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Original Article

Studies on Composition of Stool Samples in Korba Area

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

1. Introduction

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

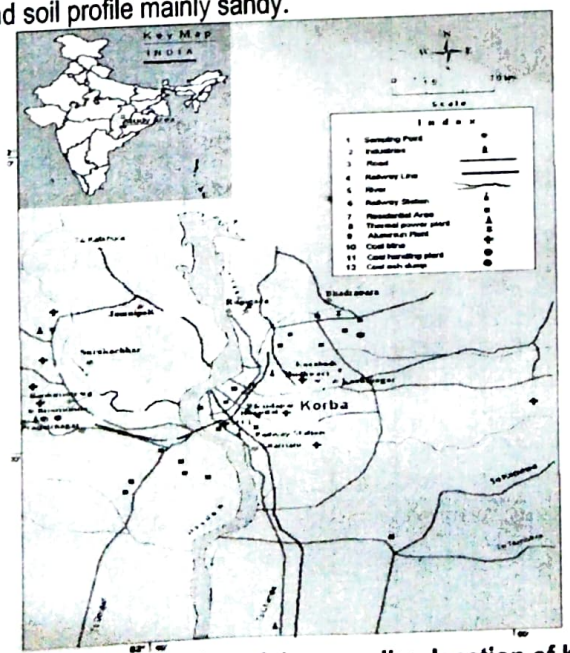

Figure 1: Representation of the sampling location of Korba region

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

1.1. Materials and Method

1.2. Study Area

The Korba (22° 21' N, 82° 42' E) area was selected for study of stool chemical and physical parameters by stool analysis during

1.3. Sample Collection

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

Figure 2: Representation of the various animal

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ORIGINAL ARTICLE

Sustainable valorization of seeds from eight aquatic plant species as a source of oil and lipophilic bioactive compounds

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Abstract

Potential biomass valorization of aquatic plant seeds of eight species was studied. *Merremia emarginata* (Convolvulaceae), *Nelumbo nucifera* (Nelumbonaceae), *Schoenoplectus articulatus* (Cyperaceae), *Cleome viscosa* (Cleomaceae), *Ipomoea purpurea* (Convolvulaceae), *Rorippa palustris* (Brassicaceae), *Ludwigia parviflora* (Onagraceae), and *Hygrophila auriculata* (Acanthaceae) were investigated for their oil yield and their lipophilic bioactive compound composition. The ultrasound-assisted extraction of oil followed by GC and HPLC analyses was applied for the determination of bioactive compounds. The oil yield ranged from 1.7 to 29.1%, in *N. nucifera* and *H. auriculata*, respectively. The studied species differed significantly with respect to the composition of fatty acids and bioactive compounds (statistically assessed). Unsaturated fatty acids (UFA) were the predominant group of fatty acids (74–88%) in the investigated samples. Four species were mainly comprised of γ-tocopherol (88–99%) (*M. emarginata*, *C. viscosa*, *I. purpurea*, *L. parviflora*), while the other four studied samples were dominated by γ-tocotrienol (72%) in *N. nucifera*, β-tocotrienol (72%) in *S. articulates*, α- and γ-tocopherol (49% and 41%, respectively) in *R. palustris*, and α-tocopherol (91%) in *H. auriculata*. β-Sitosterol was the main sterol (46–69%) in the majority of studied species, with the exception of *H. auriculata*, in which Δ5-stigmasterol (50%) dominated. Considerable levels of campesterol in each species (13–25%) were also recorded. Squalene was detected only in *I. purpurea*, *R. palustris*, and *L. parviflora*. The studied species were characterized by considerable quantities of carotenoids, tocochromanols, phytosterols, and squalene (0.6–6.9, 51–634, 292–2480, and 0–22 mg/100 g oil, respectively). Seeds of several studied aquatic species can be considered as an alternative source of oil and/or valuable lipophilic ingredients for industrial applications.

Keywords Aquatic plant seeds · Fatty acid · Tocotrienol · Tocopherol · Phytosterol · Carotenoid

1 Introduction

A large part of aquatic plants is classified as weeds due to their unwanted presence, for instance, in agriculture and water sports. Over the past decades, global weed utilization has been intermittent. Currently, productive utilization of weeds has been considered a promising alternative to aid weed management, with potential benefits for various areas of human life. Weeds have been mainly used in the past as sources of dye, fiber, and medicine; unlike cultivated plants, they are less susceptible to insects and diseases. The use of weeds have been highlighted as potential sources of phytomedicines that require increased attention due to their therapeutic properties [5]. Furthermore, economic benefits associated with their cultivation as profitable local crop have been demonstrated, for instance, *Cleome viscosa* [22].

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Original article

Seasonal size distribution and possible health implications of atmospheric aerosols collected from a rural site of eastern central India

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Abstract

This paper contributes for the first time the seasonal mass size distribution of atmospheric aerosols and their possible health implications in a rural area of eastern central India. Size-segregated atmospheric aerosols were collected from July 2012 to June 2013 at rural site near Mahanadi riverside basin of Rajim (20° 59′N and 81°55′E), Chhattisgarh, India using nine-stage cascade impactor. Bimodal size distribution was found with stable peaks at 0.4–0.7 μm (fine mode) and 4.4–5.8 μm (coarse mode) during monsoon, winter, spring and summer seasons at study site. The mass median aerodynamic diameter of total impactor particle sizes was shifted from lower particle size in winter to higher particle size in summer. High concentrations of size-segregated aerosols were found during winter season with 45%, 55% and 36% of $PM_{2.5–10}$, $PM_{2.5}$ and PM_1, respectively of the total PM_{10} aerosol. One unique observation was that the mass concentration of particulate matter increases

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pH-responsive eco-friendly chitosan modified cenosphere/alginate composite hydrogel beads as carrier for controlled release of Imidacloprid towards sustainable pest control

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Highlights

- IMI@Cht-Alg-Cn composite hydrogel beads as a CRS for imidacloprid was synthesized.
- Hydrogel beads showed 2600% water retention, pH responsiveness, and UV safeguarding.
- Long term insecticidal activity was achieved without affecting the host plant.
- Trophic level studies found the formulation to be safe towards non-targeted organisms.

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Original Article / Research Article

Total Phenolic and Flavonoid Content in various Dahlia Plant Species

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Abstract: Dahlia is a gorgeous blooming plant in the Asteraceae family that is frequently planted for flower production and garden adornment. The Dahlia plant is utilised in both culinary and medicinal applications. The current study focuses on the qualitative and quantitative investigation of phytochemicals found in this ornamental and culinary plant. Tannin, flavonoids, carbohydrates, proteins, terpenoids, and coumarins have been found in ethanolic extracts of flower petals and leaves. The Total Phenolic content as tannic acid equivalent and Total Flavonoid content of Dahlia flower petals and leaves were studied using spectrophotometric analysis in acetone extracts. It is found that total phenolic concentration was found to be highest in Dahlia Sherwood's peach flower petals (67402 mg/Kg) and lowest in Dahlia pinnata (Pale-Purple dinnerplate dahlia) (30485 mg/Kg) respectively, while among leaves it is found to be highest in Dahlia pinnata (Garden Dahlia red) (10452 mg/Kg) and lowest in Dahlia pinnata (Pale-purple dinnerplate dahlia) (5253 mg/Kg). The average tannin content detected in flowers was 51369 mg/kg, whereas leaves had a concentration of 7576 mg/kg. Dahlia pinnata (Garden Dahlia red) (146800 mg/kg) in flowers and Dahlia Sherwood's Peach (19900 mg/kg) in leaves have the highest flavonoid concentration, while Dahlia x hybrida (pinkish white) (19000 mg/Kg) in flowers and Dahlia Pinnata (Pale-purple dinnerplate Dahlia) (6300 mg/Kg) have the lowest.

Keywords: Asteraceae family, phytochemicals, Tannin, flavonoids, carbohydrates, proteins, terpenoids, coumarins, Dahlia.

Introduction

Dahlia is a prominent winter flower that is planted all around the world. From June until October, the Dahlia flower is farmed. It was given the name "Dahlia" after the great Swedish botanist Andreas Gustav Dahl. Dahlia is the most diverse species as a garden and balcony flower. The Asteraceae family comprises around 30 perennial plants with tuberous roots. More than 50,000 Dahlia cultivars with varying colours, forms, and sizes of inflorescences have been cultivated in gardens during the last century [1-2]. Crosses between various species, including Dahlia pinnata, Dahlia imperialis, Dahlia coccinea, and Dahlia rosea, have resulted in a significant variety of variations within the Dahlia genus. The shape of the inflorescences and the ligated flowers are elements that group the varieties of dahlia in several types are shown in **(Table 1)**. Dahlia is now widely utilised for a variety of uses, including landscaping, floristry as a cut flower, the pharmaceutical sector, cosmetics, cuisine, and as a raw material for colour extraction [3-4]. This beautiful and medicinal plant's leaves and blossoms are used for therapeutic reasons. Salads are made using the flower petals. Roots are prepared and eaten as a vegetable. It has a bitter taste. Sweet tuber extract known as 'dacopa' is used as a beverage or flavouring additive [5]. Dahlia flowers and leaves have nutritional value and are considered health boosters owing to the presence of different phytochemicals. It is well recognised that hybrid Dahlia species contain secondary metabolites like as flavonoids, tannin, and antioxidants that are beneficial. These chemical compounds are responsible for the desired beneficial properties **[6]**. The Aim of this study deals with Pharmacogenetic & Phytochemical Studies of flower and leaves of dahlia plant. The Present work is undertaken to screen and evaluate the total phenolic concentration of tannin and flavonoid contents in acetone extracts of *Dahlia* flower petals and leaves.

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Original Article / Research Article

Fluoride Contamination in Soil Samples of Korba Region

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Abstract: The coal is used for generation of energy in India and thereare huge exploitations which cause contamination of the environment and the inorganic contamination of surface soil in the coal burning area of the korba basin, Chhattisgarh.India is described techniques pH-meter, ion meter, Flam photometer, turbiditymeter, etc. were used for the monitoring of the elements. The concentration of F^-, pH, EC, K^+,Ca^{2+}, Na^+,NH_4^+,Alkalinity, TH, SO_4^{2-},Clin the surface soil.In this study, the electrical conductivity and pH values ranged from 241-722µS and 6.11-6.74 with mean value of 178.86±93.78 µS and 6.57±0.20 respectively. Other important parameters of soil samples, i.e. TH, alkalinity, Na^+, K^+, NH_4^+, Ca^{2+}, Cl^-, F^-, SO_4^{2-} ranged from 150-170, 79-176, 150-875, 550-850, 304-331, 56-100, 17.5-32.5 ,190-339 and 76-185 mg/kg with the mean value of 162±6.55, 131.2±31.11, 615±197, 740±90.2, 312±8.50, 69.6±13.76, 26±4.6, 264±43.82, and 120±34.09 mg/kg .The correlation studies of fluoride ion concentration with physico-chemical parameters were discussed by such statistical analysis.

Keyword: Alkalinity, turbiditymeter, Flam photometer, statistical analysis, physico-chemical parameters.

Introduction

The soil contamination of the korba basin has been not carried out so for in this work. The surface soil contamination of the korba basin with elements F^-. The pollution of soil is a great public health interest due to receiving of large number of pollutants from multiple sources including industrial wastes, vehicle, pesticides, paints, domestic waste, biomass burnings coal and batteries etc[1-5]. High concentration of metals in soil can negatively affect crop growth, as these metals interfere with respiration, photosynthesis degeneration of main cell organelles even leading to death of plants [5-12].Several environmental issues i.e., acid mine drainage, deposition of toxic compounds environmental pollution, halting of acid rain, health hazards, storage of solid waste etc [13-15]. At least ≈6 MT year−1 of coal ashes results from the burning of 20 MT coal. It has also been linked to various environmental and health problems (EPA 2007). Further contamination was generated by the largest aluminum plant in Asia [3.2 × 105 ton per year (TPY) Al smelter], which is also operated in this area. Preliminary investigations of soil pollution with HMs at nine locations were reported by Patel et al. (2016). Sharma et al. (2017) studied HMs in pond water and sediments from 20 locations in the Korba Basin. In this work, concentration variations, arsenic speciation, enrichment factors, and sources of HMs in the soil at 20 locations of the Korba Basin over a 5-year period are described.

Experimental

Study area

The korba area has been selected for the study of F^- other parameter of soil samples.korba contaminated of soil area 22.3595° N, 82.7501° Eis located in the C.G. State. The population in korba 583,338. A major producer of aluminum is also based in the

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Original Article

Distribution and Size Segregation of PM_{10} in Mosquito Coils

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Abstract: Mosquito coils are extensively used to repel mosquitos. During the preparation, the integrant (pesticide, sodium fluoride, nitrate, etc.) is added. They are fumed in the micro indoor environment, and particles are in the ultrafine mode. In the current study, eight mosquito coils of various trades were fumed in the chamber by collecting the PM. The concentration of PM_{10} was ranged from 11284 – 120103 µg m^{-3} with mean value of 43758±28409 µg m^{-3}. The relative concentration of $PM_{10.0-9.0}$, $PM_{9.0-5.8}$, $PM_{5.8-4.7}$, $PM_{4.7-3.3}$, $PM_{3.3-2.1}$, $PM_{2.1-1.1}$, $PM_{1.1-0.7}$ and $PM_{0.7-0.0}$ in the air was 1, 1, 1, 1, 4, 4, 13, 29 and 51%, respectively. The emission fluxes of various mosquito coil PM are discussed.

Keywords: *Distribution, Size segregation, aerosols, Flux, Toxicity*

1. Introduction

The mosquito problem persists for the majority of the year, and coils are fumed to repel mosquitos in the house, workplace, kitchen, restaurant, and so on. The main active elements of mosquito coils are poisonous compounds: pyrethrins, which account for around 0.3 - 0.4% of coil mass and, when burned, dissipate with smoke, repelling mosquitos from entering the room. [1]. The smoke is a complex mixture of particulate matter (PM), carbonate carbon (CC), organic carbon (OC), black carbon (BC), silica, metals, and other substances. The OC represent a wide range of organic compounds that may be categorised into generic compound classifications such as aliphatic, aromatic compounds, acids, and several unexplained compounds. [2]. They are of significant sources for particulates, polycyclic aromatic hydrocarbons (PAHs), persistent organic pollutants (POPs), carbon monoxide (CO), benzene, isoprene, etc. [3]. These particles constituted a health danger since their size allowed them to penetrate the deepest into the human body. They are known to produce oxidative stress and inflammation in the lungs, leading to an aggravation of asthma symptoms in sensitive people [4]. The particles produced by burning processes leave the lungs vulnerable to acute lower respiratory infections and chronic obstructive pulmonary disorders such as asthma, cancer, TB, cataracts, low birth weight, infant mortality, and so on. Figure 1 [5–8]. The indoor air pollution severely affects especially poor women and small children [9]. The carbonaceous aerosol in atmosphere

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Original Article

Determination of Stool Ash Samples in Korba Area

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Abstract: The environment of Korba basic is contaminated with of F^- and other element. The animal is fluorinated by intake of contaminated water and food. They are extracted by stool ash and urine. Total 10 number of sample (n=10) were taken for the analysis. In these work F^- contamination and other ion such as Na^+, K^+, Cl^-, NH_4^+ and SO_4^{2-} Concentration of fluoride were range from 112-886 mg/kg with mean value 477±224 mg/kg .This such on Na^+, K^+, Cl^-, NH_4^+ and SO_4^{2-} were obtained in the range of 480-820 ,1440-3440 ,1028-9300 , 1240-1406 , and 76-108mg/kg with mean value 622±71 , 2628±408 , 96±6, 1331±42, 5726±1692 mg/kg, .Respectively therefore, in the present study the concentration, correlation of different ion in extract of stool ash are discussed.

Keywords: *Stools samples, Stool ash, fluorosis, fluoride pollution.*

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Original Article / Research Article

Assessment of Fluoride Level in the Groundwaterof AmbagarhChowki Block

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Abstract : The groundwater of AmbagarhChowki, Rajnandgaon, India is contaminated with F^- at elevated levels. The basic bed rocks of central India are contaminated with fluorite minerals. The overuse ofgroundwater for irrigation causes increased mineralization of F^- in the groundwater. This contaminatedgroundwater is widely used for drinking and other household purposes. The prevalence of fluorosis is mainly due to the intake of large quantities of fluoride through water. Fluoride is found in shallow depth, presumably as a consequence of evaporation of water and precipitation of carbonate minerals.In this work, the fluoride pollution in groundwater of Ambagarh area (20°43'9"N and 80°44'7"E) during pre summer period (i.e. March 2020) is described. The RP value of the groundwater was found at least 5-folds lower than the recommended value of 650mV. The level of F^- is beingseveral folds higher than WHO recommended values. DO values of the groundwater were found to be in the range of permissible limits, i.e. 5–9.5 mg l^{-1}. The quality of groundwater of Ambagarhblock, Rajnandgaon, Chhattisgarh, India is examined. The physico-chemicalproperty of groundwater is discussed.

Keyword : irrigation, mineralization, evaporation, precipitation, fluoride pollution.

Introduction

Serious pollution of ground water has occurred in several regions of the country either due to leaching of contaminants from the land surface or/and abstraction from the bed rocks.The F^- contamination in groundwater of several states of the country viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, Uttrakhand, West Bengal, etc. were reported [**1-15**].

The weathering of the minerals (viz. topaz, fluorite, fluorapatite, villuamite, cryolite, ferro magnesium silicate, etc.), hydrological conditions and anthropogenic activities (viz. mining, coal burning, etc.) were reported for mineralization of excessive concentration of F^- in the groundwater [**16**].

Fluorine is a highly reactive element, and it has an important role in precipitation of various elements as minerals. Fluorine contents in the soil vary between 10 - 150 mg/kg, and the majority of fluorine occurs naturallyin combined forms in various rocks, soils, waters, plants, other living organisms, slag, fluxes, etc. The fluoridein the ground water is severely extracting from the bed rock causing a disease known as "fluorosis", which continuesto be an endemic problem in most parts of the world. India is among the 23 nations around the globe;where fluorosis health problems (*i.e.* dental, skeletal and/or non-skeletal) are continue to exist mainly due to theconsumption of contaminated water. Fluoride toxicity is characterized by a variety of signs and symptoms.Upon ingestion, fluoride binds calcium ions and may lead to hypocalcaemia. Fluoride has cytotoxic effects and interferes with a number of enzyme systems. Fluoride inhibits acetylcholinesterase, which may be partly responsible for hyper salivation, vomiting, and diarrhea[**15**]. Abnormal levels of fluoride in the groundwater is common in India due to weathering of thefractured hard rock pegmatite veins composing of minerals i.e. topaz, fluorite fluorapatite,villuamite, cryolite, ferro magnesium silicate, etc. Millions of people are exposed toexcessive amount of F^- through drinking water contaminated from natural (geogenic) andanthropogenic sources by suffering with various types of fluorosis disease.Severe gastroenteritis, salivation, restlessness, sweating, anorexia, muscle weakness, stiffness, dyspnoea, ventricular tachycardia, and colonic

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ASSESSMENT OF FLUORIDE LEVEL IN THE GROUNDWATER OF DONGARGARH CITY

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Abstract: The basic bed rocks of central India are contaminated with fluorite minerals. The overuse of groundwater for irrigation causes increased mineralization of F^- in the groundwater. This contaminated groundwater is widely used for drinking and other household purposes. The basic bed rocks of central India are contaminated with fluorite minerals. This contaminated groundwater is widely used for drinking and other household purposes. The prevalence of fluorosis is mainly due to the intake of large quantities of fluoride through water. Fluoride is found in shallow depth, presumably as a consequence of evaporation of water and precipitation of carbonate minerals. In this work, the fluoride pollution in groundwater of Dongargarh area (21.18842°N and 80.75875°E) during pre summer period (i.e. March 2020) is described. The concentration of F^- in the groundwater (n = 12) was ranged from 2.5–5.6mg l^{-1} with mean value of 4.4±0.5 mg l^{-1}.The quality of groundwater of Dongargarh city, Rajnandgaon, Chhattisgarh, India is examined. The physiochemical property of groundwater is discussed.

1. Introduction

Fluorine is a highly reactive element, and it has an important role in precipitation of various elements as minerals. Fluorine contents in the soil vary between 10 - 150 mg/kg, and the majority of fluorine occurs naturally in combined forms in various rocks, soils, waters, plants, other living organisms, slag, fluxes, etc. The fluoridein the ground water is severely extracting from the bed rock causing a disease known as "fluorosis", which continues to be an endemic problem in most parts of the world. India is among the 23 nations around the globe; where fluorosis health problems (*i.e.* dental, skeletal and/or non-skeletal) are continue to exist mainly due to the consumption of contaminated water. Fluoride toxicity is characterized by a variety of signs and symptoms. Upon ingestion, fluoride binds calcium ions and may lead to hypocalcaemia. Fluoride has cytotoxic effects and interferes with a number of enzyme systems. Fluoride inhibits acetylcholinesterase, which may be partly responsible for hyper salivation, vomiting, and diarrhea [1].

Serious pollution of ground water has occurred in several regions of the country either due to leaching of contaminants from the land surface or/and abstraction from the bed rocks. The F^- contamination in groundwater of several states of the country viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, Uttrakhand, West Bengal, etc. were reported [2-16].

The weathering of the minerals (viz. topaz, fluorite, fluorapatite, villuamite, cryolite, ferro magnesium silicate, etc.), hydrological conditions and anthropogenic activities (viz. mining, coal burning, etc.) were reported for mineralization of excessive concentration of F^- in the groundwater [17-20].

Abnormal levels of fluoride in the groundwater is common in India due to weathering of the fractured hard rock pegmatite veins composing of minerals i.e. topaz, fluorite fluorapatite, villuamite, cryolite, ferro magnesium silicate, etc. Millions of people are exposed to excessive amount of F^- through drinking water contaminated from natural (geogenic) and anthropogenic sources by suffering with various types of fluorosis disease. Severe gastroenteritis, salivation, restlessness, sweating, anorexia, muscle weakness, stiffness, dyspnoea, ventricular tachycardia, and colonic convulsions followed by depression and death are typically seen. Chronic fluorosis is characterized by unthrifty animals with skeletal and dental abnormalities. Reduced feed and water intake accompanied by poor weight gain and milk production reflect dental lesions and impaired mastication. Mottled, chalky, pitted and stained enamel and uneven and excessive wear on the teeth are frequently seen. Skeletal abnormalities associated with increased bone resorption and remodelling produces severe lameness, stiffness, abnormal hoof growth, and exostoses. **Figure 1.**

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Assessment of Fluoride Level in the Ground water of Rajnandgaon City

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Abstract : Several water-borne diseases are observed in people of Rajnandgaon city, Chhattisgarh, India. The basic bed rocks of central India are contaminated with fluorite minerals. The overuse bfgroundwater for irrigation causes increased mineralization of F^- in the groundwater. This contaminatedgroundwater is widely used for drinking and other household purposes. The basic bed rocks of central India are contaminated with fluorite minerals. This contaminatedgroundwater is widely used for drinking and other household purposes. The prevalence of fluorosis is mainly due to the intake of large quantities of fluoride through water. Fluoride is found in shallow depth, presumably as a consequence of evaporation of water and precipitation of carbonate minerals.In this work, the fluoride pollution in groundwater of Rajnandgaonarea (21.0972° N and 81.0338° E) during pre summer period (i.e. March 2020) is described. The groundwater of the Rajnandgaon city has very high conductivity. DO values of the groundwater were found to be in the range of permissible limits, i.e. 5–9.5 mg l^{-1}. The level of F^- is beingseveral folds higher than WHO recommended values.The quality of groundwater of Rajnandgaoncity, Chhattisgarh, India is examined. The physico-chemicalproperty of groundwater is discussed.

Keyword : evaporation, bed rocks, fluorite minerals, groundwater, irrigation, contaminated ground water, evaporation, carbonate minerals, conductivity, DO values.

Introduction

Most of the minerals and coal of the country are reserved in theChhattisgarh state, India. The vast exploitation of the natural resources and overuse of ground water leads todepletion of the ground water quality in several parts of the state.Millions of people and animals were exposed to excessive amount of F^- through drinking water, suffering with various types of fluoride diseases [1-17]. Fluorine is a highly reactive element, and it has an important role in precipitation of various elements as minerals. Fluorine contents in the soil vary between 10 - 150 mg/kg, and the majority of fluorine occurs naturallyin combined forms in various rocks, soils, waters, plants, other living organisms, slag, fluxes, etc. The fluoridein the ground water is severely extracting from the bed rock causing a disease known as "fluorosis", which continuesto be an endemic problem in most parts of the world. India is among the 23 nations around the globe;where fluorosis health problems (*i.e.* dental, skeletal and/or non-skeletal) are continue to exist mainly due to theconsumption of contaminated water. Fluoride toxicity is characterized by a variety of signs and symptoms.Upon ingestion, fluoride binds calcium ions and may lead to hypocalcaemia. Fluoride has cytotoxic effects and interferes with a number of enzyme systems. Fluoride inhibits acetylcholinesterase, which may be partly responsible for hyper salivation, vomiting, and diarrhea[18].

Serious pollution of ground water has occurred in several regions of the country either due to leaching of contaminants from the land surface or/and abstraction from the bed rocks.The F^- contamination in groundwater of several states of the country viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Jammu and Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Uttar Pradesh, Uttrakhand, West Bengal, etc. were reported [19-33].

Reduced feed and water intake accompanied by poor weight gain and milk production reflect dental lesions and impaired mastication. Mottled, chalky, pitted and stained enamel and uneven and excessive wear on the teeth are frequently seen. Skeletal abnormalities associated with increased bone resorption and remodelling produces severe lameness, stiffness, abnormal hoof growth, and exostoses,