Environmental Engineering and Management Journal xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
http://www.eemj.icpm.tuiasi.ro/; http://www.eemj.eu

"Gheorghe Asachi" Technical University of Iasi, Romania

HIGH POTENTIAL OF *ENTEROBACTER* SP. CASPIAN1394 IN DIESEL OIL BIODEGRADATION

Sharareh Dashteepour[1*], Mohammad Javad Mehdipour Moghaddam[2]

[1]University of Guilan, University Campus 2, Rasht, Iran
[2]Department of Biology, Faculty of Sciences, University of Guilan, Rasht, Iran

Abstract

Diesel oil (DO) as a mixture of alkanes and aromatic compounds causes damage to the ecosystem in terrestrial and aquatic habitats. One of the best methods of treating contaminated areas is to use microorganisms in a bioremediation method that can degrade pollutants. The aim of this study was to isolate indigenous bacteria with high biodegradation potential of DO from oil-contaminated wastewater. Bacterial isolation was performed using a mineral medium containing contain 1% DO as the sole source of carbon and energy. The isolates were identified using differential biochemical tests and *16S rDNA* gene analysis. The effects of 2, 3, 4 and 5% concentrations of DO on isolate growth were evaluated. Gas chromatography (GC) was used to determine the quantity of degraded DO. *Enterobacter* sp. CASPIAN1394 (EC strain) could degrade 99.44% of 1% DO over two weeks as the studied bacterium. Alkanes C11, C12, C16-C18 and C29-C32 had been completely degraded. The amount of total petroleum hydrocarbon (TPH) at 2, 3, 4 and 5% DO concentrations were 93.25%, 86%, 95.7% and 86.49%, respectively. Increasing DO concentration had no toxic effect and did not reduced bacterial growth, even to some extent increased its growth. With regard to the rate of degradation of different DO concentrations by EC strain and the good potential of this strain for the degradation of different DO hydrocarbons, EC strain may be a candidate for bioremediation in DO-contaminated wastewater. However, the environmental variables need to be studied affect the degradation of DO by this strain.

Keywords: bioremediation, diesel oil, Enterobacter, gas chromatography, wastewater

Received: February, 2019; Revised final: January, 2020; Accepted: January, 2020

[*] Authors to whom all correspondence should be addressed: e-mail: mj_mehdipour@guilan.ac.ir