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**The Thesis Submitted for the Degree of Master of Science
(In the Field of Irrigation and Drainage Engineering)**

Simulation of Neutral and Non-Sorptive Breakthrough Curves Repacked and Undisturbed Soil Columns Using Soil Hydraulic Parameters in Sistan Plain

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Abstract:

Knowledge has an important and determinant effect on transmission of solute, in soil estimation of The amount of leaching, and washing the salts out of the root, transmission oil pollutants and toxic substances in the soil, time and extent of groundwater contamination and extraction and nutrition of them, time, place, and mode of nutrients placement in the soil and their losses. There are many reports about the effect of size distribution of pores on the solute displacement curve. Also, many experimental, physical, and mathematical evidences are the reason for existent of relationship and similarity between the solute retention curve and the displacement curve. But so far, the model which could acceptably simulate solute in the soil displacement curve using soil water retention curve (in region of Sistan) has not provided. Often, because estimate and determination of soil water retention curve is easier than determination of solute displacement curve, so, it was tried, in this study, to simulate soil water retention curve by curve solute transport and the results in repacked and undisturbed soil samples are analyzed and evaluated in terms of saturation. For this purpose, 6 samples of repacked and undisturbed soil with 10cm diameter and 35cm height, with varied physical characteristics prepared and breakthrough curves in terms of saturation was obtained. As well, the displacement curve solute was simulated by Van Genuchten retention curve model using the mathematical relations. In deriving the mathematical model, it was assumed that a part of the soil moisture was stagnant and unable to transfer water and solute, and the moisture content was determined by the retention curve. The results showed that this model is able to predict the displacement curves of salts in the soil moisture curve and is able to construe difference between the curves forms of soil pore with their penetrate the size distribution.