

Screening for biosurfactant-producing *Bacillus* strains with high performance in emulsion formation

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Bacillus species are Gram-positive bacteria with great economic importance, due to their ability to produce a wide range of active compounds as biosurfactants. Biosurfactants are microbial compounds that reduce the tension surface. *Bacillus sp.* produces a wide range of this compound, highlighting the cyclic lipopeptides as surfactin, iturin and fengycin, with potential application in bioremediation, food and pharmaceutical industry. However for industrial applications, different *Bacillus sp.* strains synthesized diverse proportions of biosurfactants molecules with variable emulsion capacity, precluding the process standardization. In this context, the aim of this project is screening novel *Bacillus sp.* strains with high biosurfactants yields, concomitant with reducing properties of surface activity and high emulsion capacity. Initially, were isolated 20 strains of *Bacillus sp.*, 10 from shrimp feed (ECOVITA™) (PR-01, PR-02, FB-01, FB-02 and EV-01 to EV-06), one (PA-01) from *Opuntia ficus-indica*, an autochthonous plant of Brazilian Northeast, two isolated from the larvicide (Vectolex™) (BS-236217, BS-15931, BT-51450), and seven from Probiotic Complex (BC-01, BC-02, BC-03, BS-148, BS-198, BS-664 and BS-666). The preliminary identification of strains using MALDI-TOF showed: BS-198 as *Bacillus subtilis*, BS-666 (*Lysinibacillus fusiformis*), BT-51450 as *Bacillus cereus* and FB-02 (*Bacillus licheniformis*). The mineral medium used for biosurfactants production consisted of (per liter): glucose, 40.0g; (NH₄)₂SO₄, 8.5g; NaNO₃, 8.5g; K₂HPO₄, 13.6g; KH₂PO₄, 4.0g; MgSO₄.7H₂O, 0.5g; and 10 mL of micronutrients solution (pH 7). The biosurfactants in the supernatant was acid precipitated and extracted in a chloroform-methanol system (2:1). Measurements of the superficial tension, emulsification index (24 h), and emulsion stability were carried out. Considering all the results, it was possible determined that strains PR-01, BS-198, PA-01 and FB-02 displayed the betters emulsion stability and emulsification activity, with values uppers to 89%. At the same time, the strains PR-01, BS-198, PA-01 and EV-03 reduce significantly the surface tension in more of 40% in relation to water, outstanding the strain PR-01 with 132%. Thereby, is possible suggest that strains PR-01, BS-198, and PA-01 are good candidates as potential surface-active compounds source. The next step would be to identify the possible biosurfactants, and optimize the production conditions and yield.

Keywords: Cyclic lipopeptides, Surface-activity compounds, Stability of emulsions.

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