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Screening and characterization of agarolytic bacteria from different sources

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Statement of the Problem: Agar, a complex polysaccharide produced by marine red algae, is used throughout the world in a variety of laboratory and industrial applications, owing to its jellifying properties. In India, more than 100 plant tissue culture laboratories (PTCL) are engaged in plant propagation programme and ~25 are in Maharashtra state. Once the plants are transferred to soil, the residual agar with low nutrient contents thus becomes waste agar. Around 1500 kg waste agar is generated per day in a medium sized PTCL which poses a problem of disposal, as it is dumped in pits and takes months for decomposition. Agarolytic microorganisms produce agarases, which catalyze the hydrolysis of agar. Most agarolytic bacteria described have been isolated from marine sources, though there are few reports from other sources as well.

Methodology & Theoretical Orientation: The aim of the present study is to isolate bacteria which is effective in degradation of agar. Collection of samples for screening of microbes through different sources including river water, spinach field soil and compost has been done. Pure bacterial isolates obtained from enrichment technique followed by repeated sub-culturing were screened for agar-degrading ability by streaking on agar media. Isolates were characterized by using biochemical and molecular methods. Bacterial genomic DNA isolation was carried out using CTAB method. 16S r-RNA of isolates were studied.

Findings: Total 7 strains were selected as the candidates that hydrolyze agar around colony, among which three each from river water and spinach soil and one from compost sample. Three strains of *Pseudomonas*, *Enterobacter* and *Aeromonas* were identified and characterized using 16S rRNA.

Conclusion & Significance: Investigation on the efficiency of these isolates from non-marine sources may yield useful information and their usage for accelerated degradation of waste agar from PTCL and thus would be valuable for the industry.

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