CORRELATION OF BRACKISH WATER AND CHEMICAL PROPERTIES OF SILTY CLAY LOAM SOIL

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ABSTRACT

An experiment was conducted at University of Agriculture, Faisalabad to evaluate the effect of brackish water on chemical properties of silty clay loam soil [Bhalwal series, pH_s = 7.70, EC_e = 3.20 dS m^{-1} and SAR = 3.70 (mmol L^{-1}) $^{1/2}$]. Forty disturbed and undisturbed soil columns (20 in each case, 76-cm long and 30-cm diameter) were used. The synthetic brackish waters having different EC (0.64, 2.0, 4.0, 6.0 and 7.35 dS m^{-1}), SAR [3.95, 9.65, 18.0, 26.35 and 32.0 (mmol L^{-1}) $^{1/2}$] and RSC (0.64, 2.0, 4.0, 6.0 and 7.35 $mmol_c$ L^{-1}) were applied to these soil columns for three years. Synthetic brackish waters were prepared by dissolving the required amount of salts ($NaCl$, Na_2SO_4, $NaHCO_3$, $CaCl_2.6H_2O$, $MgSO_4.7H_2O$ and NH_4HCO_3) in canal/distilled water. Soil samples were obtained from these soil columns for various chemical determinations after three years. The Central Composite Rotatable Second Order Incomplete Factorial design with three variables each at five levels was followed to analyze the data. An increase in EC_{iw}, SAR_{iw} and RSC of irrigation water increased the EC_e of the disturbed and undisturbed soil. The correlation found for EC_{iw}, SAR_{iw} and RSC with the EC_e of the soil were highly significant in both soils. Soil pH_s and SAR were not affected by EC_{iw} in both disturbed and undisturbed soils. The SAR_{iw} and RSC significantly increased soil pH_s and SAR in both soil types. The $CaCO_3$ contents were increased by all the water parameters but effect of EC_{iw} was non-significant in both soils. The SAR_{iw} and RSC significantly increased $CaCO_3$ content in each soil type. All interactions between these parameters were non-significant for soil pH_s, SAR and $CaCO_3$.