

Isolation and Identification of a Novel Oil-Degrading Bacterium, *Pseudomonas aeruginosa* M31

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Background & Objectives: Due to their broad application, petroleum products potentially contaminate soils, water and sea, and thereby pose a serious threat to both environment and human health. Bioremediation is considered a cost-effective and environmentally safe Methods for treating oil contaminants. Therefore, isolation of oil-degrader microorganisms and finding optimal rates of growth and hydrocarbon biodegradation is important to petroleum microbiology.

Methods: Samples were collected from oil contaminated soils in Khuzestan, Iran. The ability of bacterial isolates to produce biosurfactant and degrade crude oil was studied in a mineral base medium containing 1% (v/v) crude oil as the sole source of carbon and energy. one strain was found to degrade crude oil efficiently. The morphological, physiological and phylogenetic characteristics of the strain were analyzed. Effect of temperature, pH, agitation rate and the minimum amounts of nitrogen sources needed for optimal degradation of crude oil was determined by optical density measurements at 600 nm and total protein for growth and oil degradation, respectively.

Results: Result of the seven tested isolates, one strain was best able to degrade crude oil after 5 days incubation. This strain was identified as *Pseudomonas aeruginosa* and was named M31. Crude oil is a complex mixture primarily composed of insoluble compound which are not easily dispersed in water. Production of emulsifying agents or biosurfactants by *P.aeruginosa* M31 led to the initial solubility of crude oil and the turbidity of the culture mixture and higher degradation rates. The optimum conditions for crud oil degradation were pH 8.5, temperature 35 °C, agitation rate 120 rpm and 2g/ 1 NH₄Cl.

Conclusion:A newly isolated *P. aeruginosa* M31 could grow with crude oil as the sole carbon and energy source and degrade it efficiently. Therefore this strain may be of great significance both in bioremediation of oil-contaminated soils and biotreatment of oil wastewater.

Keywords: Bioremediation; Biosurfactant; *Pseudomonas aeruginosa*