

**TITLE:** PETROLEUM DEGRADATION BY BACTERIAL CONSORTIUM ISOLATED FROM WORMS OF THE POLYCHAETA CLASS (ANNELIDA).

**AUTHORS:** SAMPAIO, C.J.S.; SOUZA, J.R.B.; CARVALHO, G.C.; QUINTELLA, C.M.; ROQUE, M.R.A.

**INSTITUTION:** UNIVERSIDADE FEDERAL DA BAHIA (UFBA), SALVADOR, BA (AVENIDA REITOR MIGUEL CALMON S/N, VALE DO CANELA, CAMPUS CANELA, CEP 40110-100, SALVADOR-BA, BRASIL).

**ABSTRACT:**

The use of bacterial consortia in bioremediation is an important tool for the degradation of petroleum hydrocarbons, since they present different enzymatic devices and metabolic pathways, which can lead to biotransformation or mineralization of pollutants. Degradation of petroleum hydrocarbons using bacterial consortia may be a means of optimizing bioremediation techniques. In this study, bacterial strains were isolated from the digestive tract of polychaete worms and evaluated concerning the potential of the bacteria to degrade petroleum compounds (*Acinetobacter* sp., *Bacillus* sp., *Pantoea* sp. and *Enterobacter* sp.). The strains were separately screened regarding their potential to degrade oil after 24 h. The main experiment was carried out for 30 days with the addition of nitrogen, phosphorus and potassium (NPK) after 15 days (Bact-NPK15) and 28 days (Bact-NPK28) and without NPK (Bact). C13-C40 n-alkanes were degraded with all treatments in the following order: Bact>Bact-NPK28>Bact-NPK15. Significant differences were observed between the controls and all treatments ( $p = 0.00031$ ). Measurement of polycyclic aromatic hydrocarbons (PAHs) indicates a lower contribution of these compounds in the Bact-NPK28 treatment, although no significant difference between groups was observed. Bact-NPK28 was able to remove 40% of naphthalene, while Bact-NPK15 removed 20%; this effect was not observed in Bact. Higher hopane degradation levels were observed in Bact and, to a lesser extent, in Bact-NPK28. NPK application for 28 days mainly favored PAH degradation. Thus, the consortium used constitutes a new group of potential to metabolize petroleum compounds, especially for the lineage, containing enzymes to catabolize structurally stable compounds, such as hopanes, even in the absence of nutrients.

**Keywords:** polychaeta, consortium, biodegradation, petroleum

**Development Agency:** Coordination for the Improvement of Higher Education Personnel (CAPES)