

Abstract:

A laboratory experiment was conducted to investigate the effects of clay content, salinity and sodicity on shrinkage volume (SHV) of fifty-seven surface soil samples, forty-two of which belong to the Vertisols and fifteen to the Aridisols order. The mean SHV percentage was 15.1, 17.4, 17.6 and 12.8 for northern, central, and southern Gezira and Al-Rawakeeb, respectively. The CV of the data ranged from 6.8% to 13.3%. Regression analysis showed highly significant ($P = 0.001$) increase in SHV with increase in clay content ($r = 0.862$), and significant ($P = 0.05$) increase in SHV with increase in SAR ($r = 0.288$) and decrease in ECe ($r = 0.283$). It was concluded that clay content is the prime predictor of SHV, since it accounted for 74 % of the variability of SHV. Both salt variables accounted for only 8% of the variation of SHV. This was attributed to the masking effects of other variables. Thus, two representative soil samples were equilibrated with mixed-salt solutions having different salt concentrations and SAR values. Regression analysis of the data of the equilibrated samples yielded highly significant second-degree polynomial increase in SHV with increase in SAR at constant salt concentration values. The trend lines accounted for more than 90 % of the variability of SHV. The results were explained on the basis of osmotic swelling prior to shrinkage.