

Understanding Complexation and Desorption of Copper Ion in Three contaminated Soil Types in Palestine Using Surfactants and Ligands.

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Abstract

In this study we investigated the efficiency of surfactants and ligands on cleaning artificially contaminated red, sandy and white chalk soil samples from copper ion.

Before contamination, soils were characterized to determine particle size, pH, organic matter content and heavy metal contents.

Surfactants are efficient soil remediation agents for heavy metals. Various concentrations of four different surfactants Triton; X-100, SDS, Tergitol and Tween 80 were used as washing solution for remediation of contaminated soils. Triton X-100 (0.1 M) was the best surfactant to desorb copper from red soil. Tween 80 was the best surfactant to desorb copper from sandy and white chalk soils.

Recently, ligands were enhancing surfactants to desorb heavy metals from contaminated soils. Surfactants in combination with ligands were tested as washing agents for contaminated soils. Different concentrations of three different ligands (I⁻, SCN⁻ and EDTA) along with nonionic surfactant, Triton X-100 were applied as soil washing agents to desorb copper from artificially contaminated soils. Triton X-100 with 0.1 M EDTA showed a higher capacity to desorb copper than did with 0.4 M SCN⁻ or 0.4 M I⁻.

The increase of ligand concentration was a critical factor for increasing leaching capacity. Without the presence of a ligand, the surfactant alone was not able to desorb copper effectively from soil.

Keywords: Adsorption, ligands, copper, leachate, isotherm.