

**TITLE:** CHARACTERIZATION AND COST OF PRODUCTION OF A BIOSURFACTANT PRODUCED BY A *BACILLUS* STRAIN

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**ABSTRACT:**

Biosurfactants are active compounds that can be used in the formulation of products such as cosmetics, medicines, cleaning products and food. Their structural features and resistance to variations in pH, temperature, pressure and salinity, associated with biodegradability and low toxicity, are essential characteristics for the choice of these molecules for industrial and environmental purposes. The objective of this study was to characterize the biosurfactant produced by a strain of *Bacillus* sp., investigating its stability, and to evaluate the cost of its production. The strain was grown in a mineral medium for 48h at 150 rpm and 30°C. Then, the culture was centrifuged and the supernatant was submitted to acid precipitation. The product was lyophilized and structurally characterized by FTIR and mass spectrometry. Thermal resistance was tested by differential exploratory calorimetry (DSC) in the range of 30 to 300°C. Combined effects of high salinity, temperature and pressure on tensoactivity were also evaluated. The chemical analysis showed a pool of lipopeptides, presenting known isoforms of surfactin, iturin and fengycin. The biosurfactants resisted to high temperatures, starting to decompose at 260 °C. With a Critical Micellar Concentration (CMC) of 6.12 mg/L, the biosurfactants were able to reduce the surface tension of water to 30 mN/m, produce a stable water-oil emulsion, and disperse oil spilled into seawater. The tensoactive properties were maintained unchanged after submitted to high pressure (600 bar) followed by autoclaving as well as in medium containing 15% NaCl. Considering the amount of biosurfactant recovered per liter of culture and counting the expenses with raw materials, it is estimated that 1g of the produced biosurfactant costs an average of R\$ 9,00. Taking everything into account the biosurfactants produced by *Bacillus* sp. are promising for industrial use.

**Keywords:** Biosurfactants; *Bacillus* sp.; Production cost.

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