

# Rhamnolipid Foam Enhanced Remediation of Cadmium and Nickel Contaminated Soil

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**Abstract** Column experiments were conducted to evaluate the feasibility of using a rhamnolipid foam to remove heavy metals (Cd and Ni) from a sandy soil contaminated with Cd (1706 ppm) and Ni (2010 ppm). Best results were obtained from the foam generated by a 0.5% rhamnolipid solution with an initial pH value of 10.0 after flushing with 20-pore-volume of solution. These conditions removed 73.2% of the Cd and 68.1% of the Ni. Removal efficiencies by foam generated by a chemical surfactant, Triton X-100, were investigated as a comparison. It removed 65.5% of the Cd and 57.3% of the Ni under the same conditions. After a 20-pore-volume liquid solution flushing, 0.5% rhamnolipid (initial pH 10.0) without foam generation removed 61.7% of the Cd and 51.0% of the Ni, whereas 0.5% Triton X-100 (initial pH 10.0) removed 52.8% of the Cd and 45.2% of the Ni. Distilled water with adjusted pH only was also used to flush through the contaminated soil column as a control. It removed 17.8% of the Cd and 18.7% of the Ni. This study shows that rhamnolipid foam technology can be an effective means for the remediation of cadmium and nickel contaminated soil.

biosurfactant - cadmium - foam - nickel - remediation - rhamnolipid - soil - surfactant - Triton X100

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