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ADSORPTION OF Fe, Mn AND Cd IN THE CARBONATE-RICH CLAYEY SOILS AND ASSESSMENT OF ENVIRONMENTAL EFFECTS

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Abstract

Aim of the study is to determine Fe, Mn and Cd adsorption in the carbonate-rich clayey soils and to assess their environmental impacts. Soil samples represented a carbonate-rich clayey soil (Isaoren), carbonate-rich soil (Maşuk) and clayey soil (Aşık) was obtained from three different villages in Sanliurfa, southeast of Turkey. Adsorption studies were carried out with batch method. The maximum Fe, Mn and Cd adsorption was found on Isaoren, Maşuk and Aşık soils with Kf (empirical Freundlich constant) values of 16.63, 2.18 and 1.01, respectively. While the carbonate content of soil showed a higher affinity than clay for Fe and Mn; the clay was found more accelerate efficacious than the carbonate on the Cd adsorption. Because of Fe and Mn adsorption on the soil, uptake of these nutrients by plants reduces, and Fe-Mn deficiency occurs with the yield losses. In this manner, unused mobile nitrate ions in soil solution from fertilizer leaches easily through the ground water. Both problem of the soil salinity decreasing the crop yield and the excessive irrigation accelerating the nitrate infiltration in the area support this phenomenon. As a conclusion, carbonate-rich clayey soils can prevent the Cd leaching into the groundwater but may trigger the nitrate contamination.

Key words: heavy metal, iron deficiency, manganese, nitrate contamination

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