

TITLE: BIOLOGICAL REMOVAL OF TWO PAH IN SOIL SUPPLEMENTED WITH SESAME CAKE

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ABSTRACT:

Bioremediation is a process that aims to accelerate the rate of biodegradation of a large number of xenobiotics, which is based on the stimulation of the metabolic activity of microorganisms and enables the conversion of the contaminants into metabolites and biomass in a reduced time. Polycyclic Aromatic Hydrocarbons constitute a class of recalcitrant organic pollutants that require more assimilable carbon sources in order to ensure their removal. The objective of this work was to remove phenanthrene and pyrene from a sandy soil, using the combination of two techniques of bioremediation. The tests were carried out for 60 days at room temperature, in reactors containing 250 g of lubricant oil-contaminated soil and 12.5 mL of a suspension of a consortium formed by 4 isolates from soil with a history of contamination by petroleum hydrocarbons: two strains of *Pseudomonas aeruginosa* and two strains of *Burkholderia cepacia*. Four conditions were tested by combining addition of 10 or 20 mL of lubricant oil and the supplementation with 5 or 10 g of sesame cake. After 60 days of processing, both PAH were removed approximately 76.5 and 80.5% (abiotic losses of 11.6 and 12.7% respectively in the contamination conditions of 10 and 20 ml of oil). In the explored perspective, the sesame cake, regardless of the quantity supplemented to the soil, played a fundamental role in the removal of the Polycyclic Aromatic Hydrocarbons, because besides serving as cosubstrate, it guaranteed the maintenance of high density of the microbiota throughout the process ($\approx 10^8$ CFU.g⁻¹). A complementary microbial respirometry test confirmed this assertion. The conversion of the contaminants produced between 600-1500 mg of CO₂ per kg of soil. After treatment, removal of PAH was found to reduce toxicity on corn and mustard seeds, but not on the cackrey.

Keywords: Bioremediation, *Pseudomonas aeruginosa*, *Burkholderia cepacia*

Development Agency: Conselho Nacional de Desenvolvimento Científico e Tecnológico and Universidade Federal da Paraíba.