

SCREENING AND ISOLATION OF ANTARCTIC PHENOL-DEGRADING BACTERIA

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Hydrocarbon pollution of Antarctic due to the rapid increase in anthropogenic activities has potentially caused phenol as the major pollutant in the most pristine region on Earth. In recent years, the utilization of indigenous bacteria in the treatment of phenol contaminated sites is well recognized. However, due to the anti-microbial properties of phenol and the severe climate conditions such as low temperature and poor nutrients, phenol bioremediation became a foremost challenge in Antarctic. A study on pure cultures of phenol degrading bacteria isolated from Antarctic soils was conducted. The study encompassed the process of isolating and screening the psychrophilic phenol-degrading bacteria. From three soil samples collected from Antarctic, seventeen pure phenol-degrading colonies were isolated by five cycles of repeated subculturing onto mineral medium agar plates supplemented with 0.5 g/l of phenol and incubated at 4 °C. Out of seventeen phenol-degrading isolates, three isolates were found to be capable of degrading 0.5 g/L of phenol in MSM completely within a five-day incubation period in a shaking incubator with 150 rpm at 4 °C. Phenol degradation was monitored daily using 4-aminoantipyrine colorimetric assay following the method of the American Public Health Association. Based on the preliminary screening, isolate CHI-15 isolated from GPS location: S62° 09' S7.2'' W58° 11.4'' with highest degradation activity was found to be capable of degrading up to 95% of phenol at a concentration of 0.5 g/L within 96 hours of incubation period. This study revealed the potential use of psychrophilic bacteria in the treatment of phenol-contaminated sites, and therefore contributes to the environmental sustainability of Antarctic.

Keywords: Biodegradation, phenol, Antarctic, psychrophilic, bacteria.