

Assessment of Soil Quality Index with Zinc Fertilizer and its Concentration Wheat Grain

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Abstract

Management of organic and inorganic treatments may have positive or negative effects on soil quality, plant growth and human nutrition. The objectives of this study were to determine the effects of organic and inorganic zinc fertilizer application on soil quality indicators and wheat yield. This research was conducted at Agricultural Research Station Roudasht, Isfahan, Iran. Sewage sludge and cow manure (5 and 10 t/ha), ash rubber (1 t/ha), powder rubber (200 kg/ha), ZnSO₄ (40 kg/ha) were applied and wheat was cultivated. Soil samples were collected at tilling and harvest stages. After taking samples and measurements of the soil parameters, we determined the critical limits for each category and class rating for the each soil parameters, and the soil quality index was calculated. The results showed sewage sludge and rubber ash were significantly effective in increasing soil bioavailable Zn compared to other treatments. Application of sewage sludge and cow manure at 10 ton/ha improved soil quality. The expanded soil quality index can help better understand the effect of fertilizers on soil. A positive and significant relationship between soil quality indicators and Zn uptake and wheat yields was also observed. Our results indicate that addition of 10 t/ha sewage sludge as fertilizer can significantly improve soil quality, supplying the necessary amount of Zn for wheat growth.

Keywords: Soil quality index, Zinc, Sewage sludge, Cow manure, Rubber ash.

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