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Departmental Seminar

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| Seminar Title | : Study on removing Cr (VI) from simulated chromite mine wastewater using nZVI-biochar infused constructed wetland microbial fuel cell  |
| Speaker       | : Divyani Kumari (520bm3007)  |
| Supervisor    | : Dr. Nivedita Patra  |
| Venue         | : BM Department Seminar Room  |
| Date and Time | : 08 May 2025 (12.00)   |
| Abstract      | : Cr (VI), a highly toxic and mobile contaminant, slowly infiltrates the environment and poses severe ecological threats even at trace concentrations. Reducing the form of Cr (VI) to Cr (III) can substantially mitigate its threat. Constructed Wetland-Microbial fuel cell (CW-MFC) is an emerging nature-based technology integrating the principle of natural wetlands with bio-electrochemical processes. CW-MFC provides dual benefits: treating wastewater while generating electricity. Despite these benefits, this technology needs modifications in its practical applicability. In this study, a modified CW-MFC system was employed with cement-graphite as anode and cathode. The substrates used in CW-MFC were first soil, then water hyacinth biochar impregnated with nano zerovalent iron (nZVI) mixed with sand, and lastly gravels. The experiments used simulated chromite mine wastewater at a constant hydraulic retention time of 48 hours for 60 days. The modified CW-MFC demonstrated effective treatment of Cr (VI) (90-96%) and COD (98-99%), simultaneously generating bioelectricity with an open circuit voltage ranging from 300-450 mV. The introduction of cement-graphite electrodes and nZVI-impregnated water hyacinth biochar in CW-MFC enhanced its electrochemical and water remediation performance. These results also showcase the potential of CW-MFC as a sustainable and dual-purpose technology for the treatment of industrial wastewater, mainly from chromite mining operations. Keywords: Bioelectricity, Constructed wetland, Chromium, Chromite mine, Microbial Fuel Cell, Simulated wastewater. |