

Comparison of Attenuation of petroleum hydrocarbons in surface and subsurface soils amended with biostimulants.

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Abstract

Two biostimulation treatments were compared in a laboratory incubation study with natural attenuation for total petroleum hydrocarbon (TPH) attenuation in gasoline and diesel spiked sandy soil at two different depths. One of the treatments was amended with 5 % clay which had pH of 6.9 and 6.98 and the other was amended with 3 % organic carbon with pH of 5.2 and 5.32 for both the surface and sub surface soils. At the end of 56 days of incubation, the soils amended with 5 % clay had no effect and those amended with organic carbon lost 69 % and 56 % of TPH for both the surface and subsurface soils respectively. These losses compared unfavourably with the non-amended soils with a pH of 7.57 and 7.92 which lost 78 % and 81 % of the TPH for both the surface and subsurface soils respectively. However, at days 0 – 14, the soils amended with 3 % organic carbon had the lowest concentrations of TPH which was attributed to sorption. These concentrations further changed at day 56 with the non amended soils now having the lowest TPH concentrations. 56 days after spiking with TPH, only the C 10 – C 12 and > C16 carbon number fractions were detected at both depths. Results suggest that natural attenuation can be a viable remediation strategy in soils with neutral to alkaline pH and that low pH of amendment material used could reduce TPH attenuation.

Key words: Petroleum hydrocarbons, pH, sorption, natural attenuation, clay, organic carbon.

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