National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Integrated constructed wetland approach for simultaneous removal of chromium and electricity generation from waste water
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Venue	: BM Seminar Room
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Abstract : Heavy metal contamination, particularly chromium released from industries such as tanneries and mining, poses a significant risk to human health and the environment. Hexavalent chromium is highly hazardous and toxic even at low concentrations which is a matter of concern addressing this issue is crucial for environmental sustainability. Conventional methods for chromium remediation are quite expensive and not eco-friendly approach. One promising and environment-friendly alternative is the use of plants in constructed wetlands for chromium removal. This phytoremediation strategy provides an innovative solution to mitigate chromium contamination while promoting sustainable environmental management. This approach utilizes phytoextraction, microbial reduction and adsorption processes to achieve effective remediation. It explores the potential of constructed wetlands as a green technology for chromium remediation highlighting key mechanisms such as plant species, and design considerations for optimizing removal efficiency. Result of the study indicated that chromium removal from contaminated soil was observed to be around 94-97% in all the three exposed concentration (10ppm, 50 ppm and 100ppm). Among the exposed concentration 100ppm showed good removal for chromium with efficiency around 96-97% (45 days) from contaminated soil followed by 10ppm and 50ppm (94%). Chromium accumulation in leaves was found significantly high in *Tradescantia spathacea* (1.18-4.7 mg/kg). Among all the plant *Tradescantia species* particularly *Tradescantia pallida* showed highest chromium accumulation in root (1.39-2.11 mg/kg), high translocation factor (2.31) and bioconcentration factor values (1.43) indicating a hyperaccumulator plant for chromium with increasing chlorophyll content, and antioxidant activity. The integrated CW&ndashMFC technique will be promising substitute for real site application in chromium contaminated environments, combining heavy metal removal with renewable energy generation.

Keywords: Heavy metal contamination, Chromium, Constructed wetland, Adsorption, Phytoremediation