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## Effect of Crude Oil on the Physicochemical and Microbial Characteristics of *Vigna unguiculata* and *Ammaranthus* sp.

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### Abstract

Environmental degradation associated with oil exploration and exploitation is a major problem confronting oil-producing countries. Man's technological and scientific advances have caused environmental changes that are impossible to evaluate and fully comprehend. Our ability to change the environment has increased faster than the ability to predict the effect of those changes. Pollution of the environment is one of the major effects of man's technological advancement. Pollution results when a change in the environment harmfully affects the quality of human life, animals, micro-organisms, and plants. An experiment was conducted in the screen house to ascertain the effects of crude oil on the physicochemical and microbiological characteristics of agricultural soil. The response of cowpea (*Vigna unguiculata*) and leafy vegetables (*Ammaranthus* sp.) to the contamination with crude oil, as well as the slight alteration of the physicochemical, physical and microbial characteristics show the deleterious effects of crude oil on agricultural soil and the negative impacts it has on our environment in general. Comparing the results of chemical, physical and microbial impacts, it was deduced that cowpea reacted almost instantly (three days) after the introduction of the crude oil. This shows that cowpea has little or no ability to withstand crude oil spillage while *Ammaranthus* sp. still exhibited some level of resistance to the crude oil especially from the least 5% (w/v) to the highest 11% (w/v) concentration. Microorganisms identified and isolated from soil samples were *Bacillus cereus*, *Bacillus megaterium*, *Clostridium sporogenes*, *Micrococcus luteus*, *Aspergillus fumigatus*, *Trichoderma viride*, *A. saprophyticus*, *Methylococcus capsulatus*, *Pseudomonas areoginosa*, *Acinetobacter calcoaceticus*, *Vibrio anguillarum*, *Penicillium notatum*, *Sporobolomyces salmonicolour*, and *Rhizopus nigrican*. However, the contamination had no significant effect on pH, rather on phosphorus, sodium, potassium, magnesium, calcium, organic carbon, and organic matter content of the contaminated soils for *Vigna unguiculata* compared to the uncontaminated, whereas for soils with *Ammaranthus* sp there were no significant effects for sodium, rather on phosphorus, pH, potassium, magnesium, calcium, organic carbon, and organic matter content of the contaminated soils compared to the uncontaminated soil samples.

**Keywords:** Agricultural soil, crude oil, microbial community, physicochemical parameters, *Vigna unguiculata*, *Ammaranthus* species