

Assessment of several extractants for determination of copper bioavailability to wheat (*Triticum aestivum* L.) in sewage sludge-treated calcareous soils

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Abstract

Copper (Cu) is an essential micronutrient for plants. However, determination of a suitable extractant of Cu in sewage sludge-amended calcareous soils has seldom been attended. The aim of this research was evaluating several extractants to predict available Cu in 10 untreated and sewage sludge-treated calcareous soils in greenhouse under wheat cultivation. After 1 month incubation, available Cu of soils was determined using 7 chemical procedures (DTPA-TEA, AB-DTPA, Mehlich 1, Mehlich 2, Mehlich 3, 0.1 N HCl and 0.01 M CaCl₂). Results showed that Mehlich 3 and 0.01 M CaCl₂ extracted the highest and the lowest concentration of Cu, respectively, in untreated and treated soils. In untreated soils, the highest significant correlation ($r=0.95^{**}$) was between extracted Cu using AB-DTPA with concentration of Cu in wheat shoots. In addition, in sewage sludge-amended soils, the correlation between extracted Cu using AB-DTPA and Mehlich 3 and concentration of Cu in wheat shoots was significant. Prediction of wheat response was improved after addition of clay and sand parameters in regression models. The results showed that proper extraction procedures for available Cu to wheat in untreated and sewage sludge-treated calcareous soils were AB-DTPA and Mehlich 3.

Keywords: Extractability, Bioavailability, Plant response.

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