

## **Impact of Low Cost Sanitation System on Soil Quality Through Soil Column Studies - A Case Study**

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In the present study an attempt has been made to investigate the degree of pollution of soil due to ILCS (integrated low cost sanitation) in Arilova slum area of Visakhapatnam of Andhra Pradesh. Soil samples exposed to leachates of low cost sanitation systems collected seasonally for analysis. The soil samples were analyzed for physical characteristics, such as specific gravity, bulk density, particle size distribution, permeability and chemical characteristics, such as pH, EC, nitrates, chlorides, calcium, magnesium, phosphates, potassium, sodium, organic carbon. Soil column studies have been conducted by filling the column with undisturbed soil sample of the study area using leachate of low cost sanitation system. The study was conducted to observe the changes in soil characteristics and behaviour of percolating leachate with reference to depth and time.

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## **Assessment of Air and Water Quality of Limestone Mining Area of Karnataka**

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This article presents the status of water, air quality and noise pollution in the lime stone mining belt (district Gulbarga and Bagalkot) in the state of Karnataka. These two districts store nearly 55% of total estimated limestone reserve of the state. An attempt was made to assess the environmental quality of this region and compare it with the national standards. The monitoring was conducted for a year covering residential and industrial areas in the mining belt. The result revealed that at most of the locations, respirable suspended particulate matters (RSPM) remained below the national standards during the observation period in industrial area but exceeds the limit for residential area. The water quality was found less likely to change since there is no wastewater discharging industry located. Most of the population rely on seasonal water sources as the study area is considered as a semiarid zone due to poor rainfall. The major water quality issues (BOD, total coliform) were due to domestic activities. Towards the end of the article, recommendations have been made to improve the quality of environment in the area.

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## **Energy Conservation, Biofuels and Renewable Energy to Environmental Sustainability**

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**This paper discusses about the issues of the energy conservation, environmental pollutions and greenhouse gases emissions. Energy efficiency improvements , alternative fuels, waste disposal management, water conservation and use of renewable energies (like wind, solar, etc.) can control many liquid, solid and gaseous pollutants and emissions of GHGs which are being contributed by burning of fossil fuels in power generations and other human activities (like deforestation, MSW, electronic waste, etc.) also. Another source of renewable energy (like biofuels) from the nonfood crops, genetically modified crops and municipal solid wastes can reduce consumption of conventional energy and emissions of GHGs which are basically responsible for global warming, climate change, environmental degradation and human lives disturbances. Therefore, opportunity of clean development mechanisms for developing countries, best practice of energy conservation and renewable energy utilization can cut the impacts of global warming and environmental pollutions to the green economic development and environmental sustainability.**

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## **Heavy Metals Concentration in Mosses Growing Around National Thermal Power Corporation (NTPC), Unchahar, Rae Bareli**

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**The mosses growing around National Thermal Power Corporation (NTPC), Unchahar, Rae Bareli and their respective substrate soil samples have been analysed for 6 selected heavy metals (Cd, Cr, Fe, Ni, Pb and Zn). The results reveal higher accumulation of these metals in mosses as compared to their respective substrate soil. It has also been found that alongwith meteorological conditions prevailing in the study site, the accumulation is also found to depend upon the distance of the site from NTPC and ash pond, leaf area of mosses and specificity of mosses for various metals.**

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## **High $\alpha$ - Radioactivity Level in Betel Leaf (Piper Betel) and Chewing Tobacco**

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Studies on alpha emitting radionuclides in tobacco samples is of significant importance as the interaction of alpha particles with cells chromosomes in different organs of tobacco eaters causes to carcinogenic changes in those organs. Apart from smoking, the tobacco products that are smokeless, like ghutka, chewing tobacco, etc., that are directly consumed through orally also contribute to carcinogenic health hazards. They can increase the internal radiation dose and thereby enhance the case of cancer in human population. Another important sample is betel leaf which is largely consumed by people. Since betel leaf is cultivated in lands using fertilizers having high alpha activity. Regular use of betel leaf may cause health hazards if alpha radioactivity is present in harmful quantities. In view of this the present work betel leafs and different type of tobacco products have been collected from the local market in and around Kolkata and alpha activity of those samples have been measured using CR-39 (SSNTD) detectors and dose has been estimated.

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## **Integrated Environmental Impact Assessment of Kollam (Quilon) Coast, Kerala, Due to Industrial and Other Operational Activities**

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Integrated environmental impact assessment of Kollam (Quilon) coast on the south west coast of India ( $8^{\circ}45'$  and  $9^{\circ}10'$  N latitude and  $76^{\circ}28'$  and  $77^{\circ}17'$  E longitude) due to industrial and other operational activities has been conducted. The baseline studies extended for a period of one year from June 2003 to May 2004 and encompassed air, water and wastewater, marine, estuarine, land and socio-economic environments. The values for the previous years was provided by Centre for Earth Science Studies, Thiruvananthapuram. Local opinion, opinion from the governmental organizations and non-governmental organizations were taken into account. The evaluation of impact was done by the Battelle method (BEES system). The 70 environmental evaluation factors evolved out of the study was grouped into 4 categories ecology, biotic, abiotic and those directly affecting human interests and subdivided by 28 quantitative components. Ranked pairwise technique has been used to arrive at the Parametric Importance Units. Ecology shows a deterioration by an index of -3 EIU, biotic environment a deterioration of -2 EIU, abiotic environment by an index of -7 EIU. The impact from industrial and other operational activities on human interest is +87 EIU. Thus we envisage a positive impact scenario from industrial and related activities at Kollam coast. However, considering the deteriorating environmental factors, continued monitoring of the coast is imperative. An environment management plan and its implementation would lead to sustainable development. Development of a best practice guide is also suggested.

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**An Physiological Aspects of Biofuel Yielding Plants (With Special Referance to *Pongamea Pinnata*) in Bhadravathi Taluk, Shimoga District**

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Biodiesel is a substance that preserves air quality. This type of fuel is designed to enhance the richness of a diesel automobile. Various organizations are setup to control air pollution and find new sources of fuels for vehicles. Not only does biodiesel help the environment, it also assists people in using a lower cost means of transportation. It is a more harmless method than the now used petroleum diesel. Biodiesel is created from nature oils and fats that can be gathered from anyone's gardens. This means that it is a renewable source of power. Biodiesel is the name of a clean burning alternative fuel produced from domestic, renewable resources and it can be blended at any level with petroleum diesel to create a biodiesel blend and can be used in compression ignition (diesel) engines with no major modifications. The oil obtained from the seeds of *Pongamia pinnata* holds promise as fuel used as alternative for diesel. These have a variety of uses, but the economic exploitation of these plants has remained neglected for long time. Survey of *Pongamia pinnata* plant species at the study area was conducted during January to September to know the density of the species and impact of morphological characteristics on the yield efficiency of both the species. Since, lot of wasteland (4631 ha) is found in the study area (Bhadravathi taluk), recognition of the potential use of these species as a source of biofuels and in wasteland reclamation has got numerous scopes. This paper reflects on the ecological and economical benefits from the implication of *Pongamia pinnata* as an energy source in the study area.

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## **Synthesis, Characterisation and Photocatalytic Study of ZnO Nanoparticles**

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ZnO precursor was prepared by direct precipitation from (1) zinc acetate and oxalic acid and (2) zinc acetate and ammonium hydroxide. ZnO nanoparticles were synthesized by incineration of the precursor at 450 °C for 2 hr. The samples were characterized by XRD, UV, SEM and EDS studies. The average crystal size of the sample 1 was 16 nm and that of sample 2 was 26 nm. UV absorption spectra revealed absorption at wavelength less than 388 nm indicating the smaller size of the ZnO nanocrystals. In addition, photocatalytic degradation of eosin and methyl orange was performed using the above synthesized ZnO nanocrystals and bulk ZnO as photocatalysts. The results showed that nano ZnO have greater photocatalytic activity than that of bulk ZnO.

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## **Assessment of Radiation Dose From $^{210}\text{Pb}$ and $^{210}\text{Po}$ due to Chewing Tobacco Leaves and Smoking Cigarettes- An Indian Scenario**

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The study of  $^{210}\text{Pb}$  and  $^{210}\text{Po}$  content in tobacco and its products is essential because of their elevated concentrations. The cumulative alpha-radiation dose delivered to humans from inhaled  $^{210}\text{Po}$  in cigarette smoke becomes significant.  $^{210}\text{Pb}$  is another element of interest since it is the precursor to  $^{210}\text{Po}$  in the radioactive decay chain of  $^{238}\text{U}$ . Further, in India the ingestion dose due to these radionuclides becomes significant because of chewing tobacco leaves. In the present study, the concentrations of these two radionuclides were determined in dried tobacco leaves and some branded cigarettes.  $^{210}\text{Pb}$  was determined by counting the beta activity of  $^{210}\text{Bi}$  with a low background beta counter after radiochemical separation and precipitation.  $^{210}\text{Po}$  was determined by alpha counter after radiochemical separation and deposition of polonium on silver disc.  $^{210}\text{Pb}$  and  $^{210}\text{Po}$  concentrations in dry tobacco leaves ranged from 6.0 to 30.5 mBq/g (mean 15.8 mBq/g) and 5.6 to 29.3 mBq/g (mean 12.7 mBq/g). The average annual committed effective dose for the tobacco chewers (10g/day) was estimated to be 95.5  $\mu\text{Sv/y}$  (39.9  $\mu\text{Sv/y}$  from  $^{210}\text{Pb}$  and 55.6  $\mu\text{Sv/y}$  from  $^{210}\text{Po}$ ).  $^{210}\text{Pb}$  and  $^{210}\text{Po}$  concentrations in branded cigarettes ranged from 11.0 to 18.4 mBq/cigarette (mean 41.2 mBq/cigarette) and 10.5 to 16.6 mBq/cigarette (mean 13.1 mBq/cigarette). The average annual committed effective dose for the smokers (20 cigarettes per day) was estimated to be 149.8  $\mu\text{Sv/y}$  (39.8  $\mu\text{Sv/y}$  from  $^{210}\text{Pb}$  and 110.0  $\mu\text{Sv/y}$  from  $^{210}\text{Po}$ ).

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