TITLE: EFFECTS OF PRESSURE, HEAT AND SALINITY OF PETROLEUM RESERVOIRS ON THE TENSOACTIVE PROPERTIES OF BIOSURFACTANT LIPOPEPTIDES

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The increased demand for green technologies has boosted the world market for biosurfactants and stimulated research for new compounds. In the oil industry there has been a growing interest in biological surfactants over synthetic ones for oil recovery from reservoirs, since biosurfactants have an important role to play in reducing carbon dioxide emissions, a major greenhouse gas, from the atmosphere. Microbial enhanced oil recovery (MEOR) employs microorganisms or their products and has been successfully applied in several countries. However, for application in MEOR the microorganisms and/or their metabolites must tolerate the severe conditions found in oil reservoirs, including high temperature, pressure and salinity. Thus, this study aimed to evaluate the resistance of surfactant lipopeptides produced by *Bacillus* strains to high pressure, temperature and salinity for MEOR applications. Samples of ten purified lipopeptides were initially submitted to high pressure in a uniaxial compression equipment for 1h, after which they were submitted to autoclaving, to verify the thermal resistance. To test the resistance to high salinity, solutions of the biosurfactants were prepared in the presence of 100 g/L and 150 g/L NaCl. After the treatments, the biosurfactants were analyzed for their properties of emulsification, reduction of surface tension and oil dispersion, comparing the results before and after the treatments. The tests confirmed that the lipopeptides retained their tensoactive properties after being subjected to a pressure of 600 bar, 121 °C and 15% NaCl. There were no statistically significant changes ($p < 0.05$) in emulsion indices (> 60%), water surface tension reduction (28 mN/m) and in the dispersion of oil spilled in seawater (100% dispersion). Therefore, our results demonstrate that the lipopeptide biosurfactants tested in this study are potential candidates for application in MEOR because they support extreme conditions of pressure, temperature and salinity found in many oil reservoirs.

KEYWORDS: oil recovery, tensoactive, lipopeptides, petroleum reservoirs

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