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Biodegradation of Hydrocarbures by Indigenous Hydrocarbonoclastics Bacteria isolated from the East-Algerian Littoral

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Abstract

The environments contaminated by hydrocarbons contain indigenous micro-organisms which have developed resistance and potential biodegradation of this pollutants. The objective of our work is to isolate and identify indigenous hydrocarbonoclast micro-organisms from the East-Algerian coastline and evaluate their potential of biodegradation. After isolation, biochemical, and molecular identification with RNA 16S, 53 strains of microorganisms have been isolated. We selected four strains; *Vibrio alginolyticus* PB-WC 11099, *Exiguobacterium aurantiacum* strain NB11_3A, *Halomonas venusta* strain NY-8 and *Dietzia sp* CNJ898 PLO4 for the growth test in the presence of different classes of hydrocarbons: alkanes-mono-aromatics and refined hydrocarbons as unique source of carbon and energy. A total hydrocarbon assay was carried out before and after each growth by a visible UV spectrophotometer at a wavelength 436 nm after extraction with pentane, removal of the polar substances, and evaporation of the extraction solvent and an oxidative decomposition of sample. The results of total hydrocarbon rates achieved after growth of the four selected autochthonous bacteria with the hydrocarbons tested show that all the strains appear to degrade the hydrocarbons with different rates. Thus, the maximum degradation is obtained with *Exiguobacterium aurantiacum* strain NB11_3A in the presence of benzene 02.21 mg/l, followed by the degradation of heptane of *Halomonas venusta* strain NY-8 with a rate of 3.12 mg/l and *Vibrio alginolyticus* PB- WC 11099 with a value of 3.76 mg/l. With *Exiguobacterium aurantiacum* strain NB11_3A we have the lowest degradation rate in the presence of cyclohexane, namely 21.23 mg/l. *Vibrio alginolyticus* PB-WC 11099 gave the best results with all the hydrocarbons tested (alkanes and mono-aromatics). The degradation of refined petroleum gasoline was also observed with all bacterial species selected with different rates. *Dietzia sp* CNJ898 PLO4 and *Vibrio alginolyticus* PB-WC 11099 use a wide range of hydrocarbons as the sole source of carbon and energy.

Key Words: Hydrocarbons, Hydrocarbonoclastics Bacteria, Bioremediation, Algeria.

