

TITLE: PRODUCTION OF SURFACTIN FROM *Bacillus velezensis* H2O-1 USING MOLASSES AS CARBON SOURCE

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ABSTRACT:

Biosurfactants are molecules of microbial origin that have surfactant activity. They are amphiphilic molecules, i.e., they have polar and apolar regions in the same structure. These compounds stand out for their greater effectiveness when compared to chemical surfactants, showing advantages as low toxicity, high biodegradability and maintenance of their surface activities under adverse conditions. In addition, these molecules can be synthesized from renewable sources of nutrients. Surfactin, a cyclic lipopeptide produced by different species of *Bacillus*, is one of the most studied and efficient biosurfactants. This lipopeptide can reduce surface tension (ST) to values close to 27 mN/m, using low concentrations of the product. The high cost of biosurfactant production has been a limiting factor for their economic competitiveness in the market. The culture medium composition accounts for about 50% of the total production costs, so it is of great importance to study these molecules using low-cost culture media. Therefore, the aim of this work was to evaluate the production and physical-chemical properties of surfactin produced by *B. velezensis* H2O-1 using molasses as carbon source. First, the microorganism was reactivated in LB medium for 48 h at 30 °C. After this time, a colony was transferred to the culture medium supplemented with 2% molasses for 24 h. Posteriorly, the medium was centrifuged, the supernatant discarded, and the inoculum was carried out to obtain a final concentration of 20 mg cells/L in the fermentation medium. The flasks were incubated at 30 °C and 170 rpm for 72 h. The production of surfactin was evaluated by the emulsification index (EI) against diesel and soybean oil, oil dispersion and surface tension reduction (ST). *B. velezensis* H2O-1 grown in culture medium with molasses as the carbon source and produced a surfactin capable of reducing the ST of the medium (72 mN/m) to 24.6 mN/m. In relation to the EI assays, surfactin was able to emulsify the soybean oil, showing an EI of 41.4%. However, no emulsion was observed when the diesel was used. In the oil dispersion assay, a halo with 5.1 cm was observed. These characteristics are similar when *B. velezensis* H2O-1 is grown in the same culture medium with glucose as carbon source. Therefore, these assays indicated with molasses can be used as an alternative carbon source to produce H2O-1 surfactin, thereby achieving reduction of the production costs of this molecule.

Keywords: *Bacillus velezensis* H2O-1, surfactin, molasses, surface tension

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