

Title: Effect of organic amendment on chronically hydrocarbon contaminated soil after chemical remediation

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Abstract:

Polycyclic aromatic hydrocarbons (PAHs) are hydrophobic organic pollutants persistent in soil. The remediation using chemical oxidants could overcome the limitations of bioremediation in the PAHs elimination, although it could also damage the community and the soil structure.

The aim of this work was to evaluate the early effect of a combined strategy applied to chronically PAHs-contaminated soil.

Chronically contaminated soil, S₀ (214 ppm of PAHs), was treated with 3.3 g of ammonium persulfate, OxS₀. Bioremediation treatments, BS and BOxS, were carried out in microcosms containing 500 g of S₀ or OxS₀ respectively, keeping constant the humidity and temperature. The stimulation treatments in SS and SOxS microcosms were done adding mature compost in S₀ and OxS₀ respectively. All microcosms were incubated 1 month at 25°C. The oxidative treatment produced an elimination of 29% of the total PAHs, and an additional PAHs elimination were detected from SOxS microcosms.

The amendment allowed the microbial population recover and the dehydrogenase increase in SOxS microcosms in comparison with S₀, after the first week. However, the increase was minor than that detected in SS microcosms. Both, the persulfate treatment and compost addition increased the toxicity of the aqueous extracts.

The combined treatment in SOxS allowed the diversity indexes of the bacterial community were recovered after a month. Members of *Sphingomonadales*, *Actinomycetales*, *Acidobacteria Gp6* and *Rizobiales* orders were predominant, suggesting the active metabolism of organic matter, nutrients mobilization and hydrocarbons degradation. A longer term treatment could define the potentiality of the combined strategy for the elimination of PAH.