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ABSTRACT BOOK

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AB-03

HIGH EFFICIENCY DEGRADATION OF CRUDE OIL BY Aspergillus sp. MM1

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The challenging aspects in the bioremediation of crude oil are the rate of removal and the complete degradation. Crude oil is a complex mixture of a variety of aliphatic and aromatic hydrocarbons. This study investigated the degradation of the aliphatic components of crude oil in liquid cultures by Aspergillus sp. MM1. Aspergillus sp. MM1 (GenBank accession no. MH503926) [1] was grown in minimal medium (Bushnell and Haas) with 1% sterile crude oil as sole source of carbon, for 7 days at 30 °C in static conditions. All assays were conducted in duplicate with controls (a control without carbon source and a control without microbial inoculum) where necessary. At the end of 7 days of incubation, residual oil was extracted in to dichloromethane (1:1) and analysed by gas chromatography / mass spectrometry (GC / MS). After 7 days, the control without microbial inoculum, the total ionic current (TIC) spectrum showed 20 different prominent peaks of straight chain alkanes (C12 to C31) and less prominent peaks for the branched alkanes pristine (Pr) and phytane (Py). No peaks were detected for straight chain alkanes (C12 - C31) and branched alkane, Pr in the TIC spectrums for the cultures of Aspergillus sp. MM1 incubation indicating their complete removal in 7 days. Branched alkane, Py indicated 52.075±7.61 % removal within 7 days. Aspergillus sp. MM1 is thus a highly efficient strain that addresses the challenges of low rates of degradation and incomplete removal of contaminants in bioremediation in crude oil.

Keywords: Crude oil, alkanes, Aspergillus, Bioremediation, GC/MS

References: 1. Perera, M., Wijayarathna, D., Wijesundera, S., Chinthaka, M., Seneviratne, G. and Jayasena, S. Biofilm mediated synergistic degradation of hexadecane by a naturally formed community comprising Aspergillus flavus complex and Bacillus cereus group (2019). BMC Microbiology, 19:84. https://doi.org/10.1186/s12866-019-1460-4

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