

TITLE: DEGRADATION OF CRUDE OIL AND DERIVATIVES BY A STRAIN OF *GORDONIA* ISOLATED FROM MANGROVE SEDIMENTS

AUTHORS: REIS, M.L.; SOUSA-JR, J.C.N.; LOPES, R.P.; OLIVEIRA, S.A.; FARIAS, B.C.S.; MELO, V.M.M.; HISSA, D.C.

INSTITUTION: LABORATÓRIO DE ECOLOGIA MICROBIANA E BIOTECNOLOGIA, DEPARTAMENTO DE BIOLOGIA, UNIVERSIDADE FEDERAL DO CEARÁ (AVENIDA HUMBERTO MONTE, 2977, CAMPUS DO PICI, BLOCO 909, CEP 60455-000, FORTALEZA – CE, BRAZIL).

ABSTRACT:

Petroleum is the world's leading energy source and one of the major environmental pollutants. Large-scale marine oil spills accidents are still well recurrent and receiving attention worldwide. Bioremediation is one the most cost effective and eco-friendly technology for recovering petroleum contaminated sites as it uses the vast metabolic potential of microorganisms to degrade recalcitrant compounds. In this study, a bacterial strain HEXBA05 previously isolated from an oil chronically contaminated mangrove in Baía de Todos os Santos, Brazil, had its potential for oil hydrocarbons degradation evaluated. HEXBA05 was grown in TGE supplemented with 2% (m/v) NaCl for 48 h at 150 rpm, 30°C. The culture was centrifuged and the cell pellet was washed and its optical density 600 nm adjusted to 1.5 in Bushnell-Haas (BH) broth. For the biodegradation assay, 1% (v/v) of the inoculum was transferred to Erlenmeyer flasks containing 75 mL BH broth supplemented with 1% (v/v) of different carbon sources (glucose, n-hexadecane, kerosene and crude oil) and incubated at 150 rpm, 30°C. Colony forming unit (cfu) was monitored on the 3rd day of incubation for glucose, 5th day for n-hexadecane and kerosene and 14th day for crude oil. Molecular identification was performed based on the sequence of 16S rRNA. The obtained data indicated that the bacterial strain was able to metabolize all the carbon source tested. HEXBA05 presented a better growth in glucose (8.03×10^8 cfu/mL), followed by kerosene (1.02×10^8 cfu/mL), n-hexadecane (1×10^6 cfu/mL) and crude oil (1.6×10^5 cfu/mL). The obtained 1448 bp 16S rRNA sequence exhibited 98% identity to *Gordonia* sp. The current study showed a promising hydrocarbon degradation pointing out the great metabolic versatility of HEXBA05 for petroleum derivatives, presenting a potential biological tool for the remediation of environments contaminated with petroleum.

Keywords: bioremediation, crude oil, *Gordonia*.

Development Agency: Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)