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NATIVE MICROORGANISMS FROM HYDROCARBON POLLUTED SOILS IN ECUADOR POTENTIALLY USEFUL FOR BIOREMEDIATION

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Abstract

The oil pollution is a global problem with a broad geographical distribution. In Ecuador new politics of environmental protection are encouraged, and the use of innovation processes such as bioremediation of contaminated matrices with microorganisms is supported.
In the process of biodegradation some microorganisms can use oil or its derivates as the only source of carbon for energy supply; some of them attack the more simple compounds (saturated hydrocarbons, aromatic hydrocarbons) or the most resistant ones (resins and asphaltenes).
The main objective of this investigation is obtaining a sustainable system for the hydrocarbon polluted soil bioremediation in Ecuador.
Effectiveness of two native bacteria in the bioremediation of residual oil (bunker oil) polluted soil was tested *in vitro* and in mesocosm. Five soil samples were collected in a thermoelectric power plant in Cuenca-Ecuador (2350 m a.s.l.). Chemical analyses were carried out on PHA content. Bacteria were isolated by means of soil dilution plates and sprinkled plate techniques on PDA and TSA at 15°C. Twenty bacterial strains were isolated and screened for their capacity of growing on bunker oil as the only source of carbon. A *Streptomyces* sp. and a bacillus encoded as B8 were selected and used single or in consortium. The *in vitro* experiment ran in 250 ml bottles containing mineral medium or TS with PHA dissolved in tween 80. PHA breakdown was evaluated after 3 months by means of Atomic Absorption spectrophotometer analysis. Statistically significant results on percentage of biodegradation were obtained, particularly on naphthalene (99.02%), phenanthrene (99,79%), B (b) Fluoranthene (97,76%), B (K) Fluoranthene (97,74%), B (g,h,i) Perylene (97.77%). Biodegradation of PHA was also tested in experiments performed in mesocosm under ambient condition, using polluted soil collected from the thermoelectric power site. Similar results to those obtained *in vitro* were recorded.

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