

EFFECT OF PRECEDING CROPS ON PHYTOAVAILABILITY AND CHEMICAL FORMS OF COPPER IN SOIL UNDER THE SUBSEQUENT WHEAT CROP

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INTRODUCTION: Preceding crops as a source of organic matter are an important source of micronutrient and can play an important role in the soil fertility and soil cycling of micronutrients. In addition to the role of the organic matter in increasing the concentration of micronutrients in soil solution, attention should be also paid to the role of the kind and the quantity of the root's exudates released in response to the incorporation of different plant residues in the rhizosphere. Present research was conducted with the objective of studying the effect of the kind of preceding crops: Trifolium (*Trifolium pretense* L), Sofflower (*Carthamus tinctorius* L), Sorghum (*Sorghum bicolor* L), Sunflower (*Helianthus annuus* L) and control (fallow) on the selected soil properties and chemical forms of copper in soil solid phase.

MATERIALS AND METHODS: Present research was conducted in a complete randomized block field experiment with split plot arrangement, consisting of 3 replications and 5 treatments. After harvesting the preceding crop, the wheat was cultivated. Then, after harvesting the wheat, soil samples collected from root zone. Soil samples were air dried, ground and passed through 2-mm sieve and stored for chemical analysis. pH in soil paste; organic matter (Walkley-Black wet digestion) (1), available Cu in soil were extractable by DTPA and was determined using atomic absorption spectroscopy (2). Fractionation of soil Cu was carried out using the MSEP method (3).

RESULTS AND DISCUSSION: Results showed that the preceding crops significantly decreased soil pH, as compared to the control, and the decrease was higher in the Trifolium treatment. All the preceding crops significant increased the concentration of DTPA-extractable Cu, both in the wheat rhizosphere and bulk soil. The highest effect was obtained for Trifolium treatment. Preceding crops significantly decreased the concentration of soil Cu-Carbonate and the largest increase was observed for Trifolium treatment. Preceding crops (except Trifolium treatment) significantly increased the concentration of soil Cu-Oxide in comparison with the control. Concentration of Cu-Organic both in the wheat rhizosphere and bulk soil increased with the preceding crops and their shoot residues incorporation into the soil as compared with the control. All the preceding crops and their residues application decreased the amount of soil Cu-Carbonate and soil Cu-Oxide forms (less soluble forms) and consequent increase of Cu-Organic which in turn elevated the concentration of DTPA-extractable Cu. Trifolium was the most effective in increasing the phytoavailability of Cu in soil under wheat crop.

KEY WORDS: Preceding crop, rhizosphere, copper, fractionation, wheat.

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