National Institute of Technology Rourkela

Synopsis Seminar

Seminar Title	: Impact of environmental stressors on the survival response of ecologically important bacteria of Bhitarkanika mangrove ecosystem
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Venue	: Life Science Seminar Room
Date and Time	: 04 Nov 2024 (04:00 PM)
Abstract	: The thesis illustrates the impact of environmental stressors (climate change factors such as pH fluctuations, UV exposure, and heavy metals) on ecologically important marine bacteria involved in biofilm formation and cellulose degradation with an aim to understand their survival mechanisms in response to these stressors. Eleven potent isolates involved in multiple ecological processes were identified, belonging to the genera *Bacillus*, *Pseudomonas*, *Enterobacter*, *Burkholderia*, and *Exiguobacterium*. Out of 11 potential bacteria, *Bacillus stercoris* GST-03 and *Pseudomonas balearica* DST-02 showed strong biofilm-forming ability and tolerance to high concentrations of Pb and Cd. Optimal growth and biofilm formation were observed at pH 6 and pH 7 for *B. stercoris* GST-03 and *P. balearica* DST-02, respectively. Both strains exhibited significant decreases in biofilm biomass with increasing the stress from optimal levels. Expression of key biofilm-forming genes (*tasA* and *pslB*) revealed, in *B. stercoris* GST-03, *tasA* expression peaked at pH 6 and 150 mJ/cm² UV exposure, corresponding with the optimal biofilm growth observed in these conditions. Expression of *pslB* in *P. balearica* was upregulated at pH 7 and in the absence of UV stress but declined under higher metal concentrations. Moreover, the cellulose-degrading genes *celA* and *celB* showed the highest expression at pH 8, correlating with peak cellulase activity. Biofilm-encased cells exhibited significantly lower oxidative damage compared to planktonic cells, demonstrating the protective role of the biofilm matrix in mitigating the effects of oxidative stress. The current findings provide a broad overview of bacterial response and adaptability concerning future climate and environmental changes.