

AN OVERVIEW ON BIOREMEDIATION, BIO-STIMULATION, AND BIO-AUGMENTATION

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ABSTRACT

To break down pollutants, such as petroleum hydrocarbons, bioremediation employs microbial metabolism in the presence of ideal environmental conditions and adequate nutrition. We looked at bioremediation technologies and found that biotechnological methods to remediation have gotten a lot of interest in recent year. Biostimulation (meaning the adding of limited nutrients to promote microbial growth) or Bioaugmentation (meaning the addition of live cells capable of destruction) research have dominated the literature, and technical evaluations of these technologies are rare if at all accessible. When nutrient delivery alone or with the addition of microorganisms is insufficient for cleanup, a simultaneous strategy is used. Recent research shows that combining the two methods is not only possible, but also advantageous. Evidently, site-specific requirements such as the availability of microorganisms capable of sufficient degradation, nutrient availability to support microorganism's growth and proliferation, as well as climatic variables including such temperature in combination with exposure time all influence technology selection. This study focuses on these technologies, with efforts aimed at eventually manipulating remedial processes in order to make bioremediation technically or economically feasible for the complete treatment of petroleum hydrocarbon-contaminated soils.

KEYWORDS: *Bioremediation, Biostimulation, Bioaugmentation, combined technologies.*

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