

# A Study on Exposure of Arsenic in Drinking water and Biological Samples in Arsenic Control and Exposed Population of West Bengal

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A study was conducted to evaluate the level of exposure to arsenic through drinking water among the population in arsenic-exposed (n= 226) and unexposed area (n= 193) in West Bengal. Participants were interviewed regarding the use of their tubewells for drinking, cooking and bathing purposes. This study evaluated the variations of concentration of arsenic in urine (U-As), hair (H-As) and nail (N-As) of exposure to arsenic via drinking water (W-As) in West Bengal based on measurements of arsenic in water, urine, hair and nail. W-As was measured by flow injection analysis system – Atomic absorption spectrometry (FIAS-AAS) and U-As, H-As and N-As were measured by transversely heated graphite atomizer (THGA-AAS) techniques, respectively. Arsenic concentrations in drinking-water varied, from N.D., (not detected) to even 4000 µg/L. U-As (range N.D. to 963.9 µg/L), H-As (range N.D. to 23.9 mg/kg) and N-As (range N.D. to 45.5 mg/kg) correlated with W-As on a group level ( $r = 0.6$ ,  $p < 0.0001$  for urine vs water;  $r = 0.83$ ,  $p < 0.0001$  for hair vs water and  $r = 0.44$ ,  $p < 0.0001$  for nail vs water). The variability among urine, hair and nail were observed with higher exposure to arsenic in drinking water and they were statistically significant ( $p < 0.0001$ ). These results indicate that these three biomarkers, that is U-As, H-As and N-As are the reliable markers of environmental arsenic exposure that can be used to identify arsenic exposure through contaminated drinking water sources.

## KEYWORD

Water arsenic, Urine arsenic, Hair arsenic, Nail arsenic, Biomarkers, West Bengal.

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# Waste Dump Management at Iron Ore Mines of Saranda Forest Region

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The Saranda forest region (West Singhbhum district, Jharkhand) is known to have huge deposits of superior grade iron and manganese ore. Mining of these minerals is bound to have adverse impacts on plants, wildlife and other ecosystems of the area. The present paper deals with a study of waste management practices adopted in iron and manganese ore mines of Saranda forest region. Forestation, waste dump management, top soil management and management of subgrade minerals are some of the popular environmental restoration techniques practised in all mechanized and semi-mechanized iron ore mines of the region. Mining and beneficiation of ores operations also cause environmental problems. The disposal of tailings and other deleterious siliceous and phosphorous materials from iron ore mines is a critical environmental threat. Therefore, to safeguard the environment and prevent ecological degradation, thrust needs to be laid on green belt development, solid waste management and other crucial environmental parameters. In this study various management techniques, such as retaining wall construction, use of coir matting, garland drain to drain out surface water, biological reclamation, etc., are also addressed in detail for stabilization of dump slope in Saranda forest region.

## KEYWORD

Mine, Waste dump, Reclamation.

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# Removal of Synthetic Dyes From Textile Wastewater Using Microbes as Bioadsorbents : A Review

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Over the past few decades, the use of synthetic dyes in textile industries has increased extensively. The effluent from textile industries is a principal source of dye pollution in aquatic ecosystems. Dyes discharged in aqueous streams deteriorate the water quality and exert potential health risks to human and aquatic living organisms. It is, therefore, exigent to remove synthetic dyes from the wastewater using cost-incentive and eco-friendly methods. A large number of physico-chemical processes have been applied globally for the scavenging of synthetic dyes from wastewater. Biosorption is the eco-friendly and cost-effective technology of removal of dyes from wastewater. This manuscript critically reviews various biosorbents, such as bacteria, fungi and algae as promising agents for dye removal from wastewater; discusses the mechanism of dye removal, impact of different physico-chemical factors on biosorption; analytical techniques and patented applications, etc.

## KEYWORD

Textile industries, Synthetic dye removal, Bio-sorbents, Microbial biomass, Biosorption, wastewater.

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# Effect of Sand Addition on the Mechanical Properties of Pervious Concrete

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In many developed countries the use of pervious concrete for the construction of pavements, at car parks and driveways is becoming popular day by day. Pervious concrete provides a sound solution for managing storm waters in built-up environments where the water runoff, as well as the natural recharge of the groundwater is an important issue. The use of pervious concrete is also been commonly related to other environmental benefits, such as the urban heat island reduction, control surface pollutants and traffic noise absorption. The performance of pervious concrete can be enhanced by adding a small amount of fine sand. Sand can lead towards better ravelling and skid resistance also improving the maximum compressive strength. On the other hand, too much sand and improper compaction energy may lead to an excessively low void content and reduced permeability. The present research aimed to analyze to the influence of fine sand addition (5%, 7% and 10 maximum) on the partial replacement of coarse aggregate into several properties of pervious concrete mixtures. The pervious concrete was obtained by the mixture of different size flyash aggregates (4.75 mm, 9.5 mm, 12.5 mm, 16 mm), Portland cement, water with the little amount of sand. Admixtures super plasticizer is added to the mixture to enhance the strength of concrete. A trial being taken on preparation of flyash based pervious concrete (FPC) with aggregate to cement ratio 1:3, 1:4 and 1:6 with water to cement ratio 0.30, 0.35 and 0.40, respectively. Results suggested that adding small amounts of fine sand (around 5% of the total aggregate weight) in 1:4 mix design of pervious concrete mixtures provided better mechanical and surface properties and a consequent reduction of drain ability, however, increase the percentage of sand addition on pervious concrete leads to the decrease of the water permeability rate. The correct balance of mechanical and hydrological properties can be achieved due to both accurate mix-design and proper compaction plan.

## KEYWORD

Pervious material, Flyash, Admixture, Compressive strength, Permeability.

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# Treatability Study of Carboxyl Methylcellulose Manufacturing Wastewater by Physico-Chemical Methods

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An attempt was made to treat carboxyl methylcellulose (CMC) manufacturing wastewater using physico-chemical treatment methods. A three-stage physico-chemical treatment train was employed, which run through neutralization followed by chemical coagulation-flocculation and finally sand filtration. In neutralization stage, an alkaline solution of 8 (N) NaOH was used to elevate pH upto about 9.0. Thereafter, alum solution of different dosages was added in the coagulation-flocculation process to remove turbidity and chemical oxygen demand (COD) from the effluent. At the final stage, the effluent was passed through a sand filter of adequate depth and comprising of grain size (0.15–1.18) mm to ensure satisfactory removal of chemical oxygen demand and turbidity. Experimental results showed almost 95% chemical oxygen demand and 80% turbidity removal under the initial chemical oxygen demand concentration of  $(1900 \pm 50)$  mg/L and colour intensity of about  $175 \pm 25$  TCU unit. The optimum alum dosage was observed to be 150 mg/L, whereas the optimum grain size of sand was obtained as 0.21 mm. The quality of treated effluent compared with the regulatory discharge standard and it was directly reusable in the process.

## KEYWORD

Carboxyl methylcellulose (CMC), Carboxyl methylcellulose manufacturing wastewater, Physico-chemical process, Coagulation-flocculation, Sand filtration.

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# **A Preliminary Investigation on Water Quality of Jai Hind Jal Prkalpa in Kolkata**

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This paper addresses a study of the performance of the various units of Jai Hind Jal Prkalpa (water supply scheme) of the city of Kolkata in the State of West Bengal for delivering potable water of specified physical, chemical and biological quality. This assignment was accomplished by carrying out laboratory analysis of water quality parameters, namely turbidity (for 450 days spanning over period of Jan 2015 to March 2016) and pH (for inlet and outlet of different units), total dissolved solids, total hardness, chloride, residual chlorine and bacteriological parameters (from inlet of the treatment plant). Optimum alum dosing and also quantum of sludge produced were also estimated. The study revealed the performance of the plant for supplying potable water to be satisfactory.

## **KEYWORD**

Water treatment plant, Water quality.

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## **Pervious Concrete and Various Testing Methods**

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Pervious concrete has been used to reduce the amount of runoff water and improve the ground water recharge, near to parking's, pavements. Due to the significantly reduced strength associated with the high porosity. Pervious concrete mixtures cannot be used for highway pavements structures. A research facility test was directed by examining and enhancing the quality properties of pervious concrete through the fuse of the latex polymer. This study focused on the balanced between permeability and strength properties of pervious concrete. The test results indicate that it was a possible to produce a pervious concrete mixture with acceptable permeability and strength through the combination of latex and sand.

### **KEYWORD**

Polymers, Pervious concrete, Fibre reinforcement, Durability.

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## **Optimum Evaluation of Health Supplements and Utility Analysis by Gas Chromatography and Mass Spectrometry**

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Gas chromatography and mass spectrometry (GC-MS) is a powerful technique for qualitative and quantitative analysis of chemical compounds in common and in particular volatile organic compounds, inorganic compounds (complexes), biological fluids/liquids, pharma-products and their preparations, extracts of medicinal plants, not only the in their liquid phase dissolved in selective solvents, but also in solid phase samples. From the reality of the situation, without analytical tools sample generation and characterization, the advantages would not be fully realized. Thus, the relationship between sample generation and analysis is a major issue in the pharmaceutical industry. Many recent industry initiatives feature the integration of sample generating and analysis activities, resulting in new paradigms for the discovery, evaluation and development of pharmaceuticals. As a result, a wide variety of analysis-based applications, like utility analysis have been implemented. In the present study optimum evaluation of commercially available health supplements in the market are taken and the utility analysis of the constituents present therein are quantitatively analyzed.

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