



***Removal of vegetable oils from contaminated coastal soil by bioaugmentation and biostimulation.***

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The environment is negatively impacted by occasional discharges from industrial activity. When these events contain insoluble compounds such as fats and oils, they are high impact pollutants. This work focuses on an environmental problem in the industrial area of Zárate-Campana, Buenos Aires, Argentina, where a lagoon was contaminated by vegetable oil residues. The aim of this work is to study bioremediation strategies in order to propose solutions for the remediation of the lagoon. For this purpose, different site-specific treatments were evaluated through microcosms systems using contaminated coastal soil. These treatments were: a control as natural attenuation; a bioaugmentation treatment with autochthonous vegetable oil degrading bacteria ( $5 \times 10^{10}$  CFU/g); two biostimulation treatments with nitrogen ( $\text{NaNO}_3$ , 1 g/Kg) and phosphorus ( $\text{Na}_2\text{HPO}_4$ , 0.2 g/Kg), and with spent mushroom substrate (10 %w/w). The microcosms carried out with 200 g of soil were incubated at 22 °C for 60 days. Samples were taken every 20 days in order to determine moisture, pH, biological activity by counting total aerobic heterotrophic bacteria and oil degrading bacteria, and total oil concentration through FTIR. The treatments showed oil removal above 43 %, being the most efficient the biostimulation with nitrogen and phosphorus, which reached 58 % degradation after 60 days. Furthermore, the evolution of oil degradation correlated with the increase in microbiological activity in all systems. We concluded that biostimulation with nitrogen and phosphorus was the most appropriate strategy to apply for lagoon remediation.