TITLE: ANTIFUNGAL ACTIVITY OF A BIOSURFACTANT PRODUCED BY A THERMOHALOPHILIC *BACILLUS* STRAIN

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ABSTRACT:

Biosurfactants (BS) are amphiphilic microbial secondary metabolites capable of reducing the surface and interfacial tensions and form stable emulsions, characteristics that make them highly applicable in different industrial sectors. Some biosurfactants produced by *Bacillus* strains have shown antifungal activity, especially lipopeptides belonging to iturin, fengycin and surfactin families. The goal of this work was to characterize the BS produced by a thermohalophilic *Bacillus alveayuensis* (strain Ar70C7-2) isolated from a Brazilian offshore reservoir rock sample, determining its chemical structure, and its antifungal activity. The BS produced by *B. alveayuensis* belongs to the class of lipopeptides, with the probable presence of surfactin, fengycin and iturin, which led us to perform a preliminary screening to evaluate its antifungal activity. The biosurfactant was produced in Mineral Medium (70 g/L of NaCl) with glycerol, and NH_4NO_3 as carbon and nitrogen sources, at 55 ºC. Crude BS obtained by acid precipitation (0.27 g/L yield) was extracted with chloroform followed by semi-purification on a silica gel 60 column. Antifungal activity was determined by the agar-well diffusion method against 11 different phytopathogenic fungal strains using BS semi-purified. Fungal mycelium and spore suspensions were cultured on Potato-Dextrose-Agar (PDA) at 28 ºC for 15 days, with and without rifampicin (this antibiotic was used to avoid bacterial contamination). Mycelia growth was considerably reduced in 8 fungal strains in comparation with the control plates. Complete inhibition of hyphal growth was observed in cultures of *Ceratocystis paradoxa*, *Phytophthora sojae* and *Lasidiplodia euphorbicola*. In the cultures with spore solution, we observed inhibition zones after 5 days of incubation for *Moniliophthora perniciosa*, *Sclerotinia sclerotiorum*, *Ceratocystis paradoxa* and *Rhizopus microsporus*. There was no difference between growth patterns under curture media with and without rifampicin addition. Further studies comprising antibacterial and antitumor activity assays are the next steps of this work.

Keywords: *Bacillus*, biosurfactant, antifungal, lipopeptide

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