

Characterization of Wastewater and Sludge Generated From a Printed Circuit Board Fabrication Industry and Decontamination of Sludge

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Production of printed circuit boards (PCBs) involves the plating and selective etching of flat circuits of copper supported on a nonconductive sheet of plastic. Each manufacturing process may generate multiple waste streams. Printed circuit board industries employ a treatment process for these waste streams is precipitation, which produces a significant volume of sludge. This report presents information on the characterization of wastewater and sludge generated from a typical printed circuit board manufacturing industry. The study involves the analysis of the parameters, such as chlorides, sulphates, total dissolved solids (TDS), hardness and some heavy metals originated from various sectors of printed circuit board fabrication. The sludge samples were also analyzed for its heavy metal content, like nickel, copper, zinc, iron and lead. This work also includes the recovery of copper metal from sludge by an electro-winning process. The effect of current density on percentage of metal recovery was investigated.

KEYWORDS

Printed circuit board (PCB), Electroless plating, Wastewaters, Characterization, Sludge.

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Predicting Leaching Behaviour of Various Salts of Chloride Through Soil Using Glass Column

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The leaching of the various salts from soil can result in the loss of pollutants and cause the groundwater contaminated. In the present paper leaching of chlorides salts in the natural slight acidic soil has been described. Various chloride salts, namely NaCl, KCl, CaCl₂, AlCl₃ have been used as sources of leachable chlorides. Soil samples for leaching study were collected from a field near the industrial area located in Hapur district of the State Uttar Pradesh in India. The leaching study of various chloride salts is carried out in the laboratory by using flow method in glass column. Initial leaching rates have been calculated and linear power form of equation has been derived for salts of chloride. The effect of size of attached cations of various chloride salts, water filled porosity (q), BTC (break through curve) and effect of soil temperature on leaching of chloride salts is discussed. Present study proves that leaching of various chloride salts can be studied by initial rate method and it can be applied for monitoring the fate of applied chloride in agricultural fields in the form either fertilizers or in irrigation water supply.

KEYWORDS

Leaching, Chloride(Cl), Soil column, Soil pollutants.

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Characterisation of the Quality of Air in the City of Kenitra (Morocco)

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Often submitted the effects of fog, near the Atlantic Ocean, more and more urbanized, the city of Kenitra is exposed to the risks of atmospheric pollution. In order to characterize this pollution, eight sites are chosen and targeted to assess the background level of pollution. The main pollutants monitored are : SPM, Pb, Cd, NO₂ and SO₂. The obtained results show that the levels of pollutants studied SPM, NO₂, SO₂ exceed Moroccan standards (respectively 300, 200 and 200 µg/m³) in all sites except Bir Rami East. The sites of Bir Rami, Palace of the fair, Corniche Oued Sebou and Carrefour Kasbah have lower Pb and Cd contents to the recommended standards. In addition, only the industrial district recorded cadmium levels that exceeded 0.04 µg/m³ (national standard). The district of Bir Rami remains spared (unpolluted air). From its results pollution maps are in progress. The present study also aims to identify the main source of each element (the various industrial processes do not emit the same pollutants and the polluting effect of the vehicles being itself dependent on several parameters). The climatic and/or weather conditions, are not the same, four different periods have been fixed (spread over the whole year) for the samples. In view of these results, it appears necessary to deepen the study in this city for the establishment of effective public policies for reducing emissions from mobile and/or stationary sources.

KEYWORDS

Air quality, Characterization, Air pollution, Standard, Gaseous pollutants, Particulate pollutants, Nitrogen dioxide (NO₂), Sulphur dioxide (SO₂), Suspended particulate matter (SPM), Lead (Pb), Cadmium (Cd), Kenitra (Morocco).

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Fertilizer Consumption in India and Need for its Balanced use: A Review

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Plants require macronutrients and micronutrients for its growth and fertilizers are the source of these nutrients which not only enhance the plant growth but also maintain the soil fertility. The purpose of this study is to evaluate the pattern of fertilizer consumption, production trends in India and suggest the sustainable use of fertilizers based on requirements of various crops, agro-climatic zones, soil and climate. The data for major fertilizer consuming zones and states helps us to understand consumption pattern in our country. During the period 2007-11, it was observed that west zone was consuming 31,116.73 kilotonnes of fertilizers which was the highest among the four zones and was also having highest total annual compound growth rate percentage of 9.68. Among major fertilizer consuming states of India Uttar Pradesh was found to be consuming maximum fertilizers, that is 16,621.29 kilotonnes. Rice and wheat are the major crops which are consuming 37% and 24% of the total fertilizers consumed in India among various crops. Climatic factors, like rainfall pattern have a very crucial role in the consumption of fertilizers as their demand increase with an increase in irrigated areas. Agro-ecological zone no.7 was consuming 177.1 kg/ha of fertilizer which was the highest among the different agro ecological zones of India. The paper also aims to recommend that fertilizers should be used in a balanced manner through integrated management of nutrient involving the use of chemical fertilizers, biofertilizers, compost and vermicompost. Balanced use of fertilizers will reduce harmful effects of chemical fertilizers on the environment and will help in making our agriculture sustainable. It also increases water and nutrients use efficiency, improve grain quality, soil health and give better economic returns to farmers and helps in sustainability. So, for sustainable growth in agriculture sector, it is imperative to reduce demand of chemical fertilizers without hampering food production. This can be achieved by having a better understanding of climate of India, its soil, agro-ecological zones and crop specific fertilizer requirements. The demand of fertilizer for consumption can also be fulfilled by bringing efficiency in the fertilizer application techniques, distribution system and extension services, increasing credit facilities and redesigning fertilizer subsidy policy.

KEYWORDS

Integrated nutrient management, Manures, Fertilizer consumption, Agro-ecological zones.

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Fluoride Removal in Groundwater Using *Phyllanthus emblica* (AMLA) as a Natural Adsorbent

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Fluoride contamination has become a huge intimidation in potable water over all parts of the world. Lack of consumption causes dental caries and over intake leads to dental fluorosis and skeletal fluorosis. According to World Health Organization prescribed limit of fluoride content in drinking water is 1 to 1.5 mg/L. The process of removal of excessive fluoride in aqueous solution is known as defluoridation. It could be done using many techniques, one such method is adsorption. It is one of the most competent and effective method, which is widely used even when the concentration of fluoride is very high. This paper deals with removal of fluoride using natural biodegradable adsorbents that are thermally activated. Seeds of *Phyllanthus emblica* (Amla) is the biosorbents prior in the study. These seeds were heated upto 973 K to attain activation temperature. The adsorption of fluoride was studied by adding biosorbents in prepared fluoride stock solution. The objective of this present study is to treat the fluoride contaminated water by adopting an alternative technique, that is reliable, economically low and household view in rural areas.

KEYWORDS

Adsorption, Biosorbents, Defluoridation, *Phyllanthus emblica*.

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Application of Raw Crusher Dust for Improving Agricultural Productivity of *Zea mays*. L and *Phaseolus vulgaris*. L

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Crushed stone is one of the most available resources which is used for construction and other industries as a basic raw material. Stone dust, also known as rock powders consists of finely crushed rock, processed by natural or mechanical means, containing minerals and trace elements which can be used in agricultural practices. A pot experiment was, therefore, conducted by amendment of crusher dust in different ratio and its effects on plant physiological and biochemical activity were studied at two different plants, that is, maize (*Zea mays*) and beans (*Phaseolus vulgaris*). The results obtained from this study showed a consistent increase in germination percentage, root length, shoot length, fresh and dry weight, leaf area, photosynthetic pigment content and foliar protein content. In case of *Zea mays* T3 (35 g CD) per kg of soil and in *Phaseolus vulgaris* T4 (45 g CD) shows best result in comparison to controls.

KEYWORDS

Amendment, Crusher dust (CD), *Phaseolus vulgaris*, Plant growth, *Zea mays*.

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A Review on a Heavy Metal (Arsenic) Contamination in Ground Water, Soil and Translocation in Plants

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Arsenic is a metal responsible for health hazard due to its toxicity. It is present worldwide in trace quantity in groundwater, soil and plants. Arsenic mainly enters the groundwater by both natural processes, such as dissolution of arsenic-containing minerals and anthropological activities, such as use of arsenic containing pesticides. According to WHO (2011) the maximum concentration level of arsenic in drinking water is 10 $\mu\text{g/L}$. India and Bangladesh are one of the worst affected countries by arsenic contamination. Moreover, the problem increases as most of the irrigation in these countries is done by groundwater in dry season. Hence the arsenic which was present in groundwater is now been taken up by crops which are translocated into various parts from roots. It is the matter of immediate concern to mitigate the health hazards due to the arsenic contaminated groundwater and food crops irrigated with it.

KEYWORDS

Arsenic, Translocation, Crops, Groundwater, Toxicity. IJEP 38 (7) : 591-600 (2018)

Controlling Air Pollutions With Euro-VI Fuels

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BS-VI fuel will bring down sulphur by 5 times from the current BS-IV levels—A whopping 80% reduction that makes this fuel extremely clean. This will improve emissions from the existing fleet, even from the older vehicles on road, while allowing more advanced emissions control systems to be fitted in BS-VI vehicles when they begin to roll. Full advantage of this move will be possible only when vehicle technology moves to BS-VI. Industry must also step up its act and show leadership to fast forward the change. The Union Ministry of Petroleum and Natural Gas (MoPNG) has announced a 2-year advancement of the introduction of Bharat Stage (BS)-VI fuel norms from April 1, 2018 in Delhi, currently suffering from its worst smog crisis in years. BS-VI norms are scheduled to be implemented across India in April 2020. BS-VI fuel will bring down sulphur by 5 times from the current BS-IV levels—A remarkable 80% reduction and would make fuel extremely clean.

KEYWORDS

Idle emission regulations, European emission, Fuel regulations, Automotive emission standards.

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People Awareness on Mangrove Conservation Policies and its Implementation-Mumbai City

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Mangrove is one of the most valuable coastal ecosystems, which provide enormous benefits to the local communities as well as the ecology. Last two to three decades human interference in coastal areas have been considerably increased; as a result, mangrove forest is destroyed significantly. So conservation of this ecosystem becomes a big issue in a metropolitan city, like Mumbai which is lost about 40% of mangrove swamps. To overcome this situation people must understand the needs of conservation and protection of mangrove ecosystem. The government has passed a number of acts which clears that non-forest activity should not be carried out in areas where mangroves grow. Subsequently, the government already has set legal frameworks for management of mangrove ecosystem. Unfortunately many times the legal provisions are not being enforced to control the illegal activities because local people have failed to adhere the correct regulation. It is also realized that one of the key challenges for mangrove conservation is inadequate understanding of their multiple roles of mangroves due to poor research, unawareness of the local people and violation of government norms. In such a situation, protection of the mangrove ecosystem is possible only through the participation of the local community and strict implementation of the legal provisions by the Government. To assess the adequacy of existing legal frameworks for mangrove conservation and to understand the people awareness is necessary. Therefore, descriptive survey was carried out and required data was collected from local peoples. This study has an earnest attempt to understand the legal policies, its implementation and people perceptions toward mangrove conservations in the Mumbai city.

KEYWORDS

Mumbai city, Government policy, Mangrove conservation, People perception.

Lignin: A Case Study as an Alternate to Diesel Fuels

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For alternate fuel studies, mixtures of a variable amount of lignin, diesel fuel and alcohols have been already tested. During such testing processes, taking the advantage of fair solubility of butanol into diesel, lignin was indirectly dissolved into diesel through blending with butanol at the initial stage. The actual soluble lignin in diesel remains less than 2% due to the restricted solubility of lignin into butanol. However, the cost feature of butanol does not permit the full and economical access of abundant and unlimited lignin resources in that way. In that context, this article presents a stable and uniform mixture of a physically and chemically modified lignin and diesel, reports the test results of using the mixture in a diesel engine and confirms that lignin can be an effective substitute for diesel.

KEYWORDS

Lignin, Diesel fuels, Renewable energy, Grain- based ethanol fuels, Soybean oil.

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