2011 लागू किया गया है। योजना में ग्रामीण महिलाओं को रोजगार से जोड़कर आर्थिक सशक्तिकरण करने का प्रयास है। प्रस्तुत अध्ययन में ध तरी जिला के महिलाओं के आर्थिक विकास में बिहान योजना की भूमिका को ज्ञात करने का प्रयास किया गया है।

Key word : ग्रामीण गरीबी, आर्थिक सशक्तिकरण, जीवन स्तर में परिवर्तन।

प्रस्तावना :

भारतीय महिलाओं की सामाजिक–आर्थिक स्थिति प्राचीन काल से कमजोर रही है। सामान्यतः महिलाओं के आर्थिक स्थिति के संबंध में जब भी बहस होती है तो इनके इतिहास की चर्चा अवश्य की जाती है। प्राचीन काल से ही भारतीय महिलाओं को चार दिवारी के अन्दर रखा जाता रहा है तथा सामाजिक गतिविधियों से उन्हें दूर ही रखा जाता था। ग्रामीण महिलाओं की बात करें तो गरीब, कमजोर और निम्न जाति की महिलाओं की स्थिति और भी अधिक खराब थी । स्वतंत्रता प्राप्ति के दौरन देश के समक्ष कई समस्याएं विद्यमान थी इसमें महिलाओं से जुड़ी समस्यायें जैसे मातृ मृत्यु दर, शिशु मृत्यु दर, बेरोजगारी अशिक्षा, पुरूष समाज पर निर्भरता आदि कोई ज्वलंत समस्यायें थी, इन्ही समस्याओं को ध्यान में रखकर आजाद भारत में पंचवर्षीय योजनाओं को क्रियान्वय किया गया जैसे– सामुदायिक विकास योजना 1951, औद्योगिक केन्द्रों को विकास (दुर्गापुर, राउरकेला एवं भिलाई) 1956, नेहरू युवा केन्द्र 1972, समेकित बाल विकास सेवा परियोजना 1975, प्रधानमंत्री रोजगार योजना 1993, स्वर्ण जयंती ग्राम स्वरोजगार योजना 1999, प्रधानमंत्री ग्राम सड़क योजना 2000 एवं मनरेगा 2005

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स्वसहायता समूह वृद्धजनों के आर्थिक स्वालंबन का प्रवेश द्वार

डॉ. एल. एस. गजपाल*
डॉ. टी. एस. सोनवानी**

शोध सारांश

प्रस्तुत शोध आलेख विश्वविद्यालय अनुदाय आयोग नई दिल्ली द्वारा स्वीकृत लघु परियोजना के परिणाम पर आधारित है। इस परियोजना के माध्यम से छत्तीसगढ़ राज्य के उत्तरी क्षेत्र के जनजातीय बाहुल्य जिलो मे स्वर्ण जयंती ग्राम स्वरोजगार कार्यक्रम की स्थिति का मूल्यांकन करना था। जिसमे छत्तीसगढ़ राज्य के उत्तरी क्षेत्र के तीन जनजातीय बाहुल्य जिलों सरगुजा, जशपुर तथा रायगढ़ के 06 विकासखण्डों के 18 स्वसहायता समूह के अध्ययन पर आधारित है। जनजातीय क्षेत्रों मे इस योजना की स्थिति, गरीबी उन्मूलन में योगदान, सामाजिक जागरूकता की स्थिति का समग्र मूल्यांकन किया गया है। विश्वविद्यालय अनुदान द्वारा स्वीकृत लघु शोध परियोजना के दौरान उन अनुभवजन्य तथ्यों पर आधारित है जिसमें यह देखा गया कि कुछ स्वसहायता समूह में वृद्धजन सदस्य के रूप में नहीं वरन परिवार के वयस्क सदस्य की अनुपस्थिति में उनकी जगह कार्य कर रहे थे। ऐसे वृद्धजनों के अध्ययन में यह पाया गया कि अप्रत्यक्ष रूप से स्वसहायता समूह से जुड़ने से उन्हें पहले घर में अकेलापरन महसूस होता था वह अब नहीं होता हैं। समूह द्वारा चलाये जा रहे गृह उद्योग संबंधी कार्यों में दिनभर लगे रहते हैं। साथ ही परिवार के जिन सदस्यों पर वे आश्रित हैं उनकी नजर में भी सम्मान बढ़ा है, क्योंकि वे वयस्क सदस्यों के कार्य कर रहे हैं। इस विशय में समूह में संलग्न वृद्ध सदस्यों का यह मानना था, कि यदि पूरे गांव के वृद्ध महिला व पुरूश जो कि शारीरिक रूप से कुद कार्य करने की स्थिति में हैं उन्हें स्वसहायता समूह के माध्यम से विभिन्न आर्थिक गतिविधियों में संलग्न कर दिया जाए तो उनकी कुछ समस्याएं जैसे अकेलापन, दैनिक जरूरतों की पूर्ति, छोटी–मोटी शरीरिक परेशानियां स्वयं दूर हो जाएगी क्योंकि वृद्धावस्था में अनेक अवसरों पर यह होता है, कि परिवार में छोटी–छोटी बात को लेकर होने वाले तनाव अनेक समस्याओं को जन्म देती है, ऐसी स्थिति में यदि वे समूह में रहकर थोड़ा बहुंत भी योगदान कर पायेंगे तो इससे वे स्वयं की कुछ आर्थिक जरूरतों को तो पूरा कर पाएंगे ही साथ परिवार पर निर्भरता भी कम होगी।

Keywords : वृद्ध, स्वसहायता समूह, आर्थिक स्वालंबन, आर्थिक

प्रस्तावना :

भारत की जनगणना 2011 के आंकड़ों के अनुसार कुल वृद्ध जनों मे लगभग 75 प्रतिशत वृद्धजन ग्रामीण समुदाय में रहते हैं जिसमें 48 प्रतिशत महिलाएं है अर्थात दो तिर्हा वृद्धजन महिलाएं है और उसमें भी 55 प्रतिशत विधवा है। कुल वृद्धजनों में 73 प्रतिशत निरक्षर होने के साथ–साथ शारीरिक श्रम करके मजदूरी के द्वारा जीवकोपार्जन करते हैं स्पष्ट है कि इन वृद्धजनों की आर्थिक स्थिति संतोषजनक नहीं कही जा सकती है। क्योंकि आंकड़े बताते है कि 90 : वृद्ध जो कार्य करने लायक स्थिति में है वे असंगठित क्षेत्र में ही संलग्न हैं।

स्पष्ट है कि जब हम वृद्ध जनों के समस्या और सशक्तीकरण की बात करें तो यह आवश्यक रूप से ध्यान रखे कि वह ग्रामीण वृद्धजनों की स्थिति से परे न हो क्योंकि ज्यादातर बाते वैश्विक परिदृश्य में नगरीय जीवन शैली में जीवन यापन करने वाले वृद्धजनों पर केन्द्रित हेाता है दूसरी महत्वपूर्ण बात यह भी कि वृद्धजनों में बहुलता महिला वृद्ध व विधवाओं की है जिन्हे परंपरागत ग्रामीण समाज में सम्मान जनक दृष्टि से नही देखा जाता है। ऐसी स्थिति में वृद्धजनों के लिए किए जा सकने वाले तमाम प्रयत्नों में इन दो महत्वपूर्ण बिंदुओं पर विचार किया जाना आवश्यक है ।

विभिन्न शोध अध्ययन के निष्कर्ष यह बताता है कि अधिकांश वृद्ध आर्थिक समस्या का सामना करते हैं। वे अपनी छोटी–छोटी दैनिक जरूरतों तक को पूरा करने के लिए पारिवारिक सदस्यो पर निर्भर रहते हैं ऐसी स्थिति में यदि उन्हे उन चीजों की आपूर्ति नहीं की जाती है तो उन्हे मानसिक आघात पहुंचता है। स्पष्ट है कि यदि हम उनकी आर्थिक समस्या का समाधान बेहतर तरीके से बरें तो मनोवैज्ञानिक समस्या स्वमेव हल हो जाएगी और यदि वृद्धजन मानसिक रूप से स्वस्थ है तो

*सह प्राध्यापक – समाजशास्त्र एवं सामाजकार्य अध्ययनशाला, पं.रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग)
**सहायक प्राध्यापक – शासकीय नवीन महाविद्यालय गोडरापदर, गारियाबंद (छ.ग.)

6.4.2025
Head
S.o.S. in Sociology & Social Work.
Pt. R.S.U., Raipur (C.G.)

बस्ती में सामाजिक एवं भौतिक परिवेश का महिलाओं पर प्रभाव (बिलासपुर नगर के विशेष संदर्भ में

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ABSTRACT:

अध्ययन हेतु बिलासपुर नगर 48 वार्ड में विभक्त है अध्ययन हेतु अध्ययन क्षेत्र को 4 जोन उत्तर, दक्षिण, पूर्व, पष्चिम में विभक्त कर प्रत्येक जोन के कुल परिवारों 1244 में से 20 प्रतिषत परिवार का चुनाव उत्तरदाताओं के रूप में दैवनिदर्षन की लाटरी प्रविधि के माध्यम से किया गया है। अध्ययन हेतु कुल 250 परिवार का चयन किया गया हैं। अध्ययन हेतु तथ्यों का संकलन साक्षात्कार अनुसूची उपकरण के माध्यम से किया गया है । अध्ययन से यह ज्ञात हुआ हैं कि नगर के अधिकांश एवं असामाजिक प्रवृत्ति के लोग प्रायः गंदी बस्तीयों में निवास करते हैं गंदे वातावरण में निवास करने के कारण लोगों की मनोवृत्ति अपराधी बन जाते हैं उनका नैतिक पतन हो जाता है । बालअपराध, यौनअपराध, चोरी, नशाखोरी की इन क्षेत्रों में अधिकता पाई जाती है।

KEYWORDS: गंदी बस्ती नशीले पदार्थ, सेवन का स्वरूप, सेवन की आदत के लिये जिम्मेदार, महिलाओं द्वारा नशापान,

प्रस्तावना

विभिन्न शोध अध्ययनो एवं अन्तराष्ट्रीय स्तर पर किए गए एक सर्वेक्षण से यह तथ्य उभरकर सामने आया है, कि गंदी बस्ती के सामाजिक पर्यावरण तथा भौतिक परिवेष का नकरात्मक प्रभाव महिलाओं पर पडता हैं। अन्तराष्ट्रीय रिर्पोट के अनुसार भारत मे पचास हजार से ज्यादा महिलाएं गदी बस्ती के परिवेष के चलते नषे के आदि बन गई है। जो कि धीरे धीरे बढते जा रहे हैं और हमारे समक्ष एक यक्ष प्रष्न बनकर खडा है।

गंदी बस्ति मे विभिन्न सामाजिक आयोजन एवं उत्सवके अवसर पर पुरूष के साथ ही साथ महिलाआं में भी नषापान की प्रवृत्ति बढती जा रही है निष्कर्ष हमें विभिन्न रूप से देखने को मिलते हैनषे में विभिन्न गांजा, अफीम, भांगगोली, तथा मदिरा पान मुख्य रूप से लिया जाता है प्रभाव की चर्चा करे तो परिवारिक वाद विवाद, मारपीट, घरेलु हिंसा जैसी घटनाएं आए दिन इन क्षेत्रो में देखने को मिलती हैं।

छत्तीसगढ राज्य के प्रमुख शहरो के गंदी बस्तियों में उपरोक्त गतिविधियॉ तेजी से बढ रही हैं ऐसे स्थिति में इस विषय पर गहन शोध अध्ययन नितांत आवष्यक

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भा में बांग्लादेशी शरणार्थियों से जुड़े प्रमुख मुद्दो का एक अध्ययन (छत्तीसगढ़ राज्य के कांकेर जिले के विषेष संदर्भ में)

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अध्ययन मुख्य रूप से इस बिन्दु पर केन्द्रित रहा है कि बांग्लादेश में हुए साम्प्रदायिक दंगे और 1971 में बांग्लादेश के विभाजन के समय जिन शरणार्थीयों को भारत सरकार के द्वारा छत्तीसगढ़ राज्य में शरणार्थी शिविरों में बसाया गया ये शरणार्थी देश तथा राज्य की आंतरिक सुरक्षा व्यवस्था, स्थानीय समुदाय व जनज़ाति संस्कृति की दृष्टि से किसी भी प्रकार से समस्यामूलक हो नहीं है? इन्हीं तथ्यों का परीक्षण शोध अध्ययन के माध्यम से किया गया है। शोध को व्यवस्थित रूप देने के लिए बांग्लादेशी शरणार्थियों के गैर श्विरार्थी शरणार्थी जो कि कांकेर जिले के पखांजूर में निवासरत हैं उन्हें लिया गया है।

अवांछित प्रवास सम्पूर्ण विश्व की ज्वलंत समस्याओं में से एक है। जब कभी भी व्यक्ति धार्मिक, राजनीतिक बाधाओं, युद्ध, आतंकवादी गतिविधियों, साम्प्रदायिक संघर्षों तथा निर्भयता के चलते अपने जीवन को जोखिम में डालकर बेहतर जीवन के लिए प्रवास करता है तो ऐसी गतिविधियाँ लोगों को पड़ोसी देशों की ओर ले जाकर शरणार्थियों के रूप में खड़ा कर देती है, तब यह प्रवास कई मायनों में समस्या-मूलक होता है।

युगों से मानव द्वारा पलायन किये जाते रहे हैं। इस प्रकार बड़ी संख्या में लोगों का अंतर्राष्ट्रीय पलायन धार्मिक, राजनीतिक तथा जातियता के आधार पर हुआ।

साधारणतः अंतर्राष्ट्रीय पलायन (प्रवास) निर्धन देषों से धनी देशों की ओर हुआ है। इस सदी का सबसे प्रमुख लोक-प्रवास जो दक्षिण-एशिया के भारतीय उपमहाद्वीप में हुआ, जब भारतीय गणराज्य का विभाजन सन् 1947 में एक पृथक राष्ट्र पाकिस्तान के रूप में हुआ, जिसके चलते अनुमानतः 7 मिलियन लोग भारत से पाकिस्तान और लगभग 8 मिलियन लोग पाकिस्तान से भारत पलायन करके एक-दूसरे देशों में गये, जो आज भी दोनों देशों के लिए एक प्रमुख समस्या बना हुआ है।1
अदस्तावेजित पलायन का मुद्दा आज विश्व की ज्वलंत समस्या है। जब भी मानवीय मतभेद, स्थानीय विवाद या गरीबी का प्रश्न उठता हैं तो लोग जीवन की बाजी लगाकर पारिवारिक बंधनों, आश्रय, भाषा, संस्कृति एवं बेहतर जिंदगी की खोज करती है। सन् 1947 में बंगाल का विभाजन विश्व इतिहासों सबसे विभाजन था। जहाँ पर के सोने का कारण पश्चिमी बंगाल की सीमा के अन्दर था

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विशेष पिछड़ी जनजाति बैगा मे शिक्षा की समस्या का एक अध्ययन: छत्तीसगढ़ राज्य के कबीरधाम जिले के विशेष सदंर्भ में

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ABSTRACT:
प्रस्तूत शोध अध्ययन छत्तीसगढ़ राज्य के विषेष पिछड़ी जनजाति बैगा मे शिक्षा की समस्या पर आधारित है। अध्ययन कबीरधाम जिले के बोड़ला विकासखण्ड के 7 बैगा बाहुल्य ग्रामो पर केन्द्रित है। अध्ययन मे दैव निर्दषन के माध्यम से चयनित 277 बैगा परिवारो मे षिक्षा की समस्या को ज्ञात करने का प्रयास किया गया है। अध्ययन मे तथ्यो का संकलन हेतू साक्षात्कार अनुसूची उपकरण तथा मुख्य रूप से केन्दि*त साक्षात्कार तथा समूह साक्षात्कार प्रविधि के माध्यम से किया गया है। षोध अध्ययन से प्राप्त तथ्य यह दर्षाता है कि केन्द्र व राज्य सरकार के तमाम प्रयत्नों के बाद भी बैगा जनजाति मे शिक्षा की स्थिति चिंताजनक है । अध्ययन क्षेत्र मे षिक्षा से जुड़ी अनेक कार्यक्रमो के लागु होन के बाद भी बैगा लोगो मे व्याप्त उदासीनता तथा षिक्षण संस्थाओ मे मूलभूत सुविधाओं की कमी के कारण शैक्षणिक विकास की गति बेहद धीमी है।

Keywords:

- बैगा जनजाति
- शिक्षा समस्या
- जनसंख्या मे कमी

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RESEARCH ARTICLE

A Brief Introduction of Kandra Tribe in the Urban Environment (With Special Reference to Raipur the Capital of Chhattisgarh)

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ABSTRACT:
Many types of tribes are found in Chhattisgarh, In which Gond tribe also knows very important who has a lot of derivatives. A major tribe of Gond, kandra tribe has been studied through this research paper, whose main task or identity is to do bamboo work, who can also be called the craftsman of bamboo. Religious rituals of the tribe and their brief introduction are presented in this research paper.

KEYWORDS: General introduction, bali pratha, Religious activities, Main business, Culture, dev work.

INTRODUCTION:

The life of most of India's tribes was completely isolated from other communities for a long time. Tribal communities had their own distinct culture due to inhabiting inaccessible and secluded places. Today the change in the life of tribes can be understood by dividing into two main parts, the first category of changes is external change, which is the result of constitutional provisions and tribal development program. The second category of change can be called internal change. This change has arisen as a result of the process of cultural assimilation and assimilation in the tribal community itself, as tribes grew in contact with other groups and social and political consciousness was generated in them, they started expressing their dissatisfaction through various types of movements.

The Kandra tribe has been selected for study, which is a sub-tribe of Gond, which is found entirely in Chhattisgarh, in the Kandra tribe also, like the Gond tribe, there are same rituals, but the work of making various types of items from bamboo is done only by the people of the Kandra tribe, they can also be called craftsmen of bamboo.

STUDY AREA:

Chhattisgarh was formed on 1 November 2000, after which the Kandra tribe grew rapidly. The notion of the origin of the Kandra is prevalent that in the Mahabharata period, the main part of the mahabharat, Sant Supalbhagat had laid two eggs in India, one of which fell in the field which gave rise to the farmers and the other fell into the bamboo tree, which is known as the Kandra. Since they used to make Kanwar from bamboo trees, the name of Kanwar changed to become the Kandra, Such is the perception of kandra tribal community. If we talk about 100 years ago, their standard of living was very simple, they (male) used to wear only dhoti and women only wear saree in the dress, Consumed meat and wine in the end meal.

Despite living in an urban environment, they have not let loose their culture, meat is essentially consumed in every

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RESEARCH ARTICLE

Development, Displacement and Rehabilitation in Tribal Communities (Special Reference to Various Industries and Kelo of Raigarh District, Chhattisgarh)

Nister Kujur[1] and Shailendra Kumar[2]*

Received: 19-11-2018; Accepted: 16-2-2019

ABSTRACT

In present era, development and displacement like both side of coin. Major development projects like industries, dams, railways and roads, army camps required large area of land. In addition, other side Industries required natural resources and labor as industry works. Forest areas are best for this kind of projects. Forest has land, natural resources and labor (displaced/affected tribal peoples). Above condition, attract government or non-government attention in forest area that is the residential area of tribal communities such from long time. The present study conduct of Raigarh district of Chhattisgarh. Raigarh district of Chhattisgarh, known as an industrial district because the Raigarh district has fourteen major industries including Jindal and one big dam called kelo. Raigarh district of Chhattisgarh has 14 large and small industries of iron, coal, etc. These industries make huge displacement in these areas and tribal groups total 61 villages, and 1406 families are affected by displacement. Total of 1044.436-acre land captures by industrialist for industries and flats of an employee. This study conduct in 31 affected tribal families of 31 villages. This study shows affected families are leaving their traditional agricultural works because they can't understand the nature of new land structure and because of this, they are in economic trouble. In study area, there are 67.7% family's primary occupations was agriculture and after displacement, there are only 9.7% families engage in agricultural work. There are some other problems also finding out in this study, which are related to fundamental needs. According to affected families, new residences have many fundamental problems, which are provided by government and industrialists. There are no electricity, no regular drinking water resources, satisfied roads and transports are no available.

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Keywords: Development, Displacement, Rehabilitation, Problems of rehabilitation, Tribal groups

INTRODUCTION

Every country, every society want to increase quality of life so development is a need of the present era. Every human society wants to more and more facilities for him, and government is busy with practices about this. But all the practices which are related to development cannot only give the positive results but also this type of practices originating some negative impacts as well. Facilities need material cultural and material cultural/production and production wanted industries. So, we can say industries are an indicator of development. In present era, all developed and developing countries in competition for became a developed country. Growths of humane benefices are important indicators for development for any country. In other words, we can say growth of human benefices like growth for the production of material

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ABSTRACT

In present era, development and displacement like both side of coin. Major development projects like industries, dams, railways and roads, army camps required large area of land. In addition, other side Industries required natural resources and labor as industry works. Forest areas are best for this kind of projects. Forest has land, natural resources and labor (displaced/affected tribal peoples). Above condition, attract government or non-government attention in forest area that is the residential area of tribal communities such from long time. The present study conduct of Raigarh district of Chhattisgarh. Raigarh district of Chhattisgarh, known as an industrial district because the Raigarh district has fourteen major industries including Jindal and one big dam called kelo. Raigarh district of Chhattisgarh has 14 large and small industries of iron, coal, etc. These industries make huge displacement in these areas and tribal groups total 61 villages, and 1406 families are affected by displacement. Total of 1044.436-acre land captures by industrialist for industries and flats of an employee. This study conduct in 31 affected tribal families of 31 villages. This study shows affected families are leaving their traditional agricultural works because they can't understand the nature of new land structure and because of this, they are in economic trouble. In study area, there are 67.7% family's primary occupations was agriculture and after displacement, there are only 9.7% families engage in agricultural work. There are some other problems also finding out in this study, which are related to fundamental needs. According to affected families, new residences have many fundamental problems, which are provided by government and industrialists. There are no electricity, no regular drinking water resources, satisfied roads and transports are no available.

Raigarh district of Chhattisgarh has 14 large and small industries of iron, coal, etc. These industries make huge displacement in these areas and tribal groups total 61 villages, and 1406 families are affected by displacement. Total of 1044.436-acre land captures by industrialist for industries and flats of an employee. This study conduct in 31 affected tribal families of 31villages. This study shows affected families are leaving their traditional agricultural works because they can't understand the nature of new land structure and because of this, they are in economic trouble. In study area, there are 67.7% family's primary occupations was agriculture and after displacement, there are only 9.7% families engage in agricultural work. There are some other problems also finding out in this study, which are related to fundamental needs. According to affected families, new residences have many fundamental problems, which are provided by government and industrialists. There are no electricity, no regular drinking water resources, satisfied roads and transports are no available.

Keywords: Development, Displacement, Rehabilitation, Problems of rehabilitation, Tribal groups

INTRODUCTION

Every country, every society want to increase quality of life so development is a need of the present era. Every human society wants to more and more facilities for him, and government is busy with practices about this. But all the practices which are related to development cannot only give the positive results but also this type of practices originating some negative impacts as well. Facilities need material cultural and material cultural/production and production wanted industries. So, we can say industries are an indicator of development. In present era, all developed and developing countries in competition for became a developed country. Growths of humane benefices are important indicators for development for any country. In other words, we can say growth of human benefices like growth for the production of material

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A Comparative Analysisof Socio-demographic Profile between Gond and Halba Tribe of Kanker district, Chhattisgarh

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ABSTRACT

According to Census 2011, 8.6% of India's total population belongs to Scheduled Tribes (STs)and the majority of tribe populationlive in rural areas, they lives near forests and hills. Mostly tribe depends on minor forest produce and farming. The objective of the research paper is to compare of socio-demographic profile between Gond and Halba tribe of Kanker district, Chhattisgarh. The present research paper was based on primary and secondary data. The sample size of the study was 180 respondents (i.e. 90 Gond respondents and 90 Halba respondents) the sampling was done by using simple random sampling. In thisresearch papermean, percentageand Kuppuswamy's Socio Economic Status Scale (2019)was used to analysis of data. Results show thataverage age of respondents is 45.6 years. Socio-economic status of Gond and Halba tribe belong upper lower class and comparatively socio economic status of Halba tribe is better than Gond tribe but score of both tribes is 7.66 i.e., between (5-10) which means both tribe belong to upper lower (IV) socio economic class as per Kuppuswamy'sSocio Economic Status Scale.

KEYWORDS:*Socio-demographic profile, Gond tribe, Halba tribe, Kanker district.*

INTRODUCTION

According to Census 2011, 8.6% of India's total population belongs to Scheduled Tribes (STs)and the majority of tribe populationlive in rural areas, they lives near forests and hills. Mostly tribe depends on minor forest produce and farming.

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Role of Family and Society in Women's Economic Empowerment

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Abstract : Economic liberalization of economy, initiated in early 1990s, within India has opened new opportunities to aspiring Indian population. Inclusiveness and fairness of distribution of these opportunities have been a major topic of discussion and available evidence suggests that there has been an increase in inequality after liberalization.

In this paper, we first establish current economic status of women by analyzing employment opportunities available to them by reviewing relevant literature. Labor force participation as well as wages for men are double than labor force participation and wages for women. A large section of female labor force is in un-organized sectors such as agriculture. Within organized sector, we are far behind in having women in leadership or entrepreneurial roles.

The objective of this paper is developing a better understanding of the social factors contributing toward economic inequality of women. One of the major factors identified is the gender role assigned to women in Indian society. Gender role for a woman in Indian family is that of a daughter, a wife or a mother; always in relation to a man and without any independent existence.

Finally, policy initiatives are reviewed in terms of their efficacy in correcting gender role assigned to women.

This research paper is based on secondary research data.

Keywords: Women empowerment, Economic development, Gender inequality, Gender role

Introduction

John Money coined the term gender role in 1955 to indicate a set of societal norms dictating what types of behaviors are generally considered acceptable, appropriate or desirable for a person based on their actual or perceived sex.[1]

Talcott Parsons gave a model of what these behaviors were for men and women in 1955 in education, profession, decision making, housework and child care in American families. His finding was that education, profession and decision making domains were primarily available to men and housework and child care domains were considered exclusive responsibility for women.[2]

Gender role for women in India is not much different than women in any part of the world. They are expected to manage household chores, look after children and family members and leave it to the men to run the world.

In this paper, we first establish that there is a significant difference in economic well- being between men and women. Then we will review existing research and available data to find reasons for why these differences exist.

Economic Status of Women in Contemporary India

In this section, basic statistics are presented to establish current economic status of women in comparison to men.

Work Participation

Women work participation - typically measured as the percentage of females that are employed out of all employable female population - is less than half of work participation for men.

There is major difference in female work participation in urban and rural India implying that women tend to participate more in manual work like agriculture (Chart 1 in appendix).

Female work participation is also the lowest in India within BRIC countries (Chart 2 in appendix).

Wages

At All-India level, wages per day worked for employed women worker was reported at INR 145.63 whereas it is almost double for their men counterpart (INR 288.14) for the year 2009-10 (Chart 3 in appendix).

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A Study on Socio-demographic Profile of Displaced and Rehabilitated Tribal with special reference to Kelo Dam Project, Chhattisgarh

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Abstract

Major Dam projects often result in massive displacement, rehabilitation and transition of population. The research paper examines the socio-demographic profile of displaced and rehabilitated tribal due to Kelo dam project in Raigarh, Chhattisgarh, India. The objectives of the study are (i) to know socio-economic status of displaced tribal due to Kelo dam project and (ii) to identify problems and challenges of rehabilitated tribal. Study was based on primary and secondary data. Field work was carried out in 5 villages of Raigarh district of Chhattisgarh. Simple random sampling was done to collect the data from 90 respondents. Analysis of data was done by Mean, Percentage and Kuppuswamy's Socio Economic Status Scale (2019). The respondents are those who displaced and rehabilitated due to Kelo dam project were included in the study. Results revealed that mean age of the respondents is 45 and respondents belong to upper lower (IV) socio economic class. It is also found that majority of the respondents reported lack of facilities in the rehabilitated area. Thus, the study concluded that socio-economic status of tribal who were displaced and rehabilitated due to Kelo dam project is in upper lower class and facing problems and challenges in their daily life. Government should focus on their issues and provide them aids, facilities, proper compensation to overcomes displaced and rehabilitated tribal's living standard.

Keywords: *Kelo Dams, Displacement, Rehabilitation, Tribal, Raigarh*

INTRODUCTION

According to 2011 Census Data, 8.6% of India's total population belongs to Scheduled Tribes (STs), and 47% of those displaced by such projects. While the government's main rationale for dams remain bringing more arable land under irrigation, farmers across the country continue to suffer from droughts, crop failure, falling prices and burden of loans leading to the highest numbers of farmers' suicides anywhere in the world. Construction of ever higher dams continues despite the high human and environmental costs and limited and questionable benefits.

The Dilip Singh Judeo Irrigation Project (DSJIP) on the Kelo River was constructed at the cost of Rs 600 crores. The state government declared that it will irrigate 23,000 hectares of farming land. Despite studies repeatedly showing that the costs often outweigh the benefits, the race for constructing dams in India continues unabated. In 1947, India had only 300 dams. Today that number is over 5,000 according to the International Commission of Large Dams.

The villages bordering the DSJIP in Raigarh district of Chhattisgarh, inhabited by indigenous people, are yet again being treated as footnotes in the glorious narrative of development. In Chhinchhona, one of these villages, the traditional occupation is weaving hand-crafted

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An almost unbiased ratio estimator of population mean in stratified sampling

Vyas Dubey, Jaya B Rathore and Ujjwal Dubey

Abstract
In this paper a generalised estimator of variance of ratio estimator has been proposed. It is seen that the suggested estimator is more efficient than existing estimator under certain conditions. Numerical illustrations have been cited to support theoretical results.

Keywords: SRSWOR, finite population correction, order of approximation, bias, MSE, relative efficiency

1. Introduction

In a sample survey the necessity of stratification is often dictated by administrative requirement or convenience. For a state wise survey, for instance, it is often convenient to draw samples independently from each district and carry out survey operations for each district separately. A statistical office may be set up for each such district to take care of the survey operations under its jurisdiction. Thus for administrative convenience, each district may be treated as a stratum. Since a stratified sample consists of units selected separately from each stratum, such a sample is expected to be better representation of the population than a simple random sample selected from the whole universe. In practice, the population often consists of heterogeneous units (with respect to the character under study). Thus, in a survey of manufacturing industries, some factories may be very large, having a huge fixed capital investment, a large number of workers, deploying sophisticated appliance, while others may be of medium size, even tiny in nature. For a socioeconomic survey, for instance, people may live in rural areas, urban localities, ordinary domestic houses, hostels, hospitals, jails, etc. It is evident that the nature of the value of y and the sampling problem will be different for these different sectors of the population and each such sector should be treated as a separate stratum. Again, administrators may require estimates for different strata separately along with the estimate for the population as a whole. This can be achieved through stratified sampling. It will be shown subsequently that by stratifying such that the units which are approximately homogeneous with respect to y, are placed in the same stratum, the variance of the estimator can be reduced from the one based on a random sample drawn from the whole population.

Let the population be divided into L homogenous groups of sizes $N_1, N_2, \ldots, N_L$ such that $N=N_1+N_2+\ldots+N_L$. Let y_{hj} and x_{hj} be the values of y and x on j-th unit in the h-th stratum, h=1,2,...L; j=1,2,...N_h. Let $\bar{Y}_h = \sum_{j=1}^{N_h} \frac{y_{hj}}{N_h}$, $\bar{X}_h = \sum_{j=1}^{N_h} \frac{x_{hj}}{N_h}$ be means of h-th strata of variables y and x. Further let $W_h = \frac{N_h}{N}$, then $\bar{Y} = \sum_{h=1}^{L} W_h \bar{Y}_h$, $\bar{X} = \sum_{h=1}^{L} W_h \bar{X}_h$ are populations means of y and x.

Let a sample of size n_h be taken from h-th strata by SRSWOR procedure such that $n=n_1+n_2+\ldots+n_L$. Then $\bar{y}_h = \sum_{j=1}^{n_h} \frac{y_{hj}}{n_h}$, $\bar{x}_h = \sum_{j=1}^{n_h} \frac{x_{hj}}{n_h}$ and $\bar{y}_{st} = \sum_{h=1}^{L} W_h \bar{y}_h$, $\bar{x}_{st} = \sum_{h=1}^{L} W_h \bar{x}_h$ are sample means of y and x based on h-th strata, h=1, 2,..., L.

Hansen, Hurwitz and Gurney (1946) [2] suggested a combined ratio estimate,

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Efficiency of Modified Product Estimators Under a Super Population Model

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***Abstract*: In this paper efficiency of transformed product type estimators suggested by Pandey and Dubey (1988), Upadhyay and Singh (1999), Singh (2003, 2004) have been studied under a super population model suggested by Durbin (1959). It is found that Singh (2003) estimator performs better among all these estimators.**

***Keywords*: Auxiliary information, simple random sampling without replacement (SRSWOR), finite population correction, Variance, order of approximation, Bias, Mean square error (MSE), Relative efficiency.**

1. Introduction

Product method of estimation is well known technique for estimating the population mean of a study character when population mean of an auxiliary character is known and it is negatively correlated with study character. Similarly, ratio method of estimation is used when study variable is highly correlated with auxiliary variable.

Mohanty and Das (1971) introduced the use of transformation as a tool for the reduction of Mean square error and bias of the ratio estimator of the population mean simultaneously. It has been shown that replacing X by $(X + \alpha/\beta)$ the bias of ratio estimator becomes zero when $Y = \alpha + \beta X$ is the regression line of y on x in the population. Moreover, a study on the use of transformation on the product estimator reveals that an increment to each value of the auxiliary variable by an amount reduces the value of the mean square error of the product estimator of the population mean to a minimum. On the other hand, the bias of the above mentioned product estimator can be reduced by changing each value of the auxiliary variable by X by a sufficient large amount. Related works in this area are available in the papers of Kulkarni (1978), Sisodia and Dwivedi (1981).

Let $U=(u_1,u_2,\ldots\ldots\ldots u_N)$ be the finite population of N units, y and x be the character under study and auxiliary character, respectively. It is assumed that y and x are negatively correlated. Let $y_i>0$, and $x_i>0$ be the values of y and x for the i-th (i=1, 2……N) unit in the population. From the population U, a simple random sample of size n is drawn without replacement. Let and be the population means and sample means of y and x respectively. The usual product estimator for the population mean is defined as

$$\bar{y}_p = \frac{\bar{y}.\bar{x}}{\bar{X}} \tag{1.1}$$

It is well known that product estimator $\bar{y}_p$ will estimate $\bar{Y}$ in large samples more precisely than sample mean $\bar{y}$ if

$$\rho \le -\frac{C_x}{2C_y} \tag{1.2}$$

Where ρ is correlation coefficient between y and x and C_y and C_x are coefficients of variations of y and x respectively.

To find more precise estimates Searls (1964) used coefficient of variation (CV) of study character at estimation stage. In practice this CV is seldom known. Motivated by Searls (1964) work, Sisodia and Dwivedi (1981) used the known CV of the auxiliary character for estimating population mean of a study character in ratio method of estimation. Following the work of Sisodia and Dwivedi (1981), Pandey and Dubey (1988) proposed a modified product estimator for population mean using known CV of an auxiliary character. Recently, Upadhyaya and Singh (1999) proposed new product estimators using known CV and coefficient of Kurtosis (CK) of an auxiliary character. All these authors have used known CV and CK of an auxiliary character in additive form to sample and population means of the same character. It could be noticed that CV and CK are unit free constants therefore their additions may not be justified. Further if coefficient of variation and population mean of an auxiliary character are known, standard deviation of the same auxiliary character is automatically known and use of standard deviation in additive form is more justified. Singh (2003) proposed new product estimators using known standard deviation (SD) of an auxiliary character, coefficient of Skewness (CS) and coefficient of Kurtosis (CK) of an auxiliary character.

Pandey and Dubey (1988) estimator

$$t_2 = \bar{y}\left[\frac{\bar{x}+C_x}{\bar{X}+C_x}\right] \tag{1.3}$$

Upadhyaya and Singh (1999) estimator

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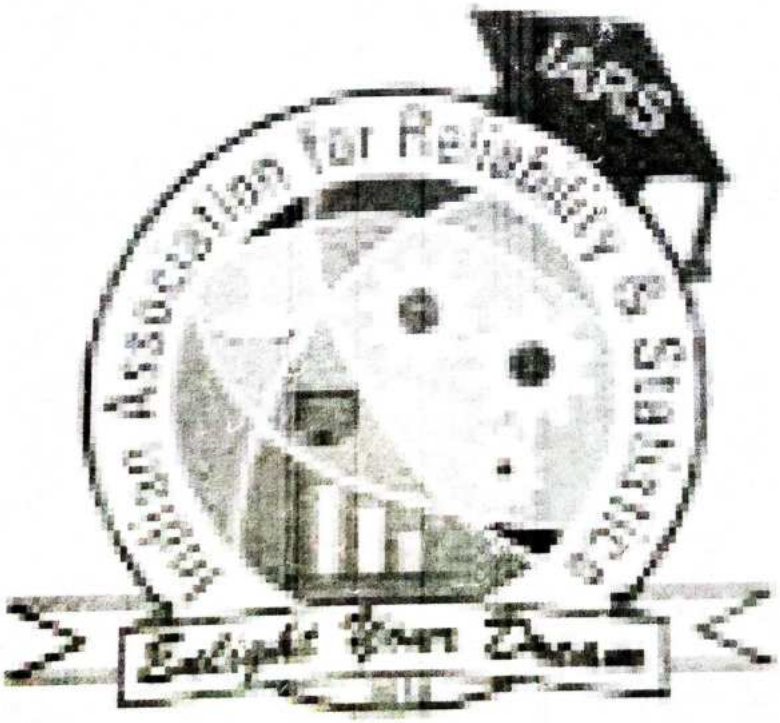

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ORIGINAL ARTICLE

IARS

An Efficiency Comparison of Some Generalized Estimators

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Abstract

In this paper, the simulation technique based on real data has been used to compare efficiency of generalized estimators of population mean suggested by Srivastava (1967), Chakraborty (1967) and Reddy (1974). It is analyzed that efficiency of the estimators depend upon nature of the data and none of the estimators perform uniformly better.

Keywords: Auxiliary Variable, Bias, Mean Squared Error (MSE), Relative Efficiency, Order of Approximation.

1. Introduction

It is well known that for estimating population parameters in sample surveys, auxiliary information is highly used in practice. Estimators so defined are ratio, regression and product methods of estimation. Ratio(product) estimator is used if correlation between study and auxiliary variables is highly positive(negative) while regression estimator is adopted if such variables are linearly related. For getting more precision, many authors like Srivastava (1967), Chakraborty (1967), Reddy (1974), Gupta (1978), Ray and Sahai(1980), Adhvaryu and Gupta (1983) and others have proposed modified estimators in literature. Again, Srivastava(1971) discussed a class of estimators which includes above estimators as its member. But, for optimum choice of constants involved in the estimators, all such estimators are equally efficient as linear regression estimator up to the first order of approximation. Therefore, a study for search of better estimator, in sense of having maximum efficiency, among all such estimators is necessitated. Gupta (1990) considered comparison of efficiency of estimators useful for negatively correlated variables for bi-variate normal populations.

In our study, we consider the estimators discussed by Srivastava (1967), Chakraborty (1969), Reddy (1974) and make a general comparison of their efficiency up to second order of approximation. Again a simulation study has been made and the performance of the estimators has been seen for some real data.

2. The Study

Let U = (1, 2, ..., i, ..., N) be a finite population of N units, y and x be study and auxiliary variables taking values (Y_i, X_i) on i^{th} unit in population and (y_j, x_j) on j^{th} unit in the sample. Let $(\bar{Y}, \bar{X})$ and $(\bar{y}, \bar{x})$ population and sample means of (y, x) respectively. If $\bar{X}$ is known, the ratio and regression estimators of population mean $\bar{Y}$ are defined as

$$\bar{y}_r = \bar{y}\bar{X}/\bar{x}$$

$$\bar{y}_{lr} = \bar{y} + b(\bar{X} - \bar{x})$$

Respectively, b is sample regression coefficient of y on x. The modified estimators due to Srivastava(1967), Chakraborty (1967), and Reddy (1974) are correspondingly given by

$$\bar{y}_\alpha = \bar{y}(\bar{X}/\bar{x})^\alpha \quad (2.1)$$

$$\bar{y}_w = (1-w)\bar{y} + w\bar{y}_r \quad (2.2)$$

$$\bar{y}_c = \bar{y}\bar{X}/\{\bar{X} + d(\bar{x} - \bar{X})\} \quad (2.3)$$

Let

$$V_{ij} = E(\bar{y} - \bar{Y})^i(\bar{x} - \bar{X})^j / \bar{Y}^i\bar{X}^j$$

Considering the values of α, w and d as $K = (C_{11}/C_{20})$, for which MSE of above estimators is minimum up to first order of approximation, the bias of above estimators up to order (n^{-2}) [Sukhatme et al (1984)] are respectively as follows:

$$B(\bar{y}_\alpha) = \bar{Y}K\left[\frac{1}{2}\{(K+1)V_{02} - 2V_{11}\} - \frac{1}{6}(K+1)\{(K+2)V_{03} - 3V_{12}\} + \frac{1}{24}(K+1)(K+2)\{(K+3)V_{04} - 4V_{13}\}\right] \quad (2.4)$$

$$B(\bar{y}_w) = K\,B(\bar{y}_r) \quad (2.5)$$

HUMAN DEVELOPMENT INDEX IN CHHATTISGARH STATE : AN ANALYTICAL STUDY

B. L. Sonekar*

The economic progress and prosperity of any country depends on progress and innovations of various technologies occurred in the field of production. With this point of view, the assessment of development and prosperity of Indian Economy depends on proper and skillful use of human resources. Human resource and Natural Resource are like two wheels of a cart, which are mandatory for an economic development of any country. A part from this, there is a direct relation between human resource and economic development, because there is a specific importance of technical knowledge, education, new inventions, technical use etc. in economic development, which are related with human resource unless the labour power available in the country. Development will be incomplete because the precious capital is that which are to be appropriated to the human only. Under Human resources, not only the size of population is studied, but population growth rate, literacy, sex-ratio, anticipation of life, professional distributions etc. are also studied. The aim of this study is to study human resource and economic development on above said factors.

Keywords: *Human resource, Economic development Skill Development Programme*

INTRODUCTION

The importance of Physical Assets along with human assets does exist in the economic development of any country or state. In practice the enhancement of capital stock depends on human capital building up to the sufficient limit, which is a process of enhancement of knowledge, skillfulness and capacities of all the before of the country. "The development of human resources is a process of enhancement of knowledge, skillfulness and capacities of persons of society, knowledge and abilities." The development of human resources is a process of enhancement of knowledge, ability and working capability of persons of society. In economic point of view it may be said that this is a collection of human assets, which are appropriated effectively in the development of economy the development of human resources is much more in developing countries and in semi-developed countries, because it is possible to utilize natural resources and physical assets rapid by in development works by human assets only.

It has been mentioned in Human Development Report of U.N.D.P. (1997), while explaining the concept of human development, that "this is such a process through which alternatives of common people are expanded and through this improved level of their welfare is achieved. This only is the origin of presumption of human development. Such principles are neither limited nor static. But keeping in view the level of development, the common people have three alternatives: to pass a long and healthy life, to gain knowledge and to enhance its approach towards requisite resources for its approach towards requisite resources for achieving a good live standard.

It has been mentioned in Human Development Report (1997) in this context that "The income is only alternative, which the people would like to obtain, thong it may be much important, but this is not the gist of their entire life. The income is a mean, whereas the human development is a goal."In

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ARTICLE/ 22

Women Entrepreneurs in Informal Sector of Chhattisgarh

Archana Sethi and B.L. Sonekar

Introduction

Last many decades, the female entrepreneur has been exaggerated in handing the societies and their activities are fully grown up we have a tendency to all recognize. As restricted resources and in depth necessities of person create this resources to enhance incessantly,in recent years, women entrepreneurs have attended structure entrepreneurship with accenting on turning into efficient; and therefore they do provided the causes of sustainable development . In recent years, women entrepreneurship has been exaggerated thanks to environmental changes and thanks to these changes women have faced with several issues that need proper measure both and economically and ideologically.

A large number of females around the globe have created and managed their own businesses. For these women it had been a tough task to succeed in business .They had to face loads of difficulties and overcome numerous barriers to become successful in their ventures. They had to cope up with discriminations and stand up to the unbelief of society and put more efforts than men to prove their qualities to others. Economic globalisation has inspired the growth of feminine business possession.

Conceptual Background of Female Entrepreneurs

Female entrepreneurs may be defined as the women or a group of women who initiate, organize and operate a business enterprise. Government of India has described female Enterpreneurs as an enterprise owned and controlled by a women having a minion financial interest of 51% of the capital and giving at least 51% of employment has many functions. They should explore the prospects of began a new enterprise; undertaking risks, introduction of recent innovation, coordination, administration and management of business and providing effective leadership altogether in business.

Characteristic features of female Entrepreneurs; Women Entrepreneurs tend to be extremely motivated and self directed. They additionally exhibits a high internal locus of management and action .Researchers contended that female business owners exhibits some specific characteristics that promote their creative thinking and generate new ideas and ways in which things would be done. Some of them are as follows:-

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A comparative study of acceleration measures of Kabaddi players on clay and synthetic surface: With reference to Raiders

Sourabh Pradhan and CD Agashe

Abstract
The aim of the present study was to assess acceleration measures of raiders on two different playing surfaces. To conduct the study, 100 national/interuniversity Kabaddi players (Average age 25.23 years) were selected. Following the inclusion criteria only raiders from teams were selected purposively as sample. Tracker video motion analysis software was used in the present study to assess acceleration measures of Raiders. A movement puzzle, designed in consultation with Kabaddi experts was used to study directional movement of selected raiders with the help of video motion analysis. It was found that the raiders accelerate faster on synthetic surface (Mean=36.53 m/s^2) as compared to clay surface (Mean = 31.53 m/s^2). The calculated t=4.68 also supports this findings at. 01 level of statistical significance because it is greater than the table value of 2.63 for df=99. It was concluded that the synthetic surface is more helpful in rate of change of velocity of raiders in relation to time as compared to clay surface.

Keywords: Acceleration, raider, synthetic and clay surface

Introduction
Traditionally Kabaddi is played on natural clay surface while recognized national and international tournaments are played on synthetic surface. Scientifically there is a major difference in mechanical properties of clay and synthetic surface. On synthetic surface a player needs to pick his feet up in contrast to clay where a player can slide his feet which is not possible in synthetic surface. Studies have also shown that faster speed and acceleration can be attained on synthetic surface as compared to clay surface. Since majority of European and Asian countries have better infrastructure facilities than India hence it is important to know the impact of playing surface on performance of Indian kabaddi players because India does not have sufficient number of synthetic surfaces to practice and is available only in handful of places. The tournaments organised at local and district levels are still played on clay surface. Thus, it is mandatory to have scientific data on mechanical advantage to kabaddi players on synthetic surface and to what magnitude? A thorough glance at previous studies specify that Krahenbuhla (1974) [3], McMahon and Greene (1979) [5] assessed speed of movement on synthetic and natural grass surface. The impact of The impact of friction on turning movements over different sports surfaces was assessed in a study by Dura and Lozano (1999). Villwock *et al*. (2009) [6] studied the shoe grip on different soccer playing surfaces. Kuganesan (2015) [4], Choi *et al*. (2015) [7] in their studies assessed the impact of different court surfaces on speed and agility of tennis players. Gale-Ansodi *et al*. (2016) [2] comparatively evaluated the acceleration and speed of tennis players on different playing surfaces while Abdul Yamin *et al*. (2017) [1] assessed the ground reaction force while running on different sports surfaces. Research literature in the area of sports surface and its effect on performance related factors and especially on injury pattern is very vast but so far mechanical advantage in terms of acceleration measures to kabaddi players on synthetic surface with special reference to raiders has not been assessed comparatively in the light of clay surface. Thus, this study was conducted.

Objective of the Study
The main objective of the present study is to compare the acceleration of raiders on clay and synthetic surface.

Hypothesis

Significant difference will be observed in acceleration of raiders on clay and synthetic playing surface.

Methodology

Sample

To conduct the study, 100 national/ interuniversity kabaddi players (Average age 25.23 years) were selected. Following the inclusion criteria only raiders from teams were selected purposively as sample.

Tools

(i) Tracker Video Motion Analysis Software

Tracker video motion analysis software was used in the present study to assess speed, acceleration, velocity and their associated measures of raiders. Tracker is a video player used in sports analysis. It contains tools to capture and measure kinematic variables. This software uses information from high definition cameras to analyse directional movement and also provide speed, acceleration and velocity of object while performing certain movements. This is free and open source software. The relative reliability with Intraclass Correlation Coefficient and the Coefficient of Variance (CV) (95% confidence interval) as evaluated by Puig *et al*. (2019) was found to be satisfactory.

(ii) Movement Puzzle

A movement puzzle, designed in consultation with kabaddi experts was used to study directional movement of selected raiders with the help of video motion analysis. The movement puzzle was used to assess specific kinematic abilities of raider. The degree of difficulty was also kept in mind considered while developing movement puzzle. The nature of this movement puzzle consists of simple as well as complex movement tasks. The test-retest reliability of this puzzle was found to be 0.82. The validity of this puzzle on the basis 10 judges rating was found to be high 0.92 and quite satisfactory as determined by Lawshe method.

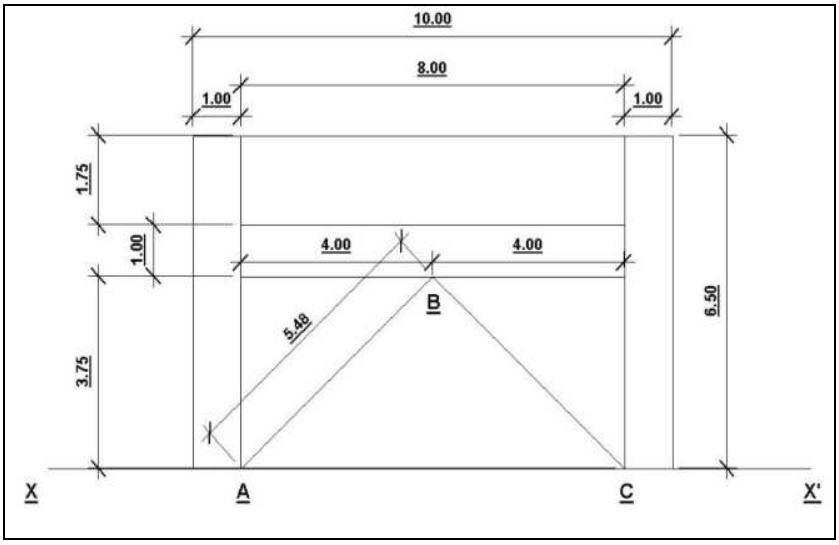

Fig 1: Movement Puzzle

- The starting point of this movement puzzle is point A.
- Subject starts running till point B and then change direction to move towards point C.
- The distance between point A and B is 5.48 meters while the distance between point B and C is also 5.48 meters
- From point C subject again change direction and move towards point A.
- The distance between point A and C is 8 meters.
- Three HD cameras are placed record movement along segment AB, BC and CA respectively.

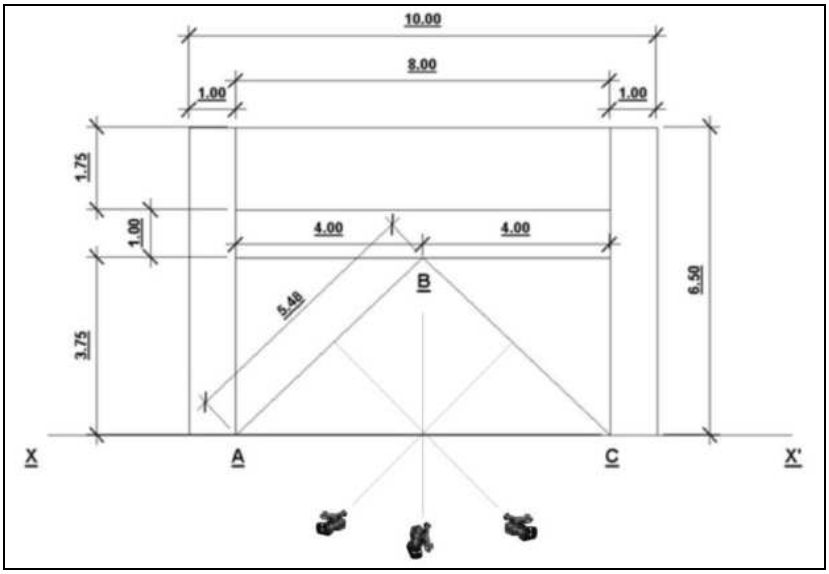

Fig 2: Placement of HD Cameras in Movement Puzzle

Procedure

Each raider was asked to complete the movement puzzle on clay surface. Subject was asked to run and accelerate as quickly as possible and then deaccelerate to change direction. The whole movement activity was captured by three HD cameras placed strategically. The video motion so captured in HD cameras was then transferred to Tracker video motion analysis software for further analysis. The reading on acceleration measure was recorded from Tracker video motion analysis software for each raider. The same procedure is followed in synthetic surface. The tabulated data for clay and synthetic surface was analysed with the help of parametric statistical tools. The results are presented in table 1.

Result and Discussion

Table 1: Comparison of Acceleration Measures of Raiders on Clay and Synthetic Surface

Variable	N	Type of Playing Surface				Mean Difference	't'
		Clay		Synthetic			
		Mean	S.D.	Mean	S.D.		
Acceleration (m/s^2)	100	31.53	9.23	36.53	9.01	5.00	4.68, $p < .01$

t(df=99) at. 05 =1.98, t(df=99) at. 01 = 2.63

Acceleration measures of raiders on different playing surface as depicted in table 4 reveals that raiders accelerate faster on synthetic surface (Mean=36.53 m/s^2) as compared to clay surface (Mean = 31.53 m/s^2). The calculated t=4.68 also supports this findings at. 01 level of statistical significance because it is greater than the table value of 2.63 for df=99. Results show that synthetic surface is more helpful in rate of change of velocity of raiders in relation to time as compared to clay surface. It indicates that raide acceleration dependent on how quickly a raider turns.

Verstegen and Marcello, 2002 and Ferrauti *et al*., 2003 also reported that clay courts are more slippery and loose as compared to acrylic courts. Also acrylic court provides more grip. That is why players opined that less grip in clay court allows for more sliding but on the other hand more grip in acrylic surface allows players to quickly change direction.

Conclusion

On the basis of results and associated discussion it can be concluded that mechanical properties of synthetic surface is more suitable for raiders to achieve greater acceleration as compared to clay surface hence gives them mechanical advantage on synthetic surface.

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A Comparative Study of Sportsman Spirit between Physically Able and Disabled Male Sportsperson

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Abstract

The aim of the present study was to compare sportsman spirit between physically able and physically disabled male sportsperson. To conduct the study 50 physically disabled male sportspersons (Av. age 21.40 yrs) were selected as sample. To fulfill the objectives of the study another set of 50 physically able male sportspersons (Av. age 24.12 yrs) were also selected as sample. The criterion for selection of subjects was participation in any sporting event at national level. Sportsman spirit of selected subjects was assessed by Sportsman Spirit Questionnaire prepared by L.N. Dubey (1988). Result reveals statistically non-significant difference in sportsman spirit of physically able and physically disabled male sportsperson. It was concluded that participation in competitive sports is equally useful for development of human virtues such as sportsman spirit even in physically challenged male population.

Key Words: Physical Disability, Sportsman Spirit, Gender

1. Introduction:

Sportsman spirit or sportsmanship has been used frequently in sports setting. The term sportsman spirit used in sports denotes morality. The concept of sportsman spirit is bit overlapping. Fair play, sportsman spirit and character in sports are somewhat overlap with each other. The term fair play means each player gets equal opportunity to win while a player needs to be truthful, firm and act in proper behaviour even if the opponent is not doing the same things. Character is defined as habits and value which determine how a person respond or behave to challenges, failures and success.

Sportsman spirit encompasses virtues such as acknowledging one's mistakes, respect and abide by the rules of the games/society, not showing temper etc. In sports setting additional features of sportsman spirit are recognizing the exceptional performance of opponent, respect for officials, not taking advantage of opponent in injured condition and not playing only for money.

Sportsmanship can be conceptualized as an enduring and fairly constant characteristic or temperament such that individuals differ in the way they are generally expected to conduct themself in sport situations. In general, sportsmanship refers to virtues such as fairness, self-control, courage and persistence and has been associated with interpersonal concepts of treating others and being treated fairly, maintaining self-control in dealing with others, and respect for both authority and opponents.

Development of sportsman spirit in sports sense has been studied by Vallerand et al (1996), Vidoni and Ward (2009) and Turkmen and Varol (2015) respectively. They applied the premises of social psychological theories, situation context, athletic environment and gender in development of sportsman spirit. Despite extensive research researches on sportsman spirit is limited to physically able sportsperson but it is also true that physically disabled population also take part in competitive sport. Impaired physical, cognitive, mental, sensory, emotional or combination of these abilities cause disability. Impaired muscle power, loss of limb, range of movement and many other medical conditions are listed as physically disability. People suffering from these disabilities take part in sports which are especially organised for physically challenged people. In this context Kasum et al. (2011), Goran et al. (2012), Sepasi et al. (2012), Polatidou et al. (2013), Agashe and Tiwari (2015) conducted studies on psychological aspects of physically disabled sportsperson. However, a close scrutiny of research literature indicate that no study has yet been conducted in which sportsman spirit of physically able and physically disabled male sportsperson were compared to each other. To fill this void, the present study was planned.

1.2 Hypothesis: It was hypothesized that physically disabled male sportsperson will shown significantly more magnitude of sportsman spirit as compared to physically able male sportsperson.

2. Methodology:

The following methodological steps were taken in order to conduct the present study.

2.1 Selection of the Subjects:

To conduct the study 50 physically disabled male sportspersons (Av. age 21.40 yrs) were selected as sample. To fulfill the objectives of the study another set of 50 physically able male sportspersons (Av. age 24.12 yrs) were also selected as sample. The criterion for selection of subjects was participation in any sporting event at national level.

2.2 Tools:

***Sportsman Spirit Questionnaire*:**

Sportsman Spirit Questionnaire prepared by Dubey (1988) was preferred to assess sportsman spirit of selected subjects. The questionnaire consists of 40 questions. The reliability of this questionnaire is 0.82 while its validity coefficient is 0.70 respectively.

2.3 Procedure:

After obtaining prior permission to participate in the study, Sportsman Spirit Questionnaire was administered to each subject in calm and relaxed atmosphere. The response for each subjects on various statements were scored off as suggested by author of this questionnaire in manual of Dubey's (1988) Sportsman Spirit Questionnaire. After tabulated in pre-defined study groups, independent sample 't' test was used. Results shown in table 1.

3. Result and Discussion:

Mean and standard deviation of different groups of subjects in performance of different motor fitness components have been presented in Table 1.

Table-1
Comparison of sportsman spirit between physically able and physically disabled male sportsperson

Groups	Sportsman Spirit		Mean Diff.	't'
	Mean	S.D.		
Physically disabled Male Sportsperson (N=50)	72.62	9.39	5.10	2.88, p<.01
Physically Able Male Sportsperson (N=50)	67.52	8.24		

t (df=98) = 2.63 at .01 level

Results presented in table 1 indicate that physically disabled male sportspersons showed significantly more magnitude of sportsman spirit (M=72.62) as compared to physically able male sportsperson (M=67.52). The calculated t=2.88 also confirms this findings statistically at .01 level of significance. The results are not surprising because so much more at stake in sports in which normal athletes take part. A nation's pride and sponsorship add more pressure on modern day athletes. Due to this win at all cost attitudes, fair play notion takes back seat sometimes. Hence it is not surprising that physically disabled male sportsperson showed more magnitude of sportsman spirit as compared to physically able male sportsperson.

4. Conlusion:

On the basis of results and associated discussion, it may be concluded that male sportsperson with physically disability showed sportsman spirit of significantly higher magnitude as compared physically able male sportsperson.

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Facile and visual detection of acetylcholinesterase inhibitors by carbon quantum dots†

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Sensitive and rapid detection of organophosphate toxicants is highly relevant and important in environmental protection and food safety. Owing to this, a carbon quantum dot (CQD)-based bio-platform was designed for dual detection (fluorometric and colorimetric) of reversible and irreversible inhibitors of enzyme acetylcholinesterase (AChE). The detection strategy is based on the fluorescence quenching and recovery of CQDs through Cu^{2+} ions, AChE and its substrate, acetylthiocholine iodide (ATChI). Initially, enhanced fluorescence of CQDs is effectively quenched by Cu^{2+} ions and later on recovered by catalytic hydrolysis of ATChI *via* the formation of Cu–S bonds by release of thiol compounds. In the presence of inhibitors, the fluorescence of CQDs remains quenched due to the blocked activity of the enzyme but in the presence of oximes the fluorescence is recovered depending upon the ability of the oxime reactivators to regenerate AChE. The fluorescence quenching and recovery is visible with color variations. The sensor facilitates good sensitivity for quick detection of both reversible (CPC, 0.62 ng mL^{-1}; Triton-X; 1.02 ng mL^{-1}) and irreversible (paraoxon, 0.21 ng mL^{-1}; chlorpyrifos, 0.46 ng mL^{-1}) inhibitors. However, strong inhibition of AChE is a major hurdle in practical implementation of biosensors; hence, the system is tested for reactivation of inactivated AChE by monopyridinium oximes and percentage reactivation was also calculated.

1. Introduction

Acetylcholinesterase (AChE) is the most crucial enzyme responsible for the proper functioning of the nervous system in humans, vertebrates and insects. When the amount of this enzyme is reduced below a critical level, nerve impulses to the muscle can no longer be controlled, causing dysfunction and even death from respiratory or cardiac failure.[1,2] Toxic compounds such as pesticides, surfactants, heavy metals *etc.* target this enzyme, and deactivate it through covalent bonding at the serine residue of the active site.[3,4]

Organophosphate pesticides (OPs) are generally used to increase agricultural productivity in developing countries like India.[5,6] Due to their acute toxicity, bioaccumulation and environmental persistence, there always exists a potential risk to human health and the environment. These hydrophobic pesticides are recognized as irreversible inhibitors of AChE and have great affinity towards it.[7,8]

Surfactants are an integral part of routine life and essentially applied for personal hygiene. After use, large amounts of surfactants are discharged into the environment leading to its contamination, preferentially, of water.[9,10] Moreover, surfactants are reported as inhibitors of cholinesterase enzymes in aquatic animals.[11] Keeping all this in view, it is really important to develop suitable, prompt and simple detection methods for effective monitoring of inhibitors of AChE.

In recent years different colorimetric,[12] electrochemical,[13] chemiluminometric[14,15] and fluorometric[16,17] techniques have been developed to detect pesticides through biosensor-based approaches. AChE is widely applied as a biosensor to detect toxic OPs and has attracted much more attention due to several advantages in terms of instant response, simple operation, low cost and sensitivity. The most common and conventional colorimetric detection method uses Ellman's reagent along with the substrate acetylthiocholine iodide (ATChI).[18–21] Another important detection technique involved oxidation of the AChE resulting in the production of choline along with H_2O_2. The hydrolysis process of neurotransmitter acetylcholine (ACh)by AChE is blocked in the presence of inhibitors, and this is reflected by the decreasing fluorescence intensity of the QDs.[22,23] Some fluorescence-based methods have also been designed to screen inhibitors of AChE with better sensitivity.[24–26]

A rising nanomaterial, CQDs, have attracted great attention from researchers worldwide due to their extraordinary tunable

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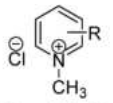
fluorescence characteristics, steady photoluminescence properties, smooth surface functionalization, low toxicity, excellent biocompatibility and chemical durability.[27–29] They are extensively applied in bio-imaging, drug delivery, biosensing and photocatalysis.[30–33] Their stupendous advantages over organic dyes and other nanomaterials (like semiconductor quantum dots and metal nanoclusters) make them a tremendous fluorophore to develop various *in vitro* and *in vivo* fluorescent biosensors.[8,9] Current research[34,35] shows that carbon quantum dots have been effectively utilized to establish several fluorescent assays for different enzymatic processes and in detection systems.

The application of nanomaterials like metal nanoparticles and semiconductor quantum dots has become the first choice of scientists as a detection system.[51–54] The combination of carbon dots and enzyme serves as a prominent fluorescent probe with superior accuracy and detection efficiency for quantification of various pesticides. Du *et al.* reported the synthesis and application of CQDs in the detection of OPs using butyrylcholinesterase (BChE) through fluorescence resonance energy transfer (FRET).[1] Feng *et al.*[29] reported a new and convenient fluorometric method that uses CQDs and ACh as the signal reporter and substrate for assaying AChE activity and its inhibitors. Tian *et al.*[6] proposed a label-free strategy for quick and responsive detection of organophosphate pesticides through a dual-readout (fluorometric and colorimetric) channel based on fluorescent carbon dots. The studies reported that in the presence of OPs, the activity of AChE was hindered, leading to the restoration of the fluorescence signal and the decrease of absorbance intensity with color variation. For several years we have also been engaged[37–41] in detoxification and decontamination of OPs in toxicants. We have designed and synthesized several reactivators of AChE against chemical warfare agents and pesticides;[37,39] and now the present investigation aims at the development of a detection system for different inhibitors of AChE through CQDs. We report a reliable, continuous and convenient dual detection method (colorimetric and fluorometric) for irreversible (Scheme 1a) and reversible inhibitors (Scheme 1b) of AChE. Reactivation of inhibited AChE has also been investigated using a series of monopyridinium oximes (Scheme 2).



(A) R= 2-CH=NOH,2-pyridine aldoxime methyl chloride (2-PAM)
(B) R= 3-CH=NOH,3-pyridine aldoxime methyl chloride (3-PAM)
(C) R= 4-CH=NOH,4-pyridine aldoxime methyl chloride (4-PAM)

Scheme 2 Structures of tested monopyridinium oxime.

2. Experimental

2.1 Materials and reagents

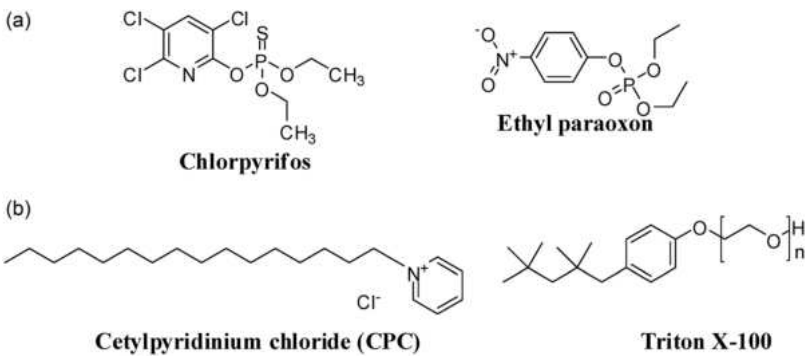
Activated charcoal, copper(II) sulphate ($CuSO_4$), acetylthiocholine iodide (ATChI), eel-acetylcholinesterase (AChE) (EC.3.1.1.7), ethyl paraoxon (paraoxon), chlorpyrifos, cetylpyridinium chloride (CPC), Triton X-100, potassium dihydrogen phosphate and di-potassium hydrogen phosphate were purchased from Sigma-Aldrich Pvt. Ltd, Bangalore, India and were used as received without further purification. Monopyridinium oximes were synthesised and characterized in the laboratory of Dr Kamil Kuca, Center of Advanced Studies, Faculty of Military Health Sciences, the University of Defence, Czech Republic. All solutions were prepared using Milli Q water.

2.2 Methods

The UV-Vis spectra were recorded using a Cary-60 spectrophotometer (Agilent techologies). Fluorescence spectra were recorded using a Cary eclipse fluorescence spectrometer (G9800A Agilent technologies) equipped with an attached Cary temperature controller and xenon arc lamp system. The excitation and emission wavelengths were recorded at 350 nm and 400–550 nm, respectively. The shape and structure of the CQDs were studied using a JEOL, JEM-2100F transmission electron microscope (TEM) with a 200 kV accelerating voltage operating system at National Chemical Laboratory, Pune (India). FT-IR spectra were obtained using a Nicolet iS10 spectrometer (Thermofisher) using KBr pellets. The pH was determined by using a 700 EUTECH Instruments pH meter.

2.3 Synthesis and characterization of CQDs

The CQDs can be synthesized and characterized *via* various simple and sensitive techniques as reported in literature.[42–45]



Scheme 1 (a) Structures of tested irreversible inhibitors. (b) Structures of tested reversible inhibitors.

Chemical oxidation was chosen as the preparation method in this study because it can significantly introduce oxygen-containing groups (like hydroxyl and carboxyl) to CQDs and provide excellent aqueous solubility and functional groups on the surface. The CQDs were synthesized by chemical oxidation method of activated charcoal. Activated charcoal was added into a mixture of concentrated sulphuric acid and nitric acid. The mixture was taken in oven at 100 °C for 4 h. After cooling, purified using a dialysis membrane which retained CQDs of the required size.[28,29]

2.4 AChE assay

For determining the activity of AChE, discrete volumes of AChE ranging from 10–50 mU mL^{-1} were first incubated with substrate ATChI (370 μL) for 1 h and then poured into 2.5 mL of CQDs solution (pH 7.4, at room temperature) containing 3 μL of Cu^{2+} (10.5 μM). After incubation of 15 minutes, UV-Vis spectra (at 200–500 nm) and fluorescence spectra (at 300–600 nm) were recorded.

2.5 Inhibitor screening

For monitoring the AChE inhibition, various reversible (CPC, and Triton-X 100) and irreversible (chlorpyrifos, and paraoxon) inhibitors were selected. Initially, appropriate concentration of the inhibitor was incubated with AChE for 30 min at room temperature to obtain an inhibition cocktail. Then the resulting cocktail was incubated for 15 min with ATChI. The obtained mixture was poured into 2.5 mL CQDs (pH 7.4) containing 3 μL of Cu^{2+} (10.5 μM) and incubated for 15 min again. Furthermore, the absorption and fluorescence spectra were recorded. The same protocol was applied to monitor the inhibition potencies of structurally different inhibitors.

The degree of AChE inhibition was measured with decrease in absorption at 300 nm for the UV-Vis technique and intensity at 550 nm for fluorescence. The following equations were used to calculate % inhibition.

For the fluorescence method

$$\text{Inhibition efficiency } (\%) = \frac{F_{\text{no inhibitor}} - F_{\text{inhibitor}}}{F_0 - F_{\text{inhibitor}}} \times 100 \quad (1)$$

For the UV-Vis method

$$I\% = \left(\frac{i_0 - i_i}{i_0}\right) \times 100 \quad (2)$$

where, i_0 is native activity of enzyme without inhibitor (in terms optical density), i_t is from the activity of enzyme in the presence of inhibitor, $F_{\text{inhibitor}}$ denotes the fluorescence intensity in the presence of AChE, ATChI, CQDs, Cu^{2+} and inhibitor, F_0 is the fluorescence intensity in the absence of inhibitor and $F_{\text{no inhibitor}}$ stands for fluorescence of a mixture of ATChI, CQDs and Cu^{2+}.

2.6 Reactivation studies

For screening of reactivation ability of reactivators, initially the inhibition cocktail was prepared (as mentioned earlier) with irreversible inhibitors. After confirming the inhibition, reactivators (10 μL, stock solution 0.1 M) were added to the inhibition mixture to obtain the reactivation cocktail, with incubation time 20 min. Then a 10 μL aliquot was withdrawn and added to 2.5 mL of CQDs containing 3 μL of Cu^{2+} (10.5 μM) and incubated for 15 min. Now the absorption and fluorescence spectra were obtained.

The extent of AChE reactivation was calculated as an increase of the absorption peak at 300–450 nm and emission peak at 560 nm. Eqn (3) and (4) were used to calculate reactivation potency.

For the fluorescence method

$$R\% = \frac{F_r - F_t}{F_0 - F_t} \times 100 \quad (3)$$

For the UV-Vis method

$$R\% = \frac{A_r - A_t}{A_0 - A_t} \times 100 \quad (4)$$

where, A_0 is absorption and F_0 is intensity of the controlled intact enzyme, A_t and F_t are the activity of the inhibited enzyme and A_r and F_r are the activity of the reactivated enzyme.

3. Results and discussion

3.1 Characterization of CQDs

The resulting CQDs are mono-dispersed in the range of 2–5 nm as measured by TEM images shown in Fig. 1D. The synthesised CQDs exhibited strong blue fluorescence under UV lamp and the fluorescence emission spectra were recorded at 460 nm at the excitation wavelength of 380 nm (Fig. 1A). The fluorescence spectra of different excitation ranges (at 330–415 nm) are shown in Fig. 1B. CQDs are also characterized by FT-IR spectrum. As depicted in Fig. 1C the transmittance bands at 3391 cm^{-1} and 2880 cm^{-1} are due to the stretching vibration of O–H and C–H bonds, respectively. The transmittance peaks at 1065 cm^{-1} and 1100 cm^{-1} are due to C–O stretching vibration of C═O bonds approximately, and the absorption bands at 1351 cm^{-1} and 1456 cm^{-1} showing C–H bending vibration are also obtained. The quantum yield of CQDs was calculated to be 11.7% using quinine sulphate as a reference. The pH effect (ranging from 4–10 pH) on fluorescence activity of CQDs is also observed. As we increase the pH, fluorescence intensity first increases and then starts to decrease as at high pH the CQDs agglomerated.[29] pH 7.4 was recognized as the optimum pH to carry out the detection (which was supported by Fig. 1E).

3.2 Optimal conditions for detection of AChE activity using Cu^{2+} ions

The proposed detection method is based on competitive binding of CQDs, Cu^{2+} and thiocholine. The fluorescence of the system is quenched by copper ions and recovered by thiol containing compounds. Many common ions such as Na^+, Zn^{2+}, Al^{3+}, Fe^{2+}, Hg^{2+} and Cu^{2+} have been tested for the system but Cu^{2+} ions are recognized to have the highest quenching efficiency toward CQDs (presented in Fig. 2a and b). Cu^{2+} at low concentration is able to quench the fluorescence of CQDs.[34]

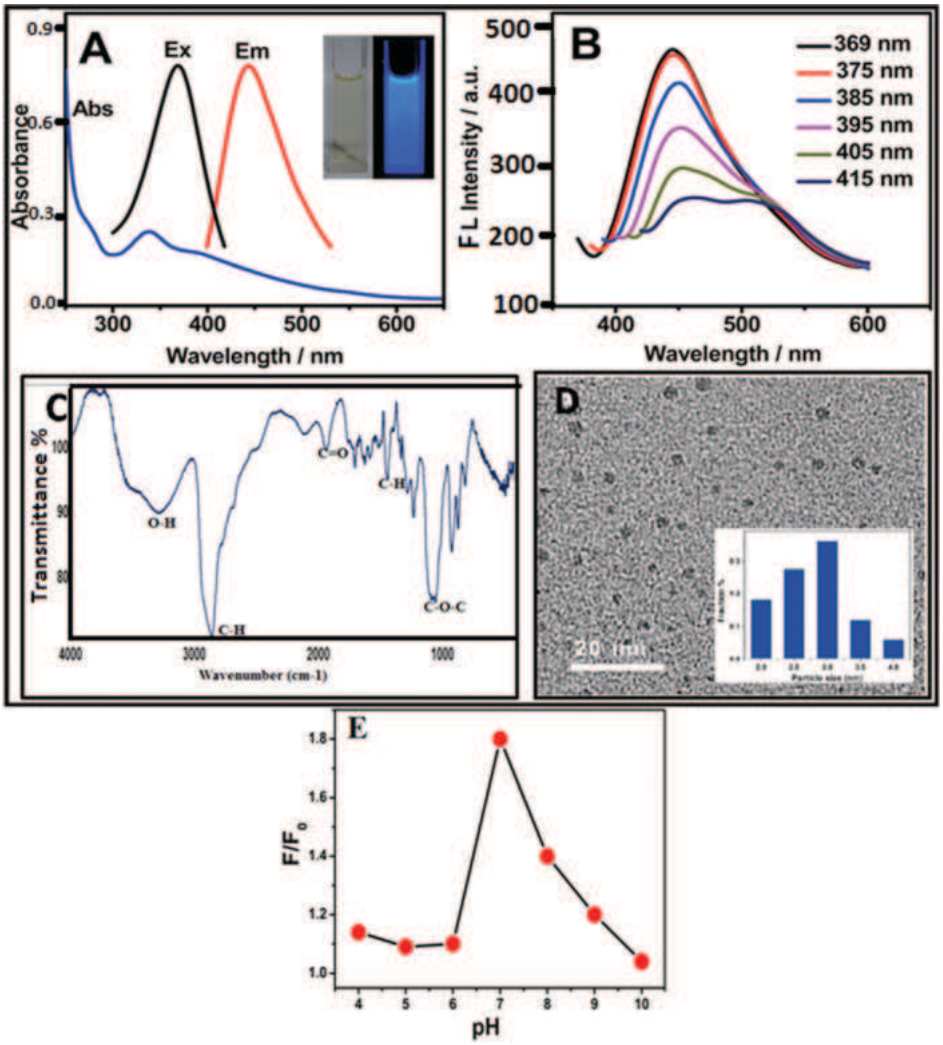


Fig. 1 (A) Excitation, emission and absorption spectra of CQDs, inset: picture of CQDs under the radiation of white light (left) and UV lamp (right); (B) fluorescence spectra of CQDs at different excitation ranges; (C) FTIR spectrum of CQDs; (D) TEM image of CQDs; (E) pH effect on fluorescence activity of CQDs.

Different amounts of Cu^{2+} (0–110 μM) were mixed into the CQDs solution. The rate of decrease in fluorescence was proportional to the concentration of Cu^{2+} and resulted in a logarithm curve. Ultimately, the optimum quenching concentration was found to be 50 μM of Cu^{2+}. As reported, Cu^{2+} has superior affinity (Fig. 2) for the carboxylic group on the CQD

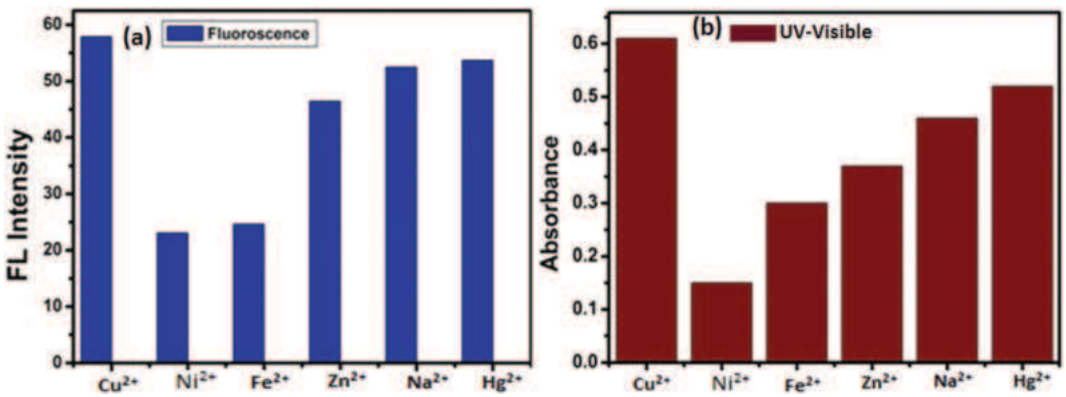
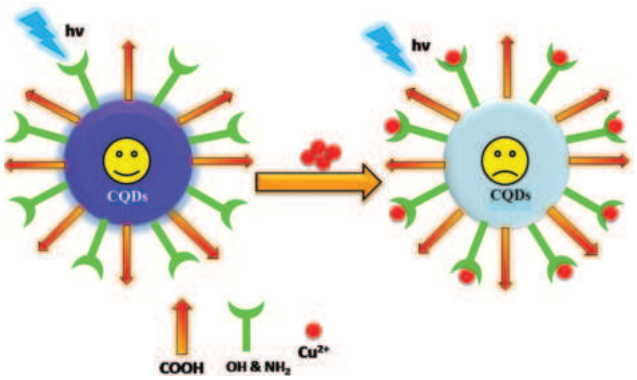


Fig. 2 The selectivity of the sensing system towards different metal cations including Cu^{2+}, Ni^{2+}, Fe^{3+}, Zn^{2+}, Na^{+} and Hg^{2+}: (a) fluorescence intensity; (b) UV-Vis absorption.



Scheme 3 The fluorescence quenching mechanism of CQDs by Cu^{2+}.

surface compared to other metal ions. The specific and potent quenching was assumed to be due to electron or energy transfer from the CQDs to Cu^{2+}.[46,47] It is observed that the carboxyl group of the CQDs served as an efficient ligand for copper ions, which can result in strong quenching of the fluorescence of CQDs due to their severe aggregation caused by copper ions. The possible mechanism of quenching of CQDs by Cu^{2+} is shown in Scheme 3.

In the presence of Cu^{2+}, CQDs fluorescence was fully reduced at 0.01 M. After quenching, the mono-dispersed CQDs (size, 2 to 4 nm) changed into aggregates and formed a CQD nanoassembly. So, the fluorescence quenching of CQDs due to copper ions is attributed to accumulation of CQDs. Biothiol compounds (glutathione (GSH) or cysteine (cys)) can selectively bind to Cu^{2+} through Cu–S bonding interaction. Due to this, the Cu^{2+}–CQDs system is completely decomposed and recovery of the fluorescence signal is noted.[40–42] The observed fluorescence recovery with the addition of cys or GSH (435 nm) is presented in Fig. 3A. The highest recovery ratio of 90% is attained and is due to higher affinity of the thiol group towards copper ions. This competitive bonding results in breakdown of Cu^{2+}–CQDs aggregates and leads to rearrangement of CQDs in their dispersed state shown in Fig. 3B and C. This assumption was also confirmed by comparing the morphology of CQDs in the absence and presence of GSH shown in Fig. 3C and D, respectively. CQDs were aggregated and a well-dispersed state in the presence of GSH is achieved. The resultant increment in fluorescence through cys or GSH is ascribed to effective disaggregation of CQDs.

During the quenching, ATChI was added to the Cu^{2+}–CQDs solution. Recovery of fluorescence due to ATChI action is shown in Fig. 3C and shows that there is a continuous increase in CQDs emission with respect to increase in concentration of ATChI. The reason for fluorescence recovery of CQDs is the formation of a Cu–S bond between the hydrolysed product of ATChI, *i.e.* thiocholine and Cu^{2+}. As we increase the concentration of ATChI substrate relative to the Cu^{2+}–CQDs solution, Cu^{2+} gets desorbed from the CQDs surface. The graph plotted between fluorescence intensity and the ATChI concentration, and logarithmic relationship was calculated in the range of 0–110 μM ATChI. An increase in fluorescence recovery ratio was observed with increasing concentration of ATChI.

By the fluorescence quenching mechanism of the CQD system the activity of AChE also was determined under the most favourable conditions. Fig. S1 and S2A and B (ESI†) show the fluorescence and absorbance spectra of CQDs after addition of copper ions, and those of ATChI and AChE are shown in Fig. S3 (ESI†). The results revealed that after addition, copper ions triggered most of the fluorescence quenching of CQDs, due to aggregation. Then addition of ATChI (Fig. S1C and S2C, ESI†) into CQDs–Cu^{2+} systems exhibited no significant changes in fluoresence intensity due to negligible interaction between them. But after transferring the mixture of ATChI and AChE (incubation time 80 min) to the CQD–Cu(II) system depicted in Fig. S1D (ESI†), the FL intensity recovers to more than that of the quenched fluorescence.

The effects of pH value and temperature on the fluorescence behaviors of CQDs, Cu^{2+}, ATCh, and AChE at different pH values and temperatures were also investigated. Investigation showed that there is a linear relationship between increasing values of F_0/F with change in pH values (6–10) and with temperature change (10–50 °C) (Fig. S4a and b, ESI†). In neutral or weakly alkaline conditions (pH 7–8) and at room temperature (30 °C) the fluorescence quenching degree (F_0/F) becomes maximum, which would benefit the analysis.

For the quantification of the developed fluorometric assay for AChE, other biological matrixes including human serum albumin (HSA), bovine serum albumin (BSA), chymotrypsin, trypsin, L-valline (val) and L-leucine were also measured as control samples. AChE exhibited outstanding response with the lowest concentration as compared to other tested species and was found to have the highest affinity and selectivity towards the CQD–Cu^{2+} system. This confirms the feasibility of the system *via* AChE. Fig. S5 (ESI†) shows AChE activity at different time intervals.

3.3 Fluorescence monitoring

3.3.1 Inhibition studies. Inhibitor screening was performed through the fluorescence (FL) technique. The long lasting function of enzyme-based biosensors could be acutely prohibited by the very structure of the inhibitors being determined. The results may be either reversible or an irreversible inhibition of the enzyme. All structurally different inhibitors may combine with the active site of the enzyme competing with the substrate and may show competitive inhibition. In irreversible inhibitors, interaction of enzyme–inhibitor carried out a covalent bond formation of the enzyme active centre with the inhibitor. This means, in that case enzyme–inhibitor complex decomposition *via* destruction of the enzyme like its hydrolysis, oxidation *etc.*, and irreversible poisoning corresponds to blocking the enzyme's biological function. For irreversible inhibition, an optimum incubation time of 10–20 minutes is generally required. Indeed, inhibition of AChE by paraoxon and chlorpyrifos requires 17 minutes while with that of Triton X-100 and CPC takes around 25 minutes for inhibition.

To establish the analytical features of the developed sensor, fluorescence was used to quantify two different enzyme inhibitors; irreversible (pesticide; chlorpyrifos, and paraoxon (POX)) and reversible (surfactants; CPC, and Triton X-100) within the concentration range of 0.01 to 0.16 μM. The observed differences in the

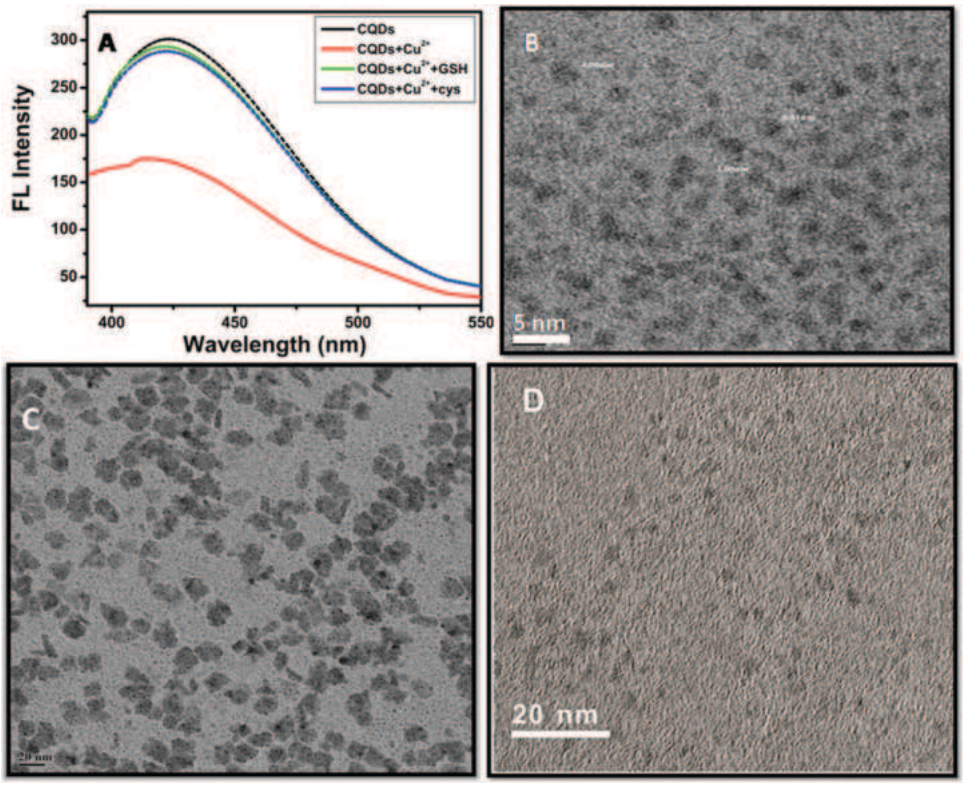


Fig. 3 (A) The changes of fluorescence spectra of CQDs in the presence of different compositions; bare CQDs; (CQDs + Cu^{2+}), (CQDs + Cu^{2+} + GSH) and (CQDs + Cu^{2+} Cys); (B) TEM image of bare CQDs in their dispersed state; (C) TEM image of CQDs–Cu(II) aggregates; (D) graph of relative frequency *versus* size of CQDs and thiol compounds.

inhibition signal can be directly related to the structural diversities of the inhibitors or the groups attached. Paraoxon is recognized as a more potent inhibitor of AChE than chlorpyrifos (Table 1). The observed result is due to higher electronegativity of oxygen in P═O ester (POX) than that of sulphur in P═S bonds (chlorpyrifos). This facilitates higher polarization of P═O bonds and a more electrophilic phosphorus atom; hence, a smooth attack on the P-atom occurs. The nature of such a group definitely influences the interactive force between oximes and OPs. Fig. 4 presents the calibration graphs for each pesticide with the respective linear fit analysis. The slopes of each calibration plot resulted in estimation of the limit of detection (LOD) and quantification (LOQ) for both pesticides. The lowest LOD was obtained for paraoxon followed by chlorpyrifos, CPC and Triton X-100, respectively, as shown in Table 1.

The biosensor's sensitivity to non-ionic and cationic surfactants was also tested. The fluorescence spectra and comparative inhibition graphs are shown in Fig. 4(c and d). A possible mechanism of enzyme inhibition by surfactants is as follows: long hydrophobic tails of surfactants intercalate among amino acid residues that compose the hydrophobic cores of the enzyme molecules and tend to avoid water environments. Due to this reason, the three-dimensional structure of the enzyme changes, resulting in a decrease in enzyme activity. Furthermore, it is believed that the arrangement of the charged groups on the surface of the enzyme serves to electrostatically guide polar substrates to its active enzymatic site; thus, modification of the charged pathway to the active site (that is caused by anionic and cationic groups of surfactants) would compromise activity.[3,4]

Table 1 The analytical characteristics of AChE inhibitory analysis of toxic compounds of different natures

		UV-visible (ng mL^{-1})		Fluorescence (ng mL^{-1})	
S. no.	Inhibitors	LOD	LOQ	LOD	LOQ
1	Paraoxon	0.21	0.24	0.11	0.79
2	Chlorpyrifos	0.46	0.45	0.26	0.56
3	CPC	0.62	1.19	0.38	0.83
4	Triton X-100	1.02	3.39	1.26	3.80

3.3.2 Reactivation of inhibited AChE. Understanding the mechanism of reactivation of enzymes is of great importance to several chemists and biochemists. To succeed in dealing with the difficulty of irreversible enzyme inhibition in the application of cholinesterase-based biosensors, reactivation by a series of monopyridiniums has been monitored. Oximes were added to inhibition cocktails to check their reactivation potency.

The observed reactivation data by monopyridinium oximes against pox-inhibited AChE are presented in Table 2. The fluorescence pattern of reactivation is also presented in Fig. S6 (ESI†). The regeneration of OP-inhibited AChE is influenced by some factors like nucleophilicity of oxime, the position of the nucleophile and dealkylation or aging of the OPs–AChE complex. However, an efficient and instant reactivator for a broad spectrum of OP-poisoning is still lacking. We have tried

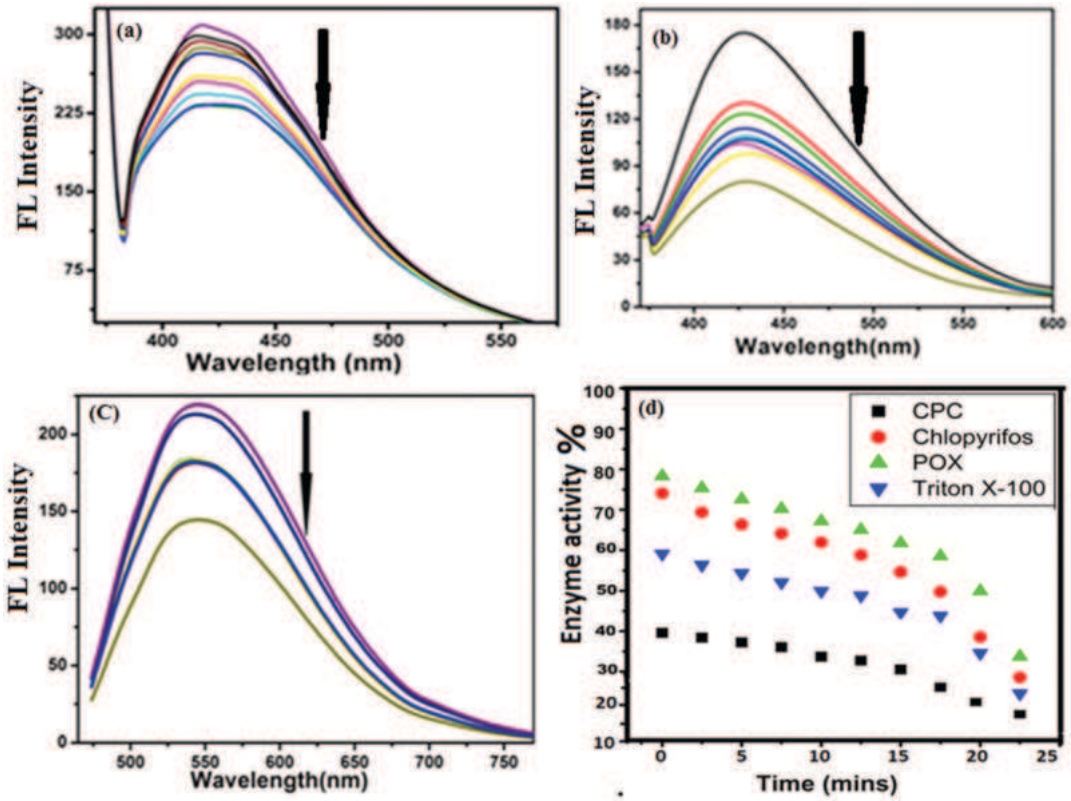


Fig. 4 Fluorescence spectra of (a) chlorpyrifos; (b) paraoxon; and (c) Triton X-100; (d) comparative % inhibition efficiency of reversible and irreversible inhibitors at room temperature (pH 7.4).

Table 2 Comparative reactivation data of paraoxon-inhibited AChE

		% reactivation		
Inhibitor	Oximes	UV	FL	Literature (through Ellman's assay)
Paraoxon	2-PAM	65.3	68.8	68[a,b]
	3-PAM	48.0	51.5	31[a,b]
	4-PAM	61.1	63.0	66[a,b]

[a] Ref. 36. [b] Ref. 38.

to develop a new and simple method by using nontoxic carbon quantum dots and oximes with lower molecular weight and of smaller size to reduce the OP poisoning effect. Recently, Satnami *et al.*[48] reported the detection of organophasphorous pesticides (OPs) in real water samples. The group also monitored AChE inhibition and reactivation using a gold nanoprobe by a UV-Vis spectroscopic method.

Under the optimal experimental conditions, we investigated the quantitative range of the prepared biosensor for the detection of ethyl paraoxon. Since AChE is an excellent biomarker for risk assessment, its regeneration is extremely essential. According to reported studies,[49,50] poisoned-AChE can be recovered by several nucleophilic compounds; hence, in the present study monopyridinium oximes were selected as an activity recovery agent.

The observed results for reactivation by the fluorescence technique are in good agreement with the achieved results with UV-Vis studies shown in Fig. 5. To the best of our knowledge for the very first time a dual detection system for inhibition and reactivation of AChE is reported with a CQDs and Cu^{2+} system. The observed % reactivation for POX-inhibited AChE obtained by fluorescence studies is 68.8% for 2-PAM, 51.5% for 3-PAM and 63% for 4-PAM. The observed results are also compared with literature values (where reactivation was performed using Ellman's assay) and are in good agreement.

3.4 UV-visible monitoring

3.4.1 Inhibition studies. To select the most favourable conditions for the determination of the inhibitor, responses of biosensors towards substrates were measured in the presence and absence of structurally different inhibitors. To estimate a dual readout signal for OP detection, we mixed the CQDs/Cu^{2+}/ATChI/AChE system with various concentrations of paraoxon and other inhibitors and recorded the absorption peaks of the system. It was observed (Fig. 6) that the absorption intensity of the CQDs/Cu^{2+}/ATChI/AChE system at 300 nm decreases progressively with rising concentration of paraoxon in the range 0.01 to 0.16 μM. Fig. 6 is the linear fit with different concentrations. The incubation times of paraoxon and AChE were also measured; we have observed that the inhibition occurred instantly with the addition of paraoxon and the reaction was finished within 15–17 minutes.

As shown in Fig. 6, absorbance of the system at 300 nm continuously decreased with increasing concentration of paraoxon. To validate the broad spectrum functioning of the

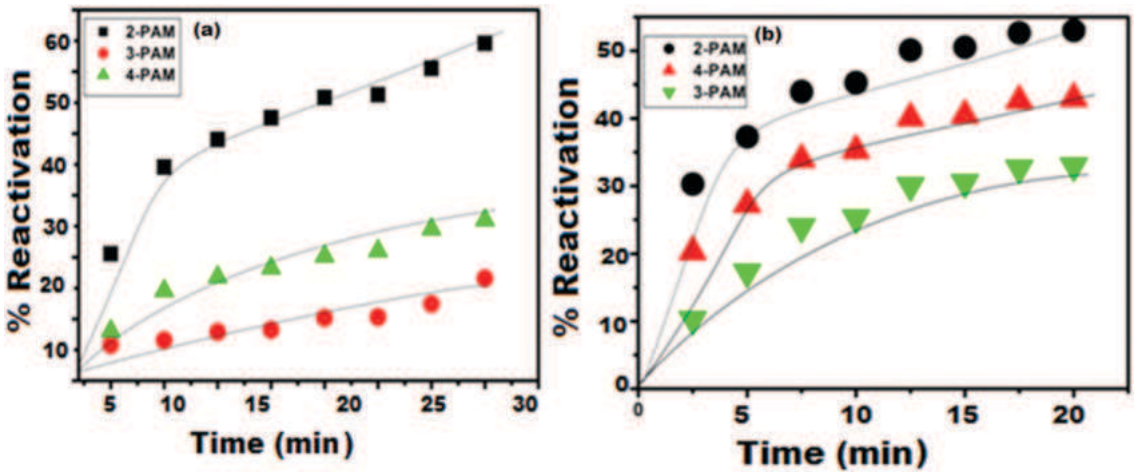


Fig. 5 Comaparative spectra of oximes: (a) UV-Vis spectra and (b) fluorescence spectra.

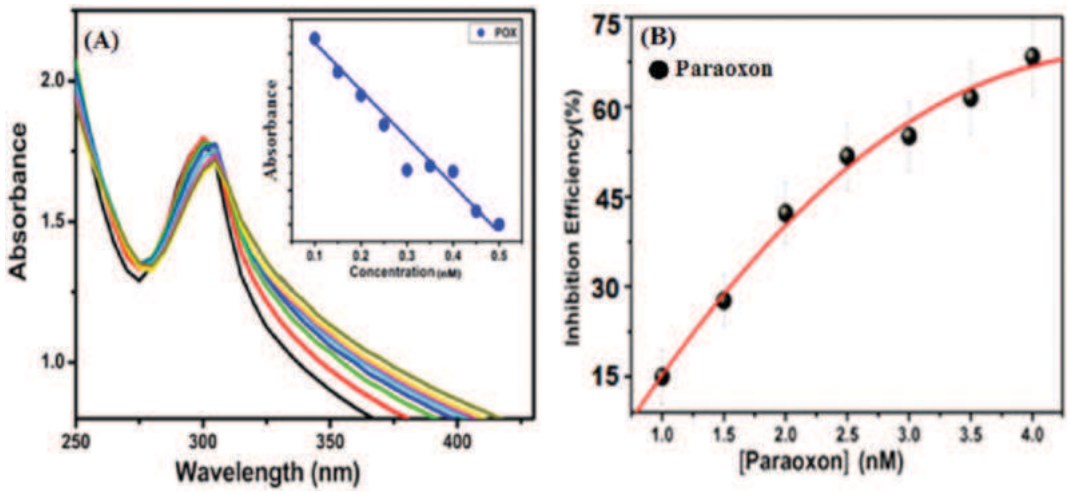


Fig. 6 (A) UV-visible spectra obtained at different concentrations of pesticide, inset: calibration graph of concentration *versus* absorbance; (B) linear calibration curve of inhibition of AChE with increasing concentration of different OPs with respect to absorbance *versus* concentration at room temperature (pH 7.4).

proposed sensor for various reversible and irreversible inhibitors, the system is checked for various inhibitors like chlorpyrifos, CPC, and Triton X-100, too.

3.4.2 Reactivation studies. The observed absorption peak showed reactivation of AChE by monopyridinium oximes (Fig. 7). The reactivation percentage was calculated using eqn (3).[43]

The maximum reactivation was observed at 1.0×10^{-3} M concentration of the oximes. The linear calibration curve of intensity *versus* concentration showed good linearity. The phosphorylation of an enzyme relies on the alkyl groups attached to a phosphorus atom. In comparison to other reported nanosensors, we have developed a dual output, efficient sensing method with high anti-interference capacity and fair sensitivity that can be used for OP detection.

To monitor the reliability of the system, structurally different monopyridinium oximes were tested for reactivation of inactivated AChE. The variation was in the position of the oxime moiety in the pyridinium ring. Observed % reactivation against POX was 65.3% (2-PAM), 48% (3-PAM), and 61.1% (4-PAM). Observed % reactivation against POX-inhibited AChE is found to be in good agreement with the reported values.[34] The representative graph of reactivation of POX-inhibited AChE by 2-PAM is presented in Fig. 7. Fig. 8 shows color variations in detection of different inhibitor and reactivator samples.

In the present investigation both reversible and irreversible inhibitors are examined as inhibitiors of AChE. In the case of the reversible inhibitor it is important to select an appropriate substrate concentration within the linear range of the calibration curve so that the level of inhibition by inhibitors is high enough.

The concentration of substrate was optimized separately for each toxicant. For irreversible inhibitors, it is mandatory to select the optimum concentration of AChE to achieve maximum sensitivity of the biosensor *i.e.*, the enzyme should be wholly involved in the process of decomposition of the enzyme substrate complex to obtain the final product.

The organophosphorous pesticides are irreversible inhibitors of AChE. They obstruct the serine residue present in the active site of

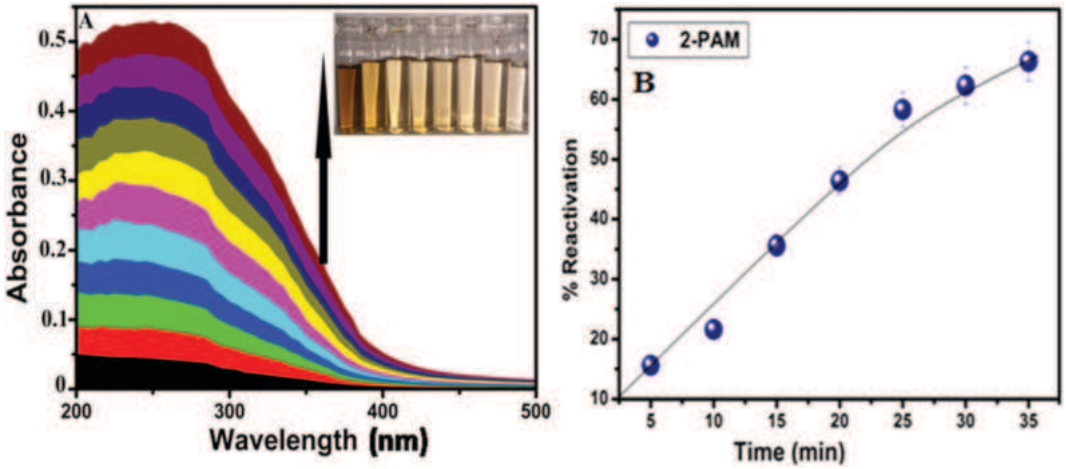


Fig. 7 Reactivation of AChE inhibited by paraoxon, using 2-PAM: (A) reactivation of AChE with different concentrations (0–100 μM) of reactivator, inset: picture of color changes with different concentration of oximes; (B) linear calibration curve between absorbance and concentration of reactivators at room temperature (pH 7.4).

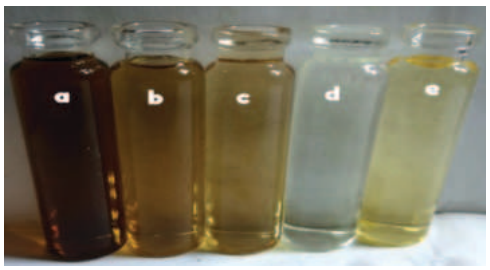


Fig. 8 Color variation during the reaction course: (a) CQD – dark brown color; (b) CQD + Cu^{2+} – light brown color; (c) CQD + Cu^{2+} + ATChI + AChE – lighter brown color; (d) CQD + Cu^{2+} + ATChI + AChE + POX – colorless; (e) CQD + Cu^{2+} + ATChI + AChE + POX + oxime – light yellow color.

AChE *via* the formation of a covalent bond between the phosphorous and oxygen of serine. The deactivation of AChE by cetylpyridinium chloride and Triton X-100 is reversible. To conquer the difficulty of irreversible enzyme poisoning during the experimental exercise of AChE-based biosensors, recovery of the enzyme by oximes was explored. Oximes are α-nucleophilic compounds that remove the phosphoryl entity bonded to serine in the active site of AChE. The least regeneration of POX inhibited AChE was observed with 3-PAM. However, the reactivation ability of the tested oxime reactivators was found to be dependent on the position of the oxime group on the pyridinium ring. The order of reactivity was similar to that reported in the literature *i.e.*, 2-PAM > 4-PAM > 3-PAM as summarized in Table 2.

4. Conclusions

In summary, a convenient and sensitive dual detection method was successfully developed for monitoring inhibition and reactivation of AChE using carbon quantum dots. In this study we found that fluorescent carbon quantum dots were not directly affected by inhibitors. The sensing approach was mounted through the quenching of increased fluorescence of CQDs by a Cu^{2+} complex with the recovery of fluorescence upon the production of a sulfhydryl compound by the catalytic hydrolysis of ATChI. OPs are well-known AChE inhibitors; and are selected as examples to analyse the promising application in inhibitor assays. The limits of detection and quantification values obtained from spectroscopic methods were acceptable. Moreover, this developed analytical approach has the added advantages of using highly fluorescent carbon quantum dots. The assay offers a convenient and quick approach for inhibitor and reactivator screening with high sensitivity. The present analytical scheme has a benefit of applying extremely fluorescent CQDs to detect deactivators of AChE without any enzyme immobilization step.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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Facile and visual detection of acetylcholinesterase inhibitors by carbon quantum dots†

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Sensitive and rapid detection of organophosphate toxicants is highly relevant and important in environmental protection and food safety. Owing to this, a carbon quantum dot (CQD)-based bio-platform was designed for dual detection (fluorometric and colorimetric) of reversible and irreversible inhibitors of enzyme acetylcholinesterase (AChE). The detection strategy is based on the fluorescence quenching and recovery of CQDs through Cu^{2+} ions, AChE and its substrate, acetylthiocholine iodide (ATChI). Initially, enhanced fluorescence of CQDs is effectively quenched by Cu^{2+} ions and later on recovered by catalytic hydrolysis of ATChI *via* the formation of Cu–S bonds by release of thiol compounds. In the presence of inhibitors, the fluorescence of CQDs remains quenched due to the blocked activity of the enzyme but in the presence of oximes the fluorescence is recovered depending upon the ability of the oxime reactivators to regenerate AChE. The fluorescence quenching and recovery is visible with color variations. The sensor facilitates good sensitivity for quick detection of both reversible (CPC, 0.62 ng mL^{-1}; Triton-X; 1.02 ng mL^{-1}) and irreversible (paraoxon, 0.21 ng mL^{-1}; chlorpyrifos, 0.46 ng mL^{-1}) inhibitors. However, strong inhibition of AChE is a major hurdle in practical implementation of biosensors; hence, the system is tested for reactivation of inactivated AChE by monopyridinium oximes and percentage reactivation was also calculated.

1. Introduction

Acetylcholinesterase (AChE) is the most crucial enzyme responsible for the proper functioning of the nervous system in humans, vertebrates and insects. When the amount of this enzyme is reduced below a critical level, nerve impulses to the muscle can no longer be controlled, causing dysfunction and even death from respiratory or cardiac failure.[1,2] Toxic compounds such as pesticides, surfactants, heavy metals *etc.* target this enzyme, and deactivate it through covalent bonding at the serine residue of the active site.[3,4]

Organophosphate pesticides (OPs) are generally used to increase agricultural productivity in developing countries like India.[5,6] Due to their acute toxicity, bioaccumulation and environmental persistence, there always exists a potential risk to human health and the environment. These hydrophobic pesticides are recognized as irreversible inhibitors of AChE and have great affinity towards it.[7,8]

Surfactants are an integral part of routine life and essentially applied for personal hygiene. After use, large amounts of surfactants are discharged into the environment leading to its contamination, preferentially, of water.[9,10] Moreover, surfactants are reported as inhibitors of cholinesterase enzymes in aquatic animals.[11] Keeping all this in view, it is really important to develop suitable, prompt and simple detection methods for effective monitoring of inhibitors of AChE.

In recent years different colorimetric,[12] electrochemical,[13] chemiluminometric[14,15] and fluorometric[16,17] techniques have been developed to detect pesticides through biosensor-based approaches. AChE is widely applied as a biosensor to detect toxic OPs and has attracted much more attention due to several advantages in terms of instant response, simple operation, low cost and sensitivity. The most common and conventional colorimetric detection method uses Ellman's reagent along with the substrate acetylthiocholine iodide (ATChI).[18–21] Another important detection technique involved oxidation of the AChE resulting in the production of choline along with H_2O_2. The hydrolysis process of neurotransmitter acetylcholine (ACh)by AChE is blocked in the presence of inhibitors, and this is reflected by the decreasing fluorescence intensity of the QDs.[22,23] Some fluorescence-based methods have also been designed to screen inhibitors of AChE with better sensitivity.[24–26]

A rising nanomaterial, CQDs, have attracted great attention from researchers worldwide due to their extraordinary tunable

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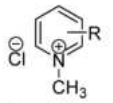
fluorescence characteristics, steady photoluminescence properties, smooth surface functionalization, low toxicity, excellent biocompatibility and chemical durability.[27–29] They are extensively applied in bio-imaging, drug delivery, biosensing and photocatalysis.[30–33] Their stupendous advantages over organic dyes and other nanomaterials (like semiconductor quantum dots and metal nanoclusters) make them a tremendous fluorophore to develop various *in vitro* and *in vivo* fluorescent biosensors.[8,9] Current research[34,35] shows that carbon quantum dots have been effectively utilized to establish several fluorescent assays for different enzymatic processes and in detection systems.

The application of nanomaterials like metal nanoparticles and semiconductor quantum dots has become the first choice of scientists as a detection system.[51–54] The combination of carbon dots and enzyme serves as a prominent fluorescent probe with superior accuracy and detection efficiency for quantification of various pesticides. Du *et al.* reported the synthesis and application of CQDs in the detection of OPs using butyrylcholinesterase (BChE) through fluorescence resonance energy transfer (FRET).[1] Feng *et al.*[29] reported a new and convenient fluorometric method that uses CQDs and ACh as the signal reporter and substrate for assaying AChE activity and its inhibitors. Tian *et al.*[6] proposed a label-free strategy for quick and responsive detection of organophosphate pesticides through a dual-readout (fluorometric and colorimetric) channel based on fluorescent carbon dots. The studies reported that in the presence of OPs, the activity of AChE was hindered, leading to the restoration of the fluorescence signal and the decrease of absorbance intensity with color variation. For several years we have also been engaged[37–41] in detoxification and decontamination of OPs in toxicants. We have designed and synthesized several reactivators of AChE against chemical warfare agents and pesticides;[37,39] and now the present investigation aims at the development of a detection system for different inhibitors of AChE through CQDs. We report a reliable, continuous and convenient dual detection method (colorimetric and fluorometric) for irreversible (Scheme 1a) and reversible inhibitors (Scheme 1b) of AChE. Reactivation of inhibited AChE has also been investigated using a series of monopyridinium oximes (Scheme 2).



(A) R= 2-CH=NOH,2-pyridine aldoxime methyl chloride (2-PAM)
(B) R= 3-CH=NOH,3-pyridine aldoxime methyl chloride (3-PAM)
(C) R= 4-CH=NOH,4-pyridine aldoxime methyl chloride (4-PAM)

Scheme 2 Structures of tested monopyridinium oxime.

2. Experimental

2.1 Materials and reagents

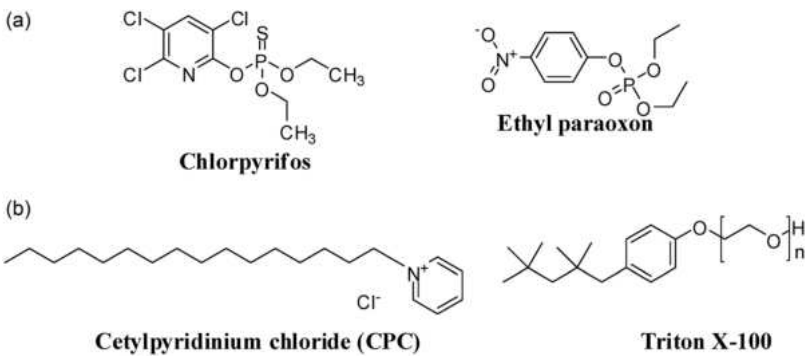
Activated charcoal, copper(II) sulphate ($CuSO_4$), acetylthiocholine iodide (ATChI), eel-acetylcholinesterase (AChE) (EC.3.1.1.7), ethyl paraoxon (paraoxon), chlorpyrifos, cetylpyridinium chloride (CPC), Triton X-100, potassium dihydrogen phosphate and di-potassium hydrogen phosphate were purchased from Sigma-Aldrich Pvt. Ltd, Bangalore, India and were used as received without further purification. Monopyridinium oximes were synthesised and characterized in the laboratory of Dr Kamil Kuca, Center of Advanced Studies, Faculty of Military Health Sciences, the University of Defence, Czech Republic. All solutions were prepared using Milli Q water.

2.2 Methods

The UV-Vis spectra were recorded using a Cary-60 spectrophotometer (Agilent techologies). Fluorescence spectra were recorded using a Cary eclipse fluorescence spectrometer (G9800A Agilent technologies) equipped with an attached Cary temperature controller and xenon arc lamp system. The excitation and emission wavelengths were recorded at 350 nm and 400–550 nm, respectively. The shape and structure of the CQDs were studied using a JEOL, JEM-2100F transmission electron microscope (TEM) with a 200 kV accelerating voltage operating system at National Chemical Laboratory, Pune (India). FT-IR spectra were obtained using a Nicolet iS10 spectrometer (Thermofisher) using KBr pellets. The pH was determined by using a 700 EUTECH Instruments pH meter.

2.3 Synthesis and characterization of CQDs

The CQDs can be synthesized and characterized *via* various simple and sensitive techniques as reported in literature.[42–45]



Scheme 1 (a) Structures of tested irreversible inhibitors. (b) Structures of tested reversible inhibitors.

Chemical oxidation was chosen as the preparation method in this study because it can significantly introduce oxygen-containing groups (like hydroxyl and carboxyl) to CQDs and provide excellent aqueous solubility and functional groups on the surface. The CQDs were synthesized by chemical oxidation method of activated charcoal. Activated charcoal was added into a mixture of concentrated sulphuric acid and nitric acid. The mixture was taken in oven at 100 °C for 4 h. After cooling, purified using a dialysis membrane which retained CQDs of the required size.[28,29]

2.4 AChE assay

For determining the activity of AChE, discrete volumes of AChE ranging from 10–50 mU mL^{-1} were first incubated with substrate ATChI (370 μL) for 1 h and then poured into 2.5 mL of CQDs solution (pH 7.4, at room temperature) containing 3 μL of Cu^{2+} (10.5 μM). After incubation of 15 minutes, UV-Vis spectra (at 200–500 nm) and fluorescence spectra (at 300–600 nm) were recorded.

2.5 Inhibitor screening

For monitoring the AChE inhibition, various reversible (CPC, and Triton-X 100) and irreversible (chlorpyrifos, and paraoxon) inhibitors were selected. Initially, appropriate concentration of the inhibitor was incubated with AChE for 30 min at room temperature to obtain an inhibition cocktail. Then the resulting cocktail was incubated for 15 min with ATChI. The obtained mixture was poured into 2.5 mL CQDs (pH 7.4) containing 3 μL of Cu^{2+} (10.5 μM) and incubated for 15 min again. Furthermore, the absorption and fluorescence spectra were recorded. The same protocol was applied to monitor the inhibition potencies of structurally different inhibitors.

The degree of AChE inhibition was measured with decrease in absorption at 300 nm for the UV-Vis technique and intensity at 550 nm for fluorescence. The following equations were used to calculate % inhibition.

For the fluorescence method

$$\text{Inhibition efficiency } (\%) = \frac{F_{\text{no inhibitor}} - F_{\text{inhibitor}}}{F_0 - F_{\text{inhibitor}}} \times 100 \quad (1)$$

For the UV-Vis method

$$I\% = \left(\frac{i_0 - i_i}{i_0}\right) \times 100 \quad (2)$$

where, i_0 is native activity of enzyme without inhibitor (in terms optical density), i_t is from the activity of enzyme in the presence of inhibitor, $F_{\text{inhibitor}}$ denotes the fluorescence intensity in the presence of AChE, ATChI, CQDs, Cu^{2+} and inhibitor, F_0 is the fluorescence intensity in the absence of inhibitor and $F_{\text{no inhibitor}}$ stands for fluorescence of a mixture of ATChI, CQDs and Cu^{2+}.

2.6 Reactivation studies

For screening of reactivation ability of reactivators, initially the inhibition cocktail was prepared (as mentioned earlier) with irreversible inhibitors. After confirming the inhibition, reactivators (10 μL, stock solution 0.1 M) were added to the inhibition mixture to obtain the reactivation cocktail, with incubation time 20 min. Then a 10 μL aliquot was withdrawn and added to 2.5 mL of CQDs containing 3 μL of Cu^{2+} (10.5 μM) and incubated for 15 min. Now the absorption and fluorescence spectra were obtained.

The extent of AChE reactivation was calculated as an increase of the absorption peak at 300–450 nm and emission peak at 560 nm. Eqn (3) and (4) were used to calculate reactivation potency.

For the fluorescence method

$$R\% = \frac{F_r - F_t}{F_0 - F_t} \times 100 \quad (3)$$

For the UV-Vis method

$$R\% = \frac{A_r - A_t}{A_0 - A_t} \times 100 \quad (4)$$

where, A_0 is absorption and F_0 is intensity of the controlled intact enzyme, A_t and F_t are the activity of the inhibited enzyme and A_r and F_r are the activity of the reactivated enzyme.

3. Results and discussion

3.1 Characterization of CQDs

The resulting CQDs are mono-dispersed in the range of 2–5 nm as measured by TEM images shown in Fig. 1D. The synthesised CQDs exhibited strong blue fluorescence under UV lamp and the fluorescence emission spectra were recorded at 460 nm at the excitation wavelength of 380 nm (Fig. 1A). The fluorescence spectra of different excitation ranges (at 330–415 nm) are shown in Fig. 1B. CQDs are also characterized by FT-IR spectrum. As depicted in Fig. 1C the transmittance bands at 3391 cm^{-1} and 2880 cm^{-1} are due to the stretching vibration of O–H and C–H bonds, respectively. The transmittance peaks at 1065 cm^{-1} and 1100 cm^{-1} are due to C–O stretching vibration of C═O bonds approximately, and the absorption bands at 1351 cm^{-1} and 1456 cm^{-1} showing C–H bending vibration are also obtained. The quantum yield of CQDs was calculated to be 11.7% using quinine sulphate as a reference. The pH effect (ranging from 4–10 pH) on fluorescence activity of CQDs is also observed. As we increase the pH, fluorescence intensity first increases and then starts to decrease as at high pH the CQDs agglomerated.[29] pH 7.4 was recognized as the optimum pH to carry out the detection (which was supported by Fig. 1E).

3.2 Optimal conditions for detection of AChE activity using Cu^{2+} ions

The proposed detection method is based on competitive binding of CQDs, Cu^{2+} and thiocholine. The fluorescence of the system is quenched by copper ions and recovered by thiol containing compounds. Many common ions such as Na^+, Zn^{2+}, Al^{3+}, Fe^{2+}, Hg^{2+} and Cu^{2+} have been tested for the system but Cu^{2+} ions are recognized to have the highest quenching efficiency toward CQDs (presented in Fig. 2a and b). Cu^{2+} at low concentration is able to quench the fluorescence of CQDs.[34]

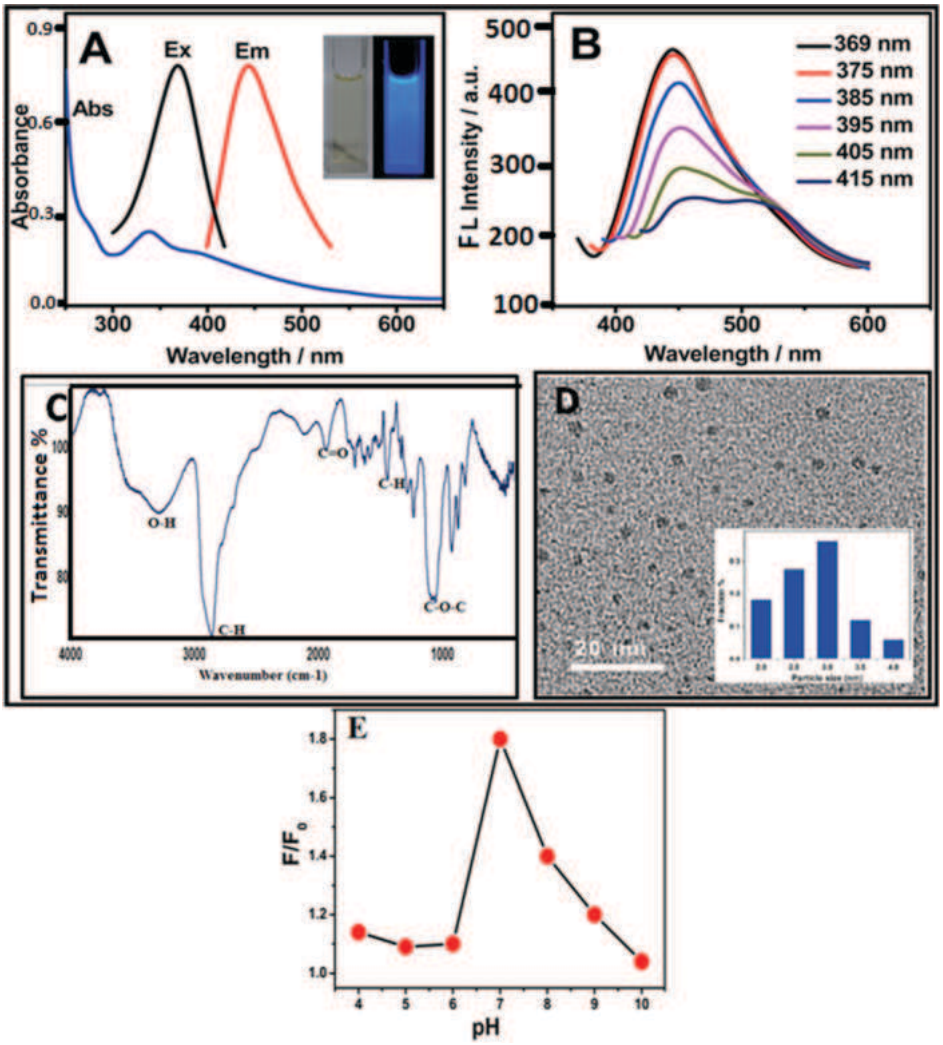


Fig. 1 (A) Excitation, emission and absorption spectra of CQDs, inset: picture of CQDs under the radiation of white light (left) and UV lamp (right); (B) fluorescence spectra of CQDs at different excitation ranges; (C) FTIR spectrum of CQDs; (D) TEM image of CQDs; (E) pH effect on fluorescence activity of CQDs.

Different amounts of Cu^{2+} (0–110 μM) were mixed into the CQDs solution. The rate of decrease in fluorescence was proportional to the concentration of Cu^{2+} and resulted in a logarithm curve. Ultimately, the optimum quenching concentration was found to be 50 μM of Cu^{2+}. As reported, Cu^{2+} has superior affinity (Fig. 2) for the carboxylic group on the CQD

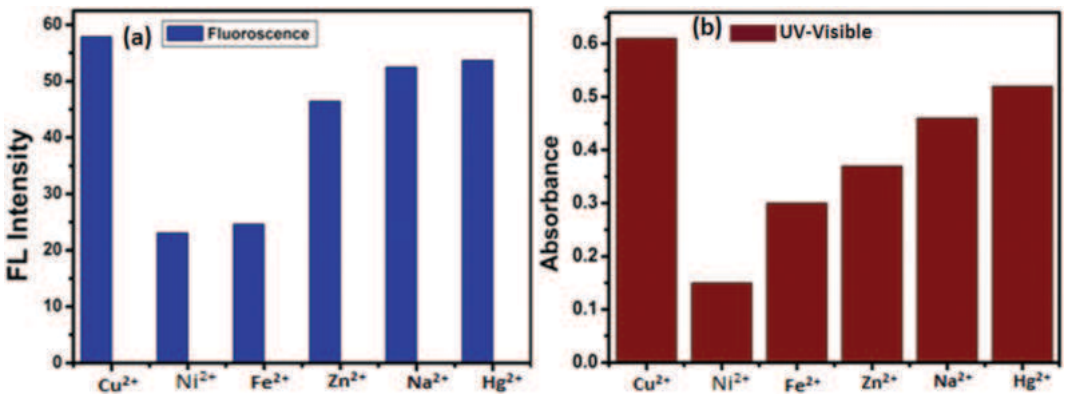
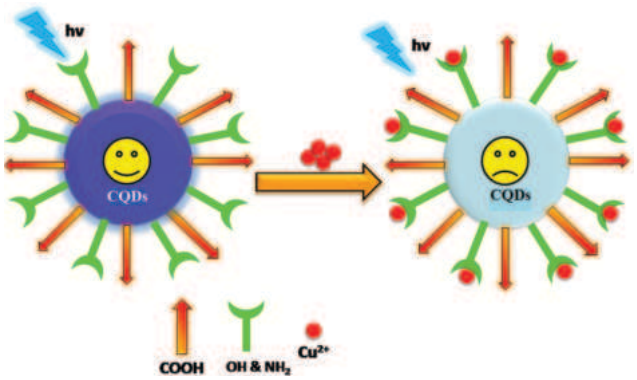


Fig. 2 The selectivity of the sensing system towards different metal cations including Cu^{2+}, Ni^{2+}, Fe^{3+}, Zn^{2+}, Na^{+} and Hg^{2+}: (a) fluorescence intensity; (b) UV-Vis absorption.



Scheme 3 The fluorescence quenching mechanism of CQDs by Cu^{2+}.

surface compared to other metal ions. The specific and potent quenching was assumed to be due to electron or energy transfer from the CQDs to Cu^{2+}.[46,47] It is observed that the carboxyl group of the CQDs served as an efficient ligand for copper ions, which can result in strong quenching of the fluorescence of CQDs due to their severe aggregation caused by copper ions. The possible mechanism of quenching of CQDs by Cu^{2+} is shown in Scheme 3.

In the presence of Cu^{2+}, CQDs fluorescence was fully reduced at 0.01 M. After quenching, the mono-dispersed CQDs (size, 2 to 4 nm) changed into aggregates and formed a CQD nanoassembly. So, the fluorescence quenching of CQDs due to copper ions is attributed to accumulation of CQDs. Biothiol compounds (glutathione (GSH) or cysteine (cys)) can selectively bind to Cu^{2+} through Cu–S bonding interaction. Due to this, the Cu^{2+}–CQDs system is completely decomposed and recovery of the fluorescence signal is noted.[40–42] The observed fluorescence recovery with the addition of cys or GSH (435 nm) is presented in Fig. 3A. The highest recovery ratio of 90% is attained and is due to higher affinity of the thiol group towards copper ions. This competitive bonding results in breakdown of Cu^{2+}–CQDs aggregates and leads to rearrangement of CQDs in their dispersed state shown in Fig. 3B and C. This assumption was also confirmed by comparing the morphology of CQDs in the absence and presence of GSH shown in Fig. 3C and D, respectively. CQDs were aggregated and a well-dispersed state in the presence of GSH is achieved. The resultant increment in fluorescence through cys or GSH is ascribed to effective disaggregation of CQDs.

During the quenching, ATChI was added to the Cu^{2+}–CQDs solution. Recovery of fluorescence due to ATChI action is shown in Fig. 3C and shows that there is a continuous increase in CQDs emission with respect to increase in concentration of ATChI. The reason for fluorescence recovery of CQDs is the formation of a Cu–S bond between the hydrolysed product of ATChI, *i.e.* thiocholine and Cu^{2+}. As we increase the concentration of ATChI substrate relative to the Cu^{2+}–CQDs solution, Cu^{2+} gets desorbed from the CQDs surface. The graph plotted between fluorescence intensity and the ATChI concentration, and logarithmic relationship was calculated in the range of 0–110 μM ATChI. An increase in fluorescence recovery ratio was observed with increasing concentration of ATChI.

By the fluorescence quenching mechanism of the CQD system the activity of AChE also was determined under the most favourable conditions. Fig. S1 and S2A and B (ESI†) show the fluorescence and absorbance spectra of CQDs after addition of copper ions, and those of ATChI and AChE are shown in Fig. S3 (ESI†). The results revealed that after addition, copper ions triggered most of the fluorescence quenching of CQDs, due to aggregation. Then addition of ATChI (Fig. S1C and S2C, ESI†) into CQDs–Cu^{2+} systems exhibited no significant changes in fluoresence intensity due to negligible interaction between them. But after transferring the mixture of ATChI and AChE (incubation time 80 min) to the CQD–Cu(II) system depicted in Fig. S1D (ESI†), the FL intensity recovers to more than that of the quenched fluorescence.

The effects of pH value and temperature on the fluorescence behaviors of CQDs, Cu^{2+}, ATCh, and AChE at different pH values and temperatures were also investigated. Investigation showed that there is a linear relationship between increasing values of F_0/F with change in pH values (6–10) and with temperature change (10–50 °C) (Fig. S4a and b, ESI†). In neutral or weakly alkaline conditions (pH 7–8) and at room temperature (30 °C) the fluorescence quenching degree (F_0/F) becomes maximum, which would benefit the analysis.

For the quantification of the developed fluorometric assay for AChE, other biological matrixes including human serum albumin (HSA), bovine serum albumin (BSA), chymotrypsin, trypsin, L-valline (val) and L-leucine were also measured as control samples. AChE exhibited outstanding response with the lowest concentration as compared to other tested species and was found to have the highest affinity and selectivity towards the CQD–Cu^{2+} system. This confirms the feasibility of the system *via* AChE. Fig. S5 (ESI†) shows AChE activity at different time intervals.

3.3 Fluorescence monitoring

3.3.1 Inhibition studies. Inhibitor screening was performed through the fluorescence (FL) technique. The long lasting function of enzyme-based biosensors could be acutely prohibited by the very structure of the inhibitors being determined. The results may be either reversible or an irreversible inhibition of the enzyme. All structurally different inhibitors may combine with the active site of the enzyme competing with the substrate and may show competitive inhibition. In irreversible inhibitors, interaction of enzyme–inhibitor carried out a covalent bond formation of the enzyme active centre with the inhibitor. This means, in that case enzyme–inhibitor complex decomposition *via* destruction of the enzyme like its hydrolysis, oxidation *etc.*, and irreversible poisoning corresponds to blocking the enzyme's biological function. For irreversible inhibition, an optimum incubation time of 10–20 minutes is generally required. Indeed, inhibition of AChE by paraoxon and chlorpyrifos requires 17 minutes while with that of Triton X-100 and CPC takes around 25 minutes for inhibition.

To establish the analytical features of the developed sensor, fluorescence was used to quantify two different enzyme inhibitors; irreversible (pesticide; chlorpyrifos, and paraoxon (POX)) and reversible (surfactants; CPC, and Triton X-100) within the concentration range of 0.01 to 0.16 μM. The observed differences in the

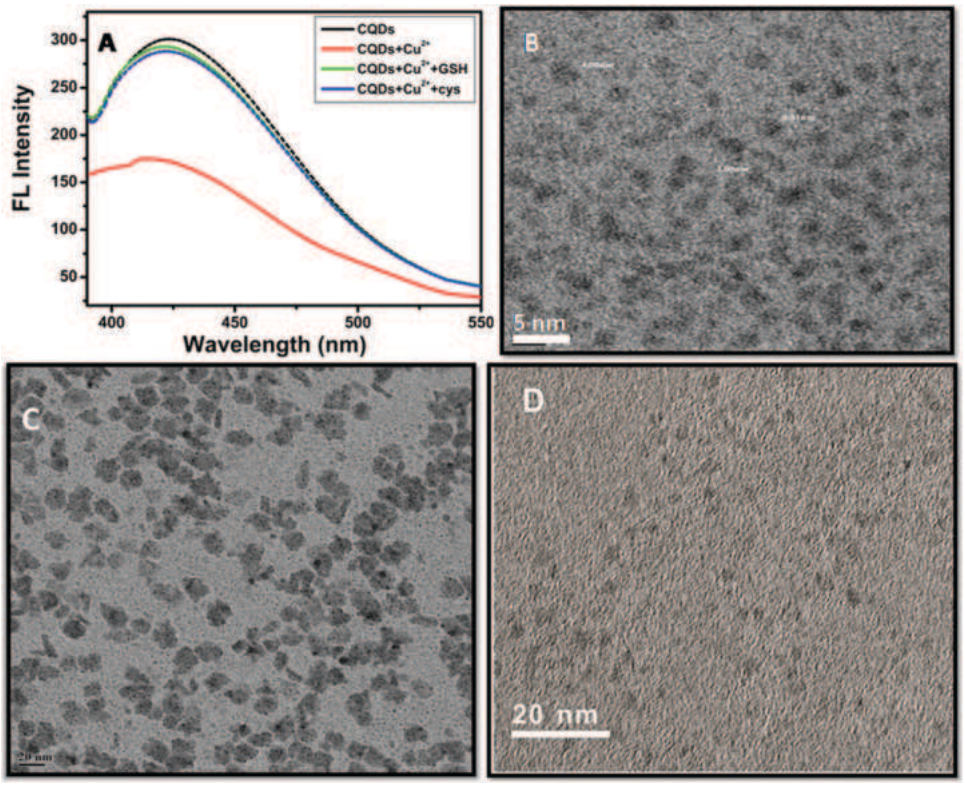


Fig. 3 (A) The changes of fluorescence spectra of CQDs in the presence of different compositions; bare CQDs; (CQDs + Cu^{2+}), (CQDs + Cu^{2+} + GSH) and (CQDs + Cu^{2+} Cys); (B) TEM image of bare CQDs in their dispersed state; (C) TEM image of CQDs–Cu(II) aggregates; (D) graph of relative frequency *versus* size of CQDs and thiol compounds.

inhibition signal can be directly related to the structural diversities of the inhibitors or the groups attached. Paraoxon is recognized as a more potent inhibitor of AChE than chlorpyrifos (Table 1). The observed result is due to higher electronegativity of oxygen in P═O ester (POX) than that of sulphur in P═S bonds (chlorpyrifos). This facilitates higher polarization of P═O bonds and a more electrophilic phosphorus atom; hence, a smooth attack on the P-atom occurs. The nature of such a group definitely influences the interactive force between oximes and OPs. Fig. 4 presents the calibration graphs for each pesticide with the respective linear fit analysis. The slopes of each calibration plot resulted in estimation of the limit of detection (LOD) and quantification (LOQ) for both pesticides. The lowest LOD was obtained for paraoxon followed by chlorpyrifos, CPC and Triton X-100, respectively, as shown in Table 1.

The biosensor's sensitivity to non-ionic and cationic surfactants was also tested. The fluorescence spectra and comparative inhibition graphs are shown in Fig. 4(c and d). A possible mechanism of enzyme inhibition by surfactants is as follows: long hydrophobic tails of surfactants intercalate among amino acid residues that compose the hydrophobic cores of the enzyme molecules and tend to avoid water environments. Due to this reason, the three-dimensional structure of the enzyme changes, resulting in a decrease in enzyme activity. Furthermore, it is believed that the arrangement of the charged groups on the surface of the enzyme serves to electrostatically guide polar substrates to its active enzymatic site; thus, modification of the charged pathway to the active site (that is caused by anionic and cationic groups of surfactants) would compromise activity.[3,4]

Table 1 The analytical characteristics of AChE inhibitory analysis of toxic compounds of different natures

		UV-visible (ng mL^{-1})		Fluorescence (ng mL^{-1})	
S. no.	Inhibitors	LOD	LOQ	LOD	LOQ
1	Paraoxon	0.21	0.24	0.11	0.79
2	Chlorpyrifos	0.46	0.45	0.26	0.56
3	CPC	0.62	1.19	0.38	0.83
4	Triton X-100	1.02	3.39	1.26	3.80

3.3.2 Reactivation of inhibited AChE. Understanding the mechanism of reactivation of enzymes is of great importance to several chemists and biochemists. To succeed in dealing with the difficulty of irreversible enzyme inhibition in the application of cholinesterase-based biosensors, reactivation by a series of monopyridiniums has been monitored. Oximes were added to inhibition cocktails to check their reactivation potency.

The observed reactivation data by monopyridinium oximes against pox-inhibited AChE are presented in Table 2. The fluorescence pattern of reactivation is also presented in Fig. S6 (ESI†). The regeneration of OP-inhibited AChE is influenced by some factors like nucleophilicity of oxime, the position of the nucleophile and dealkylation or aging of the OPs–AChE complex. However, an efficient and instant reactivator for a broad spectrum of OP-poisoning is still lacking. We have tried

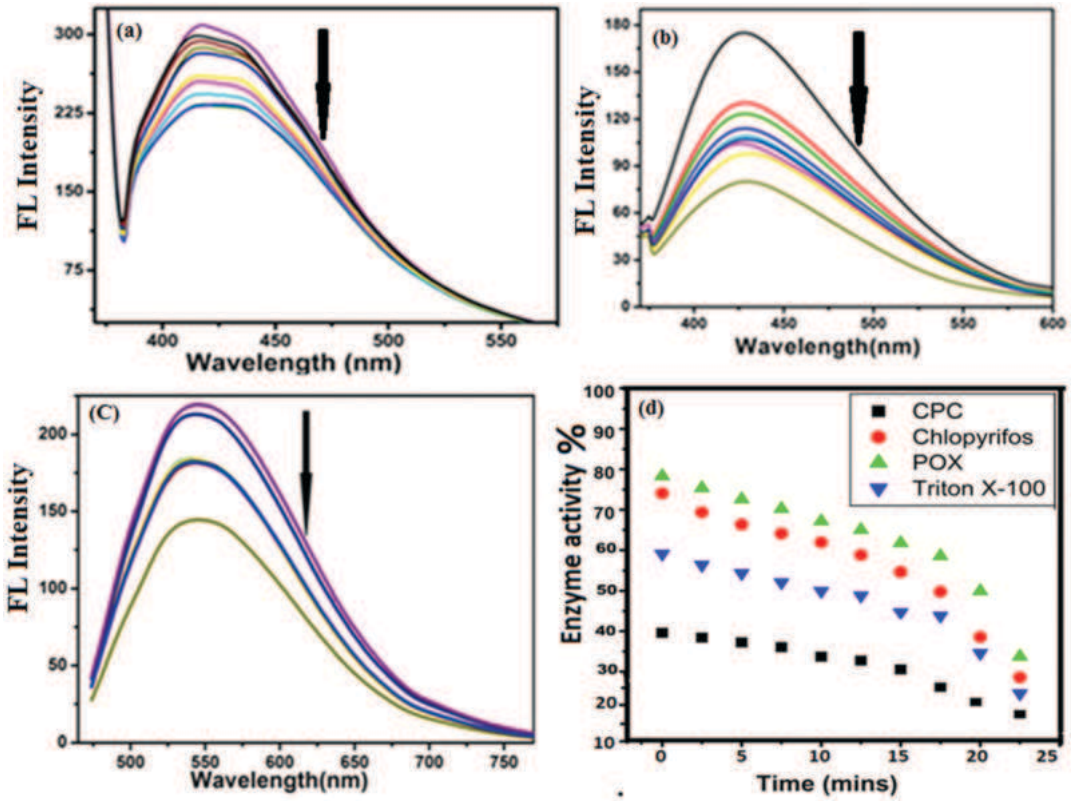


Fig. 4 Fluorescence spectra of (a) chlorpyrifos; (b) paraoxon; and (c) Triton X-100; (d) comparative % inhibition efficiency of reversible and irreversible inhibitors at room temperature (pH 7.4).

Table 2 Comparative reactivation data of paraoxon-inhibited AChE

		% reactivation		
Inhibitor	Oximes	UV	FL	Literature (through Ellman's assay)
Paraoxon	2-PAM	65.3	68.8	68[a,b]
	3-PAM	48.0	51.5	31[a,b]
	4-PAM	61.1	63.0	66[a,b]

[a] Ref. 36. [b] Ref. 38.

to develop a new and simple method by using nontoxic carbon quantum dots and oximes with lower molecular weight and of smaller size to reduce the OP poisoning effect. Recently, Satnami *et al.*[48] reported the detection of organophasphorous pesticides (OPs) in real water samples. The group also monitored AChE inhibition and reactivation using a gold nanoprobe by a UV-Vis spectroscopic method.

Under the optimal experimental conditions, we investigated the quantitative range of the prepared biosensor for the detection of ethyl paraoxon. Since AChE is an excellent biomarker for risk assessment, its regeneration is extremely essential. According to reported studies,[49,50] poisoned-AChE can be recovered by several nucleophilic compounds; hence, in the present study monopyridinium oximes were selected as an activity recovery agent.

The observed results for reactivation by the fluorescence technique are in good agreement with the achieved results with UV-Vis studies shown in Fig. 5. To the best of our knowledge for the very first time a dual detection system for inhibition and reactivation of AChE is reported with a CQDs and Cu^{2+} system. The observed % reactivation for POX-inhibited AChE obtained by fluorescence studies is 68.8% for 2-PAM, 51.5% for 3-PAM and 63% for 4-PAM. The observed results are also compared with literature values (where reactivation was performed using Ellman's assay) and are in good agreement.

3.4 UV-visible monitoring

3.4.1 Inhibition studies. To select the most favourable conditions for the determination of the inhibitor, responses of biosensors towards substrates were measured in the presence and absence of structurally different inhibitors. To estimate a dual readout signal for OP detection, we mixed the CQDs/Cu^{2+}/ATChI/AChE system with various concentrations of paraoxon and other inhibitors and recorded the absorption peaks of the system. It was observed (Fig. 6) that the absorption intensity of the CQDs/Cu^{2+}/ATChI/AChE system at 300 nm decreases progressively with rising concentration of paraoxon in the range 0.01 to 0.16 μM. Fig. 6 is the linear fit with different concentrations. The incubation times of paraoxon and AChE were also measured; we have observed that the inhibition occurred instantly with the addition of paraoxon and the reaction was finished within 15–17 minutes.

As shown in Fig. 6, absorbance of the system at 300 nm continuously decreased with increasing concentration of paraoxon. To validate the broad spectrum functioning of the

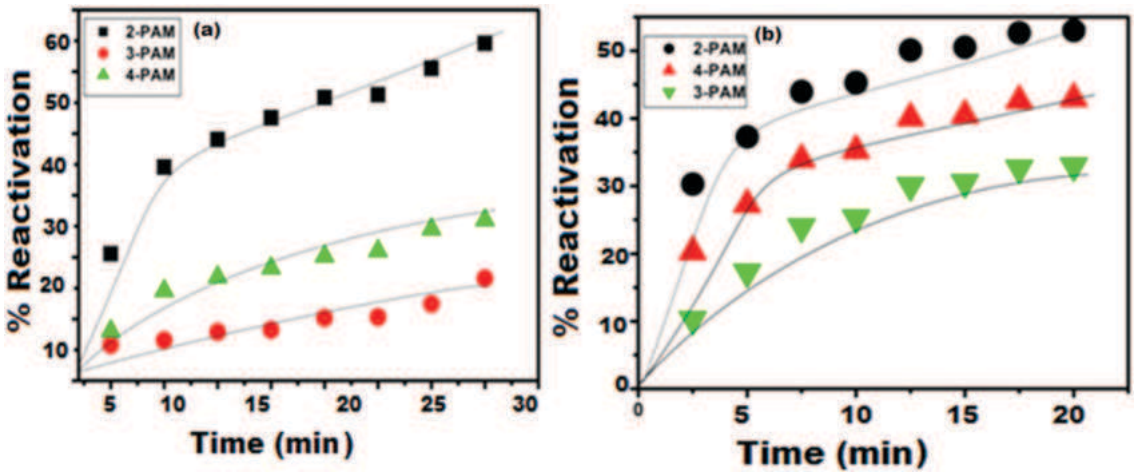


Fig. 5 Comaparative spectra of oximes: (a) UV-Vis spectra and (b) fluorescence spectra.

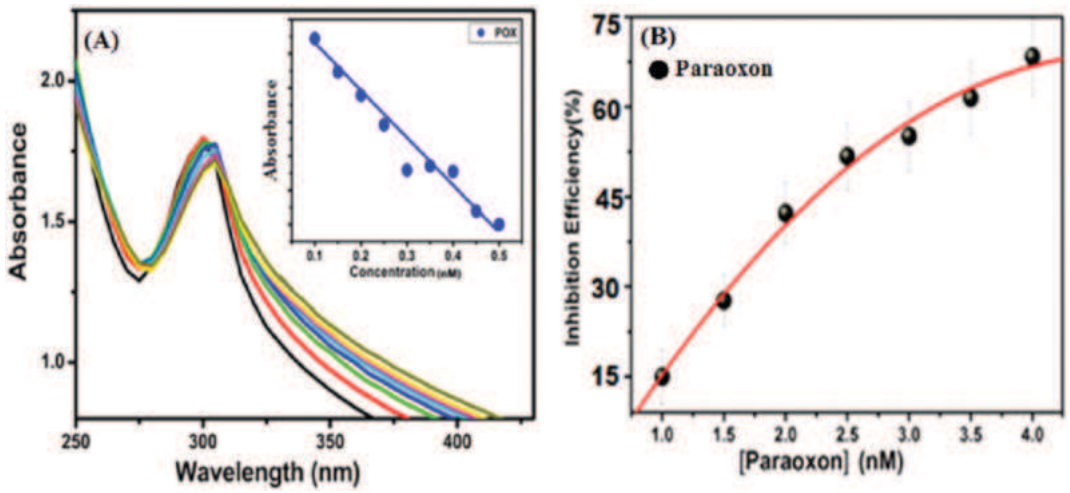


Fig. 6 (A) UV-visible spectra obtained at different concentrations of pesticide, inset: calibration graph of concentration *versus* absorbance; (B) linear calibration curve of inhibition of AChE with increasing concentration of different OPs with respect to absorbance *versus* concentration at room temperature (pH 7.4).

proposed sensor for various reversible and irreversible inhibitors, the system is checked for various inhibitors like chlorpyrifos, CPC, and Triton X-100, too.

3.4.2 Reactivation studies. The observed absorption peak showed reactivation of AChE by monopyridinium oximes (Fig. 7). The reactivation percentage was calculated using eqn (3).[43]

The maximum reactivation was observed at 1.0×10^{-3} M concentration of the oximes. The linear calibration curve of intensity *versus* concentration showed good linearity. The phosphorylation of an enzyme relies on the alkyl groups attached to a phosphorus atom. In comparison to other reported nanosensors, we have developed a dual output, efficient sensing method with high anti-interference capacity and fair sensitivity that can be used for OP detection.

To monitor the reliability of the system, structurally different monopyridinium oximes were tested for reactivation of inactivated AChE. The variation was in the position of the oxime moiety in the pyridinium ring. Observed % reactivation against POX was 65.3% (2-PAM), 48% (3-PAM), and 61.1% (4-PAM). Observed % reactivation against POX-inhibited AChE is found to be in good agreement with the reported values.[34] The representative graph of reactivation of POX-inhibited AChE by 2-PAM is presented in Fig. 7. Fig. 8 shows color variations in detection of different inhibitor and reactivator samples.

In the present investigation both reversible and irreversible inhibitors are examined as inhibitiors of AChE. In the case of the reversible inhibitor it is important to select an appropriate substrate concentration within the linear range of the calibration curve so that the level of inhibition by inhibitors is high enough.

The concentration of substrate was optimized separately for each toxicant. For irreversible inhibitors, it is mandatory to select the optimum concentration of AChE to achieve maximum sensitivity of the biosensor *i.e.*, the enzyme should be wholly involved in the process of decomposition of the enzyme substrate complex to obtain the final product.

The organophosphorous pesticides are irreversible inhibitors of AChE. They obstruct the serine residue present in the active site of

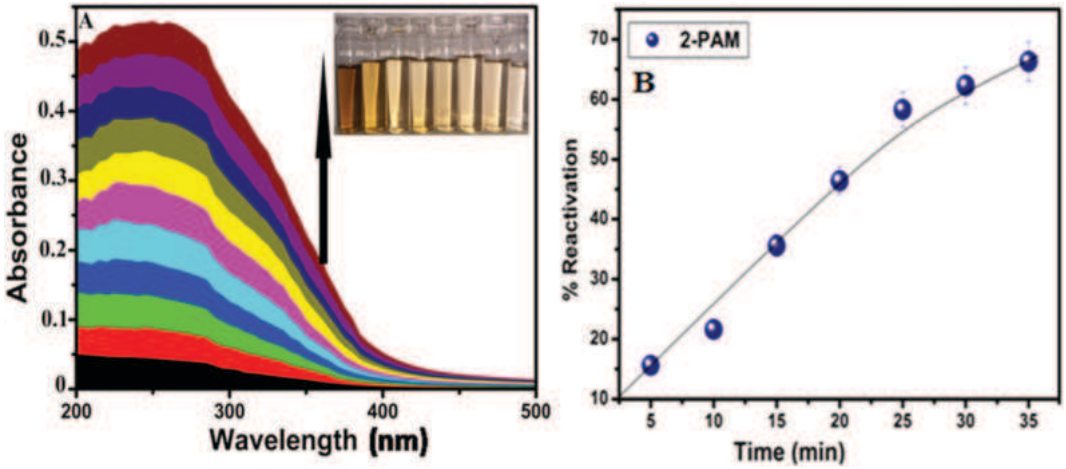


Fig. 7 Reactivation of AChE inhibited by paraoxon, using 2-PAM: (A) reactivation of AChE with different concentrations (0–100 μM) of reactivator, inset: picture of color changes with different concentration of oximes; (B) linear calibration curve between absorbance and concentration of reactivators at room temperature (pH 7.4).

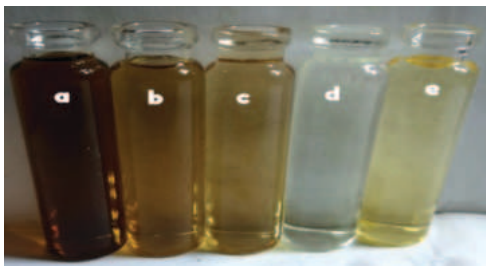


Fig. 8 Color variation during the reaction course: (a) CQD – dark brown color; (b) CQD + Cu^{2+} – light brown color; (c) CQD + Cu^{2+} + ATChI + AChE – lighter brown color; (d) CQD + Cu^{2+} + ATChI + AChE + POX – colorless; (e) CQD + Cu^{2+} + ATChI + AChE + POX + oxime – light yellow color.

AChE *via* the formation of a covalent bond between the phosphorous and oxygen of serine. The deactivation of AChE by cetylpyridinium chloride and Triton X-100 is reversible. To conquer the difficulty of irreversible enzyme poisoning during the experimental exercise of AChE-based biosensors, recovery of the enzyme by oximes was explored. Oximes are α-nucleophilic compounds that remove the phosphoryl entity bonded to serine in the active site of AChE. The least regeneration of POX inhibited AChE was observed with 3-PAM. However, the reactivation ability of the tested oxime reactivators was found to be dependent on the position of the oxime group on the pyridinium ring. The order of reactivity was similar to that reported in the literature *i.e.*, 2-PAM > 4-PAM > 3-PAM as summarized in Table 2.

4. Conclusions

In summary, a convenient and sensitive dual detection method was successfully developed for monitoring inhibition and reactivation of AChE using carbon quantum dots. In this study we found that fluorescent carbon quantum dots were not directly affected by inhibitors. The sensing approach was mounted through the quenching of increased fluorescence of CQDs by a Cu^{2+} complex with the recovery of fluorescence upon the production of a sulfhydryl compound by the catalytic hydrolysis of ATChI. OPs are well-known AChE inhibitors; and are selected as examples to analyse the promising application in inhibitor assays. The limits of detection and quantification values obtained from spectroscopic methods were acceptable. Moreover, this developed analytical approach has the added advantages of using highly fluorescent carbon quantum dots. The assay offers a convenient and quick approach for inhibitor and reactivator screening with high sensitivity. The present analytical scheme has a benefit of applying extremely fluorescent CQDs to detect deactivators of AChE without any enzyme immobilization step.

Conflicts of interest

The authors declare that there are no conflicts of interest.

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Parent Child Relationship and Demographic Predictors of Intelligence of School Going Students

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The present study aims to find out the predictors of intelligence ('G' factor) of school going children from age group of 8 to 14 years (Class 5, 6, 7, 8th students). A total number of 1319 of students (male=670 and females=649) comprised as the sample for study. Stratified random sampling technique was used to select the sample. Mohsin's inventory and fair intelligence test was used to assess aspects like intelligence, parent child relation (P.C.R.), etc. Data was analyzed using hierarchical regression analysis. The results revealed that parent child relation and the age of students, education, and birth order predicted significant change in criterion variable, intelligence, (G factor);it shows there is positive relationship between P.C.R. and intelligence. The age and birth order were negatively related with intelligence measure (G' factor) in 8-14 year age group of students. For the reason it can be discussed in the light of increasing complexity of behaviour with age (8-14), and neglected child may also be restricted in 'G' factor of intelligence.The parent child relationship is positively related with 'G' factor of intelligence. Better the parent child relation so is 'G' factor of intelligence of the students.

Keywords: Parent child relation; Intelligence; Amos; hierarchical regression; demography

Home and outside environmental factor for the development of personality is highly significant as much as parent child relationship, type of family (Kumar & Shrivastava, 2016; 2017). Hurlock, 1998; Wolman, 2000, said that for a child parents and other family members are more important because family provides physical safety, economic support, social and emotional security (Jersild, 1987).

Intelligence is the major component for a healthy personality development. It depends upon several environmental and biological factors (Bouchard, 2009; Flynn, 2007).Intelligence Quotient is scientifically accepted. It is influenced by numerous types of biological factors. Many studies on twins reported that between 40 and 80 percent of variance in IQ is related to genetics, which may play a larger role than environmental factors in determining individual's IQ. Kovas, et al (2007) noted that the identical twins are more likely to have the same IQ scores than fraternal twins. Haworth et al. (2009) studied 11,000 twin pairs from four countries. The results revealed that genetic effect on general cognitive ability increase linearly from childhood period to adolescence stage to young adulthood stage (.41, .55, and .66, respectively).MRI analysis shows that women have more white matter and few gray matter areas related to IQ, and the strongest IQ gray matter correlations are in the female frontal and male frontal and parietal lobes (Haier, Jung, Yeo, Head, &Alkire, in press).Various types of studies reported that the low intelligence has been associated with crime, smoking, drug abuse, homelessness, alcohol abuse, unemployment, poor parenting readiness, bullying, fighting, school dropout, school failure and poor health care (Shaw (2008).The outcomes of various studies reveal that IQ is influenced mostly by genetic factors but the environmental factors also play a significant role. (Kumar et al. 2017; Kumar & Shrivatava, 2018).

The school students especially in Chhattisgarh, India are reported to be less active and attentive in school performance. It was necessary to determine the G factor of intelligence of the students and find out the predicting factors of intelligence.

Method

Participants:

Four independent samples of students from 5th, 6th, 7th, and 8th classes were analyzed. Total 670 (50.8%) boys and 649 (49.2%) girls were selected in the study.The sample comprised of 282 (21.4%) 5th class students (mean age = 10.39SD = .87, range from 8 to 14 years),and 376 (28.5%) 6th class students(mean age = 11.24, SD = .78, range from 10 to 14 years,). The third sample included 358 (27.1%) 7th class students (mean age = 12.17, SD = .84, range from 10 to 16 years and the fourth sample included 303 (23 %) 8th class students (mean age = 13.5, SD = .79, range from 10 to 14 years).

(The age range differences were observed in 7-8 class students, 8th class students age range is 10-14 years and 7th class students age range is 10 to 16 years. Because the some students not join school with the proper time and some of the student fail in the classes.)

In this study stratified random sampling technique was used; state schools were selected based on the principle of randomness, considering previous stratification by regions in the country, school grade and gender within the class group at the school level.

The school system in India considers four cycles in 1thto 12th class in primary, middle, high and higher secondary school. This study takes students from the 1st cycle and 2nd cycle of primary and middle school, equal to junior high school in other countries (5th – 8th grades), and middle school (6th – 8th grades), when students choose from among several curricular options in order to follow different graduation areas in higher education or professional specialization. The first school level corresponds to the first sample mentioned above, whereas the second level matches the second sample.

Design:

In the present piece of research, correlational research design was employed. Here, the criterion variable is intelligence; parent child relation, age, birth order, gender, and education acted as predictive variables in this study. Following random sampling 1319 school students were drawn from different government and private schools of the state of Chhattisgarh to serve as participants in the present research work.

Tools:1. Intelligence('G'factor) was measured by the culture fair intelligence scale 2(CFIT)Form A. This is designed for 8 to 14 years of children. The test is comprised of five reasoning subtests: test 1. Series(12 figural progressive and 3 min of administration time), test 2. Classification (14 classification subtest and 4 min of administration time), matrices (12 items and 3 min of administration time), condition (or topology 8 items and 2 1/2 min of administration time). Cattell A.K.S. Cattell (1992) reported internal consistency reliability α= 0.76 test-retest correlation α= 0.73 and criterion validity coefficient =.70.

Parents' child relationship was measured on Mohsin parent-child inventory (MPCI). Its indirect measure of the respondents' attitude towards his/her parents. The MPCI consists of 50 statements, usually comprising the so called parental attitude inventory, 25 statements conveying permissive and 25 restrictive disciplinary practices. The items of the MPCI are to be checked on a 4-point scale: The split half reliability of the MPCI using the S-B formula is .759. Its test-retest reliability is .703and construct validity is .396.

Students filled out a demographic information sheet, which included the information of the school, class, age, birth order and gender completed by the students.

Procedure:

A team of psychologists was specifically trained for the administration of the culture fair intelligence tests by means of a training course lasting eight hours. All participants were administered the culture fair intelligence scale 2, Form A (R.B. Cattell and A.K.S. Cattell 1992). The CFIT was administered in small groups of number and strictly adhered to conditions specified in the test's manual.

Statistical Analysis:

All 1319 cases were included for data calculation. Variance inflation factors (VIFs) were examined to detect multicollinearity. A hierarchical multiple regression models were

used to examine the effect of parent child relationship on intelligence. SPSS version 16.0 and AMOS 25 version was used for data calculation.

Results

First, a measurement model was tested for all samples using confirmatory factor analysis. In this model, a general intelligence (G) predicts the four measures comprised in the Subtest: series, classification, matrices and condition or topology. Several types of research have suggested that all the indexes are supposed to be above 0.90 to be a good fit (Tanaka & Huba, 1985; Bentler, 1990; Bentler & Bonnet, 1980; Bollen, 1989 as cited in Pandey & Shrivastava 2016).

The inconsistency in chi-square is the level of acceptance once > 0.05 (Wheaton et al., 1977). RMSEA should be accepted in the range of 0.05 to 1.00 the lower value is said to be a good level (Browne & Cudeck, 1993). Model fit was excellent in the samples [= 15.7, CMIN/DF = .684, RMSEA = .036, RMR=.028, GFI=.99, NFI=.99 and CFI = 1.000] (Figure 2) shows the regression weights. All values depicted in Fig.1 for the all school going students - series, classification and matrices show the largest values (>.64). Condition or topology shows the lowest weight for the sample (.30).(CFS1=Series, CFS2= Classification, CFS3= Matrices, CFS4=Condition or topology, F1=general intelligence).

Secondly, IQ for school going students was computed with respect to gender, birth order and education level. Figure 2, 3, and 4 shows the results: third birth order student show smaller IQ (75.76) than first birth order, boys students show smaller IQ (75.76) than girls students.

Fig. 1. Measurement model (Confirmatory factor analysis) for the all samples.

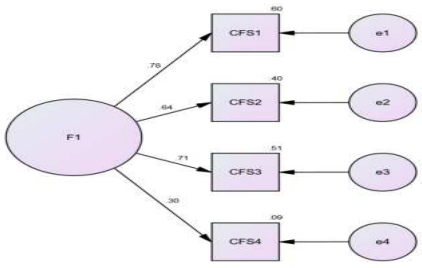


Fig.3. IQ scores for First birth order, Second birth order and Third to above birth order of school going students.

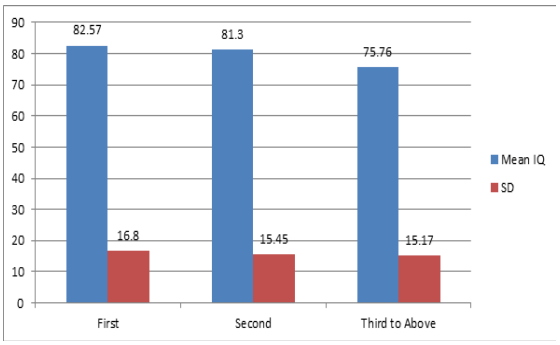
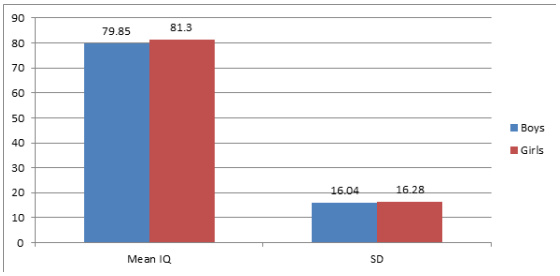


Fig.4. IQ scores for Boys and Girls of school going students.



Dependent Variable: IQvalue

Notes:- Model-(1-5)

Predictors: (Constant), Class, Birth Order, Gender, Age

Predictors: (Constant), Class, Birth Order, Gender, Age, Father Age, Mother Age

Predictors: (Constant), Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation

Predictors: (Constant), Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income

Predictors: (Constant), Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income, PCR total

Table no.1 indicates it clearly that VIF (Variance Inflation Factor) values ranged from 1.003 to 2.378, which were distant from the

Table- 1. Modal Summary of Hierarchical Multiple regression analysis.

Model	R	R^2	Adjusted R^2	DR^2	∆F	df1	df2	Sig. F Change	Durbin-Watson
1	.230	.053	.050	.053	18.357	4	1314	.000	
2	.231	.053	.049	.000	.335	2	1312	.715	
3	.240	.058	.052	.004	2.989	2	1310	.050	.490
4	.434	.189	.182	.131	105.559	2	1308	.000	
5	.523	.274	.268	.085	153.280	1	1307	.000	

Table 2. ANOVA Results of the Five - Model- Hierarchical Regression Analysis

Sl. No.	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18246.743	4	4561.686	18.357	.000
	Residual	326520.408	1314	248.493		
	Total	344767.151	1318			
2	Regression	18413.532	6	3068.922	12.338	.000
	Residual	326353.619	1312	248.745		
	Total	344767.151	1318			
3	Regression	19896.092	8	2487.011	10.029	.000
	Residual	324871.059	1310	247.993		
	Total	344767.151	1318			
4	Regression	65044.578	10	6504.458	30.415	.000
	Residual	279722.573	1308	213.855		
	Total	344767.151	1318			
5	Regression	94405.989	11	8582.363	44.804	.000
	Residual	250361.161	1307	191.554		
	Total	344767.151	1318			

Table-3. Summary of hierarchical Regression analysis for variables predicting IQ

	Model	B	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	109.005		24.168	.000		
	Age	-3.345	-.260	-6.276	.000	.421	2.378
	Birth Order	-2.384	-.153	-5.703	.000	.997	1.003
	Gender	-1.857	-.057	-2.120	.034	.983	1.017
	Class	2.785	.184	4.441	.000	.421	2.373
2	(Constant)	108.557		23.616	.000		
	Age	-3.366	-.261	-6.295	.000	.418	2.390
	Birth Order	-2.404	-.155	-5.711	.000	.984	1.016
	Gender	-1.888	-.058	-2.152	.032	.980	1.020
	Class	2.760	.182	4.317	.000	.406	2.465
	Mother Age	.383	.017	.584	.559	.824	1.214
	Father Age	-.070	-.019	-.690	.490	.922	1.085

3	(Constant)	111.707		22.380	.000		
	Age	-3.397	-.264	-6.361	.000	.418	2.392
	Birth Order	-2.411	-.155	-5.728	.000	.981	1.019
	Gender	-1.854	-.057	-2.115	.035	.979	1.022
	Class	2.722	.180	4.261	.000	.405	2.467
	Mother Age	.346	.016	.527	.598	.822	1.217
	Father Age	-.074	-.020	-.729	.466	.921	1.085
	Mother Occupation	-1.163	-.065	-2.394	.017	.990	1.010
	Father Occupation	-.214	-.011	-.405	.685	.993	1.007
4	(Constant)	91.880		18.883	.000		
	Age	-3.183	-.247	-6.416	.000	.418	2.395
	Birth Order	-1.721	-.111	-4.364	.000	.964	1.037
	Gender	-1.018	-.031	-1.247	.213	.974	1.027
	Class	2.564	.169	4.320	.000	.405	2.469
	Mother Age	-.010	.000	-.017	.986	.820	1.220
	Father Age	-.088	-.024	-.932	.352	.921	1.086
	Mother Occupation	-.482	-.027	-.912	.362	.723	1.384
	Father Occupation	-.675	-.034	-1.375	.169	.988	1.012
	Mother Income	.403	.036	1.231	.219	.745	1.343
	Father Income	6.537	.365	14.140	.000	.932	1.073
5	(Constant)	78.829		16.686	.000		
	Age	-3.181	-.247	-6.774	.000	.418	2.395
	Birth Order	-1.321	-.085	-3.528	.000	.957	1.045
	Gender	-1.457	-.045	-1.884	.060	.971	1.029
	Class	1.981	.131	3.516	.000	.402	2.486
	Mother Age	-.609	-.027	-1.050	.294	.814	1.228
	Father Age	-.093	-.026	-1.040	.299	.921	1.086
	Mother Occupation	.224	.012	.444	.657	.714	1.402
	Father Occupation	-.865	-.044	-1.860	.063	.987	1.013
	Mother Income	.207	.018	.668	.504	.743	1.347
	Father Income	5.266	.294	11.717	.000	.883	1.132
	PCtotal	.163	.311	12.381	.000	.878	1.138

4.0 criteria that may indicate multicollinearity concern (Jang, Chiriboga, Kim, &Rhew, 2010). The first model explained 5.3% of total variance (R=.230, R2=.053; F (4, 1314) = 18.357; p<0.01). Model 2, with six predictor variables (Education, Birth Order, Gender, Age, Father Age, and Mother Age), was an improvement over the earlier model, with an R of 0.231 and an R2 of 0.053, thus 5.3% of the variance had been accounted for. The change in R2 was not significant F (2, 1312) =.335; p > 0.05; this shows that the second set of predictors (Father Age and Mother Age) could not predict IQ. Model 3, with eight predictor variables (Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation), gave a better value for R=0.240 and an R2 of 0.058, thus 5.8% of the variance had been accounted

for the change in R2 was significant F (2, 1310) = 2.989; p < 0.05; thus Father Occupation, Mother Occupation was a predictor of IQ. Model 4, with Ten predictor variables (Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income), was quite better, with an R of .434 and an R2 of .189 thus 18.9% of the variance had been accounted for, the change in R2 was highly significant F (2, 1308) = 105.559; p < 0.01; thus Father Income and Mother Income was a predictor of IQ. In model-5 and final model comprised of eleven predictor variables [Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income, PCR again gave a better value for R=0.523 and an R2 of 0.274 thus 27.4% of the variance had been accounted for the change in R2 was highly significant F (1, 1307) = 153.280; p < 0.01; So the parent child relation was a predictor of IQ.

Those participants who perceive higher level of parent child relation (.193, p<0.01) were more likely to have better intelligence.

Table 2 shows the ANOVA result of all the six models' value (four predictors, six predictors, eight predictors, ten predictors, eleven predictors, respectively), which were significant; (p < .01, p <.01, p <.01, p < .001 and p < .001 respectively). Regression weighs for Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income and PCR of students obtained from the Hierarchal regression models depicted in Table-3. Age of the participants was negatively associated with intelligence (-.247, p<0.01); with increasing age participants reported low intelligence. Birth order of the participants was negatively associated with intelligence (-.085, p<0.01) that means first birth order students reported higher level of intelligence. For Class 5th, 6th, 7th, and 8th Father Income, Parent child relation of the students was positively related with intelligence (.131, p<0.01; .294, p<0.01;.311), with increasing education level, Father Income, good Parent child relation of the students reported higher level of intelligence. Those participants who perceive higher level of good parent child relation (.311, p<0.01) were more likely to have better intelligence.

Discussion

The main objective of the present study was to find out the predictors of Environmental factors for the development of Intelligence. Here, 1319 Indian school going students were considered from four independent and large representative samples of Chhattisgarh from Rural and Urban areas. Their IQ level was measured by the ('G' factor) culture fair intelligence scale 2. Education of the students were classified in India considered four cycles: primary, middle, high and higher secondary school. In model-1, education of the students was positively correlated to the intelligence scores (Table 1). Current findings are in full agreement with the earlier reports on IQ (Ceci, S. J., & Williams, W. M. 1997., Johnson, et. al., 2010., Neisser, U., Boodoo, G., Bouchard Jr, T.J., Boykin, A.W., Brody, N., Ceci, S.J., Halpern, D.F., Loehlin, J.C., Perloff, R., Sternberg, R.J., Others, 1998). Further, in model-1 Age of the participants, Birth order of the participants and Gender was negatively associated with intelligence. That means first birth order students reported higher level of intelligence than second, third, and fourth birth order, similar findings are reported by the Zanjonc & Markus, 1978, Zanjonc, 1986, 2001. The reason for such findings of the study could be that every child is born, he/she enters into a different family environment than the previous child. If there is second children enter in the family some environmental changes were observed with the lack of family attention, parents' time to share care, parental cooperation and conversation with their children. Drug addiction, and financial condition etc., of the family are important factors for 'G' factor of intelligence. A study conducted in Otago and Duke Universitie, which found that regular use of marijuana in teenage years, affects IQ in adulthood even when the user stops there is 8 point drop in IQ.

Conclusion

Family environment emerges as significant predictor for a better IQ. A good home environment, better parent child relationships, parents' higher levels of education and their wellbeing is important in enhancing the general intelligence of young students as there is a possibility in improving their G ability.

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Review

Scleroderma: An insight into causes, pathogenesis and treatment strategies

Deependra Singh [a b], Arun KS Parihar [a d], Satish Patel [a], Shikha Srivastava [a c], Prakriti Diwan [a], Manju R Singh [a b]

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Abstract

Scleroderma is an autoimmune disorder, characterized by morphological changes in skin followed by visceral organs. The pathogenesis of scleroderma involves immune imbalance and generation of auto antibodies. The major causes of scleroderma include multitude of factors such as immune imbalance, oxidative stress, genetics and environment factors. A constant effort has been made to treat scleroderma through different approaches and necessitates life time administration of drugs for maintenance of a good quality life. It has been reported more in women compared to men. Traditional treatment strategies are restricted by limited therapeutic capability due to associated side effects. Advancement in development of novel drug delivery approaches has opened a newer avenue for efficient therapy. Current review is an effort to reflect scleroderma in provisions of its pathogenesis, causative factors, and therapeutic approaches, with concern to mode of action, pharmacokinetics, marketed products, and side effects of drugs.

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Scleroderma is an autoimmune disorder, characterized by morphological changes in skin followed by visceral organs. The pathogenesis of scleroderma involves immune imbalance and generation of auto antibodies. The major causes of scleroderma include multitude of factors such as immune imbalance, oxidative stress, genetics and environment factors. A constant effort has been made to treat scleroderma through different approaches and necessitates life time administration of drugs for maintenance of a good quality life. It has been reported more in women compared to men. Traditional treatment strategies are restricted by limited therapeutic capability due to associated side effects. Advancement in development of novel drug delivery approaches has opened a newer avenue for efficient therapy. Current review is an effort to reflect scleroderma in provisions of its pathogenesis, causative factors, and therapeutic approaches, with concern to mode of action, pharmacokinetics, marketed products, and side effects of drugs.

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CONTENTS

An Analytical Study on Saving Pattern of Women Self-help Group Members through Co-operative Banks in Chhattisgarh State

Geetanjali Pankaj, Sunil Kumeti & Ranu Agrawal

INRTODUCTION

The empowerment of women is crucial for the economic development of a nation and at the world level in Millennium Development Goals were also eight international goals including to eradicate extreme poverty and hunger including promote gender equality and empowerment in women. At a gathering to launch the international year for micro-credit that access to micro finance could enable poor families to earn more build up assets and better protect themselves against unexpected setbacks and losses (Annan Koffi, 2004). The international year 2005 should encourage Government, Banks and Donors to build on extraordinary knowledge and experience already gained in the field of micro credit to reach out to the poor. In India, women constitute around half of the total population and thus very important human resource for the nation's development.

The participation of women in the country's GDP is as low 8 percent through their work participation was 19.7 percent in 1981. Over the few last decades, women have come forward to establish their own enterprises. Self Help Group first emerged in MYRADA in 1985. NABARD has defined micro finance is all about provision of thrift, credit and other financial services and products of very small amount to the declared the year 2005 as year of microcredit. The microfinance movement through SHGs across India is to make women manage themselves for social mobilization, to create self confidence, rise their self esteem through participation in socio-economic and political life. SHGs are brainchild of the Grameen Bank of Bangladesh which was founded by Prof. Mohammed Yunus of Chittagong University Bangladesh in the year 1975. SHGs started during 1992 with the small beginning as pilot program launched by NABARD by linking 255 SHGs with banks in this year. This program has reached to linking of 69.5 lakh saving linked and 48.5 lakh credit linked SHGs and it covers 9.7 Crore household are involved. Self Help Group provided financial securities and come in directly contact with the lending agencies members.

It is a small group of individual members who voluntarily come together and form an association for achieving a common objective. SHGs concept based on the homogeneity

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mutual support group approach and regular savings. In various studies on SHGs and women development provided input about the significance of approach to gender equality, specifically for those women who are engaged in unorganized economic activities. SHGs have emerged as one of the major strategies for skill development, awareness generation, gaining access to credit, exchange ideas and raised their voice on various social issues and management of credit for the economically deprived sections particularly women in district of Chhattisgarh. It has been observed from different kinds of studies about SHGs is represent although these women have different kind of traditional skills such as stiching, weaving pickle making, anganwadi food provider, agarbatti making, bangles making works. SHGs member involve work and generate income and start saving for securing the future. NABARD provide many types of facility to SHGs like bank loan disbursed to SHGs, state wise grant support sanctioned, agencies having outstanding revolving fund assistance and capital support, saving of SHGs in Public sector commercial bank, Private sector commercial bank, Regional Rural bank and Co-operative bank. NABARD give finance for development and empowerment of women through SHGs is making a silent revolution in all over India and Chhattisgarh is one of the benefited states. In Chhattisgarh there are so many banks like Public sector commercial banks, Private sector commercial banks, Regional Rural Banks, Co-operative banks are provided fund to SHGs. These banks are provided loan disbursed, state wise grant support, saving of SHGs with banks, training and capacity building program for SHGs-BPL.

Selection of topic in state of Chhattisgarh, many banks are provided loan of SHGs, in this context SHGs create income and start saving in different banks. There is a need of study of saving pattern of SHGs to find out actual trends of growth and development during the period of 2014 to 2019.This study aims to observe details of SHGs saving linked with banks, out of total SHGs- exclusive women SHGs, out of total SHGs-under NRLM/SGSY scheme. Hence the topic on the development of SHGs saving pattern through Co-operative banks in this state is selected for present study. To study the details exclusive of women SHGs out of total SHGs in progress during 2014-15 to 2018-19.The study depends on Secondary data published by Government and the study covers only the development of saving pattern of SHGs in Chhattisgarh State.

OBJECTIVE

- To analyze the impact of saving amount of SHGs member through Co-operative banks during the year of 2014-15 to 2018-19.
- To study about the progress of member in SHGs through Co-operative banks.

As shown in Tables number of SHGs saving linked with Co-operative banks during the year of 2014-15 to 2018-19. To be calculated the nature of growth rate of SHGs in the Chhattisgarh states the growth rate method is used to find out the results:

Growth Rate Method: This method represents the annual growth change in a variable as a percentage. The formula used to find out the growth rate is GrR=a1-a0/a0*100

GrR=Growth Rate in Percentage, a=Data. 0=Just Previous Year, 1=Current Year

Table 1

Details of SHGs Saving linked with Co-operative banks in Chhattisgarh states (2014-19)

Year	*No. of SHGs*	*saving Amount (in lakh)*	*GrR of SHGs (%)*	*GrR of saving amount*
2014-15	92794	12814	-	-
2015-16	98070	10131	5.68	-20.93
2016-17	20585	1528.94	-79.00	-84.90
2017-18	21373	1607.16	3.82	5.11
2018-19	22508	2066.25	5.31	28.56

Source: NABARD-Status of Microfinance in India: 2014-2019.

Result Analysis: The following result has been drawn on the basis of Table-1 data pertaining to the saving linked with Co-operative banks in Chhattisgarh states. There was 5.68 Percent growth in number of SHGs member in the year of 2015-16, after that it was high fluctuated and declined with 79 percent in the year of 2016-17 and later it was increased with 3.82 in 2017-18 and 5.31 percent in 2018-19 respectively. Growth Rate of saving amount was decreased in percentage of 20.93 in the year 2015-16 and declining continuous in next year 2016-17 with 84.90 percent. Later it was increased with 5.11 percent in year of 2017-18 and continues with 28.56 percent in the duration of 2018-19.

Table 2

Details of Out of Total SHGs- Exclusive Women SHGs with Co-operative banks in Chhattisgarh states (2014-19)

Sr. No.	*Year*	*No. of SHGs*	*Saving Amount (in lakh)*	*GrR of SHGs (%)*	*GrR of saving amount(in lakh)*
1	2014-15	6194	1078.54	-	-
2	2015-16	1242	846.63	6.15	10.11
3	2016-17	10233	3643.44	-76.75	-80.65
4	2017-18	1283	1489.33	3.94	6.49
5	2018-19	1661	1531.29	5.70	28.34

Source: NABARD-Status of Microfinance in India: 2014-2019.

Result Analysis: The following result has been drawn on the basis of Table-2 data pertaining to Out of Total SHGs- Exclusive Women SHGs with Co-operative banks in Chhattisgarh state in the duration of 2014-15 to 2018-19. Growth rate was obtained by the above formula and found that percentage of SHGs increase 6.15 in the year of 2015-16 and later it was declined with 76.75 percent in the year of 2016-17 after that growth rate has been increase in positive way with 3.97 percent in 2017-18 and 5.70 percentage in the year of2018-19.Growth Rate saving amount is 10.11 percent in 2015-16 and after that it was declined with 80.65 percent in the duration of 2016-17 then increased with 6.49 percent in 2017-18 and it was continued with 28.34 percent in year of 2018-19.

Table 3

Differences between Total SHGs, exclusive Women SHGs in Chhattisgarh state (2014-19)

Sr. No.	Year	Differences in No. of SHGs(1)	Differences in Saving Amount(2)	(%) Change in (1)	(%) Change in (2)
1	2014-15	11734	5777	12.66	45.83
2	2015-16	12018	2382	12.25	23.51
3	2016-17	585	30.15	2.84	1.97
4	2017-18	584	11.09	2.83	0.69
5	2018-19	534	17.78	2.73	0.86

Source: NABARD-Status of Microfinance in India: 2014-2019.

Result analysis: The following result has been drawn on the basis of table 3 data pertaining difference between total SHGs and exclusive of Women SHGs with Co-operative bank in Chhattisgarh during 2014-19. Difference between percent changes in saving amount is 45.83 in 2014 and 23.51in 2015, In both year percent difference in saving linked SHGs and out of total SHGs exclusive women is higher than the 1.97 in 2016, 0.69 percent in 2017, 0.86 percent in 2018.

FINDINGS, SUGGESTIONS AND CONCLUSION

In Chhattisgarh states there are so many banks those provided facility to promote SHGs and Co-operative bank is one of the major banks in rural area. There is significant increase in the income of the respondents after they have become members of SHGs in enhancing the income generating habits of its members is glaring in the present study. In the study find out that number of SHGs member and amount of saving pattern are increasing .When saving increases then it will be beneficial for SHGs member in future. More supportive and patronizing attitude on the part of the Government, NABARD, NGOs and banks are highly essential for the members to develop their entrepreneurial abilities and skills. Attractive saving schemes and insurance schemes, if introduced for SHGs members, will enhance their thrift habit. There is need for motivating efforts by Government, NGOs and voluntary private associations and individual for the development of saving pattern for securing future.

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छत्तीसगढ़ में कंवर जनजातिः एक सामान्य अध्ययन

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ABSTRACT:
प्रस्तुत अध्ययन छत्तीसगढ़ राज्य में कंवर जनजाति का सामान्य अध्ययन से संबंधित है। इस अध्ययन का उद्देश्य कंवर जनजाति का छत्तीसगढ़ में स्थान, क्षेत्र व बसाहट, गोत्र, जनसंख्या – लिंगानुपात व साक्षरता तथा बार नृत्य का सामान्य अध्ययन करना है। प्रस्तुत अध्ययन अन्वेषणात्मक सह विवरणात्मक अनुसंधान एवं द्वितीय आँकड़ों पर आधारित है। छत्तीसगढ़ के 42 अनुसुचित जनजातियों की सूची में यह क्रमांक 22 पर सूचीबद्ध है। इस जनजाति में कुल 200 से ज्यादा गोत्र हैं। आदिवासी संस्कृति के अनुसार ही गोत्र– पशु, पक्षी, पेड–पौधे, वस्तु, कार्य आदि के टोटम पर आधारित होती है। 887477 (94 प्रतिशत) जनसंख्या छत्तीसगढ़ राज्य में तथा 59195 (6 प्रतिशत) जनसंख्या मध्यप्रदेश, झारखंड, उडीसा एवं महाराष्ट्र में है। राज्य की पांच प्रमुख जनजातियों में यह दूसरी तथा पूरे भारत में 20 वीं बडी जनजाति है। इस जनजाति की राज्य में ग्रामीण जनसंख्या 94.65 प्रतिशत, लिंगानुपात 1011 तथा साक्षरता दर 67 प्रतिशत है। राज्य के कुल भौगोलिक (135133 वर्ग किमी.) क्षेत्रफल से अनुसूचित क्षेत्र (81862 वर्ग किमी.) 60.6 प्रतिशत है। बार नृत्य इस जनजाति की प्रमुख नृत्य है।

KEYWORDS: कंवर, जनजाति, गोत्र, बार नृत्य, टोटम

प्रस्तावना:

हमारे देश में कई जाति तथा धर्म के लोग निवास करते हैं। इनमें से कुछ वनाचलों में रहते हैं। इन लोगों की नगरीय समाज से इनका सम्पर्क सीमित होता है। सुदूर जंगलों में इनका निवास होने से तथा विशिष्ट जीवन शैली होने के कारण इनहे कई जातियों के नाम से भी जाना जाता है। छत्तीसगढ़ अंचल वन बहुल क्षेत्र है तथा इसमें यहां के मूल निवासी जनजाति लोग हैं।

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इस जाति के लोग प्रकृति की गोद में सरल जीवन व्यतीत करते हैं। इनकी अपनी जीवन शैली, भाषा, संस्कृति तथा परम्पराएँ है। इस जनजाति लोगों की खास विशेषता है– इनका सामूहिक जीवन, सामूहिक उत्तरदायित्व और भावात्मक संबंध है। सामूहिक जीवन की चेतना तथा परस्पर के प्रति रक्षात्मक जुडाव ये दोनों बातें इतनी एकाकर हो गई है कि ये लोग अकेले जीवन या परिवार की सोच नहीं सकते हैं। यही कारण है कि वे परस्पर निःस्वार्थ व स्वभाविक रूप से मदद करते हैं। इस समाज में अपने मूल रूप में कभी व्यापारिक लेन–देन, ब्याज, साहूकार आदि की प्रथा नहीं रही है। जैसे– खेती के लिए बीज व मदद चाहिए रहता है तो सब मिलकर उसे पूरा कर लेते हैं एवं जब फसल हो जाती है,

तब वह व्यक्ति उसे लौटा देता है। ये एक सहज, सरल, प्राकृतिक सहजीवन व्यतीत करने वाले होते हैं।

इस जाति की अर्थव्यवस्था उन्न्त समाज की अर्थव्यवस्था से अलग होती है। इनकी आवश्यकताएं सीमित होती है। ये अपनी सीमित आवश्यकताओं के लिए प्रकृति पर रहते हैं। ये जाति कृषि, वनोपज संग्रह तथा मजदूरी करके जीवन–यापन करती है। इनकी काफी बडी संख्या वन क्षेत्रों में निवास करती है। सरकारी नितियों व प्रयासों के कारण इस जाति की आर्थिक स्थिति में सुधार हुआ है। उद्योग–धंधे में विस्तार के कारण इस जाति के लोग रोजगार के लिए नगरों व शहरों की ओर आकर्षित हुए हैं तथा उत्खनन, निमार्ण कार्य, परिवहन, व्यापार और सेवाओं में भागीदारी कर रहे हैं। जिस कारण से आज अर्थ व्यवस्था को गति मिली है।

इनकी अपनी अलग पहचान व संस्कृति है, संगीत और नृत्य अभिन्न अंग है। कृषि कार्यों त्यौहारों आदि के अवसरों पर गाए जाने वाले विभिन्न प्रकार के गीत होती है। संस्कृति से संबंधित नियमों की अवहेलना करने पर कठोर सामाजिक दण्ड दिया जाता है। निवास और व्यवसायों में समयागत परिवर्तन के कारण वर्तमान में इनकी संस्कृति में बदलाव भी होने लगा है। महिलाओं में अपने शरीर पर शुभचिन्ह, पशु–पक्षियों, गहनों के चित्र और नाम इत्यादि का शरीर पर स्थायी अंकन करवा लेना लोकप्रिय है। इस अंकन को 'गुदना' कहते है। इनका मानना है कि गुदना उनके जीवन भर के आभूषण है।

अध्ययन के उद्देश्य:

प्रस्तुत अध्ययन का उद्देश्य कंवर जनजाति का छत्तीसगढ़ में स्थान, क्षेत्र व बसाहट, गोत्र, जनसंख्या – लिंगानुपात व साक्षरता तथा बार नृत्य का सामान्य अध्ययन करना है।

आँकड़ों के स्रोत एवं विधितंत्र:

प्रस्तुत अध्ययन अन्वेषणात्मक सह विवरणात्मक अनुसंधान एवं द्वितीय आँकड़ों पर आधारित है। इसके लिए सामाजिक–आर्थिक सर्वेक्षण वर्ष 2011–12 एवं जनगणना वर्ष 2011 को आधार माना गया है।

अध्ययन क्षेत्र:

01 नवम्बर सन् 2000 को छ.ग. राज्य म.प्र. से पृथक होकर स्वतंत्र अस्तित्व में आया। छ.ग. राज्य प्रायद्वीपीय पठार का एक भाग है। भारत के मध्य पूर्व में स्थित यह भारतीय संघ का 26 वां राज्य है जिसका अक्षांशीय विस्तार 17^0 00′– 23^0 70′ उत्तरी अक्षांश तथा 80^0 40′ – 83^0 38′ पूर्वी देशांतर के मध्य स्थित है। यह 135133 वर्ग कि.मी. क्षेत्र में फैला हुआ है। 81,861.88 वर्ग कि.मी. अनुसूचित क्षेत्र है। जो राज्य के कुल भौगोलिक क्षेत्रफल का 60.58 प्रतिशत है।

राज्य की कुल अनुसूचित जनजाति जनसंख्या (2011) 78,22,000 है। छ.ग. के प्रमुख जनजाति गोड़ हैं। इसके विभिन्न उपजातियां माड़िया, मुरिया, दोरला आदि है। इसके अतिरिक्त उरांव, कवंर, बिंझवार, बैगा, भतरा, कमार, हलबा, सवरा, नगेशिया, मंझवार, खरिया और धनवार जनजाति बड़ी संख्या में है।

कंवरान क्षेत्र:

अविभाजित मध्य प्रदेश का दक्षिण–पूर्वी भाग, जिसे आज छत्तीसगढ़ कहा जाता है, इसमें न केवल सरगुजा, कोरिया, जशपुर, बलरामपुर, सूरजपुर, रायगढ़, कोरबा और बिलासपुर ही नहीं बल्कि कुछ उल्लेखों के अनुसार दुर्ग, राजनांदगांव, रायपुर, धमतरी, जांजगीर–चांपा, बस्तर सहित मध्यप्रदेश, महाराष्ट्र, उड़ीसा और झारखण्ड के कुछ जिलों का बहुत सा भू–भाग कंवरान परिक्षेत्र में सम्मिलित था। विशेषकर आज हम जिस जगह को हम सरगुजा संभाग, बिलासपुर संभाग, धरमजयगढ़ और धमतरी क्षेत्र के नाम से अलग अलग जानते हैं, आज भी पुराने लोगों द्वारा इन जगहों को संयुक्त मिलाकर कंवर जनजाति की सांस्कृतिक बहुलता के कारण "कंवरान" कहा जाता है, प्राप्त पुरातन उल्लेखों से लेकर अंग्रेजों तक के काल में इस क्षेत्र को कंवरान कहने का उल्लेख मिलता है। छत्तीसगढ़ के मध्य प्रांत के अंतर्गत सरगुजा, कोरबा, बिलासपुर, जशपुर, मुंगेली, रायगढ़, कोरिया, कर्वधा, आदि क्षेत्र में है और रियासतों के अंतर्गत सरगुजा, जशपुर, कोरिया, उदयपुर, चांगभखार में है।

संक्षिप्त परिचयः

महाभारतकालीन कौरवों का वंशज मानने वाली यह जाति अपने धार्मिक आचरण, सामाजिक मर्यादा और धार्मिक विश्वास के पालन में किसी न किसी रूप में क्षात्र–धर्म का पालन करती है। यही कारण है कि इस जाति के लोग अस्त्रों–शस्त्रों की पूजा और सैनिक कर्म को प्रधानता देते हैं। लोकनाथ ने लिखा है कि कवंर जाति की उत्पति महाभारत के कौरवों से बताई जाती है, यद्यपि वे सैन्य सेवा को अपना पारंपरिक व्यावसाय मानते हैं, अधिकांश ने सैन्य जीवन छोड दिया है और किसान या मजदूर बन गए हैं। उनकी भाषा कवंरी, एक इंडो–आर्यन भाषा है, जिसे हल्बी की एक बोली माना जाता है। आज कुछ कवंर छत्तीसगढ़ी और हिंदी बोलते हैं, अपने पडौसियों की भाषा और साथ ही अपनी संस्कृतियों को अपनाना शुरू कर दिया है। कवंर जाति के लोग आसपास के लोगों की संस्कृतियों से इतने अधिक प्रभावित हो गये हैं कि अब असली कवंर नहीं माना जाता है। उनहोने अपनी भाषा और पूर्व संस्कृति को पूरी तरह से खो दिया है और अब एक अलग बोली बोलते हैं।

छत्तीसगढ़ के 42 अनुसूचित जनजातियों की सूची में यह क्रमांक 22 पर सूचीबद्ध है। इनकी चार प्रमुख उपजातियां पैकरा, राठिया, चेरवा और तवंर है। इसके आलावा कौर, चांटी, कमलवंशी और छत्री है। कंवर जनजातियों में अलग–अलग क्षेत्रों में देवी–देवताओं के सम्बन्ध में मान्यता भी भिन्न भिन्न है, किन्तु पूरे कंवरान भू–भाग के कंवर जाति के लोग दुल्हादेव, ठाकुरदेव, झगराखांड, मूढ़वा देव, कंकालिन दाई, को ही अपना आराध्य देव मानते हैं। शीरिंग के अनुसार इस जाति के लोग भू–स्वामी है। अपनी संपति और प्रतिश्ठा के कारण वे राजपूत के महत्व और गौरव को प्रभावित करते हैं।

गोत्रः

कंवर जनजाति में कुल 200 से अधिक गोत्र है। जनजाति संस्कृति के अनुसार ही ये अपना गोत्र– पशु, पक्षी, पेड–पौधे, वस्तु, कार्य आदि के टोटम के आधार पर रखते है। जैसे– अंडिल, करछूल, तेलासी, बिच्छी, बाघ, बकार, भैंसा, सिक्टा, मुर्गी, दर्पण, बैंजार, खूंटा, गोबरिला, कुकुर, ठाठ, चाक, ठसरा, जतरा, एडवा, कुर्री, कपाट, कसौदी, चंदरमा, बेलवाती, छतर, घसिया, बिरतिया, ढेकी, दुध कौरा, झांप, पखना, बिलवा, बंदरा, मैना, पडकी, धनकुटटा, लोढा, रघरा, सिंगसर, हंडार, भुईघरिहा, बरगाह, सरजाल, सुगा, जांता, लांजा आदि कंवर जाति के गोत्र के उदाहरण है।

अधिवासः

अधिवास से तात्पर्य मानव द्वारा रचित उस स्थान से है, जो उसके रहने या कार्य करने या अन्य आवश्यकता की पूर्ति के लिए बनाई गई है। ये अधिवास मानव के सांस्कृतिक वातावरण का अभिन्न होते हैं। छत्तीसगढ़ राज्य में 94 प्रतिशत कवंर जनजाति हैं। ये बिलासपुर संभाग के बिलासपुर, कोरबा, रायगढ़ एवं जांजगीर–चांपा तथा सरगुजा संभाग के कोरिया, सूरजपुर, सरगुजा, बलरामपुर एवं जशपुर में मुख्य रूप से हैं। रायपुर संभाग के महासमुंद व धमतरी तथा दुर्ग संभाग के दुर्ग व राजनांदगांव में हैं। इसके अतिरिक्त सभी जिलों में छिटपुट रूप में हैं (आर व्ही. रसेल, 1916)। 6 प्रतिशत आबादी मध्यप्रदेश, झारखंड, बिहार, उडिसा एवं महाराष्ट्र में हैं। कुछ आबादी स्थानांतरित होकर असम, राजस्थान में चले गए हैं।

छत्तीसगढ़ में स्थान :

छत्तीसगढ़ की एक तिहाई जनसंख्या अनुसूचित जनजाति की है। यहां प्रदेश की कुल जनसंख्या का 31.76 प्रतिशत अनुसूचित जनजाति का है। मध्यप्रदेश, महाराष्ट्र, उडीसा, गुजरात और झारखंड के बाद छत्तीसगढ़ की जानजातियों की जनसंख्या के आधार पर छठवें स्थान पर आता है। जबकि कुल जनसंख्या के आधार पर छत्तीसगढ़ का मिजोरम, नागालैंड, मेघालय और अरूणाचल प्रदेश के बाद पांचवें स्थान पर है।

जनसंख्या प्रतिरूपः

जनसंख्या वितरण के स्वरूप का नियंत्रित करने में सामाजिक संरचना की महत्वपूर्ण भूमिका होती है, क्योंकि प्राकृतिक तथ्यों की अपेक्षा सामाजिक संरचना अधिक प्रभावशाली होती है। आज वैज्ञानिक युग में प्राविधिक शिक्षा का विकास भौगोलिक कारकों की तुलना में अधिक महत्वपूर्ण होता जा रहा है, क्लार्क, (1972) ने इस प्रकार व्यक्त किया है कि वैज्ञानिक एवं तकनिकी प्रगति के कारण जनसंख्या वितरण पर भौगोलिक कारकों का प्रभाव कम एवं सांस्कृतिक कारकों का प्रभाव बढ़ता जा रहा है।

नवगठित छत्तीसगढ़ राज्य की कुल जनसंख्या वर्ष 2011 की जनगणना के अनुसार 2,55,45,198 है। जिसमें अनुसूचित जनजाति 78,22,902 है, जो कि राज्य की जनसंख्या का 30.62 प्रतिशत है, तथा देश की अनुसूचित जनजाति की जनसंख्या का 8.61 प्रतिशत है।

तालिका 1: छत्तीसगढ़ में अनुसूचित जनजाति का ग्रामीण व नगरीय जनसंख्या

	पुरूष	महिला	कुल
ग्रामीण	35,77,134	36,53,948	72,31,082
नगरीय	2,96,057	2,95,763	5,91,820
योग	38,73,191	39,49,711	78,22,902

स्रोत : जनगणना रिपोर्ट, 2011

देश में इस जाति की कुल जनसंख्या 9,46,672 है। छत्तीसगढ़ पांच प्रमुख जनजातियों में यह जाति दूसरी बडी जनजाति है। इसकी कुल जनसंख्या 8,87,477 (11 प्रतिशत) हैं। प्रदेश में सबसे बडी जाति गोंड 42,98,404 (55 प्रतिशत) तीसरी उरांव 7,48,789 (10 प्रतिशत), चौथी हल्बा 3,75,182 (5 प्रतिशत) और पांचवीं बडी जाति भतरा 2,13,900 (3 प्रतिशत) है।

तालिका 2 : छत्तीसगढ़ में कवंर जनजाति का ग्रामीण व नगरीय जनसंख्या

	पुरूष	महिला	कुल
ग्रामीण	4,17,251	4,22,781	8,40,032
नगरीय	23,991	23,454	47,445
योग	4,41,242	4,46,235	8,87,477

स्रोत : जनगणना रिपोर्ट, 2011

जनसंख्या वृद्धिः

किसी भी क्षेत्र की जनसंख्या वृद्धि वहां की विकास संबंधी योजनाओं के लिए अत्यधिक महत्वपूर्ण होती है, जो कि उस क्षेत्र में उपलब्ध संसाधनों, आर्थिक विकास एवं पर्यावरण संतुलन को अनेक प्रकार से प्रभावित करती है। जनसंख्या वृद्धि से तात्पर्य जनसंख्या के अंतर्गत समय विशेष के अंतराल पर जनसंख्या में होने वाले परिवर्तन से है, जो ऋणात्मक एवं धनात्मक दोनों रूपों में परिलक्षित किया जाता है (सिंह एवं राय, 2010)। वर्ष 2001 की जनगणना के अनुसार इस जाति की कुल जनसंख्या 8,12,770 थी, जो 2011 में बढ़कर 8,87,477 हो गई। इस तरह से दशकीय जनसंख्या वृद्धि 16.47 प्रतिशत हुई। प्रदेश बनने के पश्चात् इस क्षेत्र में सामाजिक एवं आर्थिक विकास, स्वास्थ्य एवं स्वच्छता की सुविधाओं में वृद्धि तथा उद्योगों का प्रसार था, विकास के साथ ही साथ नगरीकरण एवं परिवहन व संचार सुविधाओं में विस्तार हो रहा है जिसके परिणाम स्वरूप जनगणना में जनसंख्या वृद्धि हो गई।

लिंगानुपातः

किसी भी क्षेत्र के जनसंख्या की भौगोलिक विश्लेषण में लिंगानुपात महत्वपूर्ण होता है, क्योंकि यह न केवल स्थल रूप का महत्वपूर्ण लक्षण है अपितु अन्य जनसांख्यिकीय तत्वों को भी महत्वपूर्ण ढंग से प्रभावित करता है। जनसंख्या की लिंग संरचना को सामान्यताः स्त्री–पुरुष अनुपात के रूप में प्रदर्शित किया जाता है। लिंगानुपात किसी भी क्षेत्र की वर्तमान सामाजिक एवं आर्थिक स्थिति का द्योतक है। 2011 के जनगणना के अनुसार कवंर जाति में लिंगानुपात 1011 है। छत्तीसगढ़ में लिंगानुपात 991 है तथा अनुसूचित जनजाति में यह अनुपात 1019 है, जो राज्य की कुल जनसंख्या की 30.6 प्रतिशत है। देश में अनुसूचित जनजाति की जनसंख्या की दृष्टि से छत्तीसगढ का 7 वां स्थान है, जबकि अनुसूचित जनजाति प्रतिशतता की दृष्टि से 10 वें स्थान पर है।

साक्षरताः

संयुक्त राष्ट्र जनसंख्या कमीशन (1974) ने किसी भी भाषा में साधारण संदेश को समझने के साथ पढ़ने एवं लिखने की योग्यता को साक्षरता माना है। किसी भी क्षेत्र की समस्त भौतिक व सांस्कृतिक समृद्धि का आधार साक्षरता होती है। साक्षरता का सीधा संबंध जन्मदर, मृत्युदर, प्रवास, विवाह, अन्य जनांकिकी, विशेषताओं से होता है। साक्षरता ऐसा गुणात्मक तथ्य है, जो क्षेत्रीय आधार पर परिवर्तनशील

सामाजिक–आर्थिक, सांस्कृतिक प्रवृत्तियों की ओर अप्रत्यक्ष रूप से संकेत करता है। वस्तुतः साक्षरता के विकास से मनुष्य सीमित परिवेश से उन्मुक्त होकर अपने चतुर्दिक सामाजिक, आर्थिक, सांस्कृतिक व राजनैतिक प्रवृत्तियों से अन्योन्याश्रित संबंध स्थापित कर लेता है, जिससे एक इकाई के रूप में मानव ही नहीं बल्कि सम्पूर्ण मानव समाज विकासक्रम में शीर्ष की ओर गतिशील हो जाता है। साक्षरता का प्रभाव समस्त जनांकिकीय तथ्यों पर विशिष्ट रूप से परिलक्षित होता है। कवंर जाति में साक्षरता 67 प्रतिशत जो कि अनुसूचित जनजाति 59 प्रतिशत से अधिक है। तथा छत्तीसगढ़ की साक्षरता (70.3 प्रतिशत) से कम है।

बार नृत्यः

बायर या बार नृत्य को कवंर जनजाति द्वारा शुरू किया गया नृत्य माना जाता है। यह नृत्य सामान्यतः 12 (बारह) दिनों तक चलता है। कभी–कभी यह नृत्य लगातार 2 से 3 महिनों तक भी किया जाता है। यह नृतय "बार पूजा" के समय किया जाता है। बार पूजा गांव के समस्त जागृत और परालौकिक शक्तियों को एक साथ रिझाने, मनाने और नचाने के लिए किया जाता है। बार नृत्य का गीत रसदार होता है और संगीत नृत्य लोगों को नाचने के उत्साहित कर देता है। बार नृत्य के आलावा शैला, करमा व सुगा नृत्य भी कवंर जाति की प्रमुख नृत्य है।

निष्कर्षः

अध्ययन क्षेत्र में कवंर जाति का इस प्रदेश में संस्कृति – भाषा, जीवन शैली, परंपराएं, सामूहिक जीवन, बसाहट, अधिवास, गोत्र, बार नृत्य एवं जनसंख्या – लिंगानुपात, साक्षरता में अपनी एक अलग पहचान एवं स्थान रखती है।

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ECONOMY OF CHHATTISGARH

Women Entrepreneurs in Informal Sector of Chhattisgarh

Archana Sethi and B.L. Sonekar

Introduction

Last many decades, the female entrepreneur has been exaggerated in handing the societies and their activities are fully grown up we have a tendency to all recognize. As restricted resources and in depth necessities of person create this resources to enhance incessantly,in recent years, women entrepreneurs have attended structure entrepreneurship with accenting on turning into efficient; and therefore they do provided the causes of sustainable development . In recent years, women entrepreneurship has been exaggerated thanks to environmental changes and thanks to these changes women have faced with several issues that need proper measure both and economically and ideologically.

A large number of females around the globe have created and managed their own businesses. For these women it had been a tough task to succeed in business .They had to face loads of difficulties and overcome numerous barriers to become successful in their ventures. They had to cope up with discriminations and stand up to the unbelief of society and put more efforts than men to prove their qualities to others. Economic globalisation has inspired the growth of feminine business possession.

Conceptual Background of Female Entrepreneurs

Female entrepreneurs may be defined as the women or a group of women who initiate, organize and operate a business enterprise. Government of India has described female Enterpreneurs as an enterprise owned and controlled by a women having a minion financial interest of 51% of the capital and giving at least 51% of employment has many functions. They should explore the prospects of began a new enterprise; undertaking risks, introduction of recent innovation, coordination, administration and management of business and providing effective leadership altogether in business.

Characteristic features of female Entrepreneurs; Women Entrepreneurs tend to be extremely motivated and self directed. They additionally exhibits a high internal locus of management and action .Researchers contended that female business owners exhibits some specific characteristics that promote their creative thinking and generate new ideas and ways in which things would be done. Some of them are as follows:-

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1. Risk taking propensity of female Enterpreneurs
2. High energy state
3. Personal motivations
4. Married first born
5. father's self employment
6. Interpersonal skills
7. Competence in finance and in managing relationships

Objectives

1. To analyze the socio economic characteristic of female Entrepreneurs
2. To examine the sources of finance and investment created by female Entrepreneurs.
3. To identify the factors inspired the women Entrepreneurs to undertake Entrepreneurship and reasons for their success.
4. To review the issues faced by the women Entrepreneurs while beginning, operating and managing their enterprises.
5. To recommend the policy measures to strengthen the women Entrepreneurs.

Data Sources and Methodology

The present study is based mostly on primary data which is gathered from women Entrepreneurs in Raipur district of Chhattisgarh. Thus, in order analyze the status of female Entrepreneurs and hardships faced by them within the competitive world of business setting a sample of 240 women Entrepreneurs were taken and personally interviewed for the study. Four blocks of Raipur district i.e. Dharsiwa,Tilda,Arang and Abhanpur has been taken for the research. Further from each block three towns and three villages were selected. Among these selected areas 10 women entrepreneurs from each area were selected on the basis of random sampling.

Review of Literature

Patrick (1998), tries to study the saleswomen working in the registered shops and institutions by analyzing the extent of discrimination, time allocation and migration .The samples were collected from Ernakulum district of Kerala. In this paper the author has shown that in terms of wages there is a huge discrimination against saleswomen as compared to salesmen within the labour market. The perception that females are temporary participants within the business department was mention as a principle reason for paying low wage, although the actual facts are completely different. Many employers tend to pay low wage to the females on the logic that they posses low level of skill. *Narasain, M. (2004)* in his paper highlighted the condition of women in India. He stressed that even though women struggle for social justice, their conditions are very distressing .In the past several decades their struggle has truly become global.Analysis of women's poverty suggests that its main cause is from the constant deterioration of women is terms of their position in the labour market. Demography and economic freedom has brought significant changes in women's contribution towards

the society in the late 20th century. Technological advancement have meant the decline of employment in manufacturing sector and the growing dominance of service industries, this has meant more jobs for women. *Aruna Goel(2004)* in her research focused on the constitutional status capacity building for women leadership as women leaders should promote harmony and peace for women population in decision making. The need of the time is to give women social empowerment, economic empowerment, and political empowerment and eliminate all form of gender discrimination. *Kurba, (2005)* stressed that gender is a key element of discrimination ,so that in period of economic transaction ,women are likely to be especially vulnerable to increased poverty and insecurity .The gender difference impact the economic policies and thus it requires monitoring to the future policy development. In this paper gender dimension are considered more seriously while formulating and implementing economic reforms and programmes focusing more on women. Present study also seems to be an important and promising strategy to extend and supplement mainstream approaches of studying social exclusion and women entrepreneurs as a key topic of sociological and economic research. *Brush, etal (2006)*, reported in their study that the gap between male |and female entrepreneurial is very huge. The performance of female entrepreneurs is usually less than that of male. The probability of low development, smaller size of sales and failures in new adventures are very higher among females. *Soundara, Pandian(2008)*, targeted on the development of female entrepreneurship ,constraints for the females and techniques for women entrepreneurship development in India. Haridoss and *Fredrick (2009)* in their study found that different females had different attitudes towards entrepreneurship notably within the small scale industries within the study area. Highly educated women thought-about business as a challenge and that they thought-about entrepreneurship as their first priority and therefore they were ready to bear risks. They were moreover performs more logically in their respective jobs. *Gaur, Bandana (2011)* in her paper targeted on the condition of females in the economic activities and also focused that there is the need of the hour to create an environment which ensures dignity to the women of these days. The UN agency have preoccupied jobs for women on each fronts whether it is defense, Police ,Pilot and business and in every field women has managed to prove herself. As women are sceptered with right to property and divorce yet as freedom of wedding she has enough opportunities to enhance her overall standing. The women have full rights in terms of education of her children, family management and religion and spirituality. *Sahu,R.(2011)* in their study focused on the condition of females in India because the majority of Indian women resides in rural areas and concrete slums and most of them are involved in subsistence agriculture and also in the informal sector with very little or no regulation, legislative protection and union support .The conception of women's authorization throughout the planet has its root in female centered movements. *Nayak & Panigrahy (2011)* in their paper targeted the role of district industries Centre for the empowerment of women under the PMRY scheme in Ganjam district of Odisha. Their Study is based on secondary data. Authors noticed that the media could play a pivotal role each in creating awareness concerning women's downside and fighting in injustice against them. Progressive laws ought to be passed to fight against civil practices like dowry,

discrimination against girls, insult or harassment of women and different unhealthy social customs and traditions. Effective establishment of vocational education, academic education and creation of social climate among the village community to enter all girls of school going age ought to incline high priority.

Importance of Women Entrepreneurs

Women entrepreneurs encounters only one third of all entrepreneurs comprises of female entrepreneurs. As half of the population around the globe is women there is an unnatural gap between the genders. Thus there is a potential to enhance the level of women entrepreneurs. Women entrepreneurs have a massive potential which are yet to be discovered. Not only because of the gender gap, but also due to huge diversity in the world of innovation women has to be more focused in their development skills. With this we can develop a society which comprises of women business owners as innovators, job creators, and providers of economic security. As owners of small and medium sized enterprises Women can also work in multinational companies with ideas, inventions ,technology ,raw materials ,supplies ,components and business services ,female business owners will be recognized for who they are ,what they do, and how significantly they impact the global economy.

Findings of the study

The results are based on the personal interview of the 240 Women Entrepreneurs in informal sector in Raipur district. Table 01 presents the socio economic background of Women Entrepreneurs Raipur district. 26.3 percent belong to 40-49 years of age group, less than 10 percent to less than 20 years. Majority of the Women Entrepreneurs 77.1 percent belong Hindu religion and only 7.1 percent to Sikh religion. As far as social groups are concerned majority of the Women Entrepreneurs 46.7 percent belong to backward class.9.6 and 14.6 percent fall in the schedule cast and schedule tribe respectively. Majority of the Women Enterpreneurs73.3 percent belong to nuclear family.

Table 1
Women Entrepreneurs Socio Economic Characteristics

S.N.	Characteristics	Frequency	Percentage
1. Age	Less than 20	24	10
	20-29	37	15.4
	30-39	56	23.3
	40-49	63	26.3
	50-59	37	15.4
	60-+	23	9.6
Total		240	100
2 Religion	Hindu	185	77.1
	Muslim	35	14.6
	Sikh	17	07.1
	Other	03	1.2
Total		240	100

3 Social group	SC	23	9.6
	ST	35	14.6
	OBC	112	46.6
	Gen	70	29.2
Total		240	100
4 Type of family	Nuclear	176	73.3
	Joint	64	26.7
Total		240	100
5.Educational qualification	Below primary	28	11.7
	Primary	96	40.0
	Middle	47	19.6
	Higher education	25	10.4
	Graduation	26	10.8
	Post graduation	18	7.5
Total		240	100

Table 01 indicate that majority of Women Entrepreneurs had 40 percent primary school 19.6 percent middle school 10.8 percent graduation and only 7.5 percent post graduation.

Table 2

Employment Create by Women Entrepreneurs

S.N.	Employment creates (in no.)	Frequency	Percentage
1	None	85	35.4
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4	10-15	12	5.0
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6	20 and above	12	5.0
7	Total	240	100

Women are an emerging economic force during the globalization. How they are contributing in terms of employment? It has been found from our study that the contribution of the women entrepreneurs towards employment generation was found quite note worthy. Table 02 reveals that 35 percent of the women entrepreneurs employed up to 5 labors within their enterprises and indicates that women entrepreneurs are satisfied with small size business activities. 11.3 percent employed between 15-20 workers 5 percent employed between 10-15 and above 20 workers. 35.4 percent women entrepreneurs not generate any employment.

Table 3

Investment by Women Entrepreneurs

S.N.	Investment(Rs)	Frequency	Percentage
1	UP TO 25000	115	47.9
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Conclusion and Suggestions

The study analyzed the problems faced by women entrepreneurs in the business operations, reasons for starting business and succeeding. In this study it has been found with regard to the caste background of women entrepreneurs that most of these belong to the other backward caste. A look their age of starting business reveals that majority of women entrepreneurs started their business activities at the age of young. An analysis of types of enterprises and sources of finance exhibits that three fourth of women entrepreneurs own manufacturing and trade and business activities and support their money were the motivated factors to enter the business sector and further succeeded because of their management efficiency and hard work.However,family obstacles and lack of formal education and training were the dominant constraints faced by women Entrepreneurs. Based on this study makes the following suggestions to strengthen the women Entrepreneurs;

1. Institutional loans made available to the women Entrepreneurs according to their need.
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ECONOMY OF CHHATTISGARH

Women Entrepreneurs in Informal Sector of Chhattisgarh

Archana Sethi and B.L. Sonekar

Introduction

Last many decades, the female entrepreneur has been exaggerated in handing the societies and their activities are fully grown up we have a tendency to all recognize. As restricted resources and in depth necessities of person create this resources to enhance incessantly,in recent years, women entrepreneurs have attended structure entrepreneurship with accenting on turning into efficient; and therefore they do provided the causes of sustainable development . In recent years, women entrepreneurship has been exaggerated thanks to environmental changes and thanks to these changes women have faced with several issues that need proper measure both and economically and ideologically.

A large number of females around the globe have created and managed their own businesses. For these women it had been a tough task to succeed in business .They had to face loads of difficulties and overcome numerous barriers to become successful in their ventures. They had to cope up with discriminations and stand up to the unbelief of society and put more efforts than men to prove their qualities to others. Economic globalisation has inspired the growth of feminine business possession.

Conceptual Background of Female Entrepreneurs

Female entrepreneurs may be defined as the women or a group of women who initiate, organize and operate a business enterprise. Government of India has described female Enterpreneurs as an enterprise owned and controlled by a women having a minion financial interest of 51% of the capital and giving at least 51% of employment has many functions. They should explore the prospects of began a new enterprise; undertaking risks, introduction of recent innovation, coordination, administration and management of business and providing effective leadership altogether in business.

Characteristic features of female Entrepreneurs; Women Entrepreneurs tend to be extremely motivated and self directed. They additionally exhibits a high internal locus of management and action .Researchers contended that female business owners exhibits some specific characteristics that promote their creative thinking and generate new ideas and ways in which things would be done. Some of them are as follows:-

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1. Risk taking propensity of female Enterpreneurs
2. High energy state
3. Personal motivations
4. Married first born
5. father's self employment
6. Interpersonal skills
7. Competence in finance and in managing relationships

Objectives

1. To analyze the socio economic characteristic of female Entrepreneurs
2. To examine the sources of finance and investment created by female Entrepreneurs.
3. To identify the factors inspired the women Entrepreneurs to undertake Entrepreneurship and reasons for their success.
4. To review the issues faced by the women Entrepreneurs while beginning, operating and managing their enterprises.
5. To recommend the policy measures to strengthen the women Entrepreneurs.

Data Sources and Methodology

The present study is based mostly on primary data which is gathered from women Entrepreneurs in Raipur district of Chhattisgarh. Thus, in order analyze the status of female Entrepreneurs and hardships faced by them within the competitive world of business setting a sample of 240 women Entrepreneurs were taken and personally interviewed for the study. Four blocks of Raipur district i.e. Dharsiwa,Tilda,Arang and Abhanpur has been taken for the research. Further from each block three towns and three villages were selected. Among these selected areas 10 women entrepreneurs from each area were selected on the basis of random sampling.

Review of Literature

Patrick (1998), tries to study the saleswomen working in the registered shops and institutions by analyzing the extent of discrimination, time allocation and migration .The samples were collected from Ernakulum district of Kerala. In this paper the author has shown that in terms of wages there is a huge discrimination against saleswomen as compared to salesmen within the labour market. The perception that females are temporary participants within the business department was mention as a principle reason for paying low wage, although the actual facts are completely different. Many employers tend to pay low wage to the females on the logic that they posses low level of skill. *Narasain, M. (2004)* in his paper highlighted the condition of women in India. He stressed that even though women struggle for social justice, their conditions are very distressing .In the past several decades their struggle has truly become global.Analysis of women's poverty suggests that its main cause is from the constant deterioration of women is terms of their position in the labour market. Demography and economic freedom has brought significant changes in women's contribution towards

the society in the late 20th century. Technological advancement have meant the decline of employment in manufacturing sector and the growing dominance of service industries, this has meant more jobs for women. *Aruna Goel(2004)* in her research focused on the constitutional status capacity building for women leadership as women leaders should promote harmony and peace for women population in decision making. The need of the time is to give women social empowerment, economic empowerment, and political empowerment and eliminate all form of gender discrimination. *Kurba, (2005)* stressed that gender is a key element of discrimination ,so that in period of economic transaction ,women are likely to be especially vulnerable to increased poverty and insecurity .The gender difference impact the economic policies and thus it requires monitoring to the future policy development. In this paper gender dimension are considered more seriously while formulating and implementing economic reforms and programmes focusing more on women. Present study also seems to be an important and promising strategy to extend and supplement mainstream approaches of studying social exclusion and women entrepreneurs as a key topic of sociological and economic research. *Brush, etal (2006)*, reported in their study that the gap between male |and female entrepreneurial is very huge. The performance of female entrepreneurs is usually less than that of male. The probability of low development, smaller size of sales and failures in new adventures are very higher among females. *Soundara, Pandian(2008)*, targeted on the development of female entrepreneurship ,constraints for the females and techniques for women entrepreneurship development in India. Haridoss and *Fredrick (2009)* in their study found that different females had different attitudes towards entrepreneurship notably within the small scale industries within the study area. Highly educated women thought-about business as a challenge and that they thought-about entrepreneurship as their first priority and therefore they were ready to bear risks. They were moreover performs more logically in their respective jobs. *Gaur, Bandana (2011)* in her paper targeted on the condition of females in the economic activities and also focused that there is the need of the hour to create an environment which ensures dignity to the women of these days. The UN agency have preoccupied jobs for women on each fronts whether it is defense, Police ,Pilot and business and in every field women has managed to prove herself. As women are sceptered with right to property and divorce yet as freedom of wedding she has enough opportunities to enhance her overall standing. The women have full rights in terms of education of her children, family management and religion and spirituality. *Sahu,R.(2011)* in their study focused on the condition of females in India because the majority of Indian women resides in rural areas and concrete slums and most of them are involved in subsistence agriculture and also in the informal sector with very little or no regulation, legislative protection and union support .The conception of women's authorization throughout the planet has its root in female centered movements. *Nayak & Panigrahy (2011)* in their paper targeted the role of district industries Centre for the empowerment of women under the PMRY scheme in Ganjam district of Odisha. Their Study is based on secondary data. Authors noticed that the media could play a pivotal role each in creating awareness concerning women's downside and fighting in injustice against them. Progressive laws ought to be passed to fight against civil practices like dowry,

discrimination against girls, insult or harassment of women and different unhealthy social customs and traditions. Effective establishment of vocational education, academic education and creation of social climate among the village community to enter all girls of school going age ought to incline high priority.

Importance of Women Entrepreneurs

Women entrepreneurs encounters only one third of all entrepreneurs comprises of female entrepreneurs. As half of the population around the globe is women there is an unnatural gap between the genders. Thus there is a potential to enhance the level of women entrepreneurs. Women entrepreneurs have a massive potential which are yet to be discovered. Not only because of the gender gap, but also due to huge diversity in the world of innovation women has to be more focused in their development skills. With this we can develop a society which comprises of women business owners as innovators, job creators, and providers of economic security. As owners of small and medium sized enterprises Women can also work in multinational companies with ideas, inventions ,technology ,raw materials ,supplies ,components and business services ,female business owners will be recognized for who they are ,what they do, and how significantly they impact the global economy.

Findings of the study

The results are based on the personal interview of the 240 Women Entrepreneurs in informal sector in Raipur district. Table 01 presents the socio economic background of Women Entrepreneurs Raipur district. 26.3 percent belong to 40-49 years of age group, less than 10 percent to less than 20 years. Majority of the Women Entrepreneurs 77.1 percent belong Hindu religion and only 7.1 percent to Sikh religion. As far as social groups are concerned majority of the Women Entrepreneurs 46.7 percent belong to backward class.9.6 and 14.6 percent fall in the schedule cast and schedule tribe respectively. Majority of the Women Enterpreneurs73.3 percent belong to nuclear family.

Table 1
Women Entrepreneurs Socio Economic Characteristics

S.N.	Characteristics	Frequency	Percentage
1. Age	Less than 20	24	10
	20-29	37	15.4
	30-39	56	23.3
	40-49	63	26.3
	50-59	37	15.4
	60-+	23	9.6
Total		240	100
2 Religion	Hindu	185	77.1
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RESEARCH ARTICLE

छत्तीसगढ़ की जनजातीय संस्कृति ''माड़िया जनजाति के विशेष संदर्भ में''

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ABSTRACT:
विश्व इतिहास में जनजातीय अथवा आदिवासियों की जीवन शैली आधुनिक युग में अपना विशिष्ट महत्व रखती है। आदिवासियों की संस्कृति प्राचीनतम है और इनकी अपनी चारित्रिक विशेषताएँ भी हैं। ये अपनी संस्कृति की अस्मिता की रक्षा के लिए सदैव जागरूक रहे हैं और अपनी स्थापित संस्कृति, परम्पराएँ, रीति–रिवाज, खान–पान, रहन–सहन, अवधारणाओं एवं मान्यताओं को चिरकाल तक अक्षुण्ण बनाए रखना श्रेयकर समझते हैं। वे आधुनिक भौतिक वैभवों को उपलब्ध कराने की अंधा–धुंध दौड़ से कोसों दूर काफी कुछ प्राकृतिक एवं स्वाभाविक परिवेश में ही जीवन–यापन करते हैं। निष्ठा, ईमानदारी ,परिश्रम और स्वच्छंदता उन्हें धरोहर में प्राप्त हैं तथा इनकी संरक्षा के लिए वे सर्वत्र कृत संकल्प रहते हैं। उसके पारम्परिक रीति–रिवाज आज भी यथावत् हैं, यद्यपि यह नहीं कि परिवर्तन का प्रभाव उन पर लेशमात्र न हुआ हो, किन्तु आधुनिकता से वे चौक पड़ते हैं। उनका जीवन–दर्शन ,सामान्य–जीवन–शैली व जीवन–दर्शन से सदियों पीछे हैं, किन्तु उन्हें असभ्य या असंस्कृत कहना समीचीन नहीं है। वे ऐसे संस्कार धानी हैं जो अपने अमूल्य धरोहर को चिरंतन बनाए रखने के लिए सदैव तत्पर रहे हैं। माड़िया भी आम भारतीय की तरह उत्सव प्रेमी हैं। कृषक होने के कारण इसके सभी उत्सव कृषि पर आधारित होते हैं। इनके जीवन में परम्परागत संस्कारों ,त्यौहारों एवं उत्सवों का अत्यंत महत्व है, जो इनके शुष्क, कठोर व संघर्षमय जीवन में सरसता और उत्साह का संचार करते हैं। वे लोग वर्ष भर पर्व या त्यौहार मनाते हैं और प्राय सभी त्यौहारों में नृत्य व गीत का आयोजन होता है। नृत्य इनके लिए मनोरंजन एवं तनाव दूर करने का एक सुगम साधन है। यहॉ विभिन्न प्रकार के नृत्य प्रचलित हैं, जैसे– कक्साड़ ,गौर ,विवाह, गेड़ी ,जात्रा आदि।

KEYWORDS: सिरहा, लिगोंदेव, देवगुड़ी, गौर सींग, कक्साड़, जात्रा।

शोध प्रविधि :–
प्रस्तुत अध्ययन बस्तर संभाग के अबुझमाड़ क्षेत्र की माड़िया जनजाति पर केन्द्रित है यह अध्ययन अभिलेखागारीय पध्दति एवं प्राथमिक व अनुभव जन्य तथ्यों पर आधारित है। तथ्य संकलन हेतु साक्षात्कार अनुसूची उपकरण का प्रयोग किया गया है। अबुझमाड़ क्षेत्र के लगभग 500 उत्तरदाताओं में से

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100 अर्थात 20 प्रतिशत उत्तरदाताओं का चयन उद्देश्यपूर्ण निदर्शन के द्वारा किया गया है।

भूमिका:–

भारतीय कला–परम्परा अपनी प्राचीनता एवं निरन्तरता के लिए प्रसिद्ध है। कला के लिये भारतीय परम्परा में ''शिल्प'' शब्द का प्रयोग हुआ है तथा इसका विकास शिल्पियों के सहयोग से हुआ है । स्थापत्य कला, मूर्तिकला एवं चित्रकला बुद्धि की सर्जनात्मक शक्ति के विभिन्न रूप है। वास्तुकला के प्राचीनतम प्रमाण कांस्य–युग के हैं। ये प्रमाण सिंधु घाटी की सभ्यता में उपलब्ध हैं। वहाँ उपलब्ध भवन ,सड़क आदि भारत में नगरीकरण के सूचक हैं। स्तूप, चैत्य गृह एवं विहार से संबंधित वास्तुकलाओं का विकास बौद्ध धर्म के संरक्षण में हुआ। इनका निर्माण बौद्ध धर्म की आवश्यकता के अनुरूप था कला का विकास सभी धर्मों, सम्प्रदायों तथा शिल्पियों के सहयोग से हुआ है।[1]

जहाँ तक बस्तर की कला का सवाल है चित्रकला के समस्त पारम्परिक अंगों का पालन नहीं मिलता। बस्तर अंचल में निवास करने वाले माड़िया जनजाति की चर्चा तब तक अधूरी रहेगी, जब तक उनकी कला एवं संस्कृति के विषय में पर्याप्त जानकारी न दी जाय। साहित्य को समाज का दर्पण कहा जाता है, उसी तारतम्य में यह भी कहा जा सकता है कि कलाएँ समाज का प्रतिबिम्ब होती है।[2]

आदिम जातियों में नृत्य किसी त्यौहार, आनुष्ठानिक कार्यों से प्रारंभ से जुड़े रहे हैं। आदिम जनजाति के लोगों को नृत्य की प्रेरणा प्रकृति और जीवों से मिली है, बुनियादी रूप से उल्लसित मानव ने अपनी खुशी का इज़हार गीत संगीत के माध्यम से किया है। आदिम समूहों में नृत्य एक सामूहिक क्रिया–कलाप है, इसलिये नृत्य उनकी सामूहिक भावना के प्रतीक है।[3] आदिवासी के लोक नृत्य एवं लोक गीत विशेष आकर्षक हैं। विवाह आदि प्रसंगों पर उनका आयोजन किया जाता है। होली उनके लिए एक महत्वपूर्ण त्यौहार है। उस दिन और उसके पूर्व भी आकर्षक नृत्य करते हुए देखे जा सकते हैं।[4] आदिवासियों में अनेक उत्सव प्रचलित हैं, जिनका सांस्कृतिक महत्व है। प्रत्येक उत्सव में कुछ लोकगीत गाये जाते हैं। ये गीत प्रायः नृत्य परक होते हैं। सम्पूर्ण रात्रि रेला नामक तालबद्ध नृत्य करते हुए बीत जाती है। ''घोटुल'' इनका अत्यन्त प्रसिद्ध एवं लोकप्रिय नृत्य स्थान है।[5]

भारत वर्ष में गोंड़, माड़िया, मुरिया आदि जनजातियों में युवा गृहों में नृत्य का प्रशिक्षण दिया जाता है। बस्तर की माड़िया जनजाति के लोग इन युवा गृहों में बच्चों को संगीत एवं नृत्य का ज्ञान अर्जित करने हेतु भेजते हैं, जो कि युवा गृहों का प्रमुख कार्य माना जाता है। महिला–पुरुष विभिन्न अवसर पर नृत्य में भाग लेते हैं।[6]

जनजातियों के अनेक समूहों ने अधिकांश समय युद्ध तथा संघर्ष में ही बिताया है, जिसका प्रभाव उनकी कला पर भी दिखाई देता है। युद्ध का अनेक जनजातियों में प्रचलन है। प्राचीन समय में गोंड़ राजा के दरबार में प्रस्तुत किया जाने वाला सैला नृत्य भी युद्ध नृत्य के रूप में माने जाते हैं।[7]

धार्मिक नृत्य :–

समस्त जनजातियों में धार्मिक नृत्यों का आयोजन किया जाता है। अनेक अवसरों पर सिरहा स्वयं नृत्य करता है। वेरियर एल्विन ने अपना मत प्रकट करते हुए कहा है कि''सिरहा''सर्वप्रथम नृत्यकार थे तथा उनके नृत्य उल्लास से परिपूर्ण होते हैं।[8]

विवाह नृत्य :–

विवाह नृत्य अक्सर अत्यंत हर्षोल्लास का होता है। अतः समस्त आदिवासी इस मांगलिक अवसर पर नृत्य में मग्न हो जाते हैं। परन्तु ऐसे अवसरों पर मदिरापान अधिक बढ़ जाता है जिसकी वजह से अनेक लोगों ने जनजातीय संगीत कला की कुरीतियों की भर्त्सना की है, कि सामूहिक नृत्य के अवसरों पर मदिरापान किये जाने से चरित्र हीनता की भावनाएँ बढ़ जाती हैं। मदिरा पान की इसी बुरी आदत को नृत्य से सम्बद्ध न मानकार संगीत एवं नृत्य की पवित्रता को बनाये रखने का प्रयास किया जाना आवश्यक है।[9]

बस्तर का जनजीवन, जंगल, जानवार, जनजाति जितने आकर्षक और लुभावने हैं उससे कहीं अधिक मोहक और आकर्षक उनका नृत्य और संगीत है। लगता है जीवन यहीं है। प्रकृति और मनुष्य (आदिवासी) दोनों के कार्यों अविरल से चलायमान है। यहाँ के हल्बा, भतरा, परजा, गोंड, माड़िया,

मुरिया और धुरवा प्रत्येक जनजाति अपने–आप में एक संस्था है और इसी कड़ी में दण्डामी माड़िया के नृत्य और संगीत अद्‌भुत है।[10]

मनोरंजन के साधनों में नृत्य का प्रमुख स्थान रहा है। वात्सायन ने 64 कलाओं में नृत्य कला को भी एक कहा माना है। आदिवासी जनजीवन में नृत्य का महत्वपूर्ण स्थान है। श्रीमती कमला देवी चट्‌टोपाध्याय ने लिखा है – जन्म से लेकर मृत्यु तक के सभी सामाजिक अवसरों पर नृत्य का आयोजन किया जाता है। वस्तुतः समाज के किसी अवसर को ऐसे समारोहों के लिए कम महत्वपूर्ण नहीं कहा जा सकता। ऋतु परिवर्तन, धार्मिक त्यौहार, विवाह और आखेट आदि में शायद ही नृत्य के बिना कोई काम चल पाता है। विशेष अवसरों के अलावा दिन भर के कठिन परिश्रम के बाद संध्या को मनोरंजन के रूप में भी नृत्य आयोजित किए जाते हैं। ये नृत्य गानों तथा ढोल की ताल के साथ चलते हैं और इनके शरीर झूमते हैं और थिरकते हैं।[11]

आदिवासी बाहुल्य अंचल बस्तर अपने लोक नृत्यों के कारण भी प्रसिद्धि प्राप्त की है। गणतंत्र दिवस व स्वतंत्रता दिवस के अलावा विशिष्ट अतिथियों के स्वागत में बस्तर के नृत्य शासन द्वारा आयोजित किए जाते हैं। जहाँ तक आम आदिवासी का सवाल है उसके लिए नृत्य जीवन का एक अंग है। भोजन, पानी, हवा जैसे उसके लिए नृत्य भी अनिवार्य आवश्यकता है, ''जो जाति नाचती नहीं वह मरती है, जो जाति नाचती है वह मरती नहीं, यह आदिवासी अंचलों की मान्यता है। जहाँ तक बस्तर के आदिवासी प्रश्न है नृत्य उसके लिए तनाव दूर करने का, मनोरंजन का एक सुलभ साधन है। सामूहिक नृत्य बस्तर की विशेषता हैं, नृत्य यहाँ एकता के सूत्रों को मजबूत करने वाला एक महत्वपूर्ण उपादान है।[12]

आदिवासियों को उसके प्राकृतिक रूप में देखना हो तो मस्ती में झुमते हुए, नाचते हुए देखिये। तनावमुक्त, उसकी चेहरा आप कभी नहीं भूलेंगे। महिला–पुरुष मिलकर नाचते हैं, लिंग व आयु का व्यवधान आदिवासी नृत्य में नहीं है। जीवन के लिए नृत्य और नृत्य के लिए जीवन को यहाँ आवश्यक माना जाता है।[13]

कक्साड़ नृत्य :–

माड़िया जनजाति का एक प्रमुख नृत्य कक्साड़ है। इस नृत्य का स्वरूप धार्मिक है। कक्साड़, 'कर्स' शब्द से निर्मित हुआ है कर्स–नृत्य में सामूहिक रूप में गाते–बजाते माड़िया अपने आंगा देव के पास पहुँचते हैं। इस नृत्य में शामिल युवक कमर से पाँव के पँजे तक घाघरा के समान लहंगा पहने रहते हैं। घाघरा के अनुरूप कमीज अंगरखा पहनते हैं। घाघर व अंगरखा दोनों की किनारी का रंग लाल होता है। पगड़ी में पक्षियों के बहुरंगी पंख सजाये रहते हैं, तथा पगड़ी के साथ दर्पण, फुंदरा, फीता, कंघी आदि खोचते हैं। हाथ में कड़ा, गले में मूंगा की माला पहने रहते हैं। उस अवसर पर कमर में पहना जाने वाला पट्‌टा उल्लेखनीय है। लगभग पाँच किलो वजन के असंख्य छोटे–बड़े घुंघरू इस पट्‌टे में बंधे रहते है। नृत्य की भाव–भंगिमाओं में ये कमर के इस पट्‌टे को विशेष प्रकार से झटकते हैं जिससे मधुर आवाज निकलती है। वे कंधे में कुल्हाड़ी रखते हैं इसे नाचने के लिए विशेष प्रकार का बनाया जाता है।[14]

युवतियाँ अपने पोशाक में एक सफेद धोती रखती हैं जिसे कमर से घुटने तक पहना जाता है। इसके अतिरिक्त सिक्कों की माला, सूता, फुंदरा, बनुर्यांग, छल्ला आदि आभूषण हाथों और पैरों में पहनती है।

कक्साड़ नृत्य एक पूजा नृत्य है। गाँव के धार्मिक स्थान (देवगुड़ी) में वर्ष में एक बार कक्साड़ पूजा का आयोजन किया जाता है, जिसमें माड़िया जनजाति के लोग 'लिंगोदेव' को प्रसन्न करने के लिए रात भर नृत्य गायन करते हैं। पुरूष कमर में घण्टी बाँधते है और महिलाएँ विभिन्न फूलों और मोतियों की माला पहनती है।[15]

अबुझमाड़ में कक्साड़ पर्व श्रृंगार पर्व है जिसकी प्रतीक्षा वर्ष भर की जाती है यह एक ऐसा पर्व है, जिसमें प्रेमी तथा प्रेमिकाओं का उन्मुक्त मिलन होता है। इस अवसर पर कई अपरिचित तथा अजनबी युवक–युवती निकट आकर एक–दूसरे को पसंद करते हैं और उनके बीच भविष्य में सुदृढ़ होने वाले प्रेम की नींव पड़ती हैं यहीं पर अधिकांश विवाहों की भूमिका बनती है लगभग 90 प्रतिशत दाम्पत्य जीवन का सूत्रपात भी यहीं से होता है।[16]

विशेषताएँ :–

नृत्य की पूरी वेशभूषा में सजने के लिए प्रत्येक नर्तक अधिक से अधिक समय लगता है। नाच की पूरी पोशाक पहिनाना, गले में माला–मूंगों का ढेर, सिर की पगड़ियों में मयूर अथवा मुर्गा पंखों की सजावट और कमर के नीचे बड़े–बड़े घुंघरूओं की ऐसी सजावट कि नाचने के दौरान अधिक से अधिक जोर से झन्न–झन्न की आवाज हो।[17] इस तैयारी में हर नव युवक एक–दूसरे की सजावट के लिए पूरी सहायता करता है, इसके लिए हर एक को दूसरे से प्रतिस्पर्धा करनी होती है।

कक्साड़ नृत्य की सबसे बड़ी विशेषता तथा विचित्रता यही है कि वहाँ आकर्षण का केन्द्र युवक होता है, युवती नहीं। नृत्य के दौरान प्रत्येक नर्तक इसी बात पर प्रयत्नशील रहता है कि ज्यादा से ज्यादा आकर्षक वहीं दिखे, ताकि युवती ही आकर्षित होकर पास चली आए, नाच के लिए उसके साथ की कामना करें।[18] उल्लेखनीय है कि कक्साड़ नृत्य में आस–पास के गाँवों के लोग भी अपने गाँव के आंगादेव के साथ उपस्थित रहते हैं और देव स्थल में सभी नर्तक दल समूह में नाचते–गाते सात फेरा देव स्थल का लगाकर अपने–अपने निवास स्थान में लौट जाते हैं। रात्रि भर नाच–गाना चलता है जिसमें ढोल, टिमकी, आदि वाद्य यंत्रों का प्रयोग होता है। इस समय विभिन्न प्रकार के मादक पेय सेवन किए जाते हैं।[19]

गौर नृत्य :–

गौर नृत्य या गंवर नृत्य माड़िया आदिवासियों का प्रमुख लोक नृत्य है। इस लोक नृत्य के अवसर पर माड़िया युवक सिर पर गंवर का सींग धारण करते हैं, इसी गौर सींग धारण करने के कारण ही माड़ियों की एक शाखा गौर सींग माड़िया (बायवन हार्न माड़िया) के नाम से जानी जाती है। गौर नृत्य बस्तर की पहचान बन गया है। बस्तर की माड़िया जाति अपने इस नृत्य के कारण चर्चित भी है।[20] इस नृत्य को दण्डामी माड़िया शादी के अवसर पर तथा मेले व मड़ई में भी करते हैं। इस नृत्य के समय पुरूष अपने सिर पर जंगली भैंस जिसे गौर, माओं अथवा परेमा कहा जाता है की सींग को धारण करते हैं, इसीलिए इसे गौर नृत्य के नाम से जाना जाता है। युवक नर्तकों के कंधों में मांदरी होता है इसे एक ओर डंडे से तथा दूसरी ओर हाथ से बजाते हुए नृत्य करते है। युवतियॉ सिर पर पीतल की पट्टी धारण करती हैं तथा हाथ में लोहे की छड़ी जिसके उपरी भाग में सेंम की आकृति के खोखले फलियॉ, लोहे की बनी बंधी होती है, छड़ी को भूमि पर पटकने से खन–खन की आवाज होती है जो युवतियों के थिरकते पैरों को और गति देती है।[21]

जात्रा नृत्य :–

इस नृत्य को माड़िया जनजाति वार्षिक पर्व के रूप में मनाते हैं। जात्रा के दौरान गॉव के युवक–युवतियॉ रात भर नृत्य करते हैं। इस नृत्य के समय भी माड़िया युवक गौर सींग को कौड़ियों से सजाकर अपने सिर पर धारण करते हैं और युवतियॉ सिर पर पीतल की मुकुट पहनती हैं एवं नृत्य के दौरान युवतियॉ गीत गाती हुई सुन्दर मुद्राऍ बनाती हैं।

गेड़ी नृत्य :–

हरेली अमावस्या के दिन गेड़ी बांस या लकड़ी को दो डण्डों में लगभग 1 फुट की ऊचाई पर बांस की खपचियों से पैर रखने के लिए पायदान बनाया जाता है, जिसे डण्डे से बांधा जाता है। इस गेड़ी पर चढ़कर नृत्य किया जाता हैं। गेड़ी युवकों का नृत्य है युवतियों का नहीं।

विश्लेषण एवं निष्कर्ष :–

माड़िया जनजाति के परिवार में धार्मिक उत्सव के अवसर पर नृत्य करने की परम्परा का होना

तालिका क्रमांक 01

क्रमांक	नृत्य करने की परम्परा	संख्या	प्रतिशत
1	हॉ	100	100
2	नहीं	–	–
	योग	100	100

प्रस्तुत अध्ययनगत् समूह के शत प्रतिशत सर्वेक्षित माड़िया जनजातियों के परिवार में धार्मिक उत्सव अवसर पर नृत्य करने की परम्परा रही है।

यदि हॉ तो इस नृत्य का विवरण

तालिका क्रमांक 02

क्रमांक	प्रमुख नृत्य का नाम	संख्या	प्रतिशत
1	कक्साड़, जात्रा, गेड़ी,गौर	72	72
2	कक्साड़, जात्रा, गेड़ी	28	28
	योग	100	100

प्रस्तुत तालिका से स्पष्ट होता है कि 72 प्रतिशत उत्तरदाताओं के परिवार में धार्मिक उत्सव के अवसर पर कक्साड़, जात्रा, गेड़ी, गौर नृत्य किया जाता है तथा 28 प्रतिशत उत्तरदाताओं के परिवार में कक्साड़, जात्रा, गेड़ी नृत्य किया जाता है।

अतः उपरोक्त ऑकड़ों से स्पष्ट होता है कि अधिक उत्तरदाताओं के परिवार में धार्मिक उत्सव के अवसर पर कक्साड़, जात्रा, गौर एवं गेड़ी नृत्य किया जाता है। उत्तरदाताओं ने नृत्य को समूह में वर्णित किया हैं प्रथम समूह में कक्साड़, जात्रा, गौर एवं गेड़ी और द्वितीय नृत्य समूह में कक्साड़, जात्रा, गेड़ी है। द्वितीय नृत्य समूह में गौर नृत्य नहीं है, क्योंकि सर्वेक्षित कोहकामेटा क्षेत्र के अबुझमाड़िया गौर नृत्य नहीं करते है। जबकि पिड़ियाकोट, डूंगा, बेड़मा, आदेर, टोण्डाबेड़ा और मण्डाली के अबुझमाड़िया और दण्डामी माड़िया दोनों ही गौर नृत्य करते हैं, इसलिए प्रथम समूह की संख्या अधिक है।

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RESEARCH ARTICLE

भारत में बांग्लादेशी शरणार्थियों से जुड़े प्रमुख मुद्दो का एक अध्ययन (छत्तीसगढ़ राज्य के कांकेर जिले के विशेष सदंर्भ में)

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ABSTRACT:

अध्ययन मुख्य रूप से इस बिन्दु पर केन्द्रित रहा है कि बांग्लादेश में हुए साम्प्रदायिक दंगे और 1971 में बांग्लादेश के विभाजन के समय जिन शरणार्थीयों को भारत सरकार के द्वारा छत्तीसगढ़ राज्य में शरणार्थी शिविरों में बसाया गया ये शरणार्थी देश तथा राज्य की आंतरिक सुरक्षा व्यवस्था, स्थानीय समुदाय व जनजाति संस्कृति की दृश्टि से किसी भी प्रकार से समस्यामूलक हो नहीं है? इन्हीं तथ्यों का परीक्षण शोध अध्ययन के माध्यम से किया गया है। शोध को व्यवस्थित रूप देने के लिए बांग्लादेशी शरणार्थियों के गैर शिविरार्थी शरणार्थी जो कि कांकेर जिले के पखांजूर में निवासरत हैं उन्हें लिया गया है।

KEYWORDS:

INTRODUCTION:

अवांछित प्रवास सम्पूर्ण विश्व की ज्वलंत समस्याओं में से एक है। जब कभी भी व्यक्ति धार्मिक, राजनीतिक बाधाओं, युद्ध, आतंकवादी गतिविधियों, साम्प्रदायिक संघर्षों तथा निर्भयता के चलते अपने जीवन को जोखिम में डालकर बेहतर जीवन के लिए प्रवास करता है तो ऐसी गतिविधियाँ लोगों को पड़ोसी देशों की ओर ले जाकर शरणार्थियों के रूप में खड़ा कर देती है, तब यह प्रवास कई मायनों में समस्या–मूलक होता है।

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युगों से मानव द्वारा पलायन किये जाते रहे हैं। इस प्रकार बड़ी संख्या में लोगों का अंतर्राष्ट्रीय पलायन धार्मिक, राजनीतिक तथा जातियता के आधार पर हुआ।

साधारणतः अंतर्राष्ट्रीय पलायन (प्रवास) निर्धन देशों से धनी देशों की ओर हुआ है। इस सदी का सबसे प्रमुख लोक–प्रवास जो दक्षिण–एशिया के भारतीय उपमहाद्वीप में हुआ, जब भारतीय गणराज्य का विभाजन सन् 1947 में एक पृथक राष्ट्र पाकिस्तान के रूप में हुआ, जिसके चलते अनुमानतः 7 मिलियन लोग भारत से पाकिस्तान और लगभग 8 मिलियन लोग पाकिस्तान से भारत पलायन करके एक–दूसरे देशों में गये, जो आज भी दोनों देशों के लिए एक प्रमुख समस्या बना हुआ है।[1]

अदस्तावेजित पलायन का मुद्दा आज विश्व की ज्वलंत समस्या है। जब भी मानवीय मतभेद, स्थानीय विवाद या गरीबी का प्रश्न उठता हैं तो लोग जीवन की बाजी लगाकर पारिवारिक बंधनों, आश्रय, भाषा, संस्कृति एवं बेहतर जिंदगी की खोज करती है। सन् 1947 में बंगाल का विभाजन विश्व इतिहास में सबसे विभाजन था। जहाँ घर के सोने का कमरा पश्चिमी बंगाल की सीमा के अन्दर था और रसोई घर सीमा के दूसरी ओर था। जिससे अनाधिकृत पूर्वी पाकिस्तान से भारत में बहुसंख्यक पलायन हुआ। **(प्रणती दत्ता : 2004)**[2]

इस आधार पर हम कह सकते हैं कि भारत के विभिन्न हिस्सों में रहने वाले बांग्लादेशी शरणार्थियों तथा उनका भारत की सामाजिक, सांस्कृतिक व आर्थिक परिवेश पर पड़ने वाला प्रभाव अध्ययन की दृष्टि से सम–सामायिक है। अतः प्रस्तुत समाजशास्त्री अनुसंधान हेतु बांग्लादेशी शरणार्थियों का चयन किया गया है।

बांग्लादेशी शरणार्थियों का इतिहास

बांग्लादेश, बांग्लादेशीय लोगों का मूल स्थान है। वह बंगाली, संस्कृति के विरासत का केन्द्र है। जिसे एक दीर्घ और दुखदायी शासन पहले अंग्रेजों और फिर पाकिस्तानियों से आजाद कराया गया था। भौगोलिक, ऐतिहासिक और सांस्कृतिक रूप से बांग्लादेश बहुसंख्यात्मक विस्तृत बंगाल का भाग था, जो आज पश्चिम बंगाल राज्य है। 1947 से 1971 तक बांग्लादेश का क्षेत्र पाकिस्तान का एक भाग था, इस तरह उसका अधिकारिक पदनाम पूर्वी बंगाल के स्थान पर पूर्वी पाकिस्तान था। बांग्लादेश (बंगाली राष्ट्र के लिए बंगाली नाम) और उसकी आजादी 16 दिसम्बर 1971 को सुनिश्चित की गई। जबकि क्षेत्र में पाकिस्तानी सेनाओं ने बंगलादेशी और भारतीय सेना की संयुक्त कमान के आगे समर्पण किया। बांग्लादेश विश्व में लगभग 1,44,000 वर्ग के क्षेत्र के साथ सबसे निर्धन क्षेत्रों में से एक हैं। 1947 से बांग्लादेश में हिन्दू जनसंख्या 30 प्रतिशत से घटकर 10 प्रतिशत रह गई है क्योंकि उन्हें भयंकर धार्मिक और राजनैतिक आतंकवाद से पीड़ित होना पड़ा। 1947 में विभाजन के तुरन्त ही बाद शरणार्थियों का बहुसंख्यक पलायन शुरू हुआ और बाद में सभी अवैध पलायनों को भी शासन ने वैध मान लिया। भारत बांग्लादेश के साथ 4,095 किमी लम्बी सीमा अपने सभी पड़ोसियों के साथ सहभागिता करता हैं। इनमें से चार उत्तर–पूर्वी राज्यों–त्रिपुरा, मेघालय, मिजोरम और आसाम ही 1,879 किमी में हैं जबकि पश्चिमी बंगाल के पूर्वी राज्यों में 2,216 किमी लम्बी सीमा हैं। लगभग 65 किमी का क्षेत्र अभी भी निर्धारित नहीं हैं। पैरा–मिलिट्री, बी.एस.एफ. (सीमा सुरक्षा बल) जिसे सीमा पर नियुक्त किया।वे भी समस्याओं का सामना कर रहे हैं। जिनमें बांग्लादेश से अवैध पलायन और सशस्त्र अलगाववादियों के हरकतों से भारत के उत्तर–पूर्वी राज्यों और पश्चिमी बंगाल पीड़ित हैं। (**हुसैन : 2003**)[3]

भारत बांग्लादेश की सीमा पर कटिले तारों के द्वारा सुरक्षा सीमा (बाड़) बनाने का काम प्रगति पर हैं। भारत–बांग्लादेश संधि के अनुसार कोई भी देश शून्य सीमा से 150 गज की दूरी तक बाड़ लगा सकता है। लगभग 3,500 ग्रामीण इस सीमा शून्य भाग पर रहते हैं और खेती करतें हैं। इसका अर्थ यह हुआ कि जब एक बार सीमा इन लोगों के रहने के क्षेत्र में आती है तब उनकी गतिविधियों पर प्रतिबंध लगता है। (**गांगुली :1999**)[4]

अदस्तावेजित पलायन बांग्लादेश के सीमा से पश्चिम बंगाल के जिलों के लिए चिन्ता का विषय बन गया। जिससे सीमा क्षेत्र में असामाजिक गतिविधियॉ सामान्य जीवन में बाधा डालने लगीं और राष्ट्र की सुरक्षा के लिए खतरा बन गई। पश्चिम बंगाल सीमा क्षेत्र के नादिया जिले में रह रहे हिन्दू परिवारों को दो बार स्थानान्तरित किया गया–एक बार विभाजन के कारण, दूसरी बार आंतकवाद के कारण। मुस्लिम अवैध पलायनकर्ताओं के आतंक के कारण स्थानान्तरितों में साम्प्रदायिक समरसता पनप गई थी। ये घुसपैठिये शक्कर, दवाईयॉ, सोना आदि का तस्करी करने में व्यस्त थे। इन सीमा क्षेत्रों में पशुओं की चोरी एक बहुत सामान्य सी बात थीं।(**बेनर्जी : 2003**)[5]

शरणार्थी समस्या तथा अन्तर्राष्ट्रीय कानूनी व्यवस्था

अन्तर्राष्ट्रीय कानून के अन्तर्गत शरणार्थीयो को विशेष स्थिति प्रदान की गई है, इस सम्बन्ध मे 1951 का अन्तराष्ट्रीय शरणार्थी अभिसमय तथा 1967 में स्वीकृत इस अभिसमय का प्रोटोकाल उल्लेखनीय है,

अभिसमय के अनुसार, ''शरणार्थी वह व्यक्ति है, जो अपनी प्रजाति, राष्ट्रीयता, किसी विशेष सामाजिक समूह की सदस्यता अथवा अपने राजनीतिक दृष्टिकोण के कारण अपने देश में परिस्थितियों के आलोक में बसद में उक्त परिभाशा का विस्तार करते हुए उन व्यक्तियो को भी शरणार्थी माना गया है, जो अपने देश में सशस्त्र संघर्श, आन्तरिक विद्रोह अथवा मानवधिकारों के व्यवस्थाजन्य उल्लंघन के कारण अपना देश छोड़कर दूसरे देश में पलायन करने के लिए विवश हो जाते है। (**प्रतियोगिता दर्पण नवंबर 2015**)[6]

उल्लेखनीय है कानून कि प्रवासी तथा शरणार्थी मे अन्तर होता है, प्रथम प्रवासी ऐसा कोई भी व्यक्ति होता है जो स्वेच्छा से बेहतर भविष्य की तलाश में अपना देश छोड़कर दूसरे देश में निवास करने लगता है, जबकि शरणार्थी विवश होकर विपरीत परिस्थितियों में दूसरे देश पलायन करता है, दूसरे, प्रवासी की कानूनी स्थिति का निर्धारण उस देश के कानूनों के अनुसार होता है जिस देश में वह निवास करने के लिए जाता है, जबकि शरणार्थी को अंतराष्ट्रीय कानून के अंतर्गतविधिक स्थिति प्राप्त होती है तथा उन्हे कतिपय विशिष्ट अधिकार व सुविधाएं प्राप्त होती है, ये विशेष अधिकार है– उस देश में जहॉ उनका उत्पीडन होने की संम्भावना है वहॉ उन्हे वापस भेजने पर रोक : बिना किसी भेदभाव के उनकें आधारभूत मानवीय इस प्रकार के अधिकर प्राप्त नही होते है। (**प्रतियोगिता दर्पण नवंबर 2015**)[7]

वर्तमान शरणार्थी समस्या में यह अन्तर महत्वपूर्ण है क्योकि कतिपय यूरोपियन देश इसे 'प्रवासी समस्या' का नाम दे रहे है, ताकि वे शरणार्थियों के प्रति अपने कानूनी दायित्वों से मुक्त हो सकें, जबकि वस्तुतः यह एक शरणार्थी समस्या है तथा अन्तर्राष्ट्रीय कानून के अन्तर्गत शरणार्थियों को कतिपय अधिकार प्राप्त है, उसी अनुपात में शरणार्थियों के प्रति प्रत्येक देश के कतिपय कानूनी दायित्व भी होतें है।

यूएनएचसीआर :

''यूनाईटेड नेशन्स हाई कमीशनर फॉर रिफ्यूजी अन्तर्राष्ट्रीय स्तर पर शरणार्थियों की देखभाल के लिए शीर्श संस्था है, इसकी स्थापना 1950 में यूएनओं की महासभा द्वारा की गई थी, इसका मुख्यालय जेनेवा में है, वर्तमान में यह संस्था 125 देशों में 33.9 मिलियन शरणार्थियों की देखभाल कर रही है, इस संस्था का मुख्य वित्तीय स्त्रोत सदस्य देशों द्वारा दिया गया योगदान है. वर्तमान में यह संस्था वित्तीय साधनों की शारी कमी का सामना कर रही है।'' (**यूएनएचसीआर : 2015**)[8]

क्रियात्मक अवधारणा–

प्रस्तुत शोध अध्ययन हेतु प्रमुख क्रियात्मक अवधारणा निम्न है : –

बांग्लादेशी शरणार्थी –

प्रस्तुत अध्ययन में बांग्लादेशी शरणार्थी से आशय ऐसे व्यक्तियों से हैं जो कि बांग्लादेश के साम्प्रदायिक दंगों एवं 1971 विभाजन के समय छत्तीसगढ़ राज्य के विभिन्न स्थानों पर शरणार्थी के रूप में बसाया गया है। इनका नाम शरणार्थियों की सूची में आज भी शामिल हैं। जबकि अधिकांश शरणार्थियों को सरकार द्वारा विस्थापित कर भारतीय नागरिकता प्रदान की जा चुकी है।

अध्ययन का समाजशास्त्रीय महत्व –

सीमाओं के पार नागरिकों का एक राष्ट्र से दूसरे राष्ट्र में प्रवेश विवाद का एक गंभीर विषय रहा है। दीर्घावधि से कुछ समाजशास्त्री और मानव–शास्त्री, साथ ही अर्थशास्त्रियों ने घुसपैठ की समस्या का अध्ययन किया है, वह भी जनसांख्यिक बदलाव धार्मिकता, नस्लवाद और राजनैतिक चरित्र–मेजबान देश के संदर्भ में किया। फिर भी जब अन्तर–सीमा पार करने के प्रवाह का प्रभाव क्षेत्रीय रूप से राष्ट्र के सिद्धान्त के साथ जोड़ा नहीं गया। यह राष्ट्र ही है कि उसके नागरिक कौन है? राष्ट्र ही सुनिश्चित करता है कि सीमा को वहॉ तक सींचा जा सकता हैं, वे सभी लोगों जिनका दायित्व राष्ट्र पर है, दोनों राष्ट्र और नागरिकता के योग्य बन जाते हैं। नागरिकता राष्ट्रीय सीमा में सुरक्षा का पासपोर्ट बन जाती है। आव्रजन नागरिकता की मॉग व्यवहार करने योग्य बनने के लिए और एक नए राष्ट्र की स्थापना के लिए किए जाने वाली जनतांत्रिक प्रयासों से अपना सहयोग देने के लिए अन्यथा असुरक्षा उनमें घर कर जाती है।

सरकार द्वारा उन विस्थापित परिवारों को शिक्षा, स्वास्थ्य,आवास एवं अन्य मूलभूत सुविधाएं प्रदान की जा रही है। वह उस समुदाय के समाजिक एवं आर्थिक जीवनस्तर को परिवर्तन करने में कितना सहभागी हो रहा है। यह अध्ययन के समाजशास्त्रीय महत्व को इंगित करता हैं। विस्थापित परिवारों की स्थानीय समाज से सामंजस्य स्थापित करने के लिए राज्य सरकार द्वारा उन परिवारों को शिक्षा, स्वास्थ्य व आवास इत्यादि मूलभूत सुविधाएँ प्रदान की जा रही हैं। वह वास्तव में उस समुदाय के सामाजिक एवं आर्थिक जीवन स्तर को बेहतर बनाने में कितना सहायक सिद्ध हुआ है ? प्रस्तुत अध्ययन इस दृश्टि से महत्वपूर्ण मानी जा सकती है कि अध्ययन के माध्यम से बाग्लादेश के सांप्रदायिक दंगों व 1971 के विभाजन के बाद से लेकर अब तक भारत में रह रहे बांग्लादेशी शरणार्थियों की सामाजिक–आर्थिक स्थिति किस प्रकार की हैं? क्या वे स्थानीय समुदाय से अपना सामांजस्य स्थापित कर पाने में सफल रहे हैं? या स्थानीय समुदाय के साथ–साथ राज्य की आंतरिक सुरक्षा की दृश्टि से संवेदनशीला विशय बन चुके हैं? इन सभी तथ्यों का ज्ञान अध्ययन के माध्यम से हुआ है जो कि इसके महत्व को दर्शाता है।

बांग्लादेशी शरणार्थियों से जुड़े प्रमुख मुद्दे –

1. गैर शिविरार्थियों से जुड़े मुद्दे –

बांग्लादेशी शरणार्थी जिन्हें शरणार्थी शिविर में कुछ वर्श रहने के पश्चात गैर शिविरार्थी के रूप में छत्तीसगढ़ राज्य के अलग–अलग जिलों (मुख्य रूप से जनजाति क्षेत्रों) में बसाया गया है, जिन्हें गैर शिविरार्थी के रूप में रहते हुए 40 वर्श से भी अधिक समय हो चुका है, उनसे जुड़े कुछ प्रमुख मुद्दे इस प्रकार है –

(I) स्थानीय आदिवासियों पर दबाव –

चूंकि बांग्लादेशी शरणार्थियों को जब राज्य में बसाया गया तो वे सामाजिक आर्थिक व शैक्षणिक दृश्टि से स्थानिय आदिवासियों से भिन्न होने के साथ–साथ बेहतर स्थिति में थे। बसने के पश्चात शासन की ओर से शरणार्थियों को आवास, कृशि भूमि, बैलजोड़ा, अनाज जैसी सुविधाएं निःशुल्क दिया जा रहा था। वहीं दूसरी ओर राज्य की जनजातियों को इस प्रकार की सुविधाएं आसानी से उपलब्ध नहीं हो पाती थी परिणामतः बांग्लादेशी शरणार्णी संगठित होकर स्थानीय जनजातियों पर दबाव बनाने लगे और आज स्थिति यह है कि स्थानीय पंचायत में यदि मुखिया आदिवासी है तब भी नेतृत्व बांग्लादेशी शरणार्थियों के हाथ में है वे दबाव बनाकर अपने अनुरूप निर्णय करा लेते हैं। इस विशय में दखल दिया जाना आवश्यक प्रतीत होता ळें

(II) स्थानीय आदिवासियों का शोषण –

जनजाति क्षेत्रों में बाह्य समूहों के द्वारा किए जाने वाले शोशण के विविध पक्ष हैं जिसमें बांग्लादेशी शरणार्थी भी एक पक्ष हैं। बांग्लादेशी शरणार्थियों के द्वारा स्थानीय आदिवासियों पर दबाव बनाकर उनकी जमीन हड़पने, श्रम कराकर उचित परिश्रमिक प्रदान नहीं करना जैसी घटनाएं होती है। बैंक (कृशि विकास विभाग) के अधिकारी से चर्चा करने पर उन्होने बताया कि पखांजूर में पूरा वर्चस्व चाहे बैंक में लेन देन, व्यापार व अन्य कोई व्यावसायिक गतिविधियां हो, ऋण लेना, लधुव्यवसाय हेतु लोन, समूह बनाकर गतिविधि करना इन सभी में बांग्लादेशी शरणार्थि आगे हैं। इसका कारण प्रारंभ से ही उन्हें सरकारी दामाद की तरह सुविधा मुहैय्या कराना और जनजातियों हो हॉसिए पर रखना रहा है। यदि 1975 के पश्चात बांग्लादेशी शरणार्थियों को विस्थापित करने के समय स्थानीय आदिवासियों के हितों की रक्षा किया जाता तो आज इतनी खराब स्थिति क्षेत्र की जनजातियों की नहीं होती है।

स्थानीय आदिवासी आज अपने ही घर में बांग्लादेशी शरणार्थियों के प्रभाव के चलते स्वयं को ठगा हुआ महसूस कर रहे हैं। ऐसी स्थिति में स्थानीय जनजातियों के हितों की रक्षा सरकार के माध्यम से किया जाना आवश्यक प्रतीत होता है।

(III) आदिवासी क्षेत्रों में जमीन से जुड़े मुद्दें–

तथ्य संकलन के दौरान जनजाति क्षेत्रों में जमीन से जुड़े एक महत्वपूर्ण मुद्दे का ज्ञान हुआ। चूंकि केन्द्र सरकार तथा राज्य सरकार के द्वारा कानून बना दिए जाने के कारण गैर आदिवासी, आदिवासियों की जमीन खरीद नहीं सकता और ना ही आदिवासी भी किसी गैर आदिवासी को अपनी जमीन बेच सकता है। बांग्लादेशी शरणार्थियों ने इसका भी हल निकाल लिया है। लंबे समय से बसे होने के कारण स्थानीय जनजाति महिला को प्रेमजाल में फसाकर या प्रलोभन देकर अपने पुत्र से विवाह कराने के पश्चात उनके नाम पर जमीन लेकर कृशि कार्य कर रहे हैं।

चूंकि बांग्लादेशी शरणार्थियों की आर्थिक स्थिति प्रारंभ से ही जनजातियों से बेहतर रही है ऐसे में 15–20 वर्शों के बाद वे और भी सम्पन्न हो गये और अपने कूटनीतिक तरीके से क्रय किए गये जमीन पर कृशि करते–करते आज आर्थिक रूप से और भी बेहतर स्थिति में है।

यहां पर यह भी उल्लेखनीय है कि कई वैवाहिक संबंध 05–10 वर्शों में ही टूट गये पर जमीन पर मालिकाना हक अभी भी शरणार्थी परिवारों के पास हैं। यह मुद्दा गंभीर है जिस पर ध्यान दिया जाना नितांत आवश्यक प्रतीत होता है।

(IV) वोट बैंक की राजनीति का मुद्दा –

राश्ट्रीय स्तर पर बांग्लादेशी अवैध घुसपैठियों को वोट बैंक की राजनीति के चलते मतदाता बनाए जाने का मुद्दा बेहद गंभीर रूप ले चुका है। आंकड़े यह बताते हैं कि पश्चिम बंगाल के 292 विधानसभा क्षेत्रों में से 52 क्षेत्रों में अवैध धुसपैठिए चुनाव परिणाम को तय करते हैं। इसी प्रकार असम की 126 में से 40 सीटों पर अवैध बांग्लादेशी कुसयैठिए मतदाता परिणाम को प्रभावित करते हैं। ऐसी स्थिति में जिन–जिन राज्यों में बांग्लादेशी श्रणार्थियों को बसाया गया है उनका समय–समय पर जांच हो कि वे अपने साथ किसी अवैध बांग्लादेशी नागरिक को साथ में रखे तो नहीं हैं और उन्हें वोट बैंक के राजनीति के चलते मतदाता तो नहीं बना दिया गया।

छत्तीसगढ़ राज्य और अध्ययन क्षेत्र में स्थिति उतनी चिंताजनक नहीं है पर गंभीर बन सकती है यदि समय रहते विस्थापित बांग्लादेशी शरणार्थियों की गतिविधियों पर निगरानी नहीं रखा गया, स्थानीय चुनाव में, व्यापार में उनके वर्चस्व पर नियंत्रण नहीं रखा गया तो आगे समस्या खड़ी हो सकती है। हम इस सत्य को स्वीकारे या नकार दें कि आसम और पश्चिम बंगाल के शरणार्थियों के पाकिस्तान व बांग्लादेश के प्रति प्रेम किसी से छिपा नहीं है साथ वे ऐसी हिंसक गतिविधियों में लिप्त पाये गये हैं जो देश की आंतरिक सुरक्षा के लिए खतरा है। ऐसे में राज्य सरकार को भी चाहिए कि समय पूर्व स्थानीय बांग्लादेशी शरणार्थियों की गतिविधियों पर नजर रखें।

(V) घटती जनजाति आबादी –

बांग्लादेशी शरणार्थियों के विस्थापन से स्थानीय समुदाय की जनांकिकी में बदलाव देखा गया है। मुख्य रूप से बांग्लादेशी शरणार्थियों को जनजाति क्षेत्रों में बसाया गया है। जहां पर अब धीरे–धीरे शरणार्थियों की जनसंख्या में वृद्धि और जनजाति जनसंख्या में कमी हो रही है। इसे हम त्रिपुरा राज्य के उदाहरण से भी समझ सकते हैं जहां पर 1941 में जनजाति आबादी का प्रतिशत 53.16 था जो कि 2011 की स्थिति में 25 प्रतिशत रह गयी है अर्थात 70 वर्शों में जनजाति आवादी लगभग 55 प्रतिशत कम हो गयी हैं ऐसी स्थिति में इन क्षेत्रों मं जनजातियों के अस्तित्व का संकट उत्पन्न हो गया है।

छत्तीसगढ़ राज्य में स्थिति तुलनात्मक रूप से भयावह नहीं है लेकिन बाह्य समूह के बढ़ते प्रभाव और शरणार्थियों की बढ़ती जनसंख्या से कुछ दशक में स्थिति भिन्न हो सकती है जिससे जनांकिकी परिवर्तन व संरचनात्मक परिवर्तन भी संभव है ऐसी स्थिति में जो राज्य जनजाति राज्य के नाम से जाना जाता है वह इस श्रेणी से बाहर हो सकता है। ऐसे में इस स्थिति से बचने के लिए प्रयास अभी से करने होंगे।

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RESEARCH ARTICLE

गंदी बस्ती में सामाजिक एवं भौतिक परिवेश का महिलाओं पर प्रभाव (बिलासपुर नगर के विशेष संदर्भ में)

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ABSTRACT:
अध्ययन हेतु बिलासपुर नगर 48 वार्ड में विभक्त है अध्ययन हेतु अध्ययन क्षेत्र को 4 जोन उत्तर, दक्षिण, पूर्व, पश्चिम में विभक्त कर प्रत्येक जोन के कुल परिवारों 1244 में से 20 प्रतिशत परिवार का चुनाव उत्तरदाताओं के रूप में दैवनिदर्शन की लाटरी प्रविधि के माध्यम से किया गया है। अध्ययन हेतु कुल 250 परिवार का चयन किया गया हैं। अध्ययन हेतु तथ्यों का संकलन साक्षात्कार अनुसूची उपकरण के माध्यम से किया गया है । अध्ययन से यह ज्ञात हुआ हैं कि नगर के अधिकांश एवं असामाजिक प्रवृत्ति के लोग प्रायः गंदी बस्तीयों में निवास करते हैं गंदे वातावरण में निवास करने के कारण लोगों की मनोवृत्ति अपराधी बन जाते हैं उनका नैतिक पतन हो जाता है । बालअपराध, यौनअपराध, चोरी, नशाखोरी की इन क्षेत्रों में अधिकता पाई जाती है।

KEYWORDS: गंदी बस्ती नशीले पदार्थ, सेवन का स्वरूप, सेवन की आदत के लिये जिम्मेदार, महिलाओं द्वारा नशापान,

प्रस्तावना

विभिन्न शोध अध्ययनो एवं अन्तराष्ट्रीय स्तर पर किए गए एक सर्वेक्षण से यह तथ्य उभरकर सामने आया है, कि गंदी बस्ती के सामाजिक पर्यावरण तथा भौतिक परिवेश का नकरात्मक प्रभाव महिलाओं पर पडता हैं। अन्तराश्ट्रीय रिर्पोट के अनुसार भारत मे पचास हजार से ज्यादा महिलाएं गदी बस्ती के परिवेश के चलते नशे के आदि बन गई है। जो कि धीरे धीरे बढते जा रहे हैं और हमारे समक्ष एक यक्ष प्रश्न बनकर खडा है।

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गंदी बस्ति मे विभिन्न सामाजिक आयोजन एवं उत्सवके अवसर पर पुरूश के साथ ही साथ महिलाओं में भी नशापान की प्रवृत्ति बढती जा रही है निश्कर्श हमें विभिन्न रूप से देखने को मिलते हैनशे में विभिन्न गांजा, अफीम, भांगगोली, तथा मदिरा पान मुख्य रूप से लिया जाता है प्रभाव की चर्चा करे तो परिवारिक वाद विवाद, मारपीट, घरेलु हिंसा जैसी घटनाएं आए दिन इन क्षेत्रो में देखने को मिलती हैं।

छत्तीसगढ राज्य के प्रमुख शहरो के गंदी बस्तियों में उपरोक्त गतिविधियॉ तेजी से बढ रही हैं ऐसे स्थिति में इस विशय पर गहन शोध अध्ययन नितांत आवश्यक प्रतीत होता हैं।

अध्ययन विषय का समाजशास्त्रीय महत्व –

गंदी बस्तियां नगर के समस्याग्रस्त क्षेत्रों के रूप में जानी जाती है, इसलिए इनको विशेष महत्व नहीं दिया जाता है। इन बस्तियों के द्वारा निम्न आय वर्ग के लोगों में आवासीय समस्या का समाधान संभव होता है। नगरों से सम्पन्न होने वाले विभिन्न कार्यों के लिए आवश्यक सस्ते श्रमिकों की पूर्ति इन्हीं गंदी बस्तियों के निवासियों द्वारा ही संभव होती हैं। इन बस्तियों के वातावरण का प्रभाव स्त्रियों के विभिन्न पक्षों जैसे शिक्षा, सामाजिक स्तर, सांस्कृतिक, स्वास्थ्य, जागरूकता पूरी स्तर, सांस्कृतिक, स्वास्थ्य जागरूकता का प्रभाव पड़ता हैं।एक अनुमान के मुताबित दूनियां के गरीब आबादी में महिलाओं की जनसंख्या सबसे ज्यादा है। एवं निर्धनता के चलते वे तमाम तरह के सामाजिक आर्थिक एवं स्वास्थ्यगत समस्याओं का सामना करती हैं। प्रस्तावित अध्ययन के माध्यम से गंदी बस्तियों में महिलाओं की स्थिती को ज्ञात करने का प्रयास किया जाएगा जिससे उनकी समसामयिक स्थिती का ज्ञान होगा यह अध्ययन के महत्व को स्पष्ट करता हैं। इसी प्रकार 2011 की जनगणना के अनुसार गंदी बस्ती की जनसंख्या 6.54 करोड में से 5.41 प्रतिशत लोग निवास करते हैं।

उद्देश्य–

1. अध्ययनगत उत्तरदाताओं की आर्थिक एवं पारिवारिक समस्या को ज्ञात करना।
2. गंदी बस्ती के सामाजिक एवं भौतिक परिवेश का महिलाओं पर पड़ने वाले प्रभाव को ज्ञात करना।

उत्तरदाताओं का चुनाव –

बिलासपुर नगर 48 वार्ड में विभक्त है अध्ययन हेतु अध्ययन क्षेत्र को 4 जोन उत्तर, दक्षिण, पूर्व, पश्चिम में विभक्त कर प्रत्येक जोन के कुल परिवारों 1244 में से 20 प्रतिशत परिवार का चुनाव उत्तरदाताओं के रूप में दैवनिदर्शन की लाटरी प्रविधि के माध्यम से किया गया है। अध्ययन हेतु कुल 250 परिवार का चयन किया गया हैं

तथ्य संकलन की प्रविधि एवं उपकरण –

अध्ययन हेतु तथ्यों का संकलन साक्षात्कार अनुसूची उपकरण के माध्यम से किया गया है ।

प्राप्त तथ्यों का विश्लेशण

परिवार के सदस्यों द्वारा नशीले पदार्थों का सेवन करना–

नशा एक ऐसी समाजिक बुराई हैं जिससे इंसान का जीवन समय से पहले ही मौत का शिकार बन जाता हैं। गंदी बस्ती मे रहने वाले परिवार अधिकांश लोग नशे में लिप्त पाए जाते है। नशा करने वाला परिवार पूरी तरह से निर्दोश रहता है परंतु एक दूसरे के देखा देखी में नशा करना सीख जाता हैं। इस प्रकार गंदी बस्ती के कुछ सदस्य अपने परिवार के सदस्यों को देखकर ही नशा करते हैं। कभी–कभी परिवार के दो चार लोग नशा करते हैं तो कुछ ही लोग नशा करेगे यदि परिवार के सभी सदस्य नशा करेगे तो वहां पर नशा करने वाले लोगों की संख्या अधिक होगी।[1]**डी. एट सालधनहा और डी.एस. गोयल (1992)**[2] का अध्ययन 'राब पीने वाले व्यक्तियों की मनोदशा पर रहा है, निरंतर शराब का प्रयोग करते रहने से व्यक्ति बीमार अवस्था मे पहुॅच जाता हैं जिससे उसके स्वास्थ्य पर बुरा प्रभाव पडता है।

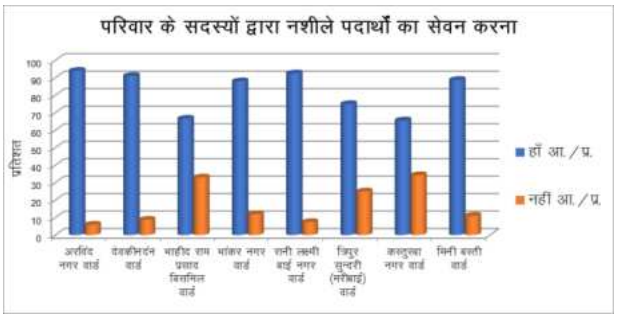
तालिका क्रमांक 1–परिवार के सदस्यों द्वारा नशीले पदार्थों का सेवन करना

जोनक्रं.	वर्ड	हाँ आ. /प्र.	नहीं आ./प्र.	योग आ./प्र.
1.	1. अरविंद नगर वार्ड	47 (94)	3 (6)	50 (100)
	2. देवकीनदंन वार्ड	31 (91. 2)	3 (8.8)	34 (100)
2.	1. शहीद राम प्रसाद बिसमिल वार्ड	20 (66. 7)	10 (33.3)	30 (100)
	2. शंकर नगर वार्ड	22 (88)	3 (12)	25 (100)
3.	1. रानी लक्ष्मी बाई नगर वार्ड	37 (92. 5)	3 (7.5)	40 (100)
	2. त्रिपुर सुन्दरी (फोकटपारा) वार्ड	9 (75)	3 (25)	12 (100)
4.	1. कस्तुरबा नगर वार्ड	21 (65. 6)	11 (34.4)	32 (100)
	2. मिनी बस्ती वार्ड	24 (88. 9)	3 (11.1)	27 (100)
	योग	**211 (84.4)**	**39 (15.6)**	**250 (100)**

नशीले पदार्थो के सेवन संबंधित उपरोक्त विश्लेशण से यह ज्ञात हुआ हैं कि सर्वाधिक 84.4 प्रतिशत परिवार के सदस्य नशीले पदार्थो का उपयोग करते हैं,जबकि 15.6 प्रतिशत परिवार के सदस्य ऐसा नही करते हैं।

प्राप्त तथ्यों का विश्लेशण जोनवार करने से यह स्पश्ट हुआ हैं कि सर्वाधिक 94 प्रतिशत उत्तरदाता अरविंद नगर वार्ड के परिवार के सदस्य नशीले पदार्थों के सेवन करने के पक्ष में हैं, जबकि सबसे कम 6 प्रतिशत परिवार के सदस्य नशीले पदार्थों का सेवन ना करने की बात करते हैं।अतः सर्वाधिक उत्तरदाता के परिवार के सदस्य नशीले पदार्थों का उपयोग करते हैं जिसका प्रमुख कारण नशे के प्रति उनकी जिज्ञासा उन्हे प्रेरित करती हैं।

आरेख क्रंमाक 1



सेवन का स्वरूप –

Alcohal (शराब) पीना या ना पीना हर व्यक्ति की अपनी व्यक्तिगत पसंद पर निर्भर करता है।परंतु हमारे भारत देश मे नशा एक सामाजिक बुराई है क्योकि यह निर्भर करता है उस आदमी के विवेक पर जो alcoholपी रहा हैं और ऐसे में कुछ मानको को ध्यान रखा जाए तो हो सकता है alcohol personal 50 % वजह बने। अतः नशे के लिए शाराब का ही प्रयोग नहीं किया जाता हैं वरन् अन्य वस्तुओं का भी प्रयोग किया जाता हैं जैसे–तम्बाकू, मद्यपान, सिगरेट, गुडाखु आदि का प्रयोग किया जाता है। यह एक चिंतनीय समस्या हैं **विश्वस्वास्थ्य संगठन का एक अनुमान है कि** शाराबियो की संख्या 140 मिलिन के आस पास है।[3]**मृदुला शर्मा और मोलीचौधरी (2016)**[4]का सर्वेक्षण 110 किशोरो पर रहा है जहॉ 46.36%किशोर मुख्य रूप से गुटखा, तम्बाखू, धूम्रपान, जैसे पदार्थो का उपयोग करने के लिए भर्ती किए गए हैं, जिसमें से सर्वाधिक 5.88% किशोर गुटखा, 46.36% तम्बाखू, 37.27% धूम्रपान, और 13.63 % शाराब, एवं शोष 8.18 % **अन्य** पदार्थ का प्रयोग करते हैं।प्रस्तुत अध्ययन में उत्तरदाताओं से इस विशय में जानकारी एकत्रित की गयी हैं जिसे निम्न तालिका में प्रदर्शित किया गया हैं।

तालिका क्रमांक 2–सेवन का स्वरूप (N=211)

जोनक्रं.	वार्ड	तम्बाकू आ/प्र	मधपान आ/प्र	सिगरेट आ/प्र	गुड़ाखु आ/प्र	योग
1.	1. अरविंद नगर वार्ड	10(24.4)	18(43.9)	6(14.6)	7(17.1)	41(100)
	2. देवकीनदंन वार्ड	10(26.3)	21(55.4)	3(7.8)	4(10.5)	38(100)
2.	1. शहीद राम प्रसाद बिसमिल वार्ड	5(20)	14(56)	3(12)	3(12)	25(100)
	2. शंकर नगर वार्ड	1(4)	20(80)	2(8)	2(8)	25(100)
3.	1. रानी लक्ष्मी बाई नगर वार्ड	6(26.1)	10(43.5)	3(11.1)	4(17.3)	23(100)
	2. त्रिपुर सुन्दरी (फोकटपार) वार्ड	8(32)	9(36)	5(20)	3(12)	25(100)
4.	1. कस्तुरबा नगर वार्ड	5 (29.4)	7(41.3)	3 (17.6)	2(11.7)	17(100)
	2. मिनी बस्ती वार्ड	6(35.3)	6(35.3)	2(11.8)	3(17.6)	17(100)
	योग	**51(24.2)**	**105(49.7)**	**27(12.7)**	**28(13.4)**	**211(100)**

तालिका के विश्लेशण से यह ज्ञात हुआ हैं कि सर्वाधिक 49.7 प्रतिशत परिवार के सदस्य मधपान का प्रयोग करते है, 24.2 प्रतिशत तम्बाखू, 13.4 प्रतिशत गुड़ाखु, 12.2 प्रतिशत सिगरेट का प्रयोग करते हैं।

जोनवार अध्ययन करने पर यह ज्ञात होता है कि जोंन क्रमांक 02 में सर्वाधिक उत्तरदाताओ ने मधपान करने की बात कही है, इसी प्रकार जोन क्रमांक 03 में उत्तरदाता तम्बाकू और सिगरेट, गुड़ाखू जैसी अन्य वस्तुओं का प्रयोग करते हैं, जिसमें से जोन क्र 01 और 04 की स्थिति भी सामान्य बनी हुई हैं।

निश्कर्शतः यह कहा जा सकता है कि उत्तरदाता शराब के अतिरिक्त अन्य नशीले पदार्थों का भी सेवन करते हैं।

सेवन की आदत के लिए जिम्मेदार –

कोई भी दुर्व्यसन जो पहले जानने की इच्छा से तत्पश्चात् शौक से और उसके बाद निरन्तर सेवन से

आदत बन जाए उसके लिए स्वयं को ही अधिक दोशी या जिम्मेदार समझे, यही बात सत्य या वास्तविक हैं। सेवन की आदत के लिए वे स्वयं जिम्मेदार हैं, गंदी बस्ती में निवासरत् परिवार की महिलाएं अपने परिवार के कुछ सदस्यों द्वारा अपनायी जा रही हैं इस प्रवृत्ति को आत्मसात कर लेती हैं, तो कुछ अपने मित्रों के प्रभाव में आने पर इसका सेवन करते हैं।5**गोरी डी. आर., सुमन एल. एन. और एस.एल. राव, पी.मूर्ति (2008)**[6]के द्वारा अध्ययन शराब पीने वाले व्यक्तियो के रोग के विशय में रहा है, शराब का निरंतर प्रयोग करते रहने से व्यक्ति के स्मरण भाक्ति का नाश होने लगता हैं जिससे उसकी याददाश में प्रभाव पडने लगता है।

तालिका क्रमांक 3–सेवन की आदत के लिए जिम्मेदार

जोनक्रं.	वार्ड	स्वयं को आ/प्र	मित्र को आ/प्र	पडोसियों आ/प्र	परिवार के सदस्यों को आ/प्र	योग
1.	1 अरविंद नगर वार्ड	24 (48)	10 (20)	8 (16)	8 (16)	50 (100)
	2 देवकीनदंन वार्ड	18 (52.9)	6 (17.7)	5 (14.7)	5 (14.7)	34 (100)
2.	1 शहीद राम प्रसाद बिसमिल वार्ड	13 (43.3)	5 (16.7)	6 (20)	6 (20)	30 (100)
	2 शंकर नगर वार्ड	15 (60)	5 (20)	2 (8)	3 (12)	25 (100)
3.	1 रानी लक्ष्मी बाई नगर वार्ड	28 (70)	2 (5)	8 (20)	2 (5)	40 (100)
	2 त्रिपुर सुन्दरी (फोकटपार) वार्ड	4 (33.4)	3 (25)	3 (25)	2 (16.6)	12 (100)
4.	1 कस्तुरबा नगर वार्ड	16 (50.1)	5 (15.6)	6 (18.7)	5 (15.6)	32 (100)
	2 मिनी बस्ती वार्ड	10 (37)	4 (14.8)	10 (37)	3 (11.2)	27 (100)
	योग	**128(51.3)**	**40(16)**	**48(19.3)**	**34(13.8)**	**250(100)**

सेवन की आदत के लिए जिम्मेदार संबंधित उपरोक्त तालिका के विश्लेशण से स्पश्ट हुआ है कि सर्वाधिक 51.3 प्रतिशत उत्तरदाता सेवन की आदत के लिए जिम्मेदार स्वयं को समझते हैं, 19.3 प्रतिशत पडोसियों को, 16 प्रतिशत मित्रों एवं,13.8 प्रतिशत परिवार के सदस्यों को जिम्मेदार समझते हैं।तालिका को यदि जोन के आधार पर विश्लेशण करे तो जोन क्र. 03 के सर्वाधिक उत्तरदाता स्वयं को जिम्मेदार समझते है, जबकि जोन क्र. 01 में मित्र को मानते है, इसी प्रकार यदि जोन क्र. 03 की बात की जाए तो पड़ोसियों को समझते है, एवं जोन क्र. 04 के उत्तरदाताओं ने परिवार के सदस्यो को जिम्मेदार समझा हैं।अतः यह स्पश्ट हो गया कि सेवन की आदत के लिए जिम्मेदार व्यक्ति स्वयं को समझता हैं।

मोहल्ले में तनाव या लड़ाई झगड़े का होना–
गंदी बस्ती में रहने वाले लोगों का अपने पड़ोसियों से प्रायः टकराव या संघर्श की स्थिति छोटी बातों पर ही अधिक होती हैं। बच्चों के आपसी झगड़े, पानी भरने को लेकर, गंदगी फैलाने के कारणों को लेकर, शराबी पड़ोसी द्वारा अपशब्दों का प्रयोग किये जाने को लेकर, मकान व जमीन की वजह से, छुआछुत जैसी बातों को लेकर लोगों का अपने पड़ोसी से टकराव होते रहता हैं। सर्वाधिक संघर्श बच्चों के आपसी झगड़ों की वजह से तथा पानी की वजह से होता हैं।

तालिका क्रमांक 4–मोहल्ले में तनाव या लड़ाई झगड़े का होना

जोनक्रं.	वार्ड	हाँ आ/प्र	नहीं आ/प्र	योग
1.	1. अरविंद नगर वार्ड	31 (62)	19 (38)	50 (100)
	2. देवकीनदंन वार्ड	17 (50)	17 (50)	34 (100)
2.	1. 'हीद राम प्रसाद बिसमिल वार्ड	23 (76.6)	7 (23.4)	30 (100)
	2. भांकर नगर वार्ड	7 (28)	8 (72)	25 (100)
3.	1. रानी लक्ष्मी बाई नगर वार्ड	20 (50)	20 (50)	40 (100)
	2. त्रिपुर सुन्दरी (फोकटपार) वार्ड	5 (41.6)	7 (58.4)	12 (100)
4.	1. कस्तुरबा नगर वार्ड	17 (53.2)	5 (46.8)	32 (100)
	2. मिनी बस्ती वार्ड	7 (25.9)	20 (74.1)	27 (100)
	योग	**127 (50.8)**	**123 (49.2)**	**250(100)**

तालिका के उपरोक्त विश्लेशण के से यह ज्ञात हुआ हैं कि सर्वाधिक 50.8 प्रतिशत उत्तरदाताओं के अनुसार मोहल्ले में तनाव या लडाई झगडे होते है, जबकि 49.2 प्रतिशत उत्तरदाता के अनुसार मोहल्ले में लडाई झगडे का नही होना बतलाया हैं।यदि वार्ड के आधार पर विश्लेशण किया जाए तो सर्वाधिक 76. 6 प्रतिशत शहीद रामप्रसाद बिसमिल वार्ड के उत्तरदाताओं ने मोहल्ले में तनाव व लड़ाई झगडे होने की बात कही है, एवं सबसे कम त्रिपुर सुंदरी फोकटपारा में 41.6 प्रतिशत लड़ाई झगड़े वार्ड में नहीं होनें कें पक्ष मे उत्तरदाताओं ने बतलाया हैं। सर्वाधिक उत्तरदाताओं ने मोहल्ले में तनाव एवं लड़ाई झगड़े की बातों को स्वीकार किया हैं इस प्रकार यह कहा जा सकता हैं कि मोहल्ले में तनाव एवं लड़ाई झगड़े का मुख्य कारण अज्ञानता हैं।

व्यक्ति से मारपीट अथवा गाली–गलौज का होना–

गंदी बस्ती में निवासरत् लोग प्रायः अशिक्षित होते हैं ये दूर दर्शिता व समझदारी से काम नहीं लेते हैं, छोटी–छोटी बातों को संघर्श का विशय बना लेते हैं, बहुत ही मामूली सी बातों पर विवाद होते रहता हैं।गंदी बस्तियों में सर्वाधिक बच्चों के कारण एवं पानी के कारण तथा शराबियों के विवाद होते रहता हैं। विवाद के दौरान बात बढ़ जाता हैं गाली–गलौज पर उतर आते हैं कुछ लोग मारपीट पर भी उतर जातेहैं।

तालिका क्रमांक 5–व्यक्ति से मारपीट अथवा गाली–गलौज का होना

जोनक्रं.	वार्ड	हाँ आ/प्र	नहीं आ/प्र	योग
1.	1. अरविंद नगर वार्ड	45 (90)	5 (10)	50 (100)
	2. देवकीनदंन वार्ड	14 (41.2)	20 (58.8)	34 (100)
2.	1. शहीद राम प्रसाद बिसमिल वार्ड	25 (83.4)	5 (16.6)	30 (100)
	2. शंकर नगर वार्ड	15 (60)	10 (40)	25 (100)
3.	1. रानी लक्ष्मी बाई नगर वार्ड	25 (62.5)	15 (37.5)	40 (100)
	2. त्रिपुर सुन्दरी (फोकटपार) वार्ड	4 (33.4)	8 (66.6)	12 (100)
4.	1. कस्तुरबा नगर वार्ड	11 (34.3)	21 (65.7)	32 (100)
	2. मिनी बस्ती वार्ड	14 (51.8)	13 (48.2)	27 (100)
	योग	**153 (61.2)**	**97 (38.8)**	**250(100)**

व्यक्ति से मारपीट अथवा गाली गलौज का होना संबध संबंधित विश्लेशण से यह स्पश्ट हुआ है कि सर्वाधिक 61.2 प्रतिशत उत्तरदाता मारपीट एवं गाली–गालौज करते है, जबकि 38.8 प्रतिशत उत्तरदाता मारपीट एवं गाली–गलौज नहीं करते हैं। प्राप्त तथ्यों को यदि जोन के आधार पर विश्लेशण करे तो यह स्पश्ट होता है कि जोन क्र. 01 में सर्वाधिक उत्तरदाताओं नेव्यक्ति से मारपीट एवं गाली गलौज होने की बातो को स्वीकार किया है, जबकि जोन क्र. 04 के उत्तरदाताओं ने इस विशय में जानकारी ना होने की बात कही है। अतःमहिला उत्तरदाताओं ने यह स्वीकार किया हैं कि मात्र गाली–गलौज होने का प्रमुख कारण मामूली वाद विवाद का होना हैं।

वार्ड में महिलाओं द्वारा नशापान करना–

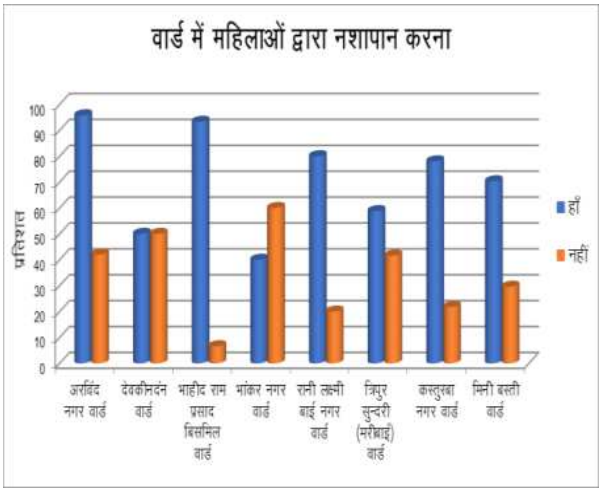
समाज कि यह धारणा है कि नशा करना केवल पुरूशो का काम हैं परतु आज महिलाएं भी इस तरह का करतुत करती हैं तो उन्हे कुल विरोधी या कुल का नाश करने वाला माना जाते है एक नए शोध से यह पता चला है कि महिलाएं भी सिगरेट, शराब, तम्बाखूका प्रयोग करती हैं। नशा ले रहे व्यक्ति की स्थिति समाज में लचार रहती है। चाहे पुरूश हो या महिला बाहर के ही नही परिवार के लोग भी उसे हेय कि दृश्टि से देखते हैं जिसकी वजह से उनमे नशा के प्रति रूझान और समाज से दूरियां बढ जाती हैं।[7]**एस. दास चौधरी और बी. एस. के. उकिल (2006)**[8] ने अपने अध्ययन में 100 शराब पिने वाले व्यक्ति के विशय पर रहा हैं उत्तरदाताओं के अनुसार काफी उच्च मात्रा में निरंतर शराब के सेवन से व्यक्ति को तनाव पूर्ण जीवन से मुक्ति की प्राप्ति होती हैं।

तालिका क्रमांक 6–वार्ड में महिलाओं द्वारा नशापान करना

जोनक्रं.	वार्ड		हाँ आ / प्र	नहींआ / प्र	योग
1.	1.	अरविंद नगर वार्ड	29 (95.8)	21 (42)	50 (100)
	2.	देवकीनदंन वार्ड	17 (50)	17 (50)	34 (100)
2.	1.	भाहीद राम प्रसाद बिसमिल वार्ड	28 (93.4)	2 (6.6)	30 (100)
	2.	भांकर नगर वार्ड	10 (40)	15 (60)	25 (100)
3.	1.	रानी लक्ष्मी बाई नगर वार्ड	32 (80)	8 (20)	40 (100)
	2.	त्रिपुर सुन्दरी (फोकटपार) वार्ड	7 (58.4)	5 (41.6)	12 (100)
4.	1.	कस्तुरबा नगर वार्ड	25 (78.2)	7 (21.8)	32 (100)
	2.	मिनी बस्ती वार्ड	19 (70.4)	8 (29.6)	27 (100)
	योग		**167 (66.8)**	**83 (33.2)**	**250(100)**

प्राप्त तथ्यों के विश्लेशण से यह स्पश्ट हुआ हैं कि सर्वाधिक 66.8 प्रतिशत वार्ड में महिलाओं द्वारा नशा–पान करना बतलाया गया है, जबकि 33.2 प्रतिशत महिलाओं ने नशापान का ना करना बताया हैं। उपरोक्त तथ्यों को वार्ड में महिलाओं द्वारा नशापान करने संबंधी अध्ययन को यदि जोन क्र. के आधार पर ज्ञात करने से यह स्पश्ट है कि जोन क्र. 01 के अरविद नगर वार्ड में 95.8 प्रतिशत उत्तदाताओं ने वार्ड की महिलाएं नशापान करने के पक्ष में है, जबकि जोन क्र. 04 के मिनी बस्ती के उत्तदाताओ ने नशापान न करने की बातों को स्वीकारा है, इसी प्रकार जोन क्र. 02 की बात की जाए तो यहाँ उत्तरदाताओं ने कभी कभार नशापान करने की बात कही है, जबकि जोन क्र. 03 के उत्तरदाताओं ने भी इन्ही बातो को स्वीकृति दी है।
अतः यह स्पश्ट है कि अधिकांश वार्ड में रहने वाली महिलाएं नशा पान करती हैं एवं वह निरंतर नशापान करना सही समझती हैं।

आरेख कमांक.6



निष्कर्ष –

उपरोक्त तालिकाओं के आधार पर हमें यह निष्कर्श प्राप्त हुआ है कि सर्वाधिक उत्तरदाताओं के परिवार के सदस्य किसी न किसी प्रकार के नशे की प्रवृत्ति से लिप्त पाये गये हैं, जिसमें सर्वाधिक सदस्यों का रूझान मद्यपान की ओर पाया गया है, तथा इस नशे की प्रवृत्ति की आदत के लिये अधिकतर सदस्य स्वयं को ही जिम्मेदार मानते हैं तथा कुछ सदस्यों का मानना है कि परिवार के वातावरण अर्थात् जिस माहौल में वह निवास करते हैं उसका भी बहुत हद तक नशा करने की ओर झुकाव था। निश्कर्श में यह भी पाया गया कि नशे में लिप्त रहने के कारण मोहल्ले में लडाई झगडें तथा गाली गलौज का स्थिति निर्मित होना साधारण हो गया है।

अध्ययन में विशेषतः महिलाओं के द्वारा नशा करने की प्रवृत्ति में यह पाया गया कि अधिकांश महिलाएं 66.8 प्रतिशत नशापान से लिप्त है तथा इसे सही समझती है और निरंतर करने की इच्छुक भी हैं।

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ECONOMY OF CHHATTISGARH

Energy Disparity in Chhattisgarh: A District Level Analysis

Pragati Krishnan & Ravindra Brahme

INTRODUCTION

There is a strong interconnection between energy and well-being of women in rural and informal sectors which has yet to be studied in the required depth. Women's energy needs go beyond the general uninformed concept that by and large they will be well served if cooking energy needs are addressed. While it is true that cooking energy needs are an important need, women also work as street vendors, construction workers, agricultural workers, small shopkeepers, and also work from home. As such, they need consistent electricity supply during the day, electricity for storing perishable goods, operating basic irrigation pumps, basic lighting of small shops, etc. Apart from energy requirements for functional needs, energy requirements for aspirational needs of women also have to be addressed if we are to build a society oriented towards gender parity.

Clean energy is presently being seen as a result of the means forward for reliable energy provide to thousands of people with investment and capability enhancements set to continue for coming few years. The commitment underneath Cop 21 provides a thrust to countries globally for increasing renewable capability to mitigate the impact of climate change.Despite the impressive program, one must remember that over 1 billion people, 14% of the population do not have access to electricity. Sanguinity in the renewable sector is accompanied by skepticism on whether the momentum can be maintained for the next two decades. Equitable and affordable access to and control over sustainable energy services for women and men is a key requisite right to development. Thereforeproviding clean and affordable energy to women and impoverished sectionsof society is a matter of great concern around the globe (Bhattacharya, 2005).Thus many international business, civil societies, NGOs , multilateral organizations and banks and other programmes and agencies of the United Nations are drawing high attention to the agendas of energy issues (The energy challenge for Achieveing the Millennium Developmnet Goals, 2005)Thus, achieving all of the MDGs will require much greater energy inputs and access to energy services (Modi Vijay, 2006).One of the hindrancesarising in achieving the progress of the MDGs is due to the shortage of energy and most particularly the availability and accessibility to modern cooking fuels and electricity(Energy and Millennium Development goals). Thus

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in order to enhance social welfare parameters in the form of rise in income, better health conditions, quality based education and improved sanitation, there is a need to move towardsa modern and cleaner form of energy.Although domesticenergyconsumptionhasbeena predominantpolicy issueasithasdistinctive indicationsforhealth,environment and climate,it is no easy undertaking to attempt to fulfill the domestic energy needs of a country like India with its demographical size and diversity. This requires constant updating in the energy sector.Whenitcomesto the accessibility of the sources of modern energy usage, we find a vast consumption gap between rural andurbanareas(Sudershan, 2017).Since 2015, SDG 7 provided an ambitious mandate: to ensure access to modern energy for all. While SDG 5 separately seeks to achieve gender equality, in reality access and gender equality are inextricably linked and can mutually reinforce each other. Addressing them together can therefore offer multiple development gains. The profuse reality is that it will not be possible to meet targets for affordable, reliable, sustainable and modern energy access for all by 2030 unless the energy needs of women are met.

The present paper aims to study the nature of domestic energy use in Chhattisgarh mainly with respect to cooking and lighting. Further, it tries to examine the trends of domestic energyuse in Chhattisgarh. The paper explores the inter district energy disparity in the usage of fuels for cooking and lighting in Chhattisgarh and possible policy implications for further improvement.

DATA SOURCE AND METHODOLOGY

For the present study the data are collectedfrom various secondarysources whichincludeseveral rounds of NSSO (CES) data, i.e 61st (2004-05), 66th (2009-10) and 68th (2011-12).Two sets of variables, namely primary source of cooking and primary source of lighting in Chhattisgarh have been made for the compilation of data. On the basis of these primary sources of cooking and lighting, it can be inferred that electricity and kerosene are mainly used for lighting and LPG and firewood are used for cooking purposes. In addition to this, crop residue and dung cake are also preferred for cooking purposes. Also,inhabitants of regions rich in coal prefer to use coal / charcoal as a fuel for cooking instead of other sources. For analyzing the district wise disparity in energy consumption in the fuels used for both cooking and lighting, data has been extracted from DistrictCensus Handbooks, Chhattisgarh Census2011.

To find out the principal sources of energy for cooking and lighting in Chhattisgarh percentage method has been used. Further to compute the district wise rural urban disparities in the primary sources of cooking and lighting Sopher's Disparity Index (Sopher, 1974) technique has been applied by using the following formula(Kundu and Rao,1986; Mulimani& Pujar,2015 ; Biswas,2016).

$$DI = \text{Log}\ (X_2/X_1) + \text{Log}\ (100-X_1) / (100-X_2)$$

Where, DI= disparity Index

X_2 = Percentage of Urban Households.

X_1= Percentage of Rural Households.

i.e. $X_2 \geq X_1$

in order to enhance social welfare parameters in the form of rise in income, better health conditions, quality based education and improved sanitation, there is a need to move towardsa modern and cleaner form of energy.Although domesticenergyconsumptionhasbeena predominantp o l i c y issueasithasdistinctive indicationsforhealth,environment and climate,it is no easy undertaking to attempt to fulfill the domestic energy needs of a country like India with its demographical size and diversity. This requires constant updating in the energy sector.Whenitcomesto the accessibility of the sources of modern energy usage, we find a vast consumption gap between rural andurbanareas(Sudershan, 2017).Since 2015, SDG 7 provided an ambitious mandate: to ensure access to modern energy for all. While SDG 5 separately seeks to achieve gender equality, in reality access and gender equality are inextricably linked and can mutually reinforce each other. Addressing them together can therefore offer multiple development gains. The profuse reality is that it will not be possible to meet targets for affordable, reliable, sustainable and modern energy access for all by 2030 unless the energy needs of women are met.

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DATA SOURCE AND METHODOLOGY

For the present study the data are collectedfrom various secondarysources whichincludeseveral rounds of NSSO (CES) data, i.e 61st (2004-05), 66th (2009-10) and 68th (2011-12).Two sets of variables, namely primary source of cooking and primary source of lighting in Chhattisgarh have been made for the compilation of data. On the basis of these primary sources of cooking and lighting, it can be inferred that electricity and kerosene are mainly used for lighting and LPG and firewood are used for cooking purposes. In addition to this, crop residue and dung cake are also preferred for cooking purposes. Also,inhabitants of regions rich in coal prefer to use coal / charcoal as a fuel for cooking instead of other sources. For analyzing the district wise disparity in energy consumption in the fuels used for both cooking and lighting, data has been extracted from DistrictCensus Handbooks, Chhattisgarh Census2011.

To find out the principal sources of energy for cooking and lighting in Chhattisgarh percentage method has been used. Further to compute the district wise rural urban disparities in the primary sources of cooking and lighting Sopher's Disparity Index (Sopher, 1974) technique has been applied by using the following formula(Kundu and Rao,1986; Mulimani& Pujar,2015 ; Biswas,2016).

$$DI = \text{Log}\ (X_2/X_1) + \text{Log}\ (100\text{-}X_1) / (100\text{-}X_2)$$

Where, DI= disparity Index

X_2 = Percentage of Urban Households.

X_1= Percentage of Rural Households.

i.e. $X_2 \geq X_1$

The technique of disparity index is appropriate in mapping -relative disparity between two variables. If the value of DI comes to be zero, itis acase of perfect equality. Thus, greater value of DI shows that the extent of disparity is higher andon the other hand lower value of DI shows that the extent of disparity is lower (Raju,1991; Biswas,2016).

HOUSEHOLDS PRIMARY SOURCE OF ENERGY FOR COOKING IN CHHATTISGARH

In Chhattisgarh, people in rural areas account for the highest proportion of the population relying on traditional biomass, a key indication that rural areas in most districts have limited access to cleaner energy options, especially for cooking. The major fuel used for cooking is Firewood. According to census 2011 on an average 85.05% of total households are using fire wood for cooking. It is mainly used by rural people as compared tour bane specially in the Bastarrange. There as on is that the divisionis having maximum are a of huge and dense forests. So the rural people rely heavily on forest products. The table below shows the percentage of households using primary source of energy for cooking in both the rural and urban areas respectively. The district wise rural –urban disparity shows that the state has very abundant natural resource then also it possess wide disparity in many of the fuels used for cooking.

Table 1

Percentage of Rural Households using primary source of energy for cooking in Chhattisgarh

S. No	*Fuel Type*	*2004 -05*	*2009-10*	*2011-12*
1	Coke & coal	2.5	0.4	0.9
2	Firewood &Chips	92.3	94.1	93.2
3	Dung Cake	2.4	0.9	3.1
	Traditional Energy (1 to 3)	**97.2**	**95.4**	**97.2**
4	LPG	1.5	2.0	1.5
5	Kerosene	----	8.0	2.0
	Modern Energy (4&5)	1.5	10	3.5

Source: Author's own calculation

In 2004-05 97.2% of rural households areusing traditional sources of energy for cooking. Amongst these the most prominent fuel is firewood and chips (92.3%). The use Coke and Coal and Dung Cake is 2.5% and 2.4% respectively. On the other hand the use of modern energy like LPG and Kerosene is very less prominent during this period. Further the table reveals that in 2009-10 there is a slight down fall in the utilization of traditional fuels. 95.4% households practice traditionalenergy, whereas the modern energy gains a huge momentum of 10% in which 2% is the share of LPG and 8% is that of Kerosene.Again in 2011-12 the application of firewood and chips is more than other traditional fuels. It is 93.2%. This increase in the usageof firewood and chips as cooking fuel is due to its easy availability and accessibility and also it is cheaper.In case of modern fuels there is a low usage of LPG (1.5%) and Kerosene (2%) in the 2011-12 among the ruralinhabitants. Firstly these fuels are very costly and secondly their availability and accessibility is very difficult in the rural areas so it is hardly preferred by rural households.

Table 2

Percentage of Urban Households using primary source of energy for cooking in Chhattisgarh

S. No	Fuel Type	2004-05	2009-10	2011-12
1	Coke & coal	7.4	5.5	11.3
2	Firewood &Chips	37.5	25.1	34.7
3	Dung Cake	----	1.3	3.3
	Traditional Energy (1 to 3)	**44.9**	**31.9**	**49.3**
4	LPG	49.5	62.3	39.8
5	Kerosene	3.0	2.0	2.7
	Modern Energy (4& 5)	52.5	64.3	42.5

Source: Author's own calculation

In 2011-12 traditional methods (49.3%) of cooking is more prominent among the urban folks as compared to the modern method (42.5%). Among the traditional method of cooking the most commonly used fuel is firewood and chips. In the urban areas the percentage of households usingfirewood and chips in 2004-05 is 37.5% which gradually came down to 25.1% in 2009- 10 and then again rose to 34.7% in 2011-12. As against this the percentage of households using modern method of cooking especiallyLPG has gained momentum by 49.5% in 2004-05, 62.3% in 2009-10 and much lower of 39.8% in 2011-12. This rapid spurt in the usage of LPG as a medium of cooking among the urban habitants in 2009-10 and again a slowdown in 2011-12 arebecause of the lack of its accessibility.

Table 3

Percentage of Total Households using primary source of energy for cooking in Chhattisgarh

S. No	Fuel Type	2004- 05	2009-10	2011-12
1	Coke & coal	4.95	2.95	6.1
2	Firewood &Chips	64.9	59.6	63.95
3	Dung Cake	1.2	1.1	3.2
	Traditional Energy (1 to 3)	71.05	63.65	73.25
4	LPG	25.5	32.15	20.65
5	Kerosene	1.5	5	2.35
	Modern Energy (4 & 5)	27	37.15	23

Source: Author's own calculation

The total percentage of households using primary source of energy as cooking in 2004-05 is 71.05 amongst traditional energy and 27 in modern energy. This percentage has dropped drastically in 2009-10 by 63.65 but again increased to 73.25% in 2011-12 in traditional energy. As against this with respect to the use of modern energy the percentage of households has increased by 37.15% in 2009-10 and further there is a decline of 23% in 2011-12. This shows that within a span of seven years there has been a shift in the primary source of energy usage for cooking from traditional to the modern ones.

Table 4
District wise Rural -Urban Disparity by Type of Fuel used for Cooking: 2011

Districts	*Firewood*	*Crop Residue*	*Cowdung*	*Coal/Coke/ Lignite*	*Kerosene*	*Lpg/Png*
	Disparity Index	*Disparity Index*	*Disparity Index*	*Disparity Index*	*Disparity Index*	*Disparity Index*
Bastar	-0.250	0.343	0.564	0.954	1.244	1.577
Bijapur	-0.060	0.659	1.402	-0.0008	1.346	1.729
Bilaspur	-0.192	0.206	-0.011	1.143	1.253	1.566
Dakshin Bastar -Dantewada	-0.032	0.417	0.426	1.332	0.913	1.425
Dhamtari	-0.032	0.28	0.004	0.875	1.038	1.339
Durg	-0.346	0.2003	0.009	1.821	1.049	1.429
Janjgir- Champa	-0.021	0.293	0.130	0.888	1.041	1.232
Jashpur	-0.099	0.249	0.051	1.322	1.307	1.456
Kabeerdham	-0.017	0.258	-0.005	0.778	1.254	1.522
Korba	-0.385	0.270	0.415	0.986	1.097	1.300
Koriya	-0.373	0.236	0.050	2.019	1.100	1.369
Mahasamund	-0.103	0.496	0.033	0.602	1.247	1.430
Narayanpur	-0.135	0.212	0.176	1.161	0.971	1.919
Rajnandgaon	-0.215	0.335	0.163	1.357	1.1636	1.531
Raigarh	-0.174	0.407	0.169	0.953	1.057	1.264
Raipur	-0.304	0.371	0.004	0.694	1.082	1.494
Sarguja	-0.250	0.340	0.047	1.116	1.509	1.593
Uttar Bastar- Kanker	-0.188	0.412	0.100	0.954	1.438	1.526

Source: Authors own calculation

The above table illustrates the district wise rural-urban disparity in the primary source of fuel used for cooking in Chhattisgarh. The figures presents remarkable study in case of firewood which shows that the highest rural-urban disparity is in Kabeerdham (-0.017) followed by Janjgir- Champa(-0.021) and jointly by Dhamtari and DakshinBastar- Dantewada (0.032). However the lowest disparity is in Korba (0.385), Koriya(0.373) and Durg(0.346). With respect to Crop residueBijapur(0.659), Mahasamund(0.496) andDantewada(0.417) is having higher disparity and Durg(0.200), Bilaspur (0.206) andNarayanpur(0.212) is having lower disparity. Further the figure highlighted the case of Cowdung as a primary fuel for cooking whose disparity is higher in Bijapur(1.402) followed by Bastar (0.564) and Dantewada(0.462) and lower in Bilaspur (-0.01), Kabirdham(-0.005) and Damatari and Raipur (0.004) respectively. Coal as a fuel has the highest rural-urban disparity in Koriya (2.029), Durg(1.821) and Rajnandgaon(1.357) and lowest in Bijapur (-0.0008), Mahasamund(0.602) and Raipur(0.694). The districts of Sarguja(1.509), Kanker(1.438)and Bijapur(1.346) are having higher disparity in contrast with Dantewada(0.913), Narayanpur(0.971) and Damatari(1.038) which are havinglower disparity with regard to kerosene .Naryanpur(1.919), Bijapur(1.729) and Sarguja(1.593) emphasized on the higher aspect of rural –urban disparity

where asJanjgir-Champa (1.232), Raigarh(1.264) and Korba(1.300) depicts the lower disparity index with respect to LPG/PNG.

HOUSEHOLDS PRIMARY SOURCE OF ENERGY FOR LIGHTING IN CHHATTISGARH

In Chhattisgarh the usage of kerosene as a principal source for lighting is most prevalent among the rural folks as compared tourban ones And that too its usage is seen mostly in the Bastar Division of state. This is because this region is nothavingproper installationof ruralelectrification. Sotheruralfolk reliesmoreon keroseneusage. The census 2011 highlighted that theuseofsolarenergy asasourceoflightingis verylessinthestatebecauseof lack of proper establishmentofsolarpowerplants.The table below shows the percentage of households using primary source of energy for lighting in both the rural and urban areasrespectively. Further the district wise rural –urban disparity shows that in-spite of rapid development in the past few years, the state still possesses huge discrepancy in the fuels utilized for lighting their homes.

Table 5

Percentage of Rural Households using Primary Source of Energy for Lighting in Chhattisgarh

Fuel Type	2004 -05	2009-10	2011-12
Kerosene	36.6	17.4	13.8
Gas/ Candle	1.5	2.4	0.7
Traditional Energy (1 & 2)	**38.1**	**19.8**	**14.5**
Electricity	61.9	78.4	85.0
Modern Energy (3)	61.9	78.4	85.0

Source: Author's own calculation

In 2011-12 traditional methods (14.5%) of lighting is less prominent among the rural folks as compared to the modern method(85%). Among the traditional method of lighting the most commonly used fuel is kerosene. In the rural areas the percentage of households using kerosene in 2004-05 is 36.6% which gradually came down to 17.45% in 2009- 10 and much lower to 13.8% in 2011-12. As against this the percentage of households using modern method of lighting especially electricity has gained momentum by 61.9% in 2004-05, 78.4% in 2009-10 and much higher of 85% in 2011-12. This rapid spurt in the usage of electricity as a medium of lighting among the rural inhabitants is because of the proper installation of electricity power plants in and around Chhattisgarh in the span of ten years. It also shows that Chhattisgarh has progressed in the areas of rural electrification.

Table 6

Percentage of Urban Households using Primary Source of Energy for Lighting in Chhattisgarh

Fuel Type	*2004 -05*	*2009-10*	*2011-12*
Kerosene	6.7	2.7	3.6
Gas/ Candle	0.1	1.5	2.8
Traditional Energy (1 & 2)	**6.8**	**4.2**	**6.4**
Electricity	93.2	94.0	93.1
Modern Energy (3)	93.2	94.0	93.1

Source: Author's own calculation

With respect to urban householdsalso in 2011-12 traditional methods (6.4%) of lighting isvery lessprominent as compared to the modern method (93.1%). Among the traditional method of lighting the most commonly used fuel is kerosene. In the urban areas the percentage of households using kerosene in 2004-05 is 6.7% which gradually comes down to 2.7% in 2009- 10 and quite increase is seen in 2011-12 by 3.6%. As against this the percentage of households using modern method of lighting especially electricity has increased rapidly by 93.2% in 2004-05, 94% in 2009-10 and a slight low of 93.1% in 2011-12. This increased percentage in the usage of electricity as a medium of lighting among the urban population is because of the availability of proper electrificationfacilities in the urban areas.

Table 7

Percentage ofTotalHouseholds using Primary Source of Energy for Lighting in Chhattisgarh

Fuel Type	2004 -05	2009-10	2011-12
Kerosene	21.65	10.05	8.7
Gas/ Candle	0.8	1.95	1.75
Traditional Energy (1 & 2)	**22.45**	**12**	**10.45**
Electricity	77.55	86.2	89.05
Modern Energy (3)	77.5	86.2	89.05

Source: Author's own calculation

The overall percentage of households using primary source of energy as lighting in 2004-05 is 22.45amongst traditionalenergy and 77.5 in modern energy. This percentage has dropped drastically in 2009-10 by 12 and 10.45 in 2011-12 in traditional energy. As against this with respect to the use of modernenergy the percentage of households has increased by 86.2% in 2009-10 and further to 89.05 in 2011-12. This shows that within a span of seven years there has been a rapid shift in the primary source of energy usage for lighting from traditional to the modern ones.

Table 8

District wise Rural -Urban Disparity of Householdsby main Source of Lighting: 2011

Districts	*Electricity*	*Kerosene*	*Solar*
	Disparity Index	*Disparity Index*	*Disparity Index*
Bastar	0.789	-0.115	0.027
Bijapur	0.760	-0.045	0.005
Bilaspur	0.681	0.056	0.028
Dakshin Bastar -Dantewada	0.941	-0.258	0.029
Dhamtari	0.463	0.177	0.054
Durg	0.555	0.178	0.263
Janjgir- Champa	0.486	0.155	0.108
Jashpur	0.817	-0.145	-0.011
Kabeerdham	0.625	0.085	0.003
Korba	0.815	-0.028	-0.599
Koriya	1.034	-0.244	0.003
Mahasamund	0.560	0.105	0.175
Narayanpur	0.917	-0.273	0.030

Districts	Electricity	Kerosene	Solar
	Disparity Index	Disparity Index	Disparity Index
Rajnandgaon	0.588	0.100	0.037
Raigarh	0.756	0.017	0.263
Raipur	0.799	0.007	0.020
Sarguja	0.952	-0.199	0.042
Uttar Bastar- Kanker	0.76	-0.009	0.0009

Source: Author's own calculation

The table above shows the rural urban disparity by the primary source of lighting in Chhattisgarh. It shows verysalient results. Electricity as a primary source of lighting has the highest disparity inthe districts of Koriya (1.034), Sarguja (0.952) and DakshinBastar-Dantewada(0.941). On the other hand the districts with lowest disparity index are Dhamtari (0.463), followed by Janjgir- Champa(0.486) and Durg (0.55). With respect to kerosene Durg (0.178), Dhamtari (0.177) and Janjgir- Champa (0.155) show higher rural-urban disparity. As against this Narayanpur (-0.273) accompanied with DakshinBastar- Dantewada (-0.258) and Koriya (-0.244) are having lower disparity. The districts of Durg (0.263) along with Raigarh (0.263), Mahasamund(0.175) and Janjgir- Champa(0.185) depicts the highest disparity index, where asKorba (-0.599), Jashpur (-0.011) and Uttar Bastar – Kanker (0.0009) shows lowest rural-urban disparity in using solar energy as a source of lighting.

DISCUSSION AND CONCLUSIONS

The present research is carried out to interpret the effect of district level energy disparity in Chhattisgarh. This study offers great possibilities for gaining new insights into the energy scenario in Chhattisgarh State. The data from NSSO and Census of Chhattisgarh are used asa geographical linkage between thedistrict and state levels. The present study enables an explanation of the regional disparity noted in primary sources of energy usage in cooking and lighting. A number of issues have been highlighted in our study. Thus, we compare our results to recent studies of fuel use in both the rural urban areas of Chhattisgarh. It is noteworthy that our study is similar to that of Ranjan*et al.*(Sudershan, 2017).

In our study we find substantial heterogeneity across the districts both in case of fuels used for cooking and lighting. But still we have derived some robust results .These findings are:

- In our study traditional sources of energy usage in cooking are most prominent among rural folk. Very few households are using LPG for cooking.
- In case of lighting, Chhattisgarh inevitably exhibits the usage of electricity.
- Overall, Chhattisgarhuses electricity rather than kerosene or candles.
- The district wise analysis shows that geographical location plays an important role in selecting the energy usage for cooking and lighting.
- In districts which are predominantly rich in coal and mining, theinhabitants use coal/ charcoal for cooking. This nexus between the existence of coal mines and fuels such as coal/charcoal used for cooking is mainly seen in northern Chhattisgarh.

- In districts with huge forest cover, theinhabitants rely more on firewood and chips as it is easily availableaccessible to them. This type of civilization is found in the southern part of Chhattisgarh which is in and around theBastar belt.
- Improved LPGdoesnot have large or accordant effect on energy use. In one district it reduced the share of firewood and in the other increased it. LPG as acooking fuel is used mainly in the urban areas of developed districts.
- Solar energy as a source of fuel used for lighting is not very popular inthe districts of Chhattisgarh. This is mainly because people are not very much aware about it and secondly its installation is not affordable and accessible enough to reach the far-flung parts of the districts. Solar energy is used only ina few urban areas of Raipur, Korba and Jashpur districts.
- Electricity is the principal source of energy for lighting both in the rural and urban districts. Thus kerosene has been substituted with electricity in rural areas.This shows that Chhattisgarh has progressed in the sphere of rural electrification too.
- In case of rural –urban disparity index in primary source of cooking,firewood shows negative disparity in all the districts whereas other fuels are having positive rural –urban disparity.
- In case of rural –urban disparityindex in primary source of lighting electricity shows positive disparity among all the districts, whereas kerosene and solar energy show negative disparity index among few districts.

As it is evident that women play an important role in the household chores it is the need of the hour to highlight mainstream gender in future efforts to address the environment especially with respect to energy sector. Regardless of government initiativessuchasRural Electrification,ImprovedBiomass Cook-stoves,UnnatChulhaAbhiyanandPradhanMantriUjjwalaYojana, thousands of people in the extreme areas of districts of Chhattisgarh still relyontraditionalenergy sourcesforcookingandlighting.In the absence of adequate gender-sensitive targets and indicators, it is hard to make progress in this goal in a gender- sensitive manner.No doubt, some progress has been made towards achieving the United Nations sustainable development goals in order to make sustainable energy available across the State by 2030. But further policy and implementation reforms are still required to complete the process of achievement of this goal. Energy as a tool for sustainable development has great potential and it can and should be used for reduction of poverty and availability of electricity for all.

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ECONOMY OF CHHATTISGARH

An Analysis of Budgetary Expenditure on Education in Chhattisgarh State

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INTRODUCTION

Chhattisgarh, carved out of Madhya Pradesh came into being on 1st November 2000 as the 26th state of union. Chhattisgarh covers an area of 135.192 km^2.The education in Chhattisgarh is not key remarkable as it lacks proper educational infrastructure. However the state government has launched several programs for enhancing academic scenario of the state. According to 2011 census report, Chhattisgarh had a literacy rate of 70.28 percent, which includes male and female literacy rate 80.27 percent and 60.24 percent respectively. Especial importance given to the education of women and student belonging to the under privileged section of the society.

The capital city Raipur is the center for higher education. Chhattisgarh is still ill equipped and does not poses the resources required for the overall development of education system.

Better and higher quality education leads to enhance productivity and economic prosperity of the nation. Nobel laureate James Heckmen argues that "investing in education determines country's economic and technological progress in the globalized era".

Empirical evidence has also shown that if investments are made in higher education and skills then it will be more growth enhancing and will also strengthen the case for public expenditure in higher education. In order to assess the government emphasis on education in relation several other public expenditure it is essential that one should understand the trends of public expenditure on education as percent of total government expenditure.

The landscape of fiscal policy and budgetary processes in India has witnessed a number of changes over the last few years. The 14th finance commission recommended increasing the share of states in the divisible pool of Central taxes from the Earth filed 32 percent to 42 percent. On the other hand, the union government has pursued its fiscal consolidation by compressing expenditure, mostly on Central schemes in social sectors including education etc.

Chhattisgarh government policy in response to education attempts to assess the impact of the 14th finance commission recommendations on the current level of public spending on education and identify the areas where more resources need to be invested.

Chhattisgarh has taken several policy initiatives to make education more accessible and affordable to children. More than 45 percent of school going children in CG belongs to

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