



Dynamics of macroelements (nitrogen, phosphorus and potassium) in ameliorating process of a saline- sodic soil

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Soil salinity and sodicity are escalating problems worldwide. Despite increasing concern with respect to saline-sodic soil reclamation, few studies have been carried out on spatial variability of macroelements in soil depth. A laboratory experiment was conducted to investigate the dynamics and availability of macronutrients in ameliorating process of a calcareous saline- sodic soil ($EC = 19.8 \text{ dS m}^{-1}$, $SAR = 32.2$, $CaCO_3 = 20.7$) using soil column. The treatments were consisted of control (untreated), rotted cattle manure (50 g kg^{-1}), rotted pistachio residue (50 g kg^{-1}), gypsum (5.2 g kg^{-1} ; equivalent of gypsum requirement) and their combinations, which were applied once in the beginning of the experiments. An intermittent irrigation method was performed in 120 days period after one month incubation, totally four leaching treatments were supplied to each column. At the end of experiments, the amounts of macroelements (i.e. nitrogen, phosphorus and potassium) were determined at three depths. The results showed that despite to absorbable P, total N and absorbable K found to have an increasing trend with soil depth. In contrast to gypsum and control, application of organic matter especially pistachio residue led to higher amounts of total N, absorbable P and K in the soil. The results also indicated that gypsum addition reversely related to absorbable P, which was attributed to calcium phosphate formation. The finding of this research reveals that pistachio residue has the most efficiency on macronutrients availability in the saline-sodic soil.