




# In-situ remediation of petroleum-contaminated soil by application of plant-based surfactants toward preventing environmental degradation

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## Abstract

Remediation in this study employs the use of green plants and their extracts in enhancing the remediation process of polluted soils. GC-MS & FTIR techniques were employed in determining the constituents of the soil during the investigation. 60 ml of the extracts were applied on 1 by 2 ft segments of hydrocarbon polluted site and observed for two months. The results show that plant extract A significantly reduced the TPHs and PAHs to 5,450 and 126.2 mg/kg, respectively, as compared to those of extract B whose TPH and PAH values are 10,432 and 362.3 mg/kg, respectively. Both plant extracts reduced the total petroleum hydrocarbon compounds significantly when compared to the standard reference PAH and PAHs (4,500 mg/kg and 50 mg/kg respectively). The microbial plate count for the three media shows that the plant based

surfactant had a synergy with the identified bacteria in enhancing Phytoremediation of the crude oil polluted site.

**Novelty statement:** This study examined the application of two plant-based surfactants for remediation. These natural surfactants significantly reduced the petroleum hydrocarbon compounds present in the soil within the in-situ observation window. These Herbaceous plant family extracts have a great advantage as an eco-friendly alternative to synthetic surfactants, and they also exhibited an anti-fungi characteristic. The two biodegradable plant-based surfactants also significantly reduced the time that it could have taken for a remediation process.

**Keywords:**

[In-situ phytoremediation](#)[petroleum hydrocarbon](#)[plant-based surfactant](#)[poly-aromatic hydrocarbons](#)

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