National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Chromium-reducing bacteria-mediated biopriming: Exploiting a sustainable strategy for immunity against blast and remediating chromium stress.
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Supervisor	: Santosh Kumar #2787
Venue	: LS Seminar Hall
Date and Time	: 12 Feb 2025 (15:30 hrs)
Abstract	: Rice production is vulnerable to a number of pressures; one of the main biotic stresses is blast disease, which is brought on by Magnaporthe oryzae and has the potential to wipe out the entire crop under extreme circumstances. Microbial-mediated seed and root prime in plants enhance defense against a broad range of pathogens by jasmonate (JA) and ethylene (ET) signaling mediated induced systemic resistance (ISR). The present work demonstrates some selected microbes like Bacillus cereus, Pseudomonas aeruginosa, Staphylococcus gallinarum, Staphylococcus hominis, Enterobacter cloacae show an antifungal effect against the rice blast pathogen (Magnaporthe oryzae). Rice (Swarna) seed and root priming with these bacteria enhance ISR in rice against rice blast disease. The MYB transcription factor gene MYB72 together with NPR1, NPR3, and NPR4 genes function as long-distance ISR signaling molecules that are highly expressed in the rice (Swarna) root by co-cultivation with the bacteria in the rice's rhizosphere. These bacteria also resist ~1100 ppm of chromium stress and reduce around 88.94% of Cr6+ to Cr3+ within 50 days in chromium-contaminated soil. Because Cr3+ has a reduced ability to enter cells, it is less poisonous than Cr6+, which is more toxic and soluble and can be transported to cells more easily. The carcinogenic and mutagenesis properties of hexavalent chromium Cr6+ make it a particularly dangerous substance. Overall, these bacteria act as a key factor against both abiotic and biotic stresses. Keywords: rice blast, microbial priming, antifungal effect, chromium, bioremediation