

Identification of phenanthrene and pyrene degrading bacteria from used engine oil contaminated soil

ABSTRACT

The purpose of the study was to identify effective bacteria that degrade phenanthrene and pyrene from used engine oil contaminated soil. A total of 93 bacterial isolates were obtained and their degradations were determined. Based on culture-dependent technique and tested for in vitro phenanthrene and pyrene degradations using spray plate technique and colorimetric assay with 2,6-dichloroindophenol (DCPIP). Fifty three isolates shows evidence of 5 g/l phenanthrene degradation within 72 hours in spray plate technique. Further 23 isolates were selected from 53 isolates after the colorimetric screening. Biodegradation study shows two isolates named MM045 and MM087 with 75.2% and 80.2% degradations for 500 mg/l phenanthrene and also 54.3% and 59.7% of 250 mg/l pyrene degradations within 24 hours respectively. These isolates were identified as *Cronobacter sakazakii* strain MM045 (Accession number: KT933253) and *Enterobacter* specie strain MM087 (Accession number: KT933254) using 16S rRNA gene sequencing and neighbour joining tree analyses. The identified isolates were proven to be fast effective in degrading high concentrations of phenanthrene and pyrene as their sole carbon and energy sources.

Keyword: Biodegradation; Contaminated soil; Phenanthrene; Pyrene