

OSV-48

Designing of Novel Bacterial Consortium for Sustainable Degradation of Petroleum Hydrocarbons

Ruveena TN^{1,2*}, Mannivannan A¹, Luciya Davis², Liyana Manaf²

¹Department of Microbiology Hindusthan College of Arts and Science, Coimbatore, Tamilnadu, India.

²Department of Microbiology St. Mary's College Thrissur, India.

Hydrocarbons like diesel and petrol are vital energy sources worldwide, but their use creates significant environmental issues, especially oil spills that endanger marine ecosystems. Traditional cleanup methods often cause additional harm, highlighting the need for more sustainable solutions. This study suggests a bioremediation approach that uses oil-degrading bacteria to naturally break down hydrocarbons. Diesel and engine oil- degrading bacteria were isolated from contaminated soil and water and identified using 16S rRNA sequencing. The growth conditions were optimized by observing at factors like temperature, pH, different carbon concentrations, and various nitrogen sources. Liquid-liquid extraction method used to gather the metabolites. Oil degradation was analyzed using Gas chromatography-Mass spectrometry. The study also examined the immobilization of effective strains, including *Pseudomonas mosselii*, Firmicutes, *Bacillus flexus* SUB 48 and *Klebsiella variicola* FDAARGOS 628, to enhance stability in bioremediation applications. Compatibility tests also showed positive results. Pilot screening in marine water revealed oil degradation rates of 30% for diesel and 90% for engine oil. This research aims to support an eco-friendly and effective strategy for reducing the environmental impact of oil pollution.

Keywords: Bioremediation, *Bacillus flexus* SUB 48, *Klebsiella variicola* FDAARGOS 628, Oil Degradation, 16S rRNA Sequencing,

***Correspondence:** Ruveena T N
tnruveena@gmail.com