Geophysical Research Abstracts
Vol. 21, EGU2019-2526-3, 2019
EGU General Assembly 2019

PHYTOREMEDIATION OF CRUDE OIL CONTAMINATED SOIL USING VETIVER (Chrypsopogon zizanioides).

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Environmental pollution is generally caused by two main factors that include high rate of industrialization and rapid increase in population thereby putting more pressure on natural resources such as petroleum. As a result the petroleum industry affects the environment through oil spills causing many negative effects on human health and the surrounding ecosystem due to presence of toxic compounds in crude oil such as the Polycyclic Aromatic Hydrocarbons (PAHs) that is potentially carcinogenic to humans.

The aim of this research is to investigate the efficiency of Chrypsopogon zizanioides also known as vetiver grass with the aid of bio surfactants and N.P.K. fertilizer in dissipating and containing organic pollutants in the soil. It is specifically focused on the 16 Polycyclic Aromatic Hydrocarbons (PAHs) classified by United States Environmental Protection Agency (US EPA) as priority pollutants.

The general methodology involved a glasshouse experiment by growing the plant C. zizanioides in a freshly spiked and a weathered crude oil contaminated soils from where the soil samples were treated with ramphnolipids including (95% (Mono-Rhamnolipid dominant) and 95% (Di-Rhamnolipid dominant) produced by Pseudomonas aeruginosa and N.P.K. fertilizer to promote plant and the microbial biomass. Some of the control samples were left uncontaminated (oil free) while others were left unplanted (plant free) to investigate the growth of the plant in the absence of oil and the fate (degradation) of crude oil in the absence of the grass. Thereafter, soil samples were collected periodically on monthly basis and the concentration of PAHs was assessed in the laboratory via Gas Chromatography Mass Spectrometry (GC MS). Also, the bio distribution of contaminants was analyzed via GC MS in both the roots and leaves of the plant.

The result of this research has already indicated an improvement in plant and microbial biomass in all the samples treated with N.P.K. fertilizer and rhamnolipids after a period of 72 days. More plant culms and heights were observed to have emerged in samples treated with N.P.K. fertilizer only followed by samples treated with N.P.K. and biosurfactants. It is also highly anticipated that further discoveries will help in breaking down organic contaminants such as PAHs in the crude oil contaminated soils with the aid of C. zizanioides, ramphnolipids and N.P.K. fertilizer as compared to the control samples.