

Departmental Seminar

Seminar Title	: Antibiofilm activity of <i>Allium Sativum</i> (Garlic) extract against the biofilm-forming bacteria in cooling water systems
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Venue	: Seminar Room
Date and Time	: 30 Dec 2024 (10:30 AM)
Abstract	: Biofilm formation causes crucial problems in many industrial sectors. It can lead to microbiologically induced corrosion and biofouling of structural materials in cooling tower systems. This study evaluated the antibiofilm efficacy of different <i>Allium Sativum</i> (garlic) extracts as green agents against a consortium of seven biofilm-forming bacteria. These strains were already isolated from Koel River water which is used as a source of cooling water for Rourkela Steel Plant. Ethanol, methanol, ethyl acetate, and aqueous garlic extracts were prepared. Antibacterial activity, biofilm inhibition, and eradication efficacies of plant extracts were evaluated using agar diffusion assay, crystal violet test, biofilm metabolic activity, and confocal laser scanning microscopy of biofilms. The plant extract showed the highest biofilm control efficacy was characterized using nuclear magnetic resonance (NMR), Fourier-transform infrared spectroscopy (FTIR), and high-resolution mass spectroscopy (HRMS). The results revealed that aqueous garlic extract showed the highest biofilm control efficacy. The presence of sulfur compounds like diallyl disulfide and S-allyl-L-cysteine, known for their antibacterial and antibiofilm activities, was confirmed by NMR, FTIR, and HRMS analyses. Therefore, the aqueous garlic extract can be used as a potential green antibiofilm agent, but more research that represents the real scenarios should be done. Keywords: Biofilm, cooling water, garlic, green antibiofilm agents