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8. Shaikh Parveen R. and Bhosle Arjun B., Plankton Biodiversity Of Siddheshwar Dam In Hingoli, Maharashtra, India, accepted for Journal of Environmental Research And Development (JERAD), (Impact Factor: 0.157).


Studies on some selected chemical parameters of Siddheshwar reservoir of Maharashtra

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ABSTRACT

Water is vital for all aspects of human and ecosystem survival and health. Thus, its quality is also important. Water quality refers to the composition of water samples because their high concentration make the water unsuitable for drinking purpose. Present study reports the concentration of ions such as Calcium, Magnesium, Sodium, Potassium, Chloride, Phosphate and Sulphate from Siddheshwar reservoir, Hingoli district of Maharashtra state. The analysis has been carried out during June 2009 to May 2010. Water of this dam is mostly useful for drinking, domestic, agricultural, aquaculture, and industrial purposes. The observed values were compared with standard permissible limit as prescribed by various organizations.

Keywords: Chemical analysis. Drinking water. Reservoir.

INTRODUCTION

Water is one of the abundantly available substances in nature. It is essential constituent of all animal and plants materials. It forms about 75% of earth crust [14]. All natural water contains dissolved ionic constituents based on numerous analyses of surface and ground waters from all over the country. It has been found that the bicarbonates, sulphates and chlorides of calcium, magnesium and sodium are major ionic species present in most waters. Some of the minor ions are Al, NH₄, PO₄, CO₃, Fe, Mn, F, SO₄, S, etc. Typically the major and minor ionic species present are derived from the contact of the water with various mineral deposits [5].

The sources of bicarbonates, sulphates and chlorides of calcium, magnesium and sodium found in natural waters are the desolution of lime stone, marble, chalk, calcite, dolomite, magnesite, dolomitic limestone, white salts (the baking soda), gypsum, alabaster, selenite, minerals containing calcium carbonate and magnesium carbonate, potassium sulphate, potassium chloride. 

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Studies on some selected metals of Siddheshwar reservoir at Hingoli, Maharashtra, India

Shailesh Parveen R & Bhosle Arjun B.

ABSTRACT: Investigations on the presence of chromium and cadmium metals in water using spectrophotometer from Siddheshwar dam in district Hingoli, Maharashtra state of India was studied during the period of July 2010 to June 2011. The chromium and cadmium are heavy metals used in a variety of industrial applications which are highly toxic to humans, animals, plants and microorganisms. The water was found to be uncontaminated with cadmium and contaminated with chromium when compared with their standard limits for drinking water prescribed by different organizations.

KEYWORDS: Trace metals, Mean, Drinking water, Permissible limit, Siddheshwar, Chromium, Cadmium.

INTRODUCTION

The problem of environmental pollution due to toxic metals has raise in face of many metropolitan cities. The toxic metals entering the ecosystem may lead to geo-accumulation, bioaccumulation, biotransformation and biomagnifications. Metals like iron, copper, zinc and other trace metals are important for proper functioning from ecological systems and their deficiency or excess could lead to a number of diseases [13]. Besides, the presence of toxic metals such as lead, mercury and cadmium in the environment has been a source of worry to the environmentalists, government agencies and health practitioners. This is mainly due to their health implication since they are non - essential metals of no benefits to human [17]. The presence of these metals in ecosystem has far reaching implications directly to the biota and indirectly to man. In addition, food chain contamination by toxic metals has become a burning issue in recent years because of their potential accumulation in bio-system through contaminated water, soil and air. Therefore, a better understanding of toxic metal source, their accumulation in the soil and the effect of their presence in water and soil or plant system seems to be particularly important issue of present day research on risk assessments [11]. Dams are sinks for heavy metals that continuously wash off rocks and soils that are directly exposed to surface waters. The common sources of heavy metals are from dead and decaying vegetation, animal waste, wet and dry natalos of atmospheric particulate matters and from anthropogenic activities.

The role of trace metals in biochemical life processes of aquatic plants and animals and their presence in trace amounts in the aquatic environment are essential. However, at high concentrations, these trace metals become toxic [1]. Temperature is a limiting factor in the aquatic environment [7]. [5]. Water temperature is probably the vital environmental variable it affects metabolic activities, growth, feeding, reproduction, distribution and migratory behaviours of aquatic taxa [12], [3], [4]. It affects solubility of gases in water, gas solubility decreases with increased temperature. Temperature is affected by time of the day; high temperatures may be recorded in daytime and become low at night. Hydrogen ion concentration or pH as one of the most important environmental characteristics declines the survival, metabolism, physiology and growth of aquatic organisms. Ramanathan et al. [14] recommended optimum range of pH 6.8-8.7 for maximum growth and production of shrimp and carp. The pH of water is influenced by acidity of the bottom sediment and biological activities. High pH may result from high rate of photosynthesis by dense phytoplankton blooms. The pH value higher than 7 but lower than 8.5 according to Abowei [9] is ideal for biological productivity, but pH at below 4 is detrimental to aquatic life. The pH may be affected by total alkalinity and acidity, surface run off from surrounding rocks and water discharges. Chromium is the transition metal, with an average atomic weight of 52 and its electronic configuration is 4d10 5s2. On the periodic table, chromium is the 24th element and a member of group VI B along with molybdenum and tungsten [6]. Cadmium is also the transition metal, with an average atomic weight of 112.4 and an electron configuration is [Kr] 4d10 5s2. On the periodic table, cadmium is the 48th element and a member of group II B along with zinc and mercury. The sources of chromium are industrial and municipal wastes, anthropogenic sources etc. The excess of chromium causes diarrhea, nausea, low blood pressure, lung irritation, CNS disease, cancer, dermatitis etc. in human beings. The sources of cadmium are electroplating wastes, impurity in all products containing zinc, industrial wastes, soil, and sewage. The effects of cadmium are hypertension, degenerative bone diseases, injury to liver, growth retardation, CNS injury, diarrhoea and kidney damage. The present study is focused on assessment of chromium and cadmium metals in surface water.
Occurrence of chromium metal in Siddeshwar Reservoir at Hingoli, India

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ABSTRACT

This research work aims to study the presence of chromium metal in water using UV-VIS spectrophotometer from Siddeshwar dam at Taluka Aundha of district Hingoli, Maharashtra state of India was studied during the study period of July 2009 to June 2010. This metal is estimated in-Diphenylcarbazide method. Chromium, a heavy metal, is used in a variety of industrial applications. It is highly toxic to humans, animals, plants and microorganisms. Chromium is found in all natural waters both in hexavalent and trivalent forms. Oxidative form of chromium is very important relative to its mobility and its role in plant and human nutrition. The water was found to be contaminated with chromium when compared with their standard limits for drinking water prescribed by different organizations like World Health Organization (WHO) and Bureau of Indian Standards (BIS). Several changes occurred during the study period in chromium concentrations from selected sampling sites.

Keywords: Trace metal, Drinking water, Permissible limit Siddeshwar dam, Chromium.

INTRODUCTION

Water is one of the most essential elements to life on the Earth without which there would be no life [11, 26]. In its purest form, it’s odorless, colorless and tasteless but due to human and animal activities, it is usually contaminated with solid and human waste, effluents from chemical industries and dissolved gases [16, 21]. Nowadays most major metropolitan cities face the ever increasing problem of environmental pollution due to toxic metals. The toxic metals entering the ecosystem may lead to bioaccumulation geo-accumulation, and biomagnifications. Metals like iron, copper, zinc and other trace metals are important for proper functioning of biological systems and their deficiency or excess concentration could led to a number of disorders [23].

Besides, the presence of toxic metals such as lead, mercury and cadmium in the environment has been a source of worry to the environmentalists, government agencies and health practitioners. This is mainly due to their health implication since they are non-essential metals of no benefit to human being [6]. The presence of these metals in ecosystem has far reaching implications directly to the pious and indirectly to man. In addition, food chain contamination by toxic metals has become a burning issue in recent years because of their potential accumulation in bio-system through contaminated water, soil and air. Therefore, a better understanding of toxic metal source, their accumulation in the soil and the effect of their presence in water and soil or plant system seems to be particularly important issue of present day research on risk assessments [17].

Dams are sinks for heavy metals that continuously wash off rocks and soils that are directly exposed to surface waters. The common sources of heavy metals are from dead and decomposing plant and animal matter, geological activities like; weathering and erosion, wet and dry fallouts of atmospheric particulate matters and from man’s activities [25]. The role of trace metals in biochemical life processes of aquatic plants and animals and their presence in trace amounts in the aquatic environment are essential. However, the high concentrations of these trace metals become toxic [1].
Bioaccumulation of Chromium by Aquatic Macrophytes

Hydrilla sp. & Chara sp.

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ABSTRACT

The absorption process is being widely used by various researchers for the removal of heavy metals from aqueous solutions. In the recent years the use of various natural products has been widely investigated as an alternative for the currently expensive methods of water treatment. Some of the natural products can be effectively used as a low cost absorbent. Heavy metals can be absorbed by living or non-living biomass. Phytoremediation uses plants to remove pollutants from the environment. About two aquatic species were examined as potential, phytoremoval agents for chromium in aqueous solutions. Aquatic plants can be used for the removal of heavy metals. For the present study batch studies were conducted and the uptake of chromium from aqueous solutions by Hydrilla sp. and Chara sp. were investigated thoroughly. The daily chromium uptakes was recorded, analyzed the results and were compared with other aquatic plants. The present study revealed that these aquatic plants Hydrilla sp. and Chara sp. can be successfully used for heavy metal removal.

Key words: Chromium, Aqueous solution, Aquatic macrophytes, UV Spectrophotometer.

INTRODUCTION

Rapid urbanization, industrialization, mining activities, metal ore refining, agricultural chemicals, liquid and solid wastes resulted in heavy metal pollution of water and land resources. The increasing load of heavy metals have caused imbalance in aquatic ecosystems and the biota growing under such habitats accumulate high amounts of heavy metals like Cu, Zn, Cd, Cr, Hg and Ni which in turn, are being assimilated and transferred within food chains by the process of magnification, called as 'Biomagnification' [12]
BIOSORPTIVE BEHAVIOUR OF NEEM (AZADIRACHTA INDICA) BARK FOR IRON REMOVAL FROM AQUEOUS SOLUTIONS

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Abstract: Phytoremediation refers to a set of technologies that use different plants as a containment technique. This technology is receiving attention lately. As the results from field trials, it indicates that it is a cost saving technique compared to conventional treatment. The present investigation has helped to understand about the phytoremediation capacity of Azadirachta indica bark to remove Iron metal from aqueous solution. The adsorptive potential of Azadirachta bark for Iron investigated in this work. This biosorbent have been examined for its capacity to sequester iron from aqueous solution with contact time. The experiments were carried out by laboratory prepared samples on spectrophotometer. The Azadirachta bark remove maximum 80% of the iron within few minutes of contact time.

Keywords: Azadirachta indica, iron adsorption, aqueous media, phytoremediation, bark

INTRODUCTION

Water is a vitally important substance. It is such a medium, which gave birth to the first primitive life, and without it no life could exist. Throughout the history, the quality and quantity of water available to man have been the vital factor in ascertaining his well being[1]. Heavy metals contamination of industrial effluents is one of the significant environmental problems due to their toxicity, accumulation and biomagnification throughout the food chain as non-biodegradable pollutants [2]. Iron is fourth most abundant element of earth’s crust which is naturally present in soils, minerals rocks and microbial activities. It is usually discharged to the environment through the effluent of many industries such as zinc, steel, inorganic chemicals, alkalis, ink, paint, chlone, fertilizers, mining, pharmaceutical products, petroleum refining and sewage. Iron is considered as an aesthetic contaminant. Ferrous iron gives a disagreeable taste, odour, colour to water and produces an inky, black appearance when it combines with tea and coffee. It causes staining on laundries, fixtures, papers, tableware etc. It deposits in pipelines, water heaters and pressure tanks [3].
THE IMPACT OF LANDFILL ON SOIL AND GROUNDWATER QUALITY OF THE NANDED CITY, MAHARASHTRA

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ABSTRACT: A field study was conducted near municipal solid waste dumping site at Nanded in Maharashtra. The objective of the study was to assess and compare the physical, chemical and biological properties of groundwater and soil samples. Also to study the effect of dumping on their quality. The leachate produced by waste disposal sites contains a large amount of substances which are likely to contaminate ground water and soil. The water parameters studied were pH, EC, total hardness, chlorides, salinity, Phenolphthalein alkalinity, fluoride, chromium, carbon dioxide, sulphate, phosphate, TS, total alkalinity, iron, magnesium, sodium, potassium, calcium, SPC and Mn. Parameters measured in the field included soil moisture, EC, WHC, soil pH, chloride, alkalinity, organic carbon (OC), organic matter, exchangeable cations (Ca, Mg, K and Na) and SPC. All the parameters were found to be significantly different in the different sampling sites.

KEY WORDS: Soil analysis, water quality, Ground water contamination, Heavy metals, Leachate, Municipal solid waste, open dumping yard, Leachate impact.

INTRODUCTION

The water quality undergoes rapid changes due to contamination. The quality of ground water is continuously changing as a result of natural and human activities. Water is polluted due to different phenomenon. Industrial water entering in to ground water as the major source of organic and inorganic pollutants. Due to rapid growth of industrialization, much sewage is disposed off that generates fair changes of ground water pollution (Gadhav et al., 2008).

The quality of ground water depends on various chemical constituents and their concentration, which are mostly derived from the geological data of the particular region. Ground water occurs in weathered portion, along the joints and fractures of the rocks. In fact, industrial waste and the municipal solid waste have emerged as one of the leading cause of pollution of surface and ground water (Gupta et al., 2009).

Leachate is any liquid that, in passing through matter, extracts solutes, suspended solids or any other component of the material through which it has passed. Leachate from a solid waste disposal site generally contain major elements like calcium, magnesium, potassium, nitrogen and ammonium, trace metals like iron, copper, manganese, chromium, nickel, lead and organic compounds like phenols, polynuclear hydrocarbons, acetone, benzene, toluene, chloroform etc (Freeze and Cherry, 1979). The concentration of these in the leachate and water depends on the composition of wastes. Some of the pollutants may be adsorbed on to the soil during their diffusion in the soil (Alker et al., 1995).

STUDY AREA

The Nanded is located between 18°1.15' and 19°55' North latitude and 77°7.7' to 78°1.15' east longitude. The district has a geographical area of 10528 Sq. Km. Nanded is one of the fastest growing city of Marathwada region of Maharashtra. It is second largest city in the Marathwada region of Maharashtra state with a population of 7.3 lakh (2010 census). The locations of sampling stations from dumping sites are shown in figure 1.

The total amount of solid waste generated in Nanded is to the tune of about 149 tons/ day, at an average of about 300 gm / person / day. While there has been no initiative to establish the waste characteristics source-wise. About 73 % of waste is to be generated from domestic sources, followed by
MICROBIOLOGICAL AND PHYSICOCHEMICAL STUDIES OF SOIL NEAR BHOKAR OF MAHARASHTRA

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ABSTRACT: A field study was conducted at Bhokar for the soil and its various contents during the period of September 2010 to August 2011. A thorough survey was carried out to examine the quality of soil samples collected from agricultural farmlands around Bhokar city of Maharashtra state, India. The soil is mainly alluvial in nature. Data presentation revealed different values of physical and chemical characteristics of the soil. The objective of the study was to assess and compare the physicochemical properties of this soil. The study was carried on few selected physical, chemical and microbiological characterization and that to for quality soil and its nature. The standard analytical methods were applied for the analysis of soil under study.

Keywords: Soil quality, Chemical analysis, UV-spectrophotometer.

INTRODUCTION

Soil is one of the most significant ecological factors, on which plants depend for their nutrients, water and mineral supply. Soil is having living organisms and products of their decay intermingled. The major inorganic constituents of soil are of Al, Si, Ca, Mg, Fe, and K. However, it also contains minor quantities of B, Mn, Zn, Cu, Mo, Co, and F. The main organic constituent of soil is humus. The essential plant nutrient elements apart from, carbon, hydrogen and oxygen are primarily supplied from the soil. These three, usually make up more than 90% of the mass of fresh plant tissue, differ in that, they come from atmospheric carbon dioxide or water. The soil derived essential elements and their important forms in soil are N, P, S, K, Ca, Mg, Fe, Mn, Cu, Zn, Mo, B, Cl, Co and Se (Johns, 1982).

It is presumed that certain native trees and differences in vegetation type are likely to impart soil properties. This is for the fact that soil supports particular type of flora and fauna (Wild, 1993). Accumulation of heavy metals in agricultural soil is a subject of increasing concern due to food safety issues and potential health risks as well as detrimental effects on soil ecosystem (McLaughlin et al., 1999). Plants grown on a land polluted with municipal, domestic or industrial wastes can absorb heavy metals in the form of mobile ions present in soil solution, through their roots or through foliar absorption. These absorbed metals get bioaccumulated in the roots, stems, fruits, grains and leaves of plants (Fatoki, 2000).

Both industry and agriculture have contributed to increase the concentration of environmentally important trace elements through many ways such as waste disposal, atmospheric deposition, fertilizer, pesticide use and other media, in many areas around the world (Hesterberg 1998; Kabata- Pendias and Pendias 2001; Cui et al. 2005). Salt accumulation in soil is a major threat to agricultural production and ecosystem sustainability. Globally, 100 million ha (3%) of arable land are damaged by high salt concentrations (Lambers, 2003). In Australia, it is estimated that more than $130 million of agricultural production are lost annually from salinization. The National Land and Water Resources Audit (2000) reported that 5.7 million hectares have a high potential for the development of dry land salinity and predicts this to rise to 17 million ha by 2030. Copper which is an active ingredient of fungicides is reported as one of the most toxic metal to soil microorganisms and soil health (Dussault et al., 2008). Heavy metal concentration in agricultural soil of industrialized countries have increased due to the expanded use of the fertilizers and the elevated atmospheric deposition (Bunat et al. 2007; Zapusk and Lesan 2008; Iskali and Moharani 2010).
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