National Institute of Technology Rourkela

Registration Seminar

Seminar Title	: Functional Aspects of Glutathione Reductase in plants under Heavy Metal Stress: Extraction, Applications, and Biochemical Properties
Speaker	: Rashmi Pratap Singh (Rollno : 523bm1010)
Supervisor	: Nandini Sarkar
Venue	: Seminar Room, BM Dept.
Date and Time	: 25 Aug 2025 (11.00 am)
Abstract	: This study investigates the comparative impact of Nickel and cobalt, in both ionic and nanoparticle forms, on Brassica plants. Plants were treated with Nickel ions (Ni^{2+}), cobalt ions (Co^{2+}), Nickel nanoparticles (NiNPs), and cobalt nanoparticles (CoNPs). Nanoparticle characterization was performed using Dynamic Light Scattering (DLS), Zeta Potential analysis, X-Ray Diffraction (XRD), and UV-Visible spectroscopy to determine size distribution, surface charge, and crystallinity. To assess oxidative stress responses, the activity of Glutathione Reductase (GR), a key antioxidant enzyme, responsible for maintaining cellular redox homeostasis by regenerating reduced glutathione (GSH) from its oxidized form (GSSG), thereby sustaining the intracellular glutathione pool required to neutralize reactive oxygen species (ROS) and support essential metabolic pathways under stress conditions, its activity was measured post-treatment. Total protein content was quantified using the Bradford assay, and SDS-PAGE was used to examine protein expression patterns. The results revealed differential GR activity and protein expression profiles between metal ion- and nanoparticle-treated groups, suggesting that nanoparticle exposure elicits a distinct biochemical response in plants compared to their ionic counterparts. This work contributes to understanding how different forms of heavy metals affect plant stress mechanisms and the potential environmental implications of nanoparticle use.