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ISOLATION AND CHARACTERIZATION OF BIOSURFACTANT-PRODUCING BACTERIA

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Abstract

Contaminants such as petroleum-derived hydrocarbons have been heavily released to the environment. Natural mechanisms of contaminant removal can take several years and bioremediation strategies have been proposed as alternative treatments. Biosurfactants are amphipatic molecules than have the ability to reduce the superficial and interfacial tension between immiscible liquids or liquid-air phase. The isolation of biosurfactant producing microorganisms from soil obtained form contaminated and uncontaminated sites, will allow the discovery of novel biosurfactants. The strategy for isolation of microorganisms can help on the isolation of bacterial strains that are not commonly associated with biosurfactant production. Therefore, the aim of this study was the isolation of bacterial strains able to produce biosurfactants from contaminated and uncontaminated soil, using different media for isolation. For primary isolation, samples were plated in agar plates with nutrient agar (NA) or tryptic soy agar (TSA) at different pH (5, 7, 9) and different temperatures (8, 32, 45°C). Also, samples were inoculated in EMB Agar, and M9 salt medium with 0.1% sodium benzoate or 1% cellulose as carbon source. Pure cultures were obtained from the inoculated plates, and were preliminary identified by Gram stain, catalase and oxidase. Biosurfactant production was identified by the drop collapse method. A total of 802 bacterial strains were isolated; those initially identified as belonging to the *Pseudomonas* group or *Bacillus* genus were not selected, because of previous and current studies in our research group including those bacteria. From the remaining bacterial strains, 40 were positive for the drop collapse test. Regarding the strategy for isolation, most of the strains (68%) were isolated from contaminated sites (automobile workshop and mine waste). Most of the strains were isolated at basic and neutral pH at 8 and 32°C and the isolation was higher on TSA (42%) than on NA (26%). *Micrococcus*, *Rhodococcus* and *Enterobacter* were the most common genus found. The strains belonging to the genus *Micrococcus* had the best results in emulsion index (60-70%) and surface tension reduction (48-61 Din/cm^2). Three strains were isolated in EMB at 32°C. Further studies will be undertaken to describe the biosurfactants that each microorganism produce.