

Abstract

Soil salinity is one of the most important degradation processes reducing agricultural potential of irrigated land. Salinization is the main characteristics of the soils in Sistan plain due to the *limited water* availability and the severe *climatic conditions*. Therefore soil reclamation as well as determination of leaching requirement for salt control is very important for better plant growth. In this study, effects of leaching on saline soil of Sistan region through unsaturated disturbed soil columns were examined. This study was carried out on four types of soil texture (loam, sandy clay loam, sandy loam and clay loam) as a randomized complete design with 4 treatments and three replications. Soil samples were purred in PVC cylinders and leaching procedures were conducted in 10 stages up to 5 pore volumes. Effluent from each column was collected and evaluated in terms of sodium, potassium, calcium and magnesium concentrations and EC. At the end of study soil columns were cut and soil properties such as salinity and solute concentrations of sodium, potassium, calcium and magnesium were measured. Data were analyzed by SPSS software and the break through curves were drawn. The results of leaching experiments showed that the water used in this study could reduce solute concentration and thus this soil does not need any amendment. For the most soil textures, it was also observed that almost 85% of the salts were leached after the fifth stage of soil leaching process. According to the results ions arrival into the effluent solution is ahead in coarse textured soils. So the difference between the amounts of irrigation water needed to transport the salts and leach the saline-sodic soils can be attributed to the soil texture. It seems that the main reason for these reactions is cation exchange.

Key words: Leaching, soil texture, solute transport, saline soils, soil columns and Sistan.



University of Zabol
Graduate school
Faculty of Water & Soil

**The Thesis Submitted for the Degree of M.Sc (in the field of
Irrigation & Drainage Science)**

The study of salt leaching process through
disturbed soil columns in Sistan plain

Supervisors:
Dr. M. Delbari

Advisors:
F. Ganji
M. Talebzadeh

By:
E.S. Hosseini

October 2013