

Biodegradation of Burnt Engine Oil by Surfactant Producing Marine Isolates of *Pseudomonas* sp.

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The impact of pollution from petroleum hydrocarbons and their derivatives, including burnt engine oil, on the environment, is growing. One of the most environmentally benign approaches for the degradation of such pollutants is bioremediation by microbial degradation. In this study, we aimed to assess the potential of newly isolated marine *Pseudomonas* sp. in deteriorating burnt engine oil. One litre of a fed-batch bioreactor with 450 mL of minimal salt medium (MSM) supplemented with 2% (w/v) burnt engine oil as a sole source of carbon and energy. The fed-batch reactor was started with the addition of bacterial inoculum (2%) which was grown in MSM with 2% burnt oil. The reactor was operated at ambient temperature and a magnetic stirrer was used to mix the culture broth. Viable microbial cells were recorded on the 10th and 20th 30th days of incubation. On the 20th day, the bioreactor was fed 100 mL of fresh MSM supplemented with burnt oil, and an equal volume of culture broth was removed prior to the addition. The presence of biosurfactant in the culture broth was determined using the drop collapse method, oil spreading technique, and emulsification assay. Viable bacterial cells found on the 30th day were 2.55×10^6 . Biosurfactant production was observed and oil displacement was found in the range of 2.8 – 3.2 cm and emulsification index was found to be in the range of 50-58%. Therefore, *Pseudomonas* sp. can be suggested as a good candidate to develop a cost-effective method for the bioremediation of burnt engine oil. Further studies are currently in progress to quantitative and qualitative analysis of biodegradation profiles of burnt oil using gas chromatography-mass spectrometry. Proceeding the research further with the characterization of the biosurfactant will undoubtedly pave the way for biosurfactant-mediated bioremediation of hydrocarbon pollutants.

Keywords: *microbial degradation, biosurfactant, bioremediation, burnt engine oil, marine Pseudomonas sp.*