

Characterization of Biosurfactants Produced by Bacteria Degrading Gasoline

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Abstract : Biosurfactants are amphiphilic biological compounds consisting of hydrophobic and hydrophilic domains produced extracellularly or as part of the cell membrane by a variety of yeast, bacteria and filamentous fungi. Biosurfactant applications in the environmental industries are promising due to their biodegradability, low toxicity, and effectiveness in enhancing biodegradation and solubilization of low solubility compounds. Currently, the main application is for enhancement of oil recovery and hydrocarbon bioremediation due to their biodegradability and low critical micelle concentration (CMC). The use of biosurfactants has also been proposed for various industrial applications, such as in food additives, cosmetics, detergent formulations and in combinations with enzymes for wastewater treatment. In this study, we have investigated the potential of bacterial strains: *Mannheimia haemolytica*, *Burkholderia cepacia* and *Serratia ficaria* were collected aseptically from the lagoon Marchika (water and soil) in Nador, Morocco; for the production of biosurfactants. This study also aimed to optimize the biosurfactant production process by changing the variables that influence the type and amount of biosurfactant produced by these microorganisms such as: carbon sources and also other physical and chemical parameters such as temperature and pH. Emulsification index, methylene blue test, and thin layer chromatography (TLC) revealed the ability of strains used in this study to produce compounds that could emulsify gasoline. In addition, a GC/MS was used to separate and identify different biosurfactants purified.

Keywords : biosurfactants, *Mannheimia haemolytica*, biodegradability, *Burkholderia cepacia*, *Serratia ficaria*

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