

## Microbial Removal of Polycyclic Aromatic Hydrocarbons from Petroleum Refinery Sludge: A Consortial Approach

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**Abstract :** The persisting problem in the world that continuously impose our planet at risk is the increasing amounts of recalcitrant. One such issue is the disposal of the Petroleum Refinery Sludge (PRS) which constitutes hydrocarbons that are hazardous to terrestrial and aquatic life. The comparatively safe approach to handling these wastes is by microbial degradation, while the other chemical and physical methods are either expensive and/or produce secondary pollutants. The bacterial and algal systems have different pathways for the degradation of hydrocarbons, and their growth rates vary. This study shows how different bacterial and microalgal strains degrade the polyaromatic hydrocarbon PAHs individually and their symbiotic influence on degradation as well. In this system, the metabolites and gaseous exchange help each other in growth. This method using also aids in the accumulation of lipids in microalgal cells and from which bio-oils can also be extracted. The bacterial strains used in this experiment are reported to be indigenous strains isolated from PRS. The target PAH studied were anthracene and pyrene for a period of 28 days. The PAH degradation kinetics best fitted the Gompertz model, and the order of the kinetics, rate constants, and half-life was determined.

**Keywords :** petroleum refinery sludge, co-culturing, polycyclic hydrocarbons, microalgal-bacterial consortia

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