

Influence of Some Organic Fertilizers on Chemical Forms of Zinc in Soil Solid Phase in Relation to Zinc Uptake in Wheat

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Abstract

Organic fertilizers affect soil chemical and physical properties, particularly chemical forms of zinc in soil solid phase and thereby improve soil Zn availability. The present field study was aimed to evaluate the effects of organic and chemical fertilizer (zinc sulfate) on different zinc fractions in soil solid phase of rhizosphere in two successive years in Rudasht Research Field, Isfahan. Treatments consisted of sewage sludge (5 and 10 t ha⁻¹), cow manure (5 and 10 t ha⁻¹), and ZnSO₄ (40 Kg ha⁻¹). The control had no added Zn. Three weeks after applying fertilizer treatments, Back Cross genotype of wheat was cultivated in each plot. Our results showed that the organic fertilizers increased Zn concentration in exchangeable fraction (EXCH-Zn), the organically bound Zn form (ORG-Zn), and Zn bound to iron and manganese oxides (FeMnOX-Zn). However, the changes in Zn fractions were dependent on the fertilizer type. Positive and significant correlation between EXCH-Zn, ORG-Zn, and FeMnOX-Zn, and the total Zn uptake by wheat indicated that these pools of Zn in solid phase are labile pools with a significant role in supplying Zn for plants.

Keywords: Fractionation, Zinc, Availability, Organic fertilizer, Wheat.

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