



The Effect of Soil Properties on Zn Adsorption

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Abstract: This study was carried out to determine effects of soil properties on Zn adsorption. For this purpose, soils with different clay and lime contents were selected. The types of clay in soils were also analysed and found that Mica/Illite, Kaolinite, Smectite and Chlorite type clays were generally dominant. For Zn adsorption, different concentrations of Zn solution (0, 50, 100, 150, 200, 250, 300, 350 and 400 mg Zn l⁻¹) were added to the soil samples and the samples were kept to reach the equilibrium state within 24 hours. It was found that the Zn adsorption properties of soils conformed to the Langmuir and Freundlich isotherms and according to the variance analysis performed on the data, R² values were generally found to be P<0.001. According to correlation analyses, statistically significant relationships were found at (P<0.001) level between the k_l value calculated in the Langmuir model, and CEC and the percent clay content. In Freundlich isotherms, however, statistically significant relationships were found between the calculated k_f value and the percent clay content in different soils (P<0.05 and P<0.001). pH, clay content, CEC and the plant-available Zn content of the soils significantly affected the Zn adsorption by the soil. Regression analyses were performed on each of the values obtained for the Langmuir and Freundlich isotherms (respectively b- k_l values and n- k_f values) in order to investigate the soil characteristics. As the result of the analyses, 95-99,1 % significance was found for the Langmuir model and 91,3-98,9 % significance was found for the Freundlich model, and it was determined that both of the models could be used for these soils. In conclusion, isotherm results should be taken into consideration in Zn fertilization recommendations to be made regarding plant nutrition.

Keywords: *Zinc, adsorption, clay type, isotherms, Langmuir, Freundlich.*

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