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Vertical Profile Of Heavy Metal Concentration In Sediments From Sadong River, Sarawak, Malaysia

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Several sources of heavy metals in the environment include biological, geochemical, geological and anthropogenic sources. A total of eighteen core sediments were taken from Sadong river, Sarawak, Malaysia. These samples were digested by acid extraction and thereafter subjected to atomic absorption spectrometry (AAS). This paper aims to determine the vertical profile of heavy metals in core sediments, infer the accumulation history and assess the possible sources of pollution. The results showed that Fe was the most abundant element while Cd had the lowest concentration. Sediment pollution assessment was carried out for the top layer using geoaccumulation index (Igeo), enrichment factor and contamination factor. EF values showed moderate to significant enrichment of heavy metals.

KEYWORDS

Anthropogenic, Atomic absorption spectrometry (AAS), Core sediments, Geoaccumulation index, Sadong river

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Durability Performance Of Nano Modified Green Concrete For Sustainable Environment

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In the manufacturing of cement, it not only affects the environment by exploiting resources but also has adverse effects on human health. The construction industry has move forwarded and shown keen interest to utilize environmentally friendly sustainable concrete materials. Green concrete has zeroless cement. Hence, it consumes less energy in its production, diminishes carbon dioxide emissions and thus helps to maintain ecological balance. This article investigates the durability performance of nano modified green concrete for a sustainable built environment. Nano silica was added in three different quantities to the weight of flyash. To ascertain the durability performance of nano modified green concrete, an experimental study was conducted through water absorption test, sorptivity test, acid attack test and seawater resistance test. The microstructure of green concrete was performed by scanning electron microscope. The test results indicated that by the addition of nanoparticles in green concrete, the characteristics of durability performance was greatly altered and thus facilitate a sustainable environment. It also observed that the nano modified green concrete filled the pores and of the concrete matrix.

KEYWORDS

Environment, Green concrete, Nano modified green concrete, Nanosilica, Sustainable

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Impact Of Dodecenyl Succinic Anhydride On Performance And Emission Analysis Of Canola Oil In Direct Injection Variable Compression Ratio Diesel Engine

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This study deals with the effects of canola oil biodiesel (BD) to improve combustion and exhaust emissions in a common rail direct injection (DI) diesel engine using BD fuel blended with diesel. Experiments were conducted with BD blend amounts of 10%, 20% and 30% on a volume basis under various engine speeds with the addition 5% of dodecenyl succinic anhydride (DDSA). Dodecenyl succinic anhydride is the surfactant being used so that the canola oil blends remain stable. As the BD blend ratio increased, the combustion pressure and indicated mean effective pressure (IMEP) decreased slightly at the low engine speed of 1500 rpm, while they increased at the middle engine speed of 2500 rpm. The brake specific fuel consumption (BSFC) increased at all engine speeds while the carbon monoxide (CO) and particulate matter (PM) emissions were considerably reduced. On the other hand, the nitrogen oxide (NO*x*) emissions only increased slightly. When increasing the BD blend ratio at an engine speed of 2000 rpm with the blends of 0%, 10%, 20% and 30%, the combustion pressure and IMEP tended to decrease. The CO and PM emissions decreased in proportion to the BD blend ratio. Also, the NO*x* emissions decreased considerably as the exhaust gas recirculation (EGR) rate increased whereas the BD blend ratio only slightly influenced the NO*x* emissions.

KEYWORDS

Emissions, Exhaust gas recirculation, Particulate matter

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Life Cycle Assessment On Membrane Bio-Reactor And Activated Sludge Systems

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Water is required for agriculture, industrial purposes and to meet the thirst of increasing population. Due to the increasing demand for water, recycling of water has become a necessity. The treatment of wastewater solves two purposes, that is meets the increasing demand for water and reduces wastewater pollution. So wastewater treatment is required due to depletion of water sources. It came early in the 1900s and became popular since then. There are many types of wastewater treatment processes. The paper focuses on two types of wastewater treatments, namely the conventional activated sludge (CAS) process and membrane bioreactor (MBR) treatment plants and their life cycle assessment (LCA) from beginning to end. In CAS process, the physical stage includes different coarse and fine screens which filter wastewater and is further treated in an aeration tank with bacteria whereas MBR process (submerged MBR) has membrane or cassettes submerged inside secondary tank made of polymer for effective cleaning. One way of comparing them can be LCA of both the treatment plants where they are to be compared based on the impact they cause on the environment by their emissions and resources they consume during their whole life from the day they were constructed and maintained during operation. The assortment and analysis of the results and the impact on the environment of the system establish an environmental profile called life cycle assessment.

KEYWORDS

Membrane bioreactor, Conventional activated sludge process, Life cycle assessment

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A Study Of The Effect On Thamirabarani Riverine Wetland Water Pollution In The Tuticorin District

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Wetlands are necessary for the limitless benefits or otherwise known as 'ecosystem services' as they deliver humanity, freshwater supply, food, biodiversity, renew groundwater and regulate the flood and climatic changes. Nowaday, water contamination has become a dangerous problem to natural ecosystems, economic growth and human society, rising the necessity to better understand the temporal variabilities of pollutants as in aquatic systems. Totally 25 sampling stations were quantified from southwest, northeast and post-monsoon on 2010 in lower reaches of Thamirabarani wetland, Tuticorin district, Tamil Nadu. Multivariate statistical techniques were used to investigate the temporal variations and to detect the major pollution factors. Two-way analysis of variance (ANOVA) showed that 16 studied water quality variables had significant temporal differences (p>0.01). Using cluster analysis, the 25 sampling sites were divided into three groups (no, moderate and high pollution) based on the similarity of water quality variables. The investigative results suggested that the wetland water pollution primarily resulted from discharging domestic and agricultural wastewater and providing perilous evidence for water resource conservation in the lower reaches wetland of Thamirabarani river, Tuticorin.

KEYWORDS

Multidimensional data analysis, Thamirabarani river, Water pollution, Wetland

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Removal of Phosphates From Aqueous Solution By Using Adsorption Process

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In this study, the possibility of using *Schanginia* as a low cost adsorbent for the removal of phosphate from aqueous solution is investigated. The batch experiments are performed in this study by using different values of the mass adsorbent. The results illustrate that the maximum removal efficiency of phosphate (PO_4) is 70% at the high mass of adsorbent. The maximum adsorption capacity of *Schanginia* with phosphate is 3.43 mg/g. The results indicate that the *Schanginia as* low cost adsorbent gives acceptable results and can be used for the removal of phosphate from aqueous solution considering the amount of adsorbent (*Schanginia)* added to the aqueous solution. The determination coefficient values are higher for Langmuir than for Freundlich. Langmuir isotherm is obviously better fitting isotherm for the experimental data with a coefficient of correlation of 0.9568.

KEYWORDS

Phosphate removal, Adsorption, Batch experiment, Langmuir model, Freundlich model

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Legal Policy For Bio-prospecting of Natural Resources In India

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Bio-prospecting is rooted in the sovereign rights of nation states over their biological resources and Indian Government being de jure gatekeepers of biological resources can contribute immensely by adopting appropriate legal policies to the development of technology and indigenous knowledge system and biodiversity conservation. The Convention on Biological Diversity (CBD), 1992 recognizes the knowledge, innovations and practices of indigenous and local communities and calls for the equitable sharing of benefits arising from the utilization of such knowledge, innovations and practices. The bioprospecting regulations should foster in fair and equitable benefit sharing among indigenous holder of traditional knowledge. The CBD, 1992 along with Bonn Guidelines, 2001 and Nagoya Protocol, 2009 sets out principles and guidelines for bioprospecting and equitable sharing of the benefit which requires strong legal support in Indian jurisdiction. India has slew of reforms in the shape of Protection of Plant Varieties Rights Act, 2001; Biodiversity Conservation Act, 2002; Biodiversity Conservation Rules, 2004; Access and Benefit Sharing Guidelines, 2014 to conserve our rich heritage from biopiracy and biocolonization. The paper takes legal stance for formulation of legal policies for bioprospecting for intellectual property protection, biodiversity conservation and sustainable use of natural resources.

KEYWORDS

Biological diversity, Bioresources, Indigenous knowledge, Bioprospecting, Equitable benefit sharing, CBD

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Heavy Metals In Vegetables And Fruits Grown In Bangalore And Different Parts Of India

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Attenuation of pollution and maintenance of a clean environment is the top priority of the world. All the sources of heavy metals whether through water or soil is getting entry into plant parts by root uptake. Heavy metals contaminate the food chain and have become a burning issue in recent years because of their potential accumulation in biosystems through contaminated water, soil and air. The pollution of lakes in Bangalore has been reported recently. The presence of heavy metals in vegetables beyond the prescribed safe limits have been reported in India. This review shows the presence of heavy metals in vegetables grown all over India.

KEYWORDS

Contamination, Fruits, Heavy metals, Uptake, Vegetables

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Phytoremediation Of Nickel Contaminated Soil By *Brassica juncea* L. And *Abelmoschus esculentus* L. In Bihar

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Phytoremediation is the term used to describe the treatment of the environmental problem with green plants. The present study indicates that *Brassica* is suitable for phytoremediation through phytoextraction method for mitigation of heavy metal especially arsenic pollution of soil by using plants as biological detoxification system. To remediate arsenic stresses on plants, the phytoremediation strategy was applied using phytoextraction technology with the hyperaccumulator plants. In this study, the *Abelmoschus* plant was selected as hyperaccumulator and was co-cultivated with *Brassica* (hyperaccumulator) for heavy metal.

KEYWORDS

Phytoremediation, Nickel**,** *Brassica, Abelmoschus*

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Assessment Of Saline Water Intrusion Using Geospatial Techniques Along The Tuticorin Coast Of Tamil Nadu

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The coastal lands around the Bay of Bengal in Tuticorin coast consists of saltpan, agriculture fields and industrial activities. The unplanned growth of industrialisation results in over-pumping of groundwater from coastal aquifers is the major cause of coastal aquifer salinization. GALDIT is one of the parametric methods developed to demarcate the vulnerability of seawater intrusion for coastal aquifers. The present study is used to develop coastal vulnerability map using GALDIT parameters, such as groundwater occurrence (G), aquifer hydraulic conductivity (A), depth to groundwater level above sea (L), distance from the shore (D), impact of existing status of seawater intrusion (I) and thickness of the aquifer (T) using remote sensing and GIS techniques. Electrical resistivity tomography (ERT) can provide subsurface inversion two-dimensional (2D) image of an aquifer's saline zones due to its inherent ability to detect formation resistivity variations based on pore water salinity. ERT survey is carried out in the study area and the extent of seawater intrusion results are validated with GALDIT model vulnerability results. It is found that around 42% of study area is more vulnerable due to seawater intrusion from the GALDIT and has been cross-verified by the electrical resistivity method using Wenner array configuration. The results of the ERT method reveals that salinization of the aquifer exceeds the WHO standards even at a depth of 3 m in the areas of Terkuveerapandiyapuram and DCW industry (Sahupuram).

KEYWORDS

Coastal aquifer salinization, GALDIT**,** Remote sensing and GIS, ERT, Wenner array

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Exposure Effect Study Of Traffic Noise On Roadside Shopkeepers In Surat City

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The inconsistent and puzzling results in noise pollution exposure effects research on humans may partially be due to discrete differences between the individuals participating in different research studies. Following research, the article puts focus on noise exposure effects on roadside open shutter shopkeepers in busy commercial areas of Surat city, as they are directly exposed to traffic noise for more than 9 -10 hr daily. A total of 12 locations were selected for noise and traffic measurement. To study exposure effects, questionnaire survey in the form of the personal interview was done with 706 respondents. The equivalent noise level in the study area was 78 dBA due to high volume of traffic, which is very high and crosses governmental standard for a commercial area. Effect of environmental factors, like ambient temperature and humidity was also considered in the study. From the interview responses, it was concluded that people working in the study area are less or moderately affected by noise pollution as well as they are satisfied working in the same area. The reason, behind such a response, can be respondent's less awareness toward the effects of noise and their daily tasks which are low level or non-cognitive.

KEYWORDS

Surat city, Road traffic noise, Roadside shopkeepers, Noise monitoring, Exposure study

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Study Of Physico-Chemical Parameters Of Water Quality Of Yamuna River-A Major Tributary Of The River Ganga In Northern India (Mathura– Agra Region)

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Rapid industrialization imposed massive environmental stress on water resources and draws global attention. In the present study, properties of physico-chemical parameters were conducted in Mathura-Agra region, U.P. Collection of samples was done at the time of pre-monsoon in Mathura and Agra city at the sampling point, namely Kesi Ghat at Vrindavan, Vishram Ghat at Dwarkadheesh, Koile Ghat at Oil Refinery and Hathi Ghat at near Taj Mahal. The physico-chemical parameter which were examined are colour, pH, electric conductivity, TDS, DO, BOD, COD, total hardness, chloride.

KEYWORDS

Water quality, Yamuna, Mathura

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Effect Of Environmental Factors On Drainage Water Network In Najaf Governorate, Iraq

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Environmental factors, whether natural or human, are significantly affected by the drainage water network. One of the most important factors to consider when considering any project for the discharge of water that exceeds the need of the plant is directly related to the water and soil to be disbursed, such as the topography of the study area, the characteristics of the climate, soil characteristics, groundwater, water resources, government subsidies and cleaning drainage. The drainage network in the study area is characterized by its low efficiency and low drainage capacity from agricultural fields. It is also not connected in a major network system and suffers a lot of problems, including non-greasy and non-lining. Also, it is exposed to natural environmental factors in high temperatures, evaporation and intensive growth of aquatic plants. All these factors have greatly affected the quality of water discharge. Besides, these direct water discharges to the nearby rivers, causing an environmental problem, that is dangerous to surface water pollution and high salinity.

KEYWORDS

Environmental factors, Drainage water, Water pollution, Shatt al-Kufa

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Evaluation Of Mechanical Properties Of Light Weight Geomaterial Using Industrial Wastes

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The problems of high settlement and slope instability caused by the densification of backfill behind the structure could be addressed by innovating light weight geo material (LWGM). In this investigation, an attempt is made to create a light weight geo material by using waste expanded polystyrene (EPS), flyash, manufactured sand (M-sand) alongwith ground granulated blast furnace slag (GGBS) and cement binder. The mix proportions of EPS, GGBS and cement are maintained as 0.2%, 2% and 1% and flyash is varied as 10%, 15% and 20% of the weight of M-sand to arrive three different samples. The light compaction test results show that while increasing the flyash content, the maximum dry density is decreased and the optimum moisture content of the composite material is increased. The California bearing ratio (CBR) test and direct shear test results indicate that increasing the flyash content, the penetration resistance and the angle of internal friction of samples is marginally increased upon increasing the flyash content in the composite. The test results indicated that the innovated geomaterial possess low unit weight which could cause marginal settlement and reasonable CBR value to satisfy embankment criteria that could be used for highway embankment purpose.

KEYWORDS

Lightweight geomaterial, Slope instability, High settlement, Expanded polystyrene beads

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Treatment Of Greywater By Using Low Cost And Easily Available Materials Like Soil, Crop Waste And Coal In Constructed Wetland

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In the present investigation, various combinations of materials as the bed in constructed wetland were studied by treatment of synthetic greywater. Materials studied in constructed wetland were, like soil (red, black, sandy), fibre waste (carpentering waste, crop waste, herb), adsorbent materials (low-grade coal, flyash). Combinations of various materials as bed gave results for COD removal (60-90%), BOD removal (60-84%), PO_4^{3-} removal (40-67%) and biodegradability index which was shown to be raised (0.50-0.90). Better results were obtained by taking the combination of red soil, coarse low-grade coal, carpentering waste as it gives maximum removal of COD (95%), BOD_5 (92%), PO_4^{3-} (66%) and increases in biodegradability index (0.96). The present study can help to design low-cost portable constructed wetland by using easily available material to treat real greywater.

KEYWORDS

Constructed wetland, Treatment, Greywater, Low-cost materials and beds

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Performance Assessment Of Soil Biotechnology Treatment Process -A Case Study

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An attempt has been undertaken to assess the performance of soil biotechnology (SBT) based on percentage removal of various impurities in bioreactors of the treatment plant, which is established at Tadepalli village, near Vijayawada, Krishna district, Andhra Pradesh. The emerging SBT uses natural material, like soil, gravels and sand, biological media, like bacteria, earthworms and plants. The present study has been taken up not only to study the performance of SBT but also to ascertain the functioning of SBT concept. Sewage samples were collected from typical locations of the treatment plant and analyzed for various quality parameters as per the standard methods for a period of four months (July - October 2018). The average removal of TSS, BOD, COD, ammonical-N and Phosphates over the study period are found to be 85.70%, 86.04%, 81.93%, 94.64% and 65.77%, respectively. The treated effluent is meeting the guidelines of the Central Pollution Control Board. On account of good efficiency and multiple advantages of SBT, it may be considered a better option for decentralized wastewater treatment.

KEYWORDS

Soil biotechnology, Bioreactor, BOD, COD, Respiration, Photosynthesis, Earthworms

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