RESEARCH ARTICLE

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Insights on Mycoremediation of Contaminated Soil with Kerosene

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ABSTRACT

Bioremediation of hydrocarbon contaminated soil is inexpensive and involves complete mineralization of organic contaminants to simple organic compounds, carbon dioxide, water and other inorganic compounds by the action of biological agents, according to their metabolic capacities.

Key Words: Bioremediation, Contaminants, Microbial population.

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INTRODUCTION BACKGROUND

The susceptibility of hydrocarbons to be degraded by microorganisms (linear alkanes > branched alkanes > small aromatic compounds > cyclic alkanes > polycyclic aromatic hydrocarbons) is one of the limiting factor for biodegradation. Soil fungi have been reported with efficiency of biodegradation of 6% to 82% while soil bacteria [2] and marine have biodegradation efficiency of 0.13- 50% and 0.003-100% respectively [3]. The fungal oxidation of hydrocarbon compounds employees' monooxygenase enzyme that leads to formation of trans-diol. *Rhizopus*utilize kerosene as carbon source. Kerosene is majorly composed of aliphatic hydrocarbons (65-70%), benzene derivatives (10-15%) and naphthalene derivatives, with C9-C16 compounds. Also there are great and vital roles of engineering nanomaterials in this work [9].

EXPERIMENTAL METHODOLOGY

The fungi were pre-cultured in an air-tight container for about 7days using approximately 30g of bread pieces as substrate, i.e. moistened with potato broth.

The same method was repeated for the soil sample taken out after 5, 10 and 15days of the treatment with the fungus. After 5days of germination, the plant height, average leaf length, average leaf width was measured using scale. To obtain fresh weight, after washing and cleaning properly, the plant was put in a zipper bag and was weighed.

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Measurement of pH

Two samples of soil were taken from the contaminated soil of equal amount in two separate containers. To one soil sample, 10ml of vinegar was added and was studied for its reaction. To other soil sample, 10ml of baking soda solution was added and was observation for the reaction.

MAIN FINDINGS

The growth ability of *Rhizopus* on hydrocarbon contaminated soil was indirectly measured by monitoring its growth promoting capacity on the treated soil. The seed germinated in case of the

soil sample taken out after 5days of mycoremediation, but failed to develop further and died. This showed that adequate mycoremediation did not occur until 5days; to promote the growth of seed. The root system was well developed [figure 3]. For the control group, seed was germinated within 24h of plantation. The study showed that approximately 90% of hydrocarbon contaminants in the soil were degraded by *Rhizopus,* allowing ample growth of *Vignaradiata* plant.

Figure 1: Control Group plant (A) plant height (B) Root system

Figure 2: Effect of mycoremediation on growth of Vignaradiataafter 10 and 15 days of treatment

Figure 3: Effect of hydrocarbon contamination on the root system after 15 days and 10 days of mycoremediation

The control soil sample didn't show any reaction in both baking soda and vinegar solution, thus it can be said to be at neutral pH. The soil sample taken out after 15days of mycoremediation did no fizzing reaction to both vinegar and baking soda solution, showing that the pH was restored to neutral due to effective mycoremediation process.

Biodegradation of kerosene constituents by *Rhizopus* made the soil suitable for plant growth, as observed from the pH measurement of the soil sample. The fungal degradation efficiently occurs within 15days of treatment, facilitating the optimal growth of *Vignaradiata* plant.

CONCLUSION

Rhizopus was competent of overwhelming carbon. The information obtain in the current search proceed our information of kerosene conflict of the fungi. It also might create gifted candidate for additional study concerning their skill to take away kerosene as of infected environment.

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