

Screening and Characterization of Hydrocarbonoclastic Bacteria Isolated from Oil-contaminated Soils from Auto Garages

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Abstract:

Release of petroleum oil and its products into the environment is a worldwide concern. The present study focused on isolation, molecular identification, morphological and biochemical characterization of bacteria possessing hydrocarbon degrading properties. The study also aimed at optimizing appropriate culture conditions for the isolates as well as screening for alkane hydroxylase enzyme. Out of twenty one microbes isolated, nine were selected based on their ability to utilize different hydrocarbons. The isolates were observed to mineralize heating oil, hexane, octane, toluene and diesel oil. PCR amplification of 16S rDNA gene revealed that the isolates belong to six different genera; Pseudomonas, Acinetobacter, Klebsiella, Enterobacter, Salmonella and Ochrobactrum. Based on their ability to degrade diesel oil, three isolates were selected and their growth conditions optimized. Optimum degradation was recorded at less than 1% substrate concentration, pH 7 and temperature range of between 30°C and 37°C and using yeast extract as nitrogen source. GC-MS analyses confirmed their diesel oil degrading properties. Alkane hydroxylase gene from one of the isolates (isolate 1C) was successfully amplified indicating its catabolic capabilities in degrading alkanes. Overall, the characterized isolates may constitute potential candidates for biotechnological application in environmental cleanup of petroleum contaminants. Keywords: Oil-Contaminated Soils, Bacteria, Biodegradation, Petroleum Hydrocarbons

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