

VII Simpósio de Microbiologia Agrícola

Inovação e Sustentabilidade para transformar o campo

18 a 21 de maio de 2026



ESALQ
USP



Optimization of Biosurfactant Production by *Microbacterium hydrothermale* Using Soy Molasses: Substrate Characterization and Process Parameters

Mateus Henrique Dezzotti Prado^{1*}, Mariana Amaral Azevedo¹, Iolanda Cristina Silveira Duarte¹.

¹Federal University of São Carlos

*mh.dezzottiprado@gmail.com

The search for sustainable alternatives to synthetic surfactants has driven the development of biosurfactants from agro-industrial residues. In this context, the present study aims to produce and optimize biosurfactants using microorganisms isolated from photovoltaic panels, with an emphasis on the use of soy molasses as a low-cost substrate with high nutritional value for microbial cultivation. In the initial stage, the strain *Microbacterium hydrothermale* was selected and cultivated for 120 hours in diluted soy molasses at 30°C. Substrate characterization revealed high levels of total carbohydrates (245.28 ± 2.22 g/L) and reducing sugars (48.28 ± 1.22 g/L), as well as protein content (14.15 ± 1.6 g/L), lipids ($4.6 \pm 0.45\%$), ash ($6.30 \pm 0.27\%$), dry matter ($63.12 \pm 0.9\%$), moisture ($36.12 \pm 0.9\%$), and pH 6.10, demonstrating its suitability as a nutritional source for microbial growth. Process optimization using a Central Composite Rotational Design (CCRD) indicated preliminary optimal conditions of zero salinity, neutral pH, and molasses dilution at a 1:5 ratio. The results demonstrated biosurfactant production, with a reduction in surface tension from 72 mN/m to approximately 25.32 mN/m and emulsification indices of 98.1% (vegetable source) and 96.4% (mineral source), confirming the surface activity of the compound. The obtained results highlight the potential of soy molasses as a promising substrate for sustainable biosurfactant production, with potential applications in agricultural microbiology.

KEYWORDS: Agro-industrial waste, Bioprocesses, Biosurfactants, *Microbacterium hydrothermale*, Soy molasses.

FUNDING: CAPES