Studies on production of Biosurfactant from isolated strain and its application for remediation of Xenobiotic

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ABSTRACT

PC1, the isolated strain later identified as *Bacillus oceanisediminis* H2 was tested for colony zonal diameter and maximal surface tension-lowering ability in NA plates with precoated anthracene. PC1 enters stationary phase after 28 hours of incubation, suggesting considerable biosurfactant production. The fermented medium had a lower maximum surface tension than the uninoculated medium at 5 days, pH 8, 37°C, and a 24hr old culture as a control. This shows the isolated strain can generate biosurfactants. The surface tension is 30.573 mN/m at 120 hours or 5 days. It also shows that the isolate strain produces biosurfactant effectively at both alkaline and acidic pH. Response surfaces show the degree of interaction between variables. A curved gradational drop in the surface tension of the fermented GlyMSM medium occurs as fermentation length and pH rise, with an optimum of 34.61 mN/m at 40°C and pH 9.0. The carbon and nitrogen sources, glycerol (29.957 mN/m) and yeast extract (30.23 mN/m) supplied the lowest surface tension for fermented MSM. The final fermentation conditions were 120 hours, 40°C, pH 9, and *Bacillus oceanisediminis* H2 growth for 24 hours. After four days of fermentation at 35°C and a pH of 8.99 utilising 4 g substrate and 3.99 ml solution, the largest reduction in surface tension was 36.428 mN/m. The FTIR and LC-MS studies revealed that the biosurfactant generated was lipopeptide-derived, namely surfactin (990 Da). The addition of Bacillus oceanisediminis H2 to tannery effluent wastewater decreased BOD and COD levels. Wastewater samples were obtained from the Calcutta Leather Complex, Bantala in Kolkata, India, and treated with a pure biosurfactant. Untreated samples' BOD and COD contents were reduced by 71.65% and 62.18 percent, respectively. Bacillus oceanisediminis H2 produces a biosurfactant.

Keywords: *Biosurfactant, Bacillus oceanisediminis H2, RSM, FTIR, LC-MS, Tannery wastewater.*

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