

Management of Spent Pot Liner, a Hazardous Waste Material of Aluminum Smelter Plant-A Pilot Plant Study

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All aluminum smelter plants discards large volume of spent pot liner (used carbon cathode blocks) which is heavily contaminated with toxic chemicals, like fluoride, cyanide, etc. Disposal of such toxic waste in an environmentally safe manner is a long standing challenge to scientists and engineers. IMMT-Bhubaneswar (Orissa) has developed a chemical process by which all the contaminants in spent pot liner can be removed in single step and its carbon value can be recovered simultaneously. The process has now been tested in pilot scale and the present paper depicts the results obtained in this pilot plant trial.

Kinetics of Phosphate Adsorption by Three Indian Soils

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Kinetics of adsorption of phosphate by 3 widely occurring and agriculturally important Indian soils was investigated by changing the various factors that influence the process of adsorption. Due to its very fast nature, adsorption measurements were done within 10 min. Kinetic parameters were analyzed with respect to pH, temperature, initial phosphate concentration, adsorbent dosage, etc. Results have been analyzed and explained by using different rate equations, such as Lagergren pseudo first order equation, Natarajan-Khalaf first order equation, Langmuir second order equation, Pseudo second order model, fractional order model, Elovich equation and parabolic diffusion equation. Applicability of Elovich equation and Langmuir second order equation was reflected in the regression values which were very close to unity. Probability of intraparticle diffusion was also investigated in each case and diffusion constants were correlated with various factors, such as concentration, pH, soil dosage and temperature.

Natural Product *Cassia auriculata* Extract as the Corrosion Inhibitor for Commercial Mild Steel in 1M HCl : Part-III

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The influence of the addition of the extract of naturally occurring plant *Cassia auriculata* on the corrosion of mild steel in 1M hydrochloric acid has been studied by weight loss measurement and polarization study in the presence and absence of quaternary ammonium salt. It has been observed that the ethyl acetate extract of the plant which contains Luteolin-7-O-glucoside reduces the corrosion rate and the inhibition efficiency increases with increase in extract concentration.

Environmental Impacts of Industrial Pollution on Saharanpur City Area, Western Uttar Pradesh

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The environmental scenario has been described in a substantial broad spectrum. The environmental health problem is being caused by industrial pollution essentially due to Star Paper Mill in Saharanpur city area at an alarming rate resulting into severe health hazards. The present paper deals with a discussion of the impacts of industrial pollution mainly by Star Paper Mill on the environmental picture of Saharanpur city, which is one of the most important city of western Uttar Pradesh, that is located at the nodal point of roads connecting to other important cities of the state. Saharanpur city area is usually affected by pulp and effluents of the Star Paper Mill that contain suspended solids, colour, foam, inorganic component, such as sodium carbonate and toxic chemicals mercaptans, mercury and inorganic sulphides. The effluents commonly comprising high BOD as well as COD contents with toxic inorganic and organic constituents, which usually discharge as untreated and considerably deteriorate quality of water system receiving such effluents of the Star Paper Mill. Moreover, the air quality that populace breathe, is being polluted due to industrial and automobile emission, by addition to the atmosphere suspended particulate matter (SPM), oxides of sulphur (SO₂) and nitrogen (NO_x), carbon monoxide (CO), photo-chemical oxidants and hydrocarbons (HC). These contaminants independently and/or collectively, have teratogenic and carcinogenic effects and frequently cause respiratory health problems.

The Proposed Environment Management Plan for the Coast of Kollam (Quilon), Southern Kerala Coast of India

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A scheme for management of the fragile coastal regime of Kollam (Quilon), South-West Coast of India has been developed. The recommendations for management has been arrived at from the baseline status of the study area. A holistic approach has been adopted for the study incorporating facets of activity and various disciplines and the researcher argues for a holistic approach towards coastal management of the fragile coast of Kollam by integration of planning management encompassing sea, estuarine and inland areas which have significant influence on processes and taking account of coastal and landscape habitats. The major points of recommendation include protection of fisheries primarily by preventing overfishing, protection of greenery by avenue planting and planting mangroves for stabilizing the coastal belt, protection of the beach by back filling sand at sand mining areas, construction of sea walls and breakwater at intermittent distance, improving sanitation facilities at ports and harbours. Due attention be given to the Ramsar site (Ashtamudi estuary) of Kollam Coast by halting reclamation, by identifying pollution sources and phasing them out to improve sanitation. Proper functioning of effluent treatment plants for major industries, common effluent treatment plant for SSI's, landfills and incinerators for solid waste and sewage treatment plant be established. Recycling of wastewater at major industries especially those involving radioactive wastes should be done. Sustain industries at the present level but new industries be started only after proper EIA. That the proposed EMP of Kollam Coast be dovetailed with the Master plan of Kollam city.

Comparative Studies of Extra Cellular Fungal Laccases by *Phanerochaete chrysosporium* (MTCC 787)

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Laccases are multi copper oxidizes of wide substrate specificity mainly found in white rot fungi, which are the only microorganisms able to degrade the whole wood components, but they are also expressed in bacteria and higher plants. The addition of laccase inducers to the culture medium of microorganisms can enhance laccase production and facilitate it's purification and utilization. The aim of this study was production of laccase enzyme and the laccase inducers in culture of *Phanerochaete chrysosporium*. The extra cellular enzyme

produced by the *Phanerochaete chrysosporium* MTCC 787 was analyzed for laccase activity. On rice bran and coir pith substrate the organism *Phanerochaete chrysosporium* MTCC 787 shows high enzyme activity. The effect of laccase enzyme activity after 7 day of incubation the strains shows a maximum production of 2 µg/mL/mn. At pH 3 the organism shows a maximum production of 2 µg/mL/mn at room temperature.

Biomedical Waste Management of Bharatpur District-A Case Study

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An attempt has been made to study the various types of waste generated in all hospitals of Bharatpur district. The analysis of all waste generated was conducted from Aug. 2007 to Jan. 2008. This analysis was carried out to study the various aspects ranging from generation of waste till their disposal. In addition to that, information related to all other types of wastes has also been collected. The study reveals that in Bharatpur district total bed strength is 1200 beds out of which 620 beds in government hospitals including T.B. clinic, primary health centres and community health centres, total 574 beds in private hospitals, nursing homes and more than 10 dental hospitals, more than 50 diagnosis centres is the source of biomedical waste generators. The study also reveals that in Bharatpur district total hospital waste generates pt/day varies from 0.65 kg/pt/day to 0.85 kg/pt/day. Non-infectious waste generates varies from 0.38 kg/pt/day to 0.58 kg/pt/day. The average total waste generates 900 kg/day, out of which 350 kg/day infectious waste and 550 kg/day non infectious waste. From the study it is observed that about 21 % infectious waste, 11.31 % plastic waste and 1 % sharp waste generated. If this waste is not handled properly it can cause the serious effect on generators, doctors, nurses, technicians, washermen, sweepers, hospital visitors, patients, rag pickers and their relatives or exposed routinely to biomedical waste and are more risk from the manifold infections due to indiscriminate management. This study must help in designing a proper treatment method for infectious wastes, disposable syringes, pathologic wastes including kitchen wastes. The quantum of combustible waste also is to be determined.

Effect of *Nicotiana tabacum* on Sodium (Na⁺) and Potassium (K⁺) Ions in the Midgut Tissue of *Oryctes rhinoceros*

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The larvae of *Oryctes rhinoceros* on treatment with 2%, 4%, and 6% of crude powder of tobacco leaf (TLP) *Nicotiana tabacum* showed variations in Na⁺ and K⁺ in its midgut tissue. Na⁺ showed a regular trend of initial increase after 8 hr followed by decrease after 16 hr and 24 hr of observation at all concentrations of TLP but K⁺ showed an irregular fluctuation. The fluctuation in Na⁺ and K⁺ in the midgut indicated that the larva was under stress due to exposure to TLP. It was inferred that TLP could be effectively used as a natural insecticide to control them.

Soil-To-Plant Transfer Factors of Trace and Major Elements in Rice Plant (*Oryza Sativa*) at Kalpakkam

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The objective of this study was to evaluate the distribution of trace and major elements in rice plant (*Oryza Sativa*) which is the staple diet of the public at Kalpakkam. The transfer factor from soil to various parts of plant was also studied. Trace and major elements such as Fe, Mn, Zn, Co, Cu, Ni, Cr, Cd, Pb, Sr, K, Ca and Mg were selected based on their role in nutrition and also to study the behaviour of their radioactive counterparts. Among the trace elements Fe concentration was observed to be maximum in soil, the mean value of which was 18394 mg/kg dry wt. Cadmium concentration was observed to be minimum with the mean value of 2 mg/kg dry wt. The maximum and minimum concentration observed in the rice grain were due to Zn and Cd and the values were found to be 9 and 0.044 mg/kg dry wt, respectively. In the stem and leaves part the maximum and minimum concentration was due to Fe and Cd and the values were found to be 26.8 and 0.12 mg/kg dry wt. Similarly in the root part Fe and Cd concentrations were found to be maximum and minimum, respectively. Among the different parts of the rice plant, trace elements concentration in root was maximum and in stem and leaves major elements concentration was maximum. Transfer factor from soil to plant parts was computed. In general, the transfer factor was maximum in root, followed by stem and leaves and grain for trace

elements. The transfer factor computed for whole rice plant was maximum for Zn and minimum for Sr which is a significant observation from radiological point of view.

Potassium Supply Power of Acid, Alkaline and Neutral Soils in Different Places of Perambalur District, Tamil Nadu

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High percentage of crop yield in cotton is essential to cater the needs of textile industries and hence a study of soil in the neighbouring wide areas of cotton fields proves to be an interesting topic. The soil for the experimental work has been obtained from cotton growing areas in different places of Perambalur district, Tamil Nadu. The cotton growing fields extend to 1127.2 ha. This investigation has been undertaken with an initiative to compare the potassium potential in soils of various areas and to assess the yield of cotton crops in these areas. The soil samples have been used to estimate the amount of exchangeable potassium, water soluble potassium, available potassium, total potassium and fixed potassium using flame photometer. A comparative study has been made to estimate the exchangeable cations, like Ca, Mg, Na in the experimental soils. The nature of the soil has been established by pH evaluation. The readily available potassium has been estimated applying the concept of Donnan equilibrium from the percentage composition of exchangeable calcium, magnesium and potassium ions. It is concluded that alkaline soils are most suited for cotton crop vegetation.
