TITLE: ISOLATION AND PURIFICATION OF BIOSURFACTANTS PRODUCED BY HALOPHILIC BACTERIA AND EVALUATION OF THEIR POTENTIAL FOR CRUDE OIL BIODEGRADATION IN MICROCOSM ASSAYS

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ABSTRACT:

Biosurfactants are surface-active compounds synthesized by a wide variety of microorganisms. These compounds play an important role in bioremediation processes by forming stable emulsions between oil-water and increasing the solubility and mobility of hydrophobic compounds. They are considered better candidates to be used in bioremediation processes in comparison to chemical surfactants due to some advantages, such as greater biodegradability in the environment and lower toxicity. The aim of this work was to isolate and purify biossurfactants from halophilic bacteria and evaluate their potential for crude oil biodegradation in microcosm assays. Five bacterial strains were selected in preliminary assays due to significant ability for reduction of the surface tension and emulsification under 9% NaCl. After growth, one liter of the supernatant obtained by centrifugation of each cell culture was used for subsequent biosurfactant extraction with equal volume of chloroform-methanol (1:1) under 4^{o}C, overnigth. Crude biosurfactant was obtained after removal of the solvent by rotary evaporation at 40^{o}C under reduced pressure. The bacterium MOD 31.J showed the most significant emulsification activity after extraction, presenting 100% of diesel oil and 83% of kerosene emulsification. The five selected strains were tested in a consortium for biodegradation of crude oil during 30 days. Every two days triplicate assays were sacrificed for extraction of the crude oil by addition of the solvent dichloromethane (1: 1) and rotary evaporation. GC-MS analyses confirmed their ability to efficiently degrade alkanes and aromatic compounds under halophilic conditions. Results gathered in this study demonstrate the potential of such bacteria for further use in biotechnological processes such as biorremediation or MEOR.

Keywords: biodegradation, bioemulsifiers, biosurfactants, halophilic bacteria, microcosm.

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