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Departmental Seminar

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Seminar Title	: Optimization of Selenium Removal from Aqueous Solution using Aluminum Modified Dolochari A Response Surface Methodology
Speaker	: Pallavi Behera
Supervisor	: Prof. Sahendra Ram
Venue	: Seminar Hall
Date and Time	: 08 Jan 2025 (4:15PM)
Abstract	: Selenium (Se) toxicity due to mining is an emerging concern worldwide. Traces of selenium were found in some mine dumps of Talcher and Ib Valley coalfields. Selenium toxicity can degrade the ecosystem and impact human health. This paper focuses on enhancing the surface characteristics of dolochar to remove selenium from mine sump of coal fields of Talcher and Ib Valley. The process optimization for the removal of toxic selenium from aqueous solution and developing a predictive model using response surface methodology, SEM, EDX, XRD, FT-IR, and BET surface area analyzers were employed to access and characterize the structural and surface properties of the dolochar. The experiments demonstrated the efficacy of dolochar in removing selenium from an aqueous solution, achieving a maximum removal percentage with low initial concentration and low pH, with an adsorption capacity of 5.5 g/L within 90 min. The pH of the adsorbent was found to be 8. Box-Behnken design (BBD) fits well with R <sup>2</sup> -0.99 with SD-1.3 experimental data. The study strongly agreed with the pseudo second-order kinetic model and Langmuir Isotherm (R <sup>2</sup> -0.99), and B3D obtained similar results. Thus, aluminum modified dolochar may be preferred as a potential adsorbent for the removal of selenium from the mine sump. Keywords: Selenium, Adsorption, Dolochar, Isotherm; Response Surface Methodology