Biodegradation of diesel D2 by indigenous *Rhodococcus sp*. recovered from petroleum contaminated soil

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Diesel has served as a primary source of fuel in transportation, as well as in small-scale energy generation for backup or emergency power supply, for decades (de Witt *et al*, 2021). Despite the decreasing production of fossil fuels due to global energy transitions, environmental contamination by petroleum derivatives can persist for extended periods (Marigómez, 2014). Consequently, there remains a high demand for improved technologies to clean up contaminated areas [Ossai *et al,* 2020].

This paper presents a GC/MS study on the biodegradation of hydrocarbon fractions of diesel D2, utilizing indigenous *Rhodocuccus sp.* isolated from petroleum-contaminated soil. GC-MS analysis was employed to determine the abundances of specific compounds such as n-alkanes, isoprenoids, sesquiterpanes, hopanes, steranes, and aromatic compounds (including trimethyl-naphthalenes, phenanthrene, anthracene, methylphenanthrenes, dibenzothiophene, and methyl-dibenzothiophenes). After 30 days of biodegradation of diesel D2, significant degradation was achieved, with complete degradation of sesquiterpanes and a reduction in the number of n-alkanes lower than C21. Pristane and phytane were almost completely degraded. Additionally, dimethyl-dibenzothiophenes were nearly completely degraded and removed from the system (Figure 1).

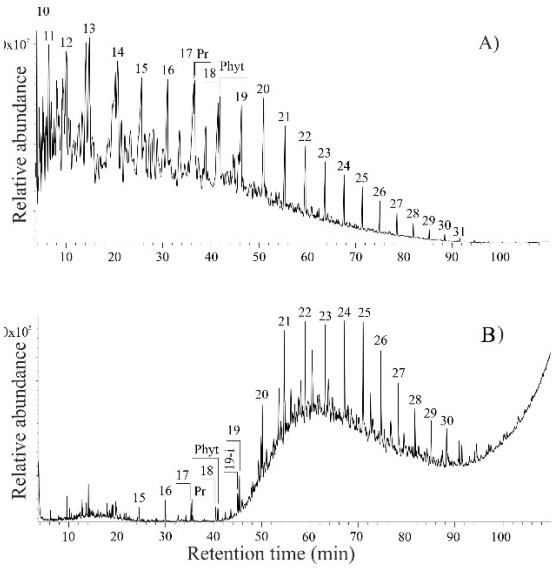

Figure 1. Total ion chromatograms (TIC) of: A) starting diesel D2 oil sample; B) of diesel D2 oil samples after degradation by *Rhodococcus sp.* after 30 days

These results highlight the potential application value of these microbial strains in the degradation of higher substituted tricyclic aromatic compounds in environmental oil pollution cleanup.

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