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Development of bioreactors for comparative study of natural attenuation, biostimulation, and bioaugmentation of petroleum-hydrocarbon contaminated soil

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Highlights

- Bioremediation of hydrocarbon contaminated soil under four modes investigated.
- Biostimulation-bioaugmentation mode showed the highest hydrocarbon removal.
- The Monod model fits the TPH data much better than first-order model.

Abstract

Bioremediation of soil and groundwater sites contaminated by petroleum hydrocarbons is known as a technically viable, cost-effective, and environmentally sustainable technology. The purpose of this study is to investigate laboratory-scale bioremediation of petroleum-hydrocarbon contaminated soil through development of eight bioreactors, two bioreactors for each bioremediation mode. The modes were: (1) natural attenuation (NA); (2) biostimulation (BS) with oxygen and nutrients; (3) bioaugmentation (BA) with hydrocarbon degrading isolates; (4) a combination of biostimulation and bioaugmentation (BS-BA). Total petroleum hydrocarbons

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