

Characterization of Biosurfactant during Crude Oil Biodegradation Employing *Pseudomonas* sp. PG1: A Strain Isolated from Garage Soil

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Abstract : Oil pollution accidents, nowadays, have become a common phenomenon and have caused ecological and social disasters. Microorganisms with high oil-degrading performance are essential for bioremediation of petroleum hydrocarbon. In this investigation, an effective biosurfactant producer and hydrocarbon degrading bacterial strain, *Pseudomonas* sp. PG1 (identified by 16s rDNA sequencing) was isolated from hydrocarbon contaminated garage soil of Pathsala, Assam, India, using crude oil enrichment technique. The growth parameters such as pH and temperature were optimized for the strain and upto 81.8% degradation of total petroleum hydrocarbon (TPH) has been achieved after 5 weeks when grown in mineral salt media (MSM) containing 2% (w/v) crude oil as the carbon source. The biosurfactant production during the course of hydrocarbon degradation was monitored by surface tension measurement and emulsification activity. The produced biosurfactant had the ability to decrease the surface tension of MSM from 72 mN/m to 29.6 mN/m, with the critical micelle concentration (CMC) of 56 mg/L. The biosurfactant exhibited 100% emulsification activity on crude oil. FTIR spectroscopy and LCMS-MS analysis of the purified biosurfactant revealed that the biosurfactant is Rhamnolipidic in nature with several rhamnolipid congeners. Gas Chromatography-Mass spectroscopy (GC-MS) analysis clearly demonstrated that the strain PG1 efficiently degrades different hydrocarbon fractions of the crude oil. The study suggests that application of the biosurfactant producing strain PG1 as an appropriate candidate for bioremediation of crude oil contaminants.

Keywords : petroleum hydrocarbon, hydrocarbon contamination, bioremediation, biosurfactant, rhamnolipid

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