

# Laboratory Scale Experiment on the Bioremediation of Refined Petroleum Hydrocarbon by using CO<sub>2</sub> Evolution Method

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## ABSTRACT

The purpose of the present study was to evaluate suitable method which enhances the bioremediation of petroleum hydrocarbon. Direct application of microorganisms originating from the remediation site was helpful in situ treatment for effective removal of petroleum hydrocarbon from polluted site. Laboratory scale experiments were used to assessment of refine petroleum oil such as petrol, diesel, kerosene and their synthetic mixture. The present work was to isolate and identify hydrocarbons degradation bacterial genera from contaminated site. In this study MSM (minimal salt media), BHB (bacto Bushnell Haas Broth) were used as a basic culture media. Using DCPIP (2,6 dichlorophenol indophenols sodium salt) indicator we were selected best two isolate. Upon morphological and biochemical test, it was determined that these strains belong to bacterial genera: *Pseudomonas spp.* and *Arthobacter spp.* Finally on the basis of turbidity *Arthobacter spp.* was selected for biodegradation purpose. Plackett-burman design was applied to screen culture condition. On the basis of this study nitrogen, potassium and phosphorus were selected which enhance the bacterial growth in presence of synthetic mixture oil as a single carbon source. Efficiency of biodegradation of *Arthobacter spp.* was measured by respirometric (microbial CO<sub>2</sub> production) method. The result showed that CO<sub>2</sub> production was higher in synthetic mixture oil (60%) and petrol (56.4%) under optimum condition, moderate in kerosene (53%) and low in diesel (17.45%) but very low in without optimum condition of synthetic mixture (13.12%).

**Keywords:** Bioremediation, Bioaugmentation, DCPIP, *Pseudomonas spp.* and *Arthobacter spp.*, plackett-burman design, respirometric method.