عنوان مقاله:

Biodegradation of total petroleum hydrocarbons in contaminated soils using indigenous bacterial consortium

محل انتشار:

مجله مدیریت ومهندسی بهداشت محیط, دوره 7, شماره 2 (سال: 1399)

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خلاصه مقاله:

Background: Biodegradation of hydrocarbon compounds is a great environmental concern due to their toxic nature and ubiquitous occurrence. In this study, biodegradation potential of oily soils was investigated in an oil field using indigenous bacterial consortium. Methods: The bacterial strains present in the contaminated and non-contaminated soils were identified via DNA extraction using 16S rDNA gene sequencing during six months. Furthermore, total petroleum hydrocarbons (TPH) were removed from oil-contaminated soils. The TPH values were determined using a gas chromatograph equipped with a flame ionization detector (GC-FID). Results: The bacterial consortium identified in oil-contaminated soils (case) belonged to the families Halomonadaceae (91.5%) and Bacillaceae (8.5%), which was significantly different from those identified in non-contaminated soils (control) belonging to the families Enterobacteriaceae (84.6%), Paenibacillaceae (6%), and Bacillaceae (9.4%). It was revealed that the diversity of bacterial strains was less in oil-contaminated soils and varied significantly between case and control samples. Indigenous bacterial consortium was used in oil-contaminated soils without need for amplification of heterogeneous bacteria and the results showed that the identified bacterial strains could be introduced as a sufficient consortium for biodegradation of oil-contaminated soils with similar texture, which is one of the innovative aspects of this research.

Conclusion: An oil-contaminated soil sample with TPH concentration of 1640 mg/kg was subjected to bioremediation during 6 months using indigenous bacterial consortium and a TPH removal efficiency of 28.1% was obtained.

کلمات کلیدی:

Oil-contaminated soils, Biodegradation, Bacterial diversity, Total petroleum hydrocarbons, Indigenous bacterial consortium