

## BIOSURFACTANT AND BIOMASS PRODUCTION BY MANGROVE BACTERIAL CONSORTIUM SUBMITTED TO DIFFERENT GROWTH CONDITIONS

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Biosurfactants are substances produced by microorganisms that can be used to bioremediate environments impacted by petroleum hydrocarbons, such as mangroves. The environmental bioremediation depends on three main factors: presence of bacteria that degrade the oily compound, favorable environmental conditions for the biodegradation and bioavailability of the contaminant. The biosurfactants helps the emulsification of oily compounds in water. Biosurfactant is a biodegradable substance and thus causes less damage to the mangrove environment than other physicochemical techniques. This study aims to test different growth variables to optimize the production of biosurfactant and biomass by hydrocarbonoclastic bacteria consortia isolated from mangrove of Magé, Rio de Janeiro, RJ, Brazil. The growth variables studied were: (a) the presence or absence of petroleum API 28 °; (b) carbohydrate sources (maltose and sucrose) and their concentrations (3.3 g/L C and 30g/L C); (c) NaCl concentration (0g/L, 30g/L, 35g/L) and (d) temperature incubation (25°C; 37°C; 42°C). Salt nutrient broth were taken as control for all variables tested. Biosurfactant production and biomass were tested for each growth variable by gasoline emulsification test (TE) and optical density lecture (OD), respectively. TE and OD readings were performed at ten, twelve and fifteen days of consortia incubation. R software with package NLME (non-linear mixed effect model) was chosen for statistical analysis of data. Data analysis revealed that biosurfactant production and consortia biomass were intensified when cultivated in the presence of petroleum. Therefore variables such as presence of carbohydrate, NaCl concentrations of 0gL<sup>-1</sup> and 35gL<sup>-1</sup> and temperature of 45°C inhibited biosurfactant production. It is known that bacteria consortia oxidize carbohydrate easier than petroleum compounds, however, bacterial consortia syntrophy can explain the best TE and DO results when petroleum was added into the broth. In conclusion, the best variables for biosurfactant production and biomass enhancement were salt nutrient medium with 30 gL<sup>-1</sup> of NaCl and petroleum API 28° as the single carbon source at incubation temperature of 37°C. Studies about this topic are required for development of new technologies for petroleum hydrocarbons environmental remediation.

Key-words: hydrocarbonoclastic bacteria; petroleum; bioremediation; mangrove.

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