

MIXTURE SUPPORT FOR ESSENTIAL ELEMENTS AND ITS EFFECT ON ZN AND CD SORPTION

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Abstract

Zinc and Cadmium are elements similar in chemical properties but different in mobility and availability, used as stress factors and contaminants. The aim of the study was to establish the sorption capacity of Zn (II) and Cd (II) on a nutrient mixture, the conditions under which the process is maximal and the changes that undergo in the chemical composition of the mixture. The mixture consists in eutrophic peat and compost (60:40%), which contains in addition to organic matter, macronutrients (N, P, K) and certain content of inorganic contaminants (Ni, Pb, Co, Cd, Zn). The parameters that influence the sorption process on nutrient mixture were: initial solution pH (1.0-9.0), contact time (0-1200 min), Zn and Cd concentrations (50-250 mg/l) and organic matter content (52%). The results show that certain characteristics such as phosphorus and potassium content did not change significantly, while the organic matter content decreased to 45%. The humic acids from the organic matter composition caused a significant immobilization of Zn (II) and only a slight immobilization of Cd (II). The values of Cd and Zn from nutritive solution are higher (42.24 mg/kg Zn and 11.69 mg/kg C) than accessible fraction (19.26 mg/kg Zn and 1.4675 mg/kg Cd). The heavy metals content decreases with the increase of pH (5.0 mg/kg Cd, 3.0 mg/kg Zn). The content of accessible fraction reveal reduced values of Cd and Zn that does not represent a threat for human health. These organic materials improve soil fertility, can change the availability of heavy metals and increase crop production.

Key words: zinc, cadmium, compost, peat, sorption