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Optimization and characterization of rhamnolipid biosurfactant from sponge associated marine fungi *Aspergillus* sp. MSF1

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ABSTRACT

A sponge associated hydrocarbon emulsifying marine fungi *Aspergillus* sp. MSF1 was isolated from the marine sponge *Dendrilla nigra*. Production of biosurfactant was confirmed with different screening methods including hemolytic activity, oil displacement test, drop collapsing test, and emulsification index. The production was optimized under submerged fermentation conditions. An enhanced biosurfactant production was achieved with pH 7, 30°C, 2% NaCl, 1% $MgCl_2$, 1% asparagine and glucose and yeast extract as carbon and nitrogen sources, respectively. Among the different media, the Sabouraud's dextrose broth showed the highest emulsification activity. The surface active compound was separated using three step differential solvents fractionation and the active fraction was obtained in diethyl ether. Based on the estimation of macromolecules, TLC, FT-IR and HPLC analysis, the surface active compound was characterized as rhamnolipid. Emulsification activity of the cell free supernatant and different solvent extracts were compared with chemical surfactants including SDS and Tween80. The surface active compound showed potential activity against the pathogenic yeast *Candida albicans* and Gram negative bacteria.

Keywords: Biosurfactant; Marine-fungi; Optimization; Rhamnolipid; *Aspergillus*

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