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Study of microbial population and diversity in soil strategies of hydrocarbon contaminants

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A laboratory study was conducted as an attempt to investigate the performance of bioremediation approach of petroleum hydrocarbon contaminated soil obtained from petrochemical industry. Biodegradation of petroleum hydrocarbon contaminated soil was performed using the hydrocarbon-degrading bacteria. Hydrocarbon utilizing microorganisms were isolated and identified from contaminated soil samples. Initial screening results of eleven isolates capable of growing on n-hexadecane five most promising isolates were selected for further testing for biosurfactant production and emulsification activity. They were identified as *Pseudomonas putida, Pseudomonas* species, *Betaproteobacterium, Actinomyces* species and *Bacillus* species. Cluster analyses of 16S rRNA gene sequences of the isolated bacterial species revealed 90% similarity amongst hydrocarbon degrading bacterial community. Emulsifying capacity was evaluated using the E24 emulsification index. The isolated species exhibited high emulsification activity. Among the five species tested, *Pseudomonas* putida showed superior performance in terms of growth on hydrocarbons, emulsifying activity and ability to transform hydrocarbons. E24 emulsification activity recorded maximum value after 48 hours of incubation (E24=86%, E24=61%) *Pseudomonas putida* and E24=66% with *Bacillus* species. Interestingly, the gas chromatographic analysis of crude oil treated with *P. putida* showed a decrease in heavy hydrocarbon fractions demonstrating a clear potential for this species to be used as a soil inoculants in bioremediation processes.

Biography

Althalb Hakima is an Assistant Professor at the Libyan Petroleum Institute, Libya.

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