

MAIN SOIL PARAMETERS GOVERNING HEAVY METAL ADSORPTION AND DESORPTION PROCESSES

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Abstract

Heavy metals are distributed within soil profile according to their chemical state, transferred by hydrological flows and taken up by organisms through trophic pathways. Persistent pollutants include Zn, Cu, Pb, Cd and Ni, which cannot be removed or destroyed, leading to bioaccumulation. In soil, the maximum permissible limit for the European Union are 100 mg/kg Cu, 300 mg/kg Zn, 50 mg/kg Ni, 3 mg/kg Cd, 250 mg/kg Pb. Adsorption and desorption take place through the exchange of molecules and ions between the solid phase of heavy metals and the liquid phase of the soil, and are in accordance with the soil components: colloidal clay content, pH, organic matter, amount of carbonates and salts. The paper aim is to characterized two soil profiles up to 110 cm depth, collected from Agromixt Spineni Farm, Iasi which govern heavy metal adsorption and desorption process. The results present a neutral to alkaline (pH up to 8.81) soil pH, a carbonate content between 0.56% - 19.62% and salt content from 52-554 mg/100g soil. The results indicate that heavy metals are deposited and accumulated in the surface soil layers 0-30 cm depth. The solubility of carbonates and the presence of salts in high concentrations can retain copper (3.1 mg/Kg), nickel (1.5 mg/Kg) and lead (6.8 mg/Kg). The increased content of organic matter, weakly acidic or neutral pH values allow an increase in the mobility of zinc (15.5 mg/Kg) and cadmium. (1.0 mg/Kg). The accessibility of heavy metals can be reduced in alkaline media by desorption phenomenon, and their effect on the environment will be low and pose no risk to human health.

Key words: soil, heavy metals, adsorption, desorption.