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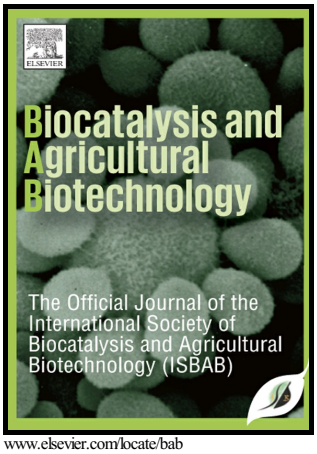


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# Production, characterization and environmental applications of biosurfactants from *Bacillus amyloliquefaciens* and *Bacillus subtilis*

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## Abstract

Biosurfactants are the superb alternates for chemical surfactants due to non-toxicity, biodegradability and cost-effectiveness. The present study describes the biosurfactant production from two isolates *Bacillus amyloliquefaciens* SAS-1 and *Bacillus subtilis* BR-15. The produced biosurfactants were characterized by fourier transform infrared spectroscopy and mass spectrometry as lipopeptides, surfactins of molecular weight 1007, 1021, 1035 and 1049 Da. These molecules displayed an excellent emulsification ($E_{24}$ 60-78%) with hydrocarbons and stability at wide temperature (4-100˚C) and pH (4-10). The biosurfactants produced by SAS-1 and BR-15 accounted for 56.91 ±1.52 and 66.31 ± 2.32 % enhanced oil recovery respectively in sand pack column experiment on account of their high surface activity. Further, the biosurfactants efficiently augmented (75-94%) the engine oil degradation with microbial consortium, more than threefold as compared to that without biosurfactants (22-31%). Hence, the presented strains have high potential for environmental applications like enhancing oil recovery and bioremediation of oil spills.

**Abbreviations**: MEOR, Microbial Enhanced Oil Recovery; CMC, Critical Micellar Concentration; CTAB, cetyltrimethylammonium bromide; SDS, sodium dodecylsulphate; FTIR, Fourier Transform Infrared Spectroscopy; ESI-MS: Electro Spray Ionization-Mass