

Treatment of Textile Dyeing Wastewater Using Ozone Based Advanced Oxidation Processes in a Pilot-Scale Reactor

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The treatment of textile dyeing wastewater is difficult by conventional methods and would damage the environment if discharged without treatment. The present work investigated the ozone based advanced oxidation treatment of the dyeing wastewater. The dyeing wastewater samples of different colours were collected from a yarn dyeing unit in Perundurai. The colour absorbance of the wastewaters ranged between 23.4 and 84.2/m at 436 nm, 14.2 and 92.2/m at 520 nm and 3.3 and 73.0/m at 620 nm. The COD of the raw wastewater was varying from 600 to 1060 mg/L. The treatment studies were conducted in a 200 L reactor fed with ozone at the rate of 10 g/hr to assess its efficiency in reducing the colour and COD. Complete decolourisation and 28–32 % COD reduction was achieved in UV/O₃/H₂O₂ process with ozone consumption of 50 mg/L and H₂O₂ dose of 500 mg/L after 60 min of treatment. The degradation was found to be higher in UV/H₂O₂ than that of simple ozonation. The ozone based advanced oxidation processes followed pseudo first order kinetics and the UV/O₃/H₂O₂ treatment was fastest in degradation. When the ozonation and peroxide treatment were carried out in sequence, about 95 % decolourisation and 50% COD reduction was observed.

KEYWORD

Ozone, Advanced oxidation, H₂O₂, Dyeing wastewater, Colour, COD.

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Measurement and Analysis of Ambient Air Quality at Selected Sites in Dombivali, Thane City

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Rapid urbanization and inadequate mass transport services impose a serious threat on human life and its environment. Urban air pollution due to vehicular emission is a matter of concern because of exposure of large number of people to it. In this paper an attempt has been made to study the air quality assessment by measuring the concentration of key pollutants, like suspended particulate matter (SPM), NO_x, SO₂ and CO at various locations comprising residential, commercial, sensitive and industrial areas. High volume respirable dust sampler with thermo electrically cooled gaseous sampling attachment was used for sample collection. Air monitoring was carried at a frequency of twice a week at each station for 24 hr covering a period of 3 months. It has been found that concentration of respiratory suspended particulate matter (RSPM) and suspended particulate matter are exceeding the prescribed limit of Central Pollution Control Board (CPCB) at various locations whereas concentration of SO₂ and NO_x is below the prescribed limit. It is observed that increasing vehicular activities, improper traffic management devices, road conditions are the major cause of increasing the concentration level of the pollutants.

KEYWORD

Air pollution, Suspended particulae matter (SPM), PM₁₀, SO₂ and NO_x pollution.

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Studies on the Adsorption of Basic and Acidic Dyes by Polypyrrole Polymer Composite

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Polypyrrole polymer composite was synthesized on the surface of the saw dust of *Thevetia peruviana*. This novel adsorbent was examined for the removal of basic (BG4) and acidic dye (AV49) from aqueous solutions. The effects of temperature, contact time, initial dye concentration and pH on the adsorption of the dyes were analyzed by batch mode adsorption experiments. The percentage removal BG4 was less (64.89%) than that of AV49 (95.54%) when the initial dye concentration was 50 mg/L at 30°C. The results revealed that the adsorption behaviour of the dyes fitted with pseudo second order kinetic model. This study used Langmuir and D- R isotherms to describe the equilibrium adsorption. Langmuir model was best fitted for the adsorption of the dyes on polypyrrole polymer composites (PPC). Thermodynamic parameters were also evaluated.

KEYWORD

Thevetia peruviana, Adsorption isotherm, Kinetic models, Langmuir isotherm, Polypyrrole polymer composites (PPC).

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Evaluation of Water Quality Index and Seasonal Variation in River Hindon Near Ghaziabad

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The pollution status in form of water quality index (WQI) of Hindon river near Ghaziabad district, U.P. has been investigated. Water quality index of Hindon was found 39.95 which refer bad quality of water due to industrial activity going on in the region. To assess the level of quality and pollution in the river, water samples of 3 sampling stations, namely SI (Daruhera, Meerut), SII (Saurana,) and SIII (Attapeer, Mohan Nagar) have been studied with the help of physico-chemical and bacteriological parameters, such as pH, conductivity, turbidity, total dissolved solids (TDS), total suspended solids (TSS), total solids (TS), biological oxygen demand (BOD), chemical oxygen demand (COD), total hardness, Ca, Mg, phosphate, nitrate, alkalinity and total coliform density as per WHO water quality standards. The water samples were collected and analysed during pre-monsoon (March to May), monsoon (June to September) and post-monsoon period (October to February) in 2012 and 2013. It has been found that these water samples have very high conductivity, turbidity, total suspended solids and also highly bacteriologically contaminated.

KEYWORD

Water quality, Hindon river, Water quality index (WQI), Industrial effluent, Contamination.

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Evaluation of Respiratory Function Status of Cycle Rickshaw Pullers in India - An Unorganized Sector

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The cycle rickshaw is a common mode of transport used throughout the country as cheap means of conveyance mainly for short distances. Cycle rickshaws are of pollution free, provides self-employment to millions of people, requires less investment, easy and usually self-maintainable. About 9 lakh of people are engaged in this profession in India. The main objective of this study is to evaluate the respiratory function status of the cycle rickshaw pullers because they are exposed to city environmental pollution and extreme of the whether conditions in different seasons through out the year. The present study was carried out in 4 different places of the country. The total number of subjects covered 773 in West Bengal (Kolkata n= 295 and Chinsurah n= 72), Orissa (Bhubaneswar n= 202) and in Bihar (Patna n= 204). The rickshaw pulling as well as the occupational and personal history was taken by questionnaire method and the pulmonary function tests (PFT) were carried out by standard spirometric technique using Spirovit-sp-10 and Wright's peak flow meter. Pulmonary function tests impairments of restrictive type were found higher in Bhubaneshwar and obstructive and combined type in Chinsurah. The occurrence of impairments was found higher with higher age group and obviously with higher cycle rickshaw pulling history. Smoker cycle rickshaw pullers as a whole have more pulmonary function tests impairment except in Patna where the non-smokers have higher figures. Ex-smokers also showed high percentage of impairments. The rickshaw pullers take deep breath during pulling and more pollutants are getting inside of the lung, the exposures to extreme of the climatic conditions in different seasons through out the year might be the possible reason of their respiratory impairments. They were also not maintaining proper personal hygiene, living and cooking in a poorly ventilated single room house, addictions to smoking and inadequate food intake may further add to the possibilities in the occurrence of the respiratory diseases amongst them.

KEYWORD

Cycle rickshaw pullers, Pulmonary function tests, Respiratory function status, Pulmonary function impairments.

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Sediment Quality in Sand Mining Areas of a River

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In the present study sediment samples were collected for a period of 1 year from sand mining areas of a river and the quality of sediment was analyzed by calculating the geo accumulation index.

KEYWORD

Geo accumulation index, trace metals, sediment.

INTRODUCTION

Sediment is the loose sand, silt and other soil particles that settle at the bottom of a water body (USEPA, 2002). Sediment strata serve as an important habitat for the benthic macro invertebrates its metabolic activities contribute to aquatic productivity (Abowei and Sikoki, 2005). Sediment is also the major site for organic matter decomposition which is largely carried out by bacteria. River sand mining causes the destruction of aquatic habitat by bed degradation, lower water levels and channel degradation (Lawal, 2011). Channel degradation causes large scale removal of river sediments, digging below the existing riverbed and changing the channel bed form and shape (ECD, 2001). All of these cause soil erosion and sedimentation in the water bodies, which reduce water quality. The physical and chemical parameters of the sediment of the river Tamiraparani was investigated in the present study. The extend of metal pollution was analysed by using geo accumulation index.

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A Study on Heavy Metal Content in Flyash and Related Products From Thermal Power Plants in Punjab and its Environmental Implications

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The study investigates heavy metal content of flyash, pond ash and bottom ash from thermal power plants in parts of Punjab and assesses their adverse effect on environment. The analyses of ash samples from Bathinda and Lehra Mohabbat Thermal Power Plants has revealed that lead and chromium concentration of 80.25 ppm and 162.00 ppm, respectively in flyash from Bathinda Power Plant and lead concentration of 48.63 ppm from Lehra Mohabbat Power Plant is found to be higher as compared to the national average of 35.00 ppm and 120 ppm, respectively for Indian power plants. However, these values are within the range as compared to global thermal power plants. Concentration of radioactive elements is found to be within limits and in a few cases, less than their occurrence in the common rocks and soils. Content of other heavy metals in ashes is comparable to some of the thermal plants in the world. It is envisaged that the wet disposal method for the ash, used in both the power plants, can cause pollution by facilitating leaching of the heavy metals in the environment. Dry disposal methods causing less pollution and increased utilization of flyash need to be undertaken to minimize the adverse environmental impact.

KEYWORD

Flyash, Bottom ash, Ash pond, Toxic element, Heavy metal, Disposal.

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Fluoride Level Studies on Underground Water and Health Impact Survey at Kandli, Maharashtra

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Ground water is one of the most broadly distributed and essential natural water resources all over the world. In India, most of the population uses ground water as its primary source of drinking water (Lilly *et al.*, 2012). The ground water is getting polluted due to the rapid urbanization, solid waste, industrial effluents and sewage in urban areas. Hazardous waste, increasing mining and petroleum operations, agricultural development activities, particularly excessive application of pesticides, fertilizers and unsanitary conditions are also contributing to the ground water pollution. Meenakshi and Maheshwari, (2006) has considered fluoride as one of the very few chemicals that have been shown to cause significant effects in people. There is a narrow margin between the desired and harmful doses of fluoride. Therefore, the efforts were made to study the concentration of fluoride in groundwater of Bhokar. The groundwater samples from 6 different sites were collected during April 2014 to March 2015 and were estimated using SPANDS method on UV spectrophotometer.

KEYWORD

Groundwater, Fluoride level, Spectrophotometer.

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Algae as Bioindicators of Fresh Water Pollution

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Most of our surface water bodies are under the threat of industrialization and urbanization. In an attempt to use algae as indicators of water quality, different algal species composition associated with polluted waters have been enumerated. It is observed that mere presence of a species is not a reliable indicator rather group of algal communities persisting over a long period of time are more reliable indicators of water pollution.

KEYWORD

Algal communities, Water quality, Reliable indicator.

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Effect of Fluoride and Fertilizers on Protein and Amino Acid Content of Groundnut (*Arachis hypogaea* Var. TMV-7)

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Effects of different levels of fluoride ion (F) concentration on the protein and amino acid content in groundnut (*Arachis hypogaea*-Var. TMV-7) was studied. Plants were grown in pots and watered with different F concentrations (0, 2.5, 5.0, 10.0, 20.0, 40.0 and 80.0 ppm) and fertilized with potash, NPK complex, urea and superphosphate. Cow dung was used as control. Application of F affected the protein and amino acid content with increasing or decreasing F concentration. Protein content was found increased maximum at 2.5 ppm with NPK complex and minimum with urea at 40.0 ppm F concentration. Similarly amino acid content was found increased at 5.0 ppm with superphosphate and minimum with potash at 40.0 ppm F concentration.

KEYWORD

Farm yard manure (FYM), Fluoride, *Arachis hypogaea*, Endemic.

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Investigation of Heavy Metal Pollution of Soil in Trees of Rasht City

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The matter of soil pollution by heavy metals caused to increase of concerns about environment. The present study has been done by the aim of investigation on zinc metal accumulation on *Cupressus arizonica*. To achieving this goal the one-year *Cupressus arizonica* species seedlings were placed in vases. After the passage of each 55-day time periods from the growth of seedlings, the shoot, root and soil of seedlings were sampled. Results were studied using ANOVA test and Duncan test. The lowest concentration rate of zinc in *Cupressus arizonica* species organs in the first time period in the shoot and root was 5 g and 1.9 g, respectively and in the second time period in the shoot and root was 2 g and 1.6 g, respectively. Based on the researches, *Cupressus arizonica* species appropriate for refining zinc metal polluted soils.

KEYWORD

Cupressus arizonica, Phytoremediation, Zinc, Heavy metal.