

RELATIONSHIP BETWEEN CU AND ZN EXTRACTABLE FOLIAR CONTENTS AND BCR SEQUENTIAL EXTRACTION IN SOIL TREATED WITH ORGANIC AMENDMENTS

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ABSTRACT

The application of organic wastes to soils, such as municipal solid waste compost (MSWC) or treated urban sewage sludge (USS) is a current practice for maintaining soil organic matter, reclaiming degraded soils and supplying plant nutrients. Since USS and MSWC may contain organic contaminants, heavy metals or pathogens, this practice represents a potential problem to the environment. In the case of heavy metals both bioavailability and toxicity seems to be critically dependent on the chemical form of the element. In this work, a pot experiment was carried out with different levels of MSWC and USS, as well as an inorganic solution of Cu and Zn. The aim was to obtain information about their bioavailability, mobility and toxicity and correlation among the different soil extracted fractions (F1 - Exchangeable metal associated with carbonated phases, F2 - Reducible metal or associated with Fe and Mn oxides, F3 - Oxidizable metal bound to organic matter) with the Cu and Zn foliar (Cu_f and Zn_f) and pseudo totals contents (Cu_{Ptotal} and Zn_{Ptotal}), using the BCR sequential and aqua regia extraction procedure. Both of these methods were adequate to predict the Cu and Zn available to the plant, as high values on the $Cu_f-Cu_{\Sigma 123}$, Cu_f-Cu_{Ptotal} , $Zn_f-Zn_{\Sigma 123}$ and Zn_f-Zn_{Ptotal} correlations were verified. Copper bounded mainly to F3, while Zn bounded to F1, F2 and F3 fractions and the regression analysis revealed that Cu and Zn ryegrass absorption were made mainly on F1 and F3 for Cu and F1 for Zn.

Keywords: Municipal solid waste compost, urban sewage sludge, speciation, heavy metal bioavailability, ryegrass.