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Perspective

Effect of Microorganisms on Environment

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INTRODUCTION

The availability of microorganisms that have the capacity to hydrocarbonoclastically destroy carbon is a big worry for environmentalists. Therefore, the goal of this effort is to isolate and characterize organisms that can thrive unaffected in a contaminated environment. Three distinct locations (non-contaminated, petrol-contaminated and refuse-contaminated) in the Nsukka area provided soil samples, which were then, isolated using various differential media. By using biochemical reactions, motility testing and gramme staining, the isolates' morphological features were determined. All of the soil samples contained *Pseudomonas putida*, *Acinetobacter buamanii* and *Proteus vulgaris*; however, the soil contaminated with premium motor spirit had higher growth densities of these microorganisms. Their capacity to flourish in the contaminated soil demonstrates that they were successful in breaking down premium motor spirit's hydrocarbon skeleton into metabolites, which provided a plentiful supply of carbon and nitrogen for their growth and metabolism. As a result, they can be used to bioremediate sites that have been contaminated by crude oil.

DESCRIPTION

Currently, a range of methods are available to treat hazardous material-contaminated soil, such as solvent extraction, thermal desorption, verification, incineration, vapour extraction, soil flushing, oil washing, excavation and containment in secured landfills, stabilization and solidification and so forth. However, a large number of these methods are either expensive or do not produce contamination or compute damage. However, one of the most promising approaches to address a variety of organic contaminants, including petroleum hydrocarbons, is biological treatment or "bioremediation."

Utilizing the many metabolic capacities of microbes, bioremediation is a technique for clearing contaminated environments by turning pollutants into safe byproducts through mineralization, the production of water and carbon (IV) oxide or conversion into microbial biomass. Its foundation is the idea that naturally existing bacteria in an altered environment evolve strategies to either break down or tolerate the presence of organic pollutants (chemicals) by using them as a source of energy to fuel their own development.

There are many different types of bacteria and fungi that have been demonstrated to be capable of breaking down petroleum hydrocarbons, making them not just limited to a small number of microbial species. Based on the quantity of reports that have been published, the orders *Mucorales* and *Monilales*, as well as the genera *Aspergillus* and *Penicillium* species (order Eurotailes), are the most significant for decomposing hydrocarbons in soil and marine environments.

Numerous fungal genera include species such as *Acromonium*, *Aspergillus*, *Cindida*, *Clasdosporium*, *Mucor*, *Penicillium*, *Saccharomyces*, *Trichoderma, Trichosporon*, etc. that are known to metabolize hydrocarbons and/or flourish in places contaminated with crude oil. While fungi cultures for oil cleanup are commercially available in wealthier nations, less often found in developing nations. The Niger Delta is one area that frequently experiences harmful oil spills and does not have access to commercially developed remediation strains.

The creation of native fungi for bioremediation could be advantageous for this area. Therefore, it is advised that any crude oil that cannot be retrieved from a spill be exposed to bioremediation with the use of fungus and fungal products such enzymes. Apart from proving the effectiveness of the treatment, bioremediation must also show that it doesn't create any hazardous byproducts and that it doesn't have any negative ecological or environmental consequences.

The application of Genetically modified or Engineered Microorganisms (GEM) to improve oil degradation is gaining a lot of attention, especially for the breakdown of alkane hydrocarbons and the high molecular weight polyaromatic

compounds. There are existing microorganisms with improved capacities to break down aromatic hydrocarbons and their compounds. The experience from bio augmentation tests indicates that the use of GEMs will be ineffective without the development of techniques to improve their survival in the face of competition from the native microbial population, even though technologies based on these concepts hold promise for improved bioreactor performance. In order to study the survival, movement and ecological effects of modified microbes when released in novel habitats, practical, affordable and efficient tracking techniques have been created.

Petroleum is a heterogeneous, water-insoluble substrate by nature, which causes unique issues for microbes. As a result, microorganisms that are forced to grow on crude oil or other hydrocarbon sources have evolved unique characteristics to get around the solubility issues.

Samples of soil polluted by crude oil, uncontaminated soil and trash soil were gathered from several sites within the nsukka community in Enugu state, Nigeria.

500 grammes of soil were gathered from various locations, including the botanical village, the university of Nigeria in Nsukka, the refuse dump site in the vicinity of Nsukka community and the petrol filling station.

With a hand trowel, soil sample collection was carried out. At each location where the samples were collected, a 4 cm-6 cm depth was formed. Every soil sample was placed in a sterile container. The area of collection was used to identify each sample.

CONCLUSION

The fact that fewer isolates were discovered in soil contaminated by petrol suggests that very few bacteria can survive in such conditions and that these bacteria can break down the hydrocarbon of the petrol oil in the soil, for example. *Acinetobacter buamanii* isolated from petrol-contaminated soil is capable of using n-alkanes with chain lengths ranging from C10 to C40 as its exclusive carbon source.