Theme 5: Conservation, restoration and management of ecosystem

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REMEDIATION OF HAZARDOUS COMPOUND-BENZENE USING PACKED BED BIOREACTOR TO DEVELOP A TECHNOLOGY FOR RESTORING ECOSYSTEM

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The Petrochemical Industry generates the hazardous waste comprising organic and inorganic compounds. The present treatment methods include physico-chemical and biological measures. Inspite of such methods being used, the waste discharged is found to contain complex organic compounds and heavy metals which cause an impact on the terrestrial and aquatic ecosystem. The treatment strategy needs to be developed for remediation of hazardous compounds persisting in environment.

In the present research, Packed Bed Bioreactor has been developed wherein solid activated charcoal packed for interaction with the pollutant. The microbial culture developed from the animal waste (cow dung) has been characterized using 16SrDNA technology and used as novel source of biomass for remediation of selected organic compound viz. Benzene as case study. Benzene is taken in the first reactor with microbial culture for primary treatment and passed through Packed Bed Bioreactor using a peristaltic pump. Benzene interacted with activated charcoal and remediated under the influence of microbial consortium in the PBR. The remediated compound is then collected in the third reactor and analysed for the biodegradation. Benzene was found biodegraded into its intermediate catechols and converted finally into environmental friendly compounds.

This research has developed a technique to reduce the impact of hazardous compound like Benzene which would be applicable to treat the hazardous wastes to restore the ecosystem.