

Design of Eco-Friendly and Energy Efficient Green Building

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Green building means designing and constructing buildings utilizing strategies as well as materials that are resource efficient and that won't trade off the soundness of nature or environmental health or the related health and safety of the peoples in a building, construction laborers, the common public or upcoming generations. The dissertation work includes the concept of green building; factors affecting the construction of a greenbuilding; technologies used in a green building and the performance evaluation of the green building. This work is conducted on a building to be used as a commercial retail shop. The building is situated at Gorakhpur (U.P.). The plot area of the building is 7448.63 sq. feet (115'4" X 64' 7") and consists of three floors, having a total floor area of 5584 sq. feet. Height of each floor of the building is 13'1" making the total height of the building to be 43'3" (including the thickness of floor and roof). The performance of the building as a green building is carried out in accordance with the guidelines provided by the USGBC LEED, IGBC, ECBC, National Building Code of India for New Construction (NBCI) and ASHRAE. The performance of the building is carried out on the parameters of energy efficiency, water efficiency, material sustainability and efficiency, use of renewable energy and minimum damage to the existing natural surroundings of the building.

KEYWORD

Green building, Sustainable development, Energy-efficiency, Renewable resources, Water conservation, Eco-friendly.

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Rainfall Runoff Modelling Using SCS-CN Method

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Runoff is one of the most important hydrological variables used in most of the land and water resources applications. The determination of surface runoff at a micro level is essential to address to soil and water conservation practices in a watershed. We live in a world where the scarcity of water is being an acute year by year. Rainfall runoff modelling is always a necessary part of the assessment of water storage and to plan water conservation practices. In this paper, it is attempted to quantify the runoff by rainfall - runoff modelling with SCS-CN method. Most of the places in Chennai face acute water shortage in summer times. The study, Thandalam, which is the outskirts of Chennai city is also one of the affected areas during summer seasons. The entire modelling was done by preparing different theme maps, like soil, slope, watershed maps, etc., have done a total station survey of the entire campus. SCS -CN method was used to do the modelling. As a recommendation which was derived from the study lot of conservative measures can be adopted in the study area as the excess runoff is being wasted due to lack of conservative measures.

KEYWORD

Rainfall, Runoff, SCS curve number, Contouring, etc.

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Studies on Model Eutrophic Aquatic Ecosystem Through Bat Guano

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Model eutrophic aquatic ecosystems was designed for bioremediation purpose, for use of hydrophytes, a freshwater static model ecosystem was established. Glass aquarium measuring 180 x 45x 45 cm was used as an ecosystem chamber. 15 kg of black soil from Wadali Lake was added to make a 4 cm bed in the aquarium. Then it was filled with 200 L of water. Afterwards certain species of zooplankton and phytoplankton, snails, *Chironomous larvae*, *Rasbora* fishes were introduced in the aquarium followed by bat guano of fruit bat. Water sample was analyzed for one month at one day interval. In a model experimental eutrophic aquatic ecosystem, pH of water become neutral, transparency of water increases after 30 days, dissolved oxygen was increased upto 7.5 mg/L, hardness of water decreased upto 124 mg/L, chloride decreased from 66 mg/L to 38 mg/L, alkalinity and acidity of water were also reduced upto certain extent, the BOD (biological oxygen demand) was depleted and the nutrients, like phosphates, sulphates and nitrates were reduced significantly.

KEYWORD

Bat guano, Model ecosystem, Removal of phosphate, Nitrate.

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Atmospheric Pollution Load Assessment Through Air Quality Index : A Case Study

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Ambient air quality with respect to the parameters, like PM_{10} , $PM_{2.5}$, SO_2 and NO_2 were monitored for a period of one year. One way analysis of variance (ANOVA) test between different monitoring stations showed a significant variation of different parameters ($F = 2.17$ at $P < 0.01$). After Duncan multiple range tests (DMRT), it has been found that air quality monitoring stations 1 and 3 (AQMS - 1 and AQMS - 3) indicate that they are nearly similar to values 37.13^A and 38.42^C , respectively, where the pollution level is satisfactory. Similarly AQMS - 2 comes under light air pollution category with an average range of value 42.45^B . The meteorological parameters, like temperature, rainfall and humidity of the study area during the study period were also recorded. Assessment of ambient air pollution and categorization of the area with respect to air quality index (AQI) is important to find out the area-specific abatement strategies to prevent air pollution which may have a global impact.

KEYWORD

Ambient air, Air quality index, Meteorological parameters, Particulate pollutants, Gaseous pollutant.

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Heavy Metals Content and Health Risk Assessment of the Processed Tobacco From Malaysian Cigarettes

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Study determined the concentration of heavy metals in the selected tobacco of the commercial and do it yourself (DIY) cigarette available in Malaysian market. Tobacco was sampled based on the type and flavor (N=24). The samples were oven dried (48 hr), ground and sieved before analyzed using XRF technique. The highest element detected was Fe (1155.81 ± 212.25 mg/kg), followed by Mn (398.13 ± 84.52 mg/kg), Zn (79.61 ± 39.27 mg/kg), Cr (40.96 ± 14.73 mg/kg) and Cu (36.11 ± 9.50 mg/kg). Elements with low concentration were Ni (8.13 ± 1.46 mg/kg), Cd (0.88 ± 1.67 mg/kg), Pb (0.63 ± 0.94 mg/kg), Hg (0.21 ± 0.46 mg/kg) and As (0.03 ± 0.07 mg/kg). Moderate correlation was detected between As-Pb ($r=0.57$, $p=0.004$), Cd-Pb ($r=0.484$, $p=0.016$), Cr-Mn ($r=-0.491$, $p=0.015$), Cr-Pb ($r=-0.433$, $p=0.034$), Cu-Hg ($r=0.432$, $p=0.035$), Mn-Ni ($r=-0.575$, $p=0.003$), Mn-Pb ($r=0.414$, $p=0.044$) and Ni-Pb ($r=-0.579$, $p=0.003$). High correlation was detected between Cr-Ni ($r=0.845$, $p<0.001$). Significant non-carcinogenic and carcinogenic health risk were determined. Heavy metals were detected in the tobacco and significant health risk was determined.

KEYWORD

Cigarette, Tobacco, Heavy metals, Health risk.

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EXNORA–A Case Study on Effective Community Participation in Solid Waste Management in Chennai

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The total municipal solid waste (MSW) generated in urban India has been estimated at 68.8 million tonne per year. However, about 40% of all municipal solid waste is not collected at all and hence lies littered in the city/town and finds its way to nearby drains and water bodies. It causes drinking water pollution and sewer blocks due to solid waste result in mosquito breeding ending in Malaria/Filariasis. The need for public participation is required. Solid waste management is one of activity where community participation is key to success. The current study explores the impact of effective community participation in the practice of soil waste management. The descriptive design and case study method are used. It used a case of Exnora- An environmental based NGO is working towards achieving zero waste in Chennai by implementing community participation. It highlights the various activities and projects of the NGO on managing solid waste in Chennai and its success in achieving its goals.

KEYWORD

Domestic solid waste, Public participation, Waste management.

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Wind Energy : Emerging Sustainable Energy Resource

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This paper presents the concept design of a modified airfoil blade for the vertical axis wind turbine in a micro wind power prototype which can be used for future research purposes. Airfoil blade turbine is one of the best turbine structures that possess the optimal speed characteristics. Although an airfoil turbine has many advantages, it still needs an efficient start-up mechanism. Hence changes were made in the airfoil blade design in order to enhance its start-up mechanism and some changes in the orientation of the turbine blades were done so that the structure has larger swept area. Tests were done on the proposed turbine structure and it is found that the new design is able to overcome the start up problem of the airfoil. A quantitative method is used to determine the efficiency of the proposed turbine and the highest efficiency is found to be 49.22%.

KEYWORD

Micro-wind turbine, Modified blade design, Vertical axis, Airfoil blade, Drag assist, Enhance start-up.

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Role of Exopolysaccharide Produced by *Lactobacillus spp.* in Heavy Metal and Dye Removal

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The present work focuses on investigating the role of exopolysaccharides produced by different species of lactic acid bacteria, namely *Lactobacillus casei* and *Lactobacillus delbrueckii subsp. bulgaricus* in heavy metal and dye removal. To identify the same, exopolysaccharide (EPS) production was optimized using different carbohydrates. Then the cultures were tested for their bioremediation efficiency in the presence and absence of cell bound exopolysaccharide. Cadmium was used as a representative heavy metal and its adsorption was estimated using atomic absorption spectroscopy. For dye removal commercial synthetic dyes, that is reactive pink (MB), reactive orange 16 (RO 16), tartrazine, carmoisine and erythrosine were used and measured using UV spectroscopy. 2% glucose and 2% sucrose seemed to be optimal carbon source for maximum exopolysaccharide production by *L. casei* and *L. bulgaricus*, respectively. The metal adsorption study revealed that the maximum cadmium uptake by *L. casei* and *L. bulgaricus* was 84% and 86%, respectively. In case of dye adsorption, *L. casei* and *L. bulgaricus* showed similar dye adsorption potential in presence and absence of exopolysaccharide except for carmoisine dye. Although, *L. casei* and *L. bulgaricus* has not shown high efficiency for the dye bioremediation, but have shown tremendous potential for cadmium uptake and thus it can be used as an alternative for treatment of industrial effluent containing cadmium.

KEYWORD

Exopolysaccharide (EPS) optimization, Cadmium bioremediation, Dye bioremediation, Adsorption, *Lactobacillus casei*, *Lactobacillus delbrueckii subsp. bulgaricus*.

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Short Article

A Study on Noise Pollution Due to Traffic in Certain Commercial Zones of Visakhapatnam

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Noise is unwanted sound, undesired by the recipient. It has both physiological and psychological impacts on human health. Noise is, therefore, a serious environmental problem that requires attention. Visakhapatnam being a fast developing city is no exception for the noise related problems. In the present work a study on noise pollution is carried out in certain commercial zones, namely Siripuram junction and Maddilapalem junction in Visakhapatnam. It is observed that the equivalent noise levels evaluated at both the junctions exceeded Central Pollution Control Board (CPCB) standard.

KEYWORD

Noise, Pollution, Commercial zones.

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Effect of Heavy Metal Toxicity on Commercially Important Fishes in Harike Wetland - A Review

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The Harike wetland is an internationally recognized wetland of Punjab. It is of riverine, lacustrine type of wetland which plays an important role in maintaining ecological balance through ground water recharge and various other diverse functions. But due to rapid industrialization and agricultural runoff, the water quality of Harike is deteriorating at an alarming rate. Heavy metal contamination from industrial effluents and pesticides is affecting aquatic fauna of this wetland. Several studies have revealed the presence of heavy metals in wetland water and sediments and its effect on aquatic animals. These aquatic animals bioaccumulate heavy metals in their bodies through the food chain. Fishes are usually present on the top of the aquatic food chain so accumulate the highest concentration of heavy metals in their skin, gills and digestive tract by the process of biomagnification. The present review provides the documentation of the studies on heavy metal toxicity on commercially important fishes in the Harike wetland.

KEYWORD

Harike wetland, Heavy metals, Bioaccumulation, Commercially important fishes.

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