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THE SOCIAL-ECONOMIC IMPACT OF TUBERCULOSIS: A REVIEW

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Abstract:
Globally, Tuberculosis has visibly impacted the daily lives of ordinary peoples in almost every country. However, the impact is pre dominant in developing countries, where poverty, social discrimination is rampant. Tuberculosis patients often face difficulty in social as well as personal aspect of life. Worldwide there is an understanding that controlling tuberculosis requires a careful amalgamation of various control programs, treatment regime and different aspects of social determinants. There is a lack of substantial literature addressing the social and economic assessment of tuberculosis patients. In this review we have reviewed the various initiatives taken by World Health Organization and supplemented the information with the steps taken by Indian government towards End TB strategy with special emphasis on social economic aspect of tuberculosis. In present paper tried to understand social- economical impact of tuberculosis in their patients and also sure relationship of culture and society with health.

Keyword: Tuberculosis, economic, social determinants, cost, Drug resistant TB, Management

1. Introduction:

Humans live in two worlds in the world: as members of the animal kingdom, they live in the animal kingdom, and as social members, they live in the social kingdom. There are lots of dimensions that have major or direct relationships between the social and animal kingdoms, and health is one of them, especially health. Reproductive health, epidemiology, etc. are strangely related to the social and environmental kingdoms. Causes, treatment, prevention, and promotion are the four major dimensions of health .And all four dimensions are directly related to the economic dimension, like If a family has a good economic situation, they are more likely to make good food choices. If they have access to a variety of nutrients, their nutritional levels are higher than in other families. AIDS, tuberculosis, Typhoid, and other diseases have had a direct and long-term impact on human society throughout

Tribal Studies : A Journal of COATS

IMPORTANCE OF MATERIAL CULTURE AMONG BINJHWAR TRIBE WITH SPECIAL REFERENCE TO MAHASAMUND DISTRICT OF CHHATTISGARH

Shailendra Kumar [1]
Ankita Bhoi [2]
Vijaylaxmi [3]
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Saroj Kurre [5]

Abstract

Culture is one of the main means for human beings to live and fulfill their needs. Culture, both material and non-material, is the total form of deeply pervasive qualities in a society, which teach the society the art of thinking, eating and drinking, living, dancing and singing etc. Culture mainly has two aspects, material and nonmaterial. Material culture is an important part of the life both of the tribals and non-tribals. Present study has been done on Binjhwar tribe in Kokdi village of Gera Panchayat of Saraipali block of Mahasamund district of Chhattisgarh, in which interview guide, non-participant observation, group and individual study were used for collection of primary data. The Binjhwar tribe of the study area is using both new techniques as well as old techniques for the manufacture, protection and preservation of material culture such as agricultural equipment, fishing equipment, musical instruments, hunting equipment, house construction and clothing and jewellery etc. The physical tools used by them have a special significance in the socio-cultural, environmental, religious and economic aspects of the life of the Binjhwar tribe, such as building such houses which are in harmony with the environment, economic dependence on agricultural implements and wearing ornaments etc. Due to the coming in contact with non-tribals in the process of modernization, changes are taking place in their construction and conservation techniques. So documentation of old techniques is also necessary for preservation of material culture.

Key Words : Binjhwar Tribe, Material Culture, Change of Culture, Ethnomuseology.

Introduction

Binjhwar people worship Vidhyanchal Vasini Devi. This tribe considers that the twelve Binjhwar, brothers are the sons of Vindhyanchalvasini. They are their

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ORIGINAL ARTICLE

Assessment of culture medium without commercial ammonium nitrate for in vitro culture of industrially important plant species

Vikram Singh[1] · Ravishankar Chauhan[2,3] · Inderpal Kaur[3] · Afaque Quraishi[2,3]

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Abstract

Ammonium nitrate (AN) is one of the major nitrogen sources of Murashige and Skoog (MS) medium. It is prohibited in various countries, including India because it is used in explosive manufacturing. Since MS is the most successful medium used for in vitro culture of many plant species, an attempt was made to achieve the composition of MS medium using ammonium hydroxide and nitric acid as an alternative to AN. This acid–base neutralization product AN, was further characterized by ATR-FTIR spectroscopy. Micropropagation of *Musa acuminata* cv 'Grand Naine' was tested using the alternate MS medium (AMS) and good mean shoot number was achieved. Shoot proliferation of *M. acuminata* cv 'Grand Naine' on AMS was significantly better than on normal MS medium. A 1-year production cycle of *M. acuminata* cv 'Grand Naine' was successfully accomplished with seven successive subcultures and rooting on AMS medium followed by satisfactory acclimation. To check broad cross-species utility of AMS for shoot proliferation, a range of species including *Chlorophytum borivilianum*, *Dalbergia sissoo*, *Dregea volubilis* and *Plumbago zeylanica* were tested. The in vitro shoot multiplication rate of these species on AMS was statistically not different from MS medium. These results indicate that AN can be replaced with ammonia hydroxide and nitric acid in preparing MS-based medium, without negatively affecting shoot proliferation/ rooting and it would be cost-effective too for micropropagation operations in comparison to commercially available MS medium.

Key message

Commercial NH_4NO_3 could be replaced with HNO_3 and NH_4OH in tissue culture medium to follow the explosive regulations and was efficient for in vitro culture of various plant species.

Keywords Banana · FTIR · Micropropagation · Murashige and Skoog medium · Nitrogen source · Tissue culture

Abbreviations

AN	Ammonium nitrate
BA	6-Benzyleadenine
IAA	Indole-3-acetic acid
IBA	Indole-3-butyric acid
NAA	Naphthalene acetic acid
AMS	Alternate MS medium
MS	Murashige and Skoog medium

Introduction

If a plant is recognized as a target of research for commercialization, conservation or for both purposes, understanding its growth requirements is of supreme importance (Moyo et al. 2011). The chemical composition of a plant tissue culture medium plays a significant role in the success of in vitro propagation (Phillips and Garda 2019). Plants fulfil their nitrogen requirements primarily in the form of nitrate (NO_3^-) and ammonium (NH_4^+) (Zhang et al. 2019). The sub-optimal nutrient medium may cause disorders or death of cultures (Nas and Read 2000; Iovinella et al. 2020). Nowadays, micropropagation technology is extensively applied in the production

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REVIEW

Contribution of strigolactone in plant physiology, hormonal interaction and abiotic stresses

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Abstract
Strigolactones (SLs) are carotenoid-derived molecules, which regulate various developmental and adaptation processes in plants. These are engaged in different aspects of growth such as development of root, leaf senescence, shoot branching, etc. Plants grown under nutrient-deficient conditions enhance SL production that facilitates root architecture and symbiosis of arbuscular mycorrhizal fungi, as a result increases nutrient uptake. The crosstalk of SLs with other phytohormones such as auxin, abscisic acid, cytokinin and gibberellins, in response to abiotic stresses indicates that SLs actively contribute to the regulatory systems of plant stress adaptation. In response to different environmental circumstances such as salinity, drought, heat, cold, heavy metals and nutrient deprivation, these SLs get accumulated in plant tissues. Strigolactones regulate multiple hormonal responsive pathways, which aids plants to surmount stressful environmental constraints as well as reduce negative impact on overall productivity of crops. The external application of SL analog GR24 for its higher bioaccumulation can be one of the possible approaches for establishing various abiotic stress tolerances in plants.

Keywords Abiotic stress · Arbuscular mycorrhizal fungi · Crosstalk · GR24 · Phytohormones · Strigolactones

Highlights

- SLs promote AMF symbiosis that fulfills nutrient requirement of plants.
- SLs interact with other phytohormones and affect the physiology of plant.
- SLs counteract the ill effects of abiotic stresses.
- SLs-related mutant plant possesses a number of impaired developmental processes.

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Introduction

Plants encounter multiple environmental stresses, time-to-time, in their entire lifecycle. These environmental stresses (such as biotic and abiotic) are culpable for crop deterioration and have become a hazard for sustainable farming (Abouqamar et al. 2017). To shield crops from various biotic stresses (such as diseases, pests, weeds, etc.), chemical solutions are known to be a well-established segment, while, only limited measures are available to counteract abiotic stresses (like drought, salt, heavy metal, nutrient deficiency, temperature, etc.) at various stages of growth and development. Plants have evolved various responses as a survival stratagem towards unfavorable circumstances by eliciting a series of signals for reprogramming of metabolic and genetic pathways (Banerjee et al. 2017). Phytohormones are inherent signaling molecules which harmonize with various stresses and boost-up the growth as well as development of plants by producing complex responses under such environmental circumstances (Choudhary et al. 2012). They act centrally and govern stress reactions even at minute concentrations such as 10^{-5}–10^{-6} mol L^{-1} (Banerjee and Roychoudhury 2018). The standard plant growth regulators (PGRs) are composed mainly of abscisic

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Ethnobotanical Survey of Medicinal Plant Species used by Tribal Communities Around Katghora Tehsil of Korba District

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The traditional knowledge about plants and their uses in India is disappearing in recent years because the new generations of villagers migrate to cities for better life and jobs. Katghora tehsil is located at 22.50 N 82.550 E and has an average elevation of 293 meters above the sea levels in Korba district of Chhattisgarh State, India. The ethnobotanical information was obtained through interviews using semi-structured questionnaires of 32 traditional healers of 14 villages. Details of plant species, part(s) used and remedy formulations were also collected for the treatment of different health problems.
A total 52 species in 35 families and 51 genera were reported in the treatment of various health conditions. Family Fabaceae was dominant of the plant species documented. Roots (38%) were the most frequently used parts in preparing herbal remedies. Decoction and oral administration were commonly used method of herbal medicine preparation. 26 health conditions were treated using medicinal plants.
This study highlighted the closed relationship between people of the area and plant species especially when faced with frequent diseases. Many plant species are used as remedies for multiple ailments. However, most of the species used were collected in the surrounding of the villages.

Keywords : Ethnobotany, Tribal community, Katghora, Medicinal plants.

INTRODUCTION

be used therapeutically, or can be used as raw material for chemical /pharmaceutical synthesis" is classified as drugs.

Journal of Computational Biophysics and Chemistry

Research

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In Silico Approaches to Reveal Structural Insights, Stability and Catalysis of *Bacillus*-Derived α-Amylases Prior to Advance Lab Experiments

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ABSTRACT: α-amylase is the most widely used Glycoside Hydrolase (GH) in industries for decades. It randomly cleaves the α-D-(1, 4) glucosidic bonds of α-polysaccharides (starch and glycogen) to release glucose and short-chain oligosaccharides. Substantial advances have taken place in research related to α-amylases. However, bioinformatics study needs a little more exploration before conducting wet-lab experiments. We aimed to perform a comparative structure-function relationship study of 10 different *Bacillus*-derived α-amylases using several computational biology tools. After aligning all the α-amylases, 3D structures were made using the SWISS-MODEL. The accuracy and stability of the predicted models were validated via different web servers like Verify-3D, ERRAT, RMSD and ProSA. MolProbity and PROCHECK were used for mapping the residues in the most favored region of the Ramachandran plot. The Ramachandran plot reveals that >90% of the amino acid residues of the selected α-amylase genes lie within the favored region. Our findings suggest that all the α-amylases were stable as per the validation results we got. The study has revealed clear and concise structural related aspects. This paper will encourage the researchers to include and prioritize *in silico* work of α-amylase genes to obtain more accurate outcomes. As the output obtained in this study via *in silico* tools reveals the structural peculiarity and more about the catalytic domain impression, it highly recommends incorporating such studies for better results. This approach will save efforts, costs and time for researchers.

KEYWORDS: α-amylase gene; bioinformatics; computational biology; *in silico*; molecular modeling; structural insights.

1. INTRODUCTION

Amylases, notably α-amylase, are one of the most crucial enzymes offering several industrial applications. α-amylase (EC 3.2.1.1, 1,4-α-glucan-glucanohydrolase) is an endo-acting GH that catalyzes the breakdown of α-D-(1, 4) glycosidic bonds present in starch, glycogen and other related polysaccharides to yield α-anomeric hydrolytic products like glucose, maltose and limit dextrin.[1–4] α-amylase belongs to GH13 which is the largest glycoside hydrolase (GH) family of clan H (group of GH13, GH70 and GH77 sharing common catalytic machinery) having 122,203 protein sequences followed by GH57 (3919 sequences), GH119 (38 sequences), and GH126 (1289 sequences) (http://www.cazy.org/, accessed on October 15th, 2021). Microorganisms serve as a precious source for producing extremely useful α-amylases. *Bacillus* sp. (*Bacillus subtilis*, *Bacillus licheniformis*, *Bacillus cereus*, *Bacillus amyloliquefaciens*, etc.) are readily used for large-scale enzyme production.[4–8] After proteases, significant contribution in the enzyme marked is shared by α-amylase by about ~30%.[9–11] As α-amylases have become an essential part of several industries (Fig. 1), it is very mandatory to focus on the qualitative aspects rather than just paying attention to quantitative production.

Computational biology or bioinformatics is considered as a boon for the scientific field. It has enabled various researchers in enzymology to predict the structural and catalytic peculiarities of novel α-amylases after comparing them with the existing α-amylases. It has provided several opportunities to obtain

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Bioresources and Bioprocessing

REVIEW Open Access

A comprehensive review on oleaginous bacteria: an alternative source for biodiesel production

Deepali Koreti, Anjali Kosre, Shailesh Kumar Jadhav and Nagendra Kumar Chandrawanshi*

Abstract

Due to continuously increasing population, industrialization, and environmental pollution, lead to generating high energy demand which suitable for our environment. Biodiesel is an alternative renewable fuel source. According to the feedstock of production, biodiesel has been categorized into four generations. The main disadvantage of the first and second generation is the raw material processing cost that the challenge for its industrial-level production. Oleaginous bacteria that contain more than 20% lipid of their cellular biomass can be a good alternative and sustainable feedstock. Oleaginous bacteria used as feedstock have numerous advantages, such as their high growth rate, being easy to cultivate, utilizing various substrates for growth, genetic or metabolic modifications possible. In addition, some species of bacteria are capable of carbon dioxide sequestration. Therefore, oleaginous bacteria can be a significant resource for the upcoming generation's biodiesel production. This review discusses the biochemistry of lipid accumulation, screening techniques, and lipid accumulation factors of oleaginous bacteria, in addition to the overall general biodiesel production process. This review also highlights the biotechnological approach for oleaginous bacteria strain improvement that can be future used for biodiesel production and the advantages of using general biodiesel in place of conventional fuel, along with the discussion about global policies and the prospect that promotes biodiesel production from oleaginous bacteria.

Highlights

- Biodiesel from oleaginous bacteria and its importance are summarized.
- Biochemical pathways for fatty acid synthesis are described.
- Critical biotechnological approaches for bacterial strain improvement have been discussed.
- Sustainable biodiesel production, challenges, and future possibilities have been discussed.

Keywords: Biodiesel, Bio-harvesting, Feedstock, Oleaginous microbes, Transesterification

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REVIEW

A mini-review on electrotherapeutic strategy for the plant viral elimination

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Abstract
Plants have electrophysiological phenomena and are influenced by external electrical fields too. Plants have been studied for this property since the early 17th century. Stimulation in the physiological processes of plants in response to the electric field was observed in several studies. The use of electric current for phytosanitation purposes was known since the 19th century. This approach gained much attention only during the late 90s when electrotherapy applied to viral-stressed plants showed viral elimination possibilities. Concerning viruses, electrotherapy has shown an elimination rate greater than 50% over a varied range of voltage, time duration, and the plant part subjected to electro-exposure. Until now, the understanding of this mechanism is obscure, and assumptions included an increase in cell temperature causing denaturation of virus particles or its movement protein. Thus, a brief bibliographic research review would give directions for improving virus eradication from infected crops and producing virus-free plant stock material using an inexpensive and rapid electrotherapy technique in the future. Alongside, comprehensive studies are needed for a better understanding of the underlying mechanisms behind electrotherapy. Viral eliminations in plants via electro-exposure blended with other therapies such as thermotherapy, cryotherapy or chemotherapy are also discussed. The studies revealed that in some cases, electrotherapy alone is a more reliable method for producing virus-free plants, whereas, in others, the therapy combined with other virus-elimination techniques exhibited a higher virus-elimination efficiency rate.

Keywords Electrotherapy · Electric field · Phytosanitation · Therapy · Virus-free plants

Electric fields and electrical phenomena in plants

In the past 180 years, much has been written on the relationship between life and electricity. Some animals and plants have been found to possess electric fields associated with them and are also influenced by electric fields applied from the outside (Briggs et al. 1926; Burr and Northrop 1939; Lund 1947a, b; Blinks 1949; Rosene and Lund 1953; Osterhout 1957; Schrank 1959). Unsurprisingly, living cells remain separated from one another through aqueous phases as well as from the external medium through lining membranes and maintain contrasting ionic composition from the environment and from the other cells, too. The passage of merely a few ions in solutions could generate an electric field (Scott 1967). These electric fields can influence the physiology of plants. Therefore, since the 18th century, researchers have been attracted to the electrical phenomena in plants.

Over 130 years ago, both Burdon-Sanderson (1873) and Darwin (1875) demonstrated the existence of electrical signals in insectivorous ('motorized') plants. Next, Darwin and Darwin (1880), who worked chiefly on circumnutation, provided evidence for chemical signals in plants. Due to such compelling reasons, plant electrical activity was forgotten soon, focusing exclusively on chemical signals. However, research studies by Bose (1924) and later Pickard (1973) have gathered substantial evidence for the existence of electrical signals (action potentials (AP)) in a wide array of plants, apart from insectivorous or other 'motorized' plants. Despondently, the hope was very short-lived, and for many years, the phenomena surrounding electrical signalling in plants were forgotten. However, about 20 years later, a breakthrough in the field

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REVIEW

A Review on Role of Nanomaterials in Bioconversion of Sustainable Fuel Bioethanol

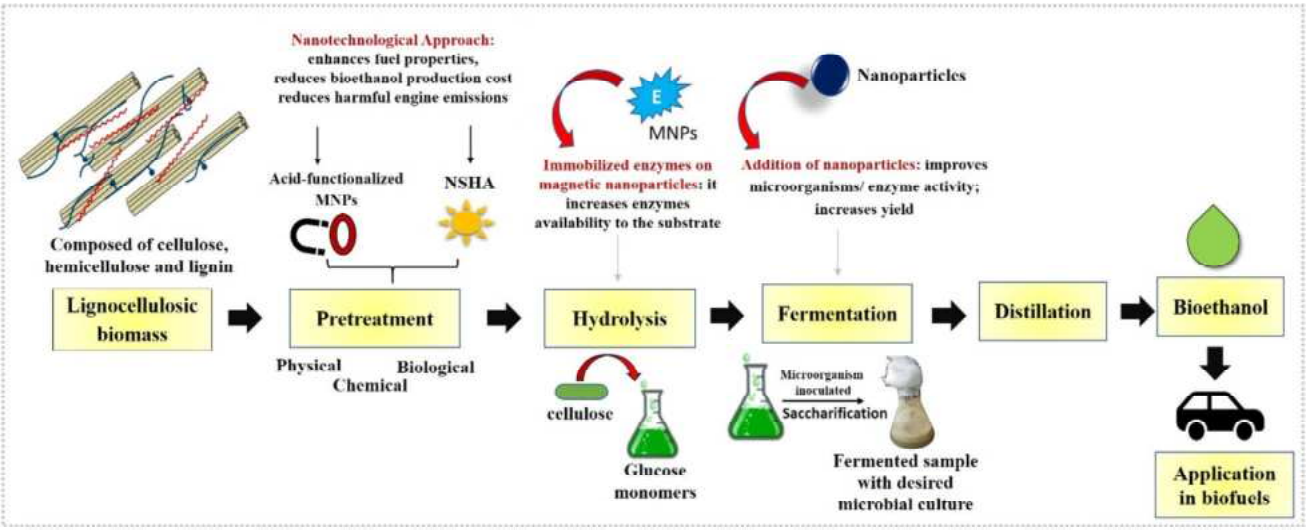
Dristi Verma[1] · Jai Shankar Paul[1] · Shubhra Tiwari[1] · S. K. Jadhav[1]

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Abstract

The growing consumption of fossil fuels like coal, petroleum, and diesel releases greenhouse gases that ultimately deteriorate the air quality. Moreover, fossil fuels pose serious threats like global warming, ocean acidification, unusual climate change and ecosystem fluctuation to the environment and human health. Biofuel is a feasible and sustainable alternative to overcome the limitations of fossil fuels. Among all the biofuels, bioethanol is currently in trend. The industrial-scale bioethanol production is a time-consuming process due to the non-availability of potential techniques and instrumentation. The pretreatment of rigid and recalcitrant lignocellulosic biomass to release fermentable sugars is crucial in the bioethanol production process. Conventionally it was done through physical, chemical and biological methods that demand high energy input, temperature, pressure, efficient organisms, expensive chemicals and solvents to loosen the compact structure of the raw materials. All these methods are sophisticated and expensive which results in the formation of harmful and inhibitory compounds and may also cause equipment corrosion. In this context, the introduction of nanotechnology in bioethanol production has shown improvement on a large scale. The small size, sturdiness and high surface to volume ratio of nanoparticles make them suitable for application in bioethanol production. Thus, the current review provides an insight into the role of nanotechnology in the various steps of the bioethanol production process. The paper will focus on the application of various nanomaterials and nanobiocatalyst in boosting the conversion of rigid lignocellulosic feedstock into fermentable sugar and facilitating the extent of reaction during fermentation for higher bioethanol yield.

Graphical Abstract



Keywords Bioethanol · Fermentation · Immobilization · Lignocellulosic · Nanobiocatalyst · Nanoparticles

Extended author information available on the last page of the article

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Electrogenic potential of *Enterococcus faecalis* DWW1 isolated from the anodic biofilm of a dairy wastewater fed dual chambered microbial fuel cell

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ARTICLE INFO

Keywords:
Microbial fuel cell
Dairy wastewater
Enterococcus faecalis
DREAM assay
Bioelectricity

ABSTRACT

In this investigation, a novel electrochemically active Gram positive bacterium was isolated from the biofilm of a dual chambered microbial fuel cell (MFC) flooded with dairy wastewater (DWW), and was annotated as *Enterococcus faecalis* DWW1 following the 16 s rRNA sequencing. The dye-reduction based electron-transfer activity (DREAM) assay was used as a simple criterion for evaluation of electrochemical activity (0.43) in the candidate microbe. The electrochemical activity of the strain DWW1 was characterized using cyclic voltametry (CV). CV studies revealed that the redox compound present in the DWW was exploited by the strain DWW1 for extracellular electron transfer towards anode. Current generation and chemical oxygen demand (COD) removal efficiencies of the strain DWW1 was examined following an optimum COD concentration of 1.440–1.665 kg COD/m^3 and anolyte pH of 8 (maximum current density 258 mA/m^2; power density 144 mW/m^2, 220 Ω; COD removal efficiency 53.5%; coulombic efficiency 10.89%). Such observations revealed the potential of *E. faecalis* DWW1 towards DWW remediation and energy generation.

1. Introduction

India is one among the larger producers of milk and dairy products. According to an estimate, annual milk production in India has now increased multi-fold, from 17 million tonnes (MTs, 1950–51) to 176.4 MTs (2017–18). Besides, being major power consumers, the Indian dairy industry, as a whole discharges approximately 300 MTs of wastewater, annually [1–3]. Dairy wastewater (DWW) produces a very persistent unpleasant foul smell apart from having higher organic load (complex carbohydrates, proteins, vitamins and lipids) and elevated concentrations of fermentable substrates [4]. Its improper disposal imposes severe ill impact on terrestrial and aquatic environments [3]. This voluminous discharge of DWW can be used for the production of energy (electrical), exploiting its organic load, for onsite usage, with simultaneous treatment of it.

Microbial fuel cell (MFC), an attractive renewable and sustainable green energy technology, can spontaneously convert the organic biomass into the electricity by exploiting microorganisms as natural biocatalysts [2]. The anode is one of the most important components of the MFC. Production of power in the MFC depends on the exoelectrogenic microorganisms that adhere on the surface of anode and catalyses the oxidation of organic matter into carbon dioxide, water and electrons [4]. Carbon based various anode materials have been employed as conventional electrodes in the MFCs [5–8] but were suffered from a severe drawback of having lower galvanic potential [9]. On the other hand, nanostructured carbonaceous anodes and fine structured metal anodes require substantially complicated procedures for their preparation. Hence, these were classified as relatively unsuitable for large scale applications such as wastewater treatment. Therefore, greater attention has now been paid over electrodes that are actual current collectors. In this regard, metals are considered as suitable anode materials for the MFCs [10]. Various metal electrodes such as Cu(II), Ag(I), Mo(VI), Zn (II), *etc.*, has been reported as a suitable surfaces for growth of microbial films [9–12].

Wastewaters are known to harbour rich diversity of microorganism that can be used as an inoculum for the MFC. Analyses of the anodic biofilms of the MFCs revealed a great bacterial diversity, however; did not divulged any specific trend in dominant members of anodophilic communities [13]. A large number of non-exoelectrogens are directly competing with exoelectrogens by propagating simultaneously with them, thus, decreasing the power output [4]. Several researchers have evaluated the performances of the MFCs using microbial consortium [1,14,15] but were failed to identify the roles of individual microorganisms, and mechanisms involved in power production. In order to

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Electrogenic potential of *Enterococcus faecalis* DWW1 isolated from the anodic biofilm of a dairy wastewater fed dual chambered microbial fuel cell

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ARTICLE INFO

Keywords:
Microbial fuel cell
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DREAM assay
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ABSTRACT

In this investigation, a novel electrochemically active Gram positive bacterium was isolated from the biofilm of a dual chambered microbial fuel cell (MFC) flooded with dairy wastewater (DWW), and was annotated as *Enterococcus faecalis* DWW1 following the 16 s rRNA sequencing. The dye-reduction based electron-transfer activity (DREAM) assay was used as a simple criterion for evaluation of electrochemical activity (0.43) in the candidate microbe. The electrochemical activity of the strain DWW1 was characterized using cyclic voltametry (CV). CV studies revealed that the redox compound present in the DWW was exploited by the strain DWW1 for extracellular electron transfer towards anode. Current generation and chemical oxygen demand (COD) removal efficiencies of the strain DWW1 was examined following an optimum COD concentration of 1.440–1.665 kg COD/m^3 and anolyte pH of 8 (maximum current density 258 mA/m^2; power density 144 mW/m^2, 220 Ω; COD removal efficiency 53.5%; coulombic efficiency 10.89%). Such observations revealed the potential of *E. faecalis* DWW1 towards DWW remediation and energy generation.

1. Introduction

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Elimination of BBTV via a systemic in vitro electrotherapy approach

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ABSTRACT

Banana bunchy top virus (BBTV) is the most destructive etiological agent limiting banana cultivation areas globally. This study attempted BBTV elimination by traditional shoot-tip culture (control) and alternative shoot-tip + electrotherapy (treated) techniques. Shoot-tip culture from *Musa acuminata* cv. 'Grand Naine' infected sources were exposed to 100 mA electric current for different time intervals (20–60 min). Virus indexing (via PCR) and genetic fidelity (by ISSR assay) from the cultures were tested, alongside the physio-biochemical parameters. Exposure of electric current for less than 50 min was ineffective for BBTV elimination. Still, a rise in the duration from 50 min or more led to eradicating the virus from some explants. Elimination of BBTV was complete from 100 % of explants exposed to 100 mA for 60 min, as confirmed by lack of BBTV detection even at six months after acclimatization. In the control treatment, the maximum efficiency of BBTV elimination was 28 % after eight subcultures. On the other hand, improved survival % was observed in the treated culture. Moreover, homogenous ISSR patterns were there between the treated and the mother plant and similar physio-biochemical activities were seen in electro-exposed cultures and healthy ones. Thus, the study reports complete BBTV-elimination from banana with international compliances, for the first time, via electrotherapy while maintaining genomic template and biochemical stability.

1. Introduction

Banana (*Musa* spp.), belonging to the *Musaceae* family, is one of the most common crops in tropical and subtropical regions (Teycheney et al., 2005). Banana occupies fourth place, alongside rice, wheat and maize, in gross production value. More than 130 countries of Asia, America, Africa, Oceania, and the Pacific cultivate it (Pei et al., 2007; FAOSTAT, 2014). Banana production occupied approximately 5.6 million hectares of land globally (FAOSTAT, 2017). Banana bunchy top virus (BBTV) caused banana bunchy top disease (BBTD) is the most economically destructive of banana viral diseases as it can contribute up to 100 % yield reductions (Qazi, 2016).

BBTV comes under the genus *Babuvirus*, which belongs to the family *Nanoviridae* (King et al., 2011). The genome is comprised of at least six circular ssDNA segments (DNA 1–6) of approximately 1 kb each, singly encapsidated in isometric virions of 18–20 nm diameter, which are composed of a single coat protein of 20,000 Mr (Harding et al., 1991; Dietzgen and Thomas, 1991). BBTV is restricted to the phloem tissue (Magee, 1940). The typical bunchy top symptoms include chlorosis of the leaf margin, narrowing and bunching of successive leaves with a 'Morse code' pattern, J-hook markings along the midrib of the leaves, and dark green streaking petioles (Dale, 1987). *Pentalonia nigronervosa* Coquerel (Hemiptera: Aphididae) transmits BBTV through a circulative and non-propagative mechanism in banana (*Musa* spp.) (Magee, 1927). *P. caladii* is also recognized as a competent BBTV vector (Bressan and Watanabe, 2011). Traditionally, bananas propagate vegetatively through suckers are shoots growing from a lateral bud on the parental rhizome (Ali et al., 2011). A series of non-professional cultivation practices, abiotic and biotic stresses significantly reduce the yield of vegetatively propagated bananas and plantains (Helliot et al., 2002; Matsumoto and Silva Neto, 2003). This process is not profitable commercially, as the multiplication rate of suckers is slow (15–20 per plant per year). Its success depends on clone selection, environmental conditions and cultural practices (Ali et al., 2011). Moreover, as explained by Lassois et al. (2012), the virus transmission is particularly an issue in the vegetatively propagated crops, like banana, because of

Abbreviations: CAT, catalase; POX, peroxidase; SOD, superoxide dismutase; ROS, reactive oxygen species; TEM, transmission electron microscope; MDA, malondialdehyde; BA, 6-benzyladenine; IAA, indole-3-acetic acid; IBA, indole-3-butyric acid; TAE, tris-acetate-EDTA; CTAB, cetyl trimethyl ammonium bromide; GTS, genomic template stability; ISSR, inter simple sequence repeat; LPX, lipid peroxidation.

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Review

Gamma radiation: A potential tool for abiotic stress mitigation and management of agroecosystem

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ARTICLE INFO

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ABSTRACT

Context: Being sessile, it is impossible for the plants to evade from the unfavourable environmental conditions prevailing due to various abiotic stresses like heat, salinity, drought, flood, heavy metals, and high radiance amongst many others. These abiotic stresses disrupt plant growth and limit crop productivity to a large extent globally. Crop plants need to acclimatize themselves in these unsuitable environmental and edaphic conditions utilizing their inherent biological mechanisms. Massive amount of pertinent researches have been done in the last few decades regarding utilization of gamma rays for improvement in traits, and management of agro-ecosystem by developing superior quality crops/ germplasms. It has been well established that the gamma rays promotes abiotic stress tolerance in plants at low doses (50–100 Gy). Gamma rays are also being widely used as mutation techniques in an attempt to raise abiotic stress tolerance and, disease resistant crop varieties. Furthermore, a better understanding of tolerance mechanisms induced by gamma rays will help in improving crop productivity under stress conditions. However, the potential mechanisms involved in this are still indefinable. This review illustrates general information about gamma ray, its dose dependant responses; beneficial effects and lethality, and also the potential mechanism(s) underlying the tolerance induction and performance enhancement of plants growing under various abiotic stress conditions.
Objective: To elucidate the role of gamma rays as a potential tool for stress mitigation and management of agroecosystem.
Methods: Gamma rays have been used quite differently by various researchers for alleviation of abiotic stress imposed responses in plants.
Results and conclusions: Application of gamma radiation has popularly been noticed to enhance nutrient uptake, modulate biosyntheses of numerous secondary key metabolites and osmolytes, and regulate various metabolic activities to engender tolerance against environmental stresses.
Significance: In most of the developing and under developed nations, owing to limited development in agro-management systems, abiotic stresses are seen to cause potential threats to growth and productivity of crops. Therefore, it is essentially to explore novel cost effective possibilities like use of low dose of gamma rays in crop plants for improvement in their performance during these rapidly changing climatic conditions.

1. Introduction

Crop plants encounter various abiotic stresses in their life span owing to global warming and climatic abnormalities which majorly limits their growth and productivity. Drought, temperature extremes, salinity and acidity of soil, light intensity, submergence, and anaerobiosis are dominant abiotic stresses amongst others, and are hostile to farming and the ecosystem (Wania et al., 2016). Crop plants of approximately 90% of cultivable area are facing one or several of the above stresses (dos Reis et al., 2012), which results in approximately 70% losses in the yield of major food grains *viz.*; *Oryza sativa, Triticum aestivum* and *Zea mays,* and hence affecting food security (Tigchelaar et al., 2018). As per the report of FAO (2007), merely 3.5% land area has left untouched by any of the environmental constrain.

Amongst the enlisted abiotic stresses, salinity becomes the most stubborn one by escalating the salt concentration in the arable land

Abbreviations: Reactive Oxygen Species, ROS.

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Review Paper:

Interaction between Nitric Oxide and Hydrogen Sulfide in Abiotic Stress Challenged Plants

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Abstract

Nitric oxide (NO) and hydrogen sulfide (H_2S) are two versatile gaseous molecules which play myriad roles in the growth and development of plants. They play an important role in signal transduction process in plants exposed to various environmental stresses. Signal transduction and various antioxidant strategies are vital for the management of abiotic stress imposed alterations in plants. These two secondary messengers neutralize the cell perturbations caused by stress-triggered over produced reactive oxygen species. Study of crosstalk between NO and H_2S reveals the functional importance of proteins regulated during S-nitrosylation and S-sulfhydration respectively, the two major signal-dependent post-translational protein modifications.

Also, NO and H_2S decrease the toxic impacts of reactive species by triggering the signal transduction process, enhancing antioxidant enzymes, stimulating other signaling molecules and regulating the transcript levels of different stress-responsive genes. This review mainly emphasizes on the roles of NO and H_2S in responses of plants to abiotic stresses and reveals the crosstalk involving NO and H_2S in stress tolerance mechanisms.

Keywords: Hydrogen Sulfide, Nitric Oxide, Oxidative stress, Reactive oxygen species, Signal transduction, Signaling molecules, Stress tolerance.

Introduction

Abiotic stresses such as heat, cold, salinity, drought, metal/ loid, ultraviolet (UV) radiation etc. adversely affect the rate of germination, development and yield of economically essential crop plants and more than 50% yield losses are direct result of these stresses[23,26]. One of the most common phenomena taking place during the plant responses to these abiotic stresses is the oxidative explosion illustrated by the uncontrolled production of reactive oxygen species (ROS) such as singlet oxygen ($^1O_2$), hydroxyl radical ($^{\bullet}OH$), hydrogen peroxide (H_2O_2) and superoxide ($O_2^{\bullet-}$)[41].

These elevated levels of ROS are severely injurious to plant cells as they directly oxidize the lipids, proteins and amino acids, inactivate enzymes and damage pigments and nucleic acids[6,17]. Condition of oxidative stress triggers a series of detrimental impacts in plants including reduced germination score, biomass, root and shoot length, reduction in the number of leaves and leaf area, curling, wilting and necrosis of leaf blades, disturbed cellular osmotic balance, alteration in flow of energy, interference with minerals and ions uptake, losses in the mineral contents, inhibition in the rate of photosynthesis, chlorophyll biosynthesis, enzyme activities and cellular metabolism[4,37]. These damaging effects of oxidative stress hamper / hinder the growth and development and ultimately lead to death of plants.

The effectual control and rapid removal of ROS is essential for the proper functioning and survival of the plants. Thus, to counterbalance the environmental stresses, plants store multiple groups of compatible solutes such as proline, glycinebetaine, sugars etc. together with defensive enzymes and non-enzymatic components[36]. Enzymatic components include superoxide dismutase (SOD), catalase (CAT), peroxidases such as ascorbate peroxidase (APX), guaiacol peroxidase (POD) and glutathione peroxidase whereas flavonoids, glutathione (GSH), ascorbate (AsA) and α-tocopherol constitute non-enzymatic components which protect the plants against ROS-induced oxidative damage[28,35]. Thus, understanding the mode of action of some of the molecules applied exogenously that can improve the defensive system of plants, could help in the mitigation of detrimental effects of abiotic stress-induced oxidative burst.

The two important gaseous molecules viz. nitric oxide (NO) and hydrogen sulfide (H_2S) have crucial roles in several developmental processes of the plants and are also involved in their protection against various abiotic stresses[29]. In plants, both of these molecules are key signal messengers involved in various developmental processes such as seed germination and root organogenesis. Also, these signaling molecules elicit the antioxidant defensive mechanisms of plants to reciprocate the oxidative damage to cellular structures[33]. The interactions of NO and H_2S have also been used in awarding plant tolerance to various stresses such as aluminum, arsenic (As), cadmium (Cd), salinity and heat in plants[11,16,23,32,33].

Being a ubiquitous, gaseous bioactive molecule and a secondary messenger, NO has gained an increasing attention of scientific research in plant cells. It is well known that NO has significant role in the management of plant growth, development, interaction with other signaling molecules and in the adaptive responses to the abiotic stresses[15]. In addition, its role is evident in seed germination, root formation and elongation, fruit yield, photomorphogenesis,

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REVIEW

Lead induced-toxicity in vegetables, its mitigation strategies, and potential health risk assessment: a review

S. K. Kumbhakar[1] · R. Chauhan[1,2] · S. K. Jadhav[1] · A. Quraishi[1]

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Abstract
In developing countries, rapid urbanization and industrialization cause heavy metal contamination, including lead (Pb). India is one of the most developing countries where anthropogenic sources are the chief generators of Pb contaminants. Mining, smelting Pb containing paints, papers, gasoline, and municipal sewage sludge enriched with Pb come in contact with a natural drain subsequently used for irrigation and cultivation of food crops and vegetables. Wastewater irrigated crops tend to cause contamination with Pb and thus pose a threat to the environment and human beings. The present review explored the anthropogenic sources of Pb and its bioaccumulation in vegetables and further consequences on human health. It also focused on reducing the phyto-bioavailability and accumulation of Pb in vegetables by using various improved strategies. Approaches like biochar application, microbes and their combination with biochar, co-remediation, co-cropping, nanoparticle-based method, biofilters, and fertilizers might hinder the subsequent transfer of Pb and other heavy metals in the food chain system and reduce the health risk.

Keywords Bioaccumulation · Contamination · Industrialization · Lead toxicity · Phyto-bioavailability

Introduction

Globally, over 20 million hectares of land are considering soil-polluted sites where hazardous heavy metals and metalloids pollution are responsible for > 50% of lands contamination (Kumar et al. 2019). Now, soil and vegetable contaminations due to the accumulation of heavy metals is a prime environmental concern (Aslam et al. 2021). Lead (Pb) is one of the toxic heavy metals existing in many forms in the world. Apart from its nitrate, chlorate, and chloride salts, other inorganic salts are poorly soluble in water (WHO 2001). Various anthropogenic activities such as mining, metallurgy, industrial waste, pesticides transportation, construction, manufacturing, fossil-fuel combustion, incinerator emissions, and urban activities are responsible for elevating Pb in soils (Yongpisanphop et al. 2017). Generally, Pb is stable, highly persistent, and has less solubility in soil solutions (Zhang et al. 2014; Kaur et al. 2018b). Therefore, it can be absorbed by vegetables through rhizosphere mediated solubility. Soils derived Pb contamination from various leaded-house paint, leaded-gasoline, some pressure-treated wood, and lead-arsenate pesticide (Schooley et al. 2008). Despite the phases out of leaded-gasoline and paint, beginning in the 1970s, historical Pb contaminations are persisted in urban, industrial, and high-traffic areas (McBride et al. 2013). Currently, due to low maintenance of vehicles resulting high emission has also significantly increased the production and consequent dry sediment deposition of Pb content (Guo et al. 2008). The by-products of municipal solid waste in urban areas of developing and developed countries are the biggest concern. Incineration is a method of disposing of municipal garbage, produces airborne metals that bind to particles or volatile metal components in the atmosphere (Sahu and Basti 2021). In the peri-urban ecosystem, industrial or municipal wastewater is mostly used for the irrigation of vegetables and other crops due to its easy availability, disposal problems, and the inadequacy of freshwater (Muchuweti et al. 2006). Water shortage is already a recurring issue in certain European nations (EEA, 2018), resulting in environmental

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REVIEW

Lead induced-toxicity in vegetables, its mitigation strategies, and potential health risk assessment: a review

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Mutagenesis: A coherent technique to develop biotic stress resistant plants

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ABSTRACT

Modernization leads to frequent and remarkable alterations in the environmental factors which consequently affect the global agricultural productivity. Environmental factors can be broadly categorized into biotic and abiotic components. Biotic factors, which are represented by pests, bacteria, viruses, fungi, nematodes, *etc.,* pose a severe threat to plants growth and development, thereby adversely impact the productivity. Taking this into consideration, crop improvement may prove to be a leading approach to ensure the sustainability of food and plant products. Modern agricultural practices rely upon agrochemicals and formulations for disease control that are responsible for causing environmental pollution and have detrimental effect on human health. Thus, development of stress resistance crop varieties must be a better approach in the current agriculture system. An array of genetic, biochemical and metabolic variations is required to produce such desirable alleles for appropriate crop improvement. Moreover, increasing genetic variation beyond natural variation is a crucial aspect of plant breeding programs. In connection, mutagenesis is one of the most prevalent tools to control plant stresses. To induce mutagenesis, techniques such as physical (gamma radiation, ultra-violet rays, *etc.*), chemical (ethyl methane sulfonate, methyl methane sulfonate, sodium azide, *etc.*) and gene editing (ZFN, TALEN, and CRISPR) are highly preferred by plant breeders. This review aims to provide an insight into mutation breeding techniques that facilitate the variable spectrum of agronomic and economic characters which is a prerequisite for successful crop improvement programs.

1. Introduction

A wide range of environmental factors are known to constantly affect plant's life. These factors are known to disturb growth, development, reproduction and overall productivity of crops. Environmental factors are broadly categorized into two groups: biotic and abiotic. Biotic factor comprises all the pathogens and plant parasites like fungi, bacteria, viruses, nematodes, and phytophagous insects and pests, while abiotic agent includes environmental cues, *viz.* cold, drought, heat, salinity, heavy metals, ultra-violet (UV) radiation, flood, *etc.*, (Meena et al., 2017). Stresses occurring due to deterioration/damage by biotic components are considered as a serious threat to global food safety, as they cause pre- and post-harvest losses of crops. These are also known to trigger deprivation in the nutrient content which leads to death of plants. In general, surrounding environmental conditions dictate the type of biotic stress that may affect the plants (Gull and Kausar, 2019). For example, *Phytophthora infestans*, an Oomycete causes potato late blight, which is one of the peak emerging biotic stresses for *Solanum tuberosum* (Coca-Morante and Tolin-Tordoya, 2013), while *Magnaporthe oryzae* has been reported to induce rice blast disease in *Oryza sativa* and reduces 10–35% of the yield (Li et al., 2019).

Plants possess intricate mechanisms to sense external signals and enable optimal responses to survive under such stress-inducing conditions. They establish a hierarchy of defense mechanisms to counter the effect of these stresses. Plants also possess damage repair mechanisms for stress neutralization, usually followed by removal of damaged tissues and restoration of tissue growth. One of the most common and effective defense mechanisms in plants is the hypersensitivity response (HR). Hypersensitive response causes rapid and localized cell death at precise site of pathogen infection (Wu et al., 2008). Endogenous low molecular weight phytohormones like ethylene (ET), abscisic acid (ABA), jasmonic acid (JA), along with salicylic acid (SA) predominantly regulate plant's protective response to various biotic stresses. Additionally, these hormones play a dominant role during pathogen infection (Fujita et al.,

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Review

Nanoarmoured α-amylase: A route leading to exceptional stability, catalysis and reusability for industrial applications

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ABSTRACT

Enzymes are tremendous bio-product for nature whose absence can make a remarkable difference in the 21st century. Amylases have attracted a lot of industries due to their several applications. α-Amylase (EC 3.2.1.1, *endo*-1,4-α-D-glucan glucanohydrolases) is a crucial enzyme for various industries. It selectively hydrolyzes the α-1–4 glucosidic bonds of α-polysaccharides to generate glucose, maltose and short-chain oligosaccharides. The only limitation associated with the applicability of enzymes is their non-reusability and instability in extreme conditions. Immobilization is a technique to offer easier recovery and several additional benefits to the enzyme by using appropriate support or carrier. Nanotechnology is the rapidly growing area of research dealing with the various biological disciplines at the molecular level. A duet of nanotechnology and immobilization can generate robust nanobiocatalyst explicating potential benefits. The most exciting properties of NMs is their high surface to volume ratio, easier fabrication and good dispersibility attracting the scientific community to utilize them for producing sturdy nanobiocatalysts. The present review evaluates the recent research and development undergoing in the field of nanoarmoured α-amylase. It deals with the various NMs like metallic nanoparticles, nanostructured metal oxide, nanofibers, nanotube and graphene-based nanocomposites used as excellent support for α-amylase immobilization along with its bottlenecks. Our study potentially delivers the measures for immobilizing α-amylase on a nanosupport without compromising with its catalytic performance. There are prospective strategies highlighted in the review dealing with the obstacles hampering the α-amylase immobilization procedure with several illustrations for easier understanding.

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RESEARCH ARTICLE

Production and Assessment of Stick-Shaped Spawns of Oyster Mushroom from Banana Leaf-Midribs

Priyanka Chouhan[1] · Deepali Koreti[1] · Anjali Kosre[1] · Ravishankar Chauhan[1,2] · S. K. Jadhav[1] · Nagendra Kumar Chandrawanshi[1]

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Abstract *Pleurotus ostreatus* is generally known as oyster mushroom that comprised in the category of edible mushroom. Various grain spawns were chiefly utilized for its commercial production. However, these spawns have several limitations such as high production cost and more contamination rate. Henceforth, the current study dealt with the development of stick-shaped spawns as an alternative to solid spawn. In the present study, banana leaf-midrib sticks were submerged in the liquid mycelium culture of *P. ostreatus* for the production of spawn. The efficiency of developed spawns were examined by the cultivation process and compared with the wheat spawn or mixture of wheat and cocopeat spawn. In term of mycelium accumulation stick spawn and wheat spawn show higher accumulation efficiency. The stick-shaped spawn exhibited significant mushroom production; its biological efficiency was 30.83% and 34.57% for both 1st and 2nd harvesting, respectively, when the stick-shaped spawn was used while it was comparably lowest for mixed spawns. Similarly nutritional content was also higher in stick and wheat spawn. Besides, it was cost-effective along with easier maintenance and handling. Thus, the banana leaf-midrib stick-shaped spawn developed in the present investigation was comparable to wheat spawn with a promising alternative in industrial application and is reported the first time for mushroom cultivation.

Keywords Cost-effective · Lignocellulosic waste · Liquid submerged culture · Oyster mushroom · Stick spawn

Significance statement Stick-shaped spawn produced by using submerged liquid mycelium culture. It unveiled high productivity, cost effective and easier to handle and is first report of using banana leaf-midrib for preparing stick-shaped spawns.

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Introduction

The demand for mushrooms has increased due to its nutritional, medicinal, and pharmacological properties [1]. *Pleurotus ostreatus* is commonly known as oyster mushroom, which is one of the widely cultivated mushrooms worldwide followed by *Agaricus bisporus* [2]. It requires cheap and easy artificial conditions for its cultivation [3]. *P. ostreatus* well documented for lignocellulosic biodegradation potential and utilization as agro-waste management [4]. Biologically active molecules reported in this mushroom are different, such as exopolysaccharides, β-D Glucan, Lectin, Lovastatin, Ubiquitin-like protein, hydrophobin like proteins and Proteoglycans. This bioactive compounds exhibited various biological activity like; anticancer agent, antioxidant, antibacterial, anti-hypercholesterolic, antiviral, and anti-arthritic [5–7]. *P. ostreatus* can be cultivated in various lignocellulosic materials and agro-wastes such as banana leaves waste [8], eucalyptus waste [9], rice/wheat straw [10], date-palm leaves [11], and sugarcane bagasse [12]. Spawns are the viable material used for mushroom cultivation, and they are commonly known as mushrooms seeds [13]. The quality and production of mushrooms is directly influenced by the spawn used for its cultivation [14]. For the commercial cultivation of mushroom both solid and liquid spawns are frequently used [13]. Solid spawns are made via various grains such as

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Keywords Cost-effective · Lignocellulosic waste · Liquid submerged culture · Oyster mushroom · Stick spawn

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ORIGINAL PAPER

Rice Husk: A Potent Lignocellulosic Biomass for Second Generation Bioethanol Production from *Klebsiella oxytoca* ATCC 13182

Shubhra Tiwari[1] · Esmil Beliya[1,2] · Monika Vaswani[1] · Khushbu Khawase[3,4] · Dristi Verma[1] · Nisha Gupta[1] · Jai Shankar Paul[1] · Shailesh Kumar Jadhav[1]

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Abstract
The demand for an alternative source of energy is an imperative requirement of the current time. Second-generation biofuel (bioethanol) is capable of overcoming the problem of energy crises soon. Bioethanol production from agricultural by-products is an effective and sustainable approach. Bioethanol from agro-waste residues fulfil the energy demand and also reduce the pollution load of the environment. The present study was based on bioethanol production from cheap lignocellulosic agro-waste 'rice husk' by using *Klebsiella oxytoca* ATCC 13182 and standardization of production parameters and determining proficient pretreatment strategies. The present investigation reveals that bioethanol production can be enhanced significantly up to 32.61 ± 0.45 g/L at pH 7, 36 °C after 48–72 h of incubation. The nitrogen supplementation like ammonium chloride, peptone, and beef extract increased bioethanol production up to 38.95 ± 0.65 g/L, 42.29 ± 0.01 g/L, 43.23 ± 0.71 g/L respectively. Among the trace metals and ions analyzed, the highest bioethanol production (44.60 ± 0.11 g/L) and (35.13 ± 0.01 g/L) was obtained in Zn^{2+} and $MgCl_2$ supplementation respectively. Out of all the pretreatment approaches analyzed, the acid and biological pretreatment (particularly with *Aspergillus niger*) had enhanced the bioethanol production (47.98 ± 1.25 g/L) up to 1.47 fold. Therefore, the current study will provide complete standardized parameters with an effective pretreatment strategy for utilizing lignocellulosic agro-wastes as an efficient and economical substrate for bioethanol production.

Shubhra Tiwari and Esmil Beliya contributed equally as first author.

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PART-B

(SCIENCE)

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Screening Some Extracellular Enzymes of Wild Mushrooms from Pt. Ravishankar Shukla University Campus (AbstractView.aspx?PID=2022-35-1-6)

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Screening Some Extracellular Enzymes of Wild Mushrooms from Pt. Ravishankar Shukla University Campus

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***Corresponding author E-mail:** kshukla26@yahoo.co.in (mailto:kshukla26@yahoo.co.in)

Abstract:
Wild mushrooms are well known to produce wide range of bioactive metabolites and different types of enzymes. In this study 5 wild mushroom samples were collected which belongs to different groups. Samples were isolated and observed the culture characteristics, during the growth of mycelia many biochemical changes are known to occur, as a result of which enzymes are secreted extracellularly to degrade the insoluble materials into the substrates. Primary screening of extracellular amylase and cellulose were carried out by plate culture method in the GYP media with soluble starch to test the amylase activity and for cellulase, CMC (Carboxymethyl cellulose) plate assay was used. All the mushroom cultures differ in context of extracellular enzymatic activity. The activity of amylase enzyme was substantially higher in all the mushroom cultures. In the screening of cellulase enzyme two cultures were observed as positive. Present study suggests the capacity of these wild mushrooms in the production of biotechnologically useful enzymes with great industrial importance.

Keywords: Amylase, Cellulase, Enzyme, Screening, Wild Mushroom

List of Abbreviations:

A-	:	After
AV	:	Average
B-	:	Before
CMC	:	Carboxymethylcellulose
DS	:	Dietary Supplement
E.E	:	Extracellular Enzyme
Gxm	:	Glucoonoxylomanan+1 Variant
GYP	:	Glucose Yeast Peptone media
HEPA	:	High Efficiency Particulate Air
LAF	:	Laminar Air Flow
MM	:	Medicinal Mushroom
MW	:	MiliQ Water
PDA	:	Potato Dextrose Agar
pH	:	potential of Hydrogen
psi	:	Pounds per Square Inch
SD	:	Standard Deviation

1. Introduction

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PART-B

(SCIENCE)

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Species of Termitomyces (Agaricales) Occurring in Achanakmar Biosphere Reserve, Chhattisgarh (AbstractView.aspx?PID=2022-35-1-8)

Author(s): Srishti Verma (search.aspx?key=Srishti Verma), Mahesh Tiwari (search.aspx?key=Mahesh Tiwari), R.V. Shukla (search.aspx?key=R.V. Shukla), Kamlesh Shukla (search.aspx?key=Kamlesh Shukla)

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Species of Termitomyces (Agaricales) Occurring in Achanakmar Biosphere Reserve, Chhattisgarh

Srishti Verma[1], Mahesh Tiwari[2], R.V. Shukla[3], Kamlesh Shukla[1]*

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Abstract:
The Agarics as a group, occurs in a varieties of habitat. Some species exist in areas that are geographically separated, while some are known only from restricted areas and many species do seem to show preference for a certain type of natural habitats as well as for a particular substrate. An extensive exploration of wild mushrooms carried out from 2019 to 2021 at different forest ranges of Achanakmar Biosphere Reserve,Chhattisgarh India. Seven different species of *Termitomyces* namely *Termitomycesclypeatus, T. microcarpus, T. rabuorii, T. streatus, T. radicatus, Termitomyces sp. -1, Termitomyces sp -2, were found in edible form.* So far members of the group which are found in soil, dung, plant derbies, independently or in association with particular plant species has minimal documentation and germ-plasm collection from Chhattisgarh state, which is known for the largest forest land and the tribal population.

Key Words: Agarics, Chhattisgarh, Diversity, Termites, *Termitomyces*.

1. Introduction

Recent studies have diversified the existence of *Termitomyces* species in Tanzania, Uganda, of Africa and South - east and west India. The species of *Termitomyces* grow in association with termites were found to originate from tropical forests (Mosseboet al., 2017; Nobre and Aanen, 2010) like ancient Sal forests of Central – India. The genus is absolutely dependent on the possible symbiont relative termites. The number of fungus-farming Termites' species is reported approximately 165 in Africa, that belong to 11 genera (Kambhampati and Eggleton, 2000), which are underestimated considering on the novel termite species that has beenalready discovered (Makonde et al., 2013).There are about more than 30 *Terimitomyces* species have been globally recorded (Tang et al., 2020; Sathiya et al., 2020).

The Achanakmar Biosphere Reserve (ABR) accounts for the occurrence and distribution of many unexplored novel varieties of *Termitomyces* and Termites due to the richness of variety of tree species. Because the large tree canopies and huge amount of litter fall in ground surface provide suitable home to various species of both the biological agents. The Sal tree provides shelter for many more species of Termites to build their nests between ridges and furrow at various heights of tree trunks. Nevertheless, the Sal and many other native tree species return back substantial amount of leaf litter that protects soil by water run-off conserving soil moisture under which Termites and microorganisms feed upon and regulate the process of biodegradation, decomposition to humification.

In fact, the species of *Termitomyces* arelinked with the economic importance of the termites as not a single species of *Ternitomyces* could be grown independently (Kuja et al., 2014) so far.This is an indication of mutualistic relationship of *Termitomyces species* with an animal group to place the genus in advance position rather than primitive ectomycorrhizal

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Process Biochemistry

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Valorization of rice milled by-products (rice husk and de-oiled rice bran) into α-amylase with its process optimization, partial purification and kinetic study

Ankita Rathi[a,1], Nisha Gupta[a,1], Vani Dhruw[a], Esmil Beliya[a,b], Shubhra Tiwari[a], Jai Shankar Paul[a,*], S.K. Jadhav[a]

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ARTICLE INFO

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ABSTRACT

A massive amount of waste is generated globally from agriculture sector annually that offers potential feedstock for biorefineries. Undoubtedly α-amylase has become the backbone of starch-based industries. It is a crucial amylolytic enzyme possessing versatile applications. An expensive synthetic substrate that is non-eco-friendly and toxic is not sustainable enough for large scale enzyme production. The agricultural residues should be employed as they are the low-budget production medium with high yield and are eco-friendly. Thus, current study deals with the valorization of agricultural by-products for α-amylase production. Two divergent rice-milled by-products (de-oiled rice bran and rice husk) were investigated to ascertain the best economical medium for α-amylase production. The study deals with production, partial purification and kinetics analysis of α-amylase from rice milled by-products by two bacteria (*Staphylococcus aureus* MTCC 3160 and *Bacillus subtilis* MB6). Out of all combinations, the best production (161.45 ± 2.60 U/mL) was obtained in DORB *S. aureus*. The K_m and V_{max} values of DORB *S. aureus* were 1.468 mg/mL and 34.722 mg/mL/min respectively. The study provides a roadmap for significant consumption of agricultural by-products. The study highly recommends researchers to explore some more agricultural residues as an eco-friendly and inexpensive medium to synthesize various bio-products under green technology.

1. Introduction

α-Amylase (1,4-α-D-glucan glucanohydrolase, EC 3.2.1.1) is a hydrolytic endoenzyme that preferentially cleaves the α-1,4 linkages of the α-polysaccharides resulting in the formation of short-chain oligosaccharides including maltose, maltotriose and limit dextrin [1]. α-amylase belongs to the family 13 of Glycoside Hydrolase (GH) which has a total of 131896 members (http://www.cazy.org/GH13.html as of May 11th, 2022). The microorganism sources are the most preferred for large scale α-amylase production due to their easy and faster cultivation, simple nutritional requirement and ease of manipulation. α-Amylase poses applications in several industrial sectors such as food, textile, laundry, pharmaceutical and paper [2–4]. The research related to α-amylase production has widened in several aspects mainly focusing on cheaper and sustainable production. Agro-waste represents the potent feedstock for manufacturing different value-added products such as hydrolytic enzymes. The foremost benefit of using these agro-residues is their cost-effectiveness, biodegradable nature, and relatively more native to the microorganism than synthetic media. Every year an enormous amount of agricultural by-products is generated. For their management, they are served as animal feed or sometimes dumped in a landfill or burned. The burning of these valuable feedstock releases various poisonous gases that raise serious environmental concerns. Therefore, instead of burning the leftover residue of agricultural fields can be utilized for industrial-scale bio-product formation. This approach is economical and sustainable.

Rice (*Oryza sativa* L.) is the staple food crop in many Asian countries. In India, it is grown in more than one-fifth of the total gross area of cropping and therefore contributes about one-fourth of total calorie intake [5]. India with a total production of 145,777MT in 2020 is the

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Volume 32, Issue 15

Editorial

The Link between Lipids and Inflammation: Focus on Targeting Sialidase Activity as a Novel Strategy for Anti-Atherosclerotic Therapy

Pp: 2887-2898
Author(s): Alexander N. Orekhov, Igor A. Sobenin and Nikolay A. Orekhov
DOI: 10.2174/0929867332152503251115534

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Review Article

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We Must Abandon the Myth: Oxidized Low-density Lipoprotein is not a Lipoprotein that Plays a Key Role in Atherogenesis

Pp: 2899-2914
Author(s): Alexander N. Orekhov*

20-24

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Current Medicinal Chemistry, XXXX, *XX*, 1-36 1

REVIEW ARTICLE

Severe Acute Respiratory Syndrome Coronavirus -2 (SARS-CoV-2): A Review on Pathophysiology, Diagnosis, and Investigational Therapeutics

Rahul Sharma[1], Dharmendra Khokhar[1], Bhanushree Gupta[2,*], Purnendu Saxena[3], Kallol Kumar Ghosh[2], Arvind Kumar Geda[1] and Kamil Kuca[5,6,*]

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Abstract: There is a new public health crisis threatening the world with the emergence and spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease was later named novel coronavirus disease or COVID-19. It was then declared a pandemic by the World Health Organization on March 11, 2020. The virus originated in bats and was transmitted to humans through unknown intermediary animals in Wuhan, Hubei province, China, in December 2019.

As of February 5, 2021, 103 million laboratory-confirmed cases and nearly 2.3 million deaths were reported globally. The number of death tolls continues to rise, and a large number of countries have been forced to distance socially and enforce lockdown. As per literature, coronavirus is transmitted human to human or human to animal via airborne droplets. Coronavirus enters the human cell through the membrane ACE-2 exopeptidase receptor. WHO, ECDC, and ICMR advised avoiding public places and close contact with infected persons and sick animals. To date, there is no evidence of any effective treatment for COVID-19. The main therapies being used to treat the disease are antiviral drugs, chloroquine/hydroxychloroquine, and respiratory therapy. Although several therapies have been proposed, quarantine is the only intervention that appears to be effective in decreasing the contagion rate. We conducted a literature review of publicly available information to summarize knowledge about the pathogen and the current epidemic. In the present literature review, the causative agent of the pandemic, epidemiology, pathogenesis, and diagnostic techniques are discussed. Further, currently used treatment and preventive strategies along with vaccine trials and computational tools are all described in detail.

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Severe Acute Respiratory Syndrome Coronavirus -2 (SARS-CoV-2): A Review on Pathophysiology, Diagnosis, and Investigational Therapeutics

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Molecular interactions between novel synthesized biodegradable ionic liquids with antidepressant drug

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ABSTRACT

Biodegradable ionic liquids (BDILs) have immense importance in medicinal chemistry and pharmaceutical industries due to their biodegradable nature. The interaction of antidepressant drug (AD) *i.e.,* promazine hydrochloride (PHC) with novel synthesized BDILs i.e., 1-(2-(octylamino)-2-oxoethyl)pyridin-1-ium bromide (OAOEPB) and 4-((hydroxyimino) methyl)-1-(2-(octylamino)-2-oxoethyl)pyridin-1-ium (HIMOAOEPB) bromide has been studied by using various spectroscopic techniques viz UV-vis, fluorescence and FTIR. A variety of interaction parameters viz binding constant (K_a), Stern-Volmer constant (K_{sv}), and thermodynamic parameter like Gibb's free energy changes ($\Delta G_{Binding}$) have been evaluated at room temperature. The observed results show significant changes in the spectral intensities of drug on the addition of BDILs. Highest binding affinity and most promising activity are shown by BDILS HIMOAOEPB than compared to OAOEPB. FTIR spectral analysis on BDIL-drug interactions was also performed in the wave number range up to 400-4000 cm^{-1}.

1. Introduction

The use of antidepressant drugs is of paramount significance in the pharmaceutical research. Many drug molecules are amphiphilic and self-associate in aqueous environment to form small aggregates. This surface-active behavior among many diverse classes of drugs has been reported and attempts have been made to correlate surface and biological activities [1-3]. The self-association of drug depends on the molecular structure of the drug, its concentration and the experimental conditions *e.g.,* temperature, pH and salt concentration etc [4]. In pharmacy, the interaction of small molecules with drugs is extensively studied. In this respect, many drugs, particularly those with local anesthetic, antidepressant, tranquillizer, and antibiotic actions, exert their activity by interaction with biological membranes, which can be considered as a complex form of amphiphilic bi-layers [5-8].

Thus, a clear knowledge of the mechanism of the interactions of drugs with other foreign materials is required before the actual application in human body. This is due to the fact that drugs are always used in the presence of a variety of additives [9-11]. Ionic liquids (ILs) have shown interesting features and promising application potential in many interdisciplinary research areas including pharmaceutics [12-14]. Several ILs are found to be non-biodegradable [15-16]. Hence IL communities across the globe are putting their best effort to synthesize ILs from bio-molecules that have enormous potential to improve their green credentials including biodegradability [17-18]. Among those, amino acid based ILs (AAILs) have shown tremendous properties and applications with relatively low cytotoxicity as compared to the common ILs and are very attractive for both economic and environmental reasons [19-21]. Biodegradable based ionic liquids (BDILs) have been widely used as drug delivery vehicles, because they have low viscosity, small aggregate size, simple preparation, and long self-life [22]. In fact, micellar solubilization is one of the most important properties of BDILs solutions, widely used in the solubilization of hydrophobic drugs, in pharmaceutical field, food, detergency, cosmetic industries and enhanced oil recovery [23-24].

As ILs have shown promising potential as drug delivery vehicles, hence it is of utmost importance to have prior knowledge on IL-drug in-

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Deep eutectic solvents as modulator on the micellization behaviour of cationic surfactants and potential application in human serum albumin aggregation

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ABSTRACT

Deep eutectic solvents (DESs) have been utilized in many important applications in interdisciplinary research areas including the investigation of self-assembly of surfactants. In present study, the micellization behaviour of two conventional cationic surfactants *i.e.,* tetradecyltrimethylammonium bromide (TTAB) and cetyltrimethylammonium bromide (CTAB) are investigated in aqueous DESs solutions with the help of surface tension, conductivity, UV–vis spectroscopy, fluorescence and dynamic light scattering (DLS) techniques. The synthesis of the DESs is done by simply mixing of choline chloride (ChCl) and urea/ethylene glycol (EG) in 1 : 2 mol ratio at 353 K temperatureand it is characterized by using FTIR technique. Various interfacial parameters and thermodynamic properties are evaluated by using tensiometric and conductometric methods. A noteworthy decrease in the critical micelle concentration (CMC) and increase in the aggregation number (N_{agg}) are observed in presence of DESs. Thus signifying that the micellization process of the surfactants is much favored in the DESs solutions and these are further supported by DLS results. DLS results show an increase in the micellar size for all the micellar systems in aqueous DESs solutions. More importantly, the micellar systems of the cationic surfactants within DESs solutions were also utilized for the study of their interaction with human serum albumin (HSA) to see how this albumin protein is behaving within the cationic micellar solutions in presence of DESs. UV–vis spectroscopic evidences show attractive results. It is noteworthy that the albumin protein HSA shows stronger binding affinity towards the DES-surfactants systems. The present work may further enhance the potential application of these neoteric green solvent systems composed of water-surfactant-DESs in the field of colloids, protein biophysics, nanoscience, which in turn will be highly applicable in the fields of synthesis, catalysis, and pharmaceutics etc.

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1. Introduction

Surfactant self-assembled nanostructures (*i.e.,* normal micelles, reverse micelles, micro -emulsions) are of enormous significance owing to their broad potential application in diverse fields of sciences and technology [1–4]. Various amphiphilic molecules including surfactants act as surface active agents and show tendency of reducing the surface tension of water [5–6]. These surface-active agents are widely used as foaming agents, emulsifier, dispersants, corrosion inhibitors, and antiseptics etc [7–8]. In aqueous solution, the aggregation of surfactant molecules takes place above certain concentration is called critical micelle concentration (CMC) and forming normal micelles. Where, surfactant (hydrophobic tail groups) monomers come closer to each other formation the micellar core and the hydrophilic surfactant head group oriented towards the aqueous media. In non-aqueous solvent media, the aggregation pattern is reversed forming reverse micelles. These nanostructures have exposed tremendous applica-

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Review

Biosensors as Nano-Analytical Tools for COVID-19 Detection

Anchal Pradhan [1,†], Preeti Lahare [1,†], Priyank Sinha [1,†], Namrata Singh [2,3,*], Bhanushree Gupta [1,*], Kamil Kuca [3,4,*], Kallol K. Ghosh [1,5] and Ondrej Krejcar [6]

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Abstract: Selective, sensitive and affordable techniques to detect disease and underlying health issues have been developed recently. Biosensors as nanoanalytical tools have taken a front seat in this context. Nanotechnology-enabled progress in the health sector has aided in disease and pandemic management at a very early stage efficiently. This report reflects the state-of-the-art of nanobiosensor-based virus detection technology in terms of their detection methods, targets, limits of detection, range, sensitivity, assay time, etc. The article effectively summarizes the challenges with traditional technologies and newly emerging biosensors, including the nanotechnology-based detection kit for COVID-19; optically enhanced technology; and electrochemical, smart and wearable enabled nanobiosensors. The less explored but crucial piezoelectric nanobiosensor and the reverse transcription-loop mediated isothermal amplification (RT-LAMP)-based biosensor are also discussed here. The article could be of significance to researchers and doctors dedicated to developing potent, versatile biosensors for the rapid identification of COVID-19. This kind of report is needed for selecting suitable treatments and to avert epidemics.

Keywords: nanobiosensor; COVID-19 detection; optical; electrochemical; smart and wearable; piezoelectric; RT-LAMP

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1. Introduction

The whole world is facing a deadly viral disease named COVID-19 caused by a novel corona virus—i.e., severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), first reported in December 2019 in Wuhan, China [1]. The World Health Organization (WHO) declared the outbreak of COVID-19 a global public health emergency of international concern on 20 January 2020 [2]. As per WHO data, more than 200,840,180 confirmed cases have been reported with 4,265,903 deaths worldwide as of 6 August 2021 [3]. After combating the first wave of COVID-19, many countries faced a more severe second wave of the pandemic. Due to the lack of appropriate treatment and diagnostic systems, the SARS-CoV-2 epidemic became more serious as it continued spreading over the world. Similar viruses have caused epidemics before: SARS-CoV in 2003 and Middle East respiratory syndrome (MERS-CoV) in 2012 [4]. The genome of the new COVID-19 virus has been found to be 80% similar to that of SARS-CoV, hence being named SARS CoV-2 [5]. The genetic material of SARS-CoV-2, SARS-CoV and MERS are RNA, so they are called RNA

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Review

Biosensors as Nano-Analytical Tools for COVID-19 Detection

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Abstract: Selective, sensitive and affordable techniques to detect disease and underlying health issues have been developed recently. Biosensors as nanoanalytical tools have taken a front seat in this context. Nanotechnology-enabled progress in the health sector has aided in disease and pandemic management at a very early stage efficiently. This report reflects the state-of-the-art of nanobiosensor-based virus detection technology in terms of their detection methods, targets, limits of detection, range, sensitivity, assay time, etc. The article effectively summarizes the challenges with traditional technologies and newly emerging biosensors, including the nanotechnology-based detection kit for COVID-19; optically enhanced technology; and electrochemical, smart and wearable enabled nanobiosensors. The less explored but crucial piezoelectric nanobiosensor and the reverse transcription-loop mediated isothermal amplification (RT-LAMP)-based biosensor are also discussed here. The article could be of significance to researchers and doctors dedicated to developing potent, versatile biosensors for the rapid identification of COVID-19. This kind of report is needed for selecting suitable treatments and to avert epidemics.

Keywords: nanobiosensor; COVID-19 detection; optical; electrochemical; smart and wearable; piezoelectric; RT-LAMP

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Citation: Pradhan, A.; Lahare, P.; Sinha, P.; Singh, N.; Gupta, B.; Kuca, K.; Ghosh, K.K.; Krejcar, O. Biosensors as Nano-Analytical Tools for COVID-19 Detection. *Sensors* **2021**, *21*, 7823. https://doi.org/10.3390/s21237823

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1. Introduction

The whole world is facing a deadly viral disease named COVID-19 caused by a novel corona virus—i.e., severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), first reported in December 2019 in Wuhan, China [1]. The World Health Organization (WHO) declared the outbreak of COVID-19 a global public health emergency of international concern on 20 January 2020 [2]. As per WHO data, more than 200,840,180 confirmed cases have been reported with 4,265,903 deaths worldwide as of 6 August 2021 [3]. After combating the first wave of COVID-19, many countries faced a more severe second wave of the pandemic. Due to the lack of appropriate treatment and diagnostic systems, the SARS-CoV-2 epidemic became more serious as it continued spreading over the world. Similar viruses have caused epidemics before: SARS-CoV in 2003 and Middle East respiratory syndrome (MERS-CoV) in 2012 [4]. The genome of the new COVID-19 virus has been found to be 80% similar to that of SARS-CoV, hence being named SARS CoV-2 [5]. The genetic material of SARS-CoV-2, SARS-CoV and MERS are RNA, so they are called RNA

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Interaction of an imidazolium based ionic liquid with antidepressant drugs: A physicochemical study

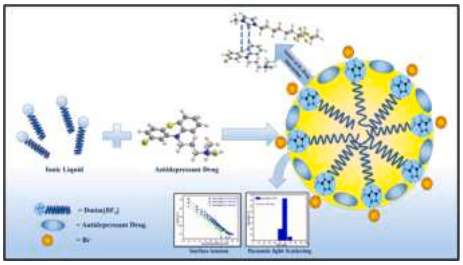
Lavkesh Kumar Singh Tanwar, Srishti Sharma, Kallol K. Ghosh *

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HIGHLIGHTS

- Colloidal behaviour of [Dmim][BF_4] was studied in presence of Antidepressant drugs.
- CMC value of [Dmim][BF_4] decreases in presence of Antidepressant drugs.
- Size of aggregates of [Dmim][BF_4] increases in presence of Antidepressant drugs.
- [Dmim][BF_4] may be act as better drug carrier as compared to cationic surfactant.

GRAPHICAL ABSTRACT



ARTICLE INFO

Keywords:
Imidazolium based ionic liquid
Cationic surfactants
Micellization
Antidepressant drugs
Fluorescence spectroscopy

ABSTRACT

The effect of two antidepressant drugs i.e., CPZ and PMZ on the colloidal behaviour of 1-decyl-3-methyl-imidazolium tetrafluoroborate [Dmim][BF_4] ionic liquid has been studied and compared with the structurally similar cationic surfactant tetradecyltrimethylammonium bromide (TTAB). The micellization and interfacial parameters of [Dmim][BF_4] and TTAB, in the presence of antidepressant drugs have been determined using conductivity and surface tension measurements. The aggregation number (N_{agg}) and Stern-Volmer constant (K_{sv}) have also been determined by fluorescence measurements. Various micellar and interfacial parameters of drug-surfactant system (CPZ/PMZ+[Dmim][BF_4]/ CPZ/PMZ+TTAB) indicates favourable interaction between them. The dynamic light scattering measurements have also been employed for the size of aggregates. This study concluded that imidazolium based ionic liquid could probably act as better drug carriers than conventional cationic surfactants.

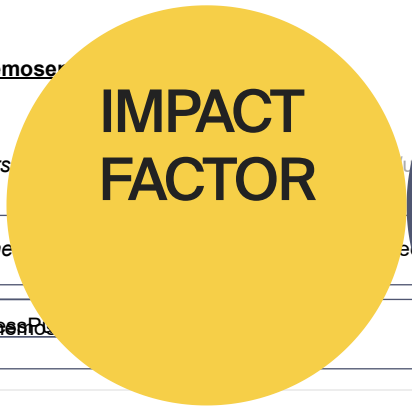
1. Introduction

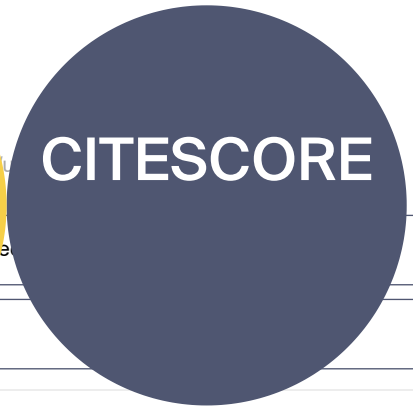
Imidazolium based ionic liquids (ILs) are the most studied ILs by researchers in last few years due to their distinctive properties, like strong solvation abilities, electrochemical stability, low-bioaccumulation, air and moisture stability [1–3]. The various physicochemical properties of imidazolium ILs depend upon the anionic/cationic species and alkyl chain length [4–6]. They find extensive applications in electro-chemistry, bio-catalysis, organic synthesis, and colloidal science [7–9]. These imidazolium ILs with the 1,3-dialkylimidazolium cation shows a surface-active behaviour similar to surfactants [10,11]. The chemical composition of imidazolium based ILs was found similar to conventional cationic surfactants [12,13]. Hence, it can be assumed that imidazolium based ILs having a similar surface activity property to conventional cationic surfactants, can be used as an alternative of conventional cationic surfactants.

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Article

Mixed Oxime-Functionalized IL/16-*s*-16 Gemini Surfactants System: Physicochemical Study and Structural Transitions in the Presence of Promethazine as a Potential Chiral Pollutant

Subhashree Jayesh Pandya [1], Illia V. Kapitanov [2,†], Manoj Kumar Banjare [1,3], Kamalakanta Behera [4], Victor Borovkov [2,*], Kallol K. Ghosh [1,*] and Yevgen Karpichev [2,*]

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Abstract: The increasing concern about chiral pharmaceutical pollutants is connected to environmental contamination causing both chronic and acute harmful effects on living organisms. The design and application of sustainable surfactants in the remediation of polluted sites require knowledge of partitioning between surfactants and potential pollutants. The interfacial and thermodynamic properties of two gemini surfactants, namely, alkanediyi-α,ω-*bis*(dimethylhexadecyl ammonium bromide) (16-*s*-16, where *s* = 10, 12), were studied in the presence of the inherently biodegradable oxime-functionalized ionic liquid (IL) 4-((hydroxyimino)methyl)-1-(2-(octylamino)-2-oxoethyl)pyridin-1-ium bromide (4-PyC8) in an aqueous solution using surface tension, conductivity, fluorescence, FTIR and ^{1}H NMR spectroscopic techniques. The conductivity, surface tension and fluorescence measurements indicated that the presence of the IL 4-PyC8 resulted in decreasing CMC and facilitated the aggregation process. The various thermodynamic parameters, interfacial properties, aggregation number and Stern–Volmer constant were also evaluated. The IL 4-PyC8-gemini interactions were studied using DLS, FTIR and NMR spectroscopic techniques. The hydrodynamic diameter of the gemini aggregates in the presence of promethazine (PMZ) as a potential chiral pollutant and the IL 4-PyC8 underwent a transition when the drug was added, from large aggregates (270 nm) to small micelles, which supported the gemini:IL 4-PyC8:promethazine interaction. The structural transitions in the presence of promethazine may be used for designing systems that are responsive to changes in size and shape of the aggregates as an analytical signal for selective detection and binding pollutants.

Keywords: mixed surfactant system; ionic liquid; gemini surfactants; chiral pollutants; promethazine; dynamic light scattering

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Citation: Pandya, S.J.; Kapitanov, I.V.; Banjare, M.K.; Behera, K.; Borovkov, V.; Ghosh, K.K.; Karpichev, Y. Mixed Oxime-Functionalized IL/16-*s*-16 Gemini Surfactants System: Physicochemical Study and Structural Transitions in the Presence of Promethazine as a Potential Chiral Pollutant. *Chemosensors* **2022**, *10*, 46. https://doi.org/10.3390/chemosensors10020046

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1. Introduction

The increasing concern about chiral pharmaceutical pollutants is connected to environmental contamination causing both chronic and acute harmful effects on living organisms. It is a problem of direct importance to detect chiral compounds [1], including chiral pollutants of different natures [2]. Using surfactants for increasing analytical signals and, consequently, reducing the detection concentration of the pollutants is one of the attractive strategies in chemical analysis [3,4] since it may ensure selective binding of one of the components, providing more reliable detection in the cases when the structurally similar compounds are present in the mixture. For example, dimeric (gemini) surfactants were reported to exhibit selectivity toward the binding of calixarenes modified with different

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Article

Alkaline Phosphatase Immobilized CdTe/ZnS Quantum Dots for Dual-Purpose Fluorescent and Electrochemical Detection of Methyl Paraoxon

Lakshita Dewangan, Jyoti Korram, Indrapal Karbhal, Rekha Nagwanshi, Kallol K. Ghosh, Shamsh Pervez, and Manmohan L. Satnami*

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ABSTRACT: A facile paper-based fluorescence sensing and electrochemical behavior of CdTe/ZnS quantum dots (QDs) for detection of methyl paraoxon has been reported. The hydrolytic activity of alkaline phosphatase (ALP) for methyl paraoxon was observed to produce *p*-nitrophenol in the presence of QDs. The fluorescence quenching of CdTe/ZnS QDs by *p*-nitrophenol was measured as a quantitative signal for the detection of methyl paraoxon. A paper chip-based sensor has been developed by deposition of CdTe/ZnS QDs into cellulose paper. The significant increase in oxidation current in the cyclic voltammogram of methyl paraoxon solution in the presence of ALP is observed using a glassy carbon electrode (GCE) modified with CdTe/ZnS QDs. The linear relationship between oxidation and reduction peak currents against concentration of methyl paraoxon is utilized as a quantitative signal of electrochemical detection of methyl paraoxon. Under optimum conditions, both fluorescence- and paper-based methods showed a limit of detection (LOD) ≈ 0.65 nM whereas cyclic voltammetry provided a 2-fold higher LOD (1.72 nM) for sensing of methyl paraoxon. Therefore, the present method is a new insight for the rapid, convenient, and trace amount detection of methyl paraoxon.



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1. INTRODUCTION

Inorganic semiconductor quantum dots have been replaced by organic fluorophores because of their high resistance to photobleaching and intense light emission with high quantum efficiency.[1,2] In semiconductor quantum dots (QDs), an increase in the number of confined dimensions yields a stronger degree of electronic confinement and thus a wider range of tunability in the bandgap, although exceptions to this trend have also been reported.[3−5] Despite high quantum yields (QYs), high stability, and bright and photostable capabilities, their biological applications are limited because cadmium-based QDs would release toxic Cd^{2+} when used in the cells or tissues.[6−8] Capping a shell of ZnS can not only decrease the toxicity of cadmium but also effectively eliminate the surface dangling bond. Developing a core−shell CdTe/ZnS, with a CdTe core and a ZnS shell is a suitable approach to solve this problem.[9−11] Apart from the different applications, the immobilization of CdTe/ZnS QDs with glucose oxidase,[12] cholesterol oxidase,[13] and organophosphorus hydrolase[14] has been reported to be used for detection of glucose, cholesterol, and methyl paraoxon, respectively.

Alkaline phosphatase is one of the most essential hydrolyses and an important biomarker in the diagnosis of various diseases such as bone disease, liver dysfunction, diabetes, prostatic cancer, etc.[15−17] The abnormal level of alkaline phosphatase in the human body is a signal for a variety of disease states, particularly involving in the cirrhosis, nephritis, rickets, and anemia.[18,19] Alkaline phosphatase bound enzyme is widely distributed in the tissues of living organisms. The normal level of alkaline phosphatase in human serum is 40−190 U/L for adults.[20,21] Alkaline phosphatase can cause a dephosphorylation reaction for nucleic acids,[22] proteins,[23] small molecules, and could be responsible for removal of the phosphate group of pesticides.[24] Methyl paraoxon pesticides have been widely used in agriculture and could cause serious health problems for humans even at very low concentrations.[25] To date, many methods such as colorimetric,[26] capillary electrophoresis,[27] electrochemiluminescence,[28] surface plasmon resonance,[29] and surface enhanced Raman scattering[30] have been used for enzymatic detection of methyl paraoxon

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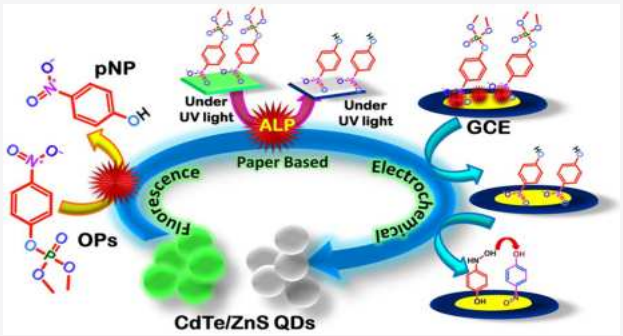
Alkaline Phosphatase Immobilized CdTe/ZnS Quantum Dots for Dual-Purpose Fluorescent and Electrochemical Detection of Methyl Paraoxon

Lakshita Dewangan, Jyoti Korram, Indrapal Karbhal, Rekha Nagwanshi, Kallol K. Ghosh, Shamsh Pervez, and Manmohan L. Satnami*

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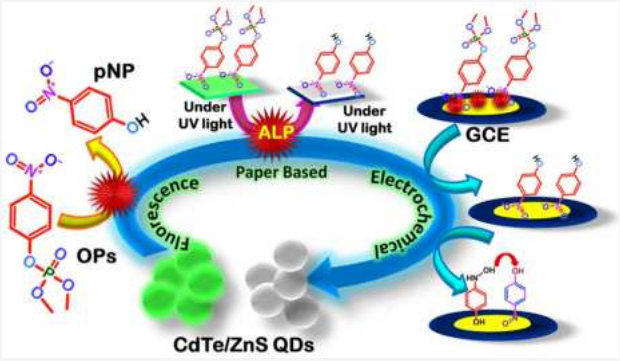
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1. INTRODUCTION

Inorganic semiconductor quantum dots have been replaced by organic fluorophores because of their high resistance to photobleaching and intense light emission with high quantum efficiency.[1,2] In semiconductor quantum dots (QDs), an increase in the number of confined dimensions yields a stronger degree of electronic confinement and thus a wider range of tunability in the bandgap, although exceptions to this trend have also been reported.[3−5] Despite high quantum yields (QYs), high stability, and bright and photostable capabilities, their biological applications are limited because cadmium-based QDs would release toxic Cd^{2+} when used in the cells or tissues.[6−8] Capping a shell of ZnS can not only decrease the toxicity of cadmium but also effectively eliminate the surface dangling bond. Developing a core−shell CdTe/ZnS, with a CdTe core and a ZnS shell is a suitable approach to solve this problem.[9−11] Apart from the different applications, the immobilization of CdTe/ZnS QDs with glucose oxidase,[12] cholesterol oxidase,[13] and organophosphorus hydrolase[14] has been reported to be used for detection of glucose, cholesterol, and methyl paraoxon, respectively.

Alkaline phosphatase is one of the most essential hydrolyses and an important biomarker in the diagnosis of various diseases such as bone disease, liver dysfunction, diabetes, prostatic cancer, etc.[15−17] The abnormal level of alkaline phosphatase in the human body is a signal for a variety of disease states, particularly involving in the cirrhosis, nephritis, rickets, and anemia.[18,19] Alkaline phosphatase bound enzyme is widely distributed in the tissues of living organisms. The normal level of alkaline phosphatase in human serum is 40−190 U/L for adults.[20,21] Alkaline phosphatase can cause a dephosphorylation reaction for nucleic acids,[22] proteins,[23] small molecules, and could be responsible for removal of the phosphate group of pesticides.[24] Methyl paraoxon pesticides have been widely used in agriculture and could cause serious health problems for humans even at very low concentrations.[25] To date, many methods such as colorimetric,[26] capillary electrophoresis,[27] electrochemiluminescence,[28] surface plasmon resonance,[29] and surface enhanced Raman scattering[30] have been used for enzymatic detection of methyl paraoxon

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Alkaline Phosphatase Immobilized CdTe/ZnS Quantum Dots for Dual-Purpose Fluorescent and Electrochemical Detection of Methyl Paraoxon

Lakshita Dewangan, Jyoti Korram, Indrapal Karbhal, Rekha Nagwanshi, Kallol K. Ghosh, Shamsh Pervez, and Manmohan L. Satnami*

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ABSTRACT: A facile paper-based fluorescence sensing and electrochemical behavior of CdTe/ZnS quantum dots (QDs) for detection of methyl paraoxon has been reported. The hydrolytic activity of alkaline phosphatase (ALP) for methyl paraoxon was observed to produce *p*-nitrophenol in the presence of QDs. The fluorescence quenching of CdTe/ZnS QDs by *p*-nitrophenol was measured as a quantitative signal for the detection of methyl paraoxon. A paper chip-based sensor has been developed by deposition of CdTe/ZnS QDs into cellulose paper. The significant increase in oxidation current in the cyclic voltammogram of methyl paraoxon solution in the presence of ALP is observed using a glassy carbon electrode (GCE) modified with CdTe/ZnS QDs. The linear relationship between oxidation and reduction peak currents against concentration of methyl paraoxon is utilized as a quantitative signal of electrochemical detection of methyl paraoxon. Under optimum conditions, both fluorescence- and paper-based methods showed a limit of detection (LOD) ≈ 0.65 nM whereas cyclic voltammetry provided a 2-fold higher LOD (1.72 nM) for sensing of methyl paraoxon. Therefore, the present method is a new insight for the rapid, convenient, and trace amount detection of methyl paraoxon.



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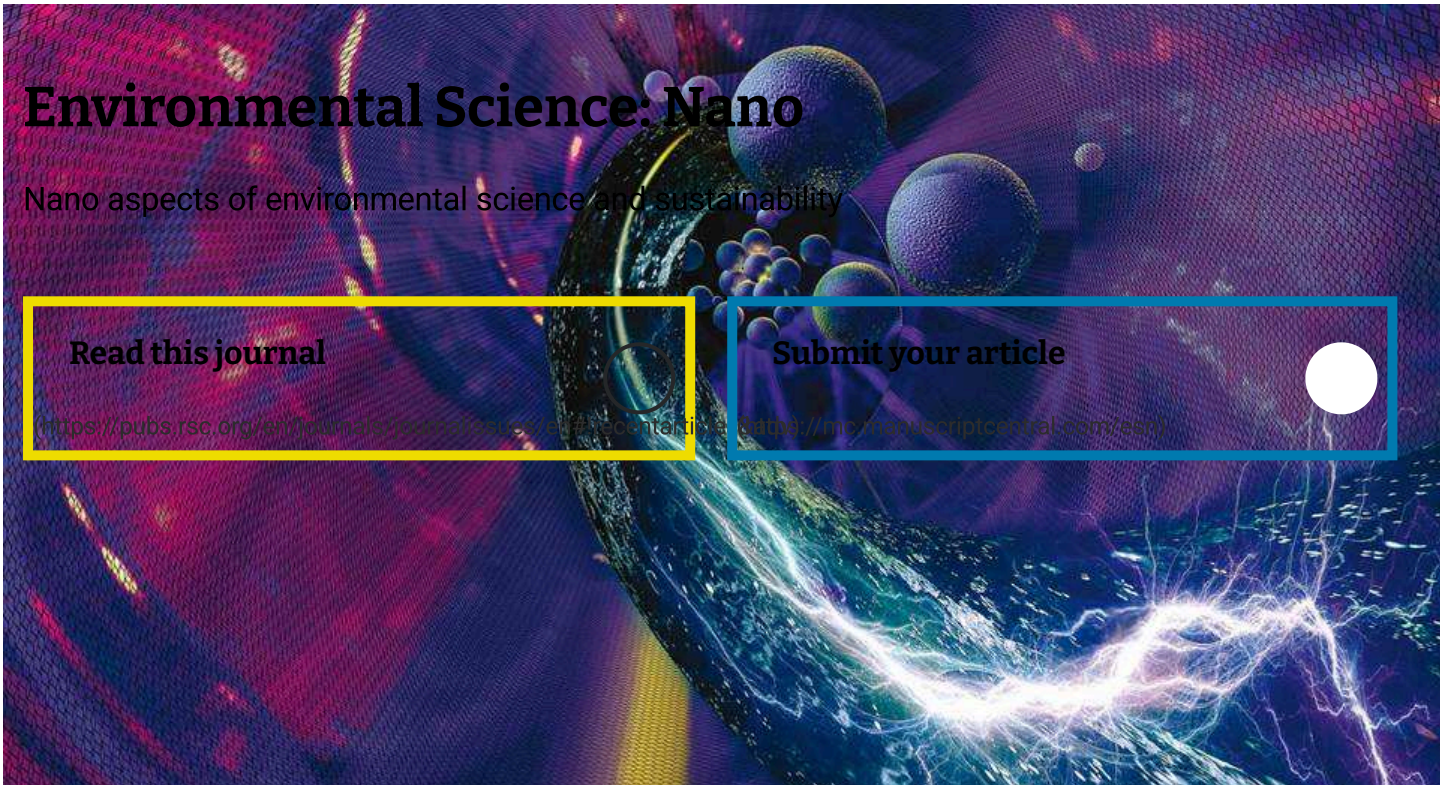
1. INTRODUCTION

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Recent advances on gold and silver nanoparticle-based colorimetric strategies for the detection of different substances and SARS-CoV-2: a comprehensive review

Sushama Sahu, Srishti Sharma, Ramsingh Kurrey and Kallol K. Ghosh *

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Nanoparticle (NP)-based colorimetric methods are extensively used for the rapid detection of environmental contaminants, different substances and SARS-CoV-2 in various fields such as environmental science, virology, pollution research, and the food industry, as well as biomedicine. Colorimetric sensors exhibit high sensitivity and selectivity, are easy to handle, portable, safe for screening purposes and can be visualized by the naked eye. Herein, the colorimetric sensing approaches of the two most commonly used metallic NPs, *i.e.*, gold (Au) and silver (Ag), and their physicochemical methods are discussed, as metallic NPs show good efficiency due to their unique optical and chemical properties. This review summarizes the progress on colorimetric sensors based on metallic NPs as sensors and their applications, elucidating the utility and superior features of metallic-NP-based colorimetric assay for the detection of different environmental contaminants, biomolecules and SARS-CoV-2 in the environmental as well as human biological samples. An outlook with respect to the trends and future development of the proposed sensors is also provided.

Environmental significance

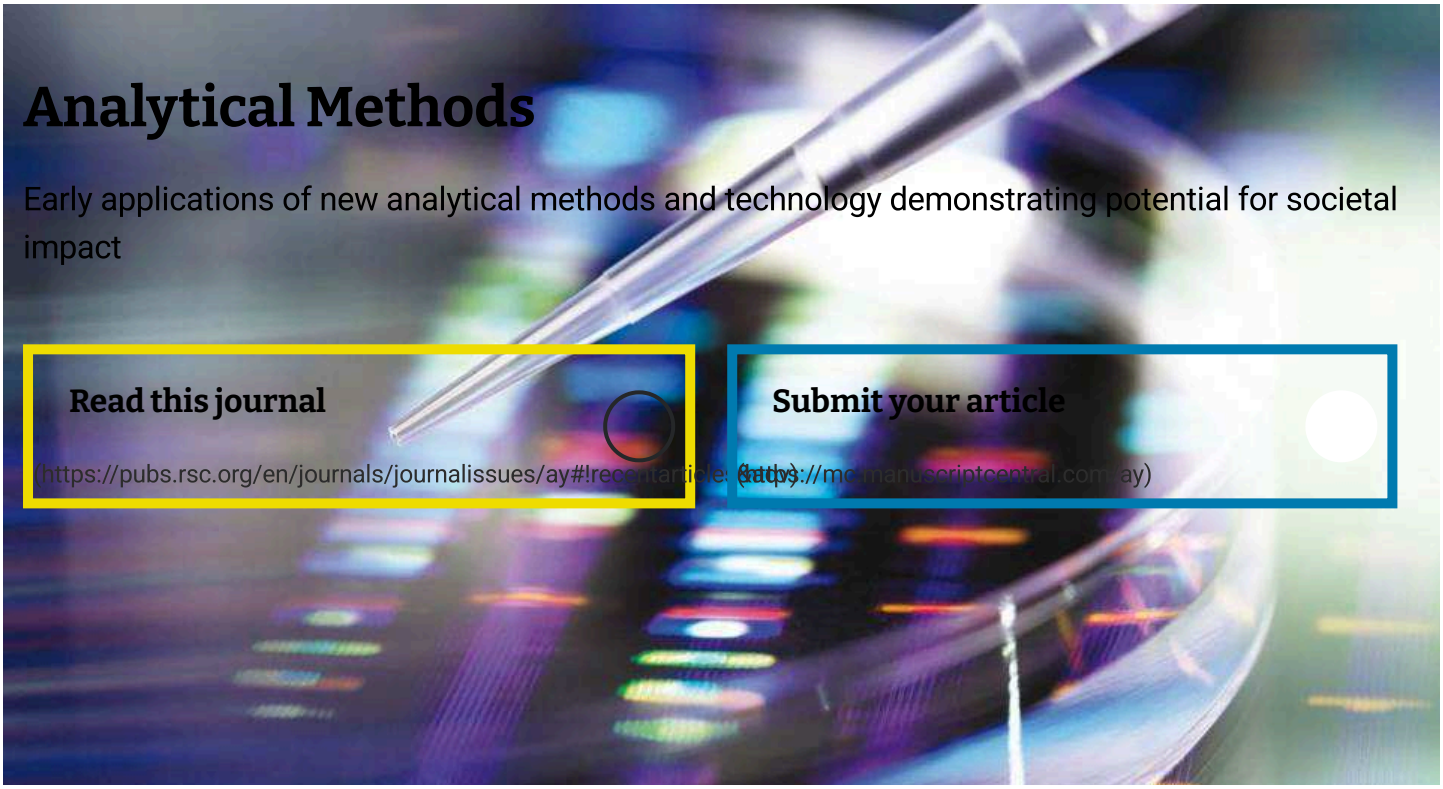
This review summarizes the research on gold (Au) and silver (Ag) nanoparticle (NP)-based colorimetric assays for the detection of different substances and SARS-CoV-2 in the environment as well as human biological samples. Herein, a series of fabrication methods for colorimetric sensors are discussed. In contrast to conventional techniques, nanomaterial-based colorimetric sensors exhibit enhanced selectivity and comparatively higher sensitivity, and allow onsite detection. Such nanosensors are cost-effective and show upgraded performance compared with other samples, and play a prominent role in a wide range of analytical applications. Additionally, the synthesized metallic NPs show better stability, minimal toxicity and biocompatibility, hence attributing them with superior properties compared to other sensors. Among different types of colorimetric-based assays employed for surface modification, NP-based biosensors have received tremendous attention due to their quick response and high specificity. The future scope of this field is to develop more approachable colorimetric probes with "non-aggregation" processing, driving this field toward a new trend of Au and Ag NPs-based probes. The fabrication of hand-held devices, digital imaging software and point-of-care technologies is also of great interest to researchers. Thus, this method may deliver a bright future for Au and Ag NPs-based colorimetric probes.

1. Introduction

The detection of environmental contaminants and severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) related to various fields, either from environmental or biological samples, has been possible due to the unique and superior properties of nanomaterials (NMs). Many research studies have reported a wide range of applications for nanostructures in developing detection systems for environmental contaminant and SARS-CoV-2, with the challenges faced.[1–5] NMs exhibit high surface reactivity, high surface area, strong adsorption capacity, and high catalytic efficiency.[1,2] A variety of NMs have been used to design efficient sensors for the detection of target species, such as metal and metal oxide nanoparticles (NPs), carbon-based NMs (as polymeric NMs) and silicon. The size-dependent properties, reactivity, large surface-to-volume ratio (S/N) and their high degree of functionalization leads to nanosensors with excellent sensitivity and selectivity.[2,3] Aside from different properties, functionalization is another significant factor, using a variety of organic ligands *via* covalent bond formation, that improves the responses of NPs toward the detection of environmental toxicants and SARS-CoV-2.[3]

Among the various NPs, the advantageous properties of gold (Au) and silver (Ag) NPs, such as unique optical,

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Selective detection of tartaric acid using amino acid interlinked silver nanoparticles as a colorimetric probe†

Sushama Sahu and Kallol K. Ghosh*

A variety of biomolecules with different functional groups play critical roles in almost all the processes occurring in living cells. Interaction of metallic nanoparticles (NPs) with various biomolecules generates a layer of molecules on their surface, and this biomolecular rich layer formed on the NP surface is described as a "biomolecular corona". The physicochemical properties of the NPs, including size, adsorption affinity, and charge on the particles' surfaces are the major factors influencing the characteristics of this corona. The formation of various biomolecular corona has been studied well, whereas the amino acid corona is relatively new by exploring their stability. In the present study, a novel formation of an amino acid corona with a fundamental interaction mechanism for a selective detection procedure using a colorimetric platform has been proposed. Herein, amino acid-coated silver NPs (AgNPs) have been used as a template with spectroscopic (steady state UV-Vis, FTIR) and imaging (HR-TEM, DLS) techniques. Our findings demonstrated that among different amino acid coronas, glutathione (GSH) stabilized AgNPs show a rapid reaction with tartaric acid. The extent and thermodynamics of the formed complex between the GSH/AgNPs and tartaric acid have also been studied and this suggested that the complex formed is spontaneous and energy releasing in nature.

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1. Introduction

In the last decade, researchers have reported that various particles directed into biological fluids are inevitably and immediately (>0.5 min) covered by different biomolecules, including proteins, peptides, enzymes or amino acids, and these form a "corona" on the surface of the particles. The protein corona was first found by Dawson and co-workers.[1–3] Here, the proteins are shown to be associated with the nanoparticles (NPs) and they participate in the formation of a "biomolecular corona" found by Monopoli *et al.*[2–4] The formation of this type of corona results in a change of the NP surfaces with an increase in their diameter.[4–7] The

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Sushama Sahu has completed her M.Phil. from the School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur, India, in 2018. Currently, she has submitted her PhD thesis with Prof. Kallol K. Ghosh, at the School of Studies in Chemistry, Pt. Ravishankar Shukla University. Her research interests are the development of new functionalized nanoparticles, analytical studies and methods for the quantification of biomolecules, environmental contaminants and pollutants in real samples.



Dr Kallol K. Ghosh is Professor and Head at the School of Studies in Chemistry, Pt. Ravishankar Shukla University, Raipur, India. He has been the INSA/JSPS fellow at Seikei University, Tokyo, Japan, and James Chair visiting fellow at the St. Francis Xavier University, Antigonish, Canada. He has published over 211 articles. His research is focused on micellar catalysis, solubility of polycyclic aromatic hydrocarbons, hydroxamic acids, detoxification of chemical warfare simulants and reactivation kinetics of organophosphate inhibited acetylcholinesterase by oxime reactivators.

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Micellization properties of quinolinium based surfactants: 1-alkylquinolinium bromide and 6-hydroxy-1-alkylquinolinium-bromide by fluorimetry, conductivity and surface tension measurements and its parameters

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ABSTRACT

Quinolinium surfactants possessing pyridinium rings have a wide range of biological applications due to its antimicrobial activity. In this study, we have used quinolinium based surfactant series i.e.1-alkylquinolinium bromide and 6-hydroxy-1-alkylquinolinium-bromide. The physicochemical behavior of quinolinium based surfactant have been carried out by various techniques viz. conductivity, surface tension and fluorescence measurements in aqueous and 10% (v/v) methanol at 300K.The critical micelle concentration (CMC) values found from conductivity, surface tension and fluorescence are in good agreement of a surfactant in aqueous and 10% (v/v) methanol. The CMC value of 1-alkyquinolinium-bromide series is higher than its derivative series (6-hydroxy-1-alkyquinolinium-bromide). The values of Γ_{max} increases with increases chain length of the both the quinolinium surfactants, as well as A_{min} values increases with increasing chain length of surfactants.

1. . Introduction

Self-organized assemblies have enormous prospective applications owing to their amphiphilic character [1–7]. The physicochemical properties of surfactant are of paramount importance for its applications [8–11]. Cationic surfactants are of great interest both for scientific community and chemical fields, because of their interesting properties, which can be potentially applied in chemical industries. Its advent has greatly broadened the perspective of interfacial sciences [12–14]. Apart from its biological significance being a cationic species, quinolinium compounds have characteristic properties [15–18]. This created its own importance as corrosion inhibitors and in emulsion polymerization, textile engineering etc [19–20]. Attributing to the excellent antimicrobial properties these surfactants are generally used as bactericide in various systems [21]. Quinolinium surfactants have the ability to π-stack among themselves that finds interest in supramolecular chemistry and in biology [22–25]. Quinolinium compounds acts as an important probe for the sensing of halides as well as have medicinal importance [26–28]. The electronic states and luminescence properties of quinolinium surfactants and their derivatives have been investigated [29–30].

The characteristic properties of cationic quinolinium surfactants with aqua-solvent media make it a very interesting topic of research. Micellization behavior of n-quinolinium surfactants have been not well studied in aqua-solvent media. Herein, we have used methanol and water for determination of micellization behavior of n-quinolinium surfactants by different methods. Methanol plays a significant role in numerous chemical processing applications, fundamentally interesting both from a practical and theoretical perspective [31]. Methanol –water system possesses remarkable interactions, which may affect self-assembly of surfactant [32]. Methanol is added in water, it breaks water structure then decrease in dielectric constant and increase in viscosity [33]. The physical properties of methanol such as density, viscosity coefficient and dielectric constant have investigated [34].

A number of researchers have been focused to synthesis of quinolinium based surfactants [35]. Marek et al. [36] prepared the quaternary quinolinium surface active agents possessing different alkyl chain length i.e. series of C_8 to C_{20}. Research group successfully developed an HPLC method for the successful distinction of all prepared long chain quinolinium derivatives and members of series.

Lava et al. [37] synthesized ionic liquid crystals based on quinolinium and isoquinolinium salts by quarternization of quinoline and isoquinoline. Investigations have been done on introducing the alkyl

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Design and development of conductive nanomaterials for electrochemical sensors: a modern approach

T. Kant [a], K. Shrivas [a, *], K. Dewangan [b, **], A. Kumar [c], N.K. Jaiswal [d], M.K. Deb [a], S. Pervez [a]

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ABSTRACT

This review describes the synthesis of noble metal nanoparticles, nanocarbons, conducting polymers, and nanocomposites. The integration of these nanomaterials on the flexible matrix (e.g. paper, cloth and carbon paper, polyethylene terephthalate) and non-flexible substrate (glass and glassy carbon electrodes) using direct-writing, inkjet printing, screen-printing, and three-dimensional printing techniques are discussed. The fluidic properties of nano-ink printing on different substrates for efficient electrode preparation in electrochemical sensing applications are also discussed. Finally, the printed electrodes are summarized to analyze environmental, biological, food, and pharmaceutical contaminants such as drugs, toxicants, metal ions, pesticides, and biomolecules. The advancement of electrochemical devices is encompassed in developing electrochemical sensors that will continue to innovate user-friendly sensors for all purposes in the future.

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1. Introduction

Hazardous chemical contamination in food materials and the environment has been a serious global health concern for the past two decades. Many potentially hazardous materials reside in the ecosystem that contaminates the air, water, soil, and foods consumed by living organisms [1–3]. These hazardous substances could be inorganic or organic materials that originated from different pathways, as summarized in Fig. 1. Thus, it is highly urged to analyze these chemical substances to reduce their toxicity from the different components of the environment. These chemical substances can be analyzed using different techniques such as ultraviolet-visible (UV–Vis) spectrophotometry [4], atomic absorption spectroscopy [2], fluorescence spectroscopy [5], Fourier transform infrared spectroscopy [6], inductively coupled plasma (ICP)-atomic emission spectrometry [7], high performance liquid chromatography (HPLC) [8], gas chromatography (GC) [9], liquid chromatography-mass spectrometry (MS) [10], HPLC-MS [11], GC-MS [12], ICP-MS [13], capillary electrophoresis [14], and X-ray fluorescence spectrometry [15]. Sometimes, these techniques are cumbersome to operate and need much time for sample preparation before instrumental analysis. Hence, a simple and rapid technique is required to analyze chemical substances from the sample source.

In contrast, the electrochemical device offers the advantages of providing a wide linear response with better sensitivity, reproducibility, and stability. Consequently, the application of electrochemical sensor devices has been exploited to determine an extensive range of chemical substances [16]. Nevertheless, detections of chemical substances at the microlevel or nanolevel are sometimes complicated because the presence of allied substances interferes with signal potential closer to the targeted analytes [17]. To resolve these electrode limitations, an effective material has been chosen to modify the working electrode having better conductive and sensitive properties. Such a modified electrode offers high sensitivity toward the analyte even in other interferences [15,16]. A variety of nanostructured materials, such as nanoparticles (NPs), nanocomposites, nanocarbons, conductive polymers, and so on, are available for refining and sensitizing the electrode surface. Among these, metallic NPs have emerged as a great interest in different fields, including biomedical, catalysis, optoelectronics,

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1. Introduction

Hazardous chemical contamination in food materials and the environment has been a serious global health concern for the past two decades. Many potentially hazardous materials reside in the ecosystem that contaminates the air, water, soil, and foods consumed by living organisms [1–3]. These hazardous substances could be inorganic or organic materials that originated from different pathways, as summarized in Fig. 1. Thus, it is highly urged to analyze these chemical substances to reduce their toxicity from the different components of the environment. These chemical substances can be analyzed using different techniques such as ultraviolet-visible (UV–Vis) spectrophotometry [4], atomic absorption spectroscopy [2], fluorescence spectroscopy [5], Fourier transform infrared spectroscopy [6], inductively coupled plasma (ICP)-atomic emission spectrometry [7], high performance liquid chromatography (HPLC) [8], gas chromatography (GC) [9], liquid chromatography-mass spectrometry (MS) [10], HPLC-MS [11], GC-MS [12], ICP-MS [13], capillary electrophoresis [14], and X-ray fluorescence spectrometry [15]. Sometimes, these techniques are cumbersome to operate and need much time for sample preparation before instrumental analysis. Hence, a simple and rapid technique is required to analyze chemical substances from the sample source.

In contrast, the electrochemical device offers the advantages of providing a wide linear response with better sensitivity, reproducibility, and stability. Consequently, the application of electrochemical sensor devices has been exploited to determine an extensive range of chemical substances [16]. Nevertheless, detections of chemical substances at the microlevel or nanolevel are sometimes complicated because the presence of allied substances interferes with signal potential closer to the targeted analytes [17]. To resolve these electrode limitations, an effective material has been chosen to modify the working electrode having better conductive and sensitive properties. Such a modified electrode offers high sensitivity toward the analyte even in other interferences [15,16]. A variety of nanostructured materials, such as nanoparticles (NPs), nanocomposites, nanocarbons, conductive polymers, and so on, are available for refining and sensitizing the electrode surface. Among these, metallic NPs have emerged as a great interest in different fields, including biomedical, catalysis, optoelectronics,

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Design and development of conductive nanomaterials for electrochemical sensors: a modern approach

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ABSTRACT

This review describes the synthesis of noble metal nanoparticles, nanocarbons, conducting polymers, and nanocomposites. The integration of these nanomaterials on the flexible matrix (e.g. paper, cloth and carbon paper, polyethylene terephthalate) and non-flexible substrate (glass and glassy carbon electrodes) using direct-writing, inkjet printing, screen-printing, and three-dimensional printing techniques are discussed. The fluidic properties of nano-ink printing on different substrates for efficient electrode preparation in electrochemical sensing applications are also discussed. Finally, the printed electrodes are summarized to analyze environmental, biological, food, and pharmaceutical contaminants such as drugs, toxicants, metal ions, pesticides, and biomolecules. The advancement of electrochemical devices is encompassed in developing electrochemical sensors that will continue to innovate user-friendly sensors for all purposes in the future.

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Muhammad Hakimin Shafie, Mohd Lias Kamal, Fathin Farhah Zulkiflee, Sharizal Hasan, ... Zainuddin Zafarina

Article 100613

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Abstract | Graphical abstract

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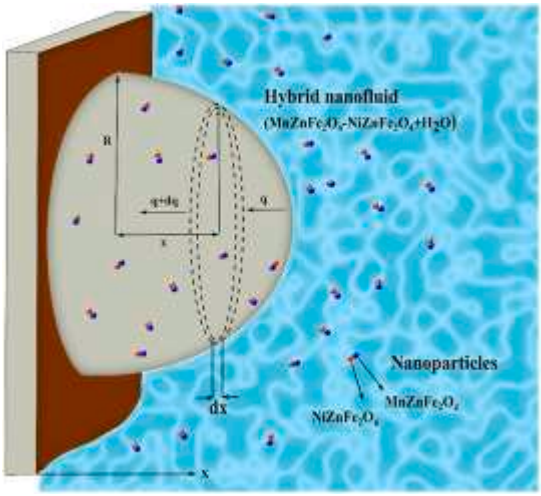
K.C. Jagadeesha, R.S. Varun Kumar, Samia Elattar, Raman Kumar, ... M.Y. Malik

Article 100457

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Analytical approaches on some selected toxic heavy metals in the environment and their socio-environmental impacts: A meticulous review

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Analytical techniques
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Removal and remediation methods

ABSTRACT

Heavy metals are a group of metals and metalloids that have relatively high density and are toxic even at ppb levels. The excess intake of heavy metals in human bodies though the environment may cause various humans health problems. Analytical approaches of some selected toxic heavy metals in the environment and their socio-environmental impacts are discussed in this review. In this present investigation, we have also discussed the design and development of nanomaterials for the detection of metal ions along with kinetic approaches. The isolation or pre-concentration and determination of heavy metals from complex matrices become challenging for analytical chemists and researchers. The fundamentals on sample preparation and analysis of some selected heavy metals employing different analytical tools for qualitative and quantitative determination of these pollutants in real samples are also discussed. In addition, this compiled work enhanced our knowledge in learning about pathway mechanisms and the degree of their risk assessment.

1. Introduction

The heavy metals are considered to be one of the main sources of the pollutants in the environment, since they have significant toxic effect on its ecological and measurable quantities [1]. The metals having high densities, atomic weights, or atomic numbers are called heavy metals, and they are naturally present in environmental and biological samples in different composition of origins [2]. Any metallic chemical element with a relatively high density that is dangerous or poisonous at low concentrations is classified as heavy metal. Some heavy metals such as mercury (Hg), cadmium (Cd), arsenic (As), chromium (Cr), thallium (Tl), iron (Fe), copper (Cu), cobalt (Co), vanadium (V), zinc (Zn), manganese (Mn), nickel (Ni), and lead (Pb) are very essential as nutrients for biochemicals and physiologicals functioning [3–5]. Main sources for heavy metals as environmental pollutants are industrial and agriculture waste, mining, tailing, occupational exposure and paints etc [6]. On the other hand some heavy metals are highly toxic due to their extensive use and widespread distribution in the environment [7,8]. The permissible limits of heavy metals have been reported by World Health Organization (WHO) and Environmental Protection Agency (EPA) etc to set discharge levels of environmental pollutants into the atmosphere [9]. The permissible limits has been set by different organizations/agencies in the ranged of 10–250 mg/L. If the heavy metal cross their permissible limits may causes various human health problems such lungs, kidney and liver damage, heart attack and disturbing nervous system [10]. A Permissible limit set of different regulatory agencies for heavy metals are shown in Table 1.

Majorities of the authors have been reported that the heavy metals are easily absorbed onto biological samples due to the various chemical and physical phenomenons' [11]. In addition, industrial and agriculture waste, mining, tailing, occupational exposure and paints waste containing large amount of heavy metal are release into the environment. Heavy metals are ubiquitous distributed non-biodegradable chemical substances that lead to a greater risk to human health by its accumulation in the human body through different ways such as air, beverages, vehicle emissions, batteries, food chain, and industrial activities in which water plays a key role [12–15]. The excess intake of heavy metals though the others human activities may cause various human health problems such as cardiovascular diseases, cancer mortality, neurological disorders [16]. These are increase the environmental concentration of

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Analytical approaches on some selected toxic heavy metals in the environment and their socio-environmental impacts: A meticulous review

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ARTICLE INFO

Keywords:
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Citrate functionalized gold nanoparticles assisted micro extraction of L-cysteine in milk and water samples using Fourier transform infrared spectroscopy

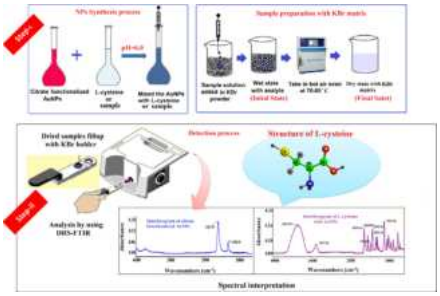
Beeta Rani Khalkho [a], Manas Kanti Deb [a,b,c,*], Ramsingh Kurrey [a], Bhuneshwari Sahu [a], Anushree Saha [a], Tarun Kumar Patle [a], Ravishankar Chauhan [c], Kamlesh Shrivas [a]

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HIGHLIGHTS

- AuNPs /DRS-FTIR method for detection of L-cysteine was established.
- Method is based on electrostatics interaction of L-cysteine and NPs.
- Peak at 3415.90 cm^{-1} was used for optimization and quantitative analysis.
- Advantages of present method are simple, sensitive and cost effective.

GRAPHICAL ABSTRACT



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Milk and water samples

ABSTRACT

This paper describes the sensing application of citrate functionalized gold nanoparticles (AuNPs) employing for the determination of L-cysteine in food and water samples. It is established with diffuse reflectance Fourier transform infrared (DRS-FTIR) spectroscopic analysis. The disappearance of the thiol (-SH) band in the FTIR spectra and the shift in the peaks of the amino group (NH_3^+) and carboxylate group ($-COO^-$) indicated the Au-S interaction and the aggregation of the NPs. The signal intensity of L-cysteine was enhanced due to hot-spots formed by the aggregation of AuNPs producing the effective absorption of electromagnetic radiation in the IR region for molecular vibration. The relationship between AuNPs and L-cysteine was theoretically investigated by the Density Function Theory (DFT) based on LANL2DZ with the aid of the Gaussian 09 (C.01) software. Interaction between AuNPs and L-cysteine molecules resulted to a shift to higher wavelengths in the plasmon bands, further verified by transmission electron microscopes (TEM), which have indicated random aggregated particles. Further dynamic light scattering (DLS) measurements showed a relatively high degree of polydispersity confirming the aggregation of the particles. Under optimized conditions, the calibration curve showed a good linearity range from 20 to 150 μg mL^{-1} with a correlation coefficient (R^2) 0.990. The limit of detection and quantification were 1.04 and 3.44 μg mL^{-1}, respectively by DRS-FTIR. This modified AuNPs sample was used successfully in milk and water samples with adequate results to determine L-cysteine.

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Citrate functionalized gold nanoparticles assisted micro extraction of L-cysteine in milk and water samples using Fourier transform infrared spectroscopy

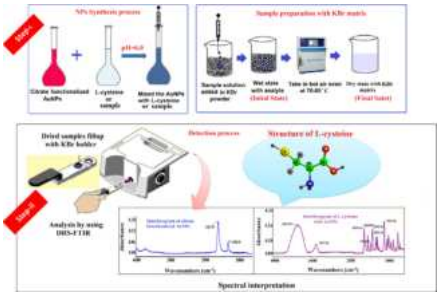
Beeta Rani Khalkho [a], Manas Kanti Deb [a,b,c,*], Ramsingh Kurrey [a], Bhuneshwari Sahu [a], Anushree Saha [a], Tarun Kumar Patle [a], Ravishankar Chauhan [c], Kamlesh Shrivas [a]

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Resin immobilized gold nanocomposites assisted surface enhanced infrared absorption (SEIRA) spectroscopy for improved surface assimilation of methylene blue from aqueous solution

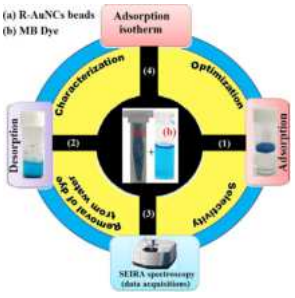
Anushree Saha [a], Ramsingh Kurrey [a,*], Manas Kanti Deb [a,*], Santosh Kumar Verma [b]

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HIGHLIGHTS

- A facile and eco-friendly method is reported for synthesis of R-AuNCs adsorbents.
- The adsorption isotherm models were performed in SEIRA spectroscopy.
- Mechanism is based on electrostatic attraction with CDs and anionic R-AuNCs.
- Characterization and application of R-AuNCs for removal of MB dye from water.
- The method is simplicity, sensitivity and excellent adsorption efficiency.

GRAPHICAL ABSTRACT



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Resin immobilized gold nanocomposites
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Adsorption and desorption
SEIRA spectroscopy

ABSTRACT

In the present work, we report the adsorption of the methylene blue (MB) dye from an aqueous solution employing resin immobilized gold nanocomposites (R-AuNCs) assisted surface-enhanced infrared absorption (SEIRA) spectroscopy. The appropriate adsorption isotherm models, including the Langmuir, Freundlich, and Temkin are tested to reveal the interactive behavior between the adsorbent (R-AuNCs) and adsorbed (MB). Interestingly, Fourier transform infrared spectroscopy (FTIR) in combination with R-AuNC materials could be another approach through which the analysis of adsorption-desorption of MB on the surface of nanocomposite adsorbents is possible in a more precise way with high sensitivity and adsorptivity. In addition, a 10-fold enhancement of the signal intensity of MB dye was obtained due to the electrostatic interaction and H-bonding interaction between COO^- groups of adsorbent and the positively charged active sites of the dye molecules. The value of % removal efficiency and % adsorption obtained in the present method was 77.64% and 186.61%, respectively. Desorption of MB from adsorbent surface was also carried out using 0.1 M cetylpyridinium chloride as cationic surfactant; resulting process shows for 'n' number of cyclic process. The maximum desorption capacity for MB found in the present investigation was 44.38 mg/g, The advantages of current method are its simplicity, sensitivity, rapidity, ease to fabrication and excellent adsorption efficiencies to remove MB dye from aqueous solution.

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1. Introduction

Methylene blue (MB) dye is an organic chloride salt having 3,7-bis (dimethylamino) phenothiazin-5-ium as the counterion. It also exhibits antioxidant, antimalarial, antidepressant and

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Madhuri Verma, Shamsh Pervez, Judith C. Chow, Dipanjali Majumdar, ... Rajan K. Chakrabarty

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Air pollution concentration forecasting based on wavelet transform and combined weighting forecasting model

Bingchun Liu, Xiaogang Yu, Jiali Chen, Qingshan Wang

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Short Communication

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Personal inhalation exposure to manganese and other trace metals in an environmentally exposed population: Bioaccessibility in size-segregated particulate matter samples

A. Expósito, B. Markiv, L. Ruiz-Azcona, M. Santibáñez, I. Fernández-Olmo

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Assessing the magnitude of $PM_{2.5}$ polycyclic aromatic hydrocarbon emissions from residential solid fuel combustion and associated health hazards in South Asia

Madhuri Verma [a,**], Shamsh Pervez [a,*], Judith C. Chow [b,c,***], Dipanjali Majumdar [d], John G. Watson [b,c], Yasmeen Fatima Pervez [e], Manas Kanti Deb [a], Kamlesh Shrivas [a], Vikas Kumar Jain [f], Noor A. Khan [g], Papiya Mandal [g], Rajan K. Chakrabarty [h,****]

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ARTICLE INFO

Keywords:
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Coal balls
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Solid fuel

ABSTRACT

In South Asia, combustion of solid fuel for residential heating and cooking is a major emission source of particulate-phase polycyclic aromatic hydrocarbons (*p*-PAHs), a potent carcinogen for human health. The emission factors (EFs) and source diagnostic ratios of PAHs currently used in regional inventory models have been estimated from controlled laboratory tests, which do not accurately reflect real-world combustion scenarios observed in rural Indian households. Consequently, the health effects associated with *p*-PAH levels in indoor and ambient air could be severely underestimated and undervalued. We performed a nationwide study across ten different states in the Indian subcontinent to evaluate the EFs and source diagnostic ratios of sixteen U.S. Environmental Protection Agency (EPA) identified high priority *p*-PAHs emitted from residential solid biomass combustion. Our estimated average annual EFs were 2.4–18.3 fold higher than those reported from previous laboratory-based investigations. Carcinogenic toxicity analysis shows that combustion of dung cake and coal ball, both widely used residential solid fuels, posed the most risk (80% and 59% respectively) in comparison to other PAHs owing to predominant emission of benzo[a]pyrene. Our findings underscore the importance of improved laboratory testing and field validations as crucial steps toward more accurate emission inventories and better assessment of public health impacts.

1. Introduction

A large portion of the population in developing countries depends on unprocessed solid fuels (coal balls, fuel wood, dung cake, and crop residues), with unvented stoves, for household cooking and heating. Emissions of fine particulate matter ($<PM_{2.5}$), trace gases, and polycyclic aromatic hydrocarbons (PAHs) contribute to local and region pollution and adverse health effects (Bond et al., 2004; ; Zhang and Tao, 2009).

PAHs are a class of organic compounds that originate from both petrogenic (e.g. vehicle exhausts, incinerators and power generation plants) and pyrogenic (incomplete combustion of fossil fuel and

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Research paper

Sources and health risk assessment of potentially toxic elements in groundwater in the mineral-rich tribal belt of Bastar, Central India

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Keywords:
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Positive matrix factorization

ABSTRACT

Concentrations of trace elements (Al, B, As, Be, Cd, Ba, Co, Cu, Fe, Cr, Sb, Ni, Li, Sn, Mn, Zn, V and Se) were determined in 160 groundwater samples, collected during pre-monsoon (PRM) and post-monsoon (POM) period (2017) in the tribal belt of Bastar, central India, using inductive coupled plasma mass spectrometry (ICP-MS). The concentrations of Al, As, Fe, Mn and Ni were found exceeding the permissible limits in 49% of samples. Cd, Sn and Se elements have shown two-fold increment in POM samples than those collected during PRM. On the contrary, Al, Ba, Co, Cr and Fe have shown a declining trend from PRM to POM period. On applying Principal component analysis (PCA) and Positive matrix factorization (PMF) approaches to the dataset, observed three primary sources (natural, geogenic and agricultural) for groundwater elemental components. Among the measured potentially toxic elements (PTEs), As has shown higher carcinogenic and non-carcinogenic risk in children as well as adults This study recommends the regular monitoring of heavy metal contamination of groundwater as various geogenic and anthropogenic activities may elevate the risk of severe health hazards.

1. Introduction

Worldwide, 71% of the population access clean drinking water while 844 million people across the world still lack clean drinking water. This issue is more severe in rural areas where only one out of three people use safe drinkable water (WHO, 2019). In India, most rural and suburban regions rely on groundwater to meet water demand for drinking and domestic purposes (Clark et al., 1996; Ahada and Suthar 2018).

Among all contaminants, inorganic trace elements are of much concern as they are xenobiotic compounds and can accumulate in the water resources for a long period (Ravindra and Mor 2019). Groundwater has the potential to accumulate trace elements that reach the water table and pollute it through various natural and anthropogenic sources such as precipitation, rock-water interaction, percolation of soil-water, industrial wastewater, agricultural, domestic wastes, etc. (Boateng et al., 2016; Bouderbala and Gharbi 2017; Hossain and Patra 2020).

However, depletion in water quality is related to public health concerns, so it is essential to estimate the exposure risk to understand groundwater sources' toxicity level imposing health hazards. Trace metals in groundwater may be exposed to human beings through two key pathways, direct ingestion and dermal absorption (Duggal and Rani 2018; Brindha et al., 2020; Hu et al., 2020). Some trace metal(loid)s such as arsenic (As), lead (Pb), nickel (Ni), chromium (Cr), copper (Cu), zinc (Zn), cadmium (Cd), and cobalt (Co) are potentially toxic if found above their threshold value in drinking water (Islam et al., 2019; Hossain and Patra 2020). Lead can cause neurological diseases as it can trigger the central nervous system mostly in children which results in fatigue, anaemia, and a decrease in intelligence quotient (IQ) level (Emenike et al., 2019). Cadmium excess affects renal function and can

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Among all contaminants, inorganic trace elements are of much concern as they are xenobiotic compounds and can accumulate in the water resources for a long period (Ravindra and Mor 2019). Groundwater has the potential to accumulate trace elements that reach the water table and pollute it through various natural and anthropogenic sources such as precipitation, rock-water interaction, percolation of soil-water, industrial wastewater, agricultural, domestic wastes, etc. (Boateng et al., 2016; Bouderbala and Gharbi 2017; Hossain and Patra 2020).

However, depletion in water quality is related to public health concerns, so it is essential to estimate the exposure risk to understand groundwater sources' toxicity level imposing health hazards. Trace metals in groundwater may be exposed to human beings through two key pathways, direct ingestion and dermal absorption (Duggal and Rani 2018; Brindha et al., 2020; Hu et al., 2020). Some trace metal(loid)s such as arsenic (As), lead (Pb), nickel (Ni), chromium (Cr), copper (Cu), zinc (Zn), cadmium (Cd), and cobalt (Co) are potentially toxic if found above their threshold value in drinking water (Islam et al., 2019; Hossain and Patra 2020). Lead can cause neurological diseases as it can trigger the central nervous system mostly in children which results in fatigue, anaemia, and a decrease in intelligence quotient (IQ) level (Emenike et al., 2019). Cadmium excess affects renal function and can

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Inkjet-printed paper-based colorimetric sensor coupled with smartphone for determination of mercury (Hg^{2+})

Monisha [a], Kamlesh Shrivas [a,*], Tushar Kant [a], Sanyukta Patel [b], Rama Devi [c], Nohar Singh Dahariya [d], Shamsh Pervez [a], Manas Kanti Deb [a], Manish K. Rai [a], Joyce Rai [e]

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ABSTRACT

We report an inkjet-printed paper based colorimetric sensor with silver nanoparticles (AgNPs) using smartphone and color detector App for on-site determination of mercuric ion (Hg^{2+}) from environmental water samples. The AgNPs printed on Whatman filter paper (No. 1) is employed for detection of Hg^{2+} which is reliant on the color change of NPs from yellow to discoloration depending on the concentration of target analyte in sample solution. The quantitative determination was performed by calculating the signal intensity of AgNPs on printed paper substrate after the introduction of Hg^{2+} using smartphone and RGB color detector. The mechanism for detection of Hg^{2+} on paper substrate is verified using UV-Vis spectrophotometry (UV-Vis), transmission electron microscope (TEM), X-ray photoelectron spectroscopy (XPS), dynamic light scattering (DLS) and basic chemical assays. The linear range acquired for paper based colorimetric detection in the range of 40–1200 μgL^{-1} with limit of detection of 10 μgL^{-1}. The results obtained using an inkjet-printed paper-based chemical sensor combined with a smartphone is validated with data of inductively coupled plasma-atomic emission spectroscopy (ICP-AES) measurement. The advantages of paper based detection are simple, rapid, economic and can be applied at the sample sources for determination of Hg^{2+}.

1. Introduction

Mercury (Hg) is one of the most toxic heavy metal naturally existing in the environment and having adverse effects on human health. Mercuric ion (Hg^{2+}) is mostly present in the environmental samples such as water, soil and rocks, etc (Rice et al., 2014). The anthropogenic source of Hg^{2+} is coal burning from power plants and wastage from chlorine alkali, pesticide, paints, battery and electronic industries (Tasleem Jan et al., 2015). The intake of Hg^{2+} through contaminated drinking water and food material can lead to severe effects on human health such as damage to the brain, kidney and infertility and birth defects (Clarkson, 1993). Therefore, monitoring of Hg^{2+} is needed to evaluate the safety of water bodies (river, pond, tube well and industrial waste) and prevent the entry of this toxic hazardous material into fresh water reservoirs.

Cyclic voltammetry (CV) (Hezard et al., 2012), cold vapor-atomic absorption spectrometry (CV-AAS) (Ghaedi et al., 2006), inductively coupled plasma-mass spectrometry (ICP-MS) (Allibone et al., 1999), high performance liquid chromatography (HPLC) (Harrington, 2000), inductively coupled plasma- atomic emission spectroscopy (Han et al., 2006) and UV-Vis spectrophotometry (UV-Vis) (Niazi et al., 2009) are reported for determination for Hg^{2+} from variety of samples. However, most of these instruments are sensitive towards the detection of Hg^{2+} though needed trained staffs and difficult to carry at the sample source. UV-Vis spectrophotometry is a simple and economic technique based on the measurement of colored complexes in visible region for quantitative determination of Hg^{2+} (Mateo et al., 1990). The drawbacks of this technique are the use of a more amount of chromophoric reagents such as organic compounds and dyes which is harmful to the environment as well as chance of interference with other chemical substances present in sample solution.

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ABSTRACT

Herein, a user-friendly and portable smartphone-integrated printed-paper sensor was designed with Cu@Ag nanoparticles (NPs) for on-site monitoring of dimethoate pesticide in food samples, and the results obtained are compared with those obtained by UV–vis spectrophotometry. The working principle for identification of dimethoate pesticide is the change of yellow color NPs to reddish-yellow with associated bathochromic shift of absorption peak when pesticide introduced onto the fabricated paper or glass vial containing the NPs. A smartphone-color detector App and colorimetry were used for quantitative analysis of dimethoate in food samples. Linearity range for analysis of dimethoate using paper sensor and colorimetry were 100–2000 μgL^{-1} and 50–2500 μgL^{-1} with detection limit of 30 and 16 μgL^{-1}, respectively. The advantages of using smartphone-integrated paper devices are rapid, instrument-free detection and economic in terms of consumption of lower amounts of NPs solution compared to other NPs-based colorimetric methods.

1. Introduction

Pesticides are extensively used in agriculture that increase the yield of the crop as required to meet the needs of the world population. Pesticides are exploited in agricultural land to prevent the growth of bacteria, fungi, weeds, nematodes, rodents, etc. Among different pesticides, organophosphorus pesticides (OPPs) are being globally used because of high insecticidal activity and low diligence (Pan, Sun, Li, Zhan, Xu, & Zhu, 2018; Kim et al., 2017). Dimethoate is one of the important phosphorus based OPPs employed to destroy the growth of the insects on leaves, flowers, fruits, vegetables, etc. The intake of this pesticide through food, water and air results in harmful consequences on human health. The acceptable value for daily intake of dimethoate is 0.002 mg kg^{-1} body weight day^{-1} (FAO/WHO, 1994). The residues of dimethoate in food possess severe health problems such as depression, anxiety, irritability as well as its high exposure can lead to anemia and cancer (Hung, Lee, Hu, & Chiu, 2018; Liu et al., 2013). Hence, the analysis of dimethoate in food and water is a very key issue to avoid the exposure of toxicants that influence human health and other environmental systems.

Gas chromatography (GC) (Ramadan, Lahmek, Jlelati, & Mandil, 2013), high performance liquid chromatography-mass spectrometry (HPLC-MS) (Montesano, Olsson, Kuklenyik, Needham, Bradman, & Barr, 2007), fluorescence spectrometry (Hung et al., 2018; Hsu et al., 2017), gas chromatography-mass spectrometry (GC–MS) (Xiong, Zhang, Zhang, Zhang, Chen, & Zhang, 2012), capillary electrophoresis-mass spectrometry (CE-MS) (Yang, Xu, Shen, Wang, Xu, Chen, & Fu, 2009), and colorimetry (Mitic, Zivanovic, Miletic, Grahovac, & Pecev, 2012; Das et al., 1994) are commonly employed for separation and identification of pesticides in food and other environmental samples. Although these techniques are sophisticated, sensitive and accurate for the determination of dimethoate at low levels though they require more maintenance cost. Moreover, these instruments are difficult to apply at on-site analysis. On the contrary, colorimetry is a facile, rapid and cost-effective method for the analysis of dimethoate. The main limitation of colorimetric assays is making use of chromophoric organic compounds or dyes which are hazardous in nature as well occasionally not found specific to a particular chemical substance in a variety of samples (Mitic et al., 2012; Das et al., 1994). Therefore, another apparent method is needed which should be exempted from the use of chromophoric reagents or dyes.

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Foods

ABSTRACT

Herein, a user-friendly and portable smartphone-integrated printed-paper sensor was designed with Cu@Ag nanoparticles (NPs) for on-site monitoring of dimethoate pesticide in food samples, and the results obtained are compared with those obtained by UV–vis spectrophotometry. The working principle for identification of dimethoate pesticide is the change of yellow color NPs to reddish-yellow with associated bathochromic shift of absorption peak when pesticide introduced onto the fabricated paper or glass vial containing the NPs. A smartphone-color detector App and colorimetry were used for quantitative analysis of dimethoate in food samples. Linearity range for analysis of dimethoate using paper sensor and colorimetry were 100–2000 μgL^{-1} and 50–2500 μgL^{-1} with detection limit of 30 and 16 μgL^{-1}, respectively. The advantages of using smartphone-integrated paper devices are rapid, instrument-free detection and economic in terms of consumption of lower amounts of NPs solution compared to other NPs-based colorimetric methods.

1. Introduction

Pesticides are extensively used in agriculture that increase the yield of the crop as required to meet the needs of the world population. Pesticides are exploited in agricultural land to prevent the growth of bacteria, fungi, weeds, nematodes, rodents, etc. Among different pesticides, organophosphorus pesticides (OPPs) are being globally used because of high insecticidal activity and low diligence (Pan, Sun, Li, Zhan, Xu, & Zhu, 2018; Kim et al., 2017). Dimethoate is one of the important phosphorus based OPPs employed to destroy the growth of the insects on leaves, flowers, fruits, vegetables, etc. The intake of this pesticide through food, water and air results in harmful consequences on human health. The acceptable value for daily intake of dimethoate is 0.002 mg kg^{-1} body weight day^{-1} (FAO/WHO, 1994). The residues of dimethoate in food possess severe health problems such as depression, anxiety, irritability as well as its high exposure can lead to anemia and cancer (Hung, Lee, Hu, & Chiu, 2018; Liu et al., 2013). Hence, the analysis of dimethoate in food and water is a very key issue to avoid the exposure of toxicants that influence human health and other environmental systems.

Gas chromatography (GC) (Ramadan, Lahmek, Jlelati, & Mandil, 2013), high performance liquid chromatography-mass spectrometry (HPLC-MS) (Montesano, Olsson, Kuklenyik, Needham, Bradman, & Barr, 2007), fluorescence spectrometry (Hung et al., 2018; Hsu et al., 2017), gas chromatography-mass spectrometry (GC–MS) (Xiong, Zhang, Zhang, Zhang, Chen, & Zhang, 2012), capillary electrophoresis-mass spectrometry (CE-MS) (Yang, Xu, Shen, Wang, Xu, Chen, & Fu, 2009), and colorimetry (Mitic, Zivanovic, Miletic, Grahovac, & Pecev, 2012; Das et al., 1994) are commonly employed for separation and identification of pesticides in food and other environmental samples. Although these techniques are sophisticated, sensitive and accurate for the determination of dimethoate at low levels though they require more maintenance cost. Moreover, these instruments are difficult to apply at on-site analysis. On the contrary, colorimetry is a facile, rapid and cost-effective method for the analysis of dimethoate. The main limitation of colorimetric assays is making use of chromophoric organic compounds or dyes which are hazardous in nature as well occasionally not found specific to a particular chemical substance in a variety of samples (Mitic et al., 2012; Das et al., 1994). Therefore, another apparent method is needed which should be exempted from the use of chromophoric reagents or dyes.

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Mehmet Fatih Cengiz, Fatih Sen, Ayse Kevser Bilgin, Cennet Pelin Boyaci-Gunduz

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Evaluation of membrane tailored with biocompatible halloysite–polyaniline nanomaterial for efficient removal of carcinogenic disinfection by–products precursor from water

S. Elakkiya, G. Arthanareeswaran

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Atmospheric wet and dry depositions of polycyclic aromatic compounds in a megacity of Southwest China

Weiwei Xia, Bo Liang, Lin Chen, Yunxi Zhu, ... Mi Tian

Article 112151

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Environmental Research 204 (2022) 112361

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Environmental Research

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Using functionalized asphaltenes as effective adsorbents for the removal of chromium and lead metal ions from aqueous solution

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ARTICLE INFO

Keywords:
Asphaltene
Functionalization
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Pb(II)
Adsorption
Wastewater treatment

ABSTRACT

For the first time, functionalized asphaltene has been designed, synthesized, and used for the removal of heavy metals from the water. Asphaltene was separated from the crude oil with the addition of n-alkanes. Asphaltene having a complex chemical structure including multilayered and clustered aromatic fused rings bearing aliphatic chains. Asphaltene also contains heteroatoms like N, S, and O atoms along with Ni and V as prominent trace metals. On functionalization of asphaltene with nitric acid, the aliphatic chains and some of the naphthenic rings broke down and developed –COOH, –C═O, C–O, and other oxygen functional groups which are playing key roles as surface-active agents in the removal of the heavy metals via chemisorption. The study was conducted using different parameters such as dose, time, pH, and concentration. The adsorption efficiency for this material at pH 4 is excellent for the removal of chromium and lead. The Langmuir, Freundlich and Temkin adsorption isotherm models as well as Lagergren pseudo second-order kinetic model were investigated. The positive enthalpies ΔHs confirm that the adsorption process is endothermic and the negative free energies ΔGs confirm the spontaneity of the process. The good efficiency of the adsorption implies the efficacy in the removal of the heavy metal ions, as well as the good efficiency in desorption, which implies the excellent recovery of the adsorbent. The effective reusability of this adsorbent makes it applicable for industrial water treatment from contaminants.

1. Introduction

The consumption of crude oil increased dramatically in the last decades. About 70% of the heavy crude oil residue is drilled out and a very small amount is being used without significant process (Speight, 1990).

One of the fractions that are considered as the most troublemaker is the asphaltenes in the refinery and cracking processing of the petroleum, that's due to the precipitation of the asphaltenes can reduce the flow of the oil and also can lead to blockage problems in several types of equipment (Cimino et al., 1995). Moreover, these compounds can form sludges and can deactivate the hydro-desulfurization and hydro-cracking catalysts which lead to a reduction in conversion efficiency for the two processes (Bartholomew, 1994; Miyauchi and de Wind, 1994).

The structure of these compounds was very difficult to study due to their chemical complexity & composition, it was reported that this material is composed of poly-aromatic groups in the center connected with alicyclic and aliphatic groups along with some heteroatoms and some metal ions (Hasan et al., 1988; Shirokoff et al., 1997).

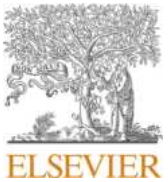
The contamination of water by heavy metal ions is a very serious issue, the source of these metals are different industries such as mining, battery, and other chemical industries. Small concentrations of these heavy metal ions can cause dangerous diseases such as anaemia, cancer, renal and kidney failure, mental retardation, and other serious diseases (Nordberg et al., 2014).

These metal ions are non-biodegradable that's why they need to be removed from the water. There are many methods available for the removal of these materials such as hydroxide or sulfide precipitation, ion

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Analytical challenges and solutions for performing metabolomic analysis of root exudates

Mònica Escolà Casas, Víctor Matamoros

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Topical advances in nanomaterials based electrochemical sensors for resorcinol detection

Tayyaba Iftikhar, Muhammad Asif, Ayesha Aziz, Ghazala Ashraf, ... Hongfang Liu

Article e00138

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Graphical abstract

Graphical representation of RS detection based on electrochemical sensors modified by different nanomaterials.



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Recent development in nanomaterials fabricated paper-based colorimetric and fluorescent sensors: A review

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ABSTRACT

The paper-based sensing devices have drawn a broad interest in analytical chemistry for colorimetric and fluorescent-based analysis of biological, environmental, clinical, and food samples. It is due to the simple, rapid, biodegradable, user-friendly, less expensive, and low waste generation into the environment. Here, the recent development of paper-based sensors fabricated with different noble metal nanoparticles (NPs) and semiconductor and carbon quantum dots (QDs) is demonstrated to analyze several chemical substances from various samples. User-friendly and portable recording devices such as digital cameras, smartphones, scanners, etc. along with color detecting softwares are employed to measure the color intensity of nanomaterials fabricated paper devices after the deposition of a sample solution containing various chemical substances. The advantages and disadvantages of incorporating nanomaterials in the paper substrate (direct deposition, inkjet printing, screen printing and wax printing) are illustrated. The mechanism for colorimetric, fluorescence, phosphorescence, and chemiluminescence sensing using noble metal NPs (Ag, Cu, and Au), semiconductors, and carbon QDs for the determination of metal ions, anions, pesticides, biomolecules, and other toxic chemical substances are discussed. Thus, this review article would be highly useful for scientists and researchers to design colorimetric sensors to monitor chemical toxicants in clinical, environment, foods, and many other related samples.

1. Introduction

Today, the environment is highly contaminated with toxic chemicals such as heavy metal ions, pesticides, anions, phenolic compounds, dyes, etc., due to the exploitation of natural resources and heavy industrialization. Some of them are highly toxic and harmful when it comes to contact with human beings. These chemical substances may cause several harmful diseases to humans and other living organisms [1,2]. Consequently, separating and analyzing toxic chemical substances present in the air, water, biotic, and other environmental samples is essential to avoid entry into different ecological zones. In this context, Tuzen and Saleh groups developed magnetic loaded activated carbon [3], bio-based magnetic activated carbon [4], magnetic activated carbon/CeO_2 nanocomposite [5], silica nanoparticles grafted with the copolymer of acrylic acrylamide [6], ZnO nanoparticles loaded activated carbon [7] for efficient separation of several dyes from water samples. In addition, multiwalled carbon nanotubes and graphene oxide-magnetic nanoparticles (NPs) are reported for more efficient removal of cations and pesticides from water samples, respectively [8,9]. Many conventional techniques are available for detection and determination of inorganic, organic, and other toxicants. For example, the quantitative determination of inorganic cations and anions are done by hydride generation-atomic absorption spectrometry (HG-AAS) [10], inductively coupled plasma-optical emission spectrometry (ICP-OES) [11], electrothermal atomic absorption spectrometry (ET-AAS) [12], voltammetry [13], surface-enhanced Raman scattering (SERS) [14], hydride generation-atomic fluorescence spectroscopy (HG-AFS) [15], inductively coupled plasma mass spectrometry (ICP-MS) [16], x-ray fluorescence (XRF) [17], spectrophotometry [18], etc. Organic compounds and pesticides are analyzed using gas chromatography-mass spectrometry (GC—MS) [19], gas chromatography (GC) [20], capillary electrophoresis [21], liquid chromatography-mass spectrometry (LC—MS) [22], high performance liquid chromatography (HPLC) [23], and immunoassay technique [24]. However, these techniques possess

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Assessing the magnitude of $PM_{2.5}$ polycyclic aromatic hydrocarbon emissions from residential solid fuel combustion and associated health hazards in South Asia

Madhuri Verma, Shamsh Pervez, Judith C. Chow, Dipanjali Majumdar, ... Rajan K. Chakrabarty

Article 101142

Article preview

Research article ○ Abstract only

Air pollution concentration forecasting based on wavelet transform and combined weighting forecasting model

Bingchun Liu, Xiaogang Yu, Jiali Chen, Qingshan Wang

Article 101144

Article preview

Short Communication

Short communication *Open access*

Personal inhalation exposure to manganese and other trace metals in an environmentally exposed population: Bioaccessibility in size-segregated particulate matter samples

A. Expósito, B. Markiv, L. Ruiz-Azcona, M. Santibáñez, I. Fernández-Olmo

Article 101123

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Assessing the magnitude of $PM_{2.5}$ polycyclic aromatic hydrocarbon emissions from residential solid fuel combustion and associated health hazards in South Asia

Madhuri Verma [a,**], Shamsh Pervez [a,*], Judith C. Chow [b,c,***], Dipanjali Majumdar [d], John G. Watson [b,c], Yasmeen Fatima Pervez [e], Manas Kanti Deb [a], Kamlesh Shrivas [a], Vikas Kumar Jain [f], Noor A. Khan [g], Papiya Mandal [g], Rajan K. Chakrabarty [h,****]

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ARTICLE INFO

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Carcinogenic toxicity
Biofuels
Coal balls
Household heating activities
Solid fuel

ABSTRACT

In South Asia, combustion of solid fuel for residential heating and cooking is a major emission source of particulate-phase polycyclic aromatic hydrocarbons (*p*-PAHs), a potent carcinogen for human health. The emission factors (EFs) and source diagnostic ratios of PAHs currently used in regional inventory models have been estimated from controlled laboratory tests, which do not accurately reflect real-world combustion scenarios observed in rural Indian households. Consequently, the health effects associated with *p*-PAH levels in indoor and ambient air could be severely underestimated and undervalued. We performed a nationwide study across ten different states in the Indian subcontinent to evaluate the EFs and source diagnostic ratios of sixteen U.S. Environmental Protection Agency (EPA) identified high priority *p*-PAHs emitted from residential solid biomass combustion. Our estimated average annual EFs were 2.4–18.3 fold higher than those reported from previous laboratory-based investigations. Carcinogenic toxicity analysis shows that combustion of dung cake and coal ball, both widely used residential solid fuels, posed the most risk (80% and 59% respectively) in comparison to other PAHs owing to predominant emission of benzo[a]pyrene. Our findings underscore the importance of improved laboratory testing and field validations as crucial steps toward more accurate emission inventories and better assessment of public health impacts.

1. Introduction

A large portion of the population in developing countries depends on unprocessed solid fuels (coal balls, fuel wood, dung cake, and crop residues), with unvented stoves, for household cooking and heating. Emissions of fine particulate matter ($<PM_{2.5}$), trace gases, and polycyclic aromatic hydrocarbons (PAHs) contribute to local and region pollution and adverse health effects (Bond et al., 2004; ; Zhang and Tao, 2009).

PAHs are a class of organic compounds that originate from both petrogenic (e.g. vehicle exhausts, incinerators and power generation plants) and pyrogenic (incomplete combustion of fossil fuel and

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Assessing the magnitude of $PM_{2.5}$ polycyclic aromatic hydrocarbon emissions from residential solid fuel combustion and associated health hazards in South Asia

Madhuri Verma [a,**], Shamsh Pervez [a,*], Judith C. Chow [b,c,***], Dipanjali Majumdar [d], John G. Watson [b,c], Yasmeen Fatima Pervez [e], Manas Kanti Deb [a], Kamlesh Shrivas [a], Vikas Kumar Jain [f], Noor A. Khan [g], Papiya Mandal [g], Rajan K. Chakrabarty [h,****]

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ABSTRACT

In South Asia, combustion of solid fuel for residential heating and cooking is a major emission source of particulate-phase polycyclic aromatic hydrocarbons (*p*-PAHs), a potent carcinogen for human health. The emission factors (EFs) and source diagnostic ratios of PAHs currently used in regional inventory models have been estimated from controlled laboratory tests, which do not accurately reflect real-world combustion scenarios observed in rural Indian households. Consequently, the health effects associated with *p*-PAH levels in indoor and ambient air could be severely underestimated and undervalued. We performed a nationwide study across ten different states in the Indian subcontinent to evaluate the EFs and source diagnostic ratios of sixteen U.S. Environmental Protection Agency (EPA) identified high priority *p*-PAHs emitted from residential solid biomass combustion. Our estimated average annual EFs were 2.4–18.3 fold higher than those reported from previous laboratory-based investigations. Carcinogenic toxicity analysis shows that combustion of dung cake and coal ball, both widely used residential solid fuels, posed the most risk (80% and 59% respectively) in comparison to other PAHs owing to predominant emission of benzo[a]pyrene. Our findings underscore the importance of improved laboratory testing and field validations as crucial steps toward more accurate emission inventories and better assessment of public health impacts.

1. Introduction

A large portion of the population in developing countries depends on unprocessed solid fuels (coal balls, fuel wood, dung cake, and crop residues), with unvented stoves, for household cooking and heating. Emissions of fine particulate matter ($<PM_{2.5}$), trace gases, and polycyclic aromatic hydrocarbons (PAHs) contribute to local and region pollution and adverse health effects (Bond et al., 2004; ; Zhang and Tao, 2009).

PAHs are a class of organic compounds that originate from both petrogenic (e.g. vehicle exhausts, incinerators and power generation plants) and pyrogenic (incomplete combustion of fossil fuel and

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an increase in the DEGME, ethanol, and PEG 400 mass fraction at a defined temperature, respectively. According to the Kamlet-Taft linear solvation energy relationship model

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Hydrothermally grown α-MoO_3 microfibers for photocatalytic degradation of methylene blue dye

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ABSTRACT

Adsorption and photodegradation efficiency of α-MoO_3 microfibers towards methylene blue (MB) dye in the aqueous solution were reported. To obtain high-quality α-MoO_3 microfibers, an aqueous solution of $(NH_4)_6Mo_7O_{24}{\cdot}4H_2O$ and citric acid was hydrothermally treated (180 °C, 12 h) in the presence of HNO_3. The possible growth mechanism of microfibers in the hydrothermal reaction is explained. XRD and TEM studies provide shreds of evidence that microfibers have crystallized in a pure orthorhombic phase and grown up in the direction of [0 0 1]. The structural bonding between molybdenum and oxygen constituent elements of microfibers was further confirmed by XPS, FTIR, and Raman techniques. The estimated optical band gap of α-MoO_3 microfibers (E_g = 2.68 eV) lies in the visible region, making them suitable for visible light photocatalytic application. MB adsorption and degradation capacity of microfibers were performed in the dark and light, respectively. The photocatalytic properties revealed that 90 % MB dye was degraded within 120 min illumination. Moreover, the good photocatalytic recycling capability of α-MoO_3 microfibers makes them a promising photocatalyst to eliminate organic pollutants from water.
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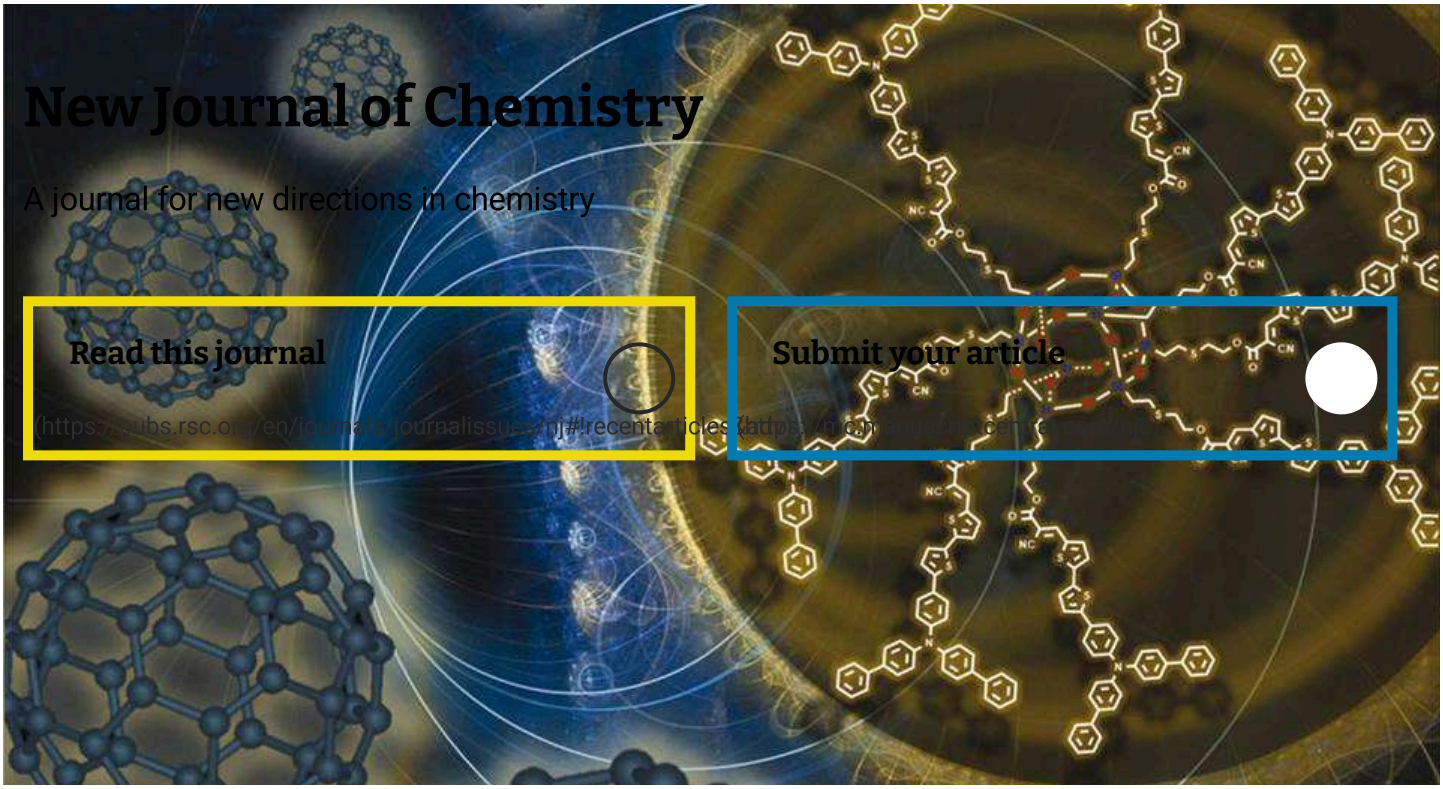
1. Introduction

The molybdenum(VI) oxide (MoO_3) is attracting a great deal of attention in the field of material science due to its unique chemical, electrochemical, electronic, and catalytic properties. MoO_3 usually crystallizes in the three basic polymorphic structures. First, orthorhombic (α-MoO_3) is a thermodynamically stable phase and the remaining two phases, such as monoclinic (β-MoO_3) and hexagonal (h-MoO_3), are the metastable phase. α-MoO_3 has a unique layered crystal structure that possesses intrinsic structural anisotropic growth of the crystal, so it is known to crystalize into low-dimensional shapes. Thus, the last two decades have witnessed considerable advances in the synthesis strategies to obtain low-dimensional micro/nano structures of α-MoO_3 such as ribbons [1], wires [2], rods [3], sheets [4], tubes [5], and many other hierarchical shapes [6–7]. These one- and two- dimensional structures exhibit high activity due to the adjustable oxidation state of Mo ions present on the surface and have widely been applied in many promising applications in the area of medicine [8], gas and biomolecule sensors [9–11], catalysis [12], dye adsorption [13], lubricant [14], and electrochemical energy storage batteries and supercapacitors [15–17]. In addition, α-MoO_3 is an *n*-type semiconductor with a wide bandgap of ~3.0 eV that make it a potential candidate in the area of photonics [17], field emission [2], photocatalytic [18–19], diluted magnetic semiconductors [20], including photochromic and electrochromic devices [21–22].

The low-dimensional morphology modulating in micro and nano levels α-MoO_3 allows tuning of specific properties as per requirement. To fabricate, such a α-MoO_3 nano and micro size structures, a variety of bottom-up approaches like chemical vapor deposition [23], thermal evaporation [24], hot-plate [25], flame synthesis [26], sonochemical [27], sol–gel [3], polymeric solution [9], electrospinning [28], solvothermal [4,29]/hydrothermal [15,30–31] have been extensively used. In recent years, a few layers of two-dimensional MoO_3 sheets have also been fabricated by exfoliation and oxidation of bulk MoO_3 and MoS_2 [17,32]. Ye and coworkers used MoS_2 powders dispersed in ethanol/water to irradiated with pulses from a femto second laser, which results plas-

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A graphene-printed paper electrode for determination of H_2O_2 in municipal wastewater during the COVID-19 pandemic†

Tushar Kant,[a] Kamlesh Shrivas,*[a] Indrapal Karbhal,[a] Monisha,[a] Sanjay Yadav,[a] Tikeshwari,[a] Sushama Sahu,[a] Yugal Kishor Mahipal[b] and Vellaichamy Ganesan[c]

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Recently, hydrogen peroxide (H_2O_2) has been used as a disinfectant in sanitizers for cleaning hands, and solid surfaces of hospitals, offices and homes to prevent the spread of the COVID-19 virus. The effluents from domestic, hospital and municipal waste should be monitored for their H_2O_2 content to avoid the entry of this toxic pollutant into the ecosystem. Therefore, we developed a low-cost graphene (Gr)-printed paper electrode for determination of H_2O_2 using cyclic voltammetry (CV). An office inkjet-printer and Gr nano-ink stabilized with ethyl cellulose (EC) were used for the fabrication of printed paper electrodes (PPEs) to determine H_2O_2 quantitatively. A stable Gr–EC nano-ink (2%) with viscosity and surface tension values of 12 mPa S^{-1} and 35 mN M^{-1}, respectively, was formulated to obtain conductive electrodes. A wide linear range (2 μM–25 mM) with a better limit of detection (0.28 μM) for the determination of H_2O_2 was obtained when the Gr–EC/PPE was used as a working electrode. Further, the Gr–EC/PPE was successfully employed for analysis of H_2O_2 in wastewater. The electrochemical determination of H_2O_2 using the Gr–EC/PPE as an electrode in CV is rapid, economical, flexible and eco-friendly when compared with previously reported methods.

Introduction

In January 2020, the World Health Organization (WHO) declared the outbreak of COVID-19 as a public health emergency and the COVID virus has, so far, infected and killed millions of people across the world. The preliminary preventive measures against the infection are cleaning hands with soaps or sanitizers and use of facial masks. More recently, cleaning of hands with alcohol-based sanitizers has tremendously increased. Most of the sanitizers contain hydrogen peroxide (3%) as a strong oxidizing agent along with isopropyl alcohol/ethanol and glycerol.[1,2] In addition, H_2O_2 has an extensive application as a disinfectant in hospitals and has been used as a bleaching agent in industry. The exposure to H_2O_2 may result in several health issues such as skin etching, headache, blindness, irritation, and redness of eyes.[3,4] The effluents from domestic sources and hospitals which are disposed into municipal wastewater may contain H_2O_2. Hence, analysis of municipal wastewater is necessary to prevent the passage of this substance into fresh water reservoirs. For this, horseradish peroxidase-based spectrophotometry,[5] titration,[6] fluorimetry,[7] electrochemical methods,[8] and chemiluminescence[9] have been reported for analysis of H_2O_2. However, most techniques have their own limitations, like the need for expensive instruments and lengthy sample preparation procedures. However, electrochemical methods have been proven to be simple and rapid for the detection of H_2O_2, as they show superiority in sensitivity, selectivity, cost and portability.[10]

Among the electrochemical techniques, cyclic voltammetry (CV) is frequently used for the quantitative analysis of H_2O_2 based on its redox properties.[8] Recently enzyme immobilization onto electrode surfaces with different nanomaterials has been used for detection of H_2O_2.[11] Stability, reproducibility and storage are the major issues related to enzymatic methods. To overcome these limitations, glassy carbon electrodes (GCEs) fabricated with metallic silver (Ag), gold (Au), platinum (Pt), and carbon/graphene (Gr) nanomaterials (NMs), *etc.*, are used in several electrochemical applications.[12–15] These NMs have the advantages of low cost, better electrocatalytic activity and conductivity. However, the synthesis of metallic NMs involves use of harmful reducing agents (hydrazine, sodium borohydride, *etc.*). Accordingly, Gr-based NMs have emerged as efficient electrode materials with better performance.[16] Gr-based

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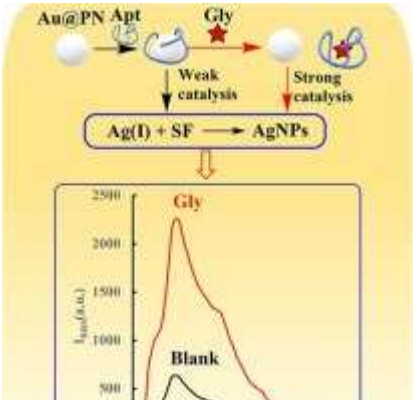
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Graphic abstract

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Simultaneous determination of B1, B3, B6 and C vitamins in green leafy vegetables using reverse phase-high performance liquid chromatography

Tarun Kumar Patle [a], Kamlesh Shrivas [a,1,*], Alka Patle [b], Sanyukta Patel [b], Neetu Harmukh [c], Antresh Kumar [d]

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ABSTRACT

A simple, rapid, and efficient RP-HPLC-DAD method is optimized for the quantitative determination of vitamin B1, B3, B6, and C in green leafy vegetables. The separation was done within 7 min with a gradient program of 20 mM phosphate buffer (pH = 3) and acetonitrile with 0.5 mL min^{-1} flow in C-18 reverse phase column (Hypersil GOLD™, 100 × 4.6 mm × 5 μm) at room temperature. All the vitamins were estimated with a diode array detector (DAD) at 275 nm. The method validation parameters like precision, accuracy, linearity, limit of detection (LOD), RSD (%), and recovery (%) were studied for quantitative purpose. The method showed a good linear range of 0.01–10 μg mL^{-1} for analysis for B1, B3, B6, and 0.1–10 μg mL^{-1} for vitamin C, with LOD of 0.025 μg mL^{-1} for vitamin B1, B3, B6, and 0.1 μg mL^{-1} for vitamin C. The optimized method was applied for the quantitative determination of respective vitamins in green leafy vegetables. The result indicated that this method can be used for qualitative and quantitative estimation of vitamin B1, B3, B6, and C in green vegetables and other sample matrices of the plant origin.

1. Introduction

The healthier metabolic and physiological function of our body depends on the types of foods, vegetables, and nutrition that are taken in our daily diet [1–2]. The major nutrients obtained from fruits and vegetables are polyphenols, vitamins, proteins, fibers, carbohydrates, minerals, etc. [3]. Despite protein, carbohydrates, and fats, vitamins also play an essential role in cell growth and metabolism, which are considered to be the most important micronutrients, received from vegetables and food materials [4–6]. The fat-soluble vitamins are known as vitamin A, E, K, and D which are non-polar compounds of isoprene derivatives, often stored in the liver, kidneys, and fat tissue. These vitamins have several functions for the growth and development of the human body [7–10]. B1 to B6, B9, B11, B12, and C are the water-soluble vitamins have specific functions in the central nervous system and respiratory organs, and some of them are responsible for the production of fatty and nucleic acid, and the formation of blood cells [11].

The water-soluble vitamins have different metabolic functions depending upon an individual vitamin involved in biological activities [12–14]. The beriberi disease is caused by a nutritional deficiency of vitamin B1 (thiamine) which affects the digestive system and nervous systems [15]. Skin inflammation and gastrointestinal issues are the common clinical symptoms of B2 (riboflavin), B3 (niacin), and B6 (pyridoxine) deficiencies [16]. Vitamin C (ascorbic acid) is an antioxidant compound, abundantly present in citrus fruits, and its deficiency leads to cause scurvy disease [17,18].

Green leafy vegetables, commonly consumed daily in food, are one of the major sources of vitamins [19]. It is very beneficial to determine the concentration level of individual vitamins present in green leafy vegetables for the regulation of a balanced diet. The concentration of water-soluble vitamins in green leafy vegetables are very low (in micrograms), accompanied by a surplus of other chemical compounds with similar chemical properties which are challenging to determine in green vegetables [20]. Different chemical, biological or physical methods have been traditionally used for the determination of individual vitamins. In earlier studies, water-soluble vitamins have been monitored using microbiological assays but the method is difficult to attain better precision [21]. High-performance liquid chromatography (HPLC) is a

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Review Article

Recent Advances in Water-Soluble Polymer and Polymeric Nanoparticles for Pharmaceutical Application

Pp: 565-584
Author(s): Harish Bhardwaj, Sulekha Khute, Ram Kumar Sahu and Rajendra Kumar Jangde*
DOI: 10.2174/0115734137294889240314032718

Published on: 06 June, 2024

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Review Article

Application of Silver Nanoparticles as a New Alternative Antiviral Agent for SARS-CoV-2: A Review

Author(s): Reena Jamunkar, Kamlesh Shrivas*, Deepak Sinha*, Sanyukta Patel, Monisha, Alka Patle, Antresh Kumar and Subhash Banerjee*

Volume 18, Issue 4, 2022

Published on: 01 April, 2022

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Pages: 13

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Abstract

Background: Today, SARS-CoV-2 (COVID-19), a viral disease caused by the novel coronavirus (a tiny crowned virus), has become one of the threats for human beings all over the world and caused the death of millions of people worldwide. Many vaccines have been developed and administered to people in several countries; however, due to their propensity to create new strains, it appears that curing all corona strains will be challenging. So, it is necessary to identify the structure of the virus, mechanism of action, and its antiviral activities against drugs and other functional materials.

Methods: AgNPs have unique physicochemical and antimicrobial properties. This review describes the structure and nature of the virus and the mechanism of action of an antiviral drug such as silver nanoparticles (AgNPs) with the virus. In addition, different methods for synthesis of AgNPs, application of AgNPs as an antiviral agent against influenza virus, human immuno deficiency virus (HIV), herpes simplex virus type 1 (HSV-1), hepatitis B virus (HBV), polio virus, respiratory syncytial virus (RSV), are discussed. Also, the most probable applications and properties of AgNPs that can help prepare it as an antiviral agent are discussed.

Results: The use of AgNPs against various viruses, including the coronavirus family, is found to be effective; therefore, it can be considered for the development of antiviral agents, disinfectants, antiviral coated mask, and their therapeutic use against the treatment of novel coronavirus with minimum side effect and great efficiency.

Conclusion: AgNPs were successfully used for the treatment of various viral diseases of the coronavirus family such as H1N1, H3N2, influenza, even for SARS and MERS coronaviruses. AgNPs coated masks, disinfectants, fabrics, wipes, and inhalation systems are effective for the inhibition of SARS-CoV-2 infection. Since sanitizers have a temporary effect, the development of some other potential alternatives having low toxicity, ease of use, long lasting efficiency, health cautiousness, minimum side effect, sustainable fabrics is required.

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Review Article

Development of Nanomaterials-fabricated Paper-based Sensors for the Analysis of Environmental and Biological Samples: A Review

Author(s): Monisha, Kamlesh Shrivas*, Tarun Kumar Patle, Reena Jamunkar, Vikas Kumar Jain, Subhash Banerjee and Antresh Kumar

Volume 18, Issue 4, 2022

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Abstract

Background: Currently, the environmental and biological samples, such as water, soil, vegetables, etc., are highly contaminated with metal ions, anions and pesticides. For analysis of these toxic substances from the environmental and biological samples, sophisticated and expensive instruments are being used. The present work deals with the development of a simple, faster, sensitive and economical method for the analysis of toxic substances present in different samples.

Methods: The general methods for synthesis and characterization of metallic (Ag, Au, Cu and graphene) nanoparticles and conductive polymer for the development of conductive nano-ink and fabrication of paper substrate by direct deposition and laser, wax, or inkjet printing techniques, have been reported.

Results: Paper-based sensors fabricated with different nanomaterials used as colorimetric, electrochemical and fluorescence-based chemical sensors for the quantitative determination of pesticides and toxic metal ions in various biological and clinical samples have been comprehensively discussed in this review.

Conclusion: The low-cost, rapid, eco-friendly, flexible, portable, and paper-based sensors using nanoparticles (NPs) are in demand for on-site detection of different chemical constituents present in various environmental, biological and clinical samples.

Keywords: Paper-based sensor, nanoparticles, electrochemical, colorimetric, fluorescence, environmental samples, biological samples.

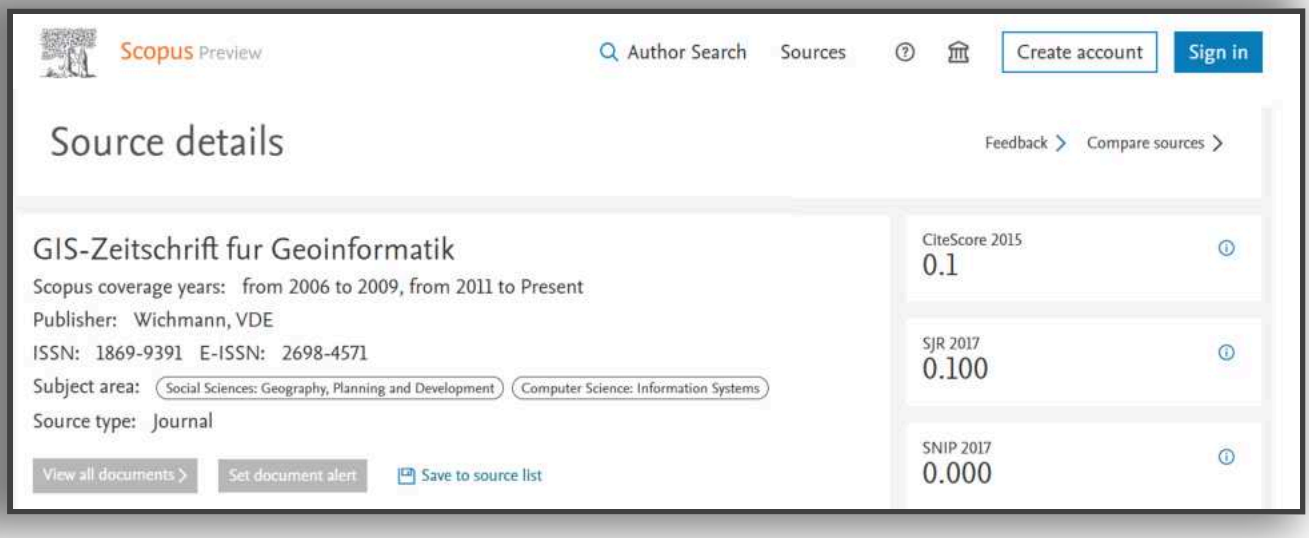
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SPECTROPHOTOMETRIC METHOD FOR THE DETERMINATION OF QUIZALOFOP-P-ETHYL HERBICIDE IN AGRICULTURAL SAMPLE USING CHARGE TRANSFER COMPLEX

Chhaya Bhatt[a*], Hashita sharma[b], Manish Kumar Rai[a], Joyce Rai[c],

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***Corresponding Authors**

Abstract- *In order to improve crop quality and yield storage life, a wide range of pesticides have been utilized in agriculture. However, due to the expanding population and fast urbanization, pesticide use has increased now more than ever before. The constant usage of these pesticides has led to environmental contamination and health risks for people. A simple and sensitive spectrophotometric method was developed for determination of quizalofop-p-ethyl herbicide in food samples. quizalofop-p-ethyl (QPE) is a post-emergence herbicide that effectively controls grass weeds and is often detected in the environment. However, the biochemical and molecular mechanisms of QPE degradation in the environment remains unclear. quizalofop-p-ethyl (QPE), a unitary R configuration aromatic oxyphenoxypropionic acid ester(AOPP) herbicide, was widely used and had led to detrimental environmental effects The method is based on acid hydrolysis of quizalofop-p-ethyl, quizalofop-p-ethyl get dissociated then the chlorinated part of the dissociated product was reacted with Fe (II) to form yellow color complex. Its λmax was found to be 420nm. The influences of various experimental parameters on the absorbance of the charge transfer complex of quizalofop-p-ethyl with Fe (II) are studied. The absorbance of complex was measured at 420 nm. The charge transfer complex of herbicide with Fe (II) shows molar absorptivity $1.5x10^{7}Lmol^{-1}cm^{-1}$ and Sandell's sensitivity $1.0x10^{-5}$. Analytical parameters were optimized and successfully applied to the determination of quizalofop-p-ethyl in various samples. The method shows a linear range from 2-18 $\mu g\ mL^{-1}$. The percent recovery for determination of quizalofop-p-ethyl in commercial formulations was found to be 89.35-106.57 %. The limit of detection and quantification was found to be 0.188 $\mu g\ mL^{-1}$ and 0.571$\mu g\ mL^{-1}$respectively.*

Key Words: *Pesticides, Quizalofop-p-ethyl herbicide, Vegetables, UV–Vis spectrophotometer, charge transfer complex.*

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SPECTROPHOTOMETRIC DETERMINATION OF TRICHLORFON INSECTICIDE AND ITS APPLICATION IN AGRICULTURAL AND ENVIRONMENTAL SAMPLES

[1]Chhaya Bhatt, [2]Anushree Saha, [3]Suryakant Manikpuri and [4]Manish Kumar Rai

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Abstract: A spectrophotometric method has been developed based on the modification of the Fujiwara reaction for the determination of trichlorfon at ppm level. Trichlorfon on its alkaline hydrolysis gives chloroform, which react with pyridine to produce pink color. In the present method the pink color acquired in the preceding reaction is discharged with a few drops of acetic acid, followed by the addition of p-nitro aniline reagent, which produces a yellow color dye. The absorption maxima of the yellow color dye formed is measured at 430 nm. Beer's law is obeyed in the range of 2.0-5.0 µg/10 mL of Trichlorfon. The molar absorptivity of the colored system is 4×10^{-5} L $mol^{-1}cm^{-1}$ and Sandell's sensitivity is 0.20×10^{7} µg cm^{-2}. This method is free from interference by other pollutants and can be successfully applied for the determination of trichlorfon in various environmental samples.

Index Terms - Pesticide, Trichlorfon, Detection Techniques, Environmental Samples.

I. INTRODUCTION

Pesticides are organic toxic compounds used against a wide range of pests that can enter the food chain through a variety of routes, creating health issues in both human and animals. Varieties of ailments are caused due to pesticide exposure [1]**.** These have been widely utilized to prevent or reduce damage caused by pests, weeds, and illnesses, so benefiting agricultural manufacturing. These are used by farmers in the agriculture industry for crop protection, pre- and post-harvesting. Pesticide use is expected to protect roughly 30% of global agricultural production. [2]. Organophosphate insecticides have significantly increased agricultural output. These are commonly employed in pre and post harvest treatments to combat fruit and vegetable diseases [3]. Because pesticides are among the most dangerous chemical industry products, there is a high demand for disposable, low-cost, and simple monitoring instruments [4].

Organophosphate pesticides have been widely used in recent decades. Apart from agricultural benefits, OPs have negative toxicological consequences on both animal and human populations [5]. Neurotoxins derived from organophosphates are amongst the most dangerous chemicals known. These chemicals have been extensively utilized in modern agriculture as pesticides and insecticides, as well as chemical warfare agents in terrorist attacks or military operations [6]. Trichlorfon [O,O-dimethyl-(2,2,2-trichloro-1-hydroxyethyl)-phosphonate] is an organophosphate insecticide that is used to combat cockroaches, crickets, silverfish, bedbugs, cattle grubs, flies, ticks, leaf-miners, and leaf-hoppers [7]. It is crucial for the non-destructive and quick detection of trichlorfon insecticide in fruits, because of the intricacy of the matrix found in vegetables, particularly spicy foods, determining tiny levels of trichlorfon is difficult. [7,8]. However, it is toxic to humans via ingestion and dermal absorption and has the potential to cause tumors, genetic mutations and to affect the reproductive system. Trichlorfon is an organophosphorus ester insecticide that is mildly toxic. Overexposure from manufacturing or use, as well as accidental or purposeful intake, can result in serious poisoning. Trichlorfon is unlikely to constitute a hazard to persons who are occupationally exposed if acceptable work practices, hygienic measures, and safety precautions are followed. Despite its severe toxicity to non-target arthropods, trichlorfon has been utilized with few or no detrimental impacts on environmental creature populations. Trichlofon has very strong dermal and inhalation effects. It is poisonous to humans and other warm-blooded animals. The oral LD50 for rats is 630 mg kg^{-1}. Organophosphate pesticide poisoning has been a major cause of concern around the world due to its severe effects on the nervous and reproductive systems of living beings [9]. For agricultural and domestic application, several organophosphorus pesticide formulations are available. Every year, our laboratory receives reports of these insecticides being misused in a number of poisoning instances, including suicide and homicide. Because of the extensive usage of these insecticides, a simple and specific method of detection is required [10]. The detection of human beneficial substances, contaminants as well as pollutants from environmental samples is very necessary and many researchers have reported their work in these regards [11-13]. Previously, a method that

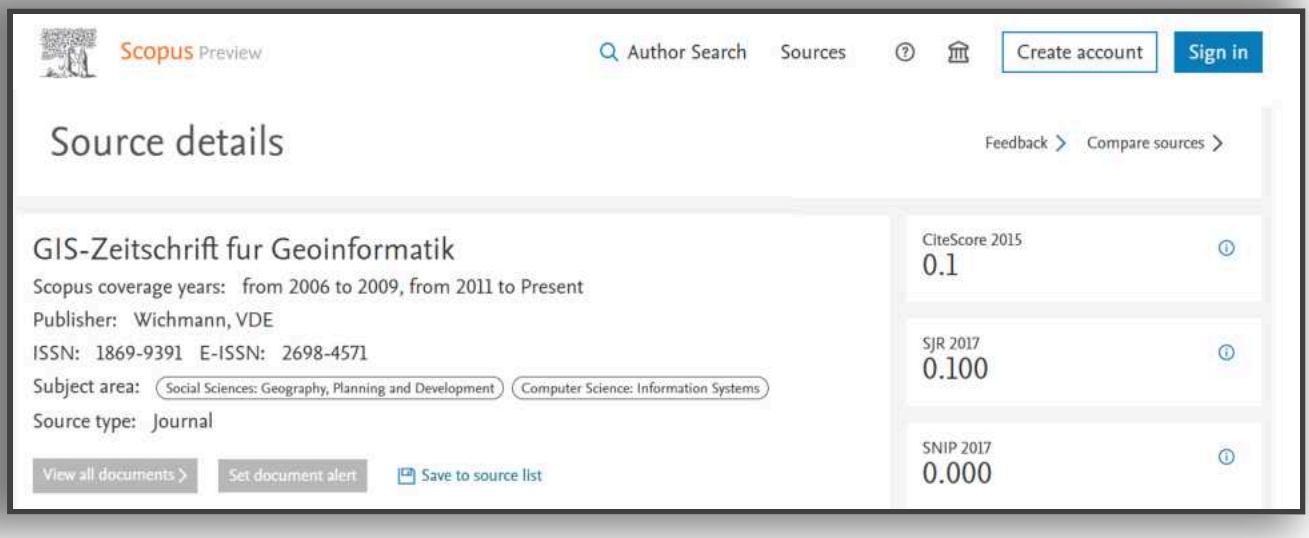
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SPECTROPHOTOMETRIC DETERMINATION OF ACEPHATE WITH 4-AMINOAZOBENZENE AND ITS APPLICATIONS

Harshita Sharma[a*], Arun Kumar Mishra[a*], Manish Kumar Rai[b]

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Abstract: *A simple and sensitive method for the determination of acephate, a widely used insecticide is describe here which is based on diazotization followed by coupling with 4-aminoazobenzene. The absorbance maxima of the coloured compound formed is measured at 460 nm. Beer's law is obeyed over the concentration range of 4 µg-12 µg acephate in solution of 25 ml. Acephate belongs to a category of insecticides known as organophosphates, which are toxic and environmentally polluted compounds. The Standard deviation and relative standard deviation are 0.006 and 1.01%. The molar absorptivity and sandell's sensitivity were found to be* 1.17×10^{3} *and* 1.0081×10^{-5} *µg* cm^{-2}*, respectively. The method is highly reproducible and has been successfully applied for determination of acephate insecticide in environmental and agricultural samples.*

Keywords: *Spectrophotometer, acephate, Organophosphate pesticide, environmental samples.*

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Dendrimer as a versatile platform for biomedical application: A review

Vidhi Patel, Princy Patel, Jigar V. Patel, Pravinkumar M. Patel

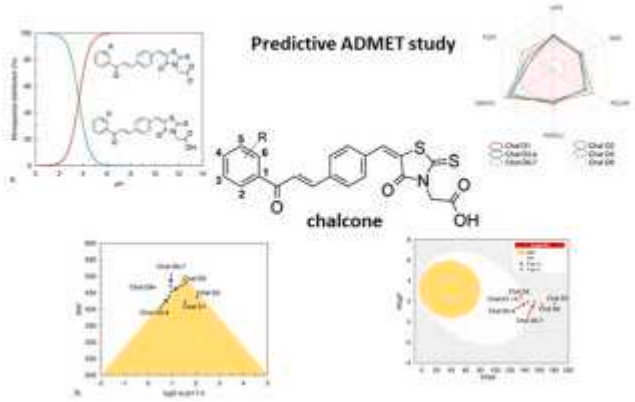
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Diazotized reagent for spectrophotometric determination of glyphosate pesticide in environmental and agricultural samples

Harshita Sharma [a], Anushree Saha [b,**], Arun Kumar Mishra [a,*], Manish Kumar Rai [b], Manas Kanti Deb [b]

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ARTICLE INFO

Keywords:
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Environmental samples

ABSTRACT

A new sensitive spectrophotometric method for the determination of glyphosate herbicide in environmental and agricultural samples is developed. The reaction is based on diazotization followed by coupling of glyphosate with *p*-dimethyl amino benzaldehyde. The resulted complex absorption spectra was observed at $\lambda_{max} = 420$ nm. The effects of other metal ions and pesticides were also tested for selective determination of glyphosate. The analytical parameters were optimized and have been successfully applied for determination of glyphosate in various environmental samples such as soil, water and vegetables. This method has a lower limit detection of 6 μg of glyphosate. Beer's law is obeyed over the concentration range of 6.0 μg–24.0 μg glyphosate in 25 mL of the final solution at 420 nm. The standard deviation and relative standard deviation calculated are 0.0055 and 1.023, respectively. The molar absorptivity of the colored system is 1.91×10^{10} L $mol^{-1}cm^{-1}$ and Sandell's sensitivity is found 0.408×10^{-5} μg cm^{-2}. The proposed method is simple, sensitive, highly reproducible and time saving as compare to those complicated time consuming methods.

1. Introduction

Glyphosate N–(Phosphonomethyl) glycine is a biocide and herbicide with broad spectrum activity that was used in agricultural fields in 1974 for weed control [1]. Herbicides based on glyphosate became available in 1974 and first marketed as round up, these days it is extensively used broad spectrum herbicide. In 2017, state members of the European union gives the re-approval of glyphosate for 5 years and was preceded through intense analysis and discussion that came to light as a consequences due to its impact on ecosystems its potential carcinogenicity, poorly understood fate in environment and human exposure [2,3]. In the urban areas glyphosate is the second most used herbicide and at present it is the most extensively used herbicide in the agricultural sector [4]. The chemical structure of glyphosate is small in size it has three functional groups which is polar (carboxyl, amino, phosphonate) because of that it is heavily retained on soil mineral compounds [5].

Glyphosate products are utilized firstly before plating of traditional agricultural crops and after planting of genetically modified glyphosate resistant crops. Progressively, glyphosate have been applied for desiccation as a "harvest aid". Additionally, they have been extensively used between trees in groves and orchards. Also it is used for weed control in urban areas along parks and streets. It has also been utilized in waterways to remove aquatic plants. In 2021, about 700,000 tons of glyphosate were used worldwide and 127,000 tons in USA. At present glyphosate is widespread utilize for agricultural production both in developing and industrialized countries. Because of the broad and intensive application of glyphosate and its accumulation in environment and its edible products various major concerns came to light in recent years about ill effects of glyphosate on animals, plants, human health and AMPA for water and soil quality [6].

Various adverse effect of glyphosate including mutagenesis, teratogenesis etc. are the most carcinogenic [7–12]. In 2015, the World Health Organization re-categorizes the herbicide glyphosate as carcinogenic to human [6]. Therefore for environmental point of view, by understanding adsorption of this herbicide is eminent for the prediction of its movement in aquifers and soil. So, it is very important to determine its residues on environmental samples for monitoring health hazard and pollution [13]. Different analytical methods have been reported for the

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Diazotized reagent for spectrophotometric determination of glyphosate pesticide in environmental and agricultural samples

Harshita Sharma [a], Anushree Saha [b,**], Arun Kumar Mishra [a,*], Manish Kumar Rai [b], Manas Kanti Deb [b]

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Dendrimer as a versatile platform for biomedical application: A review

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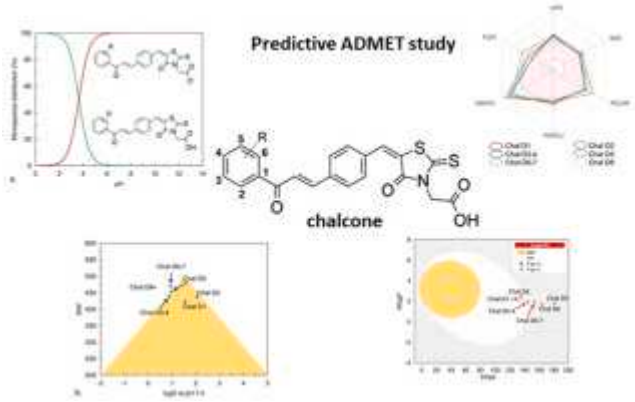
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Extraction of acephate pesticide in environmental and agricultural samples by spectrophotometric method

Jyoti Goswami [a], Manoj Kumar Banjare [a,b,*], Ramesh Kumar Banjare [b,c], Joyce K. Rai [d], Manish K. Rai [a,**]

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UV–Vis spectroscopy

ABSTRACT

In the present study, we have synthesis the azo dye for the reaction of p-amino antipyrine with HCl in $NaNO_2$ solution a 1:1 M ratio that was kept -5°C for 1–2 h, as result the absorption spectra observed at λ_{max} = 460 nm. Beer's law is obeyed over the awareness variety of 1 μg–100 μg mL^{-1}. The standard deviation and relative well-known deviation are 0.007 and 1.38%. The molar absorptivity and Sandell's sensitivity had been located to be 0.98×10^5 L mol^{-1} cm^{-1} and 0.99×10^{-3} μg cm^{-2}, respectively. Spectroscopy method used for the detection of Acephate pesticides on vegetable, fruit, soil, and water samples. FTIR method was used to consider and achieve structural information about the presented intermolecular interactions for vegetable samples. The eco-friendliness of the developed methods was assessed using the spectroscopy analytical tool on vegetables, fruit, soil, and water samples.

1. Introduction

In recent decades, the increase in the world's population per years which has been led to the rise in global pesticide consumption. Acephate (AP) is a commercially available and water-soluble insecticide, belongs to the phosphoramidothioate group of organophosphate (OP). Acephate ($C_4H_{10}NO_3PS$) his IUPAC name is N[methoxy(methylsulfonyl)phosphoryl]acetamide) is a common foliar OP, used in India. Acephate is well known for its anti-cholinesterase activity in insects and mammals. It is considered one of the safest OP insecticides because its low mammalian toxicity, with a lethal dose (LD50) of 360 mg/kg in mice and 900 mg/kg in rats, [1,4,5,7,20]. [21,57]. For more than 40years, the usage of OP pesticides in agricultural practice is common [2,3,6,22,27,30]. After the acephate is applied to plants, it is absorbed the roots or foliage the plant and transferred into the plants [33,34]. When chewing and sucking insects feed on those plants, the acephate attacks the nervous system of insects and kills them. However, acephate has high to medium acute oral or medium inhalation toxicity to mammals. It will hurt the nervous and respiratory system, and cause eye and gastrointestinal problems in humans [9,12,13,15,23,26,28,29,31]. It controls insects through contact and stomach action. Acephate insecticide is easily soluble in water and uptaken by the plant which helps in controlling from feeding by insects [8,10,11,32,35,39,58].Since AP has very good solubility in water, it was not possible to extract in with organic solvent (OP) insecticides [14,19,40,42,59]. Reversed Phase Column Liquid Chromatography [16,17,43]. Single Drop Microextraction [24,44]. High-Performance Liquid Chromatography (HPLC) [60], Solid-Phase Micro-Extraction (SPME) [18,25,36]. Thin layer chromatography-spectrophotometric method [61] Solid-phase extraction (SPE) - high-performance liquid chromatography (HPLC) [62], Spectrophotometric method [26,37,38,41,60], etc.

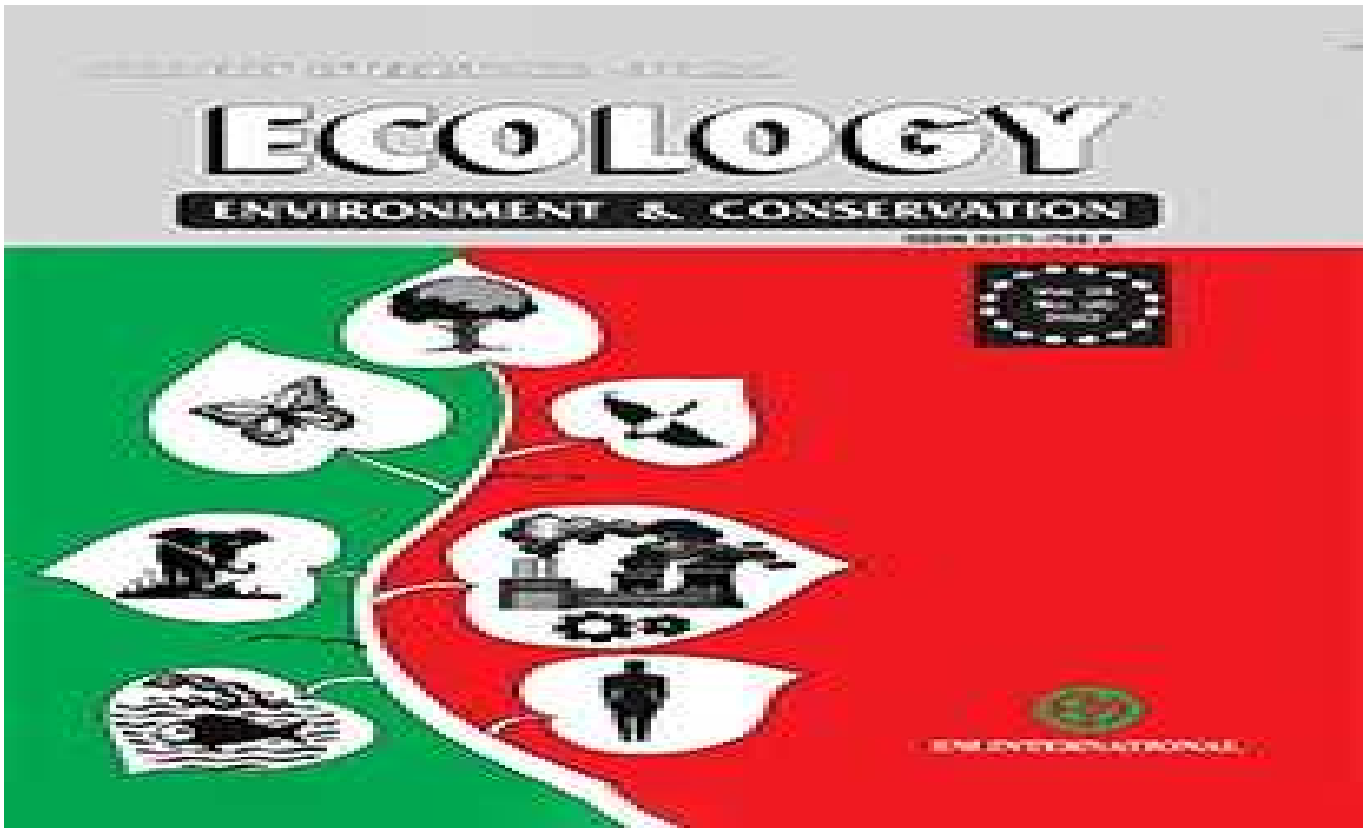
The removal of pesticides from water and waste water by using spectrophotometric method. Pesticides may appear as pollutants in water sources, having undesirable impacts to human health because of their toxicity, carcinogenicity, and mutagenicity or causing aesthetic problems such as taste and odors [67–72]. [45,73]. reported spectrophotometric method for the study of organophosphorus insecticides *i.e.,* malathion, dimethoate, and phorate. The method is based on the oxidation of organophosphorus pesticide with N-bromosuccinimide (NBS) The method has been successfully applied for the determination of organophosphorus pesticide residues in various vegetable samples [46].

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Detection of Azoxystrobin in Environmental Samples by using Ftir Spectroscopic Method

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ABSTRACT

A new UV-Visible spectrophotometric method for determination of fungicide azoxysrtobin was developed. The method is based on the bromination of azoxystrobin to form dibromoazoxystrobin which react with Potassium iodide, Potassium iodate mixture in the presence of leucomalachite green (LMG) to form a bluish green colored complex. Characterization was done for the synthesis of bluish green colored complex by using UV-Vis spectrophotometer and FTIR methods. As a result, the UV-Visible absorption spectrum was observed at 615 nm. The limits of detection and limits of quantification were observed at 0.0019 µg ml^{-1} and 0.0059 µg ml^{-1} respectively. We have also studied the conformational and functional group (such as most characteristic band of O-H stretching frequency observed at 3346.49 cm^{-1}, Bonding N-H symmetrical is 1645.50 cm^{-1}, C=C bending is 691.07 cm^{-1}, Symmetrical stretching C-N is 1493.13 cm^{-1} and 1404.70 cm^{-1}, C-C stretching and other vibrational is 1059.74 cm^{-1}). Involved in the complexation between azoxystrobin and bromination by FTIR method. This developed method has been successfully applied for the detection of azoxystrobin in various environmental samples. Beer's law obeyed over the concentration range of 0.5-13 µg mL^{-1} in final solution volume of 10 ml. The reproducibility assessed by carrying out seven days replicate analysis of a solution containing 5 µg ml^{-1} of azoxystrobin in a final solution of 10 mL. The molar absorptivity of the colour system is 1.936×10^{6} L mol^{-1} cm^{-1} and Sandell's sensitivity is 0.800×10^{-4} µg cm^{-2}. The relative standard deviation (RSD) for the absorbance value was found to be 1.9%. The suggested method is free from the interference of other toxicant agents. The analytical parameters were optimized and the method was applied to the determination of azoxystrobin in water, soil and food samples.

Key words : UV-Visible Spectrophotometer, FTIR, Azoxystrobin, Bromination and Leucomalachite green (LMG).

Introduction

Pesticides are the major basis with signicant role in ensuring safety from the destruction caused by many pests. At present time, the viable food production can't achieved without the vital role of pesticides. Pesticides are applied directly on the plants which are able to determine for long time in vegetables. When pesticides are use in the field, it is assessed that only about 1% of the pesticide is able to

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Colorimetric technique for the detection of carbofuran and its application in various environmental samples

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ABSTRACT

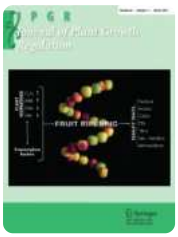
A large variety of pesticides have been used in the agriculture area to raise the quality, extend and yield storage life of crops. The nonstop uses of these pesticides have resulted in pollution of the environment and also caused risk to human health. For the rapid detection of selective CBFpesticide, we developed a simple and sensitive colorimetric detection method based on azo-coupling reaction. After a simple pre-treatment of carbofuran (2, 2-dimethyl-2, 3-dihydro-7-benzofuranyl N-methyl carbamate) (CBF) (1000 μg mL^{-1}) with a diazotized solution, the resulting is rapidly undergoing azo-coupling reaction with *p*-aminoantipyrine (1% alcoholic) with a dramatic color change only in few minutes. Finally, we successfully applied the concentrations of CBF pesticide on vegetable, fruit, soil, and water samples in the presence of natural interferences using UV–Vis spectrophotometer and FTIR with limits of detection at 0.004μgmL^{-1}. CBF had recoveries in the range of 93–98%, with relative standard deviation values less than 2% and good linearity was achieved with $r \geq 0.98$. The inhibition rate was linear with CBF concentration in the range of 1μgmL^{-1} to 10μgmL^{-1}. The proposed method applies to analyze CBF pesticide in real samples. FTIR technique was used to consider and gain structural information about the existing intermolecular interactions for vegetable samples.

1. Introduction

Pesticides play a crucial role in crop management as well as in agriculture productivity. Carbamate pesticides are being gradually more used in the protection of crops over the last four decades, because of their high pesticide efficiency and extensive spectrum in environmental activities [1,2]. The use of these pesticides in fruits, vegetables, and cereal poses a serious risk to humans, as they are often used in the manufacturing of crops [3]. CBF(2, 2-dimethyl-2, 3-dihydro-7-benzofuranyl N-methyl carbamate) is a very toxic carbamate used in agriculture as an insecticide [4]. Although forbidden in the United States (US) because of its toxicity as it is widely used in numerous crops such as wheat, soybeans, peanuts, potatoes, cabbage, maize, rice, tomatoes, lettuce, grapes, corn and tobacco to control insects, nematodes, and mites [2,5,6].The excessive use of CBFmay cause several health effects such as vomiting, sweating, tumors, fasciculation, dyspnea, abdominal cramps, blurred vision, excessive salivation, respiratory failure generalized muscle, diarrhea, and death [4,7].Different analytical methods such as high performance liquid chromatography [8], gas chromatography-mass spectroscopy [9], surface Plasmon resonance (SPR) [9], tandem diode array–fluorescence [10],gas chromatography [11],multi-walled carbon nanotubes [12], liquid chromatography with UV detection [13], fluorescence [14], mass spectrometry [15], tandem mass spectrometry [16], Solid-liquid extraction [17], Liquid-liquid extraction [18], solid-phase extraction (SPE) [19,

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

Jeabunnisha Khan[1] · Jipsi Chandra[1] · Roseline Xalxo[1] · Jyoti Korram[2] · Manmohan L. Satnami[2] · S. Keshavkant[1]

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

Jeabunnisha Khan[1] · Jipsi Chandra[1] · Roseline Xalxo[1] · Jyoti Korram[2] · Manmohan L. Satnami[2] · S. Keshavkant[1]

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ORIGINAL ARTICLE

Interaction of Folic Acid with Mn^{2+} Doped CdTe/ZnS Quantum Dots: In Situ Detection of Folic Acid

Sandeep K. Vaishanav[1,3] · Jyoti Korram[1] · Rekha Nagwanshi[2] · Indrapal Karbhal[1] · Lakshita Dewangan[1] · Kallol K. Ghosh[1] · Manmohan L. Satnami[1]

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Abstract

To utilize the nanomaterials as an effective carrier for the drug delivery applications, it is important to study the interaction between nanomaterials and drug or biomolecules. In this study GSH functionalized Mn^{2+}-doped CdTe/ZnS QDs has been utilized as a model nanomaterial due to its high luminescence property. Folic acid (FA) gradually quenches the FL of GSH functionalized Mn^{2+} − doped CdTe/ZnS QDs. The Stern-Volmer quenching constant (K_{sv}), binding constant (K_s) and effective quenching constant (Ka) for the FA-QDs system is calculated to be 1.32×10^5 M^{-1}, 1.92×10^5 and 0.27×10^5 M^{-1}, respectively under optimized condition (Temp. 300 K, pH 8.0, incubation time 40 min.). The effects of temperature, pH, and incubation time on FA-QDs system have also been studied. Statistical analysis of the quenched FL intensity versus FA concentration revealed a linear range from 1×10^{-7} to 5.0×10^{-5} for FA detection. The LOD of the current nano-sensor for FA was calculated to be 0.2 μM. The effect of common interfering metal ions and other relevant biomolecules on the detection of FA (12.0 μM) have also been investigated. L-cysteine and glutathione displayed moderate effect on FA detection. Similarly, the common metal ions (Na^+, K^+, Ca^{2+} and Mg^{2+}) produced minute interference while Zn^{2+} Cu^{2+} and Fe^{3+} exert moderate interference. Toxic metal ions (Hg^{2+} and Pb^{2+}) produced severe interferences in FA detection.

Keywords Mn^{2+} − doped CdTe/ZnS QDs · Detection of folic acid · LOD · Fluorescence quenching

Introduction

Folic acid (FA) is an essential biomolecule comprised of a pterin heterocycle, a *p*-aminobenzoyl moiety, and of L-glutamic acid. FA, also known as folate, folacin, or vitamin B9, can advance the red platelets and is recognized as an anti-anemia element [1]. Due to essential role of folate in DNA biosynthesis, requirements for this vitamin rises significantly during rapid cell growth of the embryo [2]. In vivo, FA is reduced on the pterin ring at 5, 6, 7 and 8th positions by dihydrofolate reductase to produce biologically active tetrahydrofolate (THF) [3]. THF and its subordinates are co-factors in single carbon exchange reaction and are required in the biosynthesis of purines, thymidylate, and various amino acids [4, 5]. Human unable to produce folate denovo and depend completely on their diet to avail this vitamin [6]. Folate nutritional status is reliant on intake with food and supplements, and on the bioavailability of the different ingested forms [7]. Since FA is crucial for the proper functioning of various physiological processes in humans, it is vital to design simple, selective and sensitive techniques to detect folic acid in biological system.

During the previous decades, semiconductor nanocrystals (quantum dabs, QDs) have gained incredible interest because of their exceptional optical and electronic properties, originating from their substantial surface-to volume ratio and confinement effect, and have demonstrated to be promising in various applications including biological markers [8–14], light-emitting diodes [15, 16] or solar cells [17]. One essential subgroup of QDs are those doped with a small extent of dopants to change their optical, electronic and magnetic properties for different desired applications [18–20]. These doped QDs

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ORIGINAL ARTICLE

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Abstract

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Keywords Mn^{2+} – doped CdTe/ZnS QDs · Detection of folic acid · LOD · Fluorescence quenching

Introduction

Folic acid (FA) is an essential biomolecule comprised of a pterin heterocycle, a *p*-aminobenzoyl moiety, and of L-glutamic acid. FA, also known as folate, folacin, or vitamin B9, can advance the red platelets and is recognized as an anti-anemia element [1]. Due to essential role of folate in DNA biosynthesis, requirements for this vitamin rises significantly during rapid cell growth of the embryo [2]. In vivo, FA is reduced on the pterin ring at 5, 6, 7 and 8th positions by dihydrofolate reductase to produce biologically active tetrahydrofolate (THF) [3]. THF and its subordinates are co-factors in single carbon exchange reaction and are required in the biosynthesis of purines, thymidylate, and various amino acids [4, 5]. Human unable to produce folate denovo and depend completely on their diet to avail this vitamin [6]. Folate nutritional status is reliant on intake with food and supplements, and on the bioavailability of the different ingested forms [7]. Since FA is crucial for the proper functioning of various physiological processes in humans, it is vital to design simple, selective and sensitive techniques to detect folic acid in biological system.

During the previous decades, semiconductor nanocrystals (quantum dabs, QDs) have gained incredible interest because of their exceptional optical and electronic properties, originating from their substantial surface-to volume ratio and confinement effect, and have demonstrated to be promising in various applications including biological markers [8–14], light-emitting diodes [15, 16] or solar cells [17]. One essential subgroup of QDs are those doped with a small extent of dopants to change their optical, electronic and magnetic properties for different desired applications [18–20]. These doped QDs

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ORIGINAL ARTICLE

Interaction of Folic Acid with Mn^{2+} Doped CdTe/ZnS Quantum Dots: In Situ Detection of Folic Acid

Sandeep K. Vaishanav[1,3] · Jyoti Korram[1] · Rekha Nagwanshi[2] · Indrapal Karbhal[1] · Lakshita Dewangan[1] · Kallol K. Ghosh[1] · Manmohan L. Satnami[1]

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Abstract

To utilize the nanomaterials as an effective carrier for the drug delivery applications, it is important to study the interaction between nanomaterials and drug or biomolecules. In this study GSH functionalized Mn^{2+}-doped CdTe/ZnS QDs has been utilized as a model nanomaterial due to its high luminescence property. Folic acid (FA) gradually quenches the FL of GSH functionalized Mn^{2+} − doped CdTe/ZnS QDs. The Stern-Volmer quenching constant (K_{sv}), binding constant (K_s) and effective quenching constant (Ka) for the FA-QDs system is calculated to be 1.32×10^5 M^{-1}, 1.92×10^5 and 0.27×10^5 M^{-1}, respectively under optimized condition (Temp. 300 K, pH 8.0, incubation time 40 min.). The effects of temperature, pH, and incubation time on FA-QDs system have also been studied. Statistical analysis of the quenched FL intensity versus FA concentration revealed a linear range from 1×10^{-7} to 5.0×10^{-5} for FA detection. The LOD of the current nano-sensor for FA was calculated to be 0.2 μM. The effect of common interfering metal ions and other relevant biomolecules on the detection of FA (12.0 μM) have also been investigated. L-cysteine and glutathione displayed moderate effect on FA detection. Similarly, the common metal ions (Na^+, K^+, Ca^{2+} and Mg^{2+}) produced minute interference while Zn^{2+} Cu^{2+} and Fe^{3+} exert moderate interference. Toxic metal ions (Hg^{2+} and Pb^{2+}) produced severe interferences in FA detection.

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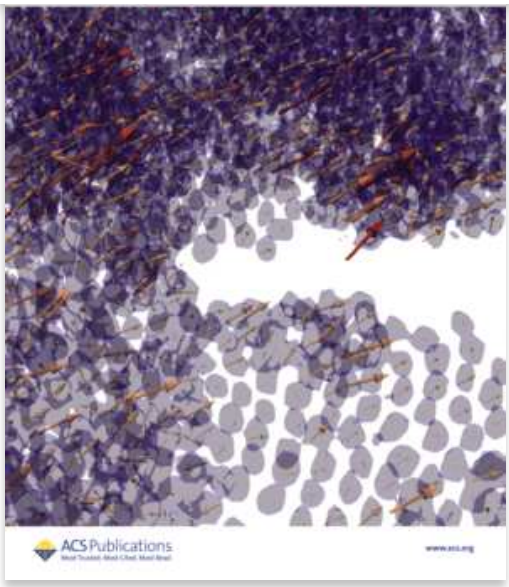
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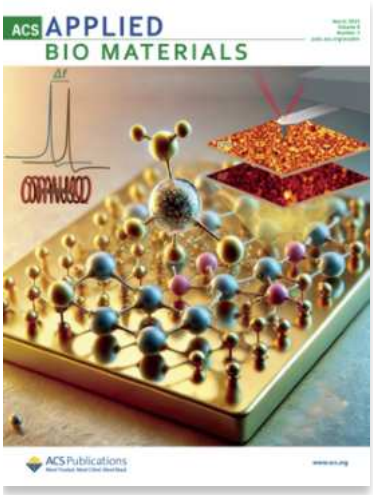
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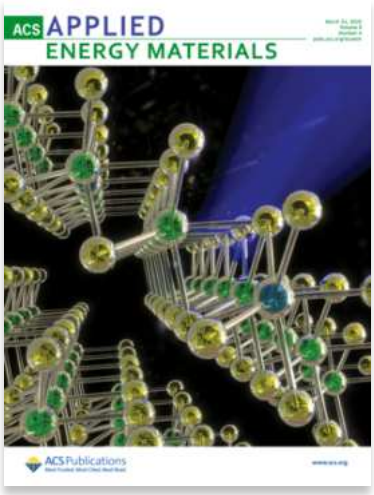
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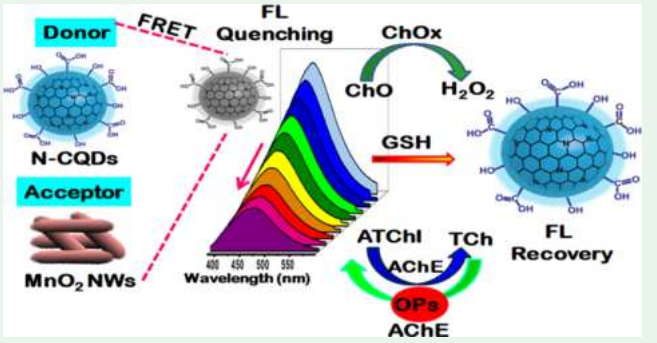
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KEYWORDS: *N-CQDs, MnO_2 nanowires, cholesterol oxidase, cholesterol, glutathione, acetylcholinesterase, chlorpyrifos*

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1. INTRODUCTION

Currently, most research studies have been focused on the eco-friendly synthesis and optical, electronic, and biochemical applications of N-CQDs.[1−4] The doping of nitrogen into carbon frameworks through bottom-up strategies has shown excellent performance in many areas, i.e., biosensing[5] and bioimaging.[6−8] The stabilization of the exciton of the CQDs by passivation of surface-active sites through nitrogen doping can effectively improve their emission properties, low toxicity, and high stability. The photoluminescence quantum yield of the N-doped CQDs is much larger than that of undoped CQDs.[9,10] Significant attention has been paid to the development of N-CQD-based assays for fluorescence turn off−on sensing and detection of biomolecules, i.e., acid phosphatase,[11] thiol-containing compound,[12,13] acetylcholinesterase,[14] uric acid,[15] ascorbic acid,[16,17] peroxidase,[18] glucose,[19] alkaline phosphatase,[20] and aflatoxin B_1.[21] Phyto-derived N-CQDs have also been used for degradation of safranin-O dye.[22]

The fluorescence resonance energy transfer (FRET) phenomenon between donor and acceptor molecules has been widely studied because of the conjunction of quantum dots and nanomaterials with biomolecules for the construction of absolute sensors. The FRET induced by nanomaterials such as silver nanoparticles,[23] gold nanoparticles,[24] g-C_3N_4,[25] and molybdenum sulfide[26] has been used for fluorescence sensing and detection of numerous analytes.[27,28] Recently, Yan et al.[29] developed the MnO_2 nanosheet-carbon dots sensing platform for determination of organophosphorus pesticide in the linear range of 0.05−5 ng mL^{-1}, with a low detection limit of 0.015 ng mL^{-1}. The inner filter effect of MnO_2 NS/BNQD has been applied for detection of glutathione with the limit of detection of 160 nM in the range of 0.5−250 μM.[30] The nanowire and nanorod morphology shows a higher surface area than those of nanosheets and bulk commercial MnO_2.[31,32] With the

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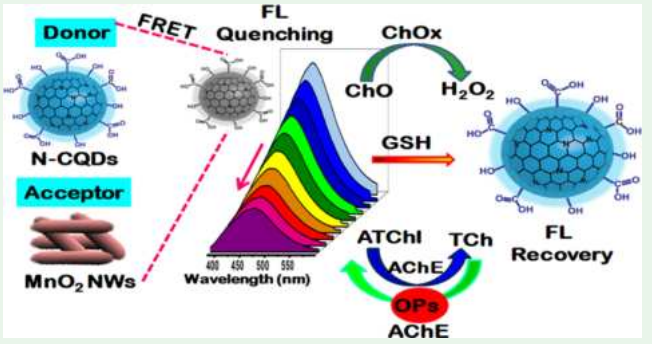
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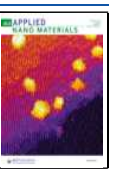
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Alkaline Phosphatase Immobilized CdTe/ZnS Quantum Dots for Dual-Purpose Fluorescent and Electrochemical Detection of Methyl Paraoxon

Lakshita Dewangan, Jyoti Korram, Indrapal Karbhal, Rekha Nagwanshi, Kallol K. Ghosh, Shamsh Pervez, and Manmohan L. Satnami*

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ABSTRACT: A facile paper-based fluorescence sensing and electrochemical behavior of CdTe/ZnS quantum dots (QDs) for detection of methyl paraoxon has been reported. The hydrolytic activity of alkaline phosphatase (ALP) for methyl paraoxon was observed to produce *p*-nitrophenol in the presence of QDs. The fluorescence quenching of CdTe/ZnS QDs by *p*-nitrophenol was measured as a quantitative signal for the detection of methyl paraoxon. A paper chip-based sensor has been developed by deposition of CdTe/ZnS QDs into cellulose paper. The significant increase in oxidation current in the cyclic voltammogram of methyl paraoxon solution in the presence of ALP is observed using a glassy carbon electrode (GCE) modified with CdTe/ZnS QDs. The linear relationship between oxidation and reduction peak currents against concentration of methyl paraoxon is utilized as a quantitative signal of electrochemical detection of methyl paraoxon. Under optimum conditions, both fluorescence- and paper-based methods showed a limit of detection (LOD) ≈ 0.65 nM whereas cyclic voltammetry provided a 2-fold higher LOD (1.72 nM) for sensing of methyl paraoxon. Therefore, the present method is a new insight for the rapid, convenient, and trace amount detection of methyl paraoxon.



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1. INTRODUCTION

Inorganic semiconductor quantum dots have been replaced by organic fluorophores because of their high resistance to photobleaching and intense light emission with high quantum efficiency.[1,2] In semiconductor quantum dots (QDs), an increase in the number of confined dimensions yields a stronger degree of electronic confinement and thus a wider range of tunability in the bandgap, although exceptions to this trend have also been reported.[3−5] Despite high quantum yields (QYs), high stability, and bright and photostable capabilities, their biological applications are limited because cadmium-based QDs would release toxic Cd^{2+} when used in the cells or tissues.[6−8] Capping a shell of ZnS can not only decrease the toxicity of cadmium but also effectively eliminate the surface dangling bond. Developing a core−shell CdTe/ZnS, with a CdTe core and a ZnS shell is a suitable approach to solve this problem.[9−11] Apart from the different applications, the immobilization of CdTe/ZnS QDs with glucose oxidase,[12] cholesterol oxidase,[13] and organophosphorus hydrolase[14] has been reported to be used for detection of glucose, cholesterol, and methyl paraoxon, respectively.

Alkaline phosphatase is one of the most essential hydrolyses and an important biomarker in the diagnosis of various diseases such as bone disease, liver dysfunction, diabetes, prostatic cancer, etc.[15−17] The abnormal level of alkaline phosphatase in the human body is a signal for a variety of disease states, particularly involving in the cirrhosis, nephritis, rickets, and anemia.[18,19] Alkaline phosphatase bound enzyme is widely distributed in the tissues of living organisms. The normal level of alkaline phosphatase in human serum is 40−190 U/L for adults.[20,21] Alkaline phosphatase can cause a dephosphorylation reaction for nucleic acids,[22] proteins,[23] small molecules, and could be responsible for removal of the phosphate group of pesticides.[24] Methyl paraoxon pesticides have been widely used in agriculture and could cause serious health problems for humans even at very low concentrations.[25] To date, many methods such as colorimetric,[26] capillary electrophoresis,[27] electrochemiluminescence,[28] surface plasmon resonance,[29] and surface enhanced Raman scattering[30] have been used for enzymatic detection of methyl paraoxon

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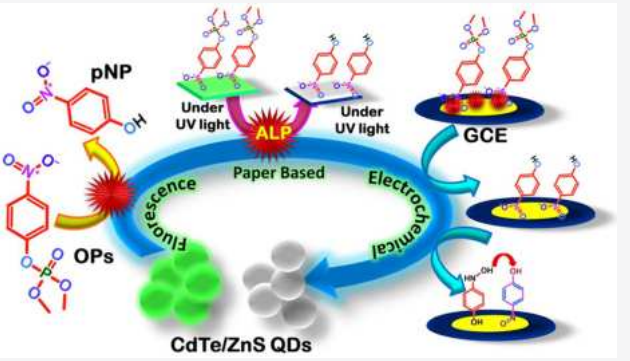
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1. INTRODUCTION

Inorganic semiconductor quantum dots have been replaced by organic fluorophores because of their high resistance to photobleaching and intense light emission with high quantum efficiency.[1,2] In semiconductor quantum dots (QDs), an increase in the number of confined dimensions yields a stronger degree of electronic confinement and thus a wider range of tunability in the bandgap, although exceptions to this trend have also been reported.[3−5] Despite high quantum yields (QYs), high stability, and bright and photostable capabilities, their biological applications are limited because cadmium-based QDs would release toxic Cd^{2+} when used in the cells or tissues.[6−8] Capping a shell of ZnS can not only decrease the toxicity of cadmium but also effectively eliminate the surface dangling bond. Developing a core−shell CdTe/ZnS, with a CdTe core and a ZnS shell is a suitable approach to solve this problem.[9−11] Apart from the different applications, the immobilization of CdTe/ZnS QDs with glucose oxidase,[12] cholesterol oxidase,[13] and organophosphorus hydrolase[14] has been reported to be used for detection of glucose, cholesterol, and methyl paraoxon, respectively.

Alkaline phosphatase is one of the most essential hydrolyses and an important biomarker in the diagnosis of various diseases such as bone disease, liver dysfunction, diabetes, prostatic cancer, etc.[15−17] The abnormal level of alkaline phosphatase in the human body is a signal for a variety of disease states, particularly involving in the cirrhosis, nephritis, rickets, and anemia.[18,19] Alkaline phosphatase bound enzyme is widely distributed in the tissues of living organisms. The normal level of alkaline phosphatase in human serum is 40−190 U/L for adults.[20,21] Alkaline phosphatase can cause a dephosphorylation reaction for nucleic acids,[22] proteins,[23] small molecules, and could be responsible for removal of the phosphate group of pesticides.[24] Methyl paraoxon pesticides have been widely used in agriculture and could cause serious health problems for humans even at very low concentrations.[25] To date, many methods such as colorimetric,[26] capillary electrophoresis,[27] electrochemiluminescence,[28] surface plasmon resonance,[29] and surface enhanced Raman scattering[30] have been used for enzymatic detection of methyl paraoxon

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Alkaline Phosphatase Immobilized CdTe/ZnS Quantum Dots for Dual-Purpose Fluorescent and Electrochemical Detection of Methyl Paraoxon

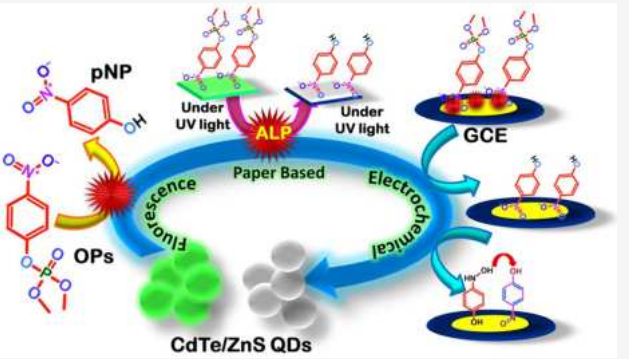
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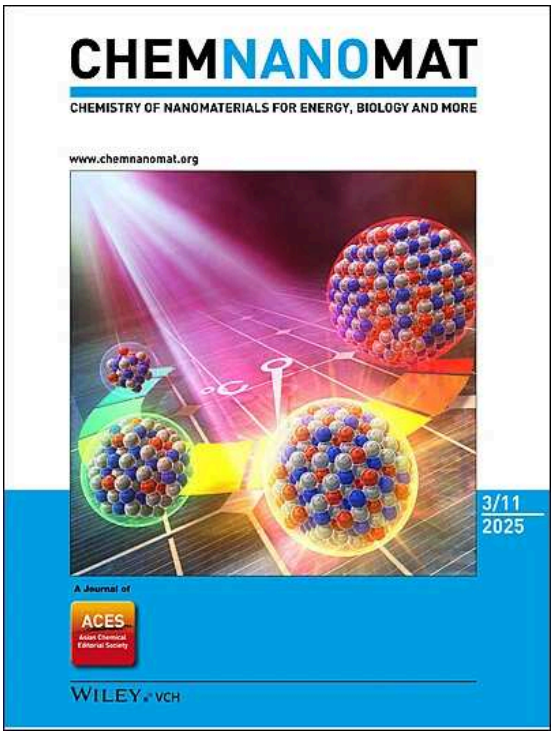
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Honeycomb Boron Carbon Nitride as High-Performance Anode Material for Li-Ion Batteries

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Abstract: 3D Porous carbon-based materials are well known for their excellent mechanical and electrochemical properties for various energy storage applications including Li-ion Battery (LIB) anodes. However, their commercial application is limited due to their low theoretical specific capacity. Heteroatom doping in carbonaceous networks proved an efficient way to modify the surface properties, which considerably improves the Li intake capacity and Li diffusion in porous carbon materials. In this work, we have synthesized 3D honeycomb boron carbon nitride (HBCN) from boric acid, glucose, and cyanamide. Silica nanoparticles (SiO_2 NPs) are used as structure-directing agents to replicate well-organized honeycomb structures. HBCN possesses a high specific surface area (SSA) of ~597 $m^2 g^{-1}$, with a uniform porosity distribution, low charge transfer resistance, and steady Li flux. When analyzed as an anode material for LIB, HBCN demonstrated an excellent specific capacity of ~652 $mAhg^{-1}$ and 408 $mAhg^{-1}$ at an input current density of 100 mAg^{-1} and 1 Ag^{-1} respectively and an energy density of 227 $Wh\,kg^{-1}$ at 1 C rate in a full cell LIB. These results indicate that the doping of B and N hetero atoms is significantly advantageous for LIBs application.

Introduction

The rechargeable Li-ion Battery (LIB) is the most extensively used energy storage system for consumer electronics applications due to its compact size, high energy density, and sufficiently long cycle life.[1] LIBs hold the potential to replace petroleum as a primary fuel in the automotive sector and are considered the most promising energy storage system for the next-generation hybrid electric vehicles (HEVs). The increased demands of high energy density, high capacity, low weight, low cost, and longer lifespan are achieved by the vital selection of electrode materials.[2] Graphite, being the state-of-the-art anode material for LIB, still faces problems to satisfy the ever-increasing energy/power density requirements due to its limited theoretical capacity (372 $mAhg^{-1}$). Hence, to achieve high energy demands, significant efforts have been employed for the development of alternate carbon-based anode chemistries, due to their robust architectural stability and superior electrochemical behavior.[3] Properties, such as unique structural morphology, large pore volume, excellent mechanical and thermal stability, less expensive with easier availability, etc. makes these carbon materials an obvious choice for designing electrode for LIBs and several other applications.[4-8] Moreover, systematic doping of heteroatoms like Boron (B), Nitrogen (N), Phosphorous (P), Sulfur (S), and Fluorine (F) in the carbon matrix can potentially tune the surface, electronic, and diffusion properties of carbon materials to enhance the theoretical limits on specific capacity.[9-12] N doping in the carbonaceous framework has been most comprehensively studied and resulted in a significant enhancement in the electrochemical behavior of graphitic and porous carbon. N atoms generally bond with carbon atoms with three common bonding configurations named pyridinic N, pyrrolic N, and graphitic N in the carbon matrix replacing carbon.[13,14] Similarly, Boron is an equally important dopant that is known to induce the complementary electronic properties to those of Nitrogen leading to specific application purposes.[15] Combined doping of N and B is also helpful in achieving high doping efficiency in a synergetic manner.[16,17] Boron carbon nitride (BCN) is an intermediate of semi-metallic graphene and insulating boron nitride (BN). BCN has found a place in several applications such as neutron absorbers, catalysts, and energy storage devices. BCN-based porous carbon materials are frequently reported as excellent supercapacitor electrodes due to the presence of both electrophilic and nucleophilic centers.[18,19] The presence of these active centers plays a key role to enhance the specific functionalities of these materials according to desired applications. Combined effects of heteroatom doping, porous carbon architecture, excellent charge transfer and ion diffusion properties of the doped surface, and higher defect density are expected to boost the electrochemical behavior of B, N doped carbon. BCN has been synthesized in various structural forms right from zero-dimensional (0 D),[20,21] 1 D,[22–24] and 2 D[25] in various literature for a range of applications. Interestingly, 3D BCN with porous morphology and controlled carbonaceous architecture has been reported scarcely in the literature.

Although it is a great challenge to design a 3D porous morphology with a ternary B

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BTEX in Ambient Air of India: a Scoping Review of their Concentrations, Sources, and impact

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Keywords BTEX · Ozone formation potential (OFP) · Volatile organic compound (VOCs)

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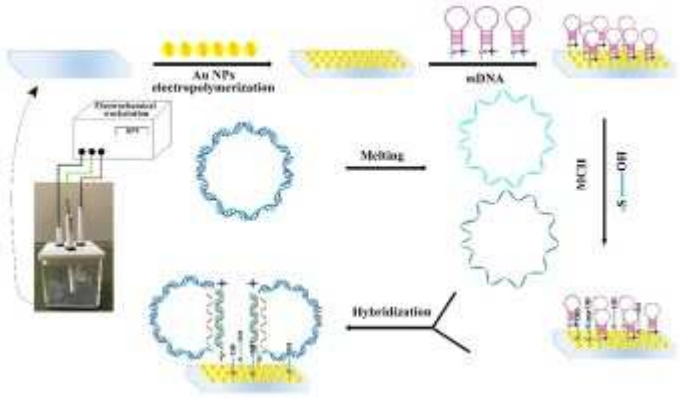
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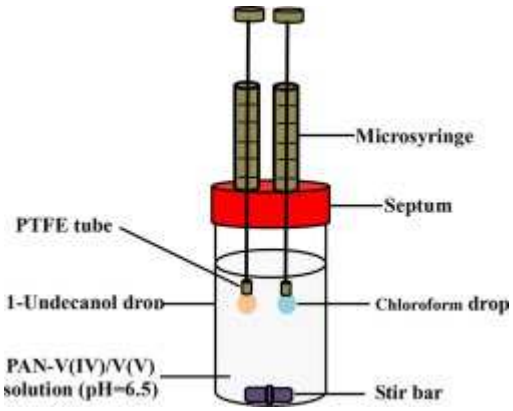
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N-doped, silver, and cerium co-doped carbon quantum dots based sensor for detection of Hg^{2+} and captopril

Lakshita Dewangan [a], Yogyata Chawre [a], Jyoti Korram [a], Indrapal Karbhal [a], Rekha Nagwanshi [b], Vishal Jain [c], Manmohan L. Satnami [a,*]

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ARTICLE INFO

Keywords:
N-CQDs
N/Ag-CQDs
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Fluorescence quenching
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ABSTRACT

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1. Introduction

In recent years, carbon quantum dots (CQDs) luminescence efficiency was evaluated in a useful way like heteroatom doping [1–3]. Compared with undoped CQDs, non-metallic atom like nitrogen doping on CQDs decreases some surface defects, increases their optical properties and quantum yields. CQDs doped with non-metallic atom (N) in combination with either co-doping with metal (Ag^{+}) and rare earth element (Ce^{3+}) could provide very bright fluorescence with good surface passivation, resistance to photobleaching and ultra-high photoluminescence quantum yields because of excitation energy traps [4–7]. The photoluminescence mechanism of heteroatom CQDs or co-doped CQDs depends on energy traps and conjugated electronic structure. The co-dopant silver (Ag^{+}) is used as biocompatible element with nitrogen passivated surface of CQDs, which enables the participation of lone pair electron of nitrogen for effectively enhancement of quantum yields [6,8–9]. On the other hand silver act as a strong lewis acid which has high affinity for nitrogen donor atom, that could result in formation of a stable complex between Ag-N by electron transfer mechanism and the outcome was successfully synthesized N/Ag-CQDs. In the N/Ce-CQDs, carboxyl group of CQDs can coordinate with Ce^{3+} in the interstitial state and provide more electrons for the CQDs. Cerium shows high stability in Ce^{3+} state, which protects the 4f energy level from the crystalline field and external chemical environment, and is used as an antioxidant for biomedical applications [10–14]. The applications of single heteroatom doped and co-doped CQDs have been reported for detection of drugs like daunorubicin [15], methimazole [16], gemcitabine [17], levodopa [18], cisplatin [19], and heavy metal ions like iron [20], arsenic [21], mercury [22], lead [23], organic pollutants [24], peroxides [25] and copper [26].

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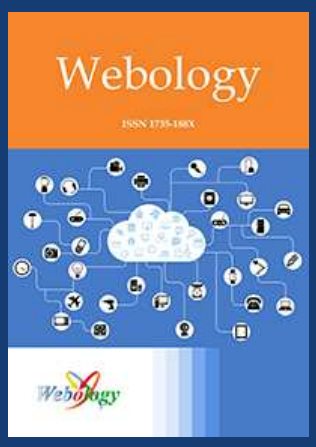
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Volume 18, No. 6, 2021

A Hybrid Outlier Detection-Based Dropout Prediction Model On Student Databases

Anil Kumar Tiwari , Sanjay Kumar

Abstract

Machine learning tools and techniques play a vital role in the education field and real-time applications. Most of the traditional machine learning models uses static metrics, limited data size and limited feature space due to high computational processing time. In this work, a hybrid outlier detection and data transformation approaches are implemented on the anomaly databases. In this work, hybrid outlier detection and data transformation approaches are implemented on the anomaly databases. Proposed data filtering module is applicable to high dimensional data size and feature space for classification problem. In the classification problem, an advanced boosting classifier is implemented on the filtered data in order to improve the true positive and error rate. Experimental results are simulated on MOOC dropout datasets with different feature space size and data size. Simulation results proved that the proposed boosting classifier has better error rate and statistical accuracy than the conventional approaches.

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Quality Of Service In Internet Of Things Using Software Defined Network: A Review

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[2] V. K. Patle
Assistant Professor,
School of studies in Computer Science and IT, Pt. Ravishankar Shukla University Raipur, Chhattisgarh, India.

Abstract: In the paper, variety of QoS models and technique models with methods have been proposed for IoT frameworks, which take advantage of architectural layer and subsystem weaknesses in an effort to tackle various factors of efficiency. Despite all the fact that IoT incorporates experiments and studies on QoS management, a new type of approach is needed to make this applicable to the IoT itself. Additionally, we observed that there is no QoS structure available for IoT which accounts for the stochastic and dynamic nature of IoT. An effective IoT architecture must adhere to the consumer and device preferences while still being extensible, modular, and scalable. QoS must be managed across mission-critical IoT layers and subsystems. In this paper, we examine the impacts of the Internet of Things components, also known as Core Network, on IoT We want to incorporate SDN technology into IoT architecture to include a single and unified QoS. Internet of Things (IoT) The standard of service (QoS) and resource allocation are equally essential. The most important thing to learn from this paper is seeking an ideal system and resource distribution model for IoT applications. That is, to satisfy industry and application demands, the QoS design must be adaptive and complex.

Keywords: Internet of Things (IOT), Software Defined Network (SDN), Quality of Services (QOS),

I. Introduction

Traditional networking is a combination of various networking equipment such as routers and ASICs that are used to implement particular applications. as a system configuration are pre-preprogramed with specialized rules (i.e., procedures) that cannot be reconfigured on the fly, and allow each device to execute its assigned functions. Also, because these systems are resource-constrained, laws cannot be pre-defined ahead of time. Because of this, conventional network systems are unable to adopt IoT policies in real-time.

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Article

Energy Saving Approaches in Multiple Layers of Internet of Things (IoT): A Review

June 2021 · Design Engineering 2021(6):4048-4061

Authors:

Aamir Hasan

V. K. Patle
Pandit Ravishankar Shukla University

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Abstract

The Internet was mainly used to exchange data packets between users and data servers. Today's world, the Internet is being used as a means to exchange data between a variety of small objects and mobile devices wired together to create the Internet of Things (IoT). The Internet of Things is a self-configuring and adaptive infrastructure consisting of a network of sensors and smart objects whose aim is to interconnect "all" things, including everyday objects and industrial objects, in such a way as to make them intelligent, programmable and more capable of communicating with humans. These smart objects operate on very low power and sources of electricity. In the last few decades, a large number of research works are done to save energy in this domain. This paper provides a deep study of various energy-saving approaches for different layers of IoT. This paper also provides a comparative study of various protocols of multiple layers of IoT available to work on these protocols associated with the energy optimization techniques.

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An Efficient Cluster-Based Feature Selection and Classification Framework for Student Dropout Prediction

PDF (https://www.provinciajournal.com/index.php/telematique/article/view/1266/1002)

Keywords:
MOOC dropout prediction; MOOC data; KDD dataset; machine learning algorithm.

Anil Kumar Tiwari
Disha College, Raipur (CG), India.

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Abstract

Massive Open Online Courses (MOOC) is an extensive way of providing online education to the students all over the world. According to statistics, this educational system has millions of students enrolled in hundreds of courses across a variety of activities. Since its inception, MOOC has faced a number of issues, one of which is known as the "student dropout prediction accuracy," which is also a significant difference between traditional teaching and MOOC. As a result of this fact, MOOC's overall performance has a negative impact on the true purpose of distance learning. In MOOCs, however, the gap between course registration and course completion is quite large. On the plus side, emerging technologies have opened up several opportunities for students to receive education online; however, due to a variety of factors, the dropout rate of online students is higher than that of traditional school students. The goal of this study is to better understand and predict the MOOC dropout rate. The multiple models and evaluation metrics generating variety of results as extracted from literature review. In this model, a hybrid cluster based feature selection model is implemented in order to optimize the class prediction. In this model, a hybrid cluster based metaheuristic model is designed and implemented on the classification problem.

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IMPROVING CLUSTERING ROUTING ALGORITHM FOR INTERNET OF THINGS PERCEPTION LAYER BASED ON ENERGY OPTIMIZATION

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ABSTRACT

In the Internet of Things (IoT), since battery replacement or recharging in sensor nodes is almost impossible, power consumption becomes one of the most important design considerations in the IoT perception layer. For an energy-constrained network, the clustering algorithm is critical for power conservation. Choosing the cluster head will help to balance the load in the network, lowering energy usage and increasing lifespan. This paper focuses on a cluster head election scheme that rotates the cluster head role among nodes. To select the next set of cluster heads for the network, the algorithm considers initial energy, residual energy, and an optimal value of cluster heads. The proposed work has integrated Particle Swarm Optimization (PSO) and Multi-Verse Optimization (MVO) approach with Ant Colony Optimization (ACO) based LEACH protocol. According to the simulation review, the updated variant outperforms the LEACH protocol by increasing throughput, lifespan, and residual energy.

Keywords: IoT, WSN, Energy Optimization, LEACH, ACO, PSO, MVO.

1. INTRODUCTION

Connected computers and artifacts may exchange data via the internet as part of IoT. An impermeable network that detects, monitors, and can be customized via the use of embedded technologies to communicate with one another is being developed. With high reliability and performance, the Internet of Things (IoT) offers instant access to knowledge connected to every computer (Bandyopadhyay et al., 2011). A basic 3-layer architecture (Zhao et al., 2013) present in Figure 1, is chosen from the collection of proposed models. This basic IoT architecture consists of a perception layer, a network layer, and a layer of an application. This research work mainly focuses on perception layer protocol to enhance performance concerning energy optimization.Wireless sensor networks (WSNs) are used to monitor and collect data from a specific region by transmitting it via a wireless network connection. WSNs are self-organizing, have the ability to quickly grow, and have a dynamic network architecture. In the military, industrial surveillance, fine agriculture, and home intelligence they have a broad range of uses. The primary goal of WSN routing research is to develop a routing algorithm that is efficient in the use of node energy, hence extending the lifespan of the whole network. It is divided into two phases: the setup phase and the steady state phase, according to the LEACH adaptive clustering routing method, which is a traditional and low-power adaptive clustering routing technique. The data from the network clusters is gathered, analyzed, and transferred during the setup phase, which is followed by the steady state phase. No promise can be made that the quantity, energy, and location of cluster heads will be distributed uniformly over the field of view. As a result, the cluster heads are picked at random using a probability distribution that has been specified (Singh et al., 2017).

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Energy-Efficient Hybrid Routing Protocol to Extend the Network Lifetime in IoT Applications

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Abstract - A Wireless Sensor Network (WSN) is made up of several inexpensive, low-power, compact sensor nodes that are densely placed across the monitoring area. Wireless connection creates a multi-hop wireless network system. WSN is particularly well suited for deployment in harsh environments and remote monitoring locations that are not suitable for personnel. It has significant advantages like a large coverage area and broad application prospects in the fields of military, environmental monitoring, industrial control, and urban transportation. IoT-enabled networks, however, suffer a variety of difficulties because of the enormous heterogeneous data generated by many sensing devices, including long communication delays, limited throughput, and short network lifetimes. In this study, a hybrid cluster-based routing protocol model is suggested that makes use of the advantages of both butterfly and particle swarm optimization methods. The suggested approach splits the network into many clusters and chooses the best node as the cluster leader to exacerbate the network's premature demise. The typical cluster-based routing protocols PSO and BOA are assessed using simulation results in terms of the quantity of alive nodes, throughput, and remaining energy of the nodes.

Keywords-Butterfly Optimization, Particle Swarm Optimization, Energy optimization, Cluster based IoT Routing, Hybrid Routing Protocols.

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1. INTRODUCTION

In wireless sensor networks, the energy is consumed when the communication is between nodes to nodes and between nodes and base stations, so efficient routing protocols have a crucial impact on the performance of the entire network. Clustering routing protocols,

Municipal Solid Waste Management & Disposal: Impact on Income & Employment Level of Sanitation Workers

Ram Pd. Chandra
Ravindra Brahme

ABSTRACT:

In this paper, we have discussed Management, Disposal and impact on Income & Employment level of sanitation workers of MSW in Ambikapur. The aim of the study to explain and describe of used methods for MSW of Ambikapur Municipal Corporations (AMC) and Impact of SLRM on employment and economic condition of sanitation workers. Municipal solid and liquid waste is a one of the biggest territory of concern in the all world. In growing countries like India, where is fastly rising in population growth and urbanization; and the improvement of people's standard of living; and the amount of MSLW is also increasing. SPSS 'version 20' and Jamovi '2.2.2' has been used for processing of the data and paired sample t-test and chi square test have been performed to test the relationship. Study result shows that AMC used of door to door waste collection is happening in hundred percent of all wards; and hundred percent used of waste management practices for collected waste and hundred percent disposal of municipal solid and liquid waste through bio-compost, biogas and vermicomsting. SLRM is a job oriented programme; whereby sanitation works, employment generations, income generation, increase of income level of the workers and appreciable type's impact of their economic conditions; and that is a faction of financial stability for AMCs; and sanitation workers looks this programme as a factor of generating employment and as a helpful in solving the economic problems.

Keyword: Municipal solid waste; Waste management; Waste disposal; Door-to-door waste collection; Income; Employment generation

JEL Classification: Q53, C12

Introduction

Municipal Solid Waste (MSW) has become a serious environmental problem in major cities all over world (Pamnani, 2014; Choudhury et al., 2017), and Economic development, urbanization and improving living standards of cities, have lead to an increase in the amount and complication of generated waste (Rathi S., 2006). Solid waste management is something that every city government provides to its residents. Although service levels, environmental impacts, and costs vary dramatic; and solid waste management is arguably the very important municipal service and serves as a condition for other municipal practices (Daniel et al., 2012). In developing countries, recent urbanization has increased the concentration of people resulting in accumulation of waste that needs to be properly managed and disposed (Ferri et al., 2015). With this in mind, it is necessary to determine the factors that influence solid waste management specific to each country context (Wilson, 2007). Integrated approach, Improving Solid Waste Management (Joseph et al., 2012; Kashyap, 2018), and the problem of solid waste management and its impact towards health and environmental problems is increasing and issue of SWM is one of the problems that need an improvement (Kassie, 2016). A sustainability approach takes into account the three pillars defined in the Johannesburg Plan of Implementation of the World Summit on Sustainable Development of 2002 (UN, 2002). The philosophy of the "Waste Management Hierarchy" (prevention/minimisation, materials recovery, incineration and landfill) has been adopted by most industrialised nations as the menu for developing municipal solid waste (MSW) management strategies (Sakai et al., 1996).

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The all world, MSW production were estimated at 1.6 billion tonnes in 2002 (Pappu et al., 2007); and it is estimated that by the year 2025 and 2050, solid waste production will reach respectively 2.2 and 4.2 billion tons/year (Saifullah, 2016). India's municipal population generated 114,576 tons/day of municipal solid waste in 1996, which is predicted to rise from four-times with regards to 440,460 tons/day by the year 2026. The maximum city ranges from 0.20 Kg to 0.6 Kg among the per capita waste production (Phapal et al., 2017). The typical rates of growth of MSW generation in the Indian cities are about 1.3% per annum (Bhide, 1998, Imura et al., 2005, Shekdar 2009) and municipal solid waste disposal is a common problem in most third world countries (Patrick, 2015). Researcher will be find out of the present study are use methods for waste management and disposal included (waste generation, waste collection, segregation, processing of waste) in AMC and Impact of the solid and liquid resource management (SLRM) Centre on employment and economic condition of the sanitation workers.

Review of Literature

(Saifullah and Islam) discussed Municipal solid waste management in Dhaka City Corporation (DCC). The aims of the study to explore current MSWM scenario in DCC; and find out the MSW production in the city is 4634.52 tons/day. Operational and collection efficiency of DCC MSWM is respectively 45% and 60%. Open dumping is a most serious issue for groundwater, air pollution and environmental pollution and greenhouse gas emissions. (Choudhury M., Dutta J., 2017), conducted a research on A comparative study of the status of municipal solid waste management for three major cities in Upper Assam India. Researcher major factors identified that Riparian ecosystem, Vermicomposting, Biogas and need advanced technological measures. Study shows that there is a good scope of biogas production and vermicomposting from waste dumping areas as 90% on average the waste is bio-degradable. (Contreras et al., 2010), researcher studies an issues factors analytical model to evaluate the current, last and to-be, municipal solid waste management strategic for the cities of Boston and Yokohama; and considered four factors who legal, socio-economic, technology development and institutional, inter-regional and international factors. (Zaman U.A., 2013), conducted a research on identification of waste management development factors and potential emerging waste treatment technologies in the Swedish context. Social, economic and environmental factors were considered. (Shekadar A.V., 2009), evaluated conceptual issues surrounding the sustainability of solid waste management. Despite all these researches, a number of developing countries are still facing recycling waste management related challenges. (Garnett et. al., 2017), conducted a research on explored attitudes towards greater levels of public involvement in waste management decision-making. Studies focused on factors perception, interests, the decision context, the means of engagement and the necessary resources and capacity for adopting a participatory decision. (Patrick A.N., 2015), evaluated conceptual issues management and disposal of municipal solid waste in Abakaliki metropolis, Nigeria; and result find that poor waste management and disposal system of Abakaliki metropolis and suggested that improve waste management services.

A Brief Review of the Study Area

Ambikapur is a city and headquarters of Surguja District. This district is one of the oldest districts in the state of Chhattisgarh in east-central India. Ambikapur is also the divisional headquarters of the Surguja Division, which consists of five districts Surjua, Jashpur, Korea, Balrampur and Surajpur. Ambikapur was the capital of the princely state of Surguja before Indian independence. The city derives its name from the Hindu goddess Mahamaya (Ambika Devi). Ambikapur is one of the largest cities in Chhattisgarh. Sarguja (Ambikapur) district is resplendent with natural aesthetic. Hence, the tourism possibilities of the place are bright enough to earn a pretty amount of revenue the year. Wealthy with several surround natural treasure and with a culture of its own, Ambikapur city of Chhattisgarh stands a prosperous platform of the state that exudes positive prospects. Sarguja (Ambikapur) generate income

for the regional people through farming and animal husbandry too. In AMCs started Solid and Liquid Resource Management Centre (SLRM) in 2014-15 and involve this campaign in AMCs Officers/employee, Public representatives and female self-help group of Ambikapur city. SLRM works basis of totally female self-help and it is a greatest example of woman empowerment. In swachh survekshan (SS) 2020, AMCs has been India's cleanest city no. 1 (in 10 Lakh Population range). SS 2019, AMCs has been adjudged 'India's Cleanest City No. '2' and SS 2018, SS 2017 rank respectively '11' and '15' at the National level swachh survekshan report (Swachh survekshan report 2017, 2018, 2019 and 2020).

Figure 1: Map of Ambikapur Municipal Corporation Area

Source: Prepared by chips DIS division and first Author Ph.D. Thesis (http://nagarnigamambikapur.co.in/municipal_boundries.php)

Objective of the Study

Two main objective of the study are:

- To study used methods for waste management and disposal of the AMCs.
- To analyses Impact of SLRM on employment and economic level of sanitation workers.

Methodology and hypothesis

The study based on primary data and Interview-schedule method used for the data collection. 40 samples choose through random sampling for study out of 400 SLRM workers from 4 areas (East-100, West-100, South-100 and North-100). AMCs is divided by 4 core areas (East, West, South and North) of the municipal Corporation area and total 18 SLRM Centre established for management and disposal of door-to-door collected householders solid and liquid waste. SPSS 'version 20' and Jamovi 'version 2.2.2' statistical software has been used for processing of the data and Paired sample T-test and Chi square test have been performed to test the relationship (Nagar and Mittal, 2012; Shukla and Sahai, 2013).

χ^2 Chi Square test:

χ^2 Chi Square test formula is following extract:

$$\chi^2 = \sum \left\{ \frac{(f_o - f_e)^2}{f_e} \right\}$$

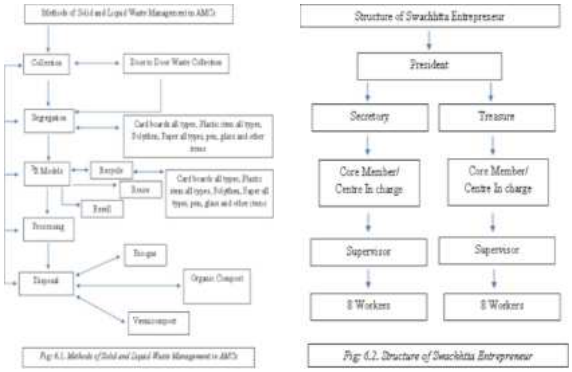
Where: χ^2 = Chi square test; f_o = Observed frequency; f_e = Expected frequency

1. H_{01}: There is no significant difference between Income before and after start SLRM Programme of the SLRM workers.
   Ha_1: There is significant difference between Income before and after start SLRM Programme of the SLRM workers.
2. H_{02}: There is no significant impact of SLRM on employment level of the SLRM workers.
   Ha_2: There is a significant impact of SLRM on employment level of the SLRM workers.
3. H_{03}: There is no significant impact of SLRM on economic condition of the SLRM workers.
   Ha_3: There is a significant impact of SLRM on economic condition of the SLRM workers.

Methods of Waste Management and Disposal

AMC is used waste management techniques are door to door collection method for collect the householder's generated waste in hundred percent of wards. Segregation of collected waste in SLRM center in category wise (card board all types, new paper, plain paper, glossary paper, pen, plastic item, all types of glasses and other items). The dry waste is Recycle, Reuse and Resell (^{3}R Model), and used biogas, organic composting and vermicomposting for disposal of collected waste; thus hundred percent used of waste management practices and disposal methods. AMCs claim hundred percent of a dumping

yard free city of the state; and claim hundred percent of bin free city validate on-ground level and the city's damp waste are getting treated at the waste treatment plant. AMCs is also use techniques ICT based monitoring system; the city comes to displaying of information, education and communication messages through hoarding, paintings and banners/writings in all commercial and public areas and sanitation awareness programs organized in school and college level; and main characteristics of the SLRM Centre are works forces totally basis of the female self-help groups; and in this way, a good example of women empowerment is being presented. Fig: 6. shows that Waste Management and Disposal Methods of AMCs and structure of Swachhta Entrepreneurs.



Source: First Author Ph.D. Thesis

Figure 2: Waste Management and Disposal Methods of AMCs; and Structure of Swachhta Entrepreneur

Condition of Ambikapur Municipal Corporation (AMC) before and after start SLRM Program



Source: First Author Ph. D. Thesis

Figure 3: Condition of AMC before and after start SLRM Program

Condition of Dumping Yard before and after Start SLRM Program



Source: First Author Ph. D. Thesis

Figure 4: Condition of Dumping Yard before and after Start SLRM Program

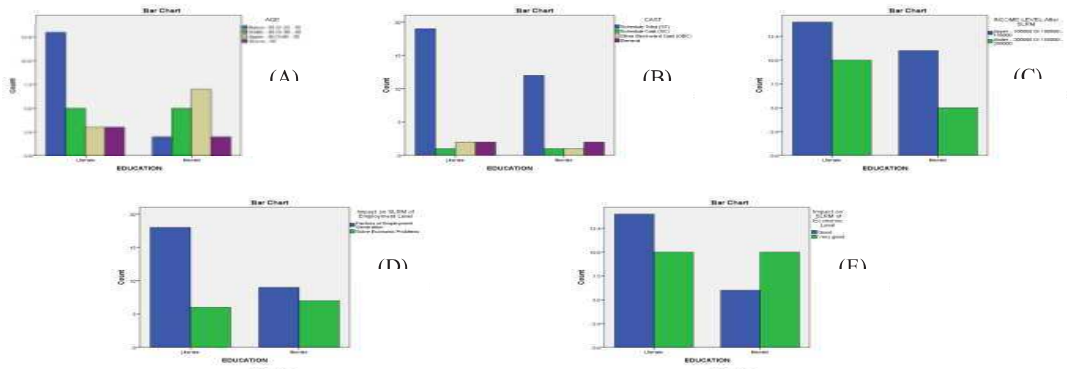
Data Analysis

Table 1: Descriptive statistics

Variable	Description	Education		Statistics				
		Lit.	Illt.	$\bar{X}$	SE*	M	Z	SD
Age Groups	1= Below- 30 (20 – 30)	13 (54.2)	2 (12.5)	2.13	.169	2.0	1.0	1.067
	2= Under - 40 (30 – 40)	5 (20.8)	5 (31.2)					
	3= Upper - 40 (40 – 50)	3 (12.5)	7 (43.8)					
	4= Above - 50	3 (12.5)	2 (12.5)					
Cast	1= Schedule Tribe (ST)	19 (79.2)	12 (75.0)	1.15	.092	1.0	1.0	.580
	2= Schedule Cast (SC)	1 (4.2)	1 (6.2)					
	3= Other Backward Cast (OBC)	2 (8.3)	1 (6.2)					
	4= General	2 (8.3)	2 (12.5)					
Income level after start SLRM	1= Upper - 100000 (100000 – 150000)	14 (58.3)	11 (68.8)	2.38	.078	2.0	2.0	.490
	2= Under - 200000 (150000 – 200000)	10 (41.7)	5 (31.2)					
Impact of SLRM on Employment level	1= As a factor of generating employment	18 (75.0)	9 (56.2)	1.33	.075	1.0	1.0	.474
	2= As a helpful in solving economic problems	6 (25.0)	7 (43.8)					
Impact of SLRM on economic condition	1= Very Good	10 (41.7)	10 (62.5)	1.50	.080	1.5	1.0	.506
	2= Good	14 (58.3)	6 (37.5)					
								Total Observation- 40

Source: Author's calculated from primary data; Lit. = Literate; Illt. = Illiterate

Note: () = percentage, $\bar{X}$ = Mean, SE* = Standard error of Mean, M= Median, Z = Mode, SD = Standard deviation



Source: First Author's Ph.D. thesis

Figure 5: (A) Age group; (B) Cast distribution; (C) Income level after start SLRM; and (D) Impact of SLRM on employment generation and (E) Economic level of the SLRM workers.

Table 2: Testing of hypothesis

Testing of hypothesis					
Used test	variable	F-value	p-value	result	remarks
Paired sample T-test	Income level before & Income level after start SLRM	7.00	0.001*	H_0 Reject	Significant
χ^2 test	Impact of SLRM on Employment level	4.57	0.033*	H_0 Reject	Significant
χ^2 test	Impact of SLRM on Economic conditions	9.60	0.002*	H_0 Reject	Significant

Source: Author Calculated from Primary data; Note: * = p-value < .05, (result significant and null hypothesis rejected)

Interpretation and Discussion

Respondents are two groups considered literate and illiterate based on their education level. Table 1 presents that descriptive statistics of age group wise distribution of the SLRM works in this analysis. In term of age distribution, respondents extreme are 37.5% in age group 20-30; moderate are 25.0% in 30-40, 40-50 age groups and least are 12.5% in above-50 age groups; thus the literate and illiterate respondent are extreme and least respectively 54.2% (20-30), 12.5% (40-50 & above-50) and 43.8% (40-50), 12.5% (20-30 & above-50). Age wise of descriptive statistics mean, SE, median, Z (mode) and SD respectively shows are 2.13, 0.169, 2.0, 1.0 and 1.067. It is found that the extremely high respondents are age groups 20-30 between other age groups. Figure 5(A) shows that distribution of the education and age group. Table 1 show that descriptive statistics of cast wise distribution of the SLRM works in this analysis. In term of cast distribution, respondents extreme are 77.5% in ST; moderate are

10.0% in general and least are 5.0% SC; thus the literate and illiterate respondent are extreme and least respectively 79.2% in ST, 4.2% in SC and 75.0% in ST, 6.2% in SC & OBC. Cast wise of descriptive statistics mean, SE, median, Z and SD respectively shows are 1.15, 0.092, 1.0, 1.0 and 0.580. It is found that the extremely high respondents are ST cast between other cast. Figure 5(B) shows that distribution of the education and cast.

Table 1 presents that descriptive statistics of distribution of Income level after start SLRM programme of the SLRM works in this analysis. In term of Income level after start SLRM programme, respondents extreme are 62.5% in level 100000 – 150000 and least are 37.5% in Under - 200000; thus the literate and illiterate respondents are extreme and least respectively 58.3% in level 100000 – 150000, 41.7% in Under – 200000 and 68.8% in level 100000 – 150000, 31.2% in Under - 200000. It is found that the extremely high respondents are belonging to 100000 – 150000 Income level between other income level groups; and descriptive statistics of Income level mean, SE, median, Z and SD respectively shows are 2.38, 0.078, 2.0, 2.0 and 0.490. It is clear that respondent's income increasing after start SLRM programme. Figure 5(C) shows that Income level after start SLRM programme.

Table 1 presents that descriptive statistics of Impact of SLRM on employment level of SLRM works in this study. In term of Impact of SLRM on employment level, respondents extreme are 67.5% in As a factor of generating employment; least are 32.5% in As a helpful in solving economic problems; thus the literate and illiterate respondents are extreme respectively 75.0% and 56.2% in As a factor of generating employment and least respectively 25.0% and 43.8% in As a helpful in solving economic problems; and descriptive statistics of employment level mean, SE, median, Z and SD respectively shows are 1.33, 0.075, 1.0, 1.0 and 0.474. It is found that SLRM Programme the extremely high respondents are as a factor of generating employment. Figure 5(D) shows that highly Impact of SLRM on employment level of SLRM works. Table 1 show that descriptive statistics of types of Impact on economic level of the SLRM works in this study. In term of types of impact, respondents extreme and least average are 50.0% in good and 50.0% in very good; thus the literate and illiterate respondents extreme of good impact on economic level are 58.3% and 62.5% very good impact on economic level; and least of very good impact on economic level 41.7% and 37.5% good impact on economic level; and descriptive statistics of employment level mean, SE, median, Z and SD respectively shows are 1.50, 0.080, 1.5, 1.0 and 0.506. It is found that SLRM programme the extremely high respondents are a very good impact on their economic level. Figure 5(E) shows that Impact of SLRM on economic level of the SLRM workers.

Result and Hypothesis testing

Table 2 presents that Paired sample t-test of Income level before & Income level after start SLRM. T-test is statically significant and it is understood that the t- value = 7.00 at 5% level of significant and 39*df*, p-value = 0.001 < 0.05. Hence the alternative hypothesis (Ha_1) is accepted and rejects the null hypothesis (H_{01}). It is clear that there is significant difference between Income level after and before start SLRM Program; and income level increasing of the sanitary works after start SLRM.

Table 2 presents that chi square test of Impact of SLRM on Employment level. Chi square test is statically significant and it is understood that the χ^2 value = 4.57, 5% level of significant and 1*df*, p-value = 0.033 < 0.05. Hence the alternative hypothesis (Ha_2) is accepted and rejects the null hypothesis (H_{02}). So it is clear that there is significant Impact of SLRM on employment generation level of the SLRM workers and helpful of generating the employment.

Table 2 presents that chi square test of Impact of SLRM on Economic conditions. Chi square test is statically significant and it is understood that the χ^2 value = 9.60, 5% level of significant and 1*df*, p-value = 0.002 < 0.05. Hence the alternative hypothesis (Ha_3) is accepted and rejects the null hypothesis

(H_{03}). It is clear that there is significant Impact of SLRM on economic condition of the sanitary works; and helpful of solving their economic problems.

Conclusion

This paper presents current status of management and disposal of solid waste; and woman empowerment, employment generation & economic condition of the sanitary workers in AMC Chhattisgarh India. Municipal solid and liquid waste is a one of the biggest territory of concern in the all world. In growing countries like India, where is fastly rising in population growth and urbanization and with the improvement of people's standard of living; and the amount of MSLW is also increasing. Study result shows that AMC used door to door collection is happening in hundred percent of all wards, and hundred percent used of waste management practices for collected waste and hundred percent disposal of municipal solid and liquid waste; therefore AMC claim hundred percent of a dumping yard free city of the state; and claim hundred percent of bin free city validate on-ground level and the city's damp waste are getting treated at the waste treatment plant. Researcher observed that the main characteristics of the SLRM center are works forces totally basis of the female self-help groups; and it is appreciable example for woman empowerment. AMC used other methods of information education and communication messages (IECM) in the shape of wall writings, paintings, and banners/hoardings in all commercial and public areas displaying for people and householders awareness of the city. SLRM programme is a job oriented programme; whereby sanitation works, employment generations, income generation, increase of income level of the works and appreciable type's impact of their economic conditions; and that is a faction of Financial Stability for AMCs; and sanitation workers looks this programme as a factor of generating employment and as a helpful in solving economic problems.

Compliance with ethical standards

Declaration of Competing Interest: All Author's disclosed that No Competing Interest.

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Author's Contributions: Ram Pd. Chandra formulated its design, coordinated with the conduct of the study including data collection, performed the statistical analysis and interpreted the data, and drafted the manuscript; Ravindra Brahme conceived the study, participated in the design of the study, assisted in interpreting the data and helped to draft the manuscript; both the authors read and approved the final manuscript.

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RESEARCH ARTICLE

छत्तीसगढ़ से ग्रामीण मजदूरों के अल्पकालिक उत्प्रवास पर कोविड–19 का प्रभाव

सुनील कुमार कुमेटी[1]*, रविन्द्र कुमार ब्रम्हे[2]

[1]सहायक प्राध्यापक, अर्थशास्त्र अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय रायपुर, छत्तीसगढ़, भारत।

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ABSTRACT:
भारत में आर्थिक, औद्योगिक एवं सामाजिक विकास ने ग्रामीण क्षेत्र की जनसंख्या को शहरों की ओर प्रवासित होने का मार्ग प्रशस्त किया है। देश के कई प्रदेशों से लोग कुछ माह या दिनों के लिए अपना घर छोड़कर अन्य प्रदेशों में रोजगार की तलाश में प्रवास करते हैं। इस प्रकार के मौसमी प्रवास को तकनीकी दृष्टि से 'सर्कुलेशन माइग्रेशन' कहा जाता है, क्योंकि 'स्थानान्तरण' का अभिप्राय स्थायी रूप से अपना मूल स्थान छोड़ना नहीं होता है। देश में मजदूरों के इसप्रकार के स्थानान्तरण की संख्या करोड़ों में है। इसके बावजूद देश की आर्थिक नीतियों में इनके लिए कोई अनुकूल व्यवस्था या नीति निर्माण नहीं की गई है। छत्तीसगढ़ प्रदेश से भी प्रतिवर्ष बड़े पैमाने पर अल्पकालिक उत्प्रवास होता है। छत्तीसगढ़ के ग्रामीण क्षेत्रों में पूर्णकालिक रोजगार एवं लघु–उद्योगों के अभाव के कारण ग्रामीण जनसंख्या का अल्पकालिक उत्प्रवास इतनी अधिक मात्रा में होता है कि उससे क्षेत्र की आर्थिक, सामाजिक एवं राजनैतिक सक्रियता के समक्ष चुनौती प्रस्तुत हो गई है। अभी वर्तमान में कोविड–19 के कारण देश के विभिन्न प्रांतों से उत्प्रवासित मजदूरों को सकुशल घर वापसी एक चुनौती बन गई थी। कोविड–19 एवं लॉकडाउन के कारण आवागमन सुविधाओं के अवरूद्ध होने के कारण छत्तीसगढ़ प्रदेश के समक्ष भी एक चुनौती उत्प्रवासित मजदूरों को अपने मूल निवास स्थल की ओर सकुशल वापसी की थी। जिसका समाधान राज्य सरकार ने अपने स्तर पर करने का प्रयास किया और प्रदेश से उत्प्रवासित मजदूरों को सकुशल घर वापसी करवाया गया। किन्तु इस दौरान उत्प्रवासित मजदूरों को कोविड–19 के नियमों के पालन एवं सकुशल घर वापसी के लिए कई प्रकार की कठिनाईयों का सामना करना पड़ा है। प्रस्तुत शोध पत्र उत्प्रवास के कारणों, उत्प्रवासित मजदूरों को कोविड–19 के कारण होने वाली समस्याओं एवं भविष्य में उत्प्रवास की प्रवृत्ति के अध्ययन से संबंधित है।

KEYWORDS: अल्पकालिक उत्प्रवास, ग्रामीण विकास, रोजगार, कोविड–19, उत्प्रवास प्रवृत्ति।

INTRODUCTION:

कोविड–19 (कोरोना वायरस) महामारी पहली बार दिसम्बर 2019 में चीन के वूहान शहर में पहचाना गया था और धीरे–धीरे यह महामारी संपूर्ण विश्व को प्रभावित किया। मार्च 2020 को विश्व स्वास्थ्य संगठन

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छत्तीसगढ़ राज्य के रायपुरशहर की मलिन बस्तियो में ऊर्जा खपत

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सारांश:

सतत् विकास लक्ष्य को प्राप्त करने के लिए संयुक्त राष्ट्रसंध द्वारा 25 सितम्बर 2015 को 193 सदस्य देानों द्वारा 2030 तक 17 लक्ष्य निर्धारित किए गए है उसमें से 7वें क्रम पर सुलभ एवं स्वच्छ ऊर्जा है। सभी के लिए सस्ती विश्वसनीय टिकाऊ और आधुनिक ऊर्जा तक पहुंच सुंनिष्ि करनातथा विश्व की बढती हुई जनसंख्या की ऊर्जा की आवश्यकताओं को पूरा करना एक बहुत बडा चुनौतीपूर्ण कार्य है। स्वच्छ ऊर्जा की पहुंच सुनिश्चित करने के लिए सौर ऊर्जा पवन ऊर्जा जैसे नवीनीकरण स्रोतों पर निर्भरता को बढावा देना होगा। प्रस्तुत अध्ययन रायपुर शहर के 09 मलिन बस्तियों के 90 परिवारों के सर्वेक्षण से प्राप्त प्राथमिक समंकों पर आधारित है।प्रस्तुत अध्ययन में 20 परिवारों का पायलेट सर्वे किया गया तत्पश्चात अनुसूची में आवश्यक सुधार कर 70 परिवारों से जानकारी एकत्र की गई। इस तरह कुल 90 परिवारों से जानकारी एकत्र की गई। अध्ययन से ज्ञात हुआ है कि 100 प्रतिशत परिवार प्रकाश के लिए बिजली का उपयोग करते है। इसके अलावा मिटटीतेल का उपयोग किया जाता है। बिजली का उपयोग परिवारो के द्वारा मुख्यरुप सेप्रकाश के अतिरिक्त टेलीविजन,पंखा तथा कूलर के लिए किया जाता है। साथ ही रसोई ईंधन के लिए ऊर्जा के विभिन्न स्रोतों का उपयोग परिवारों द्वारा किया जाता है। प्रस्तुत अध्ययन से यह स्पष्ट है कि सर्वाधिक 100 प्रतिशत लोग रसोई ईंधन के लिए एल पी जी गैस का उपभोग करते है।इसके अतिरिक्त बिजली,कोयला एवं लकडी का भी उपभोग करते है।

शब्द कुंजी –सतत् विकास लक्ष्य,छत्तीसगढ़,रायपुर,मलिन बस्ति, ऊर्जा खपत।

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प्रस्तावना:

सतत् विकास लक्ष्य को प्राप्त करने के लिए संयुक्त राष्ट्रसंध द्वारा 25 सितम्बर 2015 को193 सदस्य देानों द्वारा 2030 तक 17 लक्ष्य निर्धारित किए गए हैं उसमें से 7वें क्रम पर सुलभ एवं स्वच्छ ऊर्जा है।सभी के लिए सस्ती विश्वसनीय टिकाऊ और आधुनिक ऊर्जा तक पहुंच सुंनिश्चित करना, विश्व की बढती हुई जनसंख्या की ऊर्जा की आवश्यकताओं को पूरा करना एक बहुत बडा चुनौतीपूर्ण कार्य है। स्वच्छ ऊर्जा की पहुंच सुनिश्चित करने के लिए सौर ऊर्जा पवन ऊर्जा जैसेनवीनीकरण स्रोतों पर निर्भरता को बढावा देना होगा।

शहरीकरण की प्रक्रिया में मलिन बस्तियों का स्वरुप विकासशील देशों में उप.उत्पाद के रुप में देखा जा रहा है(गोस्वामी एवं मन्ना,2013)।भारतीय जनगणना मलिन बस्तियों को आवासीय क्षेत्रों के रूप में परिभाषित करती है जहाँ आवास, भीड–भाड़, गलियों की अव्यवस्था, संकीर्णता या दोषपूर्ण व्यवस्था, रोशनदान की कमी, प्रकाश या स्वच्छता सुविधाओं या किसी भी संयाजन के अभाव में मानव आवास के लिए आयोग्य है। ये सारे कारक सुरक्षा और स्वास्थ्य के लिए हानिकारक है (जनगणना,2011)।भारत जैसे विकासशील देश में शहरीकरण बढ़ता जा रहा है, झुग्गीवासियों की संख्या में वृध्दि जारी रहने की सम्मवना है। इन क्षेत्रों में रहने की स्थिति में सुधार करने वाली महत्वपूर्ण नीतियों के अभाव में, लोग खराब स्वास्थ्य, हिंसा और गरीबी के जोखिम उठातें है (नाकामुरा,2014)।घोष सजल,2014के अनुसार विशेष रूप से ऊर्जा और बिजली की पहुँच में सुधार करना मलिन बस्तियों के विकास के लिए महत्वपूर्ण है।अग्रवाल, वन्दना और बन्दोपाध्याय ए.,2016ने अपना अध्ययन रायपुर शहर की ज्योतीनगर मलिन बस्ती में किया तथा बताया कि खाली भूमि जो सडकके पास हो तथा जहां पर पानी की उपलब्धता हो ऐसे कारकहै, जोमलिनबस्तियोंकी उत्पत्ति में महत्वपूर्ण भूमिका निभाते हैं।

विकासशील देशों में गरीबी को कम करने और आर्थिक विकास को बढ़ावा देने के लिए ऊर्जा सेवाओं की सस्ती और ऊर्जा की विश्वसनीय आधुनिक रूपों तक पहुँच में सुधार की आवश्यकता है (माल्ला और टिमिलसिना,2014)।अधिकांश सामाजिक और आर्थिक गतिविधियों में विभिन्न रूपों और मात्राओं में ऊर्जा के उपयोग की आवश्यकता होती है। खाना पकाने, पानी उबालने, और प्रकाश व्यवस्था जैसे बुनियादी उपयोग के लिए घरों में ऊर्जा उतनी ही महत्वपूर्ण है जितना की उत्पादन के लिए बड़े–बड़ें उद्योगों और ऑटोमोबाइल कम्पनियों मे (अफ्रिकन रिजनल इम्पलिमेन्टेसन,2005)।आज के बदलते परिवेश में ऊर्जा के क्षेत्र में छत्तीसगढ प्रदेश ने अपनी अलग पहचान बनायी है(अग्रवालएवं त्रिवेदी,2016)।छत्तीसगढप्रदेश के विभिन्न जिलों में प्रकाश एवं रसोई ईंधन के लिए ऊर्जा के उपभोग परसामाजिक आथिक स्थिति के

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साथ–साथ भौगोलिक स्थिति का भी प्रभाव पडता है(कृष्णनएवं ब्रह्मे,2019)।जनगणना 2011 के अनुसार छत्तीसगढ में रोशनी के लिए प्रयुक्त ऊर्जा का 67.04प्रतिशत बिजली, 30.51प्रतिशतमिट्टी तेल तथा 1.33प्रतिशत सौर ऊर्जा से प्राप्त है। ग्रामीण क्षेत्र में बिजली के लिए प्रयुक्त ऊर्जा का 62.01प्रतिशत बिजली, 35.14प्रतिशतमिट्टी तेल और 1.63प्रतिशत सौर ऊर्जा से प्राप्त है। शहरी क्षेत्र में बिजली के लिए प्रयुक्त ऊर्जा का 90.49प्रतिशत बिजली 8.75प्रतिशतमिट्टी तेल 0.09प्रतिशत सौर ऊर्जा से मिलता है। जनगणना 2011 के अनुसार छत्तीसगढ में रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 85.05प्रतिशत लकडी 0.77प्रतिशत फसल अवशेष 2.6प्रतिशत गोबर के कंडे है। ग्रामीण क्षेत्र में रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 93.25प्रतिशत लकडी 0.76प्रतिशत फसल अवशेष 3.2प्रतिशत गोबर के कंडे है। शहरी क्षेत्र में रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 52.28प्रतिशत लकडी 0.84प्रतिशत फसल अवशेष तथा 0.60प्रतिशत गोबर के कंडे से प्राप्त है।

प्रस्तुत अध्ययन का उद्धेश्य रायपुर शहर की मलिन बस्तियों के निदर्श परिवारों की सामाजिक आर्थिक स्थिति का अध्ययन करना एवं रायपुर शहर की मलिन बस्तियों के परिवारों द्धारा बिजली उपभोग की स्थिति का अध्ययन करना तथा परिवारा द्धाररसोई ईंधन के वर्तमान उपभोग की स्थिति का अध्ययन एवं विष्लेशण करना है।वर्तमान अध्ययन प्राथमिक तथा द्वितियक समंकों पर आधारित हैं। द्वितियक समंकों के लिए जिला जनगणना पुस्तिका, छत्तीसगढ़ जनगणना 2011 का किया गया है। प्रस्तुत अध्ययन रायपुर शहर के 09 मलिन बस्तियों के 90 परिवारों के सर्वेक्षण से प्राप्त प्राथमिक समंकों पर आधारित है।समंकों का संग्रहण अनुसूची के माध्यम से किया गया है। प्रस्तुत अध्ययन में 20 परिवारों का पायलेट सर्वे कुकुरबेडा और सरोनाबस्ती से किया गया तत्पश्चात अनुसूची में आवश्यक सुधार कर 70 परिवारों से समंक संग्रहण डूमर तालाब,सरोना ईंटाभट्ठा,सतनामीपारा,जगन्नाथ नगर, टाटीबंध बस्ती,रोटरी नगर एवं बाजारपारा से समंको से ग्रहण किया गया है। इस तरह कुल 90 परिवारों से जानकारी एकत्र की गई। मलिन बस्तियों मे खाना पकाने और प्रकाश के लिए ऊर्जा के प्रमुख स्त्रोतों का विश्रलेशण करने के लिए प्रतिशत विधि का प्रयोग किया गया है। शिक्षा और आय के मध्य संबंध ज्ञात करने काईं वर्ग (χ^2) का प्रयोग किया गया है।

मलिन बस्तियों की सामाजिक आर्थिक स्थिति

रायपुर शहर में 1991 में जनसंख्या4,62,694थी जो 2001 में 6,70,042हो गई तथा 2011 में बढकर 1,010,087हो गई। 2001 जनगणना में रायपुर शहर में मलिन बस्ती की संख्या 154 थी, जहां 26899 परिवार निवासरत थे तथा मलिन बस्ती की कुल जनसंख्या 159128 थी जो शहर की कुलजनसंख्या का 23.74प्रतिशत थी।2011 की जनगणना में मलिन बस्ती की संख्या बढकर 282 हो गयी जहां 87598

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परिवार निवासरत थे तथा मलिन बस्ती की कुल जनसंख्या 516829 थी जो शहर की कुलजनसंख्या का 51. 66प्रतिशत था।रायपुर शहर के 282 मलिन बस्तियों में से 212 मान्यता प्राप्त मलिनबस्तिया है।

तालिका-1: रायपुर शहर में मलिन बस्तियोंएवं परिवार की संख्या

	1991	2001	2006	2011
मलिन बस्तियो की संख्या	154	154	282	282
मलिन बस्तियों में परिवारों की संख्या	NA	26,899	61,449	87,598

स्त्रोत:नगरनिगम विकास कार्यक्रम

समाज में व्यक्तियों के जीवन से संबंधित महत्वपूर्ण पक्षों जैसे आयु, शिक्षा,प्रशिक्षण, रोजगार, निवास स्थान आदि तत्वों के अध्ययन को अस्वीकार नहीं किया जा सकता है क्योंकि ये सभी तत्व व्यक्ति की कार्यक्षमता को प्रभावित करती है।परिवार की आय का स्रोत महत्वपूर्ण स्थान रखता है व्यवसाय, नौकरी, मजदूरी आदि स्रोतों से प्राप्त आय परिवार की आर्थिकस्तर के साथ–साथ उनका जीवनस्तर भी निर्धारित करती हैं। परिवार की आय वह तत्व है जो व्यक्ति का जीवन स्तर निर्घारित करने के साथ–साथ परिवार की संरचना को प्रभावित करती है।

तलिका–2: निदर्श परिवारों मेंरोजगार का स्रोत

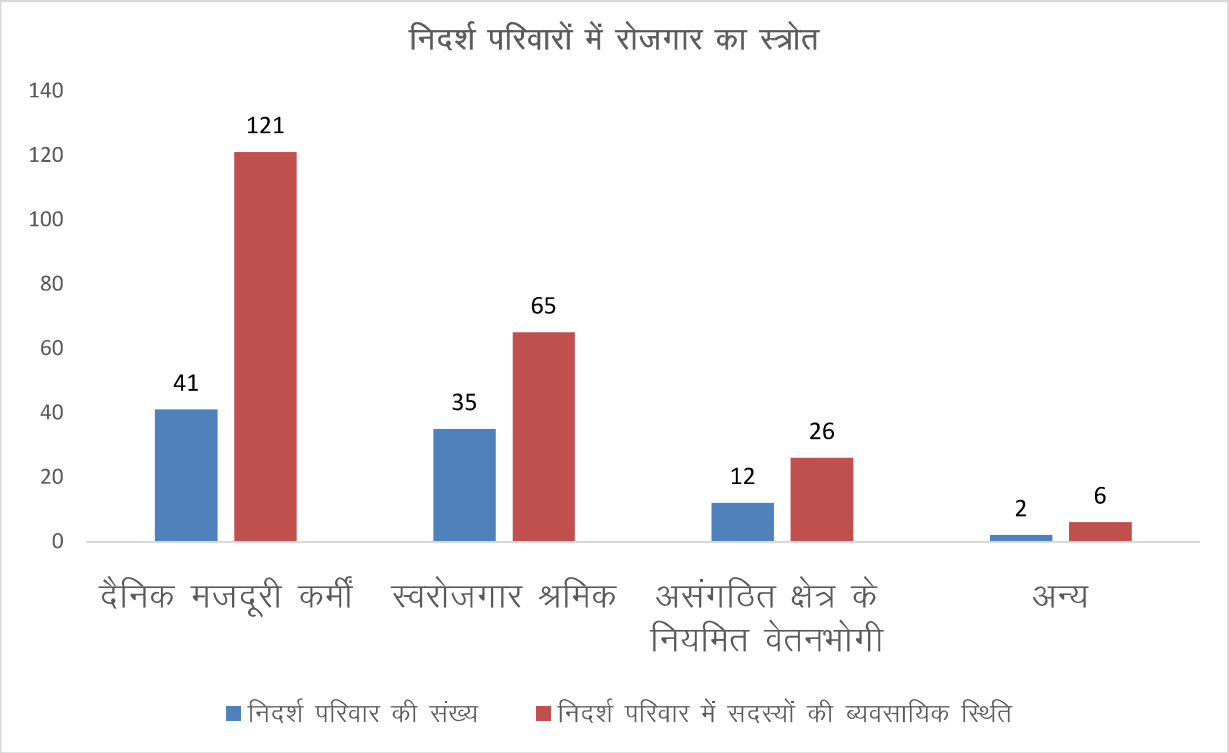
क्र	व्यवसाय	निदर्श परिवार की संख्या	निदर्शपरिवार प्रतिशत	निदर्श परिवार में सदस्यों की व्यवसायिक स्थिति	निदर्शपरिवारमें सदस्यों की व्यवसायिक स्थिति का प्रतिशत
1	दैनिक मजदूरी कर्मी	41	45.6	121	55.5
2	स्वरोजगार श्रमिक	35	38.9	65	29.8
3	असंगठित क्षेत्र के नियमित वेतनभोगी	12	13.3	26	11.9
4	अन्य	02	2.2	06	2.8
5	योग	90	100	218	100

स्त्रोतःसर्वे पर आधारित

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तालिका -2 के अनुसार निदर्श परिवार की मुखिया का 45.6 प्रतिशत दैनिक मजदूरी कर्मी(मजदूर)है, 38. 9प्रतिशत स्वरोजगारश्रमिक(रिक्शा, चालक,ठेलेवाले) एवं 13.3 प्रतिशत असंगठित क्षेत्र के नियमित वेतनभोगी(दुकान,कामवाली बाई) के माध्यम से जीवकोपार्जन करते है। निदर्श परिवार में कुल सदस्यों के 55. 5 प्रतिशत सदस्य दैनिक मजदूरी कर्मी (मजदूर)है, 29.8 प्रतिशत स्वरोजगार श्रमिक(रिक्शा,चालक,ठेलेवाले) एवं 11.9 प्रतिशत सदस्य असंगठित क्षेत्र के नियमित वेतनभोगी (दुकान,कामवाली बाई)है।



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तालिका -3: निदर्श परिवारों की आय एवं परिवार की संरचना

क्र	आय वर्ग (रु)	निदर्श परिवार संख्या	प्रतिशत	सभी परिवारों की सदस्य संख्या	सम्पूर्ण परिवार के कुल सदस्यों कीमासिक आय (रु)	परिवार का औसत आकार	परिवार की औसत मासिक आय (रु)	प्रति व्यक्ति औसत मासिक आय (रु)
1	0- 5000	29	32.2	156 (35.45)	125000	5.38	4310.3	801.1
2	5000-10000	29	32.2	135 (30.68)	230200	4.66	7937.9	1703.4
3	10000-15000	24	26.7	109 (24.7)	290000	4.5	12083.8	2685.2
4	15000-20000	06	6.7	30 (6.81)	264000	5.0	44000	8800. 0
5	20000 . से अधिक	02	2.2	10 (2.27)	55000	5.0	27500	5500. 0
6	योग	**90**	**100**	**440 (100)**	**964200**	**4.9**	**95832**	**19489.7**

स्त्रोतःसर्वे पर आधारित

तालिका - 3 के अनुसार 5000 रु तक मासिक आय प्राप्त करने वाले परिवार के मध्य 32.2प्रतिशत परिवार है एवं 5000 से 10000रु आय प्राप्त करने वाले परिवार के मध्य 32.2प्रतिशत परिवार है। 10000रु से 15000रु आय प्राप्त करने वाले परिवार के मध्य 26.7प्रतिशत परिवार है एवं 15000 से 20000 रु आय प्राप्त करने वाले परिवार के मध्य 6.7प्रतिशत परिवार है। 20000 रु से अधिक आय प्राप्त करने वाले 2 ण्2 प्रतिशत परिवार है।सभी परिवारों की सदस्य संख्या 440 है एवं परिवार का औसत आकार 4ण्9 है।सबसे कम मासिक आय (5000 रु तक)परिवारों का औसत आकार सर्वाधिक 5.38है। परिवारों की औसत मासिक आय रु 95832 है।सर्वाधिक औसत मासिक आय 10000-15000रु प्राप्त करने वाले परिवारों की 44000रु है।परिवारों की प्रति व्यक्ति औसत मासिक आय 19489.7रु है।सबसे कम प्रति व्यक्ति औसत मासिक आय 5000रु तक मासिक आय के परिवारों की 801.1रु है।सर्वाधिक प्रति व्यक्ति औसत मासिक आय 15000-20000रु प्राप्त करने वाले परिवारों की 8800 रु है।

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तालिका 4: निदर्श परिवारों की शैक्षणिक स्तर एवं आयनुसार वितरण

क		निदर्श परिवारो की आय एवं शैक्षणिक स्तर									
		अशिक्षीत (%)	केवल साक्षर	प्राथमिक स्तर	माध्यमिक स्तर	हाई स्कूल	हायर सेकेण्डरी	स्नातक	स्नातकोत्तरया अधिक	योग	
										संख्या	प्रतिशत
1	**0-5000**	03 (15.8)	03 (15.8)	02 (6.9)	04 (13.8)	01 (10.5)	05 (78.9)	01 5.3		19 (100)	21.1
2	**5000 - 10000**	04 (13.8)	02 (6.9)	04 (13.8)	06 (20.7)	05 (17.2)	04 (13.8)	04 (13.8)		29 (100)	32.2
3	**10000 – 15000**	01 (4.2)	02 (8.3)	02 (8.3)	02 (8.3)	06 (25)	04 (16.7)	06 (25)	01 (4.2)	24	26.7
4	**15000-20000**	-	-	03 (18.75)	02 (12.5)	06 (37.55)	03 (18.75)	02 (12.5)		16	17.8
5	**20000 –से अधिक**	-	-	-	-	-	01 (50.0)	01 (50.0)		02	2.22
6	योग	08	07	10	13	25	15	10	02	90	100

स्त्रोतःसर्वे पर आधारित।कोष्टक में प्रदर्शित संख्या प्रतिशत को दर्शाती है।

तालिका 4 निदर्श परिवारों की शैक्षणिक स्तर एवं आय अनुसार वितरण दर्शा रहा है जिससे स्पष्ट है कि 21.1प्रतिशत निदर्श परिवार 5000रु मासिक आय प्राप्त करते है, जिसका 78.9प्रतिशत हायर सेकेण्डरी तक शिक्षित है।5000 से 10000रु आय मासिक प्राप्त करने वाले 32.2प्रतिशत निदर्श परिवार हैं, जिसका सर्वाधिक 20.7प्रतिशत माध्यमिक सतर तक शिक्षित है। 10000 रु से 15000 तक मासिक आय प्राप्त करने वाले 26.7प्रतिशत निदर्श परिवार हैजिसका 16.7प्रतिशत हायर संकेण्डरी स्कूल तक शिक्षित है।15000 से 20000 रु मासिक आय प्राप्त करने वाले17.8प्रतिशत निदर्श परिवार है जिसका सर्वाधिक 37.5 प्रतिशत हाई स्कूल तक शिक्षित है।20000 से अधिक मासिक आय प्राप्त करने वाले 2.22प्रतिशत निदर्श परिवार है जिसका क्रमशः 50.00 प्रतिशत हायर सेकेण्डरी एवं 50.00 प्रतिशत स्नातक तक शिक्षित है।शैक्षणिक स्तर का आय पर प्रभाव ज्ञात करने हेतु काईं वर्ग (χ^2) का प्रयोग किया गया है।df. 25 तथासार्थकता स्तर(p)0.05पर परिगणितमूल्य (χ^2) 57.6हैएतथातालिका मूल्य(χ^2) 37.652 है ।विश्लेशण से ज्ञात होता है कि मलिन बस्तियोंके परिवारों मे शिक्षा के स्तर में होने वाली वृद्धि का उनकी आय पर सार्थक प्रभाव हुआ है।

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मलिन बस्तियोंमें प्रकाश हेतु ऊर्जा उपभोग

आधुनिक समाज में वर्तमान जीवन स्तर को बनाए रखने के लिए ऊर्जा अपरिहार्य है। यह आर्थिक और समाजिक विकास के मुख्य कारकों में से एक है अतः पिछले कुछ वर्षो में इसकी मांग काफी बढ़ गई है (भन्डारी एव पंडित,2018) ।ग्रेगरी एवं डेविड (2013)के अनुसारजैसे परिवार का आय बढता जाता है वैसे वैसे वह उच्च गुणवत्ता वाले ऊर्जा का उपयोग करता है तथा ऊर्जा सीढी में उपर चढते जाता है।ऊर्जा के लिए आय लोच कम होती है एवं परिवार की आयतथा आकार ऊर्जा के विभिन्न स्त्रोतआदि तत्व ऊर्जा मांग को प्रभावित करते है।

तालिका-5: रायपुर शहर के मलिन बस्तियों के परिवारों में प्रकाश हेतु ऊर्जा का उपभोग

क्र.		बिजली	बिजली एवं मिट्टी तेल	बिजली एवं मोमबत्ती
1	परिवारों की संख्या	90	03	03
2	परिवारों का प्रतिशत	100	5.6	3.3

स्त्रोतःसर्वे पर आधारित

तालिका 5 में रायपुर शहर के मलिन बस्तियों के परिवारों में प्रकाश हेतु ऊर्जा का उपभोग दर्शाया गया है। 100 प्रतिशत परिवार प्रकाश के लिएबिजली का उपयोग करते है।5. 6प्रतिशत परिवार प्रकाश के लिए बिजलीएवं मिट्टीतेलदोनों का उपयोग करते है। 3.3प्रतिशत परिवार प्रकाश के लिए बिजली एवं मोमबत्ती का उपयोग करते है।

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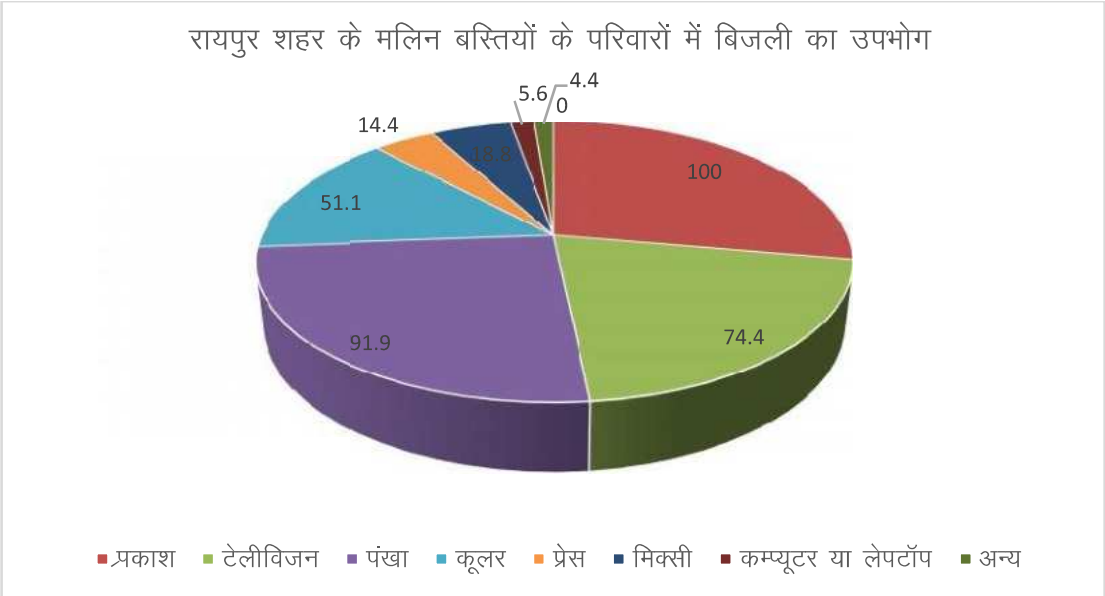
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तालिका 6: रायपुर शहर के मलिन बस्तियों के परिवारों में बिजली का उपभोग

क्र.	प्रकाश	टेलीविजन	पंखा	कूलर	प्रेस (आयरन)	मिक्सी	कम्प्यूटर या लेपटाप	अ न्य
परिवारों की संख्या	90	67	82	46	13	17	05	04
परिवारों का प्रतिशत	100	74 .4	91.9	51.1	14.4	18.8	5 .6	4. 4

स्त्रोतःसर्वे पर आधारित

तालिका 6 में रायपुर शहर के मलिन बस्तियों के परिवारों में बिजली का उपभोग दर्शाया गया है।मलिन बस्तियोंमें रहने वाले सभी परिवारों के द्वारा प्रकाशके लिए बिजली का उपयोग किया जाता है।74.4प्रतिशत परिवार टेलीविजन का उपयोग करते है।91.9प्रतिशत परिवार पंखा का उपयोग करते है।51.1प्रतिशत परिवार कूलर का उपयोग करते है।14.4प्रतिशत परिवारों के घरों में आयरन है।18.8प्रतिशत परिवारों में मिक्सी उपयोग किया जाता है।5.6प्रतिशत परिवारों में कम्प्यूटर का उपयोग किया जाता है।4.4प्रतिशत परिवार बिजली का अन्य कार्यों जैसे सिलाई मशीन आदि में उपयोग करते है।



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मलिन बस्तियोंमें रसोई ईंधन हेतुऊर्जा

स्वच्छ और सस्ती खाना पकाने की ऊर्जा तक पहुंच एक महत्वपूर्ण सामाजिक लक्य है।पारंपरिक रसोइयों के व्यापक उपयोग से स्वास्थ्य और महिला सशक्तीकरणको गंशीर खतरा है (पटनायक एवं त्रिपाठी,2017)।

तलिका7 : रायपुर शहर के मलिन बस्तियों के परिवारों में रसोई ईंधन हेतु ऊर्जा का उपभोग

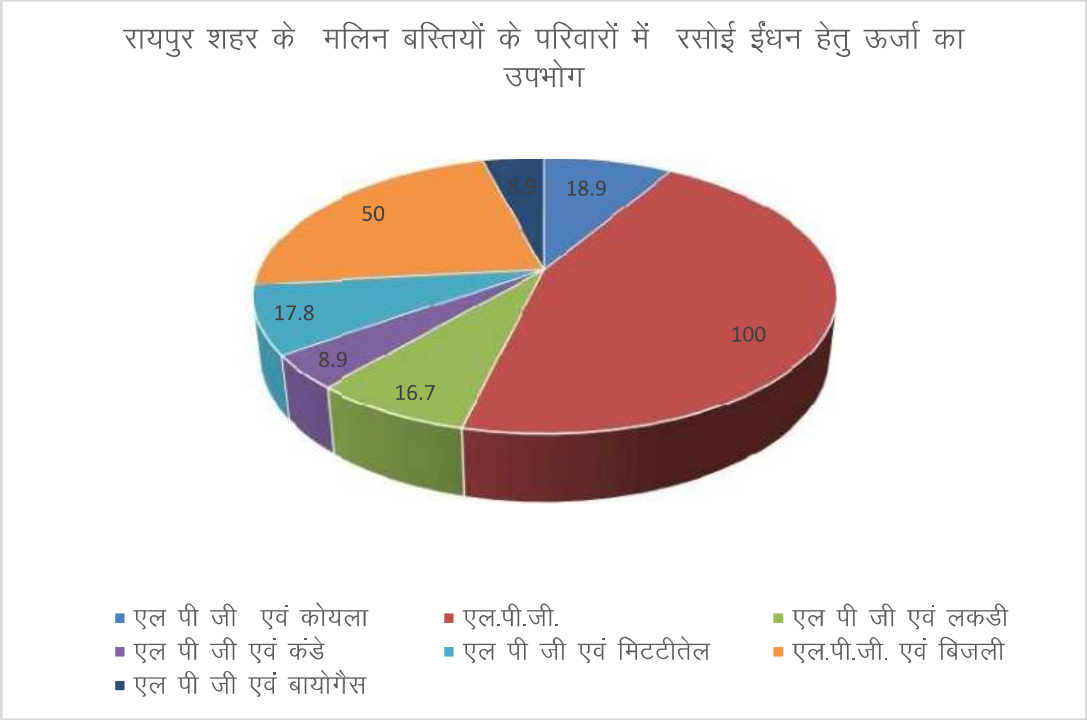
क्र.	एलपीजी एवं कोयला	एलपीजी	एलपीजी एवं लकडी	एलपीजी एवं कंडे	एलपीजी एवं मिटटीतेल	एलपीजी एवं बिजली	एलपीजी एवं बायोगैस
परिवारों की संख्या	17	90	15	08	16	45	08
परिवारों का प्रतिशत	18.9	100	16.7	8.9	17.8	50.0	8.9

स्त्रोतःसर्वे पर आधारित

तालिका - 7 में रसोई ईंधन के लिए प्रयुक्त ऊर्जा के विभिन्न स्रोतों का विश्लेषण किया गया है। तालिका से स्पष्ट है कि सर्वाधिक 100 प्रतिशत परिवार रसोई ईंधन के लिए केवल एल पी जी गैस का उपभोग करते है।50 प्रतिशत परिवार एलपीजी गैस एवं बिजली का उपभोग करते हैं।18.9प्रतिशत परिवार एल पी जी एवं कोयला का उपभोग करते है।16.7प्रतिशत परिवार एलपीजी एवं लकडी का उपयोग करते है।8.9परिवार बायो गैस एवं एलपीजी का उपयोग करते है।

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निष्कर्षएवं सुझाव

वर्तमान अध्ययन छत्तीसगढ़ राज्य के रायपुर शहर के मलिन बस्तीयों में ऊर्जा के उपयोग की व्याख्या करता है। यह अध्ययन मलिन बस्तीयों में ऊर्जा परिदृष्य में नई अर्न्तदृष्टि प्रदान करता है। अध्ययन में मुख्य रूप से खाना पकाने और प्रकाश व्यवस्था के लिए उपयोग किये जाने वाले ईधन के संबन्ध में मलिन बस्तियों में प्रर्याप्त विविधता है। रायपुर शहर की मलिन बस्तियों केपरिवार प्रकाश के लिए मुख्य रूप सेबिजली का उपयोग करते है।बिजली का उपयोग परिवारों के द्धारा प्रकाश के अतिरिक्त टेलीविजन एवं पंखे के लिए किया जाता है। 100 प्रतिशत परिवार रसोई ईंधन के लिए एल पी जी गैस का उपभोग करतें है। एल पी जी गैस के अतिरिक्त एल पी जी एवं कोयला और एलपीजी एवं लकडी का उपयोग करते है।

अतः अध्ययन से यह स्पष्ट है कि सर्वाधिक परिवार प्रकाश के लिए बिजली का उपभोग एवं रसोई ईंधन के लिए एल पी जी गैस का उपभोग करतें है, अर्थात स्वच्छ ऊर्जा का उपभोग अधिकांश परिवार करते हैं।

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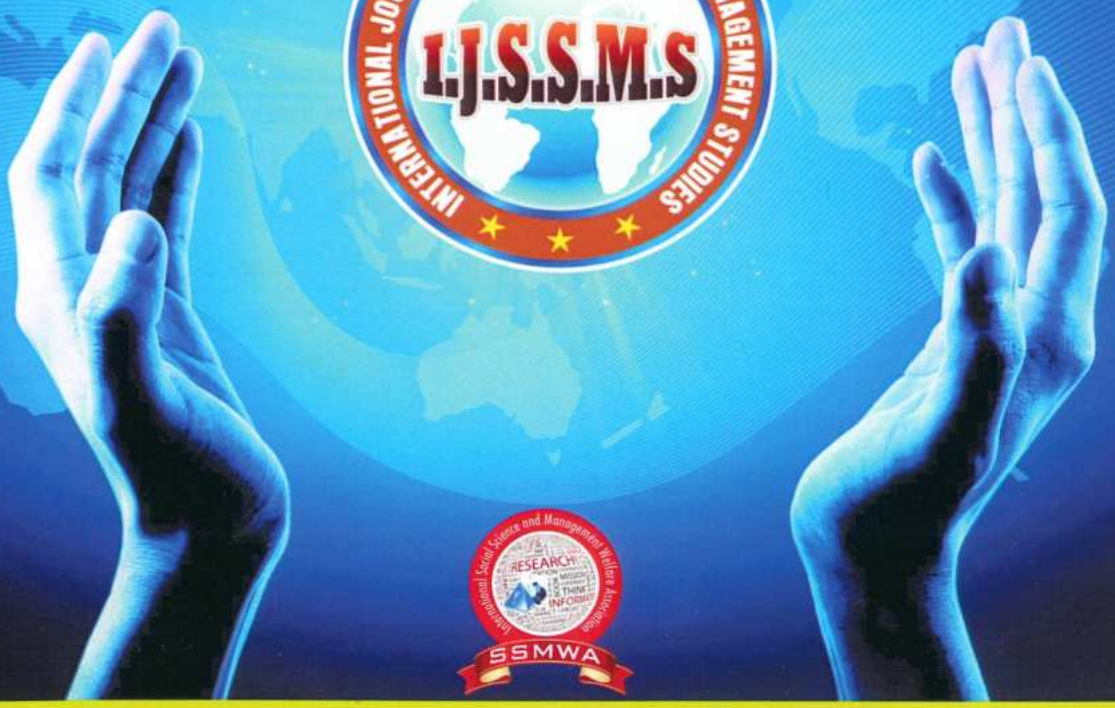
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International Journal of Social Science & Management Studies

A Study on Women Empowerment in Rural Chhattisgarh

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Abstract :- Empowerment may be described as a process which helps to assert their control over the factors which affect their lives. Empowerment of woman means developing them as more aware individuals, who are politically active, economically productive and independent and are able to make intelligent discussion in matters that affect them. Women empowerment as a concept was introduced at the **International women Conference in 1985 at Nairobi,** which defined it as redistribution of social power and control of resources in favour of women. Women's empowerment is "a process whereby women become able to organize themselves to increase their own self-reliance, to assert their independent right to make choices and to control resources which will assist in challenging and eliminating their own subordination" (Keller and Mbwewe, 1991). Although empowering women is one of the most crucial concerns of the Millennium Development Goals of the United Nations. With this aim the broad objectives of the present study are to know the participation of rural women of Chhattisgarh in decision-making, to find out the extent of women empowerment in rural Chhattisgarh and to recommend measures for future implications. The results of the study shows that the total empowerment index for Mahasamund district, from all the four empowerment indices is 0.96. It shows that women in Mahasamund are empowered and their empowerment index indicates high empowerment. Similarly, the total empowerment index for the Uttar Bastar Kanker is 0.76. Again, it shows that women in the tribal district of Uttar Bastar Kanker are empowered and their empowerment index depicts a medium empowerment. The study concludes with the suggestions that awareness generation programmes regarding the importance of empowering women should be implemented in the rural areas, so that the rural women could acquire knowledge about the economic, social, psychological and political aspects of empowerment. Also, it is the need of the hour to empower women so that they could participate in the decision-making aspects of the family. Rural women should be motivated to become independent and face challenges of their own. In this way we could reach the Sustainable development goal 5 focusing on gender equality by 2030.

Keywords :- Millennium development goals, Rural Chhattisgarh, Sustainable development goals, Women Empowerment

Acknowledgement :- The present paper is a part of the Ph.D. work and the authors would like to thank the Indian Council of Social Science Research (ICSSR), New Delhi for providing financial assistance in the form of Short-term doctoral fellowship.

1. Introduction :- Empowerment may be described as a process which helps to assert their control over the factors which affect their lives. Empowerment of woman means developing them as more aware individuals, who are politically active, economically productive and independent and are able to make intelligent discussion in matters that affect them.

Women empowerment as a concept was introduced at the **International women Conference in 1985 at Nairobi,** which defined it as redistribution of social power and control of

resources in favour of women. The United Nations Development Fund for Women (UNDFW) includes the following factors in its definition of women empowerment:

- Acquiring knowledge and understanding of gender relations and the way in which these relations may be changed.

- Developing a sense of self-worth, a belief in one's ability to secure desired changes and the right to control one's life.

Batliwala (1974) defined empowerment as "the process of challenging existing power relation and of gaining greater control over the source of power". Women's empowerment is seen as the process and the result of the process of :

- Challenging the ideology of male domination and women's subordinations.

- Enabling women to gain equal access to and control over the resources (material, human and intellectual).

There is a close relationship between Women empowerment and economic development. On the one hand development entirely plays a crucial role in driving down inequality between both the sexes and on the other empowering women potentially benefits development (Duflo,2012). Keller and Mbwewe (1991) opined that Women's empowerment is "a process whereby women become able to organize themselves to increase their own self-reliance, to assert their independent right to make choices and to control resources which will assist in challenging and eliminating their own subordination". Also, Empowering women is one of the pivotal concerns of the Millennium Development Goals (MDGs) of the United Nations which further merged into the Sustainable Development Goals (SDGs) which is to be achieved by 2030.

The term rural development connotes overall development of rural areas to improve the quality of life of rural people. It is a comprehensive and multidimensional concept, and encompasses the development with inter-actions between various physical, technological, economic, social, cultural and institutional factors.

Rural development implies both the economic betterment of people as well as grater social transformation. In order to provide the rural people with better prospects for economic development, increased participation of people in the rural development programmes, decentralization of planning, better enforcement of land reforms and greater access to credit are envisaged.

Initially, main thrust for development was laid on agriculture industry, communication, education, health and allied sectors but later on it was realized that accelerated development can be provided only if governmental efforts are adequately supplemented by direct and indirect involvement of people at the grass root level. Accordingly, on 31st March 1952, an organization known as Community Projects Administration was set up under the Planning Commission to administer the programmes relating to community development. The community development programme inaugurated on October 2, 1952, was and important landmark in the history of the rural development. This programme underwent many changes and was handled by different Ministries. Government implements many schemes for generation of self-employment and wage employment, provision of housing and minor irrigation assets to rural poor, social assistance to the destitute and rural roads etc. In order to ensure that the fruits of economic reforms are shared by all sections of societies five elements of social and economic infrastructure, critical to the quality of life in rural areas, were identified. These are health; education; drinking water; housing and roads.

During the Ninth Plan period, several anti-poverty Programmes have been restructured to enhance the efficiency of the Programmes for providing increased benefits to the rural poor. Self-Employment Programmes have been revamped by merging the Integrated Rural Development Programme (IRDP), the Development of Women and Children in Rural Areas (DWCRA), the Supply of Improved Tools-Kits to Rural Artisans (SITRA), the Training of Rural Youth for Self-Employment (TRYSEM), The Ganga Kalyan Yojna (GKY) and the Million Wells Scheme (MSW) into a holistic self-employment scheme called Swarnjayanty Gram Swarozgar Yojana (SGSY).

1.1 Dimensions of Women Empowerment : The process of empowerment has five dimensions, viz. Cognitive, psychological, economic, political and physical:

(i) **The cognitive dimensions** refer to women having an understanding of the conditions and causes of their subordination at the micro and macro levels. It involves making choices that may go against cultural expectations and norms.

(ii) **The psychological dimension** includes the belief that women can act at personal and societal levels to improve their individual realities and the society in which they live.

(iii) **The economic component** requires that women have access to, and control over, productive resources, thus ensuring some degree of financial autonomy. However, she notes that changes in the economic balance of power do not necessarily alter traditional gender roles or norms.

(iv) **The political element** entails that woman have the capability to analyse, organize and mobilise for social change; and

(v) **There is a physical element** of gaining control over one's body and sexuality and the ability to protect oneself against sexual violence to the empowerment process.
(www.unifem.org).

2. Objectives of the study : -

(i) To know the participation of rural women of Chhattisgarh in decision-making.

(ii) To find out the extent of women empowerment in rural Chhattisgarh.

(iii) To recommend measures for future implications.

3. Methodology :- The present study was descriptive in nature and inculcates both the primary and the secondary data to achieve the aim of the study. The two-phase sampling techniques that are stratified random sampling and simple random sampling without replacement have been adopted to draw a sample of rural households. Further, the respondents were selected from two geographical division of Chhattisgarh state between which one is the tribal district. A total of 80 respondents were selected from 2 villages of 2 blocks of Chhattisgarh state. The study areas were selected based on rural households from Mahasamund and Uttar Bastar Kanker and from each block two villages were selected using simple random sampling.

Eligible respondents that fulfilled the inclusion criteria, viz. those households who were living approx. 50- 60 km from district headquarters were selected for sample survey. The household sample size has been determined on the basis of World Health Organization (WHO) methodology which is as follows:

$$n = z_1^2 - \propto j2\ P\ (1 - P) \Big/ d^2$$

Where - P is anticipated population proportion which is 0.70 (70%)

1 – P is the confidence level which is 95%

d is the absolute precision which is 0.10 (10%)

Further to find out the extent of women empowerment in decision making women empowerment index has been constructed using four broad dimensions with seven indicators.

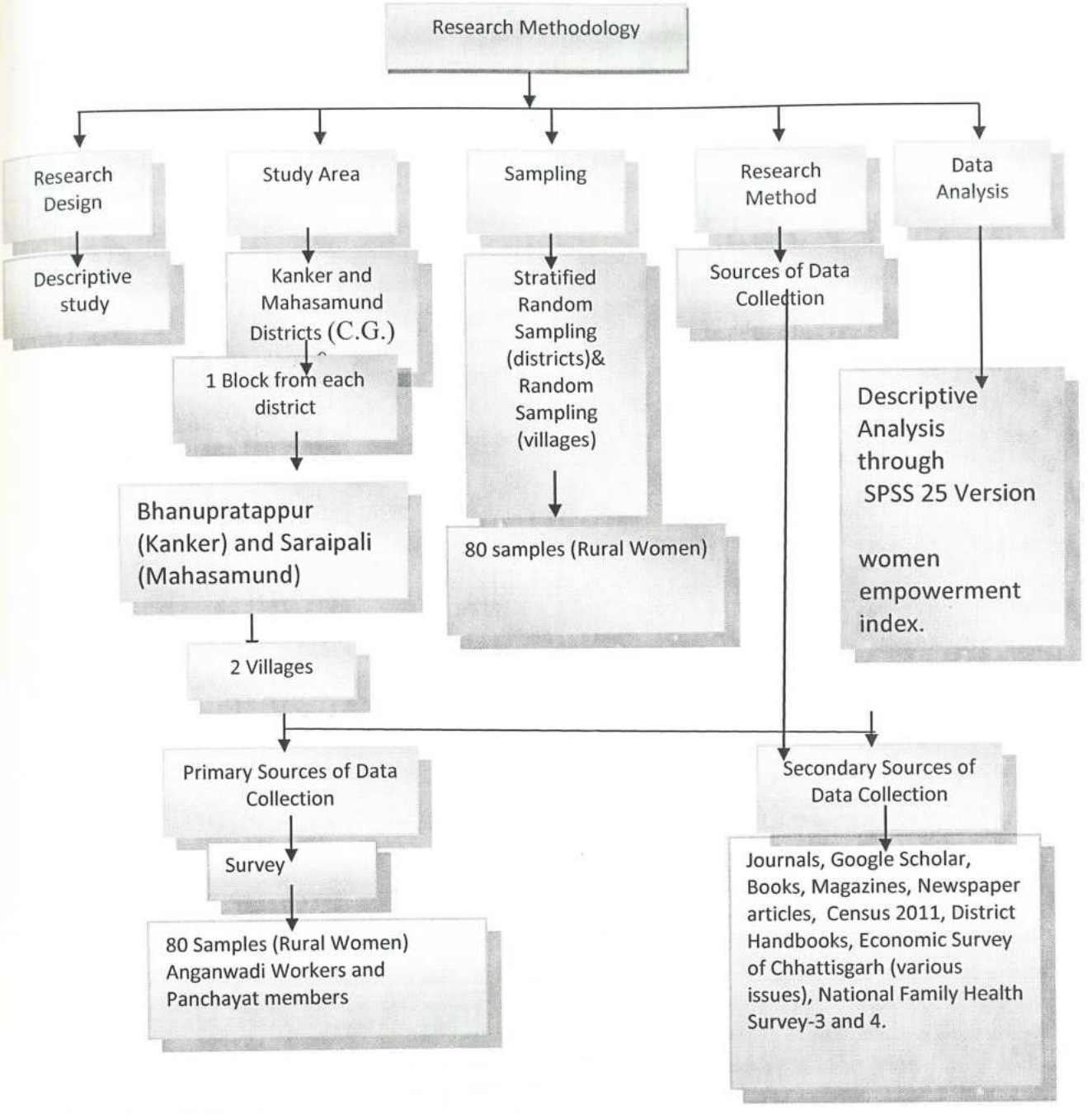
Table No.1: Dimensions of Women Empowerment Index

S. No	Dimensions	Indicators
1	Personal Autonomy Index (PAUI)	• Woman's Decision regarding her own Health • Woman's Decision Regarding Visit to her Family/ Relatives
2	Economic Decision-Making Index (EDMI)	• Woman's Decision regarding her Earnings
3	Households Decision Making Index (HDMI)	• Woman's Decision Regarding Children
4	Political Autonomy Index (POAI)	• Political participation • Exercising voting rights • Social participation

The index of each dimension was constructed where minimum and maximum values were chosen for each underlying indicator. Performance in each indicator is expressed as the minimum and maximum value between 0 and 1 in accordance with the construction method of the Human Development Index (UNDP, 2005). The Women Empowerment Index (WEI) is then computed in a simple average of four indices according to the formula below:

WEI = 1/3(personal autonomy index) + 1/3 (economic decision-making index) + 1/3 (household decision making index) +1/3 (political autonomy index).

The secondary data were collected from National Family Health Survey 3 and 4, District census handbooks, Economic Survey of Chhattisgarh etc.



4. Results and Discussions :-

4.1 To know the participation of rural women in decision making various parameters has been selected from National Family Health Survey -3 (2005-06) which includes:

(i) Woman's Decision regarding her own Health
(ii) Woman's Decision regarding her Earnings
(iii) Woman's Decision Regarding Visit to her Family/ Relatives
(iv) Woman's Decision Regarding Children

Apart from these four parameters the freedom of decision making of rural women with respect to political autonomy has also been studies. It includes Political participation of women, exercising voting rights and social participation.

The below table depicts the descriptive Statistics of rural women's participation in decision making in Mahasamund district. The mean value shows a positive response with respect to the participation in decision making of all the seven parameters; and its value ranges from 1.775 to 1.85 for all the seven parameters with standard error of 0.162 to 0.158 respectively. This means that the decision-making freedom of rural women in Mahasamund district has a significant mean value. While the median is 1 which is again close to that of the mean value. The primary measure of dispersion which is depicted through standard deviation is positive high degree (0.8) for four parameters and a very high degree of 1 for three parameters respectively which shows that there is a moderate degree of variations among the rural women with respect to making decisions. Further, when we look into skewness and kurtosis, kurtosis shows a negative value for only three parameters and positive value of the four variables, but skewness shows a positive value for all the variables and is fairly symmetrical too. Also, the women's participation in decision making touched its maximum value of 4 and minimum value of 1 respectively. Thus, the difference between the maximum value and the minimum value is defined as range which is 3 in our analysis.

Table No. 2: Descriptive Statistics of Rural Women's Participation in Decision making in Mahasamund District

Descriptive Statistics	Decision regarding her own health	Decision regarding visit to her family/relatives	Decision regarding her earnings	Decision regarding children to have	Decision regarding her political participation	Decision regarding her voting rights	Decision regarding her social participation
Mean	1.775	1.475	1.5	1.4	1.475	1.9	1.85
Standard Error	0.162067966	0.123970116	0.138675049	0.122996769	0.123970116	0.167178701	0.158316463
Median	1	1	1	1	1	1.5	2
Mode	1	1	1	1	1	1	1
Standard Deviation	1.025007817	0.784055859	0.877058019	0.777899868	0.784055859	1.057330941	1.001281231
Sample Variance	1.050641026	0.61474359	0.769230769	0.605128205	0.61474359	1.117948718	1.002564103
Kurtosis	-0.539865449	1.840666866	1.834423898	4.900094723	1.840666866	-0.789446746	-0.146644612
Skewness	0.930175921	1.598666491	1.680258521	2.243053023	1.598666491	0.7562568	0.960675198
Range	3	3	3	3	3	3	3
Minimum	1	1	1	1	1	1	1
Maximum	4	4	4	4	4	4	4
Sum	71	59	60	56	59	76	74
Count	40	40	40	40	40	40	40

Source: Authors own calculations using SPSS 25 version

Table No. 3: Descriptive Statistics of Rural Women's Participation in Decision making in Uttar Bastar Kanker District

Descriptive Statistics	Decision regarding her own health	Decision regarding visit to her family/relatives	Decision regarding her earnings	Decision regarding children to have	Decision regarding her political participation	Decision regarding her voting rights	Decision regarding her social participation
Mean	2.225	1.825	1.475	1.75	1.6	2.175	2.175
Standard Error	0.197703157	0.167513872	0.138617256	0.17449561	0.137747446	0.195748072	0.17862545
Median	2	1	1	1	1	2	2
Mode	1	1	1	1	1	1	1
Standard Deviation	1.250384556	1.059450753	0.876692502	1.103607139	0.871191345	1.23801951	1.129726538
Sample Variance	1.563461538	1.122435897	0.768589744	1.217948718	0.758974359	1.532692308	1.276282051
Kurtosis	-1.616488979	-0.946063054	2.059972991	-0.255714528	-1.070526815	-1.496099512	-1.226405374
Skewness	0.295267484	0.776154088	1.762423394	1.129511899	0.901301722	0.418246237	0.424064481
Range	3	3	3	3	2	3	3
Minimum	1	1	1	1	1	1	1
Maximum	4	4	4	4	3	4	4
Sum	89	73	59	70	64	87	87
Count	40	40	40	40	40	40	40

Source: Authors own calculations using SPSS 25 version

The above table depicts the descriptive Statistics regarding rural women's participation in decision making in Uttar Bastar Kanker District. The mean value shows a positive response with respect to the participation in decision making of all the seven parameters; and its value ranges from 1.4 to 2.2 for all the seven parameters with standard error of 0.13 to 0.19 respectively. This means that the decision-making freedom of rural women in Mahasamund district has a significant mean value. While the median is 2 which is again close to that of the mean value. The primary measure of dispersion which is depicted through standard deviation is positive high degree (0.8) for two parameters and a very high degree of 1 for five parameters respectively which shows that there is a high degree of variations among the rural women with respect to making decisions. Further, when we look into skewness and kurtosis, kurtosis shows a negative value for six parameters and positive value for only one variable, but skewness shows a positive value for all the variables and is symmetrical in nature. Also, the women's participation in decision making touched its maximum value of 4 and minimum value of 1 respectively. Thus, in our analysis the value of range is 3.

4.2 Analysis of Women Empowerment - Women's empowerment is "a process whereby women become able to organize themselves to increase their own self-reliance, to assert their independent right to make choices and to control resources which will assist in challenging and eliminating their own subordination" (Keller and Mbwewe, 1991). Although empowering women is one of the most crucial concerns of the Millennium Development Goals of the United Nations. To analyse women empowerment in

rural Chhattisgarh the methodology formulated by United Nations Development Programmes (UNDP) has been adopted in the present study. According to the United Nations Development Programme (UNDP, HDI, 2005) of formulating the Human development indices, the value of index 0 indicates the deprived of development and value 1 is exhibiting the full development, further the value between 0 to 0.5 is showing the minimum level of development, followed by 0.6 to 0.7 is medium level of development & 0.8 and more have high development respectively. The study has included the framing of the personal autonomy index, economic decision-making index, household decision making index and political autonomy index and also the total empowerment index.

Table No 4: Women Empowerment Index in Mahasamund

The table below shows the women empowerment index in different dimensions along with the total empowerment index in Mahasamund district of Chhattisgarh state.

Dimensions	WEI	Range
PAUI	0.95	High empowerment
EDMI	0.7	Medium empowerment
HDMI	0.72	Medium empowerment
POAI	0.54	Low empowerment
Total Empowerment Index	**0.96**	**High empowerment**

Source: Authors own calculations

Table No 5: Women Empowerment Index in Uttar Bastar Kanker

The table below shows the women empowerment index in different dimensions along with the total empowerment index in Uttar Bastar Kanker district of Chhattisgarh state.

Dimensions	WEI	Range
PAUI	0.51	Low empowerment
EDMI	0.72	Medium empowerment
HDMI	0.62	Medium empowerment
POAI	0.46	Low empowerment
Total Empowerment Index	**0.76**	**Medium empowerment**

Source: Authors own calculations

The table number 4 and 5 above depicts the women empowerment index in Mahasamund and Uttar Bastar Kanker districts of Chhattisgarh state. Further, we have framed the total empowerment index for Mahasamund district, from all the four empowerment indices and got the result as 0.96. It shows that women in Mahasamund are empowered and their empowerment index indicates high empowerment. Similarly, the total empowerment index for the Uttar Bastar Kanker is 0.76. Again, it shows that women in the tribal district of Uttar Bastar Kanker are empowered and their empowerment index depicts a medium empowerment. If we compare between the dimensional empowerment indices with total

empowerment index, we find that the personal autonomy index is high 0.95, for the women in Mahasamund while political empowerment is less with an index value of 0.54. The total empowerment index is affected by the performance of these four indices. The total empowerment index is 0.96, because of less political empowerment index, otherwise it would be more. On the other hand, the total empowerment index in Uttar Bastar Kanker is 0.76, which is medium empowerment because of medium empowerment level in economic and household decision making index and low empowerment level in personal and political autonomy index. Furthermore, if we make a comparison between the total empowerment indices between the two districts, we found that the rural women in Mahasamund district is highly empowered whereas the rural women in Kanker district is medium empowered.

5. Conclusions and Suggestions :- It is universally recognized that gender equality and women's empowerment are at the centre of accomplishing improvement targets, crucial for the acknowledgement of human rights, and key to successful and maintainable improvement results. In any case, on the opposite, in spite of their "proven capacities as pioneers and operators of change", from the nearby to the worldwide level, women's administration and political interest is limited. The 2011 UN General Assembly determination on women's political interest emphasized that "women in each portion of the world proceed to be generally underestimated from the political circle, often as a result of biased laws, states of mind and sex generalization, and low levels of education, needs to care of health". Therefore, to eliminate the multi-faceted problem like gender inequality, a multi-pronged approached must be adopted; and among the various initiatives, political empowerment of women could act as a catalyst. Political empowerment could lead to opening more opportunities for women and as a result, create a level playing field for them. In the Indian context, the need for women leadership is the expectation that women legislators who come to power will smash the misogynist rants proscribing women and their leadership skills as incompetent and encourage more women to be decision-makers in a highly male-dominated society. More political participation of women will help tread the path of gender equality and have a positive effect on a range of policy issues emphasizing family, women's rights issues, quality of life such as health and education. One of the factors hindering the goal of a gender-just society is the laws for the protection of women's rights being framed from a patriarchal lens. Women legislators supposedly have the ability to undo these wrongs with a strong political will. Some of the suggestions brought forward in this study are:

- Awareness generation programmes regarding the importance of empowering women should be implemented in the rural areas, so that the rural women could acquire knowledge about the economic, social, psychological and political aspects of empowerment.
- Also, it is the need of the hour to empower women so that they could participate in the decision-making aspects of the family.
- Rural women should be motivated to become independent and face challenges of their own.
- Awareness generation programmes regarding the Panchayati Raj System should be implemented in the rural areas, so that the rural women could acquire knowledge about the working and functioning of the Panchayati Raj systems.
- Further women should encourage to participate in the meetings of the panchayats and bring forward their problems and issues so that it could be solved by the panchayat members and they come out by some concrete solutions.
- Apart from women, it also become necessary to encourage the family members so that they would allow the women members of the families to come out of their home and make her own identity explores herself in the society.

In this way we could reach the Sustainable development goal 5 focusing on gender equality by 2030.

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RESEARCH ARTICLE

भारतीय कृशि का वैश्वीकरण

अर्चना सेठी, बी. एल सोनेकर

[1]सहायक प्राध्यापक, अर्थशास्त्र अध्ययन शाला, पं रविशंकर शुक्ल विश्वविद्यालय रायपुर
[2]सह प्राध्यापक, अर्थशास्त्र अध्ययन शाला, पं रविशंकर शुक्ल विश्वविद्यालय रायपुर
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ABSTRACT:
जब भी सरकार विदेशी कंपनियों को भारत के किसी भी क्षेत्र में पूंजी लगाने की अनुमति देती है तो पहले यह सुनिश्चित कर ले कि विदेशी कंपनी निवश से जो लाभ कमाती है उसका भारत के विकास में भी एक निश्चित योगदान हो यदि ऐसा नहीं होता तो सरकार को यह अनुमति नहीं देनी चाहिए।

KEYWORDS: वैश्वीकरण, बहुराश्ट्रीय निगम, कृशि उत्पाद।

प्रस्तावना

वैश्वीकरण के अंतर्गत भारत सरकार ने दो प्रमुख प्रक्रियाओं को प्रोत्साहित किया हैः 1. भारतीय अर्थब्यवस्था के विभिन्न क्षेत्रों में विदेशी पूंजी का निवेश 2. भारत के विदेशी ब्यशपार को विश्व ब्यापार संगठन के अनुसार नियमित करना।इस अध्ययन में हम भारतीय कृशि के विकास में विदेशी पूंजी की भूमिका का अध्ययन करेंगे जो प्रायः बहुराश्ट्रीय निगमों द्वारा लगायी जाती हैः

अध्ययन का उददेश्य :

1 भारतीय कृशि पर वैश्वीकरण के प्रभाव का अध्ययन करना।
2. कृशि में विदेशी पूंजी के निवेश का अध्ययन करना।

भारतीय कृशि और विश्व ब्यापार संगठन

ब्रेटनवुडस समझौते के परिणामस्वरुप अंतर्राश्ट्रीय मुद्राकोश, विश्वबैंक और कुछ समय बाद सीमाशुल्क और और ब्यापार पर सामान्य समझौते के अंतर्गत ब्यापार और अंतर्राश्ट्रीय मुद्रा प्रणाली को नियंत्रित करने के लिए एक प्रणाली की स्थापना की गई।15 अप्रेल 1994 को मोरक्को के मारकेश में 124 देश एकत्र हुए और सीमा शुल्क और ब्यापार पर सामान्य समझौते पर हस्ताक्षर किये। इस समझौते का मुख्य उद्देश्य सीमा शुल्क घटाना, कोटा कम करना, बहुपक्षीय विश्व ब्यापार को बढावा देना था। विश्व ब्यापार संगठन या WTO[1] अप्रेल 1995 से प्रचलन में है। विश्व ब्यापार संगठन की प्रस्तावना के अनुसार विकासशील देश विशेशकर पिछडे देश अंतर्राश्ट्रीय ब्यापार की वृद्धि में वह भाग प्राप्त कर सके जो उनकी आर्थिक विकास संबंधी आवश्यकताओं के अनुरुप हो। GATT का स्थान WTO ने ले लिया है। WTO विश्व ब्यापार को बढावा देगा। यह विश्व के

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जब भी सरकार विदेशी कंपनियों को भारत के किसी भी क्षेत्र में पूंजी लगाने की अनुमति देती है तो पहले यह सुनिश्चित कर ले कि विदेशी कंपनी निवश से जो लाभ कमाती है उसका भारत के विकास में भी एक निश्चित योगदान हो यदि ऐसा नहीं होता तो सरकार को यह अनुमति नहीं देनी चाहिए।

KEYWORDS: वैश्वीकरण, बहुराश्ट्रीय निगम, कृशि उत्पाद।

प्रस्तावना

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भारतीय कृशि और विश्व ब्यापार संगठन

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"छत्तीसगढ़ के असंगठित क्षेत्र में कार्यरत महिला उद्यमियों की रोजगार एवं आय का अध्ययन" (दुर्ग जिला के धमधा एवं दुर्ग जनपद पंचायत के विषेष संदर्भ में)

शंकर लाल पटेल शोधछात्र पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)
डॉ.अर्चना सेठी सहायक प्राध्यापक पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर (छ.ग.)

सारांश :–असंगठित क्षेत्र में कार्यरत महिला उद्यमियों के सर्वेक्षित क्षेत्र में कुल न्यादर्ष 80 लिया गया है जिसमें ग्रामीण क्षेत्र से 20 तथा शहरी क्षेत्र से 60 है जिसके अध्ययन से यह सारांप प्राप्त होता है कि दुर्ग जिला के धमधा तथा दुर्ग विकास खण्ड मैदानी क्षेत्र तथा उद्यम के लिए अनुकुल वातावरण, षिक्षा के स्तर आर्थिक संपन्नता होने से उद्यम के क्षेत्र बहुत अधिक विकास किया है। असंगठित क्षेत्र में उद्यम प्रारंभ कर अपना ही नहीं बल्कि अपने साथ अन्य लोंगो को भी उद्यम में सर्वाधिक 0–2 व्यक्तियों को रोजगार देने वाली महिला उद्यमियों का प्रतिषत 76.25 है। आय प्राप्त कर वह स्वयं तो संपन्न हो रही है साथ ही साथ अन्य लोगों को भी संपन्न बना रही है। उद्यम में सर्वाधिक आय 1000–3000 रूपय मासिक प्राप्त करने वालों का प्रतिषत 68.57 है। हालाकिं यह असंगठित क्षेत्र में उद्यम चलाने में शहरी क्षेत्र की महिला उद्यमी ग्रामीण क्षेत्र की महिला उद्यमियों से आगे है शहर की महिलाएं अधिक जागरूक, षिक्षित तथा अधिक स्वतंत्र महसुस कर रही है। ग्रामीण क्षेत्र की महिलाएं रूढ़ीवादी तथा सामाजिक संबंध के कारण से कम ही या एक–दो ही महिलाएं असंगठित क्षेत्र में उद्यम का संचालन कर पा रही है, परन्तु समस्याएं कितनी भी हो असंगठित क्षेत्र में कार्य करने वाली महिला उद्यमी विकास के लक्ष्य को प्राप्त करने के लिए हर समस्या को पार कर आधुनिक समाज की मुख्यधारा से जुड़ती जा रही है।

संकेत शब्द :– महिला उद्यमी, उद्यम, समस्याएं, सामाजिक, आर्थिक, संतुष्ट, असंतुष्ट, कार्य, रोजगार,

प्रस्तावना :– भारत देष 135 करोड़ की आबादी वाला दुनिया की द्वितिय बड़ा देष है जहां की 27 प्रतिषत आबादी युवा शक्ति है जिसे रोजगार दे पाना भारत सरकार के लिए चुनौती से कम नही है। यहां षिक्षा का स्तर 73 प्रतिषत है, जिसे अपनी जीवन यापन हेतु रोजगार की तलाष है ऐसे मे हमारे देष के युवाओं को रोजगार की लिए सरकार की ओर नजर गड़ाने से अच्छा है कि वह स्वरोजगार प्रारंभ कर अपने ही नही अपने साथ अन्य लोगो को भी रोजगार प्रदान कर सके।

आधुनिक भारतीय समाज में महिलाएं पुरुषो से कम नही वह पुरुषों से कदम से कदम मिलाकर चल रही है। किसी भी क्षेत्र की बात हो वह हर एक क्षेत्र में पुरुषो से कम नही है चाहे वह रोजगार हो राजनीति हो, समाज या उद्यम की क्षेत्र क्यों न हो। आज असंगठित क्षेत्र में देखा जाये तो भारत की ग्रामीण तथा शहरी दोनो क्षेत्र में महिलाओं की भागीदारी बढ़ती जा रही है। वह उद्यम के हर क्षेत्र में अपनी पांव पसार रही है। असंगठित क्षेत्र के प्रमुख उद्यम जैसे फल दुकान, किराना दुकान, सब्जी दुकान, ब्युटि पार्लर, फैंसी स्टोर, दोना पत्तल, सिलाई–कढ़ाई, कपड़ा दुकान, जैविक खाद, डेयरी, मुर्गी पालन आदि व्यवसाय को महिलाएं ही संचालित कर रही है।

समय के इस चक्र में व्यक्तियों के दृष्टिकोण बदल रहा है। आज कल स्त्रियां उद्योग–धन्धों का तीव्रगति से विकासकर रही है। विभिन्न अध्ययनो से यह बात भी सिद्ध हो चुका है कि वर्तमान समय के आर्थिक विभाजन में महिलाओं की भूमिका तथा परिस्थिति में अत्यधिक परिर्वतन आयी है। आर्थिक विकास की इस स्वरूप में महिलाओं में सोचने, समझने तथा निर्णय करने की क्षमता में आमूल चूल परिवर्तन आया है। इसी परिवर्तन का परिणाम कहा जा सकता है कि समाज कृषि आधारित व्यवसाय से आगे आधुनिक औद्योगिक व्यवस्था की ओर अग्रसर हुआ तथा अब वह घर से बाहर भी विभिन्न प्रकार से उद्यमी कार्य कर अर्थतंत्र में अपनी महत्वपूर्ण भूमिका निभा रही है।

महिला उद्यमी से आषय

सामान्य रूप से यदि कहा जाये तो भी महिलायें किसी भी प्रकार की वस्तुओं और सेवाओं का उत्पादन कर रही है महिला उद्यमी कही जायेगी। इस प्रकार से वह महिला अपने उद्योग की स्थापना से लेकर वितरण व्यवस्था तक की सम्पूर्ण जवाबदारी लेती है अर्थात वह उद्योग स्थापित करती है उसमें लगने वाली पूंजी की व्यवस्था करती है। उद्योग का सुनिश्चित ढंग से संचालन करती है। उसमे लगने वाले कच्चे माल की व्यवस्था करती है। उत्पादन प्राप्त कर उसकी ब्रिकी के लिए बाजार की खोज, वितरण की व्यवस्था तथा उस उद्योग से प्राप्त होने वाले लाभ–हानि की भागीदारी होती है उन्हें महिला उद्यमी कहा जाता है। इस प्रकार हम कह सकते है कि महिला उद्यमी जनसंख्या के उस भाग से है जो कि अपने स्वयं के

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स्व–सहायता समूह में कार्यरत महिलाओं की सामाजिक–आर्थिक स्थिति का विश्लेषण (दुर्ग जिला के विशेष संदभ में)

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सहायक प्राध्यापक अर्थशास्त्र) पं. रविशंकर शुक्ल विश्विद्यालय, रायपुर (छ.ग.)

सारांश :– स्व–सहायता समूह में कार्यरत महिलाओं की सामाजिक–आर्थिक अध्ययन के लिए न्यादर्श में कुल 20 स्व–सहायता समूहों से 60 सदस्यों का चयन किया गया है, जिसमें से समूह में कार्यरत 24 महिला सदस्य दुर्ग विकासखण्ड से तथा 36 महिला सदस्य धमधा विकासखण्ड से लिया गया है। उक्त अध्ययन से यह सारांश प्राप्त होता है कि स्व–सहायता समूह में कार्यरत महिलाएं अपने आपको सामाजिक–आर्थिक दृष्टिकोण से मजबूत करना चाहता है। समूह में कार्यरत महिलाओं का सर्वाधिक 46.67 प्रतिशत महिला सदस्य अन्य पिछड़ा वर्ग का पाया गया, तथा महिला अपने सामाजिक–आर्थिक स्थिति में मजबूत करने के लिए अधिकत्तर महिला सदस्यों एकल परिवार में रहना पसंद करते है। वैवाहिक दृष्टिकोण से देखा जाय तो समूह में सबसे अधिक 46.67 प्रतिशत महिला सदस्य है। समूह में कार्यरत महिलाओं 83.33 प्रतिशत महिला सदस्य शिक्षित है तथा 3000–6000 रूपये तक मासिक आय प्राप्त करने वाले समूह में कार्यरत महिलाओं का सर्वाधिक (43.33) प्रतिशत है। समूह में कार्यरत अधिकांश महिलाएं रोजगार के लिए कृषि में संलग्न है, जिसके कारण उसकी बचत करने की प्रवृत्ति अनिश्चित होती। समूह में कार्यरत महिलाओं का सर्वाधिक 50.00 प्रतिशत महिलाएं अपनी बचत को बैंक में रखते है। स्व–सहायता समूह में कार्यरत महिलाओं का 78.33 प्रतिशत महिला सदस्य समूह में सदस्यता से से संतुष्ट है। इस प्रकार महिलाएं अपने आय का कुछ भाग का बचत करते है, जिससे अपने रोजगार के अवसर को बढ़ा कर और अधिक आय प्राप्त करके अपने सामाजिक–आर्थिक स्थिति सुदृढ़ कर सकें।

संकेत शब्द :– कार्यरत महिला, सामाजिक–आर्थिक स्थिति, बचत, आय, रोजगार।

प्रस्तावना :– किसी भी देश में स्त्रियां समाज का एक महत्वपूर्ण घटक है और समाज में महिलाओं की सम्मानजनक स्थिति के अभाव में समग्र विकास की कल्पना करना निरर्थक है। क्योंकि महिलाओं की स्थिति समाज में जितनी सुदृढ़ होती है, समाज उतनी ही समृद्ध व मजबूत होता है। समाज तथा सभ्यता के विकास में महिलाओं का योगदान सर्वोपरी रही है। इतिहास इस बात की साक्षी है कि जब–जब कभी पुरूष प्रधान सभ्यता ने नारी जाति की अवहेलना की तब–तब समाज का विकास अवरूद्ध हुआ है। महिलाएं सम्पूर्ण विश्व की लगभग आधी आबादी का प्रतिनिधित्व करती है फिर भी आश्चर्य की बात यह है कि समाज में आज भी उन्हें सामाजिक–आर्थिक रूप से पुरूषों की तुलना में कमजोर, असहाय एवं काफी पिछड़े हुए माना गया है। भारतीय समाज विविधता से युक्त समाज है और यह समाज भी अन्य समाजों की भाँती पितृसत्तात्मक है, जहां स्त्रियों को शास्त्रीय एवं धार्मिक आधार पर तो पूजनीय अवश्य माना जाता है, किन्तु वास्तविक जगत में उसकी स्थिति दयनीय है। प्राचीन समय महिलाओं के लिए स्वर्ण काल था। उस समय पुरूषों की सहभागी होने के साथ–साथ महिलाओं को सामाजिक–आर्थिक कार्यो में भाग लेने का पूर्ण अधिकार था, परन्तु प्राचीन समय इतनी अच्छी होने के बाद भी समय और विचारधारा में परिवर्तन से समाज में महिलाओं के प्रति यह विचार पनपने लगा कि बौद्धिक दृष्टि से तो महिलाएं पुरूषों की तुलना में निम्न है। सती प्रथा, बाल विवाह, विधवा विवाह, पर्दा प्रथा जैसे दिन–हीन सामाजिक कुरूतियों ने महिलाओं की स्थिती को और दयनीय बना दिया, जो न केवल उनकी शिक्षा तथा स्वतंत्रता को बाधित किया, बल्कि सम्पूर्ण नारी जाति को घर की चारदीवारी में कैद रहने को मजबूर कर दिया। जबकि भारतीय संस्कृति महिला–पुरूष की समानता पर बल देती है। जहां पुरूषों महिलाओं को पुरूषों के समान समाज में आगे बढ़ने की पूरी स्वतंत्रता थी, स्त्री को शक्ति का स्वरूप माना गया है।

इसी प्रकार हमारे भारतीय संविधान में भी महिलाओं पूरी स्वतंत्रता दे रखी है। कानूनी अधिकरों में सुधार किया है, फिर भी हमारे समाज में स्त्रियों का मूल्य और स्थान सामाजिक–आर्थिक दृष्टि से उस स्तर तक नहीं उठ पाया जितना उठना चाहिए था। भारतीय समाज सुधारक आन्दोलन के प्रर्वतकों ने स्त्रियों की सुरक्षा के लिए कानून बनाकर उनके कल्याण के लिए अनेक प्रयास किये गये, जिसके

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सारांश :– अध्ययन से यह स्पश्ट होता है कि महिला उद्यमी को असंगठित क्षेत्र के उद्यम में संलग्न है। उनमें अधिकांश का सामाजिक–आर्थिक कार्य के प्रति लगाव के कारण सशक्तिकरण में एक निश्चित उम्र का विशेष प्रभाव पड़ता है। जिसमें 40–50 आयु वर्ग के महिला उद्यमी अपनी उद्यम के प्रति संलग्न दिखाई दिये, जिनका सर्वाधिक 34 प्रतिशत है। असंगठित क्षेत्र में अशिक्षित या कम पढ़ी लिखी महिलाओं द्वारा उद्यम संचालन अधिक किया जा रहा है, जिसका सर्वाधिक 54 प्रतिशत है। उद्यम से महिलाओं में निर्णय क्षमता का विकास हुआ है। रोजगार प्रदान करने की क्षमता बढ़ी। वह स्वयं तो उद्यम से रोजगार प्राप्त कर रही है साथ ही अन्य लोगों को भी अपने उद्यम में रोजगार दे रही है। अध्ययन से यह स्पष्ट हो गया कि असंगठित क्षेत्र के उद्यम में महिला उद्यमी सशक्त हो रही है तथा अपने समाज को भी सशक्त कर रही है।

शब्द संकेत : सशक्तिकरण, महिला उद्यमी, उद्यम, सामाजिक स्थिति, आर्थिक स्थिति, कार्य, अंसगठित क्षेत्र।

"नारी सृष्टि की अनमोल रचना हैं, जो कोमल होते हुए भी विशाल मन, अद्वितीय तव व मन सहनशीलता की प्रतिमूर्ति है। अपनी मधुर मुस्कान से जीवन के हर पल की कटुता व खुशी को जीती वह न केवल स्वंयका जीवन व्यतीत करती हैं, बल्कि परिवार की हर खुश व दुख को आंचल में समेटे हर दायित्व के लिए कुबानियां देती हैं।"

प्रस्तावना :– किसी भी देश का आर्थिक विकास वहां उपलब्ध मानव शक्ति की व्यवस्था एवं उसके विकास पर निर्भर करता हैं। निःसंदेह प्राकृतिक संसाधन, पूँजी निर्माण, तकनीकी एवं नवाचार, विदेशी सहायता, सामाजिक, आर्थिक, धार्मिक एवं राजनीतिक संस्थायें तथा अर्न्तराष्ट्रीय व्यापार आर्थिक विकास में अपनी भूमिका निभाते है, परन्तु इसमें सबसे महत्वपूर्ण मानव है। मानव आर्थिक विकास के प्रत्येक घटक से जुड़ा हुआ हैं। हमारे देश में कृशि उद्योग यातायात संचार शिक्षा, स्वास्थ्य आदि सभी क्षेत्रों में काफी तीव्र गति से विकास हुआ हैं, जिसमें महिलाओं के योगदान को प्रत्यक्ष और अप्रत्यक्ष रूप से नकारा नहीं जा सकता। आज महिलायें पुरूषों के साथ सरकारी तथा निजी क्षेत्र में कन्धे से कन्धे मिलाकर कार्य कर रही है। महिलाओं ने अनेक अवसरों पर अपनी शक्ति संपन्नता का एहसास कराया है। आर्थिक भागीदारी की दृष्टि से अर्थव्यवस्था के प्रत्येक क्षेत्र में महिलाओं के योगदान के अनुपात में बहुत सीमा तक वृद्धि हुई है। महिलाओं की आर्थिक कियाओ से संबंधित नये आयाम उभकर सामने आये है।

इस प्रकार घर की चारदीवारी से बाहर निकल कर महिलाएं मोर्चे भी संभाल रही है। इस तरह धन की उपलब्धता, व्यवसाय की संभावना और निरन्तर मिलती सफलता ने आसमान को छुने लगी है। जो महिलाएं घर के चार दिवारी से बाहर नहीं आना चाहती थी, अब वे महिलाएं भी रोजगार के क्षेत्र में लगातार अपनी संख्या में वृद्धि कर रही है तथा उनमें भविष्य के व्यवसाय के प्रति जागरूकता मे भी वृद्धि होने लगी हैं। इस प्रकार महिलाएं जीवन के विभिन्न क्षेत्र में सामाजिक, सांस्कृतिक, आर्थिक मूल्यों में बदलाव आये। वर्तमान युग की महिलाएं समाज में अपनी महत्व को बहुत अच्छे एवं प्रभावी ढंग से स्थापित किये है। अब समाज में कोई भी महिला होने पर बोझ नहीं कहे जायेंगें। समाज में महिला को अवला से संबोधित नहीं करेंगे, क्योंकि सभी महिलाओं में जागरूकता, कार्य के प्रति रूझान, आत्मविश्वास, निर्भरता तथा योग्यताएं है।

एक जमाने में महिला और पुरूष के काम में बंटवारा होता था, परन्तु नारी ने पुरूष और महिला के मध्य खिंची लक्ष्मण रेखा को अपने बलबूते पर मिटा दिया हैं। पुरूष वर्चस्व वाला ऐसा कोई क्षेत्र नहीं है, जिसे महिला नहीं कर सकती हो। महिलाओं ने चौखट से लेकर चाँद तक का सफर बड़ी सहजता से तय किया है। अब महिला को अपनी पहचान बनाने के लिए पिता अथवा पति का नाम बताने की आवश्यकता नहीं पड़ती है।

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IMPACT OF ONLINE PURCHASING UPON TRADITIONAL RETAIL BUSINESS ON CELL PHONE IN RAIPUR CITY OF CHHATTISGARH

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Abstract
In the outshine of globalised world with easy accessibility of network connectivity, internet and advancement of technology the online business is growing up promptly whether it is B2B, B2C, C2C, C2B, B2A or C2A. The online market is now reachable beyond their domestic territories, thus seller from online market can easily connect customer to a greater extent through various online business platforms. The emerging online market affects the local traditional retail market; they started facing lots of fluctuation in their business turnover yearly. The main objective of this research is to analyse and know the influence of online market upon biggest and largest traditional retail cell phone market of Raipur city of Chhattisgarh. The study is based on primary data collection by directly interviewing the owner of traditional cell phone stores through interview schedule. Sample size of 120 from universe has been selected by random sampling technique. The data collected has been studied and interpreted based on 16 key indicators which shows the impact on traditional cell phone market due to arisen of online market. The chi-square test has been performed in the data collected, reveals and concluded that there is significant impact of online purchasing on traditional cell phone retailers, the business pattern and profit margin has been significantly affected because of growing online market. This empirical analysis finds that many traditional stores were unable to gain super profits after deducting the expenses. The major effect of online market on traditional business is the discount offered by online stores to catch the attention of more customers. Online business also decreased the annual turnover and number of units sold of traditional businessmen. This study suggests comprehensive list of practical customer-winning ideas, tips and techniques to set business apart and to compete with online market, like traditional retailer should, analyze and understand the market forces that affect the consumer's attitude, provide additional services like product segmentation, special Offers, lower prices, better service, wider selection, good location, or convenient hours, new offers, new items, new prices, special announcements, stronger ads and better headlines.

Key words: Traditional retail market, online market, domestic territory, annual turnover, market forces, numbers of units sold, consumers' attitude.

1. Introduction

In the emerging globalized market with rapid growth of internet and technology, the competition has been continuously increasing between traditional retail stores and online stores. The reaches of online stores are beyond domestic territories which penetrate the domestic market of traditional retail stores. Online purchasing of product is emerging very fast in rapid way in last two decades. Millions of people shop online daily from various online stores. Online shopping allows consumer to directly buy goods and services according to their need anytime and anywhere in the world from online stores, due to which

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शोध सार

महिलाओं का कृषि में बहुत ही महत्वपुर्ण भुमिका हैं। यह कहा जा सकता हैं कि इस अर्थव्यवस्था रूपी गाड़ी को चलाने वाले कृषि महिला मजदुर हैं। यद्यपि महिलाओं का कृषि संबंधी स्वामित्व न होने के कारण महिलाओं के कार्य को न के बराबर समझा जाता हैं। 2011 के अनुसार कुल महिला कामगारों में से 65 प्रतिशत महिलाए कृषि कार्य करती है। देश में कुल किसानो का 118.7 करोड़ में से 30.3 करोड़ महिलाओं का हैं जिसमें महिला कृषि श्रमिकों का भागीदारी 55.21 प्रतिशत हैं। यह अध्ययन दुर्ग जिले के धमधा विकास खण्ड के संदर्भ में हैं। इस शोध का प्रमुख उद्देश्य महिला मजदुर की कृषि कार्य करने वाली परिवार का अध्ययन, आर्थिक, महिला मजदुरों की कृषि में भागीदारी तथा जीवन का रोजगार का अध्ययन किया गया है। इस अध्ययन में यह पाया गया कि महिलाए, पुरूषों की अपेक्षा अधिक योगदान दे रही हैं। अतः खिलोराकला और कन्हारपुरी और करेली के महिलाओं का योगदान अद्वितिय हैं। वहाँ महिलाए निंदाई, मिंजाई, कटाई तथा बीजरोपरण एवं सब्जी उत्पादन में बहुत महत्वपुर्ण भुमिका निभा रही हैं। इन कृषि कार्य करने वाली मजदुर महिलाओ के परिवार के आय में वृद्धि के साथ–साथ आर्थिक स्थिति में सुधार हुई हैं, जिसके कारण महिलाओं में अपने आत्मसम्मान, परिवार तथा बच्चों की शिक्षा की स्थिति में सुधार हुई हैं। इस प्रकार अध्ययन क्षेत्र मे कृषि महिला मजदुरों की आर्थिक, सामाजिक स्थिति सुदृढ़ हुई है।

मुख्य शब्द

महिला मजदुर, सामाजिक, आर्थिक स्थिति, कृषि, शैक्षणिक स्थिति।

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Solid Waste Management in India

Pragati Krishnan
Ravindra Brahme

Abstract

In recent years, the exponential growth in human population, enhanced density of urban and rural areas, miscellaneous culture, varying eating habits and livelihood have raised an important yet continuously neglected problem which is "waste or garbage". Not only in our country but this problem is pertinent all around the globe. The increasing growth in solid, wet, reusable, single used materials, electronic waste (e-waste) have arisen a major ecological anxiety. These wastes generated from any sources have continued as a raising tenacious environmental problem. The objectives of this paper are to study the solid waste management in global as well as in Indian perspectives.

Keywords: Environmental Economics, Environmental Sustainability, Municipal Solid Waste, Waste Management.

Introduction

In recent years, there is rapid spurt in the amount of waste all around the globe. The main factors behind this are seen in the form of rise in the community standard of living, urbanization and increase in population. In this parlance, Waste Management is emerged as a pivotal environmental issue in many developing countries including India. By Wastes, we mean the by-products of human activities in the form of production, consumption and distribution of various goods by the society. It has both the positive and negative effect on the environment. The positive effect is witnessed in the form of recycling and reuse of the biodegradable products into manures. But, on the other hand the negative effects particularly when we talk with respect to the present context is the drastic increase in the medical wastes and e-wastes which poses big challenges for efficient and sustainable management (Krishnan,2021).

In a large parlance, the waste is a substance which is labeled as waste by its owner. However, it is truth that, if one person sees a substance as a garbage, it could surely be a treasure for someone else. It is also said "someone's garbage, others treasure". Besides that, it was argued that there is a necessity to visibly describe what creates wastes as this form the foundation for guideline (Amasuomo & Baird, 2016). Simply, a waste is unwanted or unstable material (Mor, et al., 2021).

The quality of the environment in many developing countries, particularly in the urban areas is rapidly deteriorating day by day. Owing to population explosion industrialization, increased urban housing and economic prosperity, there has been a significant spurt in municipal solid waste (MSW) generation throughout the country. There is a positive correlation between municipal waste generation in kg / person / day and global economic development. Urbanization is on massive scale resulted in accelerated industrial growth and the displacement of people from villages to cities. However, it has been observed that the amount of waste generated increases annually in relation to population growth and urbanization. Since then, the per capita generation of municipal waste has also increased enormously with the improvement of the lifestyle and social status of urban inhabitants (Sharholy et al., 2007).

The non-management of all the waste generated by the municipalities from the cities is the main reason for the decline in the quality of the environment. The disposal of waste in cities is usually done by the municipalities; the major challenge before them is the lack of a proper system of waste disposal.

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Municipalities are faced with many challenges in the management of waste from cities such as lack of financial resources, lack of infrastructure etc (Sujauddin et al., 2008). Most municipalities do not have the capacity to properly address the various problems associated with waste disposal (Burntley, 2007).

Economists face many problems in decision making regarding solid waste disposal because of the collection and availability of data related to waste generation, waste collection, transportation of waste and segregation and disposal of waste with municipalities are not available (Balasubramanian,2015).The availability of various data related to waste management can be extremely useful for local policy makers in making economic decisions such as building a framework for managing waste, charging citizens fees or taxes, and providing grants or subsidies (Nahman, 2011).

The objectives of this paper are to study the solid waste management in global as well as in Indian perspectives. For this the data has been collected from secondary sources which includes the World Bank, annual reports of various years of solid waste management in India, Central Pollution Control Board, New Delhi.

2. Solid Waste Management in Global Perspectives

Waste generation and resource shortages have long been recognized as two of the greatest challenges human society is facing (Hou et al ,2012). The solid waste management includes disposal, recovery, recycling, reuse and prevention. Current global Municipal Solid Waste (MSW) generation level is 1.3 billion tons per year, and is expected to increase to approximately 2.2 billion tons per year in 2025. This amount may result in significant health, environmental, aesthetic, land-use resources, and economic concerns if not managed properly. Waste to Energy (WTE) is a viable option for disposal of MSW and energy generation (Ouda & Raza, 2014).



Fig1. The waste management hierarchy

Table 1: Projected Waste Generation and Urbanization Rate by Income

Income Level	2010		2025	
	Urban Population (million)	Waste (kg/capita/day)	Urban Population (million)	Waste (kg/capita/day)
Low-income	343	0.6	676	0.86
Lower-middle income	1296	0.78	2080	1.3
Upper-middle income	572	1.16	619	1.6
High-income	774	2.13	912	2.1

Source: https://openknowledge.worldbank.org/handle/10986/30317

The projected waste generation and urbanization rate by income is shown in table 1 which exhibits that in the higher income level the urban population is 774 million in 2010 and they produce 2.13 kg/capita/day waste. By 2050 it is projected that the population of urban lower -middle income would reach 2080 million and the urban high income would reach 912 million and their waste generation would expect to be 1.3 kg/capita/day and 2.1 kg/capita/day respectively.

Table 2: Projected Global Waste Generation

Year	Billions of Tonnes
2016	2.01
2030	2.59
2050	3.40

Source: https://openknowledge.worldbank.org/handle/10986/30317

Projected Global Waste Generation has been mentioned in table 2 which shows a very striking figure that the world is forecasted to generate 2.59 billion tonnes of waste annually by 2030 which is further predicted to reach 3.40 million tonnes annually all around the globe by 2050.

Table 3: Projected Waste Generation by Region (Millions of tonnes per year)

Region	Year		
	2016	2030	2050
Middle East and North Africa	129	177	255
Sub-Saharan Africa	174	269	516
Latin America and Caribbean	231	290	369
North America	289	342	396
South Asia	334	466	661
Europe and Central Asia	392	440	490
East Asia and Pacific	468	602	714

Source: https://openknowledge.worldbank.org/handle/10986/30317

The region wise projected waste generation has been illustrated in table 3. It exhibits that by 2030 Middle East and North Africa is expected to generate 177 million tonnes of per year waste which is projected to increase by 255 million tonnes per year by 2050. Similarly, Europe and Central Asia is anticipated to generate 440 million tonnes of waste by 2030 and 490 million tonnes of waste by 2050. 602 million tonnes per year and 714 million tonnes per year of waste have been expected to produce by East Asia and Pacific by 2030 and 2050 respectively.

3. Solid Waste Management in Indian Perspective

Municipal waste is recognized as, “the household wastes, commercial and market area waste, slaughter house waste, slit from drainage, wastes from road sweeping and treated biomedical wastes”. The rapid spurt in population followed by rise in income, unplanned urbanization and gradual changing lifestyles leads to greater volume and composition of municipal solid waste in India. As a consequence of this, India confronts many ecological challenges connected with generation, collection, transportation, treatment and disposal of waste. Also, in the current scenario India is not in a position to cope up with these challenges and henceforth it simultaneously impacts environment and public health.

In 2019 unstarred question was also asked by DR. (Prof) Kirit Premjibhai Solanki to our honorable Minister of Environment, Forest and Climate change regarding “the state/ UT- wise total quantum of annual waste generated in the country”, “the total quantum of wastes recycled or reused and deposited in the landfills”. He also questioned with regard to “the steps implemented by the government to encourage

the recycling of waste or to reduce the quantum of waste generated". In response to all these questions our honorable minister has been very beautifully answered that –

- "According to the annual report of Ministry of Housing and Urban Affairs for the year 2016-17, the total solid waste generated is estimated to be 1,50,000 T/day approximately."
- "For effective management of various types of wastes, the government has revised and notified various waste management rules in 2016 hazardous waste, E-waste, plastic waste and bio-medical waste."
- "CPCB ha published guidelines for environmentally recycling of commonly recyclable hazardous wastes and also it has prepared 52 Standard Operating procedures for utilization of 40 different types of hazardous wastes after conducing trial runs."
- Furter "the CPCB in its norms prescribed technological solutions for collecting segregating and disposing plastic wastes.

Table 4: Year wise Solid Waste Management Status

Year	Solid Waste Management Status			
	Solid waste generated (TPD)	Collected (TPD)	Treated (TPD)	Landfilled (TPD)
2015-16	1,01,066	86,531	20,288	37,953
2016-17	1,19,140	1,16,685	24,045	49,836
2018-19	1,52,076	1,49,748	55,759	50,161
2019-20	1,52,847	1,46,053	70,973	40,863
2020-21	1,60,038	1,52,749	79,956	29,427

Source: Annual Report on Solid Waste Management of various years, CPCB, Delhi

The year wise solid waste management status in the country is highlighted in the table 4 which shows that the total quantity of solid waste generated is 1,60,038 TPD in 2020-21 which is only 1,01,006 TPD in the year 2015-16. Likewise, in the year 2018-19 there is maximum landfilled with 50,161 TPD, followed by 49,836 TPD in 2016-17. There is also an increasing trend in the solid waste collected and treated in these five years.

Table 5: State Wise Solid Waste Management Status (2020-21)

Sl. No	State	Solid waste generated (TPD)	Collected (TPD)	Treated (TPD)	Landfilled (TPD)
1	Andhra Pradesh	6898	6829	1133 205	205
2	Arunachal Pradesh	236.51	202.11	Nil	27.5
3	Assam	1199	1091	41.4	0
4	Bihar	4281.27	4281.27	Not provided	No
5	Chhattisgarh	1650	1650	1650	0
6	Goa	226.87	218.87	197.47	22.05
7	Gujarat	10373.79	10332	6946	3385.82
8	Haryana	5352.12	5291.41	3123.9	2167.51
9	Himachal Pradesh	346	332	221	111
10	Jammu and Kashmir	1463.23	1437.28	547.5	376
11	Jharkhand	2226.39	1851.65	758.26	1086.33

12	Karnataka	11085	10198	6817	1250
13	Kerala	3543	964.76	2550	Not Provided
14	Madhya Pradesh	8022.5	7235.5	6472	763.5
15	Maharashtra	22632.71	22584.4	15056.1	1355.36 (Unscientif ically disposed= 6221.5)
16	Manipur	282.3	190.3	108.6	81.7
17	Meghalaya	107.01	93.02	9.64	83.4
18	Mizoram	345.47	275.92	269.71	0
19	Nagaland	330.49	285.49	122	7.5
20	Odisha	2132.95	2097.14	1038.31	1034.33
21	Punjab	4338.37	4278.86	1894.04	2384.82
22	Rajasthan	6897.16	6720.476	1210.46	5082.16
23	Sikkim	71.9	71.9	20.35	51.55
24	Tamil Nadu	13422	12844	9430.35	2301.04
25	Telangana	9965	9965	7530	991
26	Tripura	333.9	317.69	214.06	12.9
27	Uttarakhand	1458.46 -	1378.99	779.	85
28	Uttar Pradesh	14710	14292	5520	0
29	West Bengal	13709	13356	667.6	202.23
30	Andaman and Nicobar Island	89	82	75	7
31	Chandigarh	513	513	69	444
32	DDDNH	267	267	237	14.5
33	Delhi	10990	10990	5193.57	5533
34	Lakshadweep	35	17.13	17.13	Nil
35	Puducherry	504.5	482	36	446
	Total	160038.9	152749.5	79956.3	29427.2

Source: Annual Report on Solid Waste Management (2020-21), CPCB, Delhi

The table 5 shows the state wise solid waste management status for the year 2020-21. The total quantity of Solid waste generated in the country is 160038.9 TPD of which 152749.5 TPD of waste is collected at a collection efficiency of 95.4%. 79956.3 TPD (50 %) of waste is treated and 29427.2 (18.4%) TPD is landfilled. 50655.4 TPD which is 31.7 % of the total waste generated remains un-accounted.

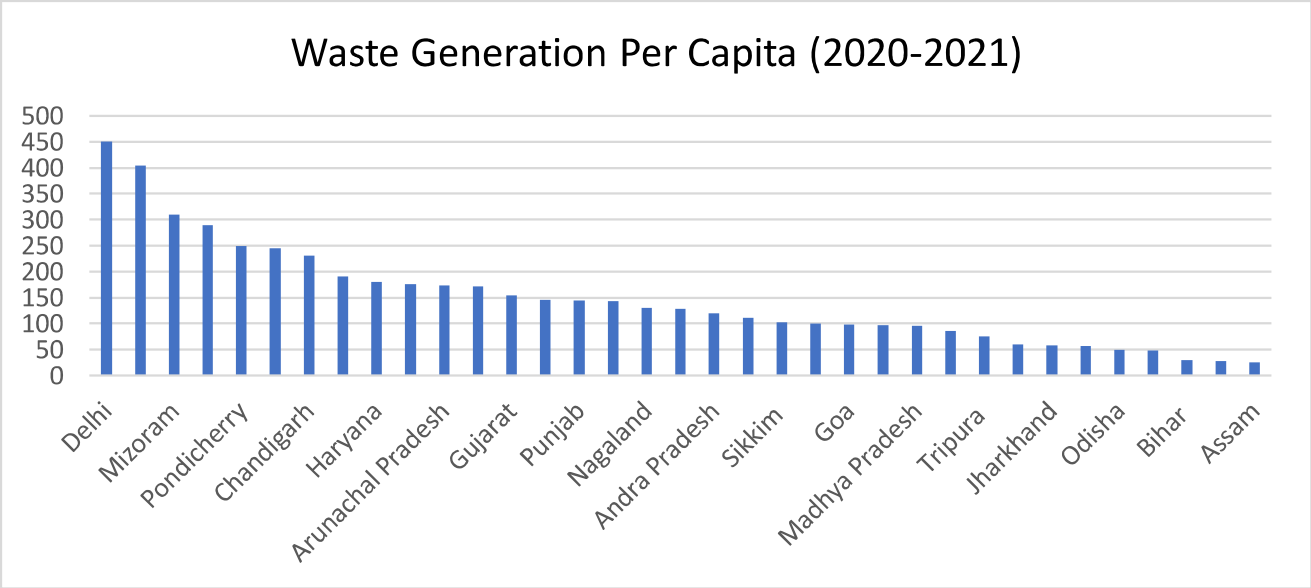
Table 6: Solid Waste Generation Per Capita

Year	Solid Waste Generation Per Capita (gm/day)
2015-16	118.68
2016-17	132.78
2018-19	121.54
2019-20	119.26
2020-21	119.07

Source: Annual Report on Solid Waste Management (2020-21), CPCB, Delhi

The Per capita solid waste generation has been calculated for the last five years and is given in Table 6. The Marginal decreasing trend is observed in per capita solid waste generation over the last five years.

Figure 2: State wise Solid Waste Generation Per Capita 2020-21



Source: Annual Report on Solid Waste Management (2020-21), CPCB, Delhi

The figure 2 highlights the state wise per capita solid waste generation for the year 2020-21. It reflects that Delhi has maximum per capita solid waste generation of 450 TPD, followed by Lakshadweep (400 TPD), Mizoram (310 TPD) where as Chhattisgarh has 57 TPD per capita solid waste generation, followed by Odisha (49 TPD), Himachal Pradesh (48 TPD), Bihar (30 TPD) respectively. Meghalaya (28 TPD) and Assam (25 TPD) have witnessed minimum per capita solid waste generation.

Table 7: Projected Population Growth and Overall Impact on Waste Generation.

Year	Population ($x10^6$)	Per capita generation (kg per day)	Total waste generation ($x10^6$ Tonnes per year)
2001	197.3	0.439	31.63
2011	260.1	0.498	47.30
2021	342.8	0.569	71.15
2031	451.8	0.649	107.01
2036	518.6	0.693	131.24
2041	595.4	0.741	160.96

Source: Report on sustainable solid waste management in India. Waste-to-Energy Research and Technology Council (WTERT)

The table number 7 exhibits the sustainable solid waste management in India which indicates that 366 cities in India were generating 31.6 million tons of waste in 2001 and in 2011, it was generating 47.3 million tons, a 50% increase in one decade. It is estimated that these 366 cities will generate 161 million tons of MSW in 2041, a five-fold increase on in four decades. At this rate the total urban MSW generated in 2041 would be 230 million TPY (630,000 TPD). Further in 2021 the per capita generation is 0.569 kg/day which is projected to increase by 0.649 kg/day, 0.693 kg/day and 0.741 kg/day in 2031, 2026 and 2041 respectively.

4. Conclusions

In most of the developing countries among several municipal communities, there are very few primary studies on the economics of managing solid wastes. However, in the present chapter the economics of managing solid waste discusses about economics of waste, overview of waste at global and national level, economic instruments, e-waste, issues and constraints of waste management etc.

Furthermore, the introduction of economic means possesses great threats. Therefore, there is an urgency to reinvigorate the institution and governance at local levels. In many developing countries including India, economists are grappling with a number of difficulties in evaluating the cost effectiveness of waste management on account of paucity of data on generation, disposal and recycling of wastes (Balasubramanian, 2015, 2018,2019, Balasubramanian and Birundha, 2012). The Solid Waste Economic estimate provides information to local policy makers to help formulate healthy urban planning for sustainable cities.

The developing countries undergoes financial and technological deprivations to enhance the effective waste management system. Therefore, the economics of waste management would gradually be emerged as a sound mechanism for waste management, primarily the cost-benefit aspects at the local and regional level (Defra, 2011). The economic estimation of solid waste is also very useful in helping decision makers to develop taxes / fees or other economic means to efficiently allocate financial and technical resources in a productive manner at the city level (Kinnaman and Fullterton, 1999).

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Millennium Development Goals: Information and Communication Technology in Rural Chhattisgarh

ORIGINAL ARTICLE




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Abstract

Information is the key to democracy. Information empowerment is an instrumental for a successful democracy. Further the introduction of information technology (IT) has nurtured the swift emergence of a global "Information Society" that is changing the way people live, learn, work and relate. In order to achieve the Millennium Development Goal of; having the number of people living in extreme poverty by the year 2015 which is a mile away, information and communication technology has been more emphasized. Everyone, the Governments, civil society, and private sectors have a vital stake in fostering digital opportunity and putting ICT at the service of development. Thus, the objectives of the present paper are to analyse the access to communication technology in rural Chhattisgarh, to analyse the access to information technology in rural Chhattisgarh, to find out the gender-based access to ICTs in rural Chhattisgarh and to suggest measures for future implications. The primary and the secondary data has been used for the study and the findings shows that all the 80 (100%) sample respondents are not having access to telephone facility in their locality but they are having access to mobiles. All the 80 males and 80 females have their own personal mobiles. Further, 42.5% male respondents are having access to internet through mobile while only 37.5% female respondents are having access to it. Also, the Gender based Information and communication Technology Index (GICTI) in Rural Chhattisgarh. reflects that Gender based use of information and communication technology is maximum in Mahasamund districts (0.65); and the tribal district of Uttar Bastar Kanker has a least score of 0.62. However, the district wise comparison shows that in both the districts there is a strong positive gender-based information and communication technology index. Thus, the study concludes that providing accessibility of digital services in the rural areas is necessary. Also, there is an urgent need to implement effective policies and programmes for the promotion of the millennium development goals in the rural Chhattisgarh, which further strengthens the sustainable development targets.

Madhya Bharti (मध्य भारती)
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Analysis of Growth of Beneficiaries Benefited from MUDRA in the State of Chhattisgarh

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Abstract

The research work determined the growth of number of beneficiaries under various Yojanas of MUDRA. For the state of Chhattisgarh Shishu yojana registers highest growth rate and highest number of beneficiaries. However, the determined trend indicates that the new beneficiaries as compared to previous year is slowing down which calls for a check to maintain the essence of the scheme.

Keyword: MUDRA, growth rate, beneficiaries.

Introduction

MUDRA or the Micro Units Development and Refinance Agency is an institution that provides refinance support to micro business. The main scope of the yojana is to enable entrepreneurship especially in those sectors that are unconventional but bears tremendous potential to outperform in terms of year by year growth, return on investment, and one time infusion of funds. Under the MUDRA offerings refinance of micro units to commercial banks / NBFCs/ RRBs/ SFBs/ MFIs is divided into three categories –

Shishu – up to 50000 INR

Kishor – 50000 to 5 Lakh INR

Tarun – 5 Lakh to 10 Lakh INR

Chhattisgarh is state that holds numerous micro entrepreneurs. Thus, these entrepreneurs take support of MUDRA to refinance their businesses and to get on the track on profitability and growth. The research thus analyses how the number beneficiaries are growing under different

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PART-B

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Abstract View

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ABSTRACT:

Itraconazole is a triazole antifungal agent that is synthesised. Itraconazole has been manufactured into a variety of pharmacological formulations and administered by a variety of ways. Itraconazole pills are used to treat pulmonary fungal infections that can spread throughout the body. Because Itraconazole is not yet officially listed in any pharmacopoeia, only a few procedures for quality control and stability testing in pharmaceutical formulations have been published. The development of itraconazole-loaded nanostructured lipid carriers (ITZ-NLC). Itraconazole NLC have been successfully developed. Itraconazole topical NLC developed for the treatment of onychomycosis does not exist, according to my survey.The development and evaluation of stable itraconazole topical gel formulations proved successful. Itraconazole NLC was produced utilising the microemulsion method, indicating the viability of adopting this method as a continuous manufacturing tool for NLC formulation. Further, the ITZ- NLC was incorporated in the gelling agent and we evaluated it under specific parameters.

Keywords: Nanostructured lipid carriers () Itraconazole () Nail delivery () Onychomycosis ()

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छत्तीसगढ़ में स्व-सहायता समूह के माध्यम से महिलाओं के सामाजिक एवं आर्थिक सशक्तिकरण का अध्ययन (दुर्ग एवं राजनांदगांव जिला के विशेष संदर्भ में)

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सहायक प्राध्यापक, अर्थशास्त्र अध्ययनशाला, पं रविशंकर शुक्ल विश्वविद्याालय, रायपुर, छत्तीसगढ़,

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सारांश –

वर्तमान भारतीय परिप्रेक्ष्य में विशेषकर ग्रामीण क्षेत्र में महिलाओं ने अपने मेहनत और लगन के बल पर यह साबित कर दिया कि स्व सहायता समूह के साथ जुड़कर एक नया मुकाम हासिल किया जा सकता है। प्रस्तुत अध्ययन में छत्तीसगढ़ के दुर्ग एवं राजनांदगांव जिले के स्व–सहायता समूह का महिलाओं के सामाजिक एवं आर्थिक सशक्तिकरण पर प्रभाव एवं संतुष्टि का अध्ययन किया गया है। दुर्ग जिले में स्व–सहायता समूह की सदस्यता से पूर्व 37.3 प्रतिशत महिलाएं सशक्त थी एवं स्व–सहायता समूह की सदस्यता के पश्चात 41.6 प्रतिशत महिलाएं सशक्त हो गई। राजनांदगांव जिले में स्व–सहायता समूह की सदस्यता से पूर्व 38.5 प्रतिशत महिलाएं सशक्त थी एवं स्व–सहायता समूह की सदस्यता के पश्चात 46.8 प्रतिशत महिलाएं सशक्त हो गई अर्थात हमारी प्रथम शून्य परिकल्पना महिला स्व–सहायता समूह से सदस्यों के सामाजिक आर्थिक सशक्तिकरण में कोई सार्थक प्रभाव नही पड़ा है, अस्वीकार की जाती है। स्व–सहायता समूह की सदस्यता से कमशः दोनों जिलों में 4.3 एवं 8.3 प्रतिशत अतिरिक्त महिलाएं सशक्त हुई एवं दुर्ग जिले में महिला सशक्तिकरण सूचकांक स्व–सहायता समूह की सदस्यता से पूर्व 0.64 था जो स्व–सहायता समूह की सदस्यता के पश्चात 0.75 हो गया। राजनांदगांव जिला में महिला सशक्तिकरण सूचकांक स्व–सहायता समूह की सदस्यता से पूर्व 0.65 था जो स्व–सहायता समूह की सदस्यता के पश्चात 0.78 हो गया। संतुष्टि का अध्ययन करने हेतु काई स्कवेयर परीक्षण किया गया है। परिगणित मूल्य 7.36 तालिका मूल्य 11.00 से छोटा है। अतः शून्य परिकल्पना अस्वीकार की जाती है कि स्व–सहायता समूहों के माध्यम से महिलाओं के संतुष्टि में कोई सार्थक प्रभाव नही पड़ा है अर्थात स्व–सहायता समूहों के माध्यम से महिलाओं के संतुष्टि में सार्थक प्रभाव पड़ा है। स्व–सहायता समूह के आय को प्रभावित करने वाले तत्वों का अध्ययन करने के लिए बहुगुणी प्रतिपगमन गुणांक का प्रयोग किया गया है। स्व–सहायता समूह का कार्य, स्व–सहायता समूह का निर्माण अवधि, स्व–सहायता समूह का आकार या सदस्यों की संख्या, सदस्यों की शिक्षा, समूह द्वारा दिए गए ऋण का आकार, समूह द्वारा दिये गये ऋण का ब्याज दर, बचत आदि आय को धनात्मक रुप से प्रभावित कर रहे है।

आभार: राज्य योजना आयोग से अनुदान प्राप्त।

शब्द कूंजी: स्व–सहायता समूह, महिला सशक्तिकरण, पंचसूत्र।

प्रस्तावना –

भारत में कुल जनसंख्या में से आधी अबादी महिलाओं की है और यहां के अधिकांश जनसंख्या ग्रामीण प्रधान है जिसमें से लगभग 77 प्रतिशत जनसंख्या गांवो में बसती है और अर्थव्यवस्था मूल रूप से कृषि पर आधारित है। अभी भी अधिकांश महिलाएं सामाजिक व आर्थिक दृष्टिकोण से पिछड़ी हुई है। ऐसी स्थिति में महिलाओं को सशक्त सबल करने, उनके अधिकारो की रक्षा करने, स्वावलंबी बनाने तथा उसकी सामाजिक, आर्थिक व राजनीतिक दशा सुधारने में स्व सहायता समूह अपनी महत्वपूर्ण भूमिका निभा रही है। महिला स्व–सहायता समूह महिलाओं को संगठित कर उनकी सामाजिक, आर्थिक व राजनीतिक सशक्तिकरण का एक सशक्त माध्यम बन चुकी है।**(थान्गमनी, एस. एवं मुठुसेलवी, एस.)**

भारतीय समाज में नारी का स्थान पूज्यनीय रहा है। समाज तथा सभ्यता के विकास में महिलाओं का योगदान सर्वोपरि रही है। महिलाएं प्रत्येक समाज का एक महत्वपूर्ण अंग है जिसका संख्या लगभग पुरूषों के समान ही होती है। अतः महिलाओं का विकास करके ही सार्वभौमिक विकास की कल्पना को साकार करना सम्भव है। पं. जवाहरलाल नेहरू ने भी इसी तथ्य को पुष्ट करते हुए कहा है कि ''यदि आपको विकास करना है तो महिलाओं का उत्थान करना होगा, महिलाओं का विकास होने पर समाज का विकास स्वतः हो जाएगा।'यह विभिन्न सामाजिक आर्थिक घटकों पर महिलाओं के जीवन शैली को बेहतर बनाने का एक स्वैच्छिक संगठन है। जिसके माध्यम से महिलाओं के विकास में महिला सशक्तिकरण अपनी महत्वपूर्ण भूमिका निभा रही है। **(कप्पाकोंडल)**

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FOOD GRAINS PRODUCTION FORECASTING IN INDIA TIME SERIES ANALYSIS BASED ON ARIMA MODEL.

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Abstract: The present study aims to serial correlation in time series data, selection of the estimated model and its diagnosis and forecasting the future value of the food grains production in India, based on various parameters. High adjusted R^2, low sigma^2 low standard of regression ,relatively low AIC ,SIC Values, after residuals diagnostics the ARIMA(3 ,1,1) Model has been identified as the best model for forecasting using the fitted model ,prediction were made for the period from 2022Y-2030Y(09 observation),based upon past data from 2001 to 2021(21 observation) .it is found from the analysis that ARIMA Model gives good forecasting for time series analysis.

KEYWORDS: Food grains Production. ARIMA, Forecasting, India

Introduction:

The current population of India is about 152 crores .Based on the current rate, the population is growing at the rate about 1 percent per year.it is very important for government of any country to know the need and availability of food grains and make predictions for the future .According to the data of 2021, the annual availability of food grains per person has been 185kg per year .India is land of Agriculture and there is a great uncertainty about the outcome for any crop year. There are a number of functions which totally depends upon the outcome of crop.

Functions which totally depends upon the outcome of crop.We can review the dependencies as follow –

*The agriculture Productivity in India is sensitive to climate change which is adversely affecting the food grains productivity and it may become a serious threat to food security in India.
*FCI always face a problem of storage every year a lot of grains is lost due to no storage if they have idea about the yield of any particular year than they can manage storage capacity according to yield .
*If we have a rough idea of crop yield for next year then we can purchase the food grains from other countries in case of shortage and can sale the excess in case of bumper yield.
*If farmer have an idea about the yield of his crop her, he can apply new techniques and precaution timely crop forecasting also helps farmer in budget management for the next crop.

Above is brief idea the need of crop forecasting .above discussion proves the impressive forecasting up to extent .In this paper we are using the data of 20 year for our applications .

Review of Literature

1. **Kumar Ajay, Sharma Pretty, and Ambrammal Kumar Sunil (2006)**: In India large number of studies show that climate change has decreased the productivity of most of food grain crops in different states. There is limited research on account of the impact of climate change on crop productivity of various food grains at country level.
2. **Sharma H.R., Singh Kamlesh and Kumari Shanta (2006):** The analysis shows an increase in average production of major food grain crops, namely rice, wheat, maize, bajra, pulses and total food grains in the 90's over 80's. The analysis once again underscores the importance of technology in raising yield levels and thereby boosting food grain production in the country.
3. **Pradhan Chandra Purna (2012)**: Now the question may arise since agriculture productivity depend upon many factor such as rainfall irrigation facility, Monsoon, Climate, Soil, Fertilizers etc.

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Organic Farming and Sustainable Development in Chhattisgarh

*Bhumika Sharma
**Archana Sethi

Abstract

Chhattisgarh is an agricultural state, where about 80% of the population depends on agriculture for livelihood. The number of agricultural families in the state is 34.46 lakhs, irrigation is available in 36% of the state's irrigation sources and the contribution of agriculture to the state's total income is 10.09% (as of 2022). State and centrally sponsored schemes have been implemented to encourage organic farming in Chhattisgarh. Initially these schemes have been fully implemented in some districts of Chhattisgarh, in the remaining districts this scheme is being implemented in one development block each. Organic agriculture is being promoted in an area of 57.290 acres in 2020-21 under the Centre-promoted ***paramparagat krishi vikas yojna*** *and State-promoted* ***Jaivik kheti mission****. The Godhan Nyaya Yojana related to organic agriculture was started in 2020-21, this has not only ensured the easy availability of organic manure, but has also provided a source of additional income for the farmers. 58888 quintals of organic manure has been produced by Gauthan self-help groups.*

Key- words: Sustainable Development, Organic Farming.

Introduction

Sustainable or inclusive development refers to such development, in which the present resources are used in such a way that along with benefiting the present generation, the resources are left for the future generation, that is, the resources are not exploited in such a way that its benefit is present. Until be limited, but continue to get its benefits without any loss in the future as well.

If sustainable development is understood in the context of agriculture, then the expansion and development of agriculture should be done in such a way that the natural resources can be used without any harm, by the use of minimum harmful drugs and chemical fertilizers, by the use of biological substances available in nature. The development of agriculture can be possible by the use of substances and agricultural residues can be used as other sources of income generation.

Concept of organic farming

The concept of organic Farming mainly includes those things, which are called farming system agriculture. This farming is self-sustaining farming. In this way, all the inputs used in farming, such as fertilizers, water and insecticides, are all in the field. This is also called "on-farm input management". More and more depends on its own resources than organic farming. In this way, methods of farming without chemical fertilizers, insecticides and pesticides come in organic agriculture goes.

Sustainable development and organic agriculture in Chhattisgarh

Chhattisgarh is an agricultural state, here about 80% of the population depends on agriculture for livelihood and the number of agricultural families in the state is 34.46 lakhs. Irrigation is available in 36% of the area from all the irrigation sources in the state.

Although the concept of organic agriculture is not new to Chhattisgarh, it is included in the traditional agriculture here, as well as it has been emphasized on the initial agricultural policies of the state. " after green revolution, Excessive use of chemical inputs, use of heavy elements, pesticides.

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छत्तीसगढ़ राज्य के रायपुरशहर की मलिन बस्तियो में ऊर्जा खपत

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*सहायक प्राध्यापक,अर्थशास्त्र अध्ययनशाला,पं रविशंकर शुक्ल विश्वविद्याालय,रायपुर, छत्तीसगढ़
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***प्राध्यापक,अर्थशास्त्र अध्ययनशाला,पं रविशंकर शुक्ल विश्वविद्याालय, रायपुर, छत्तीसगढ़

सारांश:

सतत् विकास लक्ष्य को प्राप्त करने के लिए संयुक्त राष्ट्रसंध द्वारा 25 सितम्बर 2015 को 193 सदस्य देानों द्वारा 2030 तक 17 लक्ष्य निर्धारित किए गए है उसमें से 7वें क्रम पर सुलभ एवं स्वच्छ ऊर्जा है। सभी के लिए सस्ती विश्वसनीय टिकाऊ और आधुनिक ऊर्जा तक पहुंच सुंनिष्ि करनातथा विश्व की बढती हुई जनसंख्या की ऊर्जा की आवश्यकताओं को पूरा करना एक बहुत बडा चुनौतीपूर्ण कार्य है। स्वच्छ ऊर्जा की पहुंच सुनिश्चित करने के लिए सौर ऊर्जा पवन ऊर्जा जैसे नवीनीकरण स्रोतों पर निर्भरता को बढावा देना होगा। प्रस्तुत अध्ययन रायपुर शहर के 09 मलिन बस्तियों के 90 परिवारों के सर्वेक्षण से प्राप्त प्राथमिक समंकों पर आधारित है।प्रस्तुत अध्ययन में 20 परिवारों का पायलेट सर्वे किया गया तत्पश्चात अनुसूची में आवश्यक सुधार कर 70 परिवारों से जानकारी एकत्र की गई। इस तरह कुल 90 परिवारों से जानकारी एकत्र की गई। अध्ययन से ज्ञात हुआ है कि 100 प्रतिशत परिवार प्रकाश के लिए बिजली का उपयोग करते है। इसके अलावा मिटटीतेल का उपयोग किया जाता है। बिजली का उपयोग परिवारो के द्वारा मुख्यरुप सेप्रकाश के अतिरिक्त टेलीविजन,पंखा तथा कूलर के लिए किया जाता है। साथ ही रसोई ईंधन के लिए ऊर्जा के विभिन्न स्रोतों का उपयोग परिवारों द्वारा किया जाता है। प्रस्तुत अध्ययन से यह स्पष्ट है कि सर्वाधिक 100 प्रतिशत लोग रसोई ईंधन के लिए एल पी जी गैस का उपभोग करते है।इसके अतिरिक्त बिजली,कोयला एवं लकडी का भी उपभोग करते है।

शब्द कुंजी –सतत् विकास लक्ष्य,छत्तीसगढ़,रायपुर,मलिन बस्ति, ऊर्जा खपत।

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प्रस्तावना:

सतत् विकास लक्ष्य को प्राप्त करने के लिए संयुक्त राष्ट्रसंध द्वारा 25 सितम्बर 2015 को193 सदस्य देानों द्वारा 2030 तक 17 लक्ष्य निर्धारित किए गए हैं उसमें से 7वें क्रम पर सुलभ एवं स्वच्छ ऊर्जा है।सभी के लिए सस्ती विश्वसनीय टिकाऊ और आधुनिक ऊर्जा तक पहुंच सुंनिश्चित करना, विश्व की बढती हुई जनसंख्या की ऊर्जा की आवश्यकताओं को पूरा करना एक बहुत बडा चुनौतीपूर्ण कार्य है। स्वच्छ ऊर्जा की पहुंच सुनिश्चित करने के लिए सौर ऊर्जा पवन ऊर्जा जैसेनवीनीकरण स्रोतों पर निर्भरता को बढावा देना होगा।

शहरीकरण की प्रक्रिया में मलिन बस्तियों का स्वरुप विकासशील देशों में उप.उत्पाद के रुप में देखा जा रहा है(गोस्वामी एवं मन्ना,2013)।भारतीय जनगणना मलिन बस्तियों को आवासीय क्षेत्रों के रूप में परिभाषित करती है जहाँ आवास, भीड–भाड़, गलियों की अव्यवस्था, संकीर्णता या दोषपूर्ण व्यवस्था, रोशनदान की कमी, प्रकाश या स्वच्छता सुविधाओं या किसी भी संयाजन के अभाव में मानव आवास के लिए आयोग्य है। ये सारे कारक सुरक्षा और स्वास्थ्य के लिए हानिकारक है (जनगणना,2011)।भारत जैसे विकासशील देश में शहरीकरण बढ़ता जा रहा है, झुग्गीवासियों की संख्या में वृध्दि जारी रहने की सम्मवना है। इन क्षेत्रों में रहने की स्थिति में सुधार करने वाली महत्वपूर्ण नीतियों के अभाव में, लोग खराब स्वास्थ्य, हिंसा और गरीबी के जोखिम उठातें है (नाकामुरा,2014)।घोष सजल,2014के अनुसार विशेष रूप से ऊर्जा और बिजली की पहुँच में सुधार करना मलिन बस्तियों के विकास के लिए महत्वपूर्ण है।अग्रवाल, वन्दना और बन्दोपाध्याय ए.,2016ने अपना अध्ययन रायपुर शहर की ज्योतीनगर मलिन बस्ती में किया तथा बताया कि खाली भूमि जो सडकके पास हो तथा जहां पर पानी की उपलब्धता हो ऐसे कारकहै, जोमलिनबस्तियोंकी उत्पत्ति में महत्वपूर्ण भूमिका निभाते हैं।

विकासशील देशों में गरीबी को कम करने और आर्थिक विकास को बढ़ावा देने के लिए ऊर्जा सेवाओं की सस्ती और ऊर्जा की विश्वसनीय आधुनिक रूपों तक पहुँच में सुधार की आवश्यकता है (माल्ला और टिमिलसिना,2014)।अधिकांश सामाजिक और आर्थिक गतिविधियों में विभिन्न रूपों और मात्राओं में ऊर्जा के उपयोग की आवश्यकता होती है। खाना पकाने, पानी उबालने, और प्रकाश व्यवस्था जैसे बुनियादी उपयोग के लिए घरों में ऊर्जा उतनी ही महत्वपूर्ण है जितना की उत्पादन के लिए बड़े–बड़ें उद्योगों और ऑटोमोबाइल कम्पनियों मे (अफ्रिकन रिजनल इम्पलिमेन्टेसन,2005)।आज के बदलते परिवेश में ऊर्जा के क्षेत्र में छत्तीसगढ प्रदेश ने अपनी अलग पहचान बनायी है(अग्रवालएवं त्रिवेदी,2016)।छत्तीसगढप्रदेश के विभिन्न जिलों में प्रकाश एवं रसोई ईंधन के लिए ऊर्जा के उपभोग परसामाजिक आथिक स्थिति के

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साथ–साथ भौगोलिक स्थिति का भी प्रभाव पडता है(कृष्णनएवं ब्रह्मे,2019)।जनगणना 2011 के अनुसार छत्तीसगढ में रोशनी के लिए प्रयुक्त ऊर्जा का 67.04प्रतिशत बिजली, 30.51प्रतिशतमिट्टी तेल तथा 1.33प्रतिशत सौर ऊर्जा से प्राप्त है। ग्रामीण क्षेत्र में बिजली के लिए प्रयुक्त ऊर्जा का 62.01प्रतिशत बिजली, 35.14प्रतिशतमिट्टी तेल और 1.63प्रतिशत सौर ऊर्जा से प्राप्त है। शहरी क्षेत्र में बिजली के लिए प्रयुक्त ऊर्जा का 90.49प्रतिशत बिजली 8.75प्रतिशतमिट्टी तेल 0.09प्रतिशत सौर ऊर्जा से मिलता है। जनगणना 2011 के अनुसार छत्तीसगढ में रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 85.05प्रतिशत लकडी 0.77प्रतिशत फसल अवशेष 2.6प्रतिशत गोबर के कंडे है। ग्रामीण क्षेत्र में रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 93.25प्रतिशत लकडी 0.76प्रतिशत फसल अवशेष 3.2प्रतिशत गोबर के कंडे है। शहरी क्षेत्र में रसोई ईंधन के लिए प्रयुक्त ऊर्जा का 52.28प्रतिशत लकडी 0.84प्रतिशत फसल अवशेष तथा 0.60प्रतिशत गोबर के कंडे से प्राप्त है।

प्रस्तुत अध्ययन का उद्धेश्य रायपुर शहर की मलिन बस्तियों के निदर्श परिवारों की सामाजिक आर्थिक स्थिति का अध्ययन करना एवं रायपुर शहर की मलिन बस्तियों के परिवारों द्धारा बिजली उपभोग की स्थिति का अध्ययन करना तथा परिवारा द्धाररसोई ईंधन के वर्तमान उपभोग की स्थिति का अध्ययन एवं विष्लेशण करना है।वर्तमान अध्ययन प्राथमिक तथा द्वितियक समंकों पर आधारित हैं। द्वितियक समंकों के लिए जिला जनगणना पुस्तिका, छत्तीसगढ़ जनगणना 2011 का किया गया है। प्रस्तुत अध्ययन रायपुर शहर के 09 मलिन बस्तियों के 90 परिवारों के सर्वेक्षण से प्राप्त प्राथमिक समंकों पर आधारित है।समंकों का संग्रहण अनुसूची के माध्यम से किया गया है। प्रस्तुत अध्ययन में 20 परिवारों का पायलेट सर्वे कुकुरबेडा और सरोनाबस्ती से किया गया तत्पश्चात अनुसूची में आवश्यक सुधार कर 70 परिवारों से समंक संग्रहण डूमर तालाब,सरोना ईंटाभट्ठा,सतनामीपारा,जगन्नाथ नगर, टाटीबंध बस्ती,रोटरी नगर एवं बाजारपारा से समंको से ग्रहण किया गया है। इस तरह कुल 90 परिवारों से जानकारी एकत्र की गई। मलिन बस्तियों मे खाना पकाने और प्रकाश के लिए ऊर्जा के प्रमुख स्त्रोतों का विश्रलेशण करने के लिए प्रतिशत विधि का प्रयोग किया गया है। शिक्षा और आय के मध्य संबंध ज्ञात करने काईं वर्ग (χ^2) का प्रयोग किया गया है।

मलिन बस्तियों की सामाजिक आर्थिक स्थिति

रायपुर शहर में 1991 में जनसंख्या4,62,694थी जो 2001 में 6,70,042हो गई तथा 2011 में बढकर 1,010,087हो गई। 2001 जनगणना में रायपुर शहर में मलिन बस्ती की संख्या 154 थी, जहां 26899 परिवार निवासरत थे तथा मलिन बस्ती की कुल जनसंख्या 159128 थी जो शहर की कुलजनसंख्या का 23.74प्रतिशत थी।2011 की जनगणना में मलिन बस्ती की संख्या बढकर 282 हो गयी जहां 87598

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परिवार निवासरत थे तथा मलिन बस्ती की कुल जनसंख्या 516829 थी जो शहर की कुलजनसंख्या का 51. 66प्रतिशत था।रायपुर शहर के 282 मलिन बस्तियों में से 212 मान्यता प्राप्त मलिनबस्तिया है।

तालिका-1: रायपुर शहर में मलिन बस्तियोंएवं परिवार की संख्या

	1991	2001	2006	2011
मलिन बस्तियो की संख्या	154	154	282	282
मलिन बस्तियों में परिवारों की संख्या	NA	26,899	61,449	87,598

स्त्रोत:नगरनिगम विकास कार्यक्रम

समाज में व्यक्तियों के जीवन से संबंधित महत्वपूर्ण पक्षों जैसे आयु, शिक्षा,प्रशिक्षण, रोजगार, निवास स्थान आदि तत्वों के अध्ययन को अस्वीकार नहीं किया जा सकता है क्योंकि ये सभी तत्व व्यक्ति की कार्यक्षमता को प्रभावित करती है।परिवार की आय का स्रोत महत्वपूर्ण स्थान रखता है व्यवसाय, नौकरी, मजदूरी आदि स्रोतों से प्राप्त आय परिवार की आर्थिकस्तर के साथ–साथ उनका जीवनस्तर भी निर्धारित करती हैं। परिवार की आय वह तत्व है जो व्यक्ति का जीवन स्तर निर्घारित करने के साथ–साथ परिवार की संरचना को प्रभावित करती है।

तलिका–2: निदर्श परिवारों मेंरोजगार का स्रोत

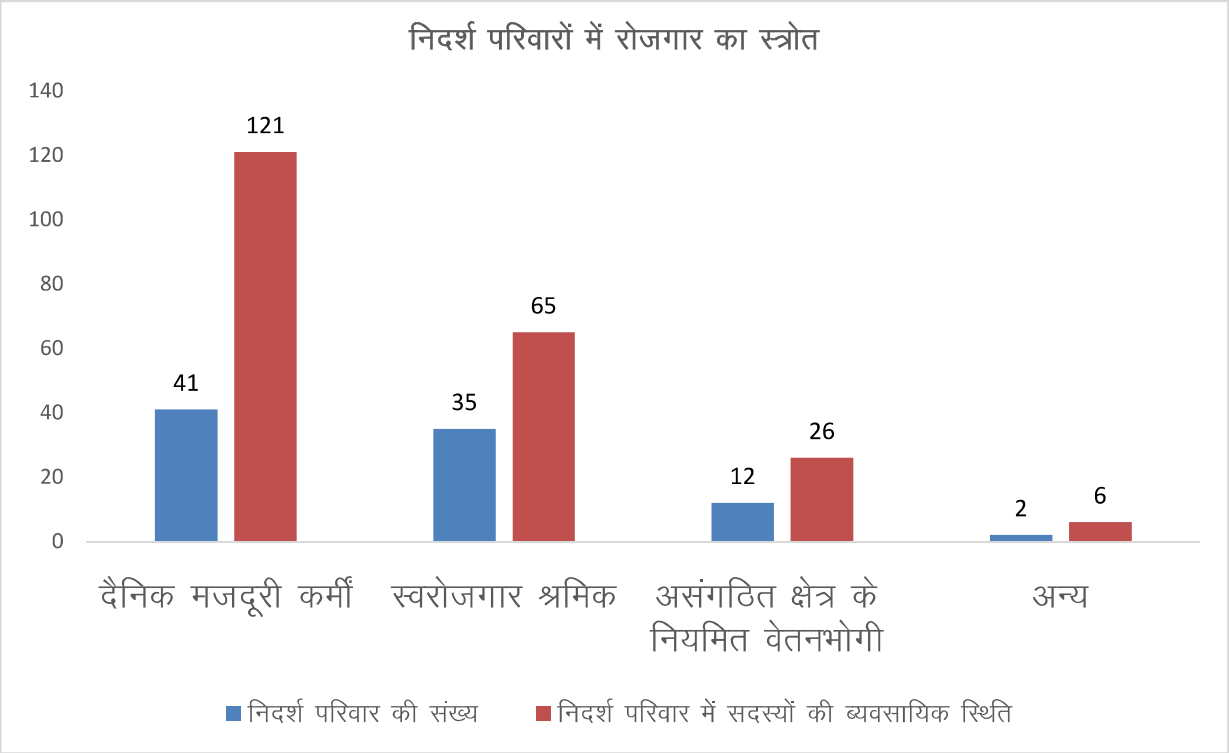
क्र	व्यवसाय	निदर्श परिवार की संख्या	निदर्शपरिवार प्रतिशत	निदर्श परिवार में सदस्यों की व्यवसायिक स्थिति	निदर्शपरिवारमें सदस्यों की व्यवसायिक स्थिति का प्रतिशत
1	दैनिक मजदूरी कर्मी	41	45.6	121	55.5
2	स्वरोजगार श्रमिक	35	38.9	65	29.8
3	असंगठित क्षेत्र के नियमित वेतनभोगी	12	13.3	26	11.9
4	अन्य	02	2.2	06	2.8
5	योग	90	100	218	100

स्त्रोतःसर्वे पर आधारित

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तालिका -2 के अनुसार निदर्श परिवार की मुखिया का 45.6 प्रतिशत दैनिक मजदूरी कर्मी(मजदूर)है, 38. 9प्रतिशत स्वरोजगारश्रमिक(रिक्शा, चालक,ठेलेवाले) एवं 13.3 प्रतिशत असंगठित क्षेत्र के नियमित वेतनभोगी(दुकान,कामवाली बाई) के माध्यम से जीवकोपार्जन करते है। निदर्श परिवार में कुल सदस्यों के 55. 5 प्रतिशत सदस्य दैनिक मजदूरी कर्मी (मजदूर)है, 29.8 प्रतिशत स्वरोजगार श्रमिक(रिक्शा,चालक,ठेलेवाले) एवं 11.9 प्रतिशत सदस्य असंगठित क्षेत्र के नियमित वेतनभोगी (दुकान,कामवाली बाई)है।



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तालिका -3: निदर्श परिवारों की आय एवं परिवार की संरचना

क्र	आय वर्ग (रु)	निदर्श परिवार संख्या	प्रतिशत	सभी परिवारों की सदस्य संख्या	सम्पूर्ण परिवार के कुल सदस्यों कीमासिक आय (रु)	परिवार का औसत आकार	परिवार की औसत मासिक आय (रु)	प्रति व्यक्ति औसत मासिक आय (रु)
1	0- 5000	29	32.2	156 (35.45)	125000	5.38	4310.3	801.1
2	5000-10000	29	32.2	135 (30.68)	230200	4.66	7937.9	1703.4
3	10000-15000	24	26.7	109 (24.7)	290000	4.5	12083.8	2685.2
4	15000-20000	06	6.7	30 (6.81)	264000	5.0	44000	8800. 0
5	20000 . से अधिक	02	2.2	10 (2.27)	55000	5.0	27500	5500. 0
6	योग	**90**	**100**	**440 (100)**	**964200**	**4.9**	**95832**	**19489.7**

स्त्रोतःसर्वे पर आधारित

तालिका - 3 के अनुसार 5000 रु तक मासिक आय प्राप्त करने वाले परिवार के मध्य 32.2प्रतिशत परिवार है एवं 5000 से 10000रु आय प्राप्त करने वाले परिवार के मध्य 32.2प्रतिशत परिवार है। 10000रु से 15000रु आय प्राप्त करने वाले परिवार के मध्य 26.7प्रतिशत परिवार है एवं 15000 से 20000 रु आय प्राप्त करने वाले परिवार के मध्य 6.7प्रतिशत परिवार है। 20000 रु से अधिक आय प्राप्त करने वाले 2 ण्2 प्रतिशत परिवार है।सभी परिवारों की सदस्य संख्या 440 है एवं परिवार का औसत आकार 4ण्9 है।सबसे कम मासिक आय (5000 रु तक)परिवारों का औसत आकार सर्वाधिक 5.38है। परिवारों की औसत मासिक आय रु 95832 है।सर्वाधिक औसत मासिक आय 10000-15000रु प्राप्त करने वाले परिवारों की 44000रु है।परिवारों की प्रति व्यक्ति औसत मासिक आय 19489.7रु है।सबसे कम प्रति व्यक्ति औसत मासिक आय 5000रु तक मासिक आय के परिवारों की 801.1रु है।सर्वाधिक प्रति व्यक्ति औसत मासिक आय 15000-20000रु प्राप्त करने वाले परिवारों की 8800 रु है।

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तालिका 4: निदर्श परिवारों की शैक्षणिक स्तर एवं आयनुसार वितरण

क		निदर्श परिवारो की आय एवं शैक्षणिक स्तर									
		अशिक्षीत (%)	केवल साक्षर	प्राथमिक स्तर	माध्यमिक स्तर	हाई स्कूल	हायर सेकेण्डरी	स्नातक	स्नातकोत्तरया अधिक	योग	
										संख्या	प्रतिशत
1	**0-5000**	03 (15.8)	03 (15.8)	02 (6.9)	04 (13.8)	01 (10.5)	05 (78.9)	01 5.3		19 (100)	21.1
2	**5000 - 10000**	04 (13.8)	02 (6.9)	04 (13.8)	06 (20.7)	05 (17.2)	04 (13.8)	04 (13.8)		29 (100)	32.2
3	**10000 – 15000**	01 (4.2)	02 (8.3)	02 (8.3)	02 (8.3)	06 (25)	04 (16.7)	06 (25)	01 (4.2)	24	26.7
4	**15000-20000**	-	-	03 (18.75)	02 (12.5)	06 (37.55)	03 (18.75)	02 (12.5)		16	17.8
5	**20000 –से अधिक**	-	-	-	-	-	01 (50.0)	01 (50.0)		02	2.22
6	योग	08	07	10	13	25	15	10	02	90	100

स्त्रोतःसर्वे पर आधारित।कोष्टक में प्रदर्शित संख्या प्रतिशत को दर्शाती है।

तालिका 4 निदर्श परिवारों की शैक्षणिक स्तर एवं आय अनुसार वितरण दर्शा रहा है जिससे स्पष्ट है कि 21.1प्रतिशत निदर्श परिवार 5000रु मासिक आय प्राप्त करते है, जिसका 78.9प्रतिशत हायर सेकेण्डरी तक शिक्षित है।5000 से 10000रु आय मासिक प्राप्त करने वाले 32.2प्रतिशत निदर्श परिवार हैं, जिसका सर्वाधिक 20.7प्रतिशत माध्यमिक सतर तक शिक्षित है। 10000 रु से 15000 तक मासिक आय प्राप्त करने वाले 26.7प्रतिशत निदर्श परिवार हैजिसका 16.7प्रतिशत हायर संकेण्डरी स्कूल तक शिक्षित है।15000 से 20000 रु मासिक आय प्राप्त करने वाले17.8प्रतिशत निदर्श परिवार है जिसका सर्वाधिक 37.5 प्रतिशत हाई स्कूल तक शिक्षित है।20000 से अधिक मासिक आय प्राप्त करने वाले 2.22प्रतिशत निदर्श परिवार है जिसका क्रमशः 50.00 प्रतिशत हायर सेकेण्डरी एवं 50.00 प्रतिशत स्नातक तक शिक्षित है।शैक्षणिक स्तर का आय पर प्रभाव ज्ञात करने हेतु काईं वर्ग (χ^2) का प्रयोग किया गया है।df. 25 तथासार्थकता स्तर(p)0.05पर परिगणितमूल्य (χ^2) 57.6हैएतथातालिका मूल्य(χ^2) 37.652 है ।विश्लेशण से ज्ञात होता है कि मलिन बस्तियोंके परिवारों मे शिक्षा के स्तर में होने वाली वृद्धि का उनकी आय पर सार्थक प्रभाव हुआ है।

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मलिन बस्तियोंमें प्रकाश हेतु ऊर्जा उपभोग

आधुनिक समाज में वर्तमान जीवन स्तर को बनाए रखने के लिए ऊर्जा अपरिहार्य है। यह आर्थिक और समाजिक विकास के मुख्य कारकों में से एक है अतः पिछले कुछ वर्षो में इसकी मांग काफी बढ़ गई है (भन्डारी एव पंडित,2018) ।ग्रेगरी एवं डेविड (2013)के अनुसारजैसे परिवार का आय बढता जाता है वैसे वैसे वह उच्च गुणवत्ता वाले ऊर्जा का उपयोग करता है तथा ऊर्जा सीढी में उपर चढते जाता है।ऊर्जा के लिए आय लोच कम होती है एवं परिवार की आयतथा आकार ऊर्जा के विभिन्न स्त्रोतआदि तत्व ऊर्जा मांग को प्रभावित करते है।

तालिका-5: रायपुर शहर के मलिन बस्तियों के परिवारों में प्रकाश हेतु ऊर्जा का उपभोग

क्र.		बिजली	बिजली एवं मिट्टी तेल	बिजली एवं मोमबत्ती
1	परिवारों की संख्या	90	03	03
2	परिवारों का प्रतिशत	100	5.6	3.3

स्त्रोतःसर्वे पर आधारित

तालिका 5 में रायपुर शहर के मलिन बस्तियों के परिवारों में प्रकाश हेतु ऊर्जा का उपभोग दर्शाया गया है। 100 प्रतिशत परिवार प्रकाश के लिएबिजली का उपयोग करते है।5. 6प्रतिशत परिवार प्रकाश के लिए बिजलीएवं मिट्टीतेलदोनों का उपयोग करते है। 3.3प्रतिशत परिवार प्रकाश के लिए बिजली एवं मोमबत्ती का उपयोग करते है।

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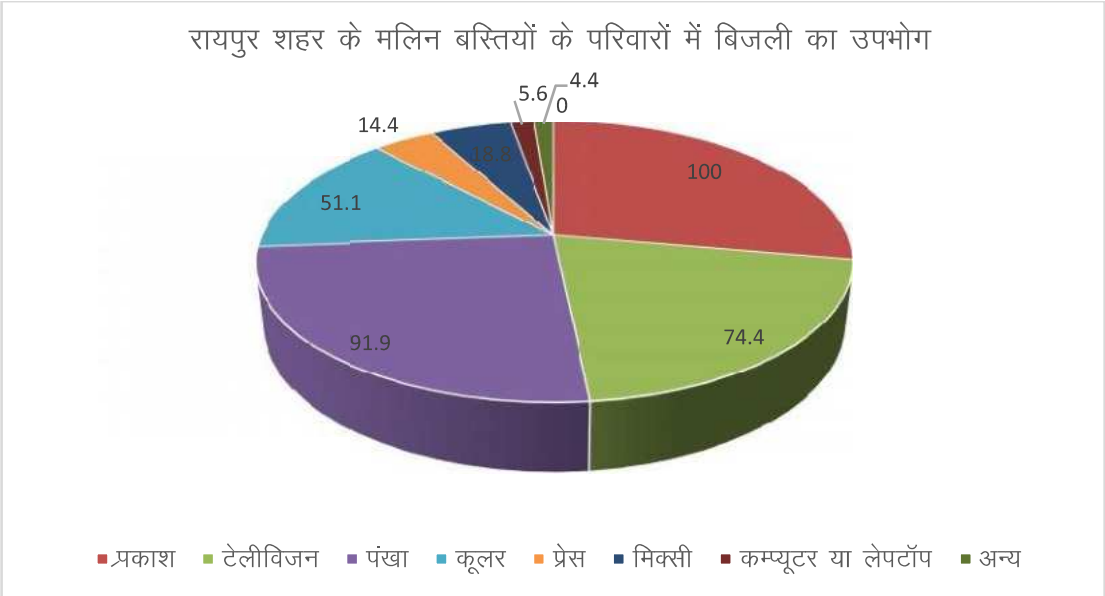
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तालिका 6: रायपुर शहर के मलिन बस्तियों के परिवारों में बिजली का उपभोग

क्र.	प्रकाश	टेलीविजन	पंखा	कूलर	प्रेस (आयरन)	मिक्सी	कम्प्यूटर या लेपटाप	अ न्य
परिवारों की संख्या	90	67	82	46	13	17	05	04
परिवारों का प्रतिशत	100	74 .4	91.9	51.1	14.4	18.8	5 .6	4. 4

स्त्रोतःसर्वे पर आधारित

तालिका 6 में रायपुर शहर के मलिन बस्तियों के परिवारों में बिजली का उपभोग दर्शाया गया है।मलिन बस्तियोंमें रहने वाले सभी परिवारों के द्वारा प्रकाशके लिए बिजली का उपयोग किया जाता है।74.4प्रतिशत परिवार टेलीविजन का उपयोग करते है।91.9प्रतिशत परिवार पंखा का उपयोग करते है।51.1प्रतिशत परिवार कूलर का उपयोग करते है।14.4प्रतिशत परिवारों के घरों में आयरन है।18.8प्रतिशत परिवारों में मिक्सी उपयोग किया जाता है।5.6प्रतिशत परिवारों में कम्प्यूटर का उपयोग किया जाता है।4.4प्रतिशत परिवार बिजली का अन्य कार्यों जैसे सिलाई मशीन आदि में उपयोग करते है।



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मलिन बस्तियोंमें रसोई ईंधन हेतुऊर्जा

स्वच्छ और सस्ती खाना पकाने की ऊर्जा तक पहुंच एक महत्वपूर्ण सामाजिक लक्य है।पारंपरिक रसोइयों के व्यापक उपयोग से स्वास्थ्य और महिला सशक्तीकरणको गंशीर खतरा है (पटनायक एवं त्रिपाठी,2017)।

तलिका7 : रायपुर शहर के मलिन बस्तियों के परिवारों में रसोई ईंधन हेतु ऊर्जा का उपभोग

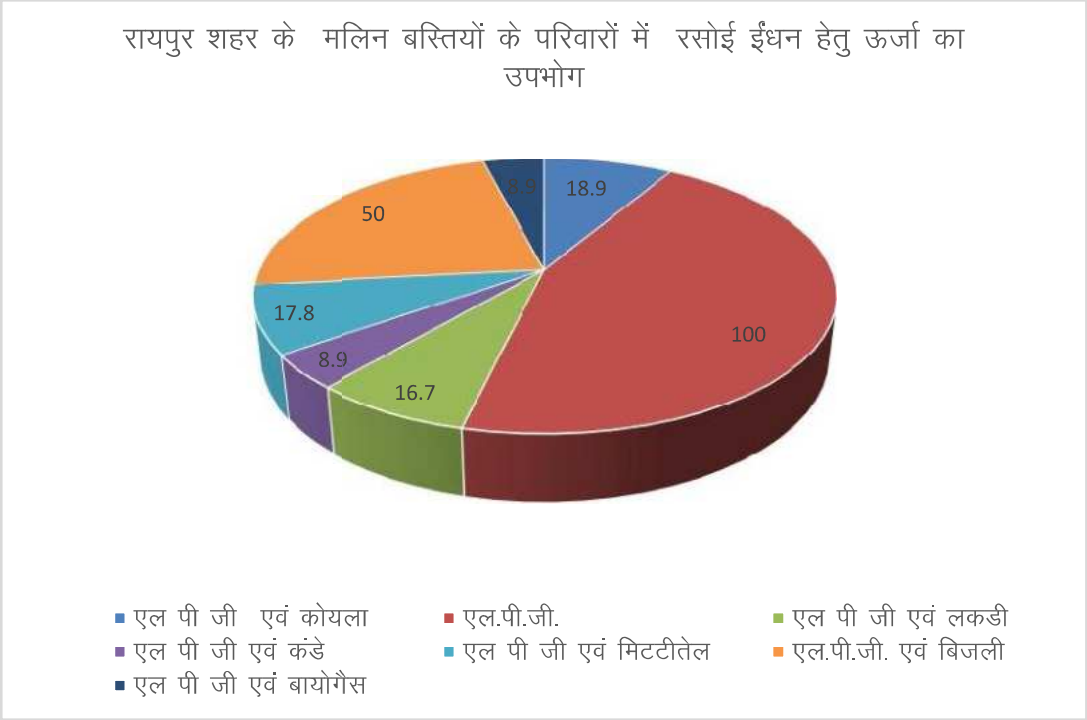
क्र.	एलपीजी एवं कोयला	एलपीजी	एलपीजी एवं लकडी	एलपीजी एवं कंडे	एलपीजी एवं मिटटीतेल	एलपीजी एवं बिजली	एलपीजी एवं बायोगैस
परिवारों की संख्या	17	90	15	08	16	45	08
परिवारों का प्रतिशत	18.9	100	16.7	8.9	17.8	50.0	8.9

स्त्रोतःसर्वे पर आधारित

तालिका - 7 में रसोई ईंधन के लिए प्रयुक्त ऊर्जा के विभिन्न स्रोतों का विश्लेषण किया गया है। तालिका से स्पष्ट है कि सर्वाधिक 100 प्रतिशत परिवार रसोई ईंधन के लिए केवल एल पी जी गैस का उपभोग करते है।50 प्रतिशत परिवार एलपीजी गैस एवं बिजली का उपभोग करते हैं।18.9प्रतिशत परिवार एल पी जी एवं कोयला का उपभोग करते है।16.7प्रतिशत परिवार एलपीजी एवं लकडी का उपयोग करते है।8.9परिवार बायो गैस एवं एलपीजी का उपयोग करते है।

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निष्कर्षएवं सुझाव

वर्तमान अध्ययन छत्तीसगढ़ राज्य के रायपुर शहर के मलिन बस्तीयों में ऊर्जा के उपयोग की व्याख्या करता है। यह अध्ययन मलिन बस्तीयों में ऊर्जा परिदृष्य में नई अर्न्तदृष्टि प्रदान करता है। अध्ययन में मुख्य रूप से खाना पकाने और प्रकाश व्यवस्था के लिए उपयोग किये जाने वाले ईधन के संबन्ध में मलिन बस्तियों में प्रर्याप्त विविधता है। रायपुर शहर की मलिन बस्तियों केपरिवार प्रकाश के लिए मुख्य रूप सेबिजली का उपयोग करते है।बिजली का उपयोग परिवारों के द्धारा प्रकाश के अतिरिक्त टेलीविजन एवं पंखे के लिए किया जाता है। 100 प्रतिशत परिवार रसोई ईंधन के लिए एल पी जी गैस का उपभोग करतें है। एल पी जी गैस के अतिरिक्त एल पी जी एवं कोयला और एलपीजी एवं लकडी का उपयोग करते है।

अतः अध्ययन से यह स्पष्ट है कि सर्वाधिक परिवार प्रकाश के लिए बिजली का उपभोग एवं रसोई ईंधन के लिए एल पी जी गैस का उपभोग करतें है, अर्थात स्वच्छ ऊर्जा का उपभोग अधिकांश परिवार करते हैं।

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Assessment of Basic Amenities in the Sub-urban Area of Siliguri Municipal Corporation

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ABSTRACT

Basic Amenities are the most neglected part of the sub urban area. Administrative difference between to civic body leads to such difference. In this study one attempt has been made to understand the condition of basic amenities of the area which is located within the four km buffer form the Siliguri Municipality Corporation. Remote sensing and GIS technique computation of built up has been used to identify the area. Primary database has been generated with the help of a well-designed schedule cum questionnaire. 422 household has been selected for the primary survey. In this study it is found that basic amenities of this area is in pathetic condition. SPSS is used for the computation of data and make the relationship between two variable and excel was used for making the graph and chart. One attempt has been made to figure out the Satisfaction level of the respondent towards the availability of basic amenities by using the five point scale. It is found that most of the people are not satisfied with present services.

Key Words : Basic Amenities, Suburb, Primary survey, Siliguri Municipal Corporation

INTRODUCTION

Before starting the discussion on basic services of Siliguri city suburb let understand the concept of basic services. Services like sanitation facilities, drinking water, electricity, waste management, connectivity education, health services etc. which required to continue our life called basic services (Ghosh *et al.,* 1995). We are familiar with the term Urban Basic Services, because there is lot of schemes are available in the name of urban services.

In case of urban area there is lot of scheme in the name of urban basic services. But in the rural area there is no such define programme. As the suburb of the city basically comes under the jurisdiction of panchayat so designated schemes are absent there. Rapid urbanisation pool people towards city, many times it is notice that people who cannot afford the residence in city they started staying city outskirt (Sudhira *et al.*, 2003). On the other hand those who not want to stay congested area of city came to the city periphery for the better living condition. In both the cases changes took place in the condition of city periphery (Ramachandra *et al.*, 2013). When this thing happen intensely it put pressure on the existing infrastructure of that area (Banu and Fazal, 2016). We can see many times these area are included with the main city but at that time there services infrastructure cannot be changed. The provision of suitable housing with essential amenities such as water supply, drainage, connectivity plays a significant role in the economic and social development goals of less developed nations such as India (Fazal, 2013).

METHODOLOGY

Area chosen for the survey Selection of the surveyed village and house hold:

In the first step a buffer of 4 Km from the Siliguri Municipal Corporation (SMC) boundary has been created. In the next step built up change of this area monitored. Primarily growth prone surrounding area has been demarked. In the next step connectivity and future

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RESEARCH PAPER

RESEARCH REVIEW International Journal of Multidisciplinary
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Double-Blind Peer Reviewed/Refereed Journal

Study of urban sprawl of Siliguri city

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Abstract

During past four decades, Siliguri city has drew a lot of people. In this four-decade Siliguri city convert into an important economic centre of the entire north Bengal, as a result land use land cover distribution of the city changed rapidly. This study aims to identify the pattern and analyse the urban growth of the city from 1991 to 2021 by giving special emphasize on built up growth. The Landsat TM, ETM and LISS IV data has been used for determine the built-up growth of the Siliguri city. Modified Maximum Likelihood Classifier approach has been adopted to classify the satellite image. From the analysis it is found that there is a drastic change in built-up 1254.54 percent in respect to 1991. The sprawl has been measured using Shannon's entropy. These changes are harmful for the ecological balance of the city surrounding. It can further influence the city's sustainable development conditions.

Keywords: *Built-up, Land Use Land Cover (LULC), Maximum Likelihood Classifier, Urban expansion.*

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Introduction

As per the World Bank report 2009, economic activities of secondary cities provide enormous opportunity to change the status of the region which will finally help to the national development (World Bank., 2009). Significance of medium sized class 1 cities has been given more importance in this report for the upliftment of world economy. The highest population density historically has been found in South and South-East Asia. The fast urban population expansion in the last few decades, particularly in the second half of the 20th century, has sparked fears of an urban explosion in this area. On the other hand, the population growth of the developed countries almost stagnant because they already passed the phase. It is worth mentioning that their rate of urban growth also stagnant. Among the Asian countries India and China combinedly share more than 64% of the overall growth of urban populations in Asia and in respect to global urban population a massive 42% of urban population growth recorded from 2005 to 2025(Sankhe et al., 2011). As per 2011 census India has the second major urban population in the world after China with 377 million urban population, by 2031 that is projected to reach 590 million. The highest decadal rise in the last hundred years occurred between 2001 and 2011, when 92 million people moved

Adoption of New Dimensions in Agriculture and Food Security With Special Reference to Jashpur District

Eastern Geographer
Vol. XXV, No. 1, January, 2019, pp. 188-194
ISSN 0973 - 7642

Dr. (Mrs.) Uma Gole

Abstract

With the implementation of Green Revolution in the 1960s Indian Agriculture has seen many reforms and developments in terms of land reforms, improved seeds, chemical fertilizers, pesticides. The crux of agricultural development is ever evolving technology and innovations; but its adoption depends on information, access, affordability and applicability. The implementation of new technologies and machinery has not only raised the productivity but have also facilitated in the spread of agriculture but still there are regions and population in need of food aids for their sustainment. Present study attempts to recognize the adoption of new dimensions in agriculture and its relationship with food security with Jashpur district as a sample unit.

Keywords: Agricultural Adoption, Food Security, Hunger Index, Jashpur District.

Introduction

Adoption in agrarian context refers to the process by which a new idea or technology is implemented in practice by the farmers with the sole purpose of increasing the quality and quantity of their produces. For increase in production and productivity, a type of system has been created where by the help of agricultural new dimension, methods, investment and scientific institutions formed and the techniques are applied in it; that can be termed as development (S.K. Sharma, 1988). Three-fourth part of the population in the world live in rural areas and their primary livelihood is agriculture. Hunger and child malnutrition is more seen in rural areas as compared to the urban areas. Keeping these facts in mind, the new agricultural dimension, food security and hunger are the important aspects in the Jashpur district of Chhattisgarh.

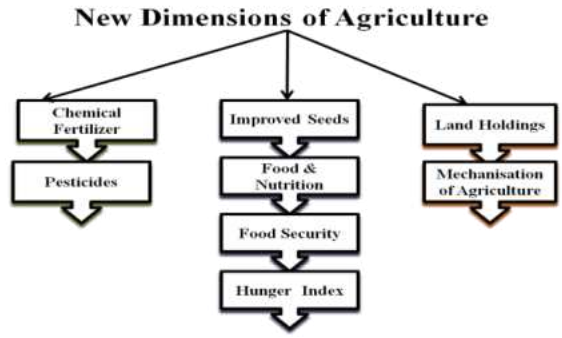


Fig.1

Objectives

1. To study the indulgence in modern Dimensions of Agriculture in the study area.
2. To analyze the Food Availability and Food Security Conditions in Monetary Value through the evaluation of Food Production by Tribal farmers.
3. To derive the Hunger Index for the sample population.

Sources of Data and Methodology

Present study is based on primary and secondary data. From each of the 8 development blocks

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A SPATIO-TEMPORAL STUDY OF LAND USE LAND COVER A BASIN USING GIS AND REMOTE SENSING TECHNIQUES

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ABSTRACT

Land is the only valuable resource of the earth wh
Land is the base of life, the changing pattern of uses
the Stone Age to modern time. On that way the pres
also been noticed remarkable changes. Digital chang
changes related with land use and land cover fea
sensing data. The objectives of the paper analyze t
well as the factor which is responsible for the transf
for the time frame of 2010 and Sentinal 2 data for t
for this present study. Total area of the study regio
Mapping has consisted of basically four steps:
interpretation/classification, post verification th
Classification schema 2019 has been used for Land
Cropland. LULC classes which has been identified in
built up, Rural Built up, Urban, Canal, Dense
Gullied/Ravines, Industrial/Mining, Lake/Pond
River/Stream, Waterlogged. It has been found that
land converted into agricultural land.70 ha. of c
agricultural land. Significant changes in the outer fo
study region, and it must be reconstructed for tribal
on natural resources.

Keywords: LULC, Digital Change Detection NRSC, I

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भारतीय राष्ट्रीय आंदोलन एवं सांस्कृतिक जागरण– बाल गंगाधर तिलक के विशेष संदर्भ में

Indian National Movement and Cultural Awakening - With Special Reference to Bal Gangadhar Tilak

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सारांश

1885 ई. में भारतीय राष्ट्रीय कांग्रेस एक अखिल भारतीय राजनीतिक संस्था के रूप में स्थापित हुई। 1885 से 1905 ई. तक का समय उदारवादी युग के नाम से जाना जाता है। उदारवाद क्रमशः सुधार की नीति में विश्वास रखते थे लेकिन 20वीं सदी के प्रारंभ में 1905 ई. से भारतीय राजनीतिक क्षितिज पर भारत को राजनीतिक अधिकार देने एवं पूर्ण स्वराज की मांग और उसकी प्राप्ति हेतु जन आंदोलन के मार्ग को अपनाने वाली उग्र राष्ट्रवादी आंदोलन का जन्म हुआ। उग्र राष्ट्रीयता के उदय में बाल गंगाधर तिलक, लाला लाजपतराय, विपिन चंद्र पाल एवं अरविंद घोष का नेतृत्व महत्वपूर्ण रहा। इनमें तिलक को भारतीय उग्र राष्ट्रवाद का जनक माना जाता है तथा लोग उन्हें लोकमान्य और भारत का बेताज बादशाह कहते थे।

In 1885 A.D. the Indian National Congress was established as an all India Political Organization. The period from 1885-1905 A.D. is known as the liberal era. Liberlism believed in the policy of gradual reform but begining 20 th Century from 1905 A.D. a militant nationalist movement was born on the Indian political horizon, adopting the path of mass movement for giving political rights to India and demanding and achieving Purn Swaraj. The leadership of Bal Gangadhar Tilak, Lala Lajpat Rai, Bipin Chandra Pal and Arobind Ghosh was important in the rise of militant nationalism. Among these, Tilak is considered the father of Indian Nationalism and people called him Lokmanya and the Uncrowned King of India.

मुख्य शब्द : पुनर्जागरण, साम्राज्यवाद, उदारवादी, उग्रराष्ट्रवाद, स्वदेशी, बहिष्कार।
Renaissance, Imperialism, Liberalism, Militant Nationalism, Swadeshi, Boycott.

प्रस्तावना

18वीं शताब्दी में भारतीयों की आपसी फूट तथा दुर्बलता से लाभ उठाकर अंग्रेजों ने भारत में अपना राज्य कायम किये। ब्रिटिश साम्राज्य के भारत में विस्तार के बाद भारत का आर्थिक व राजनीतिक रूप से खूब शोषण हुआ। उस समय देश की सामाजिक, धार्मिक व सांस्कृतिक क्षेत्र में अव्यवस्था फैली हुई थी तथा जनता अंधकार में भटक रही थी। 19वीं सदी के पूर्वार्द्ध में इन अव्यवस्थाओं को सुधारने हेतु कुछ अग्रगण्य भारतीयों द्वारा सामाजिक व धार्मिक जीवन में एक जागृति उत्पन्न हुई जिन्हें भारतीय पुनर्जागरण कहा जाता है।[1] भारत में पुनर्जागरण का संबंध औपनिवेश संघर्ष की कथा है। ब्रिट्रेन की प्रचण्ड राजनीतिक शक्ति तथा सांस्कृतिक सामाज्यवाद के विरूद्ध प्रतिक्रिया के रूप में बंगाल में ब्रम्ह समाज, महाराष्ट्र में प्रार्थना समाज, उत्तर भारत में आर्य समाज एवं रामकृष्ण मिशन आदि का उदय हुआ।[2] इस पुनर्जागरण आंदोलन का सामाजिक, धार्मिक, साहित्यिक, कलात्मक व राजनीतिक क्षेत्रों पर व्यापक प्रभाव पड़ा एवं अंततः भारतीय राष्ट्रीय आंदोलन में वह प्रवाहित हुई और उसके विकास में महत्वपूर्ण भूमिका निभाई।

शोध प्रविधि

प्रस्तुत शोध पत्र में द्वितीयक स्रोत सामग्री का उपयोग किया गया है। राष्ट्रीय स्तर के प्रकाशित पुस्तकों का अध्ययन कर शोध पत्र तैयार किया गया हैं।

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ब्रिटिश कालीन छत्तीसगढ़ की प्रशासनिक व्यवस्था (1854 ई.–1947 ई.)

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सारांश–

1818 ई. के पूर्व छत्तीसगढ़ पर शोंसलो का राज्य था, परन्तु इस क्षेत्र को जो महत्व या आत्मीयता मिलनी चाहिए थी, नागपुर से दूर होने के कारण शोंसले से वह इसे न मिल सकी। इसलिए छत्तीसगढ़ अपने आपको उपेक्षित अनुभव कर रहा था। ऐसे समय पर सन् 1818 में अंग्रेजो ने नागपुर के राज्य पर अपना नियंत्रण स्थापित किया। इस नियंत्रण के कारण न केवल नागपुर राज्य में ही अपितु छत्तीसगढ़ की राजनीति मे भी प्रारंभ मे एक गतिशील विकास परिलक्षित हुआ।

यह स्पष्ट है कि अंग्रेजो के आगमन के पूर्व छत्तीसगढ़ की दशा एक उपेक्षित तथा शासित प्रदेश के रूप थी। अंग्रेजो के आते ही इस ओर कुछ ऐसी बाते हुई कि यहां की जनता को ऐसा प्रतीत हुआ कि देशी शासन की अपेक्षा विदेशी शासन अधिक सुखकर होगा। यहां के निवासियो के मानस में भावी सुख की यह आशा इतनी बलवती हो गयी कि यहां के लोक – साहित्य मे इस शासन की प्रशंसा मे कुछ बाते कही जाने लगी। इतिहासकार सरदेसाई के अनुसार भारत वर्ष में अंग्रेजी शासन अनेक दृष्टियो से महत्वपूर्ण था। ब्रिटिश शासनकाल के छत्तीसगढ़ क सबंध में भी यह सत्य चरितार्थ होता है, क्योंकि इस अवधि में यहां के शासन में व्यवस्था, नियम और शांति का सूत्रपात हुआ। इसके पूर्व शासन में इन बातो के लिए कोई स्थान न था।

शब्द कुंजी – परिलक्षित, उपेक्षित ,अर्वाध, दुर्देव, आनुवांशिक, अप्रत्यांशित, सुदृढ, अधीक्षक, आंशिक, साम्राज्यवादी, सादृश्य, दण्डशास्त्र, सादृश्य, मासिक विवरण, प्रशिक्षित, परोक्ष, सम्बध्द, संरक्षकता, सर्वेक्षण, विनिमय, हस्तक्षेप

उद्देश्य–

- ब्रिटिशकालीन छत्तीसगढ़ के प्रशासनिक ढांचे का अध्ययन करना ।
- ब्रिटिशकालीन छत्तीसगढ़ की प्रशासनिक व्यवस्था का अध्ययन करना ।

भूमिका–

छत्तीसगढ़ का इतिहास जितना प्राचीन है, उतना ही प्रशस्त है। छत्तीसगढ़ के ऐतिहासिक दस्तावेजो के आधार पर अब तक अलग – अलग काल खण्डो पर इतिहास लिखा गया है।

उत्थान व पतन इतिहास का नियम है। सन् 1707 ई. से 1818 ई. तक के काल को मराठा सर्वोच्चता का काल माना गया है। इतिहास की यह विडंबना रही है कि जब अंग्रेजो का उत्थान हो रहा था, तब मराठो मे कोई ऐसा दबंग व्यक्तित्व नही था, जिसके झंडे के नीचे एकत्र होकर अंग्रेजो का सामना करने के लिए मराठे प्रस्तुत हो सके। अनुभवहीनता व

कांकेर जिले की गोंड जनजातीय परम्परागत न्याय व्यवस्था पर आधुनिकीकरण का प्रभाव

• डॉ. बन्सो नुरूटी

भारत के ऐतिहासिक युग के प्रभात काल में, हमें एक ऐसी जनजातीय लोगों की सामाजिक, आर्थिक तथा राजनीतिक व्यवस्था की जानकारी मिलती हैं जो निश्चय ही एक महान् आश्चर्य था, इस व्यवस्था को संघ या गणराज्य संघ पुकारते हैं। वह व्यवस्था एक ही समय में सामाजिक, राजनीतिक, आर्थिक तथा सैनिक व्यवस्था को नियंत्रित करती थी। यही कारण है, उस काल में भारत अपनी सभ्यता की शानदार ऊँचाइयों पर जा पहुँचा, दूसरी बार शहरीकरण हुआ तथा इतिहास के स्वर्ण युग की आधारशिला रखी गई।[1] संघ का अर्थ है एक जुट होना या एकत्रित होना। संघ या गण एक अव्यवथित ढंग से एकत्रित होना नहीं है, बल्कि एक निश्चित उद्देश्य के लिए अनेक लोगों को एक जुट करना है।[2]

वैदिक युग में यह 'गण' पद या शब्द जनजातियों को सूचित करता था। मगर के.पी. जायसवाल के अनुसार 'बाद में यह पद सरकार के रूप को प्रदर्शित या सूचित करने लगा।'[3] दूसरे शब्दों में संघ 'राज्य' का सूचक है। पतंजलि के कथन के अनुसार इसे संघ इसलिए पुकारा जाता है क्योंकि यह एक ईकाई है। जैसे कि हम आधुनिक युग में देखेंगे संघ एक ईकाई है, राजनीतिक इकाई जिसकी एक राजा के समान भुजाएं होती हैं या निगम के रूप में एकत्र करना है।[4] हमें संघ गणों की प्राचीन उत्पति के इतिहास के जानकारी मिलता है कि मानव सभ्यता के विकास क्रम में विभिन्न कालों तथा स्थितियों में वस्तु विकास के सिद्धांत ने बहुत बड़ा हाथ बंटाया है। सभी विद्वान इस विचार पर एक मत हैं कि संघ की उत्पति, चाहे मानवीय सभ्यता के विकास क्रम या काल की कोई स्थिति रही हो, सदा जनजातीय ही रही है।[5] प्रसिद्ध इतिहासकार डी. आर. भंडारकर इस विषय पर अपने विचार व्यक्त करते हुए लिखते हैं' राजनीतिक

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रियासतकालीन बस्तर में मुरिया जनजाति की प्रषासनिक व्यवस्था
ADMINISTRATIVE SYSTEM OF MURIA TRIBE IN PRINCELY BASTAR

शोध निर्देषक **डॉ. बन्सो नुरूटी** सहायक प्राध्यापक इतिहास अध्ययनषाला पं. रविषंकर शुक्ल विष्वविद्यालय, रायपुर(छ.ग.)
शोधार्थी **पुरोहित कुमार सोरी** सहायक प्राध्यापक इतिहास शास. गुण्डाधूर स्नातको. महाविद्यालय, कोण्डागाँव (छ.ग.)

Absract :-

The position of the tribes and their political structure reflects the regional aspects. The decision of the tribal panchayat, gram or the village head is a matter of legal decision for the tribes. Each tribal village has its own political mechanism to discuss its case. Each tribal community has its own organization, this tribal organization is relatively weak in areas, where the influence of the outside world is high, but is very strong in difficult areas, like modern society administrative organization is also found in primitive society. Administration controls the behaviour of the society. The traditional judicial system of Muria tribe is based on lineage Gotra tradition, regional and religious beliefs. Village is the smallest unit under the traditional Muria judicial system in the princely state of Bastar, every person considered at his duty to follow the traditional laws. Some of these posts are such that are working in the present democratic system. That is why these traditional administrative system have special importance in the primitive Muria society.

सारांष :–

जनजातियों की स्थिति तथा उनकी राजनीतिक संरचना क्षेत्रीय पक्ष को प्रदर्शित करती है। जनजातीय पंचायत, ग्राम पंचायत अथवा ग्राम प्रधान का निर्णय जनजातियों के लिए कानूनी निर्णय के समान होता है। प्रत्येक जनजातीय ग्रामों मे अपने मामलों की विवेचना करने के लिए अपनी राजनीतिक कार्य प्रणाली होती है। प्रत्येक जनजातीय समुदाय का अपना संगठन होता है, यह संगठन ऐसे क्षेत्रों में जहां पर बाह्य दुनियाँ का प्रभाव अधिक है अपेक्षाकृत कमजोर होता है किन्तु दुर्गम क्षेत्रों में यह अत्यधिक मजबूत होता है। आधुनिक समाज की भाँति आदिम समाज में भी प्रशासन संगठन पाया जाता है। प्रशासन समाज के व्यवहारों का नियंत्रण करते हैं। मुरिया जनजाति का पारम्परिक न्याय व्यवस्था वंश, गोत्र परम्परा, क्षेत्रीयता एवं धार्मिक विश्वासों पर आधारित होता है। पारम्परिक मुरिया न्याय व्यवस्था के अंतर्गत ग्राम सबसे छोटी इकाई होती है। रियासत कालीन बस्तर में परम्परागत कानूनों का पालन करना प्रत्येक व्यक्ति अपना कर्तव्य समझता था। इनमें से कुछ पद ऐसे हैं, जो वर्तमान लोकतांत्रिक व्यवस्था में कार्यरत हैं। इसी कारण इन परम्परागत प्रषासनिक व्यवस्था का आदिम मुरिया समाज में विषेष महत्व है।

Key words :- Panchayat, Organization, Traditional, Mukhiya, Gayata, Riyasat, Participation,

शब्द कुंजी :– पंचायत, संगठन, परम्परागत, आदिम, मुखिया, गाँयता, रियासत, लोकतांत्रिक, सहभागिता।

अध्ययन का उद्देष्य :– प्रस्तुत अध्ययन का उद्देष्य रियासतकालीन बस्तर की परम्परागत प्रषासनिक व्यवस्था को प्रकाष में लाना है। इस व्यवस्था का महत्व आदिम काल से वर्तमान तक बना हुआ है।

अध्ययन पद्धति :– प्रस्तुत अध्ययन बस्तर की मुरिया जनजाति की पारंपरिक प्रषासनिक व्यवस्था पर केन्द्रित है। प्रस्तुत अध्ययन प्राथमिक एवं द्वितीयक स्त्रोतों पर आधारित है। इसके अतिरिक्त पं. सुन्दरलाल षर्मा ग्रंथागार, रायपुर तथा शासकीय काकतीय स्नातकोत्तर महाविद्यालय, जगदलपुर में विभिन्न पुस्तकों का अध्ययन किया।

भूमिका :–

किसी भी षासन–प्रषासन में वहाँ की प्रषासनिक प्रणाली, उस शासन–प्रषासन हेतु रीढ़ की हड्डी होती है। प्राचीन राजतंत्रीय प्रणाली से लेकर वर्तमान की प्रजातंत्रीय शासन प्रणाली तक इसके महत्व को नकारा नहीं जा सकता। शासन का आधार स्तंभ सदैव ही प्रषासनिक प्रणाली या कार्यपालिका रही है। शासन के निर्णयों को जन सामान्य तक पहुंचाने की महत्वपूर्ण जिम्मेदारी षासन के इन्हीं अंगों को ही निभानी होती है।

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छत्तीसगढ़ी लोकगाथा 'धनकुल'

डॉ० बन्सो नुरुटी
सहायक प्राध्यापक, इतिहास अध्ययनशाला,
पं० रविशंकर शुक्ल विश्वविद्यालय, रायपुर
कु० शोभना देवी सेन
शोधार्थी, इतिहास अध्ययनशाला
पं० रविशंकर शुक्ल विश्वविद्यालय, रायपुर

भारत में विभिन्न राज्यों की अपनी-अपनी भौगोलिक, सामाजिक तथा सांस्कृतिक विशेषताएँ है यहाँ विद्यमान जनजातियों की संस्कृति तथा परंपराएँ काफी अनूठी है।[1] बस्तर की हल्बी, भीतरी परिवेश की तरह छत्तीसगढ़ में भी धनकुल गीतों की परंपरा रही है।[2] इसमें गाये जानेवाले गीतों की प्रकृति लोकमहाकाव्य की है जिसे 'तीजा जगार' कहा जाता है यह छत्तीसगढ़ की परंपराओं का एक अत्यंत महत्त्वपूर्ण अंग है। यहाँ की लोकगायिकाओं को गुरुमांय (गुरुमाता) कहा जाता है।[3]

लोकगाथा वस्तुतः लोकगीतों के अंतर्गत होते हैं, जिन प्रबंधगीतों में कथावस्तु बड़ी होती है तथा कई रात्रि गाने के बाद भी यह समाप्त नहीं होता और जिसकी कथावस्तु में किसी समुदाय विशेष की वीरता, जाति, प्रेम, शौर्य आदि का विस्तृत रूपों में विवेचन मिलता है उसे लोककथा कहते हैं, छत्तीसगढ़ में लोककथाएँ प्रचलित है।[4]

धनकुल लोकगीतों में वाद्ययंत्र का विशेष महत्त्व है, वाद्ययंत्र के अभाव में गायन में रोचकता नहीं आती। इन वाद्ययंत्रों में प्रमुख रूप से बेंट (गीरी), गोरा (मिट्टी का घड़ा) सूपा, धनकुल डांडी (धनुष) किरकिच डांडी (बाँस की खपची) होती है।[5]

मुख्य रूप से इन परंपराओं से ही संस्कृति का आदान-प्रदान संभवतः चलायमान रहता है।[6] छत्तीसगढ़ एक आदिवासी बाहुल्य क्षेत्र है, यहाँ पर आदिवासी महिलाओं की जीवनपद्धति, धार्मिक परंपराएँ अद्‌भुत है तथा देवी-देवताओं के प्रति इनके मन में अटूट आस्था है।[7]

छत्तीसगढ़ में भादो महीने के शुक्लपक्ष तृतीया तिथि को महिलाओं के द्वारा हरितालिका व्रत (तीजा व्रत) रखा जाता है, जिसे हल्बी भतरी परिवेश में तीजा कहा जाता है, कई स्थानों में यह व्रत अविवाहित कन्याओं द्वारा मनवांछित पति की कामना से तथा विवाहितों द्वारा अपने पति की दीर्घायु जीवन की कामना हेतु रखा जाता है। हल्बी तथा भतरी परिवेश में अविवाहित कन्याएँ पति की कामना एवं विवाहित महिलाएँ अपने पति की रक्षा के साथ ही संतान सुख की प्राप्ति हेतु भी यह व्रत रखती है। मुख्य रूप से हिंदी तथा छत्तीसगढ़ी परिवेश में यह व्रत माता पार्वती द्वारा शिवजी की प्राप्ति के लिए की गई तपस्या से है। हल्बी तथा भतरी परिवेश के अंतर्गत यह व्रत संतान प्राप्ति की कामना से किए जाने वाला एक महत्त्वपूर्ण अनुष्ठान भी है।[8]

धनकुल हल्बा जनजाति द्वारा गाया जाने वाला एक विशेष संगीत है। इसके अंतर्गत गायन तथा वादन दोनों समाहित होते हैं तथा गायन का संबंध नाभि एवं कंठ से है इसी प्रकार वाद्य का

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Dr. Alekh Sahu

2021, Emerging Researcher

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ABSTRACT:

The tern domestic violence is most commonly used to touch on the violence done within a married relationship, in which one partner, usually male or his family, uses a pattern of assault and intimidating acts

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Intellectual Property Rights in India: Emerging Laws

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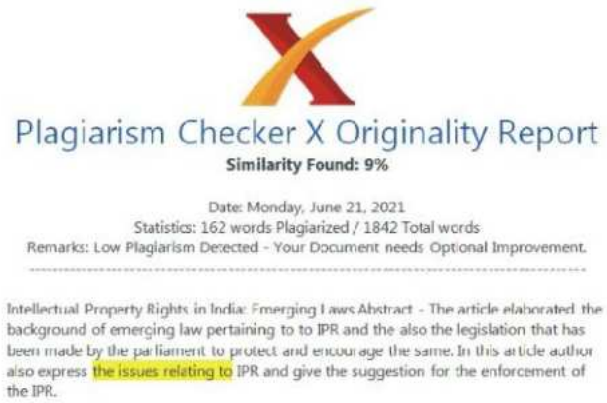
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Abstract

The article elaborated the background of emerging law pertaining to to IPR and the also the legislation that has been made by the parliament to protect and encourage the same. In this article author also express the issues relating to IPR and give the suggestion for the enforcement of the IPR. Author also discuss the different kinds of Intellectual property laws.

Key Words

Intellectual, parliament, Enforcement, Offences, Patent, Copy Rights, Industrial Design, trademark, Geo-graphical Indication.

Introduction

Intellectual property has progressively assumed an important role with the speedy pace of technological, scientific and medical innovation that we tend to square measure witnessing nowadays. Moreover, changes within the international economic surroundings have influenced the event of business models wherever intellectual property could be a central part establishing worth and potential growth. In India many new legislations for the protection of holding rights (IPRs) are passed to satisfy the international obligations underneath the World Trade Organization Agreement on Trade-Related Aspects of intellectual property Rights (TRIPS). The significance of intellectual property may be derived to the traditional use of stamps on bricks by Roman brick-makers for the aim of identification, and even before that once the leaders of the ancient Greek town of Sybaris granted monopoly for one year on cooking a delicious dish to its creator. Obviously, abundant has modified since then with

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Constitutional Prospective of Domestic Violence Act, 2005

Priya Rao, (Ph.D.), S.O.S in Law,
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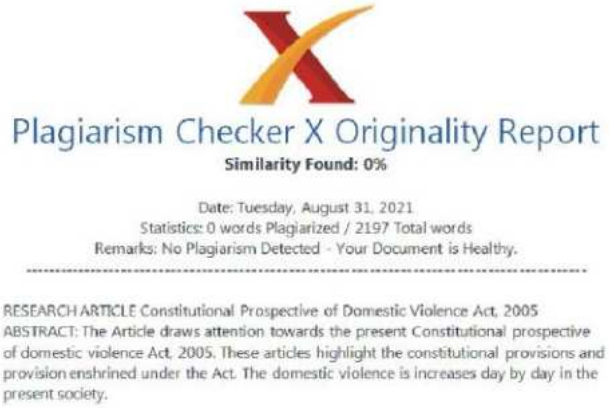




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ABSTRACT

The Article draws attention towards the present Constitutional prospective of domestic violence Act, 2005. This article highlight the constitutional provisions and provision enshrined under the Act. The domestic violence is increases day by day in the present society. In this article authors also elaborate the Fundamental rights given to women and also discussed the landmark judgments relating to domestic violence. At last the authors also evaluate the Domestic violence act, 2005.

KEYWORDS

Domestic violence Against Women in India, Fundamental rights, Constitution of India, Protection of Women.

INTRODUCTION

Domestic violence is sadly a reality in Indian society, a truism. In the Indian patriarchal setup, it became an acceptable practice to abuse women. There may be many reasons for the occurrence of domestic violence. From a feminist standpoint, it could be said that the occurrence of domestic violence against women arises out of the patriarchal setup, the stereotyping of gender roles and the distribution of power, real or perceived, in society. Following such ideology, men are believed to be stronger than women and more powerful. They control women and their lives and as a result of this power play, they may hurt women with impunity. The role of the woman is to accept her 'fate' and the violence employed against her meekly.

The Protection of Women from Domestic Violence Act (or the Domestic Violence Act) is a

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Use of E – Resources by Post Graduate College Students of Science of Dhamatari Distric, Chhattisgarh: A Study

Author(s): Dr. Santu Ram Kashyap & Deepa Sahu

Abstract – This study attempt to know the use of e – resources by post graduate college students of science of dhamatari district, Chhattisgarh. The main purpose of the study is to know the use of e- resources by the PG Students. The study was based on survey method. The study found that the most of the respondents use the internet daily with 1 – 2 hours. Where majority 278(78.97%) of the respondents use e-books, 343 (94.44%) respondents use e-resources for their study, highest 75 (21.31%) respondents spent 2 - 3 hours on the e-resources. and the maximum 229 (65.06%) respondents faced the slow downloading problem when they use electronic resources, and highest 260 (73.86%) respondents are highly satisfied with e-resources, 69 (19.60%) are satisfied, 13 (3.69%) are not satisfied and 10 (2.84%) respondents fairly satisfied with using e-resources.

Keywords - E–Resources, P.G. Students, Science, Govt. College Dhamtari, Chhattisgarh.

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Journal of The lisforum_orissa
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भारतीय पुस्तकालयाध्यक्षताः भूतकाल, वर्तमान और भविष्य



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प्रस्तावनाः—

किसी भी पुस्तकालय का प्रबंधन, व्यवस्थापन, तथा संचालन करने की कला को पुस्तकालयाध्यक्ष कहते है। किसी पुस्तकालय का कुशल रूप से व्यवस्थापन तथा उसका संचालन उस पुस्तकालय के पुस्तकालयाध्यक्ष पर निर्भर करता है, वह उसका मुख्य संचालक अधिकारी होता है। ऐसा कहा गया है कि पुस्तकालयाध्यक्ष जितना कुशल और विवकेशील होगा उसका पुस्तकालय उतना ही व्यवस्थित और सफल होगा। सर्वसुविधायुक्त पुस्तकालय और पुस्तकों का पर्याप्त संकलन होने के बावजूद भी अगर पुस्तकालयाध्यक्ष न हो तो ऐसी स्थिति में पुस्तकालय में उपलब्ध सूचना संसाधन तथा ज्ञान प्रदान करने वाली पाठ्य सामग्रियॉ पाठकों के लिए बहुत ही कम लाभदायक सिद्ध होगी। पुस्तकालय में पाठक रूपी उपयोगकर्ताओं को दी जाने वाली सेवाओं और पुस्तकालय के व्यवस्थापन तथा संचालन से संबंधित अनेक कार्यो को निष्पादित करने हेतु एक भलिभॉति शीक्षित एवं प्रशिक्षित, कुशल, एवं

Journal of Ravishankar University

Pt. Ravishankar Shukla University, Raipur, Chhattisgarh

PART-A

(SOCIAL-SCIENCE)

ISSN: 0970-5910

Abstract View

Research Trends in Library and Information Science of Pt. Ravishankar Shukla University Raipur, Chhattisgarh: A Study (AbstractView.aspx?PID=2022-28-2-7)

Author(s): Santu Ram Kashyap (search.aspx?key=Santu Ram Kashyap)

Email(s): sr_kashyap1976@rediffmail.com (mailto:sr_kashyap1976@rediffmail.com)

Address: Kashyap (2022). SoS in Library & Information Science, PT. Ravishankar Shukla University, Raipur (C.G.), India. Pt. Ravishankar Shukla University, Raipur Chhattisgarh. (Part-A: SOCIAL-SCIENCE), 28(2), pp. 51-58.

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ABSTRACT:

The present study is an attempt to find out the research trends in the field of Library and Information Science of Pt. Ravishankar Shukla University, Raipurchhattiagarh.The study was based on the Ph.D. thesis awarded in the field of Library and Information Science between 1991 to 2020. This study was conducted to achieve following objectives like most working area of reaserch in this field, highest no. of thesis done under supervisor and highest research productivity between the year 2016 to 2020. In this context, result found that out of 24 thesis majority of thesis i.e. 07 – 07 were awarded in the area of Bibliometric study and Information seeking behavior. Highest 10 doctoral thesisawarded under the supervision of Prof. A.K. Verma. followed by Prof. Maya Verma with 09 Thesis, Dr.Superna Sengupta with 03 thesis and Dr. Md Imtiaz Ahemed with 02 thesis respectively. The highest research productivity was produced between the year 2016 to 2020.This study will be beneficial for the future researcher to conduct their research.

Keywords: Research Trends () Ph – D. Thesis () Library and Information Science () Pt. Ravishankar Shukla University Raipur () Chhattisgarh ()

Cite this article:
Kashyap (2022). Research Trends in Library and Information Science of Pt. Ravishankar Shukla University Raipur, Chhattisgarh: A Study. Journal of Ravishankar University (Part-A: SOCIAL-SCIENCE), 28(2), pp. 51-58.DOI: https://doi.org/10.52228/JRUA.2022-28-2-7 (https://doi.org/10.52228/JRUA.2022-28-2-7)

Reference:

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Abstract View

An Evaluation of the Using Library Resources and Services by the Agriculture Scientists at Indira Gandhi Agriculture University Raipur, Chhattisgarh (AbstractView.aspx?PID=2022-28-2-8)

Author(s): D. S. Mahipal (search.aspx?key=D. S. Mahipal), Santu Ram Kashyap (search.aspx?key=Santu Ram Kashyap)

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View PDF View HTML (HTMLPaper.aspx?Journal=Journal of Ravishankar University;PID=2022-28-2-8)

ABSTRACT:

The aim of this paper is to identify the resources, services and make them accessible that are available at the Nehru Library, Raipur Chhattisgarh and used by its scientists. The sample for this study consisted of 245 of the 265 agricultural scientists who working at Indira Gandhi Agricultural university, Raipur. Questionnaires have been used for the collection of data under the scope of the study. The results of the study indicate that agriculture scientists visited libraries occasionally due to inadequate library resources. In addition it was found that the majority of agriculture scientists were partially satisfied with library resources and services. Indra Gandhi Agricultural University's library offers a variety of electronic resources and services in conjunction with modern resources. Scientists use the Nehru library for their studies and research. Electronic based services are proving to be an important service for scientists. Scientists are satisfied with the services provided by the library.

Keywords: Nehru Library () Library Resources and Services () Indira Gandhi Agriculture University () Raipur () Chhattisgarh ()

Cite this article:
Mahipal and Kashyap (2022). An Evaluation of the Using Library Resources and Services by the Agriculture Scientists at Indira Gandhi Agriculture University Raipur, Chhattisgarh. Journal of Ravishankar University (Part-A: SOCIAL-SCIENCE), 28(2), pp. 59-66.DOI: https://doi.org/10.52228/JRUA.2022-28-2-8 (https://doi.org/10.52228/JRUA.2022-28-2-8)

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Journal of Ravishankar University

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Abstract View

Use of E- Resources by College Students of Arts, Social Science and Science Stream of Raipur city: A Comparative Study (AbstractView.aspx?PID=2022-28-1-7)

Author(s): Santu Ram Kashyap (search.aspx?key=Santu Ram Kashyap)

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View PDF View HTML (HTMLPaper.aspx?Journal=Journal of Ravishankar University;PID=2022-28-1-7)

ABSTRACT:

The major objective of this study to compare the use of e -resources by students from Arts, Social Science and Science stream and compare preferences of the Use of e - resources by students of Arts, Social Science and Science stream of Raipur city. The study was based on survey method. Among various techniques of Survey Method, Questionnaire Technique was used for the study. Accordingly a Self structured questionnaire was designed to collect data from the regular UG and P G students of various college of Raipur city. The major findings of the study shows that The calculated value is 2 (df=2) = 5.32 and Table value is 5.991 so Ho Hypothesis is Accepted and Ha Hypothesis is rejected it means there are no Significant difference in Use of e - journals between Students of Arts, social Science and Science Stream. and e -book was found to be the most preferred e-resource by students of Arts, Social Science and Science students of Raipur city.

Keywords: E -resource () Arts () Social Science and Science students () College () Raipur () Chhattisgarh ()

Cite this article:
Kashyap (2022). Use of E- Resources by College Students of Arts, Social Science and Science Stream of Raipur city: A Comparative Study. Journal of Ravishankar University (Part-A: SOCIAL-SCIENCE), 28(1), pp. 60-68.DOI: https://doi.org/10.52228/JRUA.2022-28-1-7 (https://doi.org/10.52228/JRUA.2022-28-1-7)

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Journal of Ravishankar University

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Abstract View

5जी नेटवर्क के माध्यम से ग्रंथालय सेवाएं: एक परिचय (AbstractView.aspx?PID=2022-28-1-6)

Author(s): हरीश कुमार साहू (search.aspx?key=हरीश कुमार साहू), प्रवीण कुमार देवांगन (search.aspx?key=प्रवीण कुमार देवांगन)

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2

इलेक्ट्रॉनिक संसाधन : एक परिदृश्य
(Electronic Resources : An Overview)

डॉ. संतू राम कश्यप*

[इलेक्ट्रॉनिक संसाधनों का परिचय देते हुए इसके प्रकारों की गणना करता है। इसकी विशेषताओं, आवश्यकताएं, लाभ–दोष, समानताएं एवं अंतर इत्यादि का संक्षिप्त वर्णन करता है।]

1. प्रस्तावना (Introduction)

आज का युग सूचना क्रांति का युग है, जहाँ पर लगातार सम्पूर्ण विश्व में तीव्र गति से सूचनाओं के प्रकाशन से लेकर इनको प्रचार प्रसार में वृद्धि हो रही है। इसे सूचना विस्फोट के नाम से भी जाना जाता है। इसी परिप्रेक्ष्य में वर्तमान समय में दो प्रकार के सूचना संसाधनों का प्रचलन है, पहला मुद्रित तथा दूसरा अमुद्रित, इनमें से मुद्रित (Printed) सूचना संसाधनों का प्रचलन कई शताब्दियों से चला आ रहा है, लेकिन अमुद्रित (Non Printed) सूचना संसाधनों का प्रचलन कम्प्यूटर तथा सूचना एवं संचार प्रौद्योगिकी (ICT) के आगमन के साथ हुआ है। जिसे इलेक्ट्रॉनिक संसाधन कहा जाता है।

इलेक्ट्रानिक संसाधन वह सूचना संसाधन है जो इलेक्ट्रॉनिक स्वरूप में उपलब्ध होते हैं। जिसे इलेक्ट्रॉनिक मशीनों जैसे कम्प्यूटर के माध्यम से बनाया जाता है तथा इलेक्ट्रॉनिक माध्यमों से पढ़ा जाता है। इस प्रकार इनके अनेक लाभ है जैसे कम समय में तीव्र गति से सूचना प्राप्त करना, कम्प्यूटर से आसानी पूर्वक पढ़ा जाना, डाउनलोड करना विषयों पर अद्यतन बनाये रखना, एक ही समय में एक संसाधन को अनेकों उपयोगकर्ताओं द्वारा उपयोग किया जाना तथा समय की बचत करना इत्यादि। इस प्रकार आज इलेक्ट्रॉनिक संसाधन मुद्रित संसाधनों के पूरक के रूप में उभर कर सामने आये हैं जिनको शिक्षकों, शोधार्थियों, विद्यार्थियों से लेकर सम्पूर्ण ग्रंथालय उपयोगकर्ताओं द्वारा उपयोग किया जा रहा है।

2. इलेक्ट्रॉनिक संसाधनों के प्रकार (Types of Electronic Resources)

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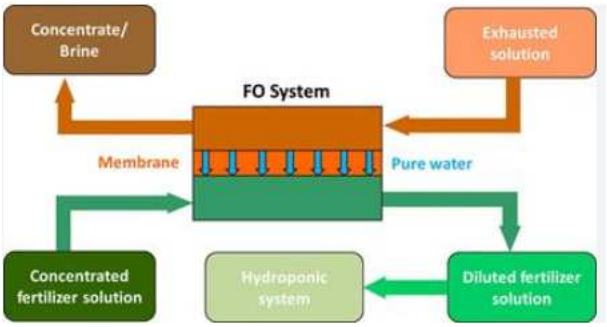
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A Review on Hydroponics: A Sustainable Approach for Plant Cultivat



PDF (https://www.jclmm.com/index.php/journal/article/view/270/241)

Keywords:
Sustainable development threshold limit resources challenge plant cultivation land area water consumption compatible morphology

Labya Prabha
School of Studies in Life Science, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh – India)

Amia Ekka
School of Studies in Life Science, Pt. Ravishankar Shukla University, Raipur (Chhattisgarh – India)

Abstract

Sustainable development is really a matter of concern now days. Many natural events prove that Earth is reaching nearby its threshold limit in terms of natural resource resources with maintaining rate of development for any country is a major challenge. Especially in case of agriculture, rate of utilization of land area and water consumption effort towards modification in traditional methods of plant cultivation is essential but with rise in total plant productivity or without affecting previous rate of productivity is requ novel or non popular plant cultivation technique is showing some assurance towards sustainable development. Hydroponics is a method of plant cultivation without so requirement is really very less as compared to soil based technique. Some of the plant species is very much compatible for hydroponic cultivation. They include mostly herba small morphology. An earlier report proves that the existence of hydroponic for plant cultivation in all the seven continents of the world map. Which indicates that wor modification and novel approaches over traditional method of plant cultivation.

How to Cite

Prabha, L. ., & Ekka, A. . (2022). A Review on Hydroponics: A Sustainable Approach for Plant Cultivation. *Journal of Coastal Life Medicine*, *10*(3), 832–838. Retrieved from https://www.jclmm.com/index.php/journal/article/view/270

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Section

Articles

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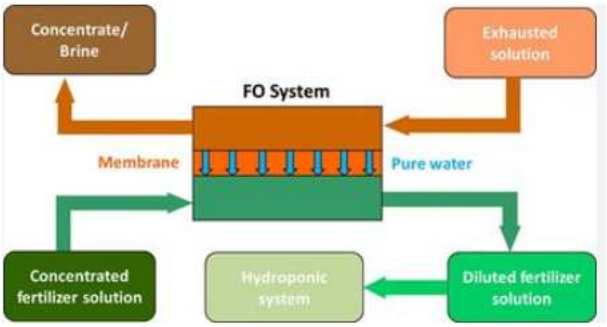
Asao T, Shimizu N, Ohta K and Hosoki T (1999) Effect of rootstocks on the extension of harvest period of cucumber (cucumis sativus L.) grown in non-renewal hydropo Japanese Society for Horticultural Science 68(3), 598-602.

Ako H and Baker A (2009) Small-scale Lettuce production with hydroponics or aquaponics. Sustainable Agriculture 2, 1-7.

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Abstract

Sustainable development is really a matter of concern now days. Many natural events prove that Earth is reaching nearby its threshold limit in terms of natural resource resources with maintaining rate of development for any country is a major challenge. Especially in case of agriculture, rate of utilization of land area and water consumption effort towards modification in traditional methods of plant cultivation is essential but with rise in total plant productivity or without affecting previous rate of productivity is requ novel or non popular plant cultivation technique is showing some assurance towards sustainable development. Hydroponics is a method of plant cultivation without so requirement is really very less as compared to soil based technique. Some of the plant species is very much compatible for hydroponic cultivation. They include mostly herba small morphology. An earlier report proves that the existence of hydroponic for plant cultivation in all the seven continents of the world map. Which indicates that wor modification and novel approaches over traditional method of plant cultivation.

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Short Communication

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

Ananya Diwan, Rakesh Kumar Swain, Sarojini Minz, Arti Parganiha & Atanu Kumar Pati

Pages 341-349 | Received 10 Mar 2020, Accepted 23 Mar 2020, Published online: 01 Apr 2020

Cite this article https://doi.org/10.1080/09291016.2020.1747741 Check for updates

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ABSTRACT

The Facebook Messenger (FBM) is one of the most popular instant messaging 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 τ = 12 h or

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Short Communication

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

Ananya Diwan, Rakesh Kumar Swain, Sarojini Minz, Arti Parganiha & Atanu Kumar Pati

Pages 341-349 | Received 10 Mar 2020, Accepted 23 Mar 2020, Published online: 01 Apr 2020

Cite this article https://doi.org/10.1080/09291016.2020.1747741 Check for updates

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ABSTRACT

The Facebook Messenger (FBM) is one of the most popular instant messaging 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 τ = 12 h or

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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

Pages 422-444 | Received 11 Dec 2019, Accepted 27 Mar 2020, Published online: 27 Apr 2020

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The main objective of this investigation was to delineate spatiotemporal patte annual production of seven species of fishes inhabiting the famous Chilika lag 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

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Predictive role of socio-demographic and chronotype on health-related quality of life of cancer patients from southeastern India

Armiya Sultan, Saba Taj, Vivek Choudhary & Arti Parganiha

Pages 592-607 | Published online: 02 Sep 2020

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ABSTRACT

It is well known that cancer and its treatment produce marked impact on the h related quality of life (HRQoL) of cancer patients. Research concerning impact chronotype on HRQoL in cancer patients is almost not studied yet, but the interests are growing in several diseases. Present study was carried out to explore the impact of socio-demographics, chronotype and consumption of tobacco, alcohol and sleeping medicine on HRQoL of Indian oncology patients. Self-reported Quality-of-Life

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Time-of-day and seasonal variations in foraging behavior of street cattle of urban Raipur, India

Bhupendra Kumar Sahu, Arti Parganiha & Atanu Kumar Pati

Pages 786-800 | Received 25 Apr 2020, Accepted 08 Jul 2020, Published online: 13 Jul 2020

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ABSTRACT

We studied time-of-day and seasonal variations in the foraging behavior of str
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Circadian rhythm in the pattern of online usage of Facebook messenger during the COVID-19-triggered lockdown: a sequel to the pre-pandemic study

Rakesh Kumar Swain, Sarojini Minz, Arti Parganiha, Ananya Diwan & Atanu Kumar Pati

Pages 801-811 | Received 09 Jul 2020, Accepted 14 Aug 2020, Published online: 20 Aug 2020

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ABSTRACT

The Government of India imposed the strictest lockdown from 25 March 2020 till 31 May 2020 to control the spread of coronavirus outbreak. Consequently, about 1.38 billion people were under home confinement. Before the COVID-19 pandemic, we studied

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Does exposure to radiofrequency radiation (RFR) affect the circadian rhythm of rest-activity patterns and behavioral sleep variables in humans?

Margaret Messiah Singh, Priyanka Chandel, Atanu Pati & Arti Parganiha

Pages 1414-1438 | Received 08 Oct 2020, Accepted 16 Jun 2021, Published online: 13 Jul 2021

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ABSTRACT

We evaluated the effects of the exposure to radio-frequency radiation emanat the base transceiver station (BTS) on the characteristics of circadian rest-activity rhythm and behavioral sleep variables in humans. We performed this exploratory field study in a sample of 89 healthy subjects randomly chosen out of 1434 individuals surveyed for the

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The current study is the first attempt to screen obstructive sleep apnea (OSA) risk in adult populations of Chhattisgarh, India. A few predictors of OSA, such as socio-demographic

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Active exploration of faces in police lineups increases discrimination accuracy. (/record/2022-04830-001?doi=1)

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Colloff, M. F., Flowe, H. D., Smith, H. M. J., Seale-Carlisle, T. M., Meissner, C. A., Rockey, J. C., Pande, B., Kujur, P., Parveen, N., Chandel, P., Singh, M. M., Pradhan, S., & Parganiha, A. (2022). Active exploration of faces in police lineups increases discrimination accuracy. *American Psychologist, 77*(2), 196–220. https://doi.org/10.1037/amp0000832 (/doi/10.1037/amp0000832)

Eyewitness identifications play a key role in the justice system, but eyewitnesses can make errors, often with profound consequences. We used findings from basic science and innovative technologies to develop and test whether a novel interactive lineup procedure, wherein witnesses can rotate and dynamically view the lineup faces from different angles, improves witness discrimination accuracy compared with a widely used procedure in laboratories and police forces around the world—the static frontal-pose photo lineup. No novel procedure has previously been shown to improve witness discrimination accuracy. In Experiment 1, participants (N = 220) identified culprits from sequentially presented interactive lineups or static frontal-pose photo lineups. In Experiment 2, participants (N = 8,507) identified culprits from interactive lineups that were either presented sequentially, simultaneously wherein the faces could be moved independently, or simultaneously wherein the faces moved jointly into the same angle. Sequential interactive lineups enhanced witness discrimination accuracy compared with static photo lineups, and simultaneous interactive lineups enhanced witness discrimination accuracy compared with sequential interactive lineups. These finding were true both when participants viewed suspects who were of the same or different ethnicity/race as themselves. Our findings exemplify how basic science can be used to address the important applied policy issue of how best to conduct a police lineup and reduce eyewitness errors.

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Determination of short-interval time estimates in humans exposed to radiofrequency electromagnetic radiation

May 2022 · Journal of Environmental Biology 43(03):369-376
DOI:10.22438/jeb/43/3/MRN-1807

Authors:


Priyanka Chandel
Pandit Ravishankar Shukla University


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Atanu Kumar Pati
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V. Choudh

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Abstract

Aim: The present study aimed at evaluating the effects of radiofrequency electromagnetic radiation exposure on short-interval time estimates in humans living in the vicinity of base transceiver stations. Methodology: The study was conducted in Phase-1 and Phase-2 with 1281 and 192 subjects, respectively. Four groups with one control were identified in each phase depending on the distance from the ground-based transceiver stations. The cognitive ability of the subjects of each group was determined by measuring short-interval time estimates, namely 10 s, 30 s, and 60 s, with time production and time reproduction methods using the Interval Clock software (Version 2.2). The electric field strength at each participant's house was determined using the Narda Broadband Meter-550 with a probe EF0-391. Results: ANOVA results demonstrated a statistically significant difference in electric field strength among different zones around the installations of base transceiver stations ($F_{4,1274} = 50.071$; $p<0.001$). It was significantly higher in the inter-tower zone than in all other zones. The prevalence of various clinical problems was higher among the individuals living in the inter-tower zone. ANCOVA results revealed that the main factors zone, gender, and year of residence, did not significantly affect any short-interval time estimates. However, a statistically significant 'time of the day' variation in most of the target short-interval time estimates with both the methods for all the studied groups, except the inter-tower zone, was observed. Interpretation: The radiofrequency electromagnetic radiation emitted from base transceiver stations did not significantly impact the ability to estimate short-time intervals in humans.

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Determination of short-interval time estimates in humans exposed to radiofrequency electromagnetic radiation

P. Chandel[1], M.M. Singh[1], A.K. Pati[1,2,3], V. Choudhary[4] and A. Parganiha[1,2]*

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[4]Regional Cancer Center, Pt. Jawaharlal Nehru Medical College, Dr. B.R. Ambedkar Memorial Hospital, Raipur-492 001, India

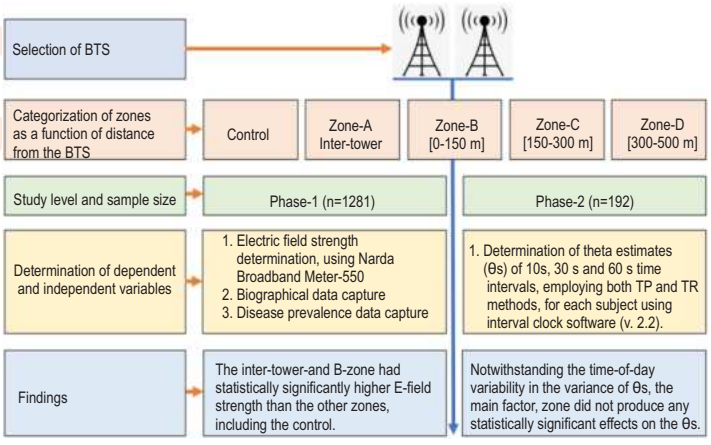
***Corresponding Author Email :** arti.parganiha@gmail.com

Received: 22.02.2021 *Revised*: 26.08.2021 *Accepted*: 13.11.2021

Abstract

Aim: The present study aimed at evaluating the effects of radiofrequency electromagnetic radiation exposure on short-interval time estimates in humans living in the vicinity of base transceiver stations.

Methodology: The study was conducted in Phase-1 and Phase-2 with 1281 and 192 subjects, respectively. Four groups with one control were identified in each phase depending on the distance from the ground-based transceiver stations. The cognitive ability of the subjects of each group was determined by measuring short-interval time estimates, namely 10 s, 30 s, and 60 s, with time production and time reproduction methods using the Interval Clock software (Version 2.2). The electric field strength at each participant's house was determined using the Narda Broadband Meter-550 with a probe EF0-391.



Results: ANOVA results demonstrated a statistically significant difference in electric field strength among different zones around the installations of base transceiver stations ($F_{4,1274}$ = 50.071; p<0.001). It was significantly higher in the inter-tower zone than in all other zones. The prevalence of various clinical problems was higher among the individuals living in the inter-tower zone. ANCOVA results revealed that the main factors zone, gender, and year of residence, did not significantly affect any short-interval time estimates. However, a statistically significant 'time of the day' variation in most of the target short-interval time estimates with both the methods for all the studied groups, except the inter-tower zone, was observed.

Interpretation: The radiofrequency electromagnetic radiation emitted from base transceiver stations did not significantly impact the ability to estimate short-time intervals in humans.

Key words: Base transceiver station, Electric-field strength, Narda Broadband Meter-550, Radiofrequency electromagnetic radiation, Short-interval time estimation.

How to cite : Chandel, P., M.M. Singh, A.K. Pati, V. Choudhary and A. Parganiha: Determination of short-interval time estimates in humans exposed to radiofrequency electromagnetic radiation. *J. Environ. Biol.*, **43**, 369-376 (2022).

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Heavy Metal Detection using AAS (Atomic Absorption Spectroscopy) in Leafy Vegetables: Part II

Labya Prabhas[1], Megha Agrawal[2], Kamal Nayan Mishra[3]

[1,3] School of Life Sciences, Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India.

[2] Department of Botany, Gurukul Mahila Mahavidyalaya, Kalibadi Road, Raipur, Chhattisgarh, India.

ABSTRACT:

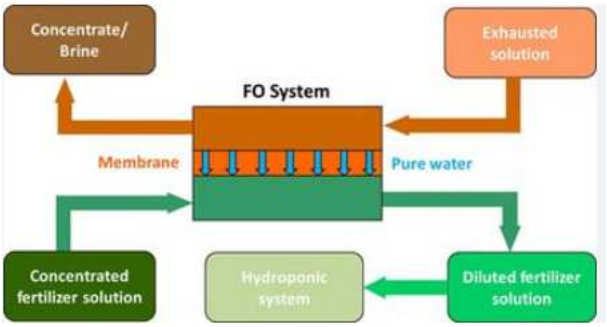
Earlier we have found that all plants are capable of absorbing and bioaccumulation of heavy metals in their own part in various concentrations, confirmed by using Atomic Absorption Spectroscopy (AAS). Rate of absorption and percentage of bioaccumulation varies among the species. In earlier study we have selected *Corchorus olitorious, Cassea tora, Raphanus Sativus, Marsilea quadrifolia and Amaranthus viridis* (Prabhas *et al*., 2018). This study is the follow up experiment of Part I and targeting some other leafy vegetable species, on the basis of their consumption and popularity among the people of central India. In this experiment we have selected *Moringa oleifera*, *Ipomea batatas*, *Brassica oleracea* var. *botrytis*, *Colocasia esculenta, Murraya koenigii, Bahunia verigeta.* Plant species were grown in the agriculture field up to optimum growth. Leaf and edible parts were collected from the plants and air dried. Dry matter were used for acid digestion after that quantity of heavy metals can be analyzed using Atomic Absorption Spectroscopy (AAS). Total six metal ions including Lead (Pb), Cadmium (Cd), Chromium (Cr), Zinc (Zn), Iron (Fe) and Copper (Cu) was targeted in this study. Lowest concentration of Pb was found in *M. Oleifera* (0.041 mg/L) and highest in *I. batatas* and *B. Oleracea var. botrytis*, Cr was low in *M. Oleifera* and higher in *I. batatas*, Zn was low in *B. Oleracea var. botrytis* and higher in *C. Esculenta*, Fe was lowest in *M. Oleifera* and high in *B. Verigeta* and Cu was low in *B. Oleracea var. botrytis* and higher in *I. batatas*. More or less all these metal ions are necessary for growth of plant. On the other hand bioaccumulation of these metals may also cause hazardous effect on human health after consumption as food source or medicinal source.

Keywords: Edible, leafy vegetable, bioaccumulation, consumption, Atomic absorption Spectroscopy, high, low, health.

INTRODUCTION:

Vegetables, crops and other food resources are cultivated in various types of soil under varied environmental conditions. Surrounding edifices always shows significant affect on the growth of all kind of living organism including plant, animals, microorganisms and human also. Likewise industrial waste released in water sources, dumping of domestic waste in soil and water resources, use of pesticides and fertilizers in agriculture field etc. Movement of

A Review on Hydroponics: A Sustainable Approach for Plant Cultivat



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Labya Prabha
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Abstract

Sustainable development is really a matter of concern now days. Many natural events prove that Earth is reaching nearby its threshold limit in terms of natural resource resources with maintaining rate of development for any country is a major challenge. Especially in case of agriculture, rate of utilization of land area and water consumption effort towards modification in traditional methods of plant cultivation is essential but with rise in total plant productivity or without affecting previous rate of productivity is requ novel or non popular plant cultivation technique is showing some assurance towards sustainable development. Hydroponics is a method of plant cultivation without so requirement is really very less as compared to soil based technique. Some of the plant species is very much compatible for hydroponic cultivation. They include mostly herba small morphology. An earlier report proves that the existence of hydroponic for plant cultivation in all the seven continents of the world map. Which indicates that wor modification and novel approaches over traditional method of plant cultivation.

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Prabha, L. ., & Ekka, A. . (2022). A Review on Hydroponics: A Sustainable Approach for Plant Cultivation. *Journal of Coastal Life Medicine*, *10*(3), 832–838. Retrieved from https://www.jclmm.com/index.php/journal/article/view/270

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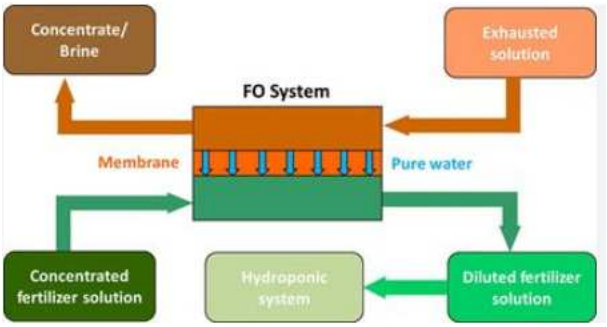
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Total Chlorophyll Determination in Leafy Vegetables Cultivated in Hydroponics and Soil

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ABSTRACT:

There are many factors that can be used to describe the growth outline of the plant. Qualitative and quantitative estimation of phyto-chemical composition of the plant's can directly reflects the growth pattern. These may also reflects the nutraceutical values of the plant for human consumption. Selected plant species are leafy vegetables and popular among the people of central India. Cultivation of selected plant's species is carried out in two different ways. Traditional method of plant cultivation includes soil based cultivation and other is hydroponic technique. In hydroponics, there is no need of soil, liquid media remains in direct contact with the seed and root of the plant. Hydroponically grown *S. oleracea* L (1.447 mg/g) was recorded with highest amount of chlorophyll, followed by *M. arvensis* (1.338 mg/g), *C. sativum* (1.162 mg/g), *T. F. graceum* L. (1.097 mg/g), *C. olitorius* L. (1.060 mg/g), *A. viridis* (0.917 mg/g) and *C. arietinum* (0.643 mg/g). On the other hand total chlorophyll content in soil cultivated plants was found highest in *M. arvensis* (1.206) followed by *S. oleracea* L. (1.085), *C. sativum* (1.046 mg/g), *T. F. graceum* L. (0.906) ,*C olitorius* L. (0.859 mg/g), *C. arietinum (*836 mg/g) and *A.viridis* (0.794). This study may reveal the compatibility and acceptance of hydroponics for plant cultivation. Chlorophyll content was consistently high in most of the experimental plants cultivated in hydroponic system as compared to soil cultivated plants.

Keyword: Phyto-chemical, neutraceutical, hydroponics, total chrolophyll, protein content, carbohydrate, recognize, suitable.

INTRODUCTION:

Plant is composed of various type of light capturing pigment like chrolophyll, carotenoid and much other type of pigments. Chlorophyll is an important fraction of photosynthetic machinery. Amount of chlorophyll directly represent the number of chloroplast in plant cell. Richness in chlorophyll molecules is responsible for capturing sunlight and conversion into sugar compound. Hence, optimum rate of production of sugar inside plant cell mainly depends upon amount chlorophyll molecule. If optimum sugar is produced and stored by plant then this will result imitate optimum growth of plant too. It means chlorophyll is an important tool which is directly associated with growth of the plant. Chlorophyll is found in

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Total Chlorophyll Determination in Leafy Vegetables Cultivated in Hydroponics and Soil

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ABSTRACT:

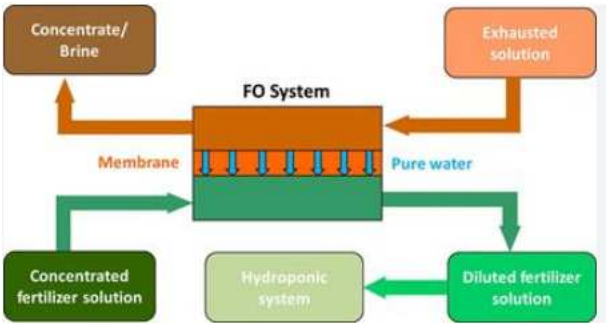
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A Review on Hydroponics: A Sustainable Approach for Plant Cultivat



PDF (https://www.jclmm.com/index.php/journal/article/view/270/241)

Keywords:
Sustainable development threshold limit resources challenge plant cultivation land area water consumption compatible morphology

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Abstract

Sustainable development is really a matter of concern now days. Many natural events prove that Earth is reaching nearby its threshold limit in terms of natural resource resources with maintaining rate of development for any country is a major challenge. Especially in case of agriculture, rate of utilization of land area and water consumption effort towards modification in traditional methods of plant cultivation is essential but with rise in total plant productivity or without affecting previous rate of productivity is requ novel or non popular plant cultivation technique is showing some assurance towards sustainable development. Hydroponics is a method of plant cultivation without so requirement is really very less as compared to soil based technique. Some of the plant species is very much compatible for hydroponic cultivation. They include mostly herba small morphology. An earlier report proves that the existence of hydroponic for plant cultivation in all the seven continents of the world map. Which indicates that wor modification and novel approaches over traditional method of plant cultivation.

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Section

Articles

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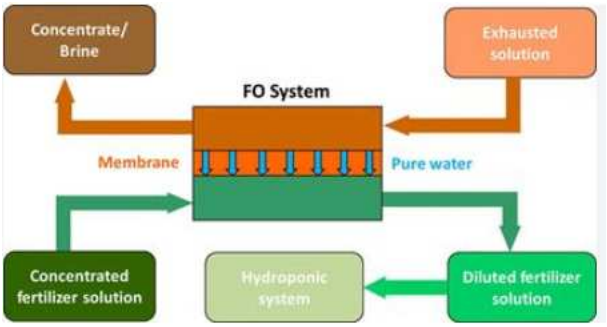
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Research Paper

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Genotoxic impacts of long term exposure of Arsenic and Fluoride to Cat Fish, *Clarias batrachus*

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Abstract - Arsenic and Fluoride are very common ground water pollutants, contributed by natural and anthropogenic sources leading to serious health effects in both terrestrial and aquatic organisms. The current research was carried out to identify the relationship between arsenic and fluoride, using *Clarias batrachus* (common cat fish) as an experimental model. The study includes seven groups (Group I to VII), one control (Group I) and other six (Group II, III, IV, V, VI, VII) exposed to different concentration of arsenic and fluoride individually and in combination. Long term exposure of 60 days was carried out for each group, with no toxicant added in Group I. Blood samples were collected from each experimental group on 60th day and COMET assay was performed to check genotoxicity. Parameters like Head DNA percentage, tail DNA Percentage, comet length, tail moment were calculated from comet images. Results revealed maximum DNA damage in group V, which was exposed to arsenic alone, concluding arsenic being more toxic than fluoride. Also, antagonistic relationship was established between arsenic and fluoride.

Keywords - *Arsenic, Fluoride, Clarias batrachus, Genotoxicity*

I. INTRODUCTION

Increasing anthropogenic activities are the key to aquatic and terrestrial pollution across the globe. Arsenic and Fluoride are very common ground water pollutants, contributed by both natural and human caused reasons. Concurrent occurrence of fluoride and arsenic is widespread in many states of India, China, Bangladesh and South East Asia. Following their exposure, severe health complications arise namely Arsenicosis and Fluorosis, respectively [1].

Fluoride gets accumulated in aquatic invertebrates and vertebrates, through food and water. Once absorbed, it is distributed and accumulated in various organs and body parts [2]. The tendency of fluoride accumulation is found more in bony tissues than in soft tissues [3]. Fluoride also alters numerous hematological parameters [4] and interferes with various enzymatic (SOD, Catalase) and non- enzymatic activities (GSH, LPO) [5]. It has propensity to bind with the DNA molecule and distort its normal structure, and also induces generation of free radicals, ultimately causing DNA damage [6].

Arsenic, on the other hand is a non essential heavy metal which is mainly contributed by coal burning industries [7], generally present in its two forms organic and inorganic; inorganic being the more toxic one [8]. Aquatic organisms get exposed to arsenic through food/dietary sources and via water. Arsenic intrudes in the food chain and hence has bioaccumulative properties [9]. Accumulation of arsenic in fishes takes place in different organs like liver, kidney and gills depending upon the source of exposure [10]. Arsenobetaine, a water-soluble arsenic compound is usually found in marine living beings, which affects the organism and also can have adverse effects on humans indirectly [11]. Arsenic inhibits various enzyme activities involved in DNA repair leading to DNA damage. It brings about oxidative stress and free radicals affecting DNA and various cellular activites [6].

Contradictory literatures are available for both antagonistic and synergistic relationship of fluoride and arsenic. However, adverse health consequences of arsenic and fluoride exposure individually have been explored more, in comparison to their combination effects [12].

The research paper is further described as follows; section II mentions about the methods acquired to carry out the experiment, section III deals with the finding of the research carried out and also the discussion in which our results were supported by other researchers. Future scope and conclusions are narrated in section IV, followed by acknowledgement and finally the references.

II. RELATED WORK

Research reports are available confirming concurrent presence of arsenic and fluoride in various water bodies; but a very little work has been explored about the effects of both toxicants on aquatic organisms. However, many reports are available on rats. Arsenic and fluoride lead to increased activities of glutathione peroxidases, SOD & catalase, and also reduce levels of glutathione and ascorbic

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FLUORIDE AND ARSENIC : BIOACCUMULATORY POTENTIAL AND THEIR COMBINED TOXIC IMPACT ON THE BEHAVIOR OF FRESHWATER CATFISH, *CLARIAS BATRACHUS* LINN. 1758

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ABSTRACT : Fluoride and arsenic, upon release into the environment, often accumulate rapidly in aquatic habitats and are taken up by aquatic organisms subsequently entering into the food chain. This study comprises of examining the tissue distribution of arsenic and fluoride in the freshwater catfish, *Clarias batrachus* chronically exposed to them in combination. Fishes were exposed to a range of aqueous arsenic trioxide and sodium fluoride, both individually and in combination, and sampled at 24, 48, 72 and 96 hours. Levels of fluoride and arsenic in the liver, kidney, bone and blood of *Clarias batrachus* demonstrated significantly a direct relationship with the exposure medium. Fluoride level in bone was the highest whereas; the lowest level was observed in the muscle. Arsenic level in the liver was the highest whereas; the lowest level was observed in the bone at the end of 96 hours, among all tissues, at the same concentration and sampling time. Impact on behavior was studied in terms of air gulping, opercular movement, swimming activity, body position and food sensitivity. Control fish remained normal throughout the experimental period (28 d), but treated fishes were very restless, with loss of equilibrium, and a significant increase ($P<0.01$) in the number of opercular movements and air gulping .Our results suggest that elevated levels of fluoride and arsenic exposure cause bioaccumulation in the fish body, which ultimately may be harmful to humans.

Key words : Bioaccumulation, biotransformation, methylation, biotransformation, TISAB.

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INTRODUCTION

Civilization and the rapid spread of industrialization have compelled developing countries to face the crisis of aquatic pollution. A large number of polluted products, especially heavy metals are constantly being drained, untreated into rivers, close at hand. These products readily get dissolved in water and are the major persistent elements in aquatic ecosystems. Chromium, lead, mercury, arsenic and cadmium, rank among the priority metals and are viewed as systemic toxicants inciting numerous organ damages, even at lower levels of exposure (Olsson *et al*, 1998). They also influence cellular organelles and various enzymes involved in the metabolic process, detoxification, and damage repair (Wang and Shi, 2001). Besides, DNA molecules and nuclear proteins are also damaged, possibly leading to carcinogenesis or apoptosis (Beyersmann and Hartwig, 2008). Obviously, the impact of heavy metals on the aquatic ecosystem is a global concern (Yousafzai *et al*, 2008).

In the present scenario, unfortunately, a billion people in the world are drinking unhealthy water regularly (Borah *et al*, 2011). To meet the need for clean drinking water of these thirsty billions, indiscriminate fracturing of rocks to dig bore wells has consequently lead the emergence of two major public-health problems, *viz*., groundwater contamination with excess fluoride and arsenic. The chief sources of high fluoride in water resources are fluoride-bearing minerals existing in rocks and soils (Jha *et al*, 2011).

Aquatic animals are capable of taking up fluoride directly from water or to a lesser extent through food. In fish, fluoride may accumulate from the food chain (Shi *et al*, 2009). Roughly, 80-90% of the total ingested fluoride is absorbed from the gastrointestinal tract by passive diffusion (Whitford, 1996). Fluoride is distributed more rapidly in well-perfused tissues, such as the heart, lung,

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RECEIVER OPERATING CURVE (ROC) ANALYSIS FOR FLUOROSIS USING SIMPLE BLOOD PARAMETER NEUTROPHIL LYMPHOCYTE RATIO

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ABSTRACT : The study aims to assess the preclinical stage of fluorosis i.e. Non skeletal fluorosis in human populations using a simple blood parameter, Neutrophil Lymphocyte Ratio as a predictive tool and includes different fluorosis categories (Dental, Skeletal & Non skeletal) surveyed out in the endemic villages and compared with the control population of non endemic area. Study Populations belonging to endemic villages Kowataal, Fulsar, Mahuapaani, Korbi and Amatikra within the block Podi uproda, distt. Korba situated in Chhattisgarh state of central India were cross sectionally studied. Segregation was done on the basis of Suspect (non-symptomatic) and Confirmed (Dental and Skeletal) cases of fluorosis and neutrophil to lymphocyte ratio calculated. A total 180 individuals were included in the study, out of which 67.33 % were confirmed cases of fluorosis. A significant decline in neutrophil to lymphocyte ratio was observed upon chronic fluoride ingestion. In the Receiver Operating Characteristic curve analysis of obtained NL ratios, the overall cut off value for fluorosis was obtained as ≤ 2.379 in the selected endemic region irrespective of symptoms of fluorosis *i.e.* dental or skeletal. The results concluding that The NL ratio can be used as a simple parameter for preclinical identification of fluorosis in fluoride exposed populations. However, urine and blood fluoride analyses of the subjects are also needed for further confirmation.

Key words : Neutrophil lymphocyte ratio, non skeletal fluorosis, ROC, skeletal fluorosis.

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INTRODUCTION

Preceding dental and skeletal fluorosis, some preclinical changes take place in the blood and body due to acute or chronic ingestion of fluoridated drinking water and have been considered under non-skeletal manifestations. Such manifestations are often overlooked due to the misconception that fluoride affects only bones and teeth (Raghuvansi *et al*, 2010). Fluoride has multiple effects on human health. A few are characterized by mineralization changes in the calcified tissues resulting in dental fluorosis and skeletal deformities. Besides other metabolic effects, visceral organs like liver and kidneys are also susceptible to toxic effects of fluoride and pathological changes in these vital organs can occur even before overt clinical signs of F intoxication (Shashi, 2002). Fluoride exposure is also associated with oxidative damage to RBCs, liver and kidney tissues. Consequent to oral exposure, fluoride is rapidly absorbed to reach systemic circulation. In blood, about 75% of it remains free in plasma and about 5% remains bound to plasma proteins. The rest of the blood F is found mainly inside RBCs or with their membrane (Swarup and Dwivedi, 2002). Neurological manifestations, like headache, insomnia (lack of sleep), lethargy (fatigue), depression, polyuria and polydipsia have been reported in populations with endemic fluoride (Sharma *et al*, 2009). Besides, skeletal and dental fluorosis, excessive consumption of fluoride may lead to muscle fiber degeneration, low hemoglobin levels, excessive thirst, headache, skin rashes, nervousness, depression, etc (Meenakshi, 2006). Pre skeletal stage of fluorosis is associated with occasional complains of pains in small points of limits and back, which simulate rheumatoid arthritis and ankylosing spondylosis (Krishna and Kiran, 2013).

In earlier studies (Zahorec *et al*, 2008; Zazula *et al*, 2008; Papa *et al*, 2008; Halazun *et al*, 2008; De Jager *et al*, 2010; Kaol *et al*, 2010; Indavarapu and Akinapelli, 2011; Tomita *et al*, 2011; Proctor *et al*, 2012; Kim and

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PROTECTIVE ROLE OF L-DOPA AGAINST CYPERMETHRIN INDUCED REPRODUCTIVE TOXICITY IN JAPANESE QUAIL

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ABSTRACT : To test whether administration of L-Dopa can protect against cypermethrin (Cyp) induced reproductive toxicity in Japanese quail, *Coturnix coturnix japonica.* Twenty four adult male quails were divided into four groups. Group-1 received normal saline and served as control. Group-2 received Cyp 1mg/kg bw. Group-3 received L-Dopa 5mg/100mg bw and Group- 4 received both Cyp and L-Dopa. Treatments were given for 30 days. Body and testes weight, testicular and cloacal gland volume and GSI of each bird of each group were recorded. Blood samples were collected from the jugular vein for the estimation of serum testosterone. Testes were collected for the estimation of acid phosphatase and histological observations. Body and testis weight, testes and cloacal gland volume, serum testosterone, testicular acid phosphatase and GSI of Cyp fed groups showed significantly decreased value. L-Dopa treated group showed significantly increased value. Cyp + L-Dopa fed group showed significantly increased value of serum testosterone and testicular acid phosphatase level where as other parameters showed no significant difference, but the mean value was higher than those of Cyp group. Histologically, testis of Cyp treated group showed irregularity and variability in seminiferous tubules shape having fewer spermatozoa. L-Dopa group showed enlarged form of seminiferous tubules with abundant spermatozoa and showed full breeding condition. Cyp + L-Dopa treated group exhibited nearly normal appearance of the seminiferous tubules and spermatozoa. It may be concluded that L-Dopa might be a potent protective agent against Cyp induced toxic effect on reproduction in Japanese quail. In view of the nutritional value of poultry products and the importance of poultry industry worldwide finding of this study may aid in the rational development of new strategies of poultry industry management aimed at improving the human health (resources of food and nutrition) and benefiting the economy.

Key words : Cypermethrin, L-Dopa, toxicity, reproduction, Japanese quail.

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INTRODUCTION

White meat and egg products of poultry industries are a rich source of essential component of food and nutrition (Ghafoor *et al*, 2010). Parasitic infection in poultry farm causes concurrent infections which results in loss of productivity. Lice, ticks, mites and flies are most common external parasites of poultry. An infestation with *Argaspersicus*(poultry soft tick) represent a major ectoparasitic problem worldwide in poultry industries and is affecting egg and meat production (Hagos and Eshetu, 2005). Cypermethrin is one of the widely used pesticides as anti parasitic medicine to resolve the ectoparasitic infestation in poultry farm along with other practices (Alves *et al*, 2016; Sivajothi *et al*, 2017). Their excessive use is the major source of environmental hazards for animals and even for human beings, because it gets incorporated in the food chains (Abd-Alla *et al*, 2002). Many pesticides are known to cause degeneration of reproductive organs, inhibition of spermatogenesis, sterility and decrease in hormone and steroid levels. Pyrethroids are derived from natural occurring pyrethrum flowers (*Chrysanthemum cinerariaefolium*) and it has insecticidal properties (Perger and Szadkowski, 1994). *In vitro* study reveals that pyrethroid insecticides including permethrin, fenvalerate and cypermethrin act as anti-androgen chemicals (Xu *et al*, 2008). Among these, Cypermethrin is one of the widely used pesticides and it is considered as an endocrine distruptive chemical (Mnif *et al*, 2011). It affects secondary sexual characters, the processes of oogenesis, spermatogenesis, early onset of

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Title

PYRETHROID INDUCED TERATO-GENICITY AND GENOTOXICITY.

Authors

Shakya, Ajay Singh; Kumar, Ajay; Prasad, S. K.

Abstract

Pesticide has become an integral part of modern agriculture. Pyrethroids are biodegradable that is why uses of this pesticide being in large amounts, and due to their not being used properly, they affect harmful insects as well as many beneficial insects and many different types of organisms and humans. Produced effects such as neurotoxic, genotoxic and teratogenic effects. Cypermethrin (CYP), a class-II type of pyrethroid pesticide has been studied in many organisms for its various adverse effects, but its teratogenic and genotoxic effect has not been much studied in birds. So, in this review conclude the genotoxic and teratogenic potential of different type of pyrethroid in various animals.

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Abstract

To address the problem of antibiotic resistance in pathogens, our research aimed for endophytic actinobacteria, producers of a diverse array of significant bioactive metabolites. Endophytic actinobacteria SIR5 was isolated from roots of Sphaeranthus indicus Linn. and was identified to be Actinoalloteichus cyanogriseus via 16S rRNA sequencing. With the accession number MK793584, the gene sequence was deposited to NCBI. In the current study, a rare actinobacteria Actinoalloteichus cyanogriseus, has been reported as an endophyte for the first time. Both Microbial Type Culture Collection (MTCC) and Clinical Cultures (CC) were used to investigate the antimicrobial property of the bioactive chemicals synthesized by A. cyanogriseus SIR5. A significant zone of inhibitions was recorded against clinical cultures: B. cereus (12.16±0.16 mm), Candida albicans (12.83±0.44 mm), E. coli (15.33±0.33 mm), S. epidermidis (11.50±0.28 mm) and MTCC pathogens: B. cereus (11.16±0.16 mm), B. subtilis (13.33±0.16 mm), P. aeruginosa (13.33±0.33 mm), S. epidermidis (12.33±0.33 mm). The production of bioactive compound was enhanced by optimization using one factor at a time (OFAT), which was achieved with modified ISP-4 medium (starch-1% w/v, NH4NO3-1% w/v, CaCO3-2 g/l, K2HPO4-1 g/l, MgSO4-1 g/l, NaCl-1g/l, trace solution-1 ml/l) with inoculum size-13%, incubation period-16 days, pH-8.0 and temperature-28 o C.

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ANTIMICROBIAL EFFICACY OF BIOACTIVE COMPOUNDS OF RARE ENDOPHYTIC ACTINOBACTERIA, *Actinoalloteichus cyanogriseus* SIR5 (MK793584)

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Characterization of a novel keratinase from Chrysosporium tropicum

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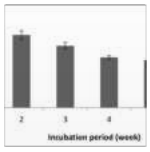


Ashwini Kumar Gupta
Pandit Ravishankar Shukla University

References (22) Figures (3)

Abstract and Figures

A keratinophilic fungus Chrysosporium tropicum was isolated from poultry farm soil and screened for extracellular keratinase activity. The fungus was cultured in basal salts medium and keratinase production was assessed. The novel keratinase was purified by Sephadex G-100 column chromatography and characterized. The molecular weight of the enzyme was estimated to be 14.5 KDa by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE). The optimum pH and temperature of the keratinase were found to be 7.5 and 40oC respectively. The Km for keratin powder from human hair was 6.67 mg and the Vmax of novel keratinase was determined to be 0.33 mg ml-1 by the Lineweaver-Burk plot. The enzyme activity was almost completely inhibited by phenylmethylsulphonyl fluoride (PMSF) suggesting that the keratinase belongs to the serine protease family.



Production of keratinase…

…itors on residual activi… keratinase enzyme	
…rs	Residual Act…
…l	100.0
…	88.4…
…	83.6…
…thanol	77.5…
…	15.1…

Summary of the partial purificati…

Total protein (mg)	Total activity ($x10^3$) KU
128.77	1.46
25.18	1.19
13.36	0.97
7.71	0.63

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PHYTOCHEMICAL ASSESSMENT AND SYNERGISTIC BIOEFFICACY OF CURCUMA CAESIA (ROXB.) FROM BASTAR AGAINST MULTI-DRUG RESISTANT HUMAN PATHOGENS

Abstract

The current research is an attempt to investigate the antibacterial and synergistic bioefficacy of *Curcuma caesia* (Roxb.) versus human pathogenic bacteria *viz.*, *Bacillus cereus*, *Bacillus subtilis*, *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli*, *Klebsiella pneumonia*, *Pseudomonas aeruginosa* and *Proteus vulgaris* procured from IMTECH, Chandigarh, India. Agar well diffusion assay was performed, and one-way ANOVA examined the outcome. The qualitative phytochemical examination revealed a positive test for flavonoids, glycosides, phytosterols, resins, saponins, and tannins. However, the quantitative estimation of phytochemicals revealed that the root sample contains highest amount of flavonoid followed by total phenol, saponin and alkaloid. The bioactive extract was purified using column chromatography. The purified fraction and commercially available antibacterials *viz.*, tetracycline, streptomycin, and penicillin was evaluated for their synergistic or antagonistic efficacy counter to multi-drug resistant human pathogenic bacteria. The outcome divulge that a purified fraction of *C. caesia* was found to act synergistically with tetracycline against all the bacterial cultures under investigation. The results with streptomycin showed maximum synergistic activity against *B. cereus*. However, penicillin and purified fraction exhibit utmost synergistic activity against *S. epidermidis* and *B. subtilis*. The results revealed that the methanolic root extract of *C. caesia* bears a potential bioactive phytocompound conferring enhanced synergism.

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THE SOCIAL-ECONOMIC IMPACT OF TUBERCULOSIS: A REVIEW

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Abstract:
Globally, Tuberculosis has visibly impacted the daily lives of ordinary peoples in almost every country. However, the impact is pre dominant in developing countries, where poverty, social discrimination is rampant. Tuberculosis patients often face difficulty in social as well as personal aspect of life. Worldwide there is an understanding that controlling tuberculosis requires a careful amalgamation of various control programs, treatment regime and different aspects of social determinants. There is a lack of substantial literature addressing the social and economic assessment of tuberculosis patients. In this review we have reviewed the various initiatives taken by World Health Organization and supplemented the information with the steps taken by Indian government towards End TB strategy with special emphasis on social economic aspect of tuberculosis. In present paper tried to understand social- economical impact of tuberculosis in their patients and also sure relationship of culture and society with health.

Keyword: Tuberculosis, economic, social determinants, cost, Drug resistant TB, Management

1. Introduction:

Humans live in two worlds in the world: as members of the animal kingdom, they live in the animal kingdom, and as social members, they live in the social kingdom. There are lots of dimensions that have major or direct relationships between the social and animal kingdoms, and health is one of them, especially health. Reproductive health, epidemiology, etc. are strangely related to the social and environmental kingdoms. Causes, treatment, prevention, and promotion are the four major dimensions of health .And all four dimensions are directly related to the economic dimension, like If a family has a good economic situation, they are more likely to make good food choices. If they have access to a variety of nutrients, their nutritional levels are higher than in other families. AIDS, tuberculosis, Typhoid, and other diseases have had a direct and long-term impact on human society throughout

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नोट:- अक्षरवार्ता में सभी पद मानद व अवैतनिक है।

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सृजनशीलता का संघर्ष और 'हानूश'

डॉ. मधुलता वारा

सहायक प्राध्यापक, साहित्य एवं भाषा अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर, छत्तीसगढ़

सारांश:- रचनाकार भीष्म साहनी ने हानूश नाटक मे अधिकांशतः निम्नवर्गीय जीवन की यथार्थ अभिव्यक्ति की है। जीर्ण-शीर्ण आर्थिक स्थिति के बीच जुनूनी हानूश की बनाई गई बेजोड़ घड़ी ने उसे दुर्भाग्य वरने के बजाय कुरतापूर्ण सजा का हकदार बना दिया।

प्रस्तावना:-स्वतन्त्रता के पश्चात हिंदी नाट्य जगत में साहित्य की अनेक विधाओं ने समाज की जटिलता, तनाव-संघर्ष, द्वन्द्वात्मकता, अजनबीपन, नए मूल्यों की टकराहट, क्रिया-प्रतिक्रिया, घुटन, संत्रास तथा मूल्य हीनता चेतना, सादगी भरे कथ्य भीष्म साहनी के रचनाओं में अभिव्यक्त हुई है।

संघर्ष और हानूश:-भावों की यथार्थ अभिव्यक्ति से साहित्य में सृजनशीलता बनी रहती है। लेखक सतर्कतापूर्वक समस्याओं को देखता है संवेदनशीलता बनी रहती है। 'साहित्यकार जिस युग और परिवेश में जीता है उसकी विसंगतियाँ प्रश्न बनकर उसके मन को कुरेदती रहती है। अन्य विधाओं की अपेक्षा नाटककार को ऐसे प्रश्नो से कुछ ज्यादा ही जूझना पड़ता है, जिसका संबंध एक समूह से हो, अगर वह आम आदमी से संबंध हो तो नाटककार की वही अनुभूति और अधिक व्यापक बन सकती है।' हानूश नाटक लेखन के प्रेरणा के संबंध में बताते हुए घड़ी के गाथा के बारे में भीष्म साहनी का कथन है- ''मेरे मित्र निर्मल वर्मा उन दिनों वहीं पर थे और वे भाषा तथा संस्कृति की उन्हें खासी जानकारी थी। सड़को पर घूमते-घूमते एक दिन उन्होंने मुझे एक मीनारी घडी दिखाई जिसके बारे में तरह-तरह की कहानियाँ प्रचलित थी कि यह प्राग में बनाई जाने वाली पहली मैकेनिकल घड़ी थी, और इसके बनाने वाले को उस समय के बादशाह ने अंधा करवा दिया था।''

जीवन की बुनियादी आवश्यकता रोटी, कपड़ा और मकान के लिए संघर्षरत हानूश का परिवार घड़ी के प्रति हानूश के जुनून से परेशान है। आर्थिक अभाव, विपन्नता, तंगी, संकट के कारण पारिवारिक स्थिति का चित्रण इस प्रकार किया गया है। ''मेरी सारी जवानी बीत गई है- यह ठंडे-ठंडे पोंछते हुए। अब मुझसे और बर्दाश्त नहीं हो सकता।.....छः महीने तक मैं बच्चे को छाती से लगाए घूमती रही। किधर गया मेरा मासूम बेटा? मैं इस घड़ी को क्या करूँ? क्या मै इससे कुछ अपने लिए माँगती हूँ? मैंने अपने लिए कभी इससे जेवर माँगा है, या कपड़ा माँगा है? पर कौन माँ अपने बच्चे को अपनी आँखो के सामने ठिठुरता देख सकती है?''

जर्जर आर्थिक अवस्था के बाद भी पत्नी द्वारा पति को उसके परिवार के कार्य के लिए स्वतंत्र कर देना उसका बड़प्पन है। पत्नी का कथन- ''अब तुम आजाद हो। अपने बजीफे का इन्तजाम करो और घड़ी बनाओ। मै तुमसे कभी कुछ नही कहूँगी। तुम उसी से निबटो तो बहुत बड़ी बात है।'' पत्नी के साथ से ही हानूश ने उस अद्भुत घड़ी का निर्माण किया।

जिस प्रकार कला की परख पारखी ही कर सकता है उसी प्रकार लोहार ने हानूश की कला से प्रभावित होकर उसका उत्साहवर्धन किया। लोहार का कथन- ''तुम बुरा मान गए, हानूश। मेरा मतलब तुम्हे नसीहत करने का नहीं था। मैं एक ही बात चाहता हूँ और वह यह कि घड़ी बनाने का काम नहीं छोड़ना, भले ही दुनिया इधर से उधर हो जाए। पैसे की वजह से बिल्कुल भी नहीं छोड़ना। हम लोग मर नहीं गए है। बजीफे का कहीं इन्तजाम नहीं हुआ तो मैं लोहारो की जमात से तुम्हे पैसा इकट्ठा करके ला दूँगा। लोहार कभी इनकार नहीं करेंगे। तुम बेधड़क होकर अपना काम जारी रखो।'' प्रोत्साहन व्यक्ति में जोश का संचार करता है।

कला के प्रति आम आदमी की रुचि, लगाव को लेखक ने सहजता एवं संवेदनशीलता के साथ रेखांकित किया है। विवेक द्विवेदी का कथन है- ''हानूश मानसिक यातना, द्वंद्व, सृजनशीलता, संवेदनशीलता, तन्मयता, तल्लीनता, करूणा और पीड़ा आदि मनोभावों को भी उन्होंने सहज भाषा में बड़ी क्षमता और आंतरिक छुअन के साथ अभिव्यक्त की है। घड़ी के नाजुक पुर्जो को छूने की उसकी कोमलता और आकुलता के अनुरूप ही भाषा और संवादों की अत्यंत नाजुक गठन है।'' लेखक की भाषा शैली की विशेषता इन पंक्तियों से स्पष्ट होती है।

हानूश की बनाई घड़ी बेजोड़ थी, कला का अद्भुत नमूना था। घड़ी की प्रतिकृति न बने, प्रशासन की इस सोच ने हानूश के प्रति क्रूरतापूर्वक व्यवहार किया। दरबार में महाराजा का आदेश- ''(हाथ ऊँचा उठाकर) हमें नगरपालिका से कहीं ज्यादा एतबार हानूश कुफ्लसाज पर है। इस आदमी को और घड़ियाँ बनाने की इजाजत नहीं होगी। इस हुक्म पर अमल करवाने के लिए..... (थोड़ा ठिठककर) हानूश कुफ्लसाज को उसकी दोनो आँखो से महरूम कर दिया जाए। उसकी दोनों आँखे निकाल दी जाएँ। उसकी आँखे नहीं होगी तो और घड़ियाँ नहीं बना सकेगा।'' इस प्रकार एक कलाकार की आँखें क्रूरता की भेंट चढ़ गई, उस गरीब की आजीविका चली गई जिससे परिवार की आर्थिक अवस्था बद से बदतर हो गई।

जहाँ एक ओर हानूश की बनाई अद्भुत घड़ी से राजा और प्रजा दोनों मे उत्साह व खुशी की लहर है। वहीं दूसरी ओर पुरस्कार की जगह राजा मिलने से वह भी आँखे निकलवाने की निर्मम सजा से हानूश पीड़ा व अंतर्द्वंद से गुजर रहा है। एक ''घड़ी बजने के कारण बाहर तालियाँ पीटी जाने लगी है। खुशी और सरोकार की आवाजे आ रही है। हानूश जुग-जुग जियो!... खूब है, वाह-वाह!.....पूरे दस बजाए हैं। हानूश हताश-सा घुटनों

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दृष्टिकोण

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नोट: पत्रिका में प्रकाशित लेखकों के विचार अपने हैं। उसके लिए पत्रिका/संपादक/संपादक मंडल को उत्तरदायी नहीं ठहराया जा सकता। पत्रिका से सम्बंधित किसी भी विवाद के निपटारे के लिए न्याय क्षेत्र दिल्ली होगा।

संजीव की कहानियों में समकालीन परिदृश्य

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शोध-सार

हिंदी साहित्य जगत के जनवादी रचनाकार संजीव ने अपने लेखन-क्षेत्र में अपने आस-पास के फलक मे रू-ब-रू होकर रचनाएँ की हैं। साथ ही कई रचनाओं के लिए क्षेत्र विशेष में जाकर उस पीड़ा को, उस मर्म को गहराई से जानने के लिए वर्ग विशेष के बीच रहकर जो अनुभव किया, उसे मार्मिकता के साथ चित्रित किया है। संजीव की कहानियों में मौजूदा समय की सच्चाइयाँ हैं। समकालीन परिप्रेक्ष्य में नए-नए कथा-क्षेत्रों, जैसे- गाँवों की कहानियाँ हो या शहरों की, पहाड़ों की कहानियाँ हो या मैदानों की, उच्च वर्ग सामंतों, सेठों की कहानियाँ हो या निम्न मजदूर वर्गों की, संजीव बड़ी गहराई के साथ रचनात्मक उपक्रम करते हैं। संजीव ने कहानियों में मानवीयता, सामाजिकता, मार्मिकता तथा सृजन-सौंदर्य की अभिव्यक्ति का चित्रण बखूबी किया है। जिससे मानव स्वभाव की कोमल संवेदनाओं की छुअन को गहराई के साथ महसूस किया जा सकता है।

भूमिका

समकालीनता काल-सापेक्ष या जीवन-दृष्टि है, जिसमें रचनाकार किसी युग विशेष में अपने कृतित्व को समेटता है, जो वर्तमान युग में रचना-कार्य में रत हैं तथा परिदृश्य वह संवेदना की भूमि है, जिस पर साहित्यकार अपने परिदृश्य का आंकलन करता है, जो वह महसूस करता है। समकालीन साहित्य में जीवन की स्थितियों से जूझने और समय की ललकारों का निरूपण व दिशा- निर्देश की चाह भी दृष्टिगत होती है। समकालीन का एक अर्थ यह भी है कि लेखक समय का स्वयं गवाह होता है। यदि हम समकालीन कथाकारों में उदय प्रकाश कृत 'और अंत में प्रार्थना', 'तिरिछ'; चित्रा मुद्गल कृत 'ब्लेड', 'भूख'; स्वयं प्रकाश कृत 'पार्टीशन'; संजय कृत 'कामरेड का कोट'; सुशीला टाकभौरे कृत 'सीलिया आदि कहानियाँ देखते हैं, तो पता चलता है कि इन कहानीकारों ने समय के दवाव को महसूस करते हुए अपनी कथाओं में जीवन के यथार्थ का चित्रण गंभीरता के साथ किया है, चाहे वह समाज, धर्म, राजनीति या आर्थिक ही क्यों न हो।

साहित्य में कहानी का महत्वपूर्ण स्थान है। संजीव कथा-साहित्य जगत में यथार्थ को ऐसी शिद्दत के साथ प्रस्तुत करते हैं, जिसकी आँच पाठक को ताप महसूस करने पर मजबूर करती हैं। संजीव अपने आस-पास के परिदृश्य को अनदेखा न करते हुए समकालीन परिस्थितियों और समस्याओं को उजागर करके अपनी लेखनी से समाज को अनेक समस्याओं से रू-ब-रू कराते हैं। संजीव की रचनाओं में व्यक्त जीवन और समाज के साथ यथार्थ संबंध समकालीन संदर्भ के रूप में दिखलाई पड़ती है। उनके साहित्य की सबसे बड़ी विशेषता विषय की विविधता है। संजीव ने अपनी कहानियों में निम्न वर्ग, दलित, शोषित, नारी-जीवन और उनका संघर्ष तथा विद्रोह को पूरी ईमानदारी के साथ चित्रित किया है। "नई सृजनशीलता का संघर्ष अपनी परंपरा व समय के प्रश्नों और चुनौतियों से होता है। रचनाकार के लिए परंपरा संबद्ध विधा के साथ समाज की भी होती है।"[1] उनकी कहानियों में सामाजिक, भौगोलिक, आर्थिक, राजनीतिक व सांस्कृतिक विभिन्न परिदृश्यों का चित्रण मिलता है।

सामाजिक परिदृश्य

सामाजिक परिदृश्य के अंतर्गत प्रायः सामाजिक परिस्थितियों के विविध पक्षों का चित्रण किया गया है। इसमें समाज से संबंधित वर्ग-भेद, रीति-रिवाज, अंधविश्वास, बेरोजगारी आदि का वर्णन स्पष्ट रूप से देखा जा सकता है। 'दुनिया की सबसे हसीन औरत' कहानी में उराँव जनजाति की महिला जब ट्रेन में चढ़ती है, तब उसे जाति के आधार पर नीचा दिखाने की कोशिश इज़्जतदार लोगों और टी.टी. साहिबा द्वारा किया गया है- "गे रहा है हम अपन नसीब पे। आज हमरा साथ कोई मरद होता, पैसा होता, रोब होता, तो पाँच-दस थमा के हमहू इज्जतदार बनल रहता। ऐसे का इज्जत है हमरा? हम बजारू हैं!"[2] समाज की सबसे बड़ी विडंबना है कि समाज में बाहरी आवरण को और दिखावे को ही इज़्जत का पैमाना बना लिया गया है। संजीव ने समाज में फैली बुराइयों, समस्याओं से उपजी मानसिकता को अपनी लेखनी का माध्यम बनाया है। वे उनके पात्रों की पीड़ा व दर्द को महसूस करा कर पाठक से रू-ब-रू कराते हैं। 'जसी बहू' कहानी में जसी बहू जाति से चमारिन है। जसी अपनी फरियाद लेकर प्रधान के पास जाती है, तब- "सितई पंडित जोर-जोर से गाली

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जयनंदन की कहानियों में जीवन-संघर्ष

डॉ. मधुलता बारा* एवं बरातू राम ध्रुव*

कहानी हिंदी साहित्य की अत्यंत लोकप्रिय एवं पुरानी विधा है। पुराण, महाभारत, पंचतंत्र, जातक कथाएँ आदि अनेक प्राचीन-ग्रंथों में बहुत कहानियाँ भरी पड़ी हैं। इन कहानियों को पढ़ने से मनोरंजन के साथ-साथ शिक्षा और उपदेश भी मिलते हैं। बाल्यकाल में ही हमने अपने बुजुर्गों से जो कहानियाँ सुनी हैं, उनमें 'एक राजा था,एक रानी थी...' इत्यादि से लेकर देवी-देवताओं पशु-पक्षियों तक न जाने कितनी तरह की कहानियाँ हमने सुनी होंगी।

मानव एक समुदाय या समाज में निवास करते हैं, उसी समाज में जब विभिन्न घटित घटनाओं को ओर लेखक की दृष्टि पड़ती है, तो वह उस घटना को अपने शब्दों में वर्णन कर कहानी के रूप में बहुत ही सरल एवं सुस्पष्ट बनाकर प्रस्तुत करने का प्रयास करते हैं। अनेक कहानियों में रचनाकार जयनंदन द्वारा जीवन के विभिन्न पहलूओं पर मार्मिक कहानियाँ लिखी और ये पसंद की गई। उनकी कहानियों में आधुनिकता और उत्कृष्टता है।

समृद्ध हिंदी भाषी राज्य बिहार के नवादा जिले के गिलकी ग्राम में जन्मे जयनंदन का साहित्य के इस विशाल कुंज में विशिष्ट योगदान एवं महत्वपूर्ण स्थान है। साहित्य-जगत में बंजर भूमि के पौधे के समान जन्म लेकर उन्होंने अपने अथक प्रयास, लगन एवं कठिन परिश्रम के बलबूते कामयाबी की सीढ़ी-दर-सीढ़ी चढ़कर आज उस शिखर पर विराजमान हैं, जहाँ लोगों की गणना श्रेष्ठ तथा प्रबुद्धजनों की श्रेणी में होती है।

अपने अनेक कहानियों में जयनंदन द्वारा देश, समाज एवं मानव-मन के अंतर्द्वंद्व की भावना को सफलतापूर्वक चित्रित किया गया है। उनके अधिकांशतः कहानियों का अध्ययन करते समय हम अपने देश व समाज के भीतर ही नहीं, बल्कि अपने अंदर हो रहे हलचल को भी झाँकने के लिए विवश हो उठते हैं।

उनके एक कहानी 'भितरघात' में गरीबी का यथार्थ चित्रण, बेरोजगारी बंगलादेश मुक्ति-संग्राम, जातिगत भेदभाव, गुण्डागिरी और आतंकवाद जैसे ज्वलंत समस्याओं को प्रकाश में लाने का प्रयास किया है। गरीबी का यथार्थ चित्रण इस प्रकार प्रस्तुत किया है– "सभी कुछ न कुछ कमा लेते थे इसलिए घर की गुजर-बसर खींच खांच कर निभ जाती थी। मुश्किलें तब पेश आती थी जब कोई बड़ा काम सिर पर लद जाता था। जैसे माँ के पेट में पथरी हो गयी और उसके ऑपरेशन का मुद्दा सामने आ गया।"[1] यह स्थिति कहानी के नायक मकसूद तथा उसके परिवार की है, जो जीवन का एक-एक साधन जुटाने के लिए कड़े संघर्षों से जूझ रहे निम्नवर्गीय परिवार की है, जिसमें मकसूद के अलावा उसके तीन छोटे भाई, वृद्ध माता-पिता और दो कुँवारी बहनें थी। उसी प्रकार 1971 के बंगलादेश मुक्ति-संग्राम में चारों ओर फैली हिंसा में भूषण बोराल के दादा और चाचा दंगाइयों की भेंट चढ़ जाते हैं। भूषण बोराल को पुलिस की नौकरी मिल जाती है तथा बंगलादेशी और निचली जाति का होने के कारण पुलिस होकर भी जातिगत भेदभाव का सामना करना पड़ता है।

इसी तरह "इंसाफ-ए-कबीला... एक दहशतगर्द दास्तां। एसाइनमेंट... यानी फिदायीन कार्रवाई यानी मौत का खुला खेल।"[2] इस संगठन के माध्यम से देश में व्याप्त आतंकवाद समस्या की ओर प्रकाश डाला गया है।

इसी तरह 'कल्याण का अन्त' कहानी में परंपरा, आस्था और आधुनिकता का यथार्थ चित्रण प्रस्तुत किया गया है, जिसमें कहानी का नायक कोनाई पुरानी परंपरा की मान्यता का निर्वाह करता है, तो वहीं दूसरी ओर उसका बेटा निमाई और पत्नी राधामुनी आधुनिकता का बोध कराते हुए प्रतीत होते हैं– "इस पेशे ने हमारे पूरे खानदान को बौना बनाकर गरीबी के घेरे में सिमटे रहने के लिए अभिशप्त कर दिया है। भला कोई मछली मारकर और नाव खेकर दो रोटी जुटाने से ज्यादा और क्या कर सकता है।"[3] निमाई शहर में पढ़कर अपने पिता के कार्यों का विरोध करता है और अपने पिता के व्यवसाय को ही अपनी गरीबी का कारण मानता है। "पच्चीस बीघा का रकबा इस इलाके के लिए लाख की नहीं करोड़ की सम्पत्ति साबित होगा। चारों तरफ जिस तरह कॉलोनियाँ बसी है, उद्योगों के जाल बिछ रहे हैं, इसकी मुहमाँगी कीमत वसूली जा सकता है।"[4] इस प्रकार निमाई अपने पिता की आस्था व व्यवसाय का केंद और पूर्वजों के धरोहर कल्याण तालाब को

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गाँधी और जयनंदन की कहानियों में आम आदमी का संघर्ष

ORIGINAL ARTICLE



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शोध सार

जयनंदन की कहानियों में आम आदमी अर्थात् पात्रों की अधिकता है। उनके जीवन–संघर्ष एवं समस्याओं का चित्रण जयनंदन ने अपनी विभिन्न कहानियों में समाहित किया है। वे कहानियाँ–संग्रह हैं– 'सन्नाटा भंग', 'एक अकेले गान्ही जी', 'बस नहीं गलेगे अब', 'घर फूंक तमाशा', 'सूखते स्रोत', 'गाँव की सिसकियाँ', 'भितरघात', 'सेराज बैण्ड बाजा' और संकलित कहानियाँ। जयनंदन ने स्वयं आम आदमी का जीवन जीया है इसलिए उनकी कहानियों में आम आदमी की समस्याओं का बारीकी से चित्रण हुआ है।

मुख्य शब्द

जयनंदन, गाँधी, आम आदमी.

प्रस्तावना

भारत के महान संतों में एक मोहन दास करमचंद गाँधी जो शरीर से दिखने में बेहद कमजोर लेकिन दृढ़ इच्छाशक्ति वाले, बहुत रचनात्मक और बहुत दूरदर्शी विचारक थे। उनका संपूर्ण जीवन भारतीय आम जनमानस की सेवा करते हुए उनके हित व अधिकारों के लिए लड़ते हुए संघर्षमय व्यतीत हुआ। गाँधीजी अपनी प्रसिद्ध पत्रिका 'इंडियन ओपिनियन' में बराबर भारतीय समाज पर लगे प्रतिबंधों के विरुद्ध आवाज़ उठाते रहे हैं। उनके समय में भारतीय लोग ट्राम गाड़ियों और रेलगाड़ियों में सम्मान के साथ यात्रा नहीं कर सकते थे। भारतीय व्यापारियों को नैटाल में सरकार द्वारा बार–बार परमिट लेने के लिए आदेश दिया जाता था, जिसका विरोध करते हुए उन्होंने व्यापारियों को दुबारा परमिट नहीं लेने की सलाह दी। तात्कालीन सरकार द्वारा सोलह वर्ष से अधिक अवस्था वाले भारतीयों पर प्रतिवर्ष एक पौंड कर लगाया गया था इसके अतिरिक्त प्रमाण–पत्रों व प्रवेश–पत्रों पर भी फीस लगाई जाती थी। ऐसे कई अपमानजनक कानूनों और नियमों को रद्द कराने के लिए गाँधीजी को विरोध स्वरूप अदालतों की शरण जाना पड़ता था, जिसके बावजूद फैसला भारतीयों के पक्ष में नहीं आता था।

संघर्ष का अर्थ होता है– टकराव, प्रतिस्पर्धा या निरोध। जब व्यक्ति का व्यक्ति से, व्यक्ति का समूह से, समूह का व्यक्ति से या समूह का समूह से टकराव या विरोध होता है, तो उसे संघर्ष कहा जाता है। संघर्ष कई प्रकार हो सकता है, जैसे– प्रत्यक्ष संघर्ष, वर्ग–संघर्ष, सामाजिक संघर्ष, संघर्ष विरोधी संघर्ष, राजनयिका संघर्ष एवं प्रजातीय संघर्ष आदि। सभी का जीवन संघर्षमय होता है चाहे वह व्यक्ति कोई खास हो या आम। संघर्ष का स्वरूप

छत्तीसगढ़ी लोक-जीवन में रामधुनी की प्रासंगिकता

—डॉ. (श्रीमती) शैल शर्मा
—ज्योतिबाला साहू

छत्तीसगढ़ की भूमि धर्म की भूमि है। माँ कौशिल्या का मायका अर्थात् रामजी का ननिहाल होने के कारण यहाँ के आम जन-जीवन के हर कर्मों में राम रमे हुए हैं, जहाँ छत्तीसगढ़ का एक धार्मिक यज्ञ है महाधुनी। यहाँ किसान अपने कृषि-कार्यों को संपन्न कर फुरसत के क्षणों में रामधुनी का आयोजन करते हैं, जहाँ पाँच से तीन दिन तक अनवरत रूप से रामनाम की गूँज पूरे गाँव, मोहल्ले और अंचल में इसकी ध्वनि सुनाई देती है। रामधुनी के आयोजन में गाँव के लोग अपना सारा काम-धाम छोड़कर इसे एक त्यौहार के रूप में मनाते हैं। रामधुनी मुख्यतः तीजा, पोला, पितृ-पक्ष या धान कटाई के बाद आयोजित की जाती है। रामधुनी में एक मुख्य गायक, संगीत-पक्ष एवं नृत्य-पक्ष मिलकर रामकथा, कृष्णकथा एवं पुराणों की कथा का मंचन करके लोगों में भक्ति का संचार करते हैं।

मुख्य शब्द : संस्कारधानी, इकतारा, आजीविका, महामंत्र, अष्टाक्षरी, सहभागिता, यथाशक्ति, प्रभातफेरी, समिधा, प्रचलित, अखंड, महाभारत, पितृपक्ष, अनवरत, यज्ञकुंड, रामचरितमानस।

रामधुनी की कथा-प्रसंग हमारे व्यवहारिक जीवन को जोड़कर संदेश देता है, जैसे राजा हरिश्चन्द्र की कथा सत्यता की सीख, शीत बसंत की कथा भाई-भाई के प्रेम की सीख, शिव-पार्वती विवाह की कथा पति-पत्नी में आपसी प्रेम की कथा, राजा मोरध्वज की कथा दानशीलता की चरम सीमा की एक अनूठी सीख प्रदान करती है, जिसमें गायक पूर्ण अभिनय के साथ प्रस्तुती देता है।

छत्तीसगढ़ एक संस्कारधानी राज्य है। छत्तीसगढ़ की माटी की सुगंध समूचे विश्व स्तर पर पहचानी जाती है। छत्तीसगढ़ की भूमि की इतनी महिमा मंडित होने का सबसे महत्वपूर्ण कारण ब्रह्माण्ड नायक राम को जन्म देने वाली माँ कौशिल्या हमारे छत्तीसगढ़ की बेटी है। रामचरितम में इनका उल्लेख मिलता है-'ब्रह्म भयऊ कोसल पुर भूपा'। इस नाते राम छत्तीसगढ़ के भांजे हुए। श्रीराम अपने वनवास काल में चौदह वर्ष में कुछ समय हमारे छत्तीसगढ़ में भी व्यतीत किए। छत्तीसगढ़ में सरगुजा से लेकर बस्तर तक के लोग रामकथा का गायन विभिन्न तरीकों से करते हैं। छत्तीसगढ़ की भूमि धार्मिक आस्था का केंद्र रही है। गाँव-गाँव रामधुनी, मानस-यज्ञ, मानस-प्रतियोगिता, नवधा रामायण का आयोजन छत्तीसगढ़ वाले का राम के प्रति आत्मीय जुड़ाव को दृष्टिगोचर करता है।

रामधुनी परंपरा

रामधुनी को हम छत्तीसगढ़ का एक पावन यज्ञ कह सकते हैं, जहाँ गाँव के हर वर्ग के बच्चे, बूढ़े सभी इसमें हिस्सा लेते हैं।

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छत्तीसगढ़ की माटी में बसा हिंदी का रखवाला कवि विनोद कुमार शुक्ल

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ABSTRACT

छत्तीसगढ़ की मिट्टी उसकी बोली में रचे बसे मूर्धन्य कवि विनोदकुमार शुक्ल को अपनी जमीन से जितना लगाव है उतना ही मातृभाषा हिंदी से भी. उन्होंने दुनिया को देखा हिंदी में, सोचा हिंदी में और शब्दों के रूप में विरोया भी हिंदी में ही कवि केवल अपनी सीमा तक नहीं बल्कि इन्होंने अपनी कविताओं के माध्यम से हिंदी का परचम विदेशों तक भी लहराया है। कवि विनोदकुमार शुक्ल अपनी सारी रचनाएँ हिंदी में किए. हाँ कहीं -कहीं क्षेत्रीयता का प्रभाव दिखना स्वाभाविक है जिसमें आज के समाज का सच्चा यथार्थ है. चित्रण है तो कहीं अपने भीतर संवेदनाओं को बचा लेने की झटपटाहट। कहीं मानवीय मूल्यों को खोने का भय तो कहीं तनाव एवं एकाकीपन के बढ़ने की आशंका। कवि अपने भीतर की मर्मस्पर्शी भावनाओं को बड़ी ही सार्थकता से व्यक्त करते हैं। वास्तव में छत्तीसगढ़ राज्य में हिंदी का ऐसा विलक्षण कवि दुर्लभ है। हिंदी का ऐसा उन्नायक, ऐसा रखवाला और विश्वस्तर तक पहुँचाने में उनकी कविताएँ अग्रसर दिखती है। देश – विदेश के बीच एक बाँध की तरह कार्य करने में इनकी कविताओं का जवाब नहीं है।

Keywords: हताशा, हत्यारा, बेदखल, खेतिहर, बाजार, कमजोर, इकट्ठा, खटखटाना, भात, भूख, आदिवासी, किसान ।

कुछ कविताएँ ऐसी होती हैं जो कभी अतीत के पन्नों में नहीं सिमटतीं, सदैव वर्तमान बनी रहती है ऐसी ही कविताओं के कलमकार हैं कवि विनोदकुमार शुक्ल, जिनकी कविताओं में जब भी झाँका जाय तो तभी उसमें वर्तमान दृश्य उभरकर सामने आ जाते है। इनकी कविताएँ निज से ज्यादा समूचा जगत् के लिए लिखी गई है, जिसमें मानवीय पक्ष की वकालत है, एक आम आदमी के जीवन की विसंगतियाँ है, एक गरीब किसान की समस्या है, एक निर्धन व्यक्ति की पीडा है, व्यवस्था के प्रति अंतर्विरोध है, आज के परिस्थितियों में निज को ढालने की विडंबना है।

कितने सारे दृश्य जो सदैव हमारे आसपास घटित होते हैं। जिसमें एक व्याकुल हृदय का कवि उसके भीतर का रहस्य जान उसे हमारे सामने बहुत बेबाकीपन से कहने का प्रयास करता है। कवि ने सर्वप्रथम मानव को मानव बने रहने की घोषणा की है–

"संध्या की पहली तरैया
केवल मैं देखता हूँ।
चारों तरफ प्रकृति और प्रकृति की ध्वनियाँ हैं
यदि मैंने कुछ कहा तो
अपनी भाषा नहीं कहूँगा
मनुष्य ध्वनि कहूँगा। (1)

कवि की झटपटाहट स्पष्ट दिखती है कि, कवि मनुष्यता की ध्वनि से सबके भीतर वह सारे भाव भर देना चाहते हैं कि, लोग अपना – पराया सब भुलाकर केवल मनुष्यता के रंग में रंग जाएँ, वे मानवीय भावनाओं का संचार करने के साथ – साथ अपनी दुनिया को बचा लेना चाहते हैं आतंक, भय, तनाव, कड़वाहट और विसंगतियों से। वे दुनियाँ को इन सब विद्रुपताओं से बचाकर किसी अन्य जगह जा बसाने की कल्पना करते हैं जिसमें केवल मनुष्य और मनुष्यता के सारे गुण बसते हों। कवि अपनी भाषा में कितने अनोखे ढंग से कहते हैं –

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निराला के काव्य में लोकजीवन के विविध रंग

❑ डॉ. मधुलता बारा*
श्रीमती रामश्वरी दास**

ABSTRACT

"कही सावन का आगमन, कहीं वृक्षों की हरियाली, ऋतुओं का स्वागत तो कहीं कोयल की मधुर गान, पक्षियों का कलरव, वर्षा की बूँदें, प्रिय का संगम तो विरह की तपीस ये तो लोकजीवन के रंग है, जो बिखरे हैं बहुँओर। कवि निराला ने इन सारे विविधताओं को समेट लिया है अपनी कविताओं में, और प्रस्तुत किये हैं अपने निराले रंग – ढग में जिसमें उनका शब्द विन्यास देखते हा बनता हं।"

Keywords: *कलरव, लोकजीवन, सराबोर, मुखौटा, हरियाली*

छायावाद में कल्पनाओं की प्रधानता है। कवि सूर्यकान्त त्रिपाठी निराला छायावादी कवियों के कतार में एक श्रेष्ठ कवि के रूप में गिने जाते हैं। कवि निराला अपने नाम को सार्थक करते हैं उनकी कविताओं में कहीं सूरज के जैसा तेज तो कहीं निरालेपन की झलक है। केवल कल्पनालोक में विचरण करना इन्हें भाता नहीं है, इन्होंने जीवनभर में जहाँ –जहाँ यात्राएँ की उसकी छटा, उसकी झलक उनकी कविताओं में अवश्य दिख पड़ती हैं।

निराला को कभी अकेलापन बैचेन करता है तो कभी भूखा बालक, कभी तिलमिलाती धूप में पत्थर तोड़ती स्त्री की मजबूरी, तो कभी गरजते बादल से डरता मन, कभी वियोग में तड़पती प्रेयसी तो कभी प्रकृति का मनोरम दृश्य देखकर उनका कवि हृदय उद्वेलित हो उठता है।

निराला के काव्य में लोकजीवन के विविध रंग देखने को मिलते हैं, इसमें स्पष्ट है कि , कवि केवल कल्पना लोक में नहीं, उनका संबंध वास्तविक जीवन और उनकी जीवन शैली के इर्द गिर्द घूमती है। स्पष्ट है कि कवि जो देखता है, अनुभव करता है, उसके लिए वह अपने हृदय और मन के बगीचे से शब्दों के पुष्प चुनता है और मन के बगीचे से शब्दों के पुष्प चुनता है और उसे वाक्यों के धागे से पिराते जाता है। कवि निराला बहुमुखी लोकजीवन के पक्षों को बडी ही खूबसूरती एवं मार्मिकता से उभारते हैं। निराला ने अपनी कविताओं मे अधिकतर प्रकृति के मनोरम दृश्य, खेत – खलिहान, ग्रामीण जीवन, कभी वर्षा, कभी किसान और कभी उनकी पीड़ा अपने पीड़ा अपने दुख –संताप को व्यक्त करते हैं।

उन्होंने अपनी प्रथम संग्रह 'अनामिका ' में संकलित कविता 'खुला आसमन' में लिखा है –

"दिखीं दिशाएँ, झलके पेड़,
चरने को चले ढोर –गाय–भैंस– भेड़,
खेलने लगे लड़के छेड़ – छाड़
लड़कियाँ घरों को कर मासमान।" (1)

एक कवि का हृदय बड़ा कोमल होता है, वह सुक्ष्म – से – सुक्ष्म वस्तुओं को भी कल्पना से विस्तार दे सकता है, वे खिली – खिली धूप को देख, चरने जाते गाय –बैलों की झुण्ड को देख उसे अपने कविता में अंकित कर देते हैं और आगे लिखते हैं –

"लोग गाँव –गाँव को चले,
कोई बाजार, कोई बरगद के पेड़ के तले
जाधिया – लँगोटा ले, सँभले,
तगड़े – तगड़े सीधे नौजवान ।" (2)

ग्रामीण दृश्य को कितनी बारीकी से निहारते हैं, बरसात के बाद आसमान खुल गया है जिससे लोगों की एक झुण्ड बरगद के नीचे बैठ आपस में वार्तालाप किया करते हैं, वह एक पुरानी प्रथा है जो अब तक चल रही है। कवि अपने जीवन में भी निराले ढंग के थे नगेन्द्र ने लिखा है –

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शोध सार

वैभवशाली अखण्ड भारत के पूर्वी हिस्से में एक छोटा–सा प्रदेश है जिसको छत्तीसगढ़ कहा जाता है। छत्तीसगढ़ को प्रकृति ने अनुपम सौंदर्य का वरदान और विभिन्न अनमोल खनिजों का भण्डार दिया है। यहाँ हरे–भरे जंगलों से ढँकी हुई पहाड़ियाँ, नदियों की कल–कल आवाज़ तथा पानी में डूबे धान के स्यामल खेत और ऊँचाइयों से गिरते हुए सुंदर मनोरम जलप्रपात व झरने हैं। छत्तीसगढ़ को मुख्यतः आदिवासी समुदायों का प्रदेश कहा जाता है। यहाँ विभिन्न प्रकार के आदिवासी समुदाय निवास करते हैं, जिनमें सबसे प्रमुख व सर्वाधिक जनसंख्या में गोंड़ जनजाति पूरे छत्तीसगढ़ अंचल में निवासरत् हैं। इनके अपने विशेष रीति–रिवाज, पूजा–पाठ, परंपरा तथा लोक–कथाएँ विभिन्न रूढ़ियों को लिए हुए आज भी विद्यमान हैं। छत्तीसगढ़ में कई गोंड राजाओं ने कई वर्षों तक शासन किया है, जिसका प्रमाण आज भी छत्तीसगढ़ के विभिन्न क्षेत्रों में देखने को मिलता है।

मुख्य शब्द

गोड़ जनजाति, लोक कथाएँ, अखंड भारत.

प्रस्तावना

भारत के अनेक राज्यों में विभिन्न प्रकार के आदिवासी समुदायों के लोग अधिक–से–अधिक संख्या में निवास करते हैं और इन समुदायों की अपनी भिन्न–भिन्न संस्कृति, परंपरा एवं मान्यताएँ हैं। इन समुदायों में गोंड आदिवासी समुदाय की एक बड़ी जनसंख्या देखने को मिलती है और इनके देवी–देवताओं की संख्या भी अधिक दिखाई देते हैं, जो इन लोगों को दुःख के समय में सुख–शांति व समृद्धि प्रदान कर उनके कष्टों को दूर करते हैं। गोंड जनजाति प्रकृति पुजारी होने के कारण उनकी कथाएँ वृक्ष–पुष्प, पशु–पक्षी, नदी–नाले एवं छोटे–बड़े

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हमारा देश लोककलाओं से समृद्ध है। लोकरंग से मानव-जीवन अत्यंत आनंदित एवं उल्लासित होता है। यह बहुमुखी एवं बहुरूपी होती है। इसके अंतर्गत स्थान, भाषिक-भेद आदि में चाहे जो भी अंतर हो, परंतु सांस्कृतिक एकता के दर्शन अवश्य होते हैं। लोकरंग, लोककला एवं लोक-संस्कृति प्रत्येक देशवासी की आत्मा है। मनुष्य का जीवन लोकरंग के बिना अधूरा है। लोकरंग में देश की मिट्टी की सुगंध बसी रहती है। इनमें भाषा-बोली, गीत-संगीत के साथ-साथ जायका भी बसता है। लोकरंग लोक-संस्कृतियों का संवर्द्धन है। 'लोक शब्द व्यंजक है। इसका अर्थ है-लोक में रहनेवाले लोग अथवा जन। उसका आचरण, विश्वास नित्य एवं नैमित्तक क्रियाएँ, रीति एवं परंपराएँ और समष्टिगत मांगलिक अनुष्ठान और सामूहिक जागरण के वे सब कार्य जो समाज सापेक्ष हों। जो कुछ जनसामान्य में व्याप्त है और उसके व्यवहार का आधार एवं निदर्शन है, वह सब लोक के अंतर्गत आता है।'[1] लोकरंग में स्थानीय संस्कृति के रंग आपस में घुले-मिले रहते हैं।

संजीव की कहानियाँ भी लोकरंग की सौंधी-सौंधी खुशबू से सनी हुई है। उन्होंने जनजातीय क्षेत्र के परंपरा को लोकरंग में रंग दिया है। उनकी कहानियाँ आंचलिक लोकरंगों से सराबोर होकर इंद्रधनुषी मनोहारी छटा बिखेरती हैं। संजीव तन-मन से मूल रूप से ग्रामीण संवेदना में रचे-बसे व्यक्ति हैं। ग्रामीण अंचल का लोकजीवन उनके रीति-रिवाज, आचार-विचार, नाच-गाना, भाषा, अंधविश्वास आदि संपूर्ण लोकसंस्कृति का रसात्मक चित्रण उनकी कहानियों की विशिष्ट उपलब्धि है।

'सागर सीमांत' कहानी में मुर्शीदाबाद वाली नसीबन, करीम के लिए गुनगुनाती है-

गंगा-सागर तरंगे प्राण-पद्मे भासाइलाम रे
मागो रेखिओ जतने बुके निया
मागो दुलाओ आशार देउ दिया रे-रे-हे-हे-हे।

(माँ गंगे, तुम्हारी लहरों पर मैंने अपने प्राण का कमल तैरा दिया है। इसे जतन से सीने से लगाए रखना, माँ इसे आशा की लहरों से झुलाती रहना...)[2]

बांग्ला भाषा में रचित गीत के अंश से सागर के आस-पास के अंचल की संस्कृति एवं वहाँ के जनमानस के आस्था का परिचय मिलता है साथ-ही-साथ समुद्र में गए नसीबन के पति करीम के प्रति पत्नी की प्रेमानुभूति एवं परवाह भी अभिव्यंजित होती है। माँ गंगा के प्रति लोगों की अटूट आस्था व विश्वास तिरोहित होती है। कहानी में समुद्री अंचल के जनजीवन व व्यवसाय एवं खान पान को उजागर किया गया है। भोजन में मछली की मुँडी का झोल, भात और मछली

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A Logical Approach to Development of Natamycin Loaded NLCs: Preformulation Studies, Formulation Development and In Vitro Characterization (AbstractView.aspx?PID=2021-14-11-74) (https://scholar.google.co.in/scholar?q=A Logical Approach to Development of Natamycin Loaded NLCs: Preformulation Studies, Formulation Development and In Vitro Characterization)

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ABSTRACT:
This study was aimed at the development of natamycin loaded nano-structured lipid carriers (NLCs) and their characterization for physicochemical properties i.e., Fourier Transform Infrared (FTIR), UV-Visible spectroscopy, meting point, solubility pro?le and partition coe?cient. FTIR and Di?erential Scanning Calorimetry (DSC) permit the characterization of the drug, excipients and binary mixture and thus assisted in predicting the compatibility of natamycin with other excipients. Lipid screening for formulation of NLCs were performed by their solubility and drug affinity studies. High homogenization and sonication method was employed for the development of natamycin loaded NLCs and it was characterized for vesicle size, zeta potential, % entrapment e?ciency, viscosity, pH and percentage drug release up to 12 h.

Keywords: Natamycin () Preformulation () Lipid screening () NLCs () Characterization () Keratomycosis. ()

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The comparison of two Chemometric Assisted UV Spectrophotometric Techniques with High-performance Liquid Chromatography Methods for simultaneous determination of three Antiemetic drugs used in Chemotherapy Induced Nausea and Vomiting (AbstractView.aspx?PID=2021-14-9-51) (https://scholar.go ar? q=The comparison o tric Assisted UV Spectrophotometric Techniques with Hig Chromatograp simultaneous determination of three

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Antiemetic drugs used in Chemotherapy Induced Nausea and Vomiting)

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ABSTRACT:

This research work was emphasis to adopt green analytical chemistry via development of environmentally friendly methods for simultaneously estimation of drugs used for chemotherapy induced nausea and vomiting (CINV). In these study two multivariate calibration methods namely; Partial least square (PLS) models, Principal component regression (PCR) and RP-HPLC (Reverse phase- high performance liquid chromatography) method were employed for simultaneous assessment of aprepitant (APT), dexamethsone (DEX) and ondansetron (OND natographic separation was achieved on Phenomenex Luna C: ter with 5µ particle size) and detection was carried out by U comprises a mixture of ethanol and toluene in a ratio of 65:35% v/v, at the flow rate of 1.2ml/ min. The elution was monitored at 225nm and total run time required for separation was 10 min. The retention time of APT, DEX and OND were found to be 4.37 min, 6.57 and 8.11 min respectively. The Applied methods were validated as per ICH guidelines to achieve maxi r multivariate calibration methods was found to b r HPLC methods was found to be 5-30µg/mL,5 respectively. A statistical procedure was carried ou methods. The results revealed that there is no significant difference between two multivariate models and HPLC methods. Therefore, it could be applied as an alternative of HPLC method in quality control

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Application of Central Composite Design for screening and Optimization of HPTLC method for simultaneous quantitation of Aprepitant, Dexamethasone and Ondansetron in their synthetic mixtures (AbstractView.aspx?PID=2021-14-10-83)

Author(s): Veena Devi Singh (search.aspx?key=Veena Devi Singh), Vijay Kumar Singh (search.aspx?key=Vijay Kumar Singh), Sanjay J Daharwal (search.aspx?key=Sanjay J Daharwal)

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DOI: 10.52711/0974-360X.2021.00965 (https://doi.org/10.52711/0974-360X.2021.00965)

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Keywords: Aprepitant () Dexamethasone () Ondansetron () HPTLC ()
Central Composite design and Response Surface Methodology. ()

Cite this article:
Veena Devi Singh, Vijay Kumar Singh, Sanjay J Daharwal. Application of Central Composite Design for screening and Optimization of HPTLC method for simultaneous quantitation of Aprepitant, Dexamethasone and Ondansetron in their synthetic mixtures. Research Journal of Pharmacy and Technology 2021; 14(10):5531-9. doi: 10.52711/0974-360X.2021.00965

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Journal of Drug Delivery Science and Technology

Volume 65, October 2021, 102688

Opinion Paper

Nanovesicles delivery approach for targeting steroid mediated mechanism of antipsoriatic therapeutics

Krishna Yadav, Deependra Singh, Manju Rawat Singh

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Abstract

Psoriasis is a most devastating autoimmune condition of anomalously differentiating keratinocytes modifying the barrier function of skin for topical medication. A recurring supply of antiinflammatory therapeutics at a viable epidermal layer is needed to regulate the skin pathology in psoriasis. To meet these treatment targets, traditional modules such as creams, lotions, and gels have been found to be relatively ineffective. Vesicular delivery carriers such as first-generation vesicular structures like liposomes and their modified forms are being utilized for effectual topical delivery of numerous therapeutics for about centuries but remain a realm to be explored with innovation. To provide a controlled release and therapeutic retention at the desired site, the nanovesicular approach is most effective. Apart from that, nanovesicles have numerous advantages such as substantial penetration through the stratum corneum (SC), ease of production, stability, biocompatibility, and inertness. Therefore, in the current investigation, the Triamcinolone acetonide-loaded transfersomes (TA-TFS) have been developed and optimized for the delivery of corticosteroids. The nanovesicles were tested for different *in vitro* and *ex vivo* characterization criteria and optimized carriers were subsequently incorporated into a gel as the final formulation. Further, the psoriatic animal model was

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Journal of Drug Delivery Science and Technology

Volume 73, July 2022, 103437

Dermal nanomedicine: Uncovering the ability of nucleic acid to alleviate autoimmune and other related skin disorders

Krishna Yadav [a] [b], Deependra Singh [a], Manju Rawat Singh [a], Sunita Minz [c], Kantrol Kumar Sahu [d], Monika Kaurav [e], Madhulika Pradhan [f]

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Abstract

Various skin problems are affected significantly by a combination of factors that include genetics, environmental factors, particular infections, and hitherto unexplained variables. The structure and function of key cellular networks may be altered by a single mutation, leading to significant phenotypic changes and the development of abnormal skin disorders in affected individuals. In recent years, there has been a great deal of discussion about the huge medicinal potential of nucleic acids. Although nucleic acids may be delivered to the desired location, there are a number of difficulties that must be solved before they can be used in clinical trials. Providing a comprehensive overview of numerous facts that highlight a range of skin-related autoimmune illnesses, as well as the use of dermal nanomedicine as a powerful tool for personalized therapy in the context of nuclear acid delivery, is our primary purpose in this paper. The most recent emerging trends and up-to-date metadata on various perspectives of dermal nanomedicines in different autoimmune diseases and related skin conditions as potential candidates for nucleic acid delivery have been gathered from a variety of databases that

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Abstract

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Article

Hesperidin-Loaded Lipid Polymer Hybrid Nanoparticles for Topical Delivery of Bioactive Drugs

Rajendra Jangde [1,*], Gamal Osman Elhassan [2], Sulekha Khute [1], Deependra Singh [1], Manju Singh [1], Ram Kumar Sahu [3,*] and Jiyauddin Khan [4,*]

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Abstract: Hesperidin is a bioflavonoid constituent that among many other biological activities shows significant wound healing properties. However, the bioavailability of hesperidin when applied topically is limited due to its low solubility and systemic absorption, so novel dosage forms are needed to improve its therapeutic efficacy. The objectives of this study were to develop hesperidin-loaded lipid-polymer hybrid nanoparticles (HLPHNs) to enhance the delivery of hesperidin to endogenous sites in the wound bed and promote the efficacy of hesperidin. HLPHNs were optimized by response surface methodology (RSM) using the Box-Behnken design. HLPHNs were prepared using an emulsion-solvent evaporation method based on a double emulsion of water-in-oil-in-water (w/o/w) followed by freeze-drying to obtain nanoparticles. The prepared formulations were characterized using various evaluation parameters. In addition, the antioxidant activity of HLPHN 4 was investigated in vitro using the DPPH model. Seventeen different HLPHNs were prepared and the HLPHN4 exhibited the best mean particle size distribution, zeta potential, drug release and entrapment efficiency. The values are 91.43 nm, +23 mV, 79.97% and 92.8%, respectively. Transmission electron microscope showed similar spherical morphology as HLPHN4. Differential scanning calorimetry verified the physical stability of the loaded drug in a hybrid system. In vitro release studies showed uniform release of the drug over 24 h. HLPHN4 showed potent antioxidant activity in vitro in the DPPH model. The results of this study suggest that HLPHNs can achieve sustained release of the drug at the wound site and exhibit potent in vitro antioxidant activity.

Keywords: hesperidin; hybrid nanoparticles; emulsion solvent evaporation; DPPH model; sustained release

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Citation: Jangde, R.; Elhassan, G.O.; Khute, S.; Singh, D.; Singh, M.; Sahu, R.K.; Khan, J. Hesperidin-Loaded Lipid Polymer Hybrid Nanoparticles for Topical Delivery of Bioactive Drugs. *Pharmaceuticals* **2022**, *15*, 211. https://doi.org/10.3390/ph15020211

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1. Introduction

Hesperidin (Figure 1) is a bioflavonoid mainly extracted from various citrus fruits. Numerous researchers have found that hesperidin has antioxidant properties and additionally possesses antitumor, antimicrobial, anti-inflammatory, antidiabetic and hepatoprotective effects [1,2]. The significant wound-healing effect of hesperidin has been demonstrated in animal models of excision wound healing and in clinical studies. In addition, hesperidin also reduces the formation of fibroses and scars after wound healing in experimental animals. Hesperidin is used to treat tropical infections by placing a dressing over them. Treatment of wounds with drugs can lead to undesirable side effects on healthy cells due to systemic delivery of drugs and also decreases the bioavailability of drugs [3–5]. Accordingly, several studies have focused on the local delivery of the drug for the healing process of the wound through the dressing. This could avoid adverse effects on non-target tissues

Article

Hesperidin-Loaded Lipid Polymer Hybrid Nanoparticles for Topical Delivery of Bioactive Drugs

Rajendra Jangde [1,*], Gamal Osman Elhassan [2], Sulekha Khute [1], Deependra Singh [1], Manju Singh [1], Ram Kumar Sahu [3,*] and Jiyauddin Khan [4,*]

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Abstract: Hesperidin is a bioflavonoid constituent that among many other biological activities shows significant wound healing properties. However, the bioavailability of hesperidin when applied topically is limited due to its low solubility and systemic absorption, so novel dosage forms are needed to improve its therapeutic efficacy. The objectives of this study were to develop hesperidin-loaded lipid-polymer hybrid nanoparticles (HLPHNs) to enhance the delivery of hesperidin to endogenous sites in the wound bed and promote the efficacy of hesperidin. HLPHNs were optimized by response surface methodology (RSM) using the Box-Behnken design. HLPHNs were prepared using an emulsion-solvent evaporation method based on a double emulsion of water-in-oil-in-water (w/o/w) followed by freeze-drying to obtain nanoparticles. The prepared formulations were characterized using various evaluation parameters. In addition, the antioxidant activity of HLPHN 4 was investigated in vitro using the DPPH model. Seventeen different HLPHNs were prepared and the HLPHN4 exhibited the best mean particle size distribution, zeta potential, drug release and entrapment efficiency. The values are 91.43 nm, +23 mV, 79.97% and 92.8%, respectively. Transmission electron microscope showed similar spherical morphology as HLPHN4. Differential scanning calorimetry verified the physical stability of the loaded drug in a hybrid system. In vitro release studies showed uniform release of the drug over 24 h. HLPHN4 showed potent antioxidant activity in vitro in the DPPH model. The results of this study suggest that HLPHNs can achieve sustained release of the drug at the wound site and exhibit potent in vitro antioxidant activity.

Keywords: hesperidin; hybrid nanoparticles; emulsion solvent evaporation; DPPH model; sustained release

check for updates

Citation: Jangde, R.; Elhassan, G.O.; Khute, S.; Singh, D.; Singh, M.; Sahu, R.K.; Khan, J. Hesperidin-Loaded Lipid Polymer Hybrid Nanoparticles for Topical Delivery of Bioactive Drugs. *Pharmaceuticals* **2022**, *15*, 211. https://doi.org/10.3390/ph15020211

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1. Introduction

Hesperidin (Figure 1) is a bioflavonoid mainly extracted from various citrus fruits. Numerous researchers have found that hesperidin has antioxidant properties and additionally possesses antitumor, antimicrobial, anti-inflammatory, antidiabetic and hepatoprotective effects [1,2]. The significant wound-healing effect of hesperidin has been demonstrated in animal models of excision wound healing and in clinical studies. In addition, hesperidin also reduces the formation of fibroses and scars after wound healing in experimental animals. Hesperidin is used to treat tropical infections by placing a dressing over them. Treatment of wounds with drugs can lead to undesirable side effects on healthy cells due to systemic delivery of drugs and also decreases the bioavailability of drugs [3–5]. Accordingly, several studies have focused on the local delivery of the drug for the healing process of the wound through the dressing. This could avoid adverse effects on non-target tissues

Article

Hesperidin-Loaded Lipid Polymer Hybrid Nanoparticles for Topical Delivery of Bioactive Drugs

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In-vitro evaluation of nano-liposomal formulation of Fluconazole and Amphotericin B against visceral leishmaniasis (AbstractView.aspx?PID=2021-14-9-71) (https://scholar.google.co.in/scholar?q=In-vitro evaluation of nano-liposomal formulation of Fluconazole and Amphotericin B against visceral leishmaniasis)

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ABSTRACT:

Objectives: The aim of the present study was to compare the efficacy of a dual drug loaded nano-liposomal formulation of Amphotericin B and Fluconazole for the treatment of visceral leishmaniasis with plain drugs. Methods: We have formulated nano-liposomes (200-250 nm) from Amphotericin B and Fluconazole using dry film hydration method and have tested their efficacy on promastigotes and amastigotes of Leishmania donovani strain. Physicochemical characterization, entrapment study, stability study, in-vitro release study, in-vitro macrophagic uptake studies (Confocal microscopy) and in-vitro antileishmanial activity were evaluated for various formulations containing Amphotericin B and Fluconazole. Results: The in-vitro cellular uptake confocal studies revealed that NR-loaded AmpB + Flu nanoliposomes have enhanced cellular uptake of formulation. The in-vitro inhibition of promastigotes and amastigotes with liposome containing both Amphotericin B and Fluconazole was significantly more than with liposomes containing individual drugs. The IC50 and CC50 of AmpB + Flu nanoliposomes against promastigotes was found to be 3.308µg/mL and 73.48µg/mL respectively, while the IC50 against axenic and intramacrophagic amastigotes was found to be 3.412 and 3.7028µg/mL respectively. Conclusion: In conclusion, Liposomal formulation containing both Amphotericin B and Fluconazole had significantly greater efficacy than conventional combination and other formulation with individual drugs. Current dual drug loaded formulation may have a favourable safety profile, and if production costs are low, it may prove to be a feasible alternative to currently available therapy after in-vivo testing.

Keywords: Nano-liposomal formulation visceral Leishmaniasis intramacrophagic amastigotes. ()

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Recent Advancement of Polymersomes as Drug Delivery Carrier

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Affiliations

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Abstract

Background: Biomedical applications of polymersomes have been explored, including drug and gene delivery, insulin delivery, hemoglobin delivery, the delivery of anticancer agents, and various diagnostic purposes.

Objectives: Polymersomes, which are self-assembled amphiphilic block copolymers, have received a lot of attention in drug delivery approaches. This review represents the methods of preparation of polymersomes, including thin-film rehydration, electroformation, double emulsion, gel-assisted rehydration, PAPYRUS method, and solvent injection methods, including various therapeutic applications of polymersomes.

Methods: Data was searched from PubMed, Google Scholar, and Science Direct through searching of the following keywords: Polymersomes, methods of preparation, amphiphilic block copolymers, anticancer drug delivery.

Results: Polymersomes provide both hydrophilic and hydrophobic drug delivery to a targeted site, increasing the formulation's stability and reducing the cytotoxic side effects of drugs.

Conclusion: Polymersomes have the potential to be used in a variety of biological applications, including drug and gene delivery, insulin delivery, hemoglobin delivery, delivery of anticancer agents, as well as in various diagnostic purposes. Recently, polymersomes have been used more frequently because of their stability, reducing the encapsulated drug's leakage, site-specific drug delivery, and increasing the bioavailability of the drugs and different diagnostic purposes. The liposomes encapsulate only hydrophilic drugs, but polymersomes encapsulate both hydrophilic and hydrophobic drugs in their cores.

Keywords: PAPYRUS; Polymersomes; anticancer; block copolymer; double emulsion; drug delivery; electroformation; method of preparation; solvent injection; thin-film rehydration.

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Ciprofloxacin Hydrochloride Mediated Enhanced Solubilization and Stability by UV-Spectroscopy

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Original Research Article

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ABSTRACT

In the case of solubility limited absorption, creating supersaturation in the GI fluid is very critical as supersaturation may provide great improvement of oral absorption. The techniques to create the so-called supersaturation in the GI fluid include microemulsions, emulsions, liposomes, complexations, polymeric micelles, and conventional micelles. Ciprofloxacin was chosen because it is practically insoluble in water; hence its salt form is used commercially, which is soluble in water. The objective of the present investigation was to enhance the solubility of ciprofloxacin by formulating solid dispersions techniques in water soluble carriers have attracted considerable interests as a mean of improving the dissolution rate & hence possibly bioavailability range of hydrophobic drugs. The poor solubility of ciprofloxacin leads to poor dissolution & hence variation in bioavailability. The purpose of present investigation was formulation & evaluation of controlled release floating capsule of ciprofloxacin with improved solubility & dissolution rate. In the present study solid dispersions using various carriers like mannitol & lactose in different ratios were prepared by solvent evaporation method. The prepared solid dispersions were characterized for drug content, solubility & dissolution rate. The dissolution rate substantially improved for ciprofloxacin from its solid dispersions compared with the pure drug. Dissolution rate increased with increasing carrier content.

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Advances in Bioresearch

ORIGINAL ARTICLE

Development and Characterization of *Costus Speciosus* Rhizome Extract Based Antimicrobial Liposomal Gel

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ABSTRACT

Objective: *Liposome based formulations are quite popular nowadays for effectively treating different dermal disorders. Different synthetic and plant based drugs are successfully used for liposome preparation for better potential effect. Use of herbal extract into liposome results reduction in side effects as in case of synthetic drugs. Costus speciosus rhizomes possess good antibacterial potential, assuring its greatness as potent plant active of this plant. Alcoholic extract of Costus speciosus rhizomes were found to be more active towards the bacterial species than the aqueous extract. Therefore, this rhizomes extract was incorporated into liposomes for enhanced activity, upon topical application. The main objective of the present research work is to develop this potent rhizome extract into a nano formulations i.e. liposomes and to fabricate its novel topical liposomal gel for anti-microbial activity. Methanolic Rhizome Extract (MeRE) was incorporated into liposomes by thin film hydration method. The batch having lipid ratio i.e. Soya lecithin: Cholesterol (3:1); MeRE concentration 70 mg with entrapment efficiency 71.5 ± 0.9% was finalized. The vesicle size was found to be 3.3µm ± 0.4. In vitro drug diffusion and skin retention from liposomal gel was found to be 63.3% ± 1.2 and 24.02% ± 0.28 respectively. Stability studies indicated that formulation was stable over a period of 3 months when stored at 2-8°C.*

Conclusions: *The fabricated gel formulation showed a promising drug delivery vehicle for topical delivery of Costus speciosus rhizome extract and could be successfully used for the treatment of dermal microbial infections.*

Keywords: *Costus speciosus, Methanolic Rhizome Extract (MeRE), Antibacterial, In vitro drug diffusion.*

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INTRODUCTION

The fruitful management of pharmacokinetics as well as the tissue distribution of any drug is the main goal during the development of new drug delivery system. To achieve the above target, variety of delivery systems such as microspheres, nanoparticles, lipoproteins, micellular systems and liposomes are used in the past for several years. Among these, most useful delivery system has been liposomal drug delivery system. Liposome has the ability of to carry a wide variety of substances. Based on their structural properties and harmless nature of their components, liposomes have been very popular to treat variety of therapeutic conditions [1]. Liposomes are the promising carriers as they are having potential to incorporate with variety of small drug molecules, proteins, nucleotides and plasmids as well. Liposomes can be easily formulated and refined to different sizes, compositions, charges and lamellarity [2].

On topical application of liposomal formulation, the liposomes are easily absorbed and merged with the cellular membranes of the skin. During this process, the drug loaded liposomes release the active materials into the cells. Due to the interaction of liposomal formulation with the corneocytes and of the intercellular lipids, it results in the softening and smoothening of skin [3]. Liposomes are capable of reaching the deeper layers of skin with high dose of drugs as well as it reduces the percutaneous absorption and unwanted side effects [4].

A wide variety of synthetic and herbal drugs are successfully incorporated into liposome for enhanced efficacy [5]. Liposomes are most suitable for plant extract delivery vehicles. Examples like turmeric, carrot extract, papaya extract, aloe-vera, green tea extract are reported for successful delivery through

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AN OBSERVATIONAL STUDY OF TRADITIONAL AND REPORTED HEALTH BENEFITS OF ETHNOMEDICINAL PLANT AMARANTH FOUND IN SARGUJA CHHATTISGARH

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ABSTRACT

Natural medications are considered as an extraordinary demand in both developing and developed nations for essential medical care due to their characteristics having therapeutic benefits, least side effects, and lesser expenses. Individuals living in rural areas of the Sarguja region rely to a great extent upon natural medicines for treatment. The present study concerns the collective information of pharmacognostic characteristics, phytoconstituents and the biological activity of *Amaranthus spinosus* L. We have also included a minor study report about the ethnic use of amaranth plant. This study cum review report will surely help the budding researchers to render a scientific background to the traditional knowledge for the benefit of mankind.

Keywords: Medicinal plant, Rural area, *Amaranthus spinosus*, Ethnic use, Scientific background

INTRODUCTION

Ethno phytology is the learn about of correlation between plants and other people particularly within the social group and ancient situation. The World Health Organization has considered ancient drugs a vital issue to attain health goals. 65% of the

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RANDOM AMPLIFIED POLYMORPHIC DNA (RAPD) MOLECULAR MARKER BASED GENETIC ANALYSIS OF *ALOCASIA INDICA* AND *TEPHROSIA PERPUREA*

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ABSTRACT

The present investigation is mainly focused on developing the genetic relationship between *Alocasia indica* and *Tephrosia perpurea* plant samples (05 each) collected from various zone of Chhattisgarh using fifteen 10 decamer random amplified polymorphic DNA (RAPD) molecular marker. The result revealed that *A. indica* had a similarity coefficient ranged from 0.23 to 0.43 whereas it ranged from 0.51 to 0.69 in case of *T. perpurea* plant. The dendrogram showed that all selected plants of *A.indica* grouped in one; except samples collected from Lundra Surguja which separated alone at a coefficient value of 0.23, it was seen that, sample collected from Achanakmar forest Bilaspur and Pakhanjur Kanker were firmly related together. Similarly 05 plants of *T. perpurea* grouped in a single cluster; except sample collected from Lundra Surguja which separated alone at a coefficient value of 0.51, sample collected from the University campus, Pt. RSU, Raipur and Pakhanjur Kanker was firmly related together. A set of differentiating markers *viz.* OPB-06, OPC-01, OPD-01 and OPD-03 may be used as diagnostic markers to identify the particular plant. The finding, suggested that genetic characterization be useful for distinguishing variation at molecular level and rapid identification of any plant species.

Keywords: ***Alocasia indica, Tephrosia Purpurea*, Molecular marker, RAPD, Genetic relationship**

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Keywords: ***Alocasia indica, Tephrosia Purpurea*, Molecular marker, RAPD, Genetic relationship**

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Standardization and comparative evaluation of phytochemical content and antioxidant activity of Alocasia indica and Tephrosia purpurea

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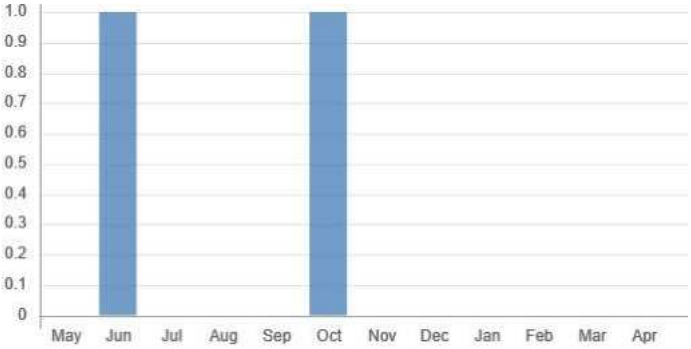
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Keywords: Alocasia Indica Schott, Tephrosia Purpurea, Antioxidant, Standardization, Phytochemical Evaluation

ABSTRACT

Extracts of leaves of *Tephrosia purpurea* and tuber of *Alocasia indica* were used as a traditional medicine in India for the management of various diseases, including rheumatic arthritis, hepatoprotective activity and antifungal properties. The objective of the work is to standardize the phytochemical constituent and comparatively analyze the anti-oxidant activity of *Alocasia indica* and *Tephrosia purpurea.* Leaves ethanolic extract of *Tephrosia purpurea* and tuber ethanolic extract of *Alocasia indicia* Schott. were evaluated for antioxidant activity using 1, -diphenyl-2-picryl hydrazyl (DPPH) assay. Phenolic content was estimated by using Folin-Ciocalteu's reagent. Total flavonoid content was measured for *Alocasia indica* and *Tephrosia purpurea* by the aluminum chloride colorimetric assay. Furthermore, Albino mice were used to test the acute toxicity of the plant extracts. The standardization of plant extracts demonstrated lesser amount of oil-soluble contents is present in both the plants. The total flavonoid contents were 76.93±1.41 and 107.44±1.89 mg QE/g while the total phenolic contents were 512.33±1.52 and 595.66±2.51 mg GAE/g for *A. Indica* and *T. Perpurea,* respectively. The antioxidant assay illustrated, significant DPPH radical scavenging potency of plant extracts.

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Standardization and comparative evaluation of phytochemical content and antioxidant activity of Alocasia indica and Tephrosia purpurea

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UV Spectroscopy Analysis for Itraconazole

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Abstract:

Itraconazole is a triazole antifungal agent that is synthesised. Itraconazole has been manufactured into a variety of pharmacological formulations and administered in a variety of ways. Itraconazole pills are used to treat pulmonary fungi that can cause fungal infection and spread throughout the body. Because Itraconazole is not yet officially listed in any pharmacopoeia, only a few procedures for quality control and stability testing in pharmaceutical formulations have been published. The goal of this study is to develop a more precise, easy, and cost-effective spectrophotometric approach for analysing Itraconazole in bulk and capsule dosage forms with improved precision, accuracy, and sensitivity. The UV spectroscopic determination was performed with Chloroform as the solvent at an absorption maximum of 267 nm. Linearity over the concentration range in the UV spectroscopic approach. The linearity of Itraconazole over the concentration range was found to be 1-10 g/ml using the UV spectroscopic technique, with a correlation coefficient of 0.999. The findings of the analyses were statistically and the recovery studies have confirmed this.

Keywords: Itraconazole, pharmacopoeia, UV spectroscopic technique, Quality control.

Introduction

Itraconazole is a triazole antifungal agent that is synthesised. Itraconazole is a racemic combination of four diastereomers (two enantiomeric pairs), each with three chiral centres, in a ratio of 1:1:1:1. The following nomenclature can be used to denote it: 4-[4-[4-[4-[[2. (2, 4-dichlorophenyl) - two (1H-1, 2, 4- triazole- 1-ylmethyl) - 1,3- dioxolan-4-yl] methoxy]phenyl] piperazine-1- yl]phenyl] piperazine-1- yl]phenyl] piperazine-1- yl]phenyl] piperazine-1-yl]phenyl] piperazine-1- -2-(1-methyl propyl) -2, 4-dihydro-1, 2-dihydro-1, 2-dihydro-1, 2-dihydro-1, 2-dihydro-1, 2-dihydro (Fig 1).

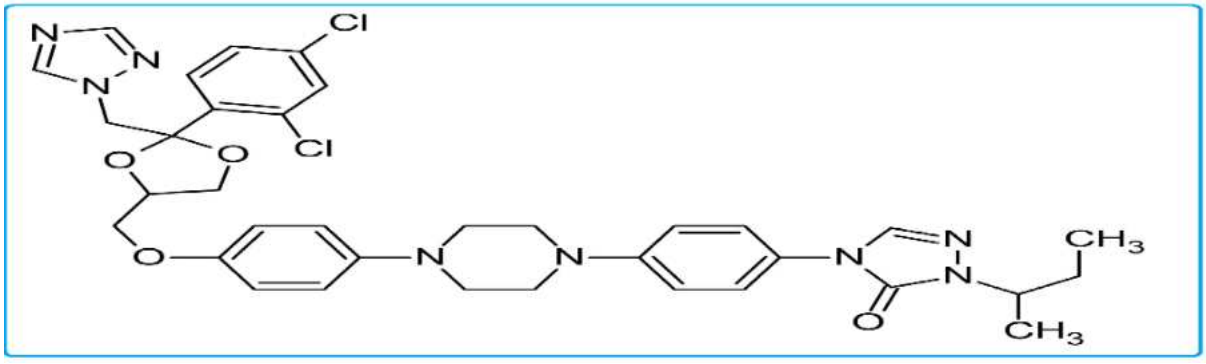


Figure1: Itraconazole's structure

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C35H38Cl2N8O4 is the molecular formula and the chemical molecular weight is noted to be705.64. [1-4] It's a powder that's white to slightly yellowish. In alcohols, it is very partially soluble, but in dichloromethane, it is completely soluble. Itraconazole is an extremely lipophilic compound that is water insoluble. It's a very weak base (pKa =3.7) that only ionises at very low pH levels. It's a three-chiral hydrophobic antimycotic medication that's employed in clinical trials as a stereoisomeric combination. [5] It is an oral triazole antifungal medication efficacious against dermatophytes, species of bacteria, Malassezia, and penicillium species having a broad range of activity and Histoplasma capsulatum var. capsulatum, among other fungal species. [6,7]

Mechanism of action of Itraconazole

It binds to 14-demethylase, a cytochrome P-450 enzyme that is required for the conversion of lanosterol to ergosterol. Because ergosterol is a necessary component of the fungal cell membrane, inhibiting its synthesis increases cellular permeability, causing cellular contents to flow out. Itraconazole can also decrease endogenous respiration, interact with membrane phospholipids, prevent yeasts from transforming into mycelial forms, block purine uptake, and disrupt triglyceride and/or phospholipid production. When itraconazole is taken with food, its oral bioavailability increases and plasma concentrations are nearly twice as high as when taken when fasting. Itraconazole is metabolised primarily in the liver by the cytochrome p450 3a4 isoenzyme system, which produces various metabolites, the most significant of which is hydroxyl itraconazole 8. [9] It is metabolised in the liver, primarily through an oxidative pathway, forming the bioactive metabolite hydroxyl itraconazole. [10]

Materials and methods

Experimental

Chemicals and reagents: Throughout UV spectrophotometric technique, development and validation Chloroform was used.

Instrumentation

UV spectrophotometric technique was performed on a double beam UV-visible spectrophotometer (Shimadzu, model 1800) having two matched quartz cells with a 1 cm light path.

Selection of solvent

For the analysis of Itraconazole, Chloroform had been selected as the ideal solvent for spectrophotometry.

Standard stock solutions preparation

A 10 mg Itraconazole reference standard was accurately weighed and transferred to a 10 ml volumetric flask, where it was dissolved and diluted up to the mark using chloroform to yield a stock solution with a strength of 500g/ml. Diluting 1 ml of stock solution to 5 ml with chloroform yielded a 50 g/ml working standard solution.

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Preparation of Sample stock solution

For analysis of the drug, 10mg of the drug itraconazole was weighed and transferred to a 10ml volumetric flask and dissolved with chloroform. The itraconazole drug solution was diluted to get a final concentration of 10µg/ml. The absorbance of these solutions was measured at 267 nm. The amount of Itraconazole was calculated using the calibration curve.

Formula:

%Purity=Sample absorbance / Standard absorbance X 100

1. Method validation

The method was validated according to the International Conference on Harmonization (ICH) Q2B guidelines 1996 for validation of analytical procedure to determine the linearity, limit of detection, accuracy and precision.

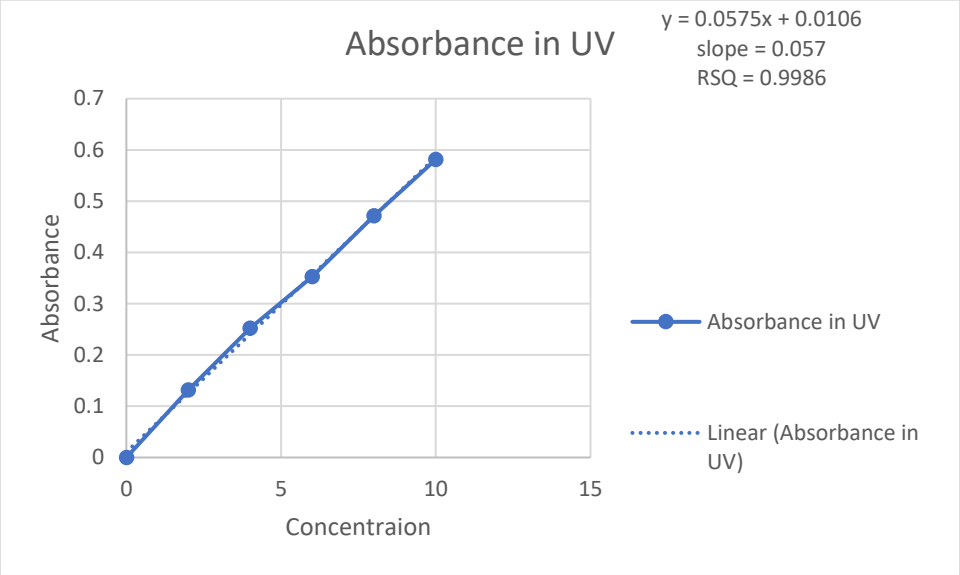
2. Linearity & Range

Under the experimental conditions, the calibration graphs of the absorbance versus Concentration was found to be linear over the range of 0.2-1.0µg/ml for the proposed method. The statistical analysis of data obtained for estimation of Itraconazole is indicated chloroform of accuracy for the proposed methods evidenced by the low values of standard deviation and coefficient of variation. The results are noted below:

Table 1: Itraconazole Linearity Data

S. No.	Concentration in µg/ml	Absorbance in UV
1	0	0
2	2	0.1316
3	4	0.2520
4	6	0.3527
5	8	0.4713
6	10	0.5813
	y = 0.0575x + 0.0106 slope = 0.057 RSQ = 0.9986	

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Results and Discussion

The purpose of this study was to validate an Itraconazole using a UV-Spectrophotometric technique under optimal conditions. The validation parameters' results were found to be within acceptable limits. Within the concentration range of 1-10g/ml, itraconazole followed linearity. The measured linearity range suited Beer-law Lambert's well, and the corresponding regression coefficient (r=0.999) indicates a high degree of technique sensitivity, as shown in Table 1. The number of drugs detected and the findings of the analysis demonstrate that the percentage of the drugs found and the number of drugs found was in good accord.

Conclusion

UV-Spectrophotometer techniques produced equivalent results. The linearity of Itraconazole over the concentration range was found to be 1-10 g/ml using the UV spectroscopic technique, with a correlation coefficient of 0.999. The findings of the analyses were statistically and the recovery studies have been confirmed.

Acknowledgment

I am thankful to the University Institute of Pharmacy (UIOP), Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India for my practical support. I also want to thank Prof. Swarnlata Saraf, University Institute of Pharmacy (UIOP), Pt. Ravishankar Shukla University, Raipur, Chhattisgarh, India for her valuable suggestions and guidance.

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Effect of Age on Psychological Burnout in National Male Hockey Players

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ABSTRACT

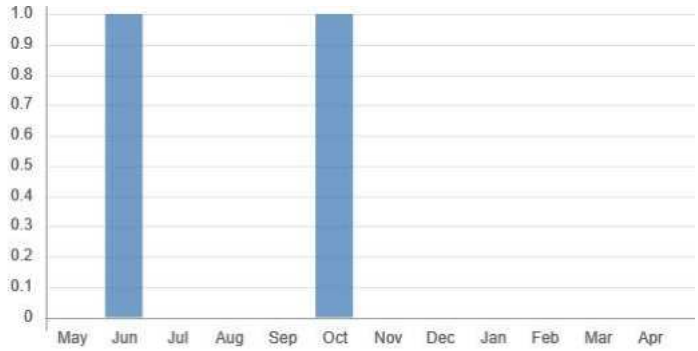
The present study aimed to assess the impact of age on psychological burnout in national male hockey players. To conduct the study 60 national / interuniversity male hockey players were selected. This sample comprises 30 male hockey players between 18-24 years of age group and 30 male hockey players between 25-28 years of age group. The magnitude of psychological burnout was evaluated with the Athlete Burnout Questionnaire. This questionnaire is a valid measure to assess psychological burnout and the authors of this questionnaire are Raedeke and Smith (2001). The questionnaire consists of 15 items based on three sub-scales i.e. emotional exhaustion, devaluation and a reduced sense of accomplishment respectively. Results revealed a significant effect of age on psychological burnout in national male hockey players and the symptoms of psychological burnout were significantly higher in younger age group as compared to older age group hockey players. It was concluded that age certainly has a significant predictor value in describing symptoms of psychological burnout in national male hockey players.

Keywords: Psychological burnout, hockey, national male players

INTRODUCTION

An endless devotion is needed to attain success in any field and this is true in the field of sports also. Sportspersons always strive to improve their skills and game-related attributes but sometimes the pressure to acquire the perfect skill set training load becomes unbearable. In sports win and loss is part of the game so when an athlete does not taste success despite the best of his efforts he feels let down. Markati (2018) feels that sports competition is a pressure cooker and apart from physical stressors there are psychological stressors also and can cause psychological burnout.

When a person is experiencing stress for a long time and the magnitude of stress is beyond tolerable limits, he may suffer from burnout. So burnout is caused by physical or



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RESEARCH ARTICLE

A Study of Nutritional Status and Prevalence of Anaemia among the Adolescent girls and Women of Reproductive age of Baigatribe accessing Antenatal Clinic in Public Health Sector in Chhattisgarh, India

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ABSTRACT:

Nutritional problems have serious health implications impacting physical development, psychological, behavioral and work performance of an individual. Anaemia is the most common problem among pregnant and lactating women in most of the developing countries. Anemia during pregnancy is the most common preventable causes of maternal morbidity and poor prenatal outcome. Healthy growth and development of a girl through adolescence helps to prepare her for healthy pregnancies during child bearing years. Prevalence of anemia in India is very high across all groups. The present study was conducted to assess the levels of anaemia and nutritional status among the Baiga women and adolescent girls residing in three districts of Chhattisgarh. Only 42% of the Baiga women, of reproductive age, were found to have normal levels of anemia while 58% of them were found to be anaemic. Prevalence of anaemia was found to be very high among adolescent Baiga girls. Only 5.3% adolescent Baiga girls were found to have normal levels of Hb while 94.7% had various degrees of anaemia, putting them into high risk zones for the future pregnancies. Majority of the Baiga women respondents i.e. 47.33% had low BMI between16-18.5 which falls as under nutritional category, 6.67% were very severely underweight and only 40.66 % of the respondents could be categorized under the normal category of Body Mass Index (BMI). BMI among adolescent girls when compared to WHO 2004 standard of malnutrition revealed that 27.2% girls could be classified under the normal category, 24.2 % girls suffered from mild thinness, 17.8 % girls suffered from moderate thinness and 30.8% girls suffered from severe thinness category of malnutrition.The strategy of increasing iron intake in every households through dietary diversifications and use of iron fortified iodized salts, providing IFA supplementations to vulnerable groups, testing and timely treatment of pregnant women and adolescent girls with anaemia, is required to accelerate the pace of reduction in the prevalence of iron deficient anemia to enable the country to achieve SDG target for the reduction of anaemia.

KEYWORDS: Nutritional Status, Anaemia, BMI, Baiga Women and Adolescent girls.

INTRODUCTION:

Promotion of maternal and child health has been one of the most important components of family welfare programme of government of India and national population policy 2000, which aims for safe motherhood programme within wider context of reproductive health. Nutritional problems have serious public health

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RESEARCH ARTICLE

A Study of Nutritional Status and Prevalence of Anaemia among the Adolescent girls and Women of Reproductive age of Baigatribe accessing Antenatal Clinic in Public Health Sector in Chhattisgarh, India

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Assessment of Body Fat Percentage Using B-Mode Ultrasound Technique versus Skinfold Caliper in Obese Healthy Volunteers

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Abstract

Background and aims

The measurement of the skinfold thickness at various sites with the calipers has remained the traditional method for estimation of body fat percentage (%BF) in clinical practice. Although this technique is relatively inexpensive and easy to learn, there are more chances of errors while measuring the skinfold thickness by this method. Therefore, no single standard prediction formula for the determination of body fat could be fixed. The aim of our study was to use B-mode ultrasound (US) for measuring the subcutaneous fat thickness and the calipers for skinfold thickness, and then compare, correlate, and derive the prediction equations for estimation of %BF by both the techniques.

Methods

This cross-sectional, observational, monocentric study was conducted on 43 Indian male volunteers aged 18 to 40 years. After collecting anthropometric data (age, height, weight, body mass index, waist circumference, hip circumference, waist-to-hip ratio [WHR], etc.), the skinfold thickness was measured at four standard sites (biceps, triceps, subscapular region, and suprailiac region) with skinfold caliper (SFC) and then B-mode US. The data were analyzed for distribution, and independent t-test was applied to compare the difference between two means of a %BF estimated by both the methods. The prediction equations were developed from anthropometric and skinfold thickness data obtained from both the methods, i.e., SFC and US, by applying stepwise multiple linear regression.

Results

It was observed that mean values of all the skinfold thicknesses along with the %BF measured by SFC were far more than those measured by US. The %BF measured by US technique (%BF US) was significantly lesser, i.e., 20.69 (SD: 3.126; $p < 0.0002$), than that of the SFC method (%BF SFC), i.e., 30.38 (SD: 4.634), which is 0.68 % higher. The best prediction equation for the %BF by SFC method was [%BF SFC = -26.154 + 0.208 SFss + 0.374 age + 0.354 SFbi + 32.066 WHR] ($R^2 = 84.8$), where SFss and SFbi are skin fold thicknesses at subscapular and biceps regions, respectively, measured with SFCs, and that by the US method was [%BF US = 0.713 + 0.351 USsi + 0.232 age + 0.248 USss + 0.448 USbi] ($R^2 = 84.6$), where USsi and USss are skinfold measurements at suprailiac and subscapular regions, respectively, measured by US technique.

Conclusion

In our study, we arrived to the conclusion that even though the estimated %BF by both the methods were found to have a significant correlation with each other, the values were very less in case of the US method. In the prediction equations, it was found that the skinfold thickness at the suprailiac region was not found to be the significant determining factor for estimation of %BF by SFC method as that by the US method. Looking at the lesser sample size with all participants being males, we do not recommend the prediction equations to be used in clinical practice in spite of the high R^2 values.

Categories: Medical Physics, Other, Anatomy
Keywords: inference, ultrasound, skin caliper, assessment, fat

Introduction

Lack of physical exercise is well known to contribute to overweight and obesity, which is a risk factor for several noncommunicable diseases (NCDs). In the South-East Asia Region (SEAR), physical inactivity is responsible for 5.1% of deaths, with the incidence of insufficient physical activity ranging from 3% to 41% among males and 6.6% to 64% among females. Bhutan had the highest male and female prevalence (41% and 64%, respectively), followed by the Maldives (37% and 42%, respectively) [1]. According to the recent trial conducted by McKinsey Global Institute, London, 2.1 billion adults of the world are obese (30% of the global population), and obesity is responsible for nearly 5% of all deaths and 20% of the health care expenditure on the prevention and management of obesity [2]. It has been noticed by many researchers that India is also not the exception for it [3,4]. Therefore, the frequent assessment of body composition for the

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Prophesy of Spiker Performance on the basis of selected Anthropometric Characteristics (AbstractView.aspx?PID=2022-28-2-6)

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Applied Physics A
Materials Science & Processing

Investigation of structural and conduction mechanism of Europium modified $BaZr_{0.05}Ti_{0.95}O_3$ ceramic prepared by solid-state reaction method

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Abstract

The possibility of tuning and improving the electrical properties of Perovskite materials is essential for highlighting their industrial applications. In this work, the impact of substituting Europium at Ba-sites in $BaZr_{0.05}Ti_{0.95}O_3$ ceramic is reported preferably in the light of structural, microstructural and conduction behavior. The Eu doped $BaZr_{0.05}Ti_{0.95}O_3$ i.e. $Ba_{1-x}Eu_{2x/3}Zr_{0.05}Ti_{0.95}O_3$ ($x = 0.00, 0.01, 0.02, 0.03, 0.04, 0.05$) samples were synthesized by the conventional solid-state reaction method. The impedance, electric modulus and electrical conductivity behavior in the paraelectric phase has been investigated using the Jonscher's Power law and Jump relaxation model. The conductivity in the samples has been discussed taking into account the oxygen vacancies mechanism. The role of oxygen vacancies in decreasing the electrical conductivity of the doped samples are explained in detail. The deduced activation energies from the conduction and relaxation behavior decrease with increasing the Europium content. The X-ray diffraction (XRD) plot deduced that the Eu^{3+} ions tend to occupy Ba-site and the crystal structure changes from orthorhombic to tetragonal with Eu doping. The solubility of Eu in $BaZr_{0.05}Ti_{0.95}O_3$ was found maximum up to $x \leq 0.02$ and secondary phases were observed for a higher concentration of Eu. Scanning electron microscopy (SEM) images show that the grain size is reducing as an influence of Eu^{3+} ions. Also, due to the impact of secondary phase neck between the grains are observed at grain boundaries for the compositions $x \geq 0.03$.

Keywords X-ray diffraction · Scanning electron microscopy · Impedance spectroscopy · Oxygen vacancy · Hopping mechanism

1 Introduction

Lead free ceramics having perovskite structure (ABO_3) have received attention in recent days due to environmental concerns. Some of these ceramics, such as NBT, KNN, BNT and BT [1–15] have splendid applications in electronic industry for sensors, Dynamic random-access memories (DRAM), actuators and multilayer ceramic capacitors (MLCC), etc. Among the various ceramics, Barium Zirconium Titanate ($BaZr_xTi_{1-x}O_3$) has the tendency to customize the electrical and optical properties by the substitution of some homo and heterovalent ions at both A and B sites. The $BaZr_xTi_{1-x}O_3$ (BZT) system has been an attraction for several researchers because of its suitable electrical properties, such as moderate dielectric constant and low dielectric loss that has applications in ceramic capacitors and random-access memories [16–23]. The BZT system is characterized with polymorphic phase transitions that are purely composition dependent. In $BaZr_xTi_{1-x}O_3$ the polymorphic phase transitions [i.e. rhombohedral to orthorhombic (T_1), orthorhombic to tetragonal (T_2) and tetragonal to cubic (T_c)] come close to each other with the increasing percentage of Zr (T_c shifts toward lower temperature and T_1, T_2 shift toward high temperature) and all together merge near room temperature for a particular composition of

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Optical properties of rare earth (Ce) and transition metal (Ti) doped ZrO_2 phosphors

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Abstract. Thermoluminescence and Photoluminescence of un-doped as well as Titanium (Ti^{3+}) & Cerium (Ce^{3+}) doped ZrO_2 phosphors, prepared via solid-state reaction method. For the characterization of the sample FTIR, XRD, EDAX and FESEM study were done. FTIR confirms the presence of conventional impurities (such as NO3, OH-) present in the prepared sample. Structural characterization technique (XRD) shows the monoclinic formation and reveals the average grain size in the nano region. EDAX study confirms the chemical composition and through FESEM morphological status is studied. For kinetic parameters study themoluminescence studies is carried out and try to correlate the XRD results with thermoluminescence behavior of prepared phosphors. Photoluminescence emission spectra show the blue and green emission band for Ti and Ce doped ZrO_2 phosphors respectively.

1. Introduction

Phosphors are most commonly used materials in photonics as well as in optics fields due to its superior hardness, high refractive index, optical transparency, chemical stability, high thermal expansion coefficient, low thermal conductivity and high thermo-mechanical resistance. Zirconium Oxide (ZrO_2) phosphors are most promising host material in the field of electro-optical materials, due to its electrical, mechanical, chemical and optical characteristics. Zirconia has a wide band gap (= 5.4 ev) semiconductor material, has good optical transparency and low phonon energy of 470 cm^{-1} [1]. This will increase the number and probability of radiative transition and reduce non radiative multiphonon relaxation [2,3]. And hence, it has vast application areas in oxygen sensor, Solid State electrolytes, thermal barrier coatings, and in the field of photonics [4,5,6]. Zirconia is a IV group member, in periodic database table and the main source of zirconia is Baddeleyite (ZrO_2) and zircon (zirconium ortho-silicate $ZrSiO_4$). Hafnium, Hamatite (Fe_2O_3) Fe and Ti are the major impurities found in a commercial zirconia due to closeness in their crystal radii (Zr^{4+} 0.79A^0, Hf^{4+} 0.78 A^0) [7].

ZrO_2 exhibits three polymorphs with increasing temperature at a normal atmospheric pressure: the monoclinic phase (m-ZrO_2) that is stable from room temperature (RT) to 1175^{0}C; the tetragonal phase (t-ZrO_2) stability ranges between 1175^{0}C to 2370^{0}C and cubic phase (c-ZrO_2), exceptional stable at 2370^{0}C to 2750^{0}C (melting point). However, the substitution of dissimilar elements into the ZrO_2 host develops oxygen ion vacancies and as a consequence the phase of the phosphor material stabilized through charge compensation mechanism [8,9]. Phosphors or luminescent materials are mostly inorganic materials consisting of a host lattice intentionally doped with impurities or activators.

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Enhanced thermoluminescence properties of $CaSrAl_2SiO_7:Ce^{3+},Tb^{3+}$ phosphor

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ABSTRACT

The application of thermoluminescence technique in radiation dosimetry spans field of health physics, biological and geological sciences and personnel monitoring; this led to the search for new compositions with desirable dosimetric properties. In the present work, $CaSrAl_2SiO_7:Tb^{3+}$ and $CaSrAl_2SiO_7:Ce^{3+},Tb^{3+}$ phosphors were prepared by solid-state reaction method and their TL properties were studied in detail. The comparison of their TL results showed that co-doping of Ce^{3+} ions enhanced TL response of $CaSrAl_2SiO_7:Tb^{3+}$ phosphors; this was also verified from measurement of TL emission spectra of the samples. Optimized glow curves were analysed and TL parameters were extracted from Chen's method. Co-doped $CaSrAl_2SiO_7:Ce^{3+},Tb^{3+}$ phosphor is found to be useful in dosimetric application.

1 Introduction

When an insulating or a superconducting material is exposed to any kind of ionizing radiation, deposited energy is stored in the defect sites and colour centres of the crystal lattice. Due to action of heat energy, a fraction of this stored energy released and emitted as visible light which is called thermoluminescence [1, 2]. Nowadays application of various radiations such as ultraviolet, X-rays, β-rays, γ-rays in the different fields like medical, industrial, agriculture, etc., is increasing [3]. Thermoluminescence (TL) is one of the techniques used in radiation dosimetry [4]. Thermoluminescent materials are more investigated in on-going researches, because they found to have increasing application in thermoluminescence dosimeters. Thermoluminescent dosimeters necessarily have linearity of TL response with exposed radiation dose.

$CaSrAl_2SiO_7$ is one of the members of melilite group; these melilites that are basically silicate-based materials showed their use in TL dosimetry. In this work, thermoluminescence properties of $CaSrAl_2SiO_7:Tb^{3+}$ phosphor are investigated and also

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Luminescence properties of blue-emitting Ce^{3+}-doped series of $Ca_2Al_2SiO_7$ and $Sr_2Al_2SiO_7$ phosphors

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ABSTRACT

Ce^{3+}-doped series of $Ca_2Al_2SiO_7$ and $Sr_2Al_2SiO_7$ are prepared via conventional high-temperature solid-state reaction method and impact of Ce^{3+} doping on Fracto-mechanoluminescence (ML) and Photoluminescence (PL) properties of $Ca_2Al_2SiO_7$ and $Sr_2Al_2SiO_7$ was analyzed. Identification of phase formation was done by XRD. Analysis of PL studies reveals that both phosphors emit broad-band in the intense blue region, when excited by near-UV light (356 nm), and for further analysis, the emission band was resolved into two peaks, which was attributed to $^2D_{3/2} \rightarrow {}^2F_{5/2}$ and $^2D_{3/2} \rightarrow {}^2F_{7/2}$ transitions of Ce^{3+} ion. The calculated energy difference between these two peaks was found to be 1979 cm^{-1} and 2037 cm^{-1}, which were in good agreement with the theoretical energy difference ($\sim$ 2000 cm^{-1}). The color purity of prepared phosphors was much better than commercial BAM ($BaMgAl_{10}O_{17}$: Eu^{2+}) phosphor. ML studies were also performed and effect of radiation dose on ML sensitivity has been studied. Results suggest that synthesized phosphors were applied to damage sensors and display devices.

1 Introduction

The most important and interesting optical property of phosphor that arises because of the mechanical stimulation like grinding, cutting, cleaving, stretching, and bending is termed Mechanoluminescence (ML). Based on the type of deformation on applying mechanical action, ML is categorized into many types such as elastic mechanoluminescence (due to elastic deformation), plastic mechanoluminescence (due to plastic deformation), fractomechanoluminescence (arises due to the fracture in solids) and so on. In the analogy to thermoluminescence, ML is also a phenomenon related to defects, arises owing to impurities, and it is produced by releasing the trapped charge carriers followed by recombination with opposite charge carriers [1, 2]. The advantage of ML studies lies in the fact that it provides wireless detection, high mechano-optical conversion efficiency, and many more. From this point of view, ML materials find their possible application as damage diagnosis, stress sensing, and visualization of stress

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Thermoluminescence Glow Curve Analysis with Variable Concentration of Erbium-Doped Y_2O_3 Phosphor

Manmeet Kaur, Prashant K. Sahu, D.P. Bisen, V.R. Panse, and Prabhjot Singh*

A series of Y_2O_3:Er^{3+} phosphors have been synthesized via combustion synthesis method using urea as a fuel. The prepared samples are characterized by X-ray diffractometer (XRD) and Fourier transforms infrared spectroscopy (FTIR) techniques. TL glow curves are recorded for Y_2O_3:Er^{3+} doped phosphors to study dose dependence, UV response, and heating rate effect. The trapping parameters (μ, E, s) are calculated from Chen's glow peak shape method. TL glow curve is fitted in computerized glow curve deconvolution (CGCD) techniques and are discussed in detail for their possible usage in dosimetry applications.

1. Introduction

Y_2O_3 is considered as an attractive choice for a host material because of its high refractive index, broad transparency range (0.2–8μm), high band gap (5.6eV), and better thermal conductivity.[1] Due to its similarities in chemical and ionic properties with other rare earth ions, yttrium oxide (Y_2O_3) is considered as one of the attractive doping host. In recent years, the researchers at numerous laboratories has been an intense interest in the investigation of upconversion luminescence.[2–3] Erbium ion is an excellent candidate for upconversion as its metastable levels $^4I_{9/2}$ and $^4I_{11/2}$ can be conveniently populated by commercial low-cost high-power near-infrared laser diodes (980 and 808 nm, respectively).[4–6] Due to interesting luminescence properties of these materials, they have found uses in different fields including imaging of biological systems, displays devices, solid-state lighting, temperature sensors, and in optical communication.[7–10] In this present article, we have synthesized erbium-doped Y_2O_3 nanophosphors by combustion synthesis method using urea as a fuel. The main benefit of using combustion synthesis method is formation of high purity product, required low cost and simple equipment. Our main objective is to investigate the thermoluminescence spectra of Y_2O_3:Er^{3+} phosphors under UV irradiation and the phenomenon of concentration quenching and the effect of radiation were studied and discussed with supporting kinetic parameters for its further use in radiation dosimetry.

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2. Results and Discussion

2.1. Powder X Ray Diffraction (PXRD)

The crystallinity and the structure of Y_2O_3:Er^{3+}(2 mol%) phosphors were analyzed by the PXRD analysis. The obtained diffraction pattern reveals that the prepared phosphors possess single phase compounds and obtained peaks suggest that the prepared phosphors possess BCC structure having space group Ia-3(206) without having any impurity traces (**Figure 1**). Obtained XRD patterns are well matched with the JCPDS data card no 41–1105 (shown in inset). Debye–Scherrer formula[12] were used for the determination of crystallite size(D)

$$E = 0.89\lambda/\beta\cos\theta \quad (1)$$

where β represents the full-width at half-maximum (FWHM), λ (nm) express the wavelength of the X ray, θ represents the Bragg's angle of the XRD peak. The average crystallite size was found to be ~14.58 nm. The structural parameters of $(Y_{0.99}Er_{0.02})_2O_3$ phosphor are illustrated in **Table 1**.

2.2. Fourier Transform Infrared Spectroscopy (FTIR)

Figure 2 shows the FTIR images of Y_2O_3:Er^{3+}(2 mol%), phosphors in the middle infrared region 3700 to 450 cm^{-1} range. The broad band around 710–1300 cm^{-1} corresponds to CO stretching vibrations and band at around 2200–3400 cm^{-1} corresponds

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ABSTRACT

Alkaline earth orthosilicate (Sr 2 SiO 4) phosphor doped with Dy 3+ was synthesized by a traditional high-temperature solid-state reaction method. XRD analysis confirmed the formation of the phosphor with the orthorhombic crystal structure and their phase purity was checked using theoretical fitting Rietveld refinement. Zeta potential measurements of parent phosphor in different medium were performed to check its stability. The surface morphology and the elemental composition of the phosphors were examined using SEM and EDX, respectively. The optical behavior is determined by PL analysis. CIE coordinates of the phosphors represents the white light emission characteristics of Sr 2 SiO 4: Dy 3+ phosphors. Due to white light emission characteristic, this work will open a new window for its use in W-LED applications. Thermoluminescence (TL) behavior of phosphor was studied and its TL kinetic parameters were estimated based on computerized glow curve deconvolution (CGCD) fitting.

1. Introduction

Recently, Solid State Lighting (SSL) based white light emitting diodes (W-LEDs) is the topic of research and considered as lighting system for future generation. White light emission through White light emitting diodes (WLEDs) shows lots of advantages over the traditional fluorescent and incandescent lamps because of lightweight, small size, long lifetime, pollution-free, flat packaging, good stability, high luminous efficiency, and environment-friendly characteristics along with energy savings. Now, researchers have proposed various technologies to generate white light by coupling of blue/UV (Ultraviolet) LEDs with the phosphors [1]. At present, several strategies have been followed by the researchers to develop w-LEDs with high quantum efficiency and better color rendering index (CRI). There are two common approaches to produce white light (i) a yellow emitting YAG: Ce^{3+} phosphor pumped with blue LED, (ii) combination of RGB phosphors excited by UV-LED. First approach has some drawbacks such as low CRI, halo effect, high CCT and the second approach suffers from low luminescent efficiency due to re-absorption of blue light [2].Therefore it has drawn much attention of the researchers to solve the above difficulties. Many researchers have focused to find out the single phase white light emitting phosphors with high luminosity and CRI, when excited by Ultraviolet (UV) or near – Ultraviolet (n – UV) [3-5]. Nowadays, rare earth doped phosphors are on demand in the market due to its wide applications in various fields. Especially Europium (Eu), Cerium (Ce) and Dysprosium (Dy) doped silicate phosphors have better spectroscopic properties i. e. emission and excitation spectra [6]. Dy^{3+}doped phosphors shows two emission peaks at 460–480 nm (Blue region) and 570–590 nm (yellow region) simultaneously, although the combination of yellow and blue emission gives white light. By adjusting the yellow to blue intensity ratio (Y/B) value appropriately, it is possible to obtain pure white light from Dy^{3+} activated phosphors [7]. To obtain, efficient white light emitting phosphor, selection of the host is a key factor. Now, silicate based phosphors have been investigated because of their properties of stability (Physical, Chemical and Crystal structure) [8]. Among the various silicate based phosphors, *ortho*-silicates has proved to be excellent candidate for the white light emission in SSL applications [9] as it exhibits long-wavelength excitation properties, facile synthesis and cheap raw material (SiO2) [10]. In the *ortho*-silicates such as Ca_2SiO_4 [11], Ba_2SiO_4 [8], $CaBaSiO_4$, $CaSrSiO_4$ [12] etc., Sr_2SiO_4 is the suitable and potential candidate for W – LEDs because of wide lighting applications [13]. Sr_2SiO_4 has two crystallographic phases namely α'- $Sr_2SiO_4$and β - Sr_2SiO_4 and it is easy to find the desired single phase by changing the synthesis conditions and calcinations temperature as per requirement

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Abstract

The present article reports the photoluminescence, thermoluminescence and mechanoluminescence behavior of $Ba_2Al_2SiO_7$: xDy^{3+} (x = 1–4 mol%) phosphor synthesized via solid-state reaction method. X-Ray powder diffraction technique was used to confirm the phase purity and calculate the average crystallite size. Photoluminescence studies show intense peaks in blue and yellow region, which attributes to $^4F_{9/2} \rightarrow {}^6H_{15/2}$ and $^6H_{13/2}$ transition of Dy^{3+} respectively and optimum intensity in the photoluminescence emission spectra was found to be at 2 mol% concentration of Dy^{3+}. From the TL glow curve trapping parameter; like activation energy and frequency factor were calculated and it is noticed that TL intensity vary linearly with UV dose up to 15 min of exposure time. Mechanoluminescence studies depicts that, ML intensity increases both with increase in UV dose and height of piston. This suggest that the prepared phosphor may act as a potential candidate for low UV dosimetry and damage sensor.

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Many studies were already done in this field using alkaline earth-based silicate phosphor as host. Minhong Li et al investigated energy transfer from Bi^{3+} to Sm^{3+} in $Ca_2Al_2SiO_7$ phosphor [8], Zefeng Xu et al reported Eu^{3+} and Eu^{2+}

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Abstract

The europium ion (Eu^{3+}) activated lithium zirconium phosphate ($Li_2Zr(PO_4)_2$) phosphor samples have been synthesized by conventional solid state reaction (SSR) method at high temperature. The obtained phosphor samples crystallize in the hexagonal phase with space group R3C. Photoluminescence (PL) excitation and emission spectra have been recorded and optimum concentration was found to be 2 mol%. In the PL spectra of the synthesized phosphors, a characteristic emission peak observed at 594 nm which is ascribed to the magnetic dipole (MD) dominant transition $^5D_0 \rightarrow {}^7F_1$. The colorimetric parameters CCT and CIE R_a values are estimated by CIE chromaticity coordinates. Judd-Ofelt (J-O) intensity parameters obtained from emission spectra have been used to evaluate the local site symmetry around Eu^{3+} ions. The J-O parameters have also been used to calculate the radiative transition probability, branching ratio and radiative lifetime. The gain bandwidth, optical gain parameter and stimulated emission cross-section are also investigated. Thermoluminescence (TL) properties of prepared phosphor have been explained in terms of glow curve and kinetic parameters. The synthesized phosphors are expected to be promising candidates for applications as solid state lighting and optical displays.

Introduction

In recent years, light-emitting diodes (LEDs) used in solid-state lighting, have attracted remarkable attention. LEDs-based white-light sources are superior to conventional incandescent and fluorescent lamps. LEDs based devices have higher power efficiency, energy saving, longer lifetime, reliability, safety and eco-friendly characteristics [[1], [2], [3], [4], [5]]. At the present time, the mixing of a blue LED and yellow phosphors (YAG:Ce^{3+}) have become the conventional and popular method to produce white light owing to plain fabrication and mature processing [6]. For decades the alkaline earth phosphates have been deliberated to employ as luminescent compounds. However, this requires high annealing temperatures and long run-times [7,8]. The phosphors based on alkaline earth phosphate compounds have attracted enormous interest for extensive analysis due to their broad applications in illuminations and displays. In recent years, orthophosphates have become an significant host because of their tremendous studied and reported thermally stable luminescence of

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Judd-Ofelt analysis and luminescent characterization of Eu3+ activated Li2Zr(PO4)2 phosphor ScienceDirect

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Optical Materials

Volume 118, August 2021, 111196

Research Article

Judd-Ofelt analysis and luminescent characterization of Eu^{3+} activated $Li_2Zr(PO_4)_2$ phosphor

Bhuneshwar Verma [a b], R.N. Baghel [b], D.P. Bisen [b], N. Brahme [b], V. Jena [c]

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https://doi.org/10.1016/j.optmat.2021.111196

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Full length article

Generation of cold white light by using energy transfer process in single phase Ce^{3+}/Tb^{3+} co-doped $CaSrAl_2SiO_7$ phosphor

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ARTICLE INFO

Keywords:
Photoluminescence
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Cerium terbium co-doped phosphor
Energy transfer process
Sensitizer and activator

ABSTRACT

Single phased $CaSrAl_2SiO_7$ phosphor singly doped with different concentrations of trivalent cerium and terbium; and co-doped with varying Tb^{3+} concentration were prepared by standard solid state reaction (SSR) method. The crystallinity and particle morphology of the product samples were analysed by using XRD and TEM characterizations. Photoluminescence characterizations of singly doped and co-doped samples were studied in detail. $CaSrAl_2SiO_7:Ce^{3+},Tb^{3+}$ phosphor exhibit a broad blue emission band at 410 nm and some sharp emission bands in blue green and yellow regions, which originate from Ce^{3+} and Tb^{3+} ions, respectively. By increasing the concentration of Tb^{3+} ions while fixing Ce^{3+} concentration in the host lattice energy transfer takes place from Ce^{3+} to Tb^{3+} ions which create luminescence emission in white region. $CaSrAl_2SiO_7:Ce^{3+},Tb^{3+}$ phosphors are proved to be promising candidates for white lighting for outdoor illumination.

1. Introduction

Phosphors that are the luminescent materials are widely utilized in our daily life; some of the best applications of phosphors are color television screen, fluorescent lamps, scintillators, dosimeters, X-ray storage, screen intensifying phosphors, sensors, LEDs, watch dials, laser materials etc. [1]. The white light sources based on light emitting diode have so many valuable advantages as compare to conventional incandescent lamps. White LEDs have longer lifetime, better reliability, environmentally characteristics and higher efficiency which provide significant contractions in power consumption and pollution from fossil fuel power plants [2]. In recent years, researchers have been concentrating on investigation of single composition white-light-emitting phosphors that are excited by UV-LED to prevent some difficulties like the cross-color, instability of color temperature, and expensive cost problems [3]. The process of co-doping of sensitizer and activator into one host matrix is one of the best ways to fabricate a single–phased white-light-emitting material by utilising the principle of energy transfer from sensitizer to activator. Now a days the white light can be obtained from co-doping of divalent and trivalent rare earth elements in a single phase host, white light emission was investigated in Eu^{2+}, Mn^{2+} co-doped $Ca_8MgY(PO_4)_7$ [4], Ce^{3+}, Tb^{3+} co-doped $Ba_2Ln(BO_3)_2Cl$ (Ln = Gd and Y) [5], Ce^{3+}, Dy^{3+} co-doped $Ca_3(P_{1-x}B_xO_4)_2$ [6] and Dy^{3+}, Sm^{3+} co-doped $Lu_3Ga_5O_{12}$ [7]systems [8]. Due to predominant $^5D_4 \rightarrow {}^7F_5$ transition (545 nm) of Tb^{3+} ion it is the best candidate for green luminescence among all rare earth ions. However, within the 4*f* configurations of the Tb^{3+} ion, the electric dipole transitions is both spin and parity forbidden, which results in the weak absorption intensity in the near UV region and the narrow width. Therefore a suitable sensitizer is must for the Tb^{3+} activated phosphors. From the very beginning to recent years, Ce^{3+} ion is proven to be an excellent sensitizer for Tb^{3+} ion. Ce^{3+} ion transfer a fraction of its energy to Tb^{3+} ion depending up on its lowest 5d electronic state and broad absorption and emission bands associated with 4f → 5d transitions [9,10,11].

In the present work we synthesized a novel single phase $CaSrAl_2SiO_7:Ce^{3+},Tb^{3+}$ phosphor by solid state reaction (SSR) method for generation of cool white-light emission. Photoluminescence (PL) behaviour shows that the present co-doped phosphor covers the entire range of visible region which can create cool white emission which was resulted from the energy transfer from Ce^{3+} to Tb^{3+} ions. To the best of our knowledge, luminescence properties and energy transfer between Ce^{3+} and Tb^{3+} in $CaSrAl_2SiO_7$ host lattice have not been reported so far. PL spectrum of Ce^{3+},Tb^{3+} co-doped sample was compared with PL spectra Ce^{3+} and Tb^{3+} single doped sample. Preparation of powder samples was

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Full length article

Generation of cold white light by using energy transfer process in single phase Ce^{3+}/Tb^{3+} co-doped $CaSrAl_2SiO_7$ phosphor

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Original research article

Study of Photoluminescence,Thermoluminescence, and Afterglow properties of Dy^{3+} doped $Ba_2ZnSi_2O_7$ phosphor

Yugbodh Patle [a,*], Nameeta Brahme [a,*], D.P. Bisen [a], Tripti Richhariya [a], Ekta Chandrawanshi [a], Anil Choubey [b], Manju Tiwari [c]

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ARTICLE INFO

Keywords:
Phosphor
Thermoluminescence
afterglow
dosimetry

ABSTRACT

Barium Zinc Silicate $Ba_2ZnSi_2O_7$ (BZS) phosphor doped with Dysprosium (Dy^{3+}) was prepared at 1200 °C in the air by a solid-state reaction method. The prepared phosphor shows an efficient blue and yellow emission centered around 480 nm and 580 nm, respectively under UV excitation, which is believed due to incorporation of Dy^{3+} ion. The optimum concentration for Dy^{3+} ion is at 2 mol% and concentration quenching is attributed to exchange interaction. The CIE diagram is drawn for the whole series of phosphor samples prepared and it confirms that emission color had, indeed, tuned with the incorporation of Dy^{3+} ion in the BZS samples. The afterglow properties and Thermoluminescence (TL) have also been studied. TL curve confirms the presence of at least four traps in the phosphor material. The present results suggest BZS:Dy^{3+} phosphor is a promising one for display and dosimetry application.

1. Introduction

The light-emitting diode (LED) is the best choice at the moment among the most energy efficient devices to produce light. Presently phosphor converted LEDs receives much attention, so there is a considerable amount of research involved in search of new phosphor materials for better white light emission. Inorganic phosphors are widely studied materials for this purpose. These inorganic phosphors are available in various forms such as aluminate, silicate, phosphate, etc. [1–3]. Doping plays a very important role for the enhancement of luminescent properties of the inorganic phosphor. The rare-earth elements are used extensively for this purpose because of their intrinsic properties which are due to their unpaired 4f electrons. It enhances their chemical, optical and electronic characteristics. Due to this unique electronic configuration, rare earth doped inorganic phosphor produces a wide emission, which covers the range from ultraviolet to near infra-red region. Hence, rare-earth doped materials are always preferred as potential candidates for making multicolor light-emitting devices [4]. Among the rare-earth ions, Dy^{3+} is the center of attraction due to its white light emission property. In general, Dy^{3+} phosphor gives two strong emission peaks in blue and yellow regions. Near-white light emission can be achieved by altering the ratio of the intensity of yellow to blue. Thus, Dy^{3+} activated phosphor materials have drawn much attention, because of their applications as promising single-phase white emitting phosphors[5]. These phosphors always contain some intrinsic defects and incorporation of impurity may create new defects. These defects play an especially important role in the

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Efficient white light-emitting $Mg_{21}Ca_4Na_4(PO_4)_{18}$: Dy^{3+}, Tb^{3+}, Eu^{3+} triple-doped glasses: a multipurpose glasses for WLEDs, solar cell efficiency enhancement, and smart windows applications

Toshi S. Dhapodkar [a], Abhijeet R. Kadam [a], Nameeta Brahme [b], S.J. Dhoble [a]

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Abstract

As a kind of lanthanide-activated luminescent materials, the development of rare-earth-activated luminescent glasses is one of the promising trends in the modern luminescence research. In the proposed work, Dy^{3+}, Tb^{3+}, Eu^{3+} activated/co-activated/triple-activated $Mg_{21}Ca_4Na_4(PO_4)_{18}$ orthophosphate glasses have been prepared by melt quenching technique for the first time. XRD pattern of the proposed glass sample shows amorphous nature, but the most intense peak is get matched with the standard ICSD database of $Mg_{21}Ca_4Na_4(PO_4)_{18}$ material. Vibrational feature of the proposed glass sample has been investigated using FTIR analysis. SEM and EDS confirm the morphology and elemental analysis of the as-prepared glass. Photoluminescence study of triple-activated $Mg_{21}Ca_4Na_4(PO_4)_{18}$ glass sample shows multiple emission peaks under NUV excitations which covers complete white light emission. Other optical properties like UV–Vis DRS, the refractive index of the glass and molar refraction of glass sample were investigated. Moreover, this glass sample is crushed homogeneously and coated on solar cell using doctor blade method shows the efficiency of solar cell enhanced by 43.33% than the blank solar cell. These results of the proposed sample prove its worth in the WLEDs, solar cell efficiency enhancement, and smart windows applications.

Graphical abstract

An efficient white light-emitting phosphate glass has been prepared and shows five simultaneous emission peaks in the visible range monitoring with nUV excitation coated on solar cell to enhance its efficiency together with the

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Investigation of structural, photoluminescence, and thermoluminescence properties of Praseodymium doped $CaWO_4$ phosphor

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Abstract

The structural, optical, photoluminescence and thermoluminescence behaviors of Praseodymium doped $CaWO_4$ ($Ca_{1-x}Pr_{2x/3}WO_4$; x=0.01, 0.02, 0.03, 0.04, 0.05) phosphors prepared via conventional solid-state reaction route were reported in this paper. X-ray diffraction study revealed the fact that all the synthesized samples crystallize in a tetragonal structure with I41/a (88) space group and the structural parameters were obtained from the Reitveld refinement. The unit cell volume was found to rise with the increase in Pr concentration. The bandgaps of the prepared samples were obtained from the UV-Visible absorbance spectra by using the Wood-Tauc method. Bandgap and unit cell volume of the prepared samples were directly proportional to each other. Photoluminescence behaviors were investigated from the excitation and the emission spectra. The PL spectra highlight that the quenching occurs at x=0.02 and the critical distance for energy transfer of the phosphor was found to be 20Å. Dexter theory was applied to determine the mechanism of quenching and confirmed that the concentration quenching was caused by the dipole-dipole interaction. CIE Chromaticity denoted that the phosphors emit red color. Color purity and CCT of the material were calculated. Thermoluminescence behaviors were studied with different durations of UV dose for the composition x=0.02 and the kinetic parameters were calculated. Variations of TL emission intensity with temperature confirmed the second-order kinetics of the phosphor with a critical quenching concentration at x=0.02.

Graphical Abstract

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Optical Materials

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Luminescence properties of a novel cyan-blue light emitting Ce^{3+} doped $SrZrSi_2O_7$ phosphor

Sanjay Kumar Baghel [a], Nameeta Brahme [a b], D.P. Bisen [a], Yugbodh Patle [a], Tripti Richhariya [a], Ekta Chandrawanshi [a], Chitrkant Belodhiya [a]

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Highlights

- $SrZrSi_2O_7$: Ce^{3+} phosphors are prepared by high temperature conventional solid-state reaction method (SSRM).
- Structural, compositional and functional groups properties thoroughly discussed by XRD, FESEM, EDS and FTIR.
- Photoluminescence and thermoluminescence Properties of phosphors have been investigated in details.
- Frequency Factor and Activation energy are calculated of $SrZrSi_2O_7$: Ce^{3+} phosphor.
- TL fading effect and TL emission spectra are also investigated.

Abstract

A novel Ce^{3+} doped $SrZrSi_2O_7$ (SZSO) phosphor with different doping concentration (0.05–1.5 mol %) were synthesized by conventional solid-state reaction method. To confirm crystal structure and phase purity of prepared phosphor X-ray diffractions (XRDs) have been done. Surface morphology, compositional and functional groups analysis were investigated using FE-SEM, EDXS & FTIR techniques. In order to study the optical properties of the synthesized phosphor photoluminescence and thermoluminescence were investigated in detailed. Photoluminescence studies of SZSO: Ce^{3+} phosphor shows strong broad excitation peak at 293 nm owing due to 4f → 5d transition and corresponding broad emission peak obtain at 480 nm due to 5d → 4f spin allowed transition. The optimum PL intensity obtain for 0.1 mol% Ce^{3+} doping concentration. CIE co-ordinate, color purity and CCT of prepared phosphor are also calculated which shows the SZSO: Ce^{3+} phosphor emits cyan-blue light, can be applicable for solid state lighting. Thermoluminescence of SZSO: Ce^{3+} phosphor shows two TL glow curve peaks at 56 °C and 130 °C temperature. The optimum TL intensity obtained for 0.2 mol% Ce^{3+} doped SZSO phosphor for 15 min UV irradiation time at 254 nm UV excitation source. TL emission spectra and fading effect are also analyzed. TL kinetic parameters are determined by peak shape method. Thermoluminescence properties shows that prepared SZSO: Ce^{3+} phosphor will be potential applicable for UV-dosimetry.

Introduction

In lighting technology, rare earth doped solid state lighting materials get much attention due to their wide range of applications as a white light emitting diodes (W-LEDs), LEDs, display devices, lasers, traffic signals, backlight display etc. Among traditional incandescent and fluorescent lighting sources, white light emitting diodes (WLEDs) possess many properties such as power saving, low energy consumption, higher luminous efficiency & brightness, long lifetime and eco-friendly [[1], [2], [3], [4]]. Commercially available W-LEDs are fabricating by combining blue LED (GaInN) chip with yellow (YAG: Ce^{3+}) phosphor which has high correlated color temperature (CCT) and poor color rendering index (CRI). Another way to fabricate W-LEDs by mixing of red, green and blue emitting phosphors with UV-LED chip. The emitted white light by this way are very good CRI (above 90) and high luminous efficiency [[5], [6], [7]].

Different types of phosphor materials are namely such as-oxides, sulfides, aluminates, silicates, nitrides, oxy-nitrides, halides, phosphates, borates etc. [8,9]. The choice of phosphor matrix plays very important key role to obtain highly phosphor conversion devices. Silicates based phosphor shows great attention due to low cost, low phonon energy,

ScienceDirect

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Optical Materials

Volume 123, January 2022, 111787

Structural, luminescent properties and Judd-Ofelt analysis of $CaMgSiO_4:Eu^{3+}$ phosphor for solid state lighting

Bhuneshwar Verma [a], R.N. Baghel [b], D.P. Bisen [b], N. Brahme [b], V. Jena [c]

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Highlights

- $CaMgSiO_4$:Eu^{3+}phosphors are prepared by solid state synthesis technique at high temperature.
- Spectroscopic properties thoroughly discussed by XRD, SEM, EDX, FTIR and Raman spectroscopy.
- Photoluminescence and photometric properties of phosphors have been investigated.
- The Judd–Ofelt and radiative parameters of $CaMgSiO_4$:Eu^{3+} phosphors have also been calculated.
- Thermo-luminescence (TL) properties of prepared phosphor have also been explained in terms of glow curve and kinetic parameters.

Abstract

A series of Eu^{3+} doped calcium magnesium silicate ($CaMgSiO_4$) phosphor samples were successfully prepared via solid state synthesis technique. Their structural and morphological studies were investigated by powder X-ray diffraction (PXRD), scanning electron microscopy (SEM) and energy dispersive X-ray analysis (EDX) measurements. Phase structure and phase purity of sample were investigated by Rietveld refinement method. The vibrational and bonding behavior of silicate groups were confirmed by Fourier transform infrared (FTIR) and Raman spectroscopy. The luminescent properties of prepared samples were studied by photoluminescence (PL) and thermoluminescence (TL) characteristics. The emission spectra recorded under the excitation wavelength λ_{ex}=396 nm. The highest emission peak was observed at 595 nm which corresponds to the $^5D_0 \rightarrow {}^7F_1$ transition of Eu^{3+} ions with selection rule $\Delta J=1$. The concentration quenching and energy transfer mechanisms were elucidated by Blasse and Dexter's formula. The photometric parameters correlated color temperature (CCT), color rendering index (CRI) and color purity (CP) were computed using CIE chromaticity co-ordinate diagram. In addition, Judd-Ofelt (JO) parameters (Ω_2, Ω_4) and other derived radiative parameters were calculated using Judd-Ofelt theory from the PL emission spectra. Time resolved fluorescence spectra were carried out to determine the decay lifetime of the samples. The prepared samples are expected to be suitable candidates for the applications as solid state devices, lighting and optical displays.

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Structural, luminescent properties and Judd-Ofelt analysis of $CaMgSiO_4:Eu^{3+}$ phosphor for solid state lighting

Bhuneshwar Verma [a], R.N. Baghel [b], D.P. Bisen [b], N. Brahme [b], V. Jena [c]

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Highlights

- $CaMgSiO_4$:Eu^{3+}phosphors are prepared by solid state synthesis technique at high temperature.
- Spectroscopic properties thoroughly discussed by XRD, SEM, EDX, FTIR and Raman spectroscopy.
- Photoluminescence and photometric properties of phosphors have been investigated.
- The Judd–Ofelt and radiative parameters of $CaMgSiO_4$:Eu^{3+} phosphors have also been calculated.
- Thermo-luminescence (TL) properties of prepared phosphor have also been explained in terms of glow curve and kinetic parameters.

Abstract

A series of Eu^{3+} doped calcium magnesium silicate ($CaMgSiO_4$) phosphor samples were successfully prepared via solid state synthesis technique. Their structural and morphological studies were investigated by powder X-ray diffraction (PXRD), scanning electron microscopy (SEM) and energy dispersive X-ray analysis (EDX) measurements. Phase structure and phase purity of sample were investigated by Rietveld refinement method. The vibrational and bonding behavior of silicate groups were confirmed by Fourier transform infrared (FTIR) and Raman spectroscopy. The luminescent properties of prepared samples were studied by photoluminescence (PL) and thermoluminescence (TL) characteristics. The emission spectra recorded under the excitation wavelength λ_{ex}=396 nm. The highest emission peak was observed at 595 nm which corresponds to the $^5D_0 \rightarrow {}^7F_1$ transition of Eu^{3+} ions with selection rule $\Delta J=1$. The concentration quenching and energy transfer mechanisms were elucidated by Blasse and Dexter's formula. The photometric parameters correlated color temperature (CCT), color rendering index (CRI) and color purity (CP) were computed using CIE chromaticity co-ordinate diagram. In addition, Judd-Ofelt (JO) parameters (Ω_2, Ω_4) and other derived radiative parameters were calculated using Judd-Ofelt theory from the PL emission spectra. Time resolved fluorescence spectra were carried out to determine the decay lifetime of the samples. The prepared samples are expected to be suitable candidates for the applications as solid state devices, lighting and optical displays.

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Sh 2-301: A Blistered H II Region Undergoing Star Formation

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Abstract

We present a multiwavelength study of the H II region Sh 2-301 (S301) using deep optical data, near-infrared data, radio continuum data, and other archival data at longer wavelengths. A cluster of young stellar objects (YSOs) is identified in the northeast (NE) direction of S301. The Hα and radio continuum images trace the distribution of the ionized gas surrounding a massive star, ALS 207, and the S301 H II region is bounded by an arc-like structure of gas and dust emission in the southeastern direction. The northwestern part of S301 seems to be devoid of gas and dust emission, while the presence of molecular material between the NE cluster and the central massive star ALS 207 is found. The distribution of warm dust emission, ionized gas, and neutral hydrogen together suggests a blistered morphology of the S301 H II region powered by ALS 207, which appears to be located near the edge of the cloud. The location of the NE cluster embedded in the cold molecular cloud is found opposite to the blistered morphology. There is a noticeable age difference investigated between the massive star and the NE cluster. This age difference, pressure calculation, photodissociation regions, and the distribution of YSOs favor the positive feedback of the massive star ALS 207 in S301. On a wider scale of S301, the H II region and the young stellar cluster are depicted toward the central region of a hub-filamentary system, which is evident in the infrared images.

Unified Astronomy Thesaurus concepts: Interstellar dust extinction (837); Interstellar filaments (842); Stellar-interstellar interactions (1576); Star formation (1569)

Supporting material: machine-readable tables

1. Introduction

Previous studies of bubbles associated with H II regions have suggested that their expansion probably triggers 14%–30% of the star formation in our Galaxy (e.g., Deharveng et al. 2010; Kendrew et al. 2012; Thompson et al. 2012). Feedback from massive stars ionizes the surrounding molecular cloud through their immense UV radiation and powerful winds, resulting in an H II region, a glowing nebula of ionized gas. Lopez et al. (2014) have discussed the various feedback processes in detail. Feedback from a massive star may inhibit or terminate further star formation in the immediate vicinity (termed as "negative feedback") or it can also promote and accelerate the star formation (known as "positive feedback"). Out of these two outcomes which one will dominate depends not only on the process itself but also on the properties of the clouds (Shima et al. 2017). Stars born out of these processes are generally assembled in a group or cluster, an entity having a collection of physically related stars. The physical features such as shape, size, age, and mass distribution of these clusters vary with their host environment and seem to show the imprints of star formation processes themselves (Lada & Lada 2003; Allen et al. 2007; Grasha et al. 2017, 2018). Therefore, stellar clusters constitute the nearest laboratories for direct astronomical investigation of the physical processes of star formation and early evolution. The first generation of massive stars in these regions also play a very important role as they can give very crucial clues on the star formation through entirely different physical processes. Thus, we can have a mix of stars in the same star-forming region, giving hints of their origin. Dale et al. (2015) have discussed other star formation processes like cloud–cloud collision, filamentary interactions, etc. In recent years, many authors have pointed out the active role of filamentary structures and their subsequent interaction in star formation (Schneider et al. 2012; Dewangan et al. 2017b, 2020a). Filamentary structures are often seen harboring young stellar clusters and massive star-forming clumps, yet their precise role in star formation is not very well understood.

With an aim to investigate the stellar clustering and their origin, star formation, shape of the mass function (MF), and effects of the feedback from massive stars on these processes, we have performed a multiwavelength study of the H II region "Sh 2-301" (hereafter, S301). This is a southern sky ($\alpha_{2000} = 07^h09^m55^s$, $\delta_{2000} = -18°29'36''$) Galactic H II region located in a very large molecular cloud complex (~6° × 3°; Russeil et al. 1995). Avedisova & Palous (1989) placed this region in a star-forming region, "SFR 231.44-4.41", along with the reflection nebulae Bran 6 and Bran 7. This region is thought to be ionized by a massive O-type star, ALS 207, and also harbors two B-type stars, ALS 208 and ALS 212 (Moffat et al. 1979; Garmany et al. 2015; Maíz Apellániz et al. 2016). Despite showing very interesting features at different wavelengths, this region is one of the most poorly studied H II regions in our Galaxy. In Figure 1, we show a color-composite image made by using 3.4 μm (red), *K*-band (green), and Hα (blue) images. The image clearly shows a heated environment in the central region near the massive star

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Gaia 20eae: A Newly Discovered Episodically Accreting Young Star

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Abstract

The Gaia Alert System issued an alert on 2020 August 28, on Gaia 20eae when its light curve showed a ~4.25 magnitude outburst. We present multiwavelength photometric and spectroscopic follow-up observations of this source since 2020 August and identify it as the newest member of the FUor/EXor family of sources. We find that the present brightening of Gaia 20eae is not due to the dust-clearing event but due to an intrinsic change in the spectral energy distribution. The light curve of Gaia 20eae shows a transition stage during which most of its brightness (~3.4 mag) has occurred on a short timescale of 34 days with a rise rate of 3 mag/month. Gaia 20eae has now started to decay at a rate of 0.3 mag/month. We have detected a strong P Cygni profile in Hα, which indicates the presence of winds originating from regions close to the accretion. We find signatures of very strong and turbulent outflow and accretion in Gaia 20eae during this outburst phase. We have also detected a redshifted absorption component in all of the Ca II IR triplet lines consistent with a signature of hot infalling gas in the magnetospheric accretion funnel. This enables us to constrain the viewing angle with respect to the accretion funnel. Our investigation of Gaia 20eae points toward magnetospheric accretion being the phenomenon for the current outburst.

Unified Astronomy Thesaurus concepts: Protoplanetary disks (1300); Variable stars (1761); Early-type stars (430); Star formation (1569); Stellar winds (1636); T Tauri stars (1681); Young stellar objects (1834)

1. Introduction

Episodic accretion onto low-mass pre-main sequence (PMS) stars is no longer considered an oddity. It is now considered as one of the important stages in the grand scheme of evolution of the low-mass PMS stars, even though it is a poorly understood phenomenon. The short outburst timescales compared to the millions of years spent in the formation stage of these PMS stars make these events extremely rare, although statistically each PMS star is expected to experience ~50 such short-duration outbursts during its formation stages (Scholz et al. 2013). The outburst durations, although short in timescale, are capable of delivering a substantial fraction of circumstellar mass onto the central PMS star (Vorobyov & Basu 2006). These events have been observed to span the entire age range of young stars starting from the embedded Class 0 sources to the Class II sources (Safron et al. 2015). Based on the outburst timescales and spectroscopic features, these classes of sources have been classically divided into two categories: (1) FUors, which experience a luminosity outburst of 4–5 mag that last for several decades and contain only absorption lines in their spectra, and (2) EXors experiencing a luminosity outburst of 2–3 mag, which last for a timescale of a few months to a few years and contains emission lines in their spectra (Herbig 1977; Hartmann & Kenyon 1996; Hartmann 1998). The physical origin of the sudden enhancement of accretion rate is not yet clear. However, a variety of models ranging from thermal instability, magneto-rotational instability, combination of magneto-rotational instability and gravitational instability, disk fragmentation to external perturbations have been proposed (Audard et al. 2014, pp. 387–410). To arrive at a general consensus about the physics behind such sudden enhancement of accretion rates, a large sample of FUor/EXor sources is required to test the above instability models. However, only about 25 FUor/EXor sources have been discovered so far (Audard et al. 2014, pp. 387–410). Therefore, any newly discovered source provides an important test-bed to probe the various physical aspects of episodic accretion and their comparison with the previous sources.

[15] NASA Earth and Space Science Fellow

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Study of Chemically Peculiar Stars-I : High-resolution Spectroscopy and *K2* Photometry of Am Stars in the Region of M44

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ABSTRACT

We present a study based on the high-resolution spectroscopy and *K2* space photometry of five chemically peculiar stars in the region of the open cluster M44. The analysis of the high-precision photometric *K2* data reveals that the light variations in HD 73045 and HD 76310 are rotational in nature and caused by spots or cloud-like co-rotating structures, which are non-stationary and short-lived. The time-resolved radial velocity measurements, in combination with the *K2* photometry, confirm that HD 73045 does not show any periodic variability on timescales shorter than 1.3 d, contrary to previous reports in the literature. In addition to these new rotational variables, we discovered a new heartbeat system, HD 73619, where no pulsational signatures are seen. The spectroscopic and spectropolarimetric analyses indicate that HD 73619 belongs to the peculiar Am class, with either a weak or no magnetic field considering the 200 G detection limit of our study. The Least-Squares Deconvolution (LSD) profiles for HD 76310 indicate a complex structure in its spectra suggesting that this star is either part of a binary system or surrounded by a cloud shell. When placed in the Hertzsprung-Russell diagram, all studied stars are evolved from main-sequence and situated in the δ Scuti instability strip. The present work is relevant for further detailed studies of CP stars, such as inhomogeneities (including spots) in the absence of magnetic fields and the origin of the pulsational variability in heartbeat systems.

Key words: Stars: chemically peculiar– stars: individual (HD 73045, HD 73574, HD 73618, HD 73619, HD 76310) – stars: rotation, techniques – photometry, spectroscopy, spectropolarimetry

1 INTRODUCTION

The chemically peculiar (CP) stars are a group of main sequence (MS) B-, A-, and F-type stars having peculiar surface elemental abundances; they are characterized by abnormal spectral lines strengths (Preston 1974). The chemical anomalies in these stars are thought to be confined to the outer stellar layers and to arise from gravitational settling and radiative levitation of certain elements, a process known as atomic diffusion (Michaud 1970; Michaud et al. 1981). The present study is confined to one subset of CP stars, the metallic-lined A (Am) stars, which are generally non-magnetic in nature and characterized by under-abundances of some light elements such as Ca and Sc, but slight/moderate over-abundances of iron peak elements, e.g., Zn, Sr, Y, Zr, and Ba. The projected rotational velocities of these stars are generally smaller than for ordinary A stars ($v \sin i$ typically < 120 km s^{-1}), with the majority of the Am stars being members of close binary systems. Rotational braking through tidal interaction is regarded as a possible cause of the low rotational velocities.

Using four years of high-precision photometry from the nominal *Kepler* mission and the *K2* campaigns, Balona et al. (2015) investigated the light variations in 29 Am stars and found that most of the Am stars in the *Kepler* field have light curves with the characteristics of rotational modulation arising from star spots or co-rotating structures. The origin of spots in Am stars seems to be different from solar-like spots as these stars do not show any signs of intense magnetic fields able to produce such magnetic features. Magnetic fields on the order of sub-Gauss strengths have been reported in some Am stars, e.g., Sirius A (Petit et al. 2011), Vega (Böhm et al. 2015), β UMa, and θ Leo (Blazère et al. 2015), Alhena (Blazère et al. 2016) and ρ Pup (Neiner et al. 2017). It is thought that for the majority of these stars that convective flows in the atmospheres may disrupt any spot-like features (Kupka 2003). Hence, the rotational modulation in some Am stars indicates that either a weak magnetic field may lead to surface inhomogeneities in the form of spots across the stellar surface or, alternatively, there is some unknown mechanism(s) producing those spots. If a weak magnetic field is indeed present, then

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Quest for the Upcoming Periastron Passage of an Episodic Dust Maker and Particle-accelerating Colliding-wind Binary: WR 125

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Abstract

We have carried out a long-term infrared and X-ray investigation of the colliding-wind binary WR 125 (WC7 + O9III). The source was monitored using AstroSat Soft X-ray Telescope and the Tata Institute of Fundamental Research Near Infrared Imaging Camera-II mounted at the back of 3.6 m Devasthal Optical Telescope. WR 125 appeared brighter in the near-infrared *K*-band during the years 2017–2021 which is attributed to another episode of dust formation similar to the one reported during the likely periastron passage at the beginning of the 1990s. This is further supported by enhanced emission observed in the W1 and W2 bands of Wide-field Infrared Survey Explorer from 2018–2019. By combining archival X-ray data sets with our new measurements, long-term variations have been noticed. The source reaches a lower emission state in 2020 June (close to the recent infrared maximum) which could be due to enhanced absorption of X-rays produced in the colliding-wind region by the WC stellar wind close to the periastron in an eccentric orbit. The time interval between the previous and latest X-ray low states may indicate an orbital period of 28–29 years, in fair agreement with the recurrence time of episodic dust production. We also discuss published radio measurements in the context of a common picture based on a long-period binary scenario. These results allow us to draw relevant guidelines for future multiwavelength observations of WR 125.

Unified Astronomy Thesaurus concepts: Massive stars (732); Binary stars (154); Wolf–Rayet stars (1806); WC stars (1793); Stellar winds (1636); X-ray stars (1823)

1. Introduction

Among the category of hot and massive stars, Wolf–Rayet stars (WRs) are the evolved counterparts of *O*-type objects. They are characterized by strong stellar winds that unravel gradually deeper layers presenting abundances resulting from the nucleosynthesis at work in the stellar core. While some WRs display enhanced nitrogen and helium abundances (WN stars), as expected from the CNO cycle, others present enhanced carbon and depletion in nitrogen while helium is still highly present. In the latter case, one is dealing with evolved objects conventionally referred to as WC stars, i.e., WRs with enhanced carbon (see, e.g., Crowther 2007). These objects are characterized by strong and dense stellar winds, likely as a result of a significantly enhanced opacity due to highly ionized iron in the deeper layer of their atmosphere (Gräfener & Hamann 2005). Several decades ago, it appeared that some of WC stars displayed a significant infrared excess, attributed to the presence of circumstellar dust (Allen et al. 1972). The exact circumstances for the formation of dust in WC star environments are still far from being completely elucidated. Many WC stars often undergo variable dust production, some periodic and others random. The class of episodic dust makers (EDM) shows recurrent infrared bursts that fade away with time (Williams 1995, 2008). The standard interpretation framework for EDMs is dust formation in the colliding-wind region (CWR) of a binary systems made of a WC star and another massive companion. The episodic nature of the dust emission is reasonably well explained as a result of colliding stellar winds in a wide, massive binary system with a highly elliptical orbit (Williams et al. 1990).

Let us clarify that the physics of CWRs can also be investigated at other wavelengths. Massive binary systems produce thermal X-ray emission that originates from the interaction region of the winds of the massive binary components, in addition to some contributions from the individual stellar winds (Cherepashchuk 1976; Prilutskii & Usov 1976; Stevens et al. 1992; Pittard & Parkin 2010). The X-ray contribution from the CWR is expected to vary periodically, especially if the stars move in an elliptic orbit. The separation (D) varies so that the CWR moves periodically in and out of the deeper regions of the stellar winds. In particular, in the case of adiabatic shocks, the X-ray emission from the CWR is expected to vary as 1/D, i.e., stronger emission close to periastron (Stevens et al. 1992). In addition, depending on the inclination of the system, our line of sight to the CWR passes through varying amounts of stellar wind as the orbit progresses, causing variations in the photoelectric absorption by the stellar wind material. Given the high density of WC star winds, the emission measure of the X-ray emitting plasma is expected to be rather high, such as in the case of WR 140 (e.g., Williams et al. 1990).

Massive binaries are also radio emitters. Besides the steady thermal free–free emission produced by individual stellar winds (e.g., Panagia & Felli 1975; Wright & Barlow 1975), in a binary system the CWR is likely to produce some nonthermal, synchrotron radiation. The latter component is expected to vary as a function of the orbital phase (especially in eccentric orbits) and is characterized by a negative spectral index α, defined as $S_\nu \propto \nu^\alpha$. A requirement is the existence of a population of relativistic electrons, hence the so-called class of particle-accelerating colliding-wind binaries (PACWBs;

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ORIGINAL PAPER

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Investigation of ZnO nano-filler-dispersed nano-composite polymer electrolytes and their ion transport property

Niranjan Kumar[1] · Manju Sahu[1] · Dinesh K. Sahu[2] · Y. K. Mahipal[1]

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Abstract

The present manuscript represents the comprehensive studies of the poly (ethylene oxide)-based sodium ion-conducting solid polymer electrolyte (SPE) and nano-composite polymer electrolyte (NCPE) membranes dispersed with different wt. (%) of ZnO nano-filler that have been synthesized by the hot-press method. This novel method gave rise to flexible, uniform/thin polymer electrolyte films which can be achieved in any desired shape/size. X-ray diffraction (XRD) was used to analyze the structural properties of the SPE host and the NCPE optimum conducting composition (OCC) film. Scanning electron microscopy (SEM) confirmed the smoother surface and energy-dispersive spectroscopy (EDAX) confirmed the presence of all key elements. Thermo-gravimetric analysis (TGA) and differential scanning calorimetry (DSC), respectively, indicated good thermal stability and an improved amorphous phase. The dispersion of the ZnO nano-filler particles has enhanced the ionic conductivity, thermal stability, and also mechanical integrity. Ion transport properties have been characterized by assembling symmetric cells: SS||SPE/NCPE||SS (SS stainless steel), the NCPE OCC membrane exhibits the maximum ionic conductivity (σ_{rt}) ~ 1.45×10^{-5} S/cm at room temperature, low activation energy (E_a ~ 0.35 eV), and ionic transference number (t_{ion} ~ 0.99) close to unity and also the cyclic voltammetry (CV) curve shows the good electrochemical stability so electrolyte has been found more suitable for device fabrication.

Keywords Solid polymer electrolyte · Nano-composite polymer electrolyte · Ionic conductivity · A.C. impedance spectroscopy · Thermal properties · Cyclic voltammetry

Introduction

In the era of advanced technology, the development of renewable energy sources, such as wind, solar, and nuclear energy sources, has become necessary due to the limited availability of traditional fossil fuels [1]. However, with the advancement of renewable energy sources, we have to focus on portable electrical energy storage devices to smooth the intermittency of the energy sources. Battery devices have the potential to provide a solution, especially as they can store energy from renewable energy sources such as wind and solar power. The rechargeable battery can store chemical energy as well as it can convert it into electrical energy with high efficiency [2, 3]. In the latest technology of electrical energy storage devices, lithium-ion battery (LIB) has been dominating the market of portable electronic devices, electric vehicles, and hybrid electric vehicles due to their high output voltages, high energy densities, and long durability. But due to very high cost, less abundance and the toxic nature of lithium are inhibiting the application of LIB in large-scale energy storage [4–9]. Therefore, many researchers are trying to develop sodium-ion secondary batteries parallelly which could be able to replace Li-ion associated energy storage devices successfully. The most believable and competitive element with comparable performance and very close chemical insertion properties that have the potential to replace lithium (Li) and eliminate the hurdles is sodium (Na). The abundance of sodium resources (1000 times more than Li), low price of starting materials, voltage versus SHE (2.7 V), and low toxicity are favorable for sodium-ion battery (SIB) technology enhancement in industrial applications, viz., portable electronic devices and for electric road

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A graphene-printed paper electrode for determination of H_2O_2 in municipal wastewater during the COVID-19 pandemic†

Tushar Kant,[a] Kamlesh Shrivas,*[a] Indrapal Karbhal,[a] Monisha,[a] Sanjay Yadav,[a] Tikeshwari,[a] Sushama Sahu,[a] Yugal Kishor Mahipal[b] and Vellaichamy Ganesan[c]

Recently, hydrogen peroxide (H_2O_2) has been used as a disinfectant in sanitizers for cleaning hands, and solid surfaces of hospitals, offices and homes to prevent the spread of the COVID-19 virus. The effluents from domestic, hospital and municipal waste should be monitored for their H_2O_2 content to avoid the entry of this toxic pollutant into the ecosystem. Therefore, we developed a low-cost graphene (Gr)-printed paper electrode for determination of H_2O_2 using cyclic voltammetry (CV). An office inkjet-printer and Gr nano-ink stabilized with ethyl cellulose (EC) were used for the fabrication of printed paper electrodes (PPEs) to determine H_2O_2 quantitatively. A stable Gr–EC nano-ink (2%) with viscosity and surface tension values of 12 mPa S^{-1} and 35 mN M^{-1}, respectively, was formulated to obtain conductive electrodes. A wide linear range (2 μM–25 mM) with a better limit of detection (0.28 μM) for the determination of H_2O_2 was obtained when the Gr–EC/PPE was used as a working electrode. Further, the Gr–EC/PPE was successfully employed for analysis of H_2O_2 in wastewater. The electrochemical determination of H_2O_2 using the Gr–EC/PPE as an electrode in CV is rapid, economical, flexible and eco-friendly when compared with previously reported methods.

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Introduction

In January 2020, the World Health Organization (WHO) declared the outbreak of COVID-19 as a public health emergency and the COVID virus has, so far, infected and killed millions of people across the world. The preliminary preventive measures against the infection are cleaning hands with soaps or sanitizers and use of facial masks. More recently, cleaning of hands with alcohol-based sanitizers has tremendously increased. Most of the sanitizers contain hydrogen peroxide (3%) as a strong oxidizing agent along with isopropyl alcohol/ethanol and glycerol.[1,2] In addition, H_2O_2 has an extensive application as a disinfectant in hospitals and has been used as a bleaching agent in industry. The exposure to H_2O_2 may result in several health issues such as skin etching, headache, blindness, irritation, and redness of eyes.[3,4] The effluents from domestic sources and hospitals which are disposed into municipal wastewater may contain H_2O_2. Hence, analysis of municipal wastewater is necessary to prevent the passage of this substance into fresh water reservoirs. For this, horseradish peroxidase-based spectrophotometry,[5] titration,[6] fluorimetry,[7] electrochemical methods,[8] and chemiluminescence[9] have been reported for analysis of H_2O_2. However, most techniques have their own limitations, like the need for expensive instruments and lengthy sample preparation procedures. However, electrochemical methods have been proven to be simple and rapid for the detection of H_2O_2, as they show superiority in sensitivity, selectivity, cost and portability.[10]

Among the electrochemical techniques, cyclic voltammetry (CV) is frequently used for the quantitative analysis of H_2O_2 based on its redox properties.[8] Recently enzyme immobilization onto electrode surfaces with different nanomaterials has been used for detection of H_2O_2.[11] Stability, reproducibility and storage are the major issues related to enzymatic methods. To overcome these limitations, glassy carbon electrodes (GCEs) fabricated with metallic silver (Ag), gold (Au), platinum (Pt), and carbon/graphene (Gr) nanomaterials (NMs), *etc.*, are used in several electrochemical applications.[12–15] These NMs have the advantages of low cost, better electrocatalytic activity and conductivity. However, the synthesis of metallic NMs involves use of harmful reducing agents (hydrazine, sodium borohydride, *etc.*). Accordingly, Gr-based NMs have emerged as efficient electrode materials with better performance.[16] Gr-based

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The Effect of Mindfulness-Based Intervention on Caregivers of Person with Chronic Schizophrenia

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ABSTRACT:

When family members find out that a loved one has developed schizophrenia, they often feel helpless, angry, depressed, and anxious. As a result, the caregiver's psychological health is greatly affected, which increases both the caregiver's subjective and objective burden. As a result, they may require assistance and communication with mental health professionals at times. As a result, the study sought to assess the efficacy of mindfulness-based interventions on caregivers of people with chronic schizophrenia. **Objectives:** The study aimed to evaluate the effectiveness of a mindfulness-based intervention on various psychological parameters such as mindfulness, sense of control, and overall well-being in caregivers of people with chronic schizophrenia. **Methodology:** A total of 26 caregivers of persons with chronic schizophrenia, who fulfilled the inclusion and exclusion criteria were selected and formed into the Treatment As Usual (TAU) and Mindfulness Based Intervention with Treatment As Usual (MBITAU) groups. **The current intervention was found to be effective in increasing well-being and mindfulness, particularly action awareness, as the MBITAU group differed significantly from the TAU group in the post-assessment.** Thus, MBI can be an effective therapy to maintain the psychological health of caregivers.

Keywords: Mindfulness, General Well-being, Caregivers, Schizophrenia, Mindfulness Based Intervention

INTRODUCTION:

The initial reactions, a family has when one of its members is diagnosed with mental illness include shock, denial, blame, and suffering. The suffering of primary caregivers is exacerbated in the case of those with schizophrenia, the most prevalent serious disorder with a poor prognosis, by symptoms and signs, caregiving demands, an inability to accept the loved one's illness and the ensuing emotional distress, the financial burden of treatment, the

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PRO-SOCIAL BEHAVIOR AND ACADEMIC OUTCOME OF HIGH SCHOOL STUDENTS A SYSTEMATIC REVIEW

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Abstract
Willingness to help others is an essential attitude by which one can lead an effective social life. The term "pro-social" refers to the behavior that is positive and intended to benefit other individuals. It is an internationally voluntary behavior (Eisenberg, 1990). The present review tries to find out the relationship between pro-social behavior and demographic variables like home and school environment, gender, self efficacy, self concept, waning personality traits, value orientation, subjective well being, empathy, locality, and academic outcome of high school students. A literature search using Google Scholar, Review Science Direct, Research Gate, and Academia, a database covering the period from 2000–2022, was conducted. The author reviewed studies with certain inclusion and exclusion criteria. Search terms were Pro-social Behavior, Academic Outcome, and High School Students. After examining different types of empirical papers, it was found that in most of the studies, this variable (pro-social behavior) has been ignored by the researchers working in this area of research in India. Methodological and theoretical issues have been discussed.

Keywords: pro-social behavior, academic outcome, locality, gender, school management.

Introduction

Pro-social behavior is defined as voluntary behavior that is intended to benefit another (Eisenberg et al. 2006).It is characterized by acts of kindness, compassion, and helping behaviors, which may be considered to be one of the finest qualities of human nature, foster positive traits that are beneficial for children and society. Encouraging pro-social behavior also require decreasing or eliminating undesirable social behavior. It is often associated with developing desirable traits in children and adults' behavior as well. (Eisenberg, et al. 2006).

Academic outcome: An academic outcome is a performance that is a measure of educational output (Adyemi 2008), the product of the interaction of the student, as an individual with their environment, namely, school, teacher, peers (Bhatnagar, R.P. 1969), multidimensional activity, involving a number of phases (Gupta & Kapoor, 1969). It is significantly designed by test scores or marks assigned by the teacher, mentor, guide, or any board and refers to the outcome of disciplined curricular and co curricular activities of students in the class as well as school.

Method for Review -

A Literature Search Procedure

Studies were identified through J-Store, Research Gate, Google Scholar and Science Direct. It covers the period from 2000 to 2022. The review was conducted using the search term Pro-social behavior, Academic outcome.

Inclusion Criteria

The following are the inclusion criteria: (1) empirical studies published in peer-reviewed journals (2) empirical studies in English only (3) quantitative research (4) peer-reviewed journal critical review article

Exclusion Criteria

The following are exclusion criteria: (1) Prior to the year 2000, (2) Students from primary and secondary schools, and (3) University students

Methodology

The present review is based on the following six parameters: (1) Research Plan: (2) Criterion variable validity: (3) Predictor variable reliability coefficient: (4) The validity and reliability coefficients of various predictor measures on their own data: Statistical analysis (6) Size of the effect.

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PART-A

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The Predicting effect of Self-Esteem and Gender on Youth's Happiness (AbstractView.aspx?PID=2022-28-2-3)

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Keywords: Happiness () Self-esteem () Youth () Gender ()

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The Predicting effect of Self-Esteem and Gender on Youth's Happiness

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Abstract:

Happiness has been researched over time and still is the subject of many studies; in this case, youth's happiness is more important because in higher education at present youths are covered with complex issues more than at any other time. The main objective of the study is to predict the effect of self-esteem and gender on youth's happiness. Data were collected from 100 youths (age range 17-26 years) studying in various colleges in Raipur, Chhattisgarh by using the Happiness Scale, and Self-esteem Scale. 50 subjects were male and the remaining 50 were female. SPSS version 22.0 was used for prediction analyses. The majority of youths (87%) had a high level of happiness; while above average (59%) had a moderate level of self-esteem. Findings revealed thatself-esteem has been discovered to be a strong predictor of happiness, while gender does not. Self-esteem improvement will help in the reduction of mental health problems in youth. Limitations, future directions, and implications were discussed.

Keywords: Happiness, self-esteem, youth, gender

Introduction:

At present in higher education youths are engulfed with complex issues more than at any other time. While the stage is viewed as a phase of conversion from childhood reliance to adulthood independence, many people have failed the adulthood independence test. (World Programme of Action for Youth, 2007). As a result, youth

Ethos and Edos in Traditional Health Care Practices of Hill Korwa Tribe of Chhattisgarh

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ABSTRACT:

The Hill Korwa is particularly vulnerable tribal group of the Chhattisgarh state of India. their natural habitats are found in Jashpur, Balrampur, Sarguja and Korba districts of the state. on the basis of censes 2011 report, there are total 37195 Hill Korwa tribes are residing in the state in 9046 households (Hand book of Tribal Welfare Dept. Govt. of C.G.). As the Hill Korwa tribe are the primitive tribal group so they can show various characteristics such as first, declining population, second, primitive technology, third, very low level of literacy and fourth subsistence level of economy(Ministry of Tribal Affairs, India) , as mentioned in the article 342 of Indian constitution. this paper is basically focused to the cultural works of The Hill Korwa tribe special reference to their traditional treatment and healing procedures. the main objective of this paper is to identify the ethos and edos factors during the treatment process among Hill Korwa Tribe. the area of study belongs to fourteen villages from Bagicha and Kunkuri blocks of Jashpur district and it has been selected through lottery method of simple random sampling. an interview and case study is conducted among Hill Korwa community and participatory observation is also done to witness the way the healers used in carrying out their treatment processes in order to see the satisfaction of the people. the paper basically focused to Sociological theory of Social System introduced by Talcott Parson and Krober's concept about culture which is termed as Ethos and Edos.

KEYWORDS: Hill Korwa, Indigenous Culture, Tribal Health, Traditional healing, Primitive Tribe, Ethos and Edos.

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Pt. R.S.U., Raipur (C.G.)

वैश्विक महामारी कोविड-19 का प्रवासी महिला श्रमिकों के सामाजिक-आर्थिक स्थित पर प्रभाव-एक समाजशास्त्रीय अध्ययन (छत्तीसगढ़ राज्य के रायपुर जिले के विशेष संदर्भ में)

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एसोसिएट प्रोफेसर एवं विभागाध्यक्ष, समाजशास्त्र एवं समाजकार्य अध्ययनशाला, पं. रविशंकर शुक्ल विश्वविद्यालय, रायपुर

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ABSTRACT:

विश्व अर्थतंत्र के महत्वपूर्ण इकाई होने के बाद भी श्रमिकों की सामाजिक-आर्थिक स्थिति बहुत खराब है। खासकर श्रम-प्रवास में प्रवासी महिला श्रमिकों के लिए यह स्थिति बेहद दयनीय है। विकासशील देश भारत में प्रवासी श्रमिकों के संबंध में विभिन्न समस्याएं एवं संकट मौजूद हैं। अनेक शोध अध्ययन यह दर्शाते है कि श्रम प्रवास में महिलाओं की स्थिति सकारात्मक कम बल्कि नकारात्मक अधिक परिणीत हुए हैं। विशेषकर वैश्विक महामारी कोविड-19 से प्रवासी श्रमिक महिलाएं अधिक प्रभावित हुई हैं। प्रस्तुत शोध-पत्र में छत्तीसगढ़ राज्य की राजधानी रायपुर जिले के प्रभावित 80 महिला प्रवासी श्रमिकों से अर्द्ध संरिचत साक्षात्कार अनुसूची उपकरण के माध्यम से तथ्य संकलन किया गया है एवं कोविड-19 महामारी के कारण सामाजिक-आर्थिक स्थिति पर हुए प्रभाव का अध्ययन किया गया हैं। प्रस्तुत अध्ययन प्रवासी महिला श्रमिकों की सामाजिक असमानता; जीवन संकट एवं आर्थिक असुरक्षा की निराशाजनक स्थिति को चिन्हांकित करता है और यह तर्कगत् बल देता है कि वे पूर्व की अपेक्षा और अधिक दयनीय स्थिति का अनुभव कर रहे है। सामाजिक-आर्थिक सुरक्षा पर प्रभावी एवं ठोस नीतिगत् हस्तक्षेप किया जाना आवश्यक हैं।

Keywords:

- प्रवासी महिला श्रमिक
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कमार जनजाति की महिलाओं की रोजगार एवं ऋणग्रस्तता की स्थिति का अध्ययन : छत्तीसगढ़ राज्य के गरियाबंद जिले के विशेष संदर्भ में

दीपिका कंवर, डॉ. एल. एस. गजपाल , मुकेश सिंह

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सारांश- कमार जनजाति शासन द्वारा घोषित एक विशेष पिछड़ी जनजाति है। यह गोड़ की एक उपजाति है। कमार मध्य भारत की अन्य जनजातियों की भांति प्रोटोआस्ट्रेलायड प्रजाति के हैं। कमार द्रविडियन परिवार से संबंधित है। इनका संकेन्द्रण मुख्यतः गरियाबंद जिले में तथा आंशिक रूप से धमतरी जिले में है। जनजातीय समुदाय में ऋणग्रस्तता एक प्रमुख समस्या है। राज्य में इन्हें विशेष पिछड़ी जनजाति के श्रेणी में रखा गया है इनके विकास एवं उत्थान के लिए गरियाबंद जिले में कमार विकास प्राधिकरण का गठन किया गया है। अपनी सामाजिक एवं सांस्कृतिक आवश्यकताओं की पूर्ति हेतु इन्हें साहूकारों, महाजनों एवं बैंकों से ऋण लेना पड़ता है। उचित समय पर ऋण नहीं चुकाने पर जनजातियों को शोषण का शिकार का होना पड़ता है। यह अध्ययन गरियाबंद जिला के कमार अनुसूचित जनजाति पर आधारित है। इस अध्ययन हेतु गरियाबंद जिले के 3 कमार बाहुल्य ग्रामों का चयन किया गया है। इस अध्ययन के माध्यम से 50 कमार परिवारों के ऋणग्रस्तता की स्थिति को जानने का प्रयास किया गया है । प्रस्तुत अध्ययन की प्राप्त जानकारी से ज्ञात होता है कि कमार जनजाति परिवार में ऋणग्रस्तता जैसी गंभीर समस्या विद्यमान है ।

महत्वपूर्ण शब्द- कमार जनजाति, ऋणग्रस्तता

प्रस्तावना- कमार अनुसूचित जनजाति भारत सरकार द्वारा घोषित विशेष पिछड़ी जनजातियों में से एक है। कमार जनजाति दुर्गम एवं अभावग्रस्त क्षेत्र में निवास करने के कारण अत्यंत पिछड़ी हुई है, जिसके कारण विकास से वंचित है। कमार जनजाति के पिछड़ेपन के कारण महिलाओं की समस्याओं पर विशेष ध्यान नहीं दिया गया है, अतः उन्हें विकसित करने की आवश्यकता महसूस की गई है। सरकारी कार्यक्रमों के प्रयासों के बावजूद कमार जनजाति की महिलाओं की स्थिति निम्नतम है । सरकारी प्रयासों एवं कार्यक्रमों के माध्यम से जनजाति समाज की स्थिति को ऊपर उठाने के लिये निरंतर प्रयासरत है फिर भी यह जनजाति समाज विकास से स्वयं को जोड़ पाने में असफल रहा है। तमाम कोशिशों के बाद भी जनजाति समाज अशिक्षा, ऋणग्रसस्ता, शोषण तथा निर्धनता जैसी सामाजिक समस्याओं से ग्रसित है। ऐसे में कमार जनजाति की महिलाओं की वर्तमान स्थिति एवं समस्याओं का अध्ययन और भी महत्वपूर्ण हो जाता है।

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An Estimator of Population Mean Using Auxiliary Information for Small Samples

Abstract

In this paper a new class of estimators for estimating population mean under general sampling design has been proposed. The expressions of bias and mean square error of the suggested estimator are derived. For the optimum choice of constants it is more efficient than other existing estimators. Further properties of the proposed estimator are discussed under simple random sampling without replacement procedure. Numerical illustrations have been made

Full Text

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Book Review

Discrimination based on Sex, Caste, Religion and Disability

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Book Review

Discrimination based on Sex, Caste, Religion and Disability

A cost-free handbook of 152 pages in 2003 developed by NCTE under the aegis of National Human Rights Commission to sensitize and address teachers and teacher educators through educational interventions.

The following contributors and editors developed this handbook.

Contributors

- Usha Nayar, Formerly Professor and Head, Department of Women's Studies, NCERT, New Delhi
- G. G. Wankhede, Professor and Head, Unit of for Child and Youth Research, Tata Institute of Social Sciences, Mumbai
- M.N.G. Mani, Secretary General, International Council for Education of People with Visual Empowerment, IHRDC campus, Coimbatore
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Editors

- Mool Chand Sharma, Adviser (Research) NHRC
- A.K. Shrama, Formerly Director, NCERT

There are six chapters in this book which are as follows:

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1. **Discrimination based on Sex, Caste, Religion and Disability : A Conceptual Framework**

   In the first chapter, meaning and scope of the Discrimination, Non-discrimination and Positive/Protective discrimination are explained**.** After knowing this module, the teacher will be familiar with the provisions contained in the Constitution of India regarding discrimination and discuss the implications of these provisions. A comprehensive introduction of various committees and commissions, fundamental rights, constitutional provisions made for women and children are also described in this chapter. After reading this, the teacher will understand the implications of caste as a system and as an institution as well as the dilemma of caste and casteism. The fundamental principles of any contemporary society are humanity dignity, liberty, equality, justice, but in India injustice, inequality and discrimination exist in the worst form due to social stratification and hierarchy which are directly linked to religion and caste. The prevailing theory regarding the origin of caste is "occupational theory". The upper castes are in clean occupations while the lower castes work for the service of upper castes and following unclean occupations, they do not have right to both property and education. These castes are socially, economically and culturally backward till date. Castes are a complex phenomenon, their structures are diverse and differ from each other, from one another to culture and region to region. The caste-based system affects the development of society and the nation also. So it is necessary to the teacher that they have enough knowledge about all legislative measures to eliminate discrimination amongst SCs and STs which have been introduced through this handbook. In this chapter, the teacher will also be to know the major factors leading to discrimination for disabled persons and various national and international recommendations on disabilities.

2. **Discrimination based on sex/gender**

   After reading second chapter of this book, the teacher would-be able to understand the processes that lead to formation of the sex-role identity and self-concept in children and adults. The teacher is able to evaluate gender-based discrimination in constructing a negative self-concept (poor self-esteem and poor self-image) in girls and a positive self-concept in boys. We observe many differences among girls and boys, in the home, in the street, inside the classroom, in the play-field, during the school recess. For instance, in general, boys are active, playful, confident, bold, demanding, loud, at times rough, rowdy,

A Conceptual Review on Research Attitude in Indian Academia

*Namrata Singh, **Dr. Anil Kumar Panda, ***Dr. Amitesh Kumar Singh

सारांश

ज्ञान के विस्तार और शोधन में शिक्षा और अनुसंधान की महत्वपूर्ण भूमिका है। वर्तमान भारतीय विद्यामूलक समाज के संदर्भ में चाहे वह छात्र हों, शोधार्थी हों, शिक्षक हों, प्रशासक हों, सभी को अनुसंधान के संचालन और प्रकाशन में कई बाधाओं और चुनौतियों का सामना करना पड़ता है। इसका सीधा प्रभाव अनुसंधानकर्ता की शोध अभिवृत्ति पर पड़ता है। इस लेख में शोधार्थी के अनुसंधान दृष्टिकोण एवं इसे प्रभावित करने वाले कारकों से संबंधित पूर्व में किये गए अध्ययनों का विश्लेषण करके भारतीय शिक्षाविदों के सामने आने वाली विभिन्न समस्याओं और चुनौतियों की ओर ध्यान आकर्षित करने का प्रयास किया गया है।

समीक्षा के उपरांत भारतीय विश्वविद्यालयों में पूर्व में हुए शोध कार्यों में कई प्रकार की विसंगतियां पायी गयीं जिनके समाधान एवं भारतीय उच्च शिक्षा प्रणाली के उन्नयन हेतु नई शिक्षा नीति-2020 में बहु-विषयक अनुसंधान, लचीली उच्च शिक्षा और अनुसंधान विश्वविद्यालयों की स्थापना जैसे कुछ मूल्यवान सुझाव दिये गए हैं ताकि ज्ञान का केंद्र बनकर भारत विश्वपटल पर अपनी उत्कृष्ट छवि बनाने में सक्षम हो सके।

Introduction

Education is an important tool for the overall development of both the person and the society. Through higher education, youth is enabled to do any work efficiently according to their interest, tendency and ability and successfully face the challenges of life. India's higher education system is the largest after the US and China (Times of India, 2014). This education system made by many public and private colleges which affiliated to the higher institutions or universities. Presently the Indian universities face many challenges in framing regulation and quality control. The quality of education depends on the various variables related to it like teachers, learners, curriculum, educational institutions and research activity going on in it. The higher level education is directly correlated to the knowledge creation which is developed and refined by using innovative products and methodologies created by research. After globalization special emphasis and high demand is being laid on research which shows its importance in human life. According to the All India survey reports on higher education released by MHRD (2019-20) there has been enrolment in research work is increasing at the rate of 10% per annum from 2010 to 2019. But the research task performed by Indian academiahasfailed to prove its effectiveness and usefulness. As we know knowledge, attitude and skill is essential condition for performing the research task. After studying the research work done in the past, we have got the information about the facts responsible for the research attitude. An attempt has been made to draw attention to the research attitude in Indian academia by reviewing the instructions given by the UGC from time to time for research quality and the works implemented by the universities on them.

Objectives of the Study

To study the conceptual review on research attitude in Indian academia.

Research Methodology

An exploratory and detailed review has been done of various research studies, available literature and various policies framed by UGC and other Institutions related toresearch attitude of Indian Academia.

Conceptualization of Terminology used in study

Indian Academia

The group of students studying in higher education and its teachers, who engage in teaching and research activities, refer to Academia (Kaneenika, 2015). In earlier years, research work was not an essential part of all higher institutions. Due to the need of economic

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उच्चतर माध्यमिक स्तर के शिक्षकों के शिक्षक प्रभावशीलता का उनके विद्यार्थियों की शैक्षिक उपलब्धि पर पड़ने वाले प्रभाव का अध्ययन

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सारांश – प्रस्तुत शोध अध्ययन में उच्चतर माध्यमिक विद्यालय में कार्यरत शिक्षकों के शिक्षक प्रभावशीलता का उनके विद्यार्थियों की शैक्षिक उपलब्धि पर पड़ने वाले प्रभाव का अध्ययन किया गया है। अध्ययन हेतु दुर्ग जिले के 8 उच्चतर माध्यमिक विद्यालय का चयन यादृच्छिक न्यादर्श विधि द्वारा किया गया है एवं 108 शिक्षकों एवं उनके 540 विद्यार्थियों का चयन न्यादर्श के रूप में उद्देशयपूर्ण विधि से किया गया है।प्रदत्तों के संकलन हेतु कुमार एवं मुथा (1999) द्वारा निर्मित शिक्षक प्रभावशीलता स्केल का उपयोग किया गया है और शैक्षिक उपलब्धि का मापन विद्यार्थियों के द्वारा पूर्व कक्षा में प्राप्त किए गए प्राप्तांक से किया गया है।एक द्विश प्रसरण विश्लेषण से परिणाम प्राप्त हुआ कि शिक्षकों के शिक्षक प्रभावशीलता का उनके विद्यार्थियों की शैक्षिक उपलब्धि पर अंशतः सार्थक प्रभाव पड़ता है ।

मुख्य शब्द – शिक्षक प्रभावशीलता – उच्च, मध्यम, निम्न, एवं शैक्षिक उपलब्धि।

प्रस्तावना – शिक्षा मानव के जीवन को प्रकाशित करती है एवं उसमे अंतर्निहित गुणों को विकसित करके जीवनयापन करने में समर्थ बनाती है।शिक्षा के द्वारा ज्ञान को अर्जित कर किया जाता है।शिक्षा प्राप्त करने की प्रक्रिया जीवन पर्यन्त चलती रहती है।बालक की शिक्षा औपचारिक रूप से विद्यालय से प्रांरभ होती है।प्राथमिक, माध्यमिक, उच्चतर माध्यमिक स्तर पर शिक्षा विद्यालय में होती है।यहॉ विद्यालय में शिक्षकों के द्वारा ज्ञान प्राप्त कर विद्यार्थियों में ज्ञान, अवबोध, कौशल विभिन्न गुणों का विकास होता है।विद्यार्थियों के लिए शिक्षक आदर्श होते है, शिक्षकों के आदर्श व्यवहार , शिक्षण, अनुशासन, कर्तव्यनिष्ठा एवं अन्य गुणों से विद्यार्थी प्रभावित होते है।शिक्षक प्रभावशीलता का अर्थ शिक्षकों के प्रभावी शिक्षण से है।वर्तमान समय में विद्यार्थियों का आकलन उनकी शैक्षिक उपलब्धि से किया जा रहा है।विद्यार्थियों की शैक्षिक उपलब्धि जितनी अधिक होगी उनके शिक्षकों का शिक्षण उतना ही प्रभावी माना जाता है। **अकिरि (2013)** ने नाइजीरिया के डेल्टा स्टेट में पब्लिक सेकेन्डरी स्कूलों में छात्रों के शैक्षिक प्रदर्शन पर शिक्षकों की

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Salicylic acid attenuates salinity-induced growth inhibition in *in vitro* raised ginger (*Zingiber officinale* Roscoe) plantlets by regulating ionic balance and antioxidative system

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ABSTRACT

Ginger (*Zingiber officinalis* Roscoe) is valued as a spice and herbal plant with high economic importance, but its productivity is affected by soil salinity. In the present study, potential of salicylic acid (SA) to reduce salt stress was tested in ginger plantlets grown under *in vitro* conditions. NaCl stress at 150 mM concentration caused a significant decline in growth parameters and photosynthetic pigment contents and a rise in Na^+, Cl^-, H_2O_2, superoxide radical contents, activities of chlorophyllase, superoxide dismutase (SOD), catalase (CAT) and peroxidase (POD) enzymes. A foliar spray of 0.5 mM salicylic acid showed a remarkable improvement in the growth parameters (around 3-fold increase in shoot number and fresh weight) of stressed plantlets. SA treatment enhanced the contents of chlorophyll a (41%), chlorophyll *b* (51%), total chlorophyll (48.56%), carotenoids (36%) and reduced chlorophyllase activity (18%) under salt stress conditions. NaCl - induced activities of antioxidative enzymes were further increased by SA treatment. An increase of 71.22, 50.84 and 50.45 percent was recorded for SOD, CAT and POD, respectively. A reduction in H_2O_2 content (31.24%) and superoxide production rate (43%) in stressed plantlets was noted after SA application. This treatment also reversed the sodium ion toxicity as revealed by a decline in $Na^+$and Cl^- contents (90%) with a concomitant rise in K^+ ion concentration (25.65%) in stressed plantlets. These results indicated that SA-mediated improvement in ionic balance and antioxidative defense system contributed to the acclimatization of plantlets under salinity. In conclusion, foliar application of 0.5 mM salicylic acid could help recover the reduced growth of stressed plantlets. Therefore, SA treatment could be suggested as a feasible approach to produce salt adapted ginger plantlets *in vitro*. Such plants can perform well on saline soils and could serve as a continuous source of raw material for ginger industry.

1. Introduction

Ginger (*Zingiber officinale* Rosc.), a herbaceous perennial, is one of the most important cash crops of the world native to South-Eastern Asia (Gang and Ma, 2008). It is valued for its rhizomes which accumulates active constituents such as gingerols, shogaols, paradols, zingerone and semiterpenes (Mao et al., 2019). The rhizomes are used worldwide as a spice in preparation of several food items, beverages, soft drinks and in herbal medicines (Gang and Ma, 2008; Tapsell et al., 2006) making it commercially important high demand item in the international markets. Poor seed setting and low rate of propagation by rhizome account for its slow natural regeneration (Ravindran and Nirmal Babu, 2005). Exploitation of rhizomes for commercial purpose limits its availability as planting material. Further, its production is also severely challenged by biotic and abiotic stresses. It is susceptible to soil-borne pathogens such as *Pseudomonas solanacearum, Pythium aphanidermatum* and nematodes (Abbas et al., 2011) and sensitive to drought and salinity (Ahmad et al., 2009; Vivek et al., 2017). All these factors together reduce the overall productivity, affecting its supply to the ginger industry.

Potential of plant tissue cultures in screening for tolerance against various environmental stresses has been well established (Kacem et al., 2017; Muchate et al., 2019). *In vitro* culture system provides the advantage of response being studied under controlled conditions independent of other environmental cues existing at the field level. Further,

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ADVANCES IN CHEMICAL AND ENVIRONMENTAL ENGINEERING

Feasibility and potential of laccase-based enzyme in wastewater treatment through sustainable approach: A review

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Abstract

The worldwide increase in metropolitan cities and rise in industrialization have resulted in the assimilation of hazardous pollutants into the ecosystems. Different physical, chemical and biological techniques have been employed to remove these toxins from water bodies. Several bioprocess applications using microbes and their enzymes are utilized to achieve the goal. Biocatalysts, such as laccases, are employed explicitly to deplete a variety of organic pollutants. However, the degradation of contaminants using biocatalysts has many disadvantages concerning the stability and activity of the enzyme. Hence, they are immobilized on different supports to improve the enzyme kinetics and recyclability. Furthermore, standard wastewater treatment methods are not effective in eliminating all the contaminants. As a result, membrane separation technologies have emerged to overcome the limitations of traditional wastewater treatment methods. Moreover, enzymes immobilized onto these membranes have generated new avenues in wastewater purification technology. This review provides the latest information on laccases from diverse sources, their molecular framework and their mode of action. This report also gives information about various immobilization techniques and the application of membrane bioreactors to eliminate and biotransform hazardous contaminants. In a nutshell, laccases appear to be the most promising biocatalysts for green and cost-efficient wastewater treatment technologies.

Keywords Bioremediation · Enzyme immobilization · Cross-linked enzyme aggregates · Wastewater treatment · Laccase grafted membranes · Endocrine disrupter chemicals

Introduction

Expansion and economic development of countries followed by industrial and agricultural growth had led to an increased effluent discharge in the environment, ultimately contributing to the pollution of natural water bodies. Untreated chemical effluents generated by industries are discharged into the water reservoirs and have been found to increase the surface water pollution (Daughton 2004; Hernando et al. 2006; Spina et al. 2012; Malhotra and Suman 2021). Several contaminants such as fertilizers, pesticides, dyes, heavy metals, discharge from pharmaceutical industries (hormones and antibiotics) and other chemical derivatives like poly aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzo furans (PCDFs) get accumulated in these water bodies. These pollutants can be hazardous to both aquatic and terrestrial life forms of the environment (Lokhande et al. 2011; Deshmukh et al. 2016; Sarker et al. 2022). The concentration of these pollutants and the water quality can be checked via analysis of several physicochemical parameters like pH, BOD, COD and total suspended solids (TSS). Maintaining these parameters up to their discharge level is an essential requirements for the wastewater treatment plants. The major application of these wastewater treatment plants is to convert harmful effluents into neutral ones (Elekwachi et al. 2014). Traditionally, these methods include primary, secondary and tertiary treatments. The primary treatment involves the reduction of coarse solids and sedimentation, secondary treatment includes activated sludge followed by a tertiary treatment which involves

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DYNAMICAL BEHAVIOR OF AN INNOVATION DIFFUSION MODEL WITH INTRA-SPECIFIC COMPETITION BETWEEN COMPETING ADOPTERS*

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Abstract In this paper, we proposed an innovation diffusion model with three compartments to investigate the diffusion of an innovation (product) in a particular region. The model exhibits two equilibria, namely, the adopter-free and an interior equilibrium. The existence and local stability of the adopter-free and interior equilibria are explored in terms of the effective Basic Influence Number (BIN) R_A. It is investigated that the adopter free steady-state is stable if $R_A < 1$. By considering τ (the adoption experience of the adopters) as the bifurcation parameter, we have been able to obtain the critical value of τ responsible for the periodic solutions due to Hopf bifurcation. The direction and stability analysis of bifurcating periodic solutions has been performed by using the arguments of normal form theory and the center manifold theorem. Exhaustive numerical simulations in the support of analytical results have been presented.

Key words intra-specific competition; basic influence number; local stability; Hopf-bifurcation; normal form theory; center manifold theorem

2010 MR Subject Classification 34C23; 34D05; 34K18; 92D25

1 Introduction

Diffusion is the particular technique of communication by which a creative thought or innovative product is acknowledged by the market and signifies a specific level of uncertainty

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SURFACE PHOTOMETRY OF A SAMPLE OF E/So GALAXIES

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SURFACE PHOTOMETRY OF A SAMPLE OF *E/S*0 GALAXIES

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ABSTRACT

We study the isophotal shape analysis and the bulge-to-total light ratios (*B/T*) by the 1-dimensional method of surface brightness profile fitting for a sample of 20 early-type galaxies. We perform the bulge-disk decomposition in the g, r and i-bands of SDSS images using PROFILER software. We present the surface brightness profiles, colour profiles, other derived parameters and discuss correlations among them. Our surface photometry analysis reveals that six galaxies have *B/T* = 1, which means their radial light profiles modelled very well by pure bulge, two galaxies have *B/T* between 1 to 0.7, while 11 galaxies have *B/T* between 0.7 to 0.3 which are fitted well with their bulge and disk components with their respective Sersic and exponential functions. One galaxy has *B/T* < 0.2, hence lying into the category of a late-type spiral. We expect that these studies may help to get some clues about the formation history of the galaxies.

Key words and phrases. Galaxy, Early-type galaxies, Surface brightness, bulge-disk.

1. Introduction

Galaxies are the complex structures of heaven, having gone through different physical processes during their evolution period. Clues for the evolution history of galaxies are buried in their morphology. The morphological investigation is one of the important tools in our garage to search for some clues. Through this, one can suggest if the galaxy has evolved through a re-arrangement of its building blocks or had any mergers like violent processes. A popular way to classify the morphology of galaxies includes isophotal light profile decomposition as two main components: Bulge and Disk and estimating the total light of the galaxy. The estimated values of bulge-to-total light ratio (B/T) help us to separate the galaxies into different classes. Such a scheme is widely used for sample selection for further analysis of the galaxies, see selection criteria for early-type galaxies by Chaware et al. (2014). In this paper, we present a surface brightness profile and structural analysis of a sample of 20 galaxies, chosen from the catalogue by Nair et al. (2010) with redshift range $z \leqslant 0.02$ and magnitude limit is $g < 14$ mag. We prefer a more stable and computationally less expensive approach to profile fitting, which is 1- Dimensional profile modelling and bulge-disc decomposition to estimate bulge and disc properties of the galaxies. We study the isophotal properties of the sample galaxies using a wide-field survey Sloan Digital Sky Survey (SDSS) (York et al. (2000)) in optical (g- and r-band) and infrared (i-band) bands. In this study, we measure the bulge-to-total (B/T) light ratio for the sample galaxies and perform the isophotal shape analysis. The B/T parameter provides a rough estimation of disk-dominated or bulge-dominated galaxies (Alexander, 2011). The paper is organised as follows: in Section 2, we describe the sample and data reduction; in Section 3, we describe data analysis, colour profile, Figures and tables; Section 4 presents the discussion and conclusion.

2. The Data

The images of the sample galaxies are drawn from a very popular Wide-field survey SDSS Data Release 9 (DR9, Paris *at al.* 2012) which provides background subtracted and science-ready images in five bands u (3543 A°), g (4770 A°), r (6231 A°), i (7625 A°), and z-band (9134 A°) in ultraviolet, green, red, near- infrared and infrared filters respectively. In terms of good signal-to-noise ratio, g-, r-, and i-band images are more reliable. And hence g-, r- and i-band images are used for our analysis. These images have sky-subtraction applied and calibrated in nanomaggies per pixel. Inverted colour r-band images with the coordinate grid of the sample galaxies are presented in figure 1 and the global parameters for the sample galaxies are listed in table 1.

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Review Article

Plants' Steroidal Saponins - A Review on Its Pharmacology Properties and Analytical Techniques

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Abstract

The plant is a rich repository of useful secondary metabolites with profound medicinal potential. Saponins, one type of bioactive compound, are amphitheatric glycosides with one and more hydrophilic sugar and hydrophobic steroidal and terpenoid part. The former is known as steroidal saponin, and the latter is called terpenoid saponins. Steroidal saponin is mostly distributed among monocotyledon families such as *Asparagaceae*, *Amaryllidaceae*, *Dioscoreaceae*, *Smilacaceae*, and *Liliaceae*. Even though it is unusual, it could also be detected to some extent by dicotyledonous angiosperms, such as *Plantaginaceae*, *Zygophyllaceae*, *Fabaceae*, *Asteraceae*, and *Solanaceae*. It exhibits diverse pharmacological ability including antimicrobic, anti-inflammatory, cAMP phosphodiesterase inhibitory, antiadipogenic, bactericide, cardioprotective, antitumor, antidiabetic, cytotoxic activity, antifungal, antiviral, antioxidant, and hepatoprotective. Steroidal saponin timosaponin AIII from *Anemarrhena asphodeloides* has been found to possess antitumor activity. Diosgenin, another steroidal sapogenin, has the potential of preventing neurological diseases by affecting different signaling pathways, increasing bone formation, and increasing antithrombotic activity. Spicatoside A from *Liriope platyphylla* possesses anti-inflammatory, antiasthma, and antiosteoclastogenic activities. TTB2 from *Trillium tschonoskii* exhibits anticancer potential. The cell cycle arrest and ROS-dependent autophagy are induced by polyphyllin I. These diverse biological activities of steroidal saponins are attributed to the variability of their structural features. Analysis of steroidal saponins in plant materials mainly utilizes classically and advances thin layer chromatography (TLC) on normal and reverses-phase (high-performance thin-layer chromatography, densitometric TLC), gas chromatography, LC, UPLC, ultra-high-performance liquid chromatography (HPLC), supercritical fluid chromatography, and HPLC coupled to ultraviolet detector and diode array detector. HPLC coupled with MS and Nuclear magnetic resonance is used for online identification of separated saponins. The present review aims to furnish a comprehensive account of the recent advances in analytical methods of determination and medicinal applications of steroidal saponins.

Keywords: Steroidal, Saponins, Glycosides, Antitumour, Antioxidant, Analytical techniques

Introduction

Since bioactive compounds occurring in the herbal plant are popular as traditional medicine for different diseases. Currently using phytochemicals are treated to be secure and friendly for the human body. Phytochemicals are bioactive compounds naturally occurring which act as medicine and nutrient for the benefits of the human health.[1] Plants are a versatile source of different organic chemicals or phytochemicals. They comprised two groups in respect of their activity in plants as primary and secondary metabolites. The metabolites that are required to complete plant basic metabolic processes are known as primary metabolites, such as fats, carbohydrates, proteins, nucleic acid, and chlorophyll. They found throughout the plant kingdom. They are produced in large quantities and can easily extract. Secondary metabolites are not involved in primary metabolic processes but play a role to protect against abiotic and biotic stresses and ensure their existence in the environment. They usually produced in minor concentration and extraction often difficult and expensive.[2] Some examples are alkaloids, phenolics, terpenes, saponins, flavonoids, glucosides, lignans, curcumins, and plant steroids.[3,4]

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Isolation and Screening of Potent Cellulolytic Soil Fungi from Raipur City of Chhattisgarh State, India

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The current research focuses on the diversity of fungal isolates obtained from the soil and their ability to produce cellulolytic enzymes. Out of 76 colonies obtained, 11 fungal colonies were isolated viz. *Aspergillus*, *Humicola* and *Rhizopus* being the major genera of the isolates. From the 11 isolates, the identification of potent cellulase producing cultures was done using qualitative carboxy methyl cellulase screening test. Following the preliminary screening, five cultures viz., *Aspergillus sydowii*, *Humicola* sp-1, *Aspergillus niger*, *Aspergillus ustus*, *Aspergillus flavus* were identified to be potent with enzymatic indices ranging from 1.25 to 2.29. These were further selected for quantitative enzyme analysis. *Aspergillus sydowii* was found to have highest enzymatic activity and *Aspergillus flavus* was found to have the least enzymatic activity. Our findings revealed that *Aspergillus sydowii* appeared to be a promising candidate for cellulase production and can be utilized for waste recycling and other biotechnological applications.

Keywords: *Aspergillus*, Carboxy methyl cellulase, Endoglucanase, *Humicola*, Lignocellulose

Introduction

Population explosion has resulted in increased industrialization, which has escalated annual waste production. In the current economic scenario, the production of energy is also becoming an issue. Hence, there is a need to find new sources of raw materials for the generation of energy. One of the most promising forms available is a lignocellulosic waste. Due to their wide existence in nature, they have been exploited for the production of biofuels. Lignocellulosic biomass is the most abundant biological material derived from the biosphere. The major contribution to the cellulose pool is made by plants through photosynthesis.[1,2] Even though cellulose has numerous applications in fields such as paper manufacturing, nanomaterials, and bioenergy production, it is estimated that 1.5×10^{12} tonnes of cellulose gets wasted each year.[3] The main source of cellulosic waste is from industries such as forestry, agriculture, and municipal waste. However, 35–45% of cellulosic wastes are present in these residues.[4] Since, the tropical and sub-tropical region hosts the majority of agriculture, the zone inputs a large quantity of cellulosic waste in form of agricultural residues, which is either burned or removed from the site. This leads to the downfall in productivity, soil quality, and organic sources and indirectly causes some health issues in humans, loss of biodiversity and climate change.[5] Scientifically, rapid accumulation of this residual waste makes its management challenging. Hence, to cope up with upcoming environmental challenges, bioconversion of lignocellulosic waste into valuable biobased products can be achieved by a significant class of enzymes termed cellulases.[6,7] Cellulases are complexes of hydrolytic enzymes capable of hydrolyzing cellulosic residues into smaller sugar units like glucose. This complex shows high breakdown action on crude natural cellulosic residues and is found most commonly in fungi. Cellulase is a complex enzyme system that contains endo-1,4-β-D-glucanase (endoglucanase), exo-1,4-β-D-glucanase (exoglucanase) and β-D-glucosidase (β-D-glucoside glucanhydrolase).[8–10] The endoglucanase attacks randomly in the internal glycosidic bonds, producing glucan chains of different lengths, while the exoglucanase breaks down cellulose from the end of the chain. Endoglucanase also acts on cellodextrins and converts them into cellobiose and glucose. The completion of the hydrolysis process is mediated by β-glucosidase which cleaves cellobiose and removes glucose from the non-reducing end of the oligosaccharide.[11] The combination of cellulases is also used with other enzymes for the breakdown of biomass into simple sugars, which are further fermented to

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अनुक्रमणिका

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मोहन राकेश के नाटकों में नारी पात्रों का वैशिष्ट्य

डॉ. गिरजा शंकर गौतम

शोध सार

समकालीन जीवन के स्वर मोहन राकेश के नाटकों में सुने जा सकते हैं। नवीन नाट्यांदोलन में मोहन राकेश महत्वपूर्ण है, ऐतिहासिकता और आधुनिकता, नारी पात्रों की प्रधानता, काव्यात्मकता, परिस्थितियाँ इन्हें विशिष्ट बनाती हैं । इन्होंने वर्तमान में व्याप्त ज्वलंत समस्याओं को अपने नाटकों के माध्यम से अभिव्यक्ति दी है। प्रस्तुत अध्ययन स्त्री-पुरुष के अनाम संबंध, द्वंद्व, संत्रास, प्रेम और विवाह आदि जटिल प्रश्नों के साथ नारी चरित्र का वैशिष्ट्य को जानने समझने का प्रयास है। 'आषाढ़ का एक दिन' नाटक का पात्र कालिदास व्यक्ति नहीं वरन आज के साहित्यकार का प्रतीक जैसा है। मल्लिका के पिता की मृत्यु महामारी से होती है, तत्कालीन एवं समकालीन परिस्थितियों में गृहस्वामी की आर्थिक स्थिति को मल्लिका एवं अंबिका के रहन-सहन में देखा जा सकता है। रंगिणि-संगिनी आज की शोध गतिविधि को अभिव्यक्ति देती शोध छात्राएँ हैं, जो शोध की आत्मा में प्रवेश नहीं कर पातीं। स्वाधीनता के बाद सामाजिक, राजनीतिक, धार्मिक एवं आर्थिक परिस्थितियों, जीवनमूल्यों तथा मापदंडों में जो बदलाव आया उसका यथार्थ चित्रण स्वतंत्र्योत्तर नाटकों में मिलता है। इस काल की सामाजिक परिस्थितियों एवं मनोवृत्तियों के बदलाव को नाटककार मोहन राकेश ने अनुभव किया। प्राचीन कथानक को आधार बनाकर भी समाज को सामाजिक विकृतियों कुत्सित प्रवृत्तियों, विगलित मान्यताओं और रूढ़िगत संस्कारों से मुक्त करने का प्रयास किया । आधुनिकता से ग्रस्त व्यक्ति के आंतरिक द्वंद को पकड़ने की चेष्टा करने वाले नाटककारों के मध्य मोहन राकेश प्रमुख हस्ताक्षर हैं।

कुंजी शब्द : नाटक, रंगमंच, नाट्यकला, व्यक्तित्व अंतः संघर्ष, स्वगतभाषण, कथानक, सौंदर्यमुद्रा, भावभंगिमा, नाट्यसौंदर्य, आधुनिकता, परंपरा, नाट्यांदोलन, रंगमंच , अभिनय |

मोहन राकेश के नाटकों में युग, परिवेश,वातावरण, व्यक्ति का आंतरिक द्वंद्व तथा रंगमंचीय तत्वों का अद्भुत समन्वय प्रथमतः दृष्टिगोचर होता है। उन्होंने नाटकों में नए प्रयोग करने के लिए तत्पर रहते हुए नेपथ्य की ध्वनि, शब्द, प्रकाश व्यवस्था आदि के महत्व की खोज की। इसलिए इनके नाटक पठनीयता में उत्कृष्ट होते हुए पूर्णरूपेण अभिनेय भी हैं। कहना अतिशयोक्ति न होगा कि रंगमंच को सामने रखकर नाटक लिखने की परंपरा तथा नाटकों को अभिनेय बनाने का प्रयत्न मोहन राकेश के नाटकों से प्रारंभ होता प्रतीत होता है। वे रंगमंच की आंतरिक बाह्य आवश्यकताओं को पहंचानने, समझने और अभिनेय बनाने का सार्थक प्रयत्न करते हैं। इसलिए इनके नाटकों ने स्वतंत्र्योत्तर हिंदी नाटकों के विकास को नई दिशा और दृष्टि दी। 'लहरों के राजहंस' की लंबी भूमिका इसका साक्ष्य है।

मोहन राकेश नाटकों में कभी अतीत के माध्यम से आधुनिक युग की समस्याओं को चित्रित करते हैं, तो कभी समाज की व्याप्त ज्वलंत समस्याओं को नाटकों में सीधे-सीधे अभिव्यक्ति दी हैं। नाटककार के रूप में उन्होंने समाज की विसंगति, संत्रास तथा उत्पीड़न को भोगा उसका यथार्थ चित्रण अपने नाटकों में किया है। व्यक्ति की आर्थिक समस्याओं, सामाजिक विसंगतियों, अतिमहत्वाकाक्षाओं, कुंठाओं अधूरेपन की भावना को सहजता से चित्रित किया है ।

महत्वपूर्ण यह है कि इन्होंने नाटकों द्वारा नारी समस्याओं, पीड़ा, द्वंद तथा संत्रास को अभिव्यक्ति दी है|कहना उचित होगा कि नाटकों की केंद्रीय पात्र नारी ही हैं। पुरुष इनके नाटकों में निस्तेज और गौण भूमिका में हैं। 'आषाढ़ का एक दिन' में तीन मुख्य नारी पात्र हैं।अंबिका, मल्लिका एवं प्रियंगुमंजरी | दो गौण पात्र रंगिणि-संगिनी हैं।

अंबिका गाँव की बुजुर्ग विधवा तथा मल्लिका की मां है। मल्लिका नाटक की नायिका है। कवि कालिदास की प्रेयसी तथा सौंदर्य की साक्षात मूर्ति है। प्रियंगुमंजरी, गुप्तवंश की राजदुहिता, राजनीति में प्रवीण कवि कलिदास की पत्नी है। अंबिका, मल्लिका, रंगिणि, संगिनी काल्पनिक नारी पात्र हैं। काल्पनिक पात्रों में मल्लिका नायिका है। रंगिणि, संगिनी कवि कालिदास के जीवन की पृष्ठभूमि पर शोधकार्य कर रही हैं। इसी कार्य के लिए वे मल्लिका के ग्राम आती हैं। इन गौण पात्रों के चरित्रों को उभारने के लिए नाटकार ने कोई विशेष उद्यम नहीं किया है। नाटक की विशिष्ट नारी पात्र तथा केंद्रबिन्दु मल्लिका है, अन्य पात्र उसके व्यक्तित्व से प्रभावित प्रतीत होते हैं। मल्लिका के पिता महामारी से चल बसे हैं। अंबिका ने मल्लिका का पालन-पोषण वात्सल्य से किया है। मल्लिका कालिदास की प्रेयसी और प्रेरणा है। वह कालीदास से अपने संबंधों को सब संबंधों से श्रेष्ठ मानती है।