

**EFFECT OF ORGANIC MANURES ON PLANT
GROWTH AND NUTRIENTS UPTAKE UNDER
SALINE CONDITIONS**

By

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ABSTRACT

A pot experiment was carried out under greenhouse condition to study the effect of chicken manure additions either distributed with soil (DCM) or as a thin layer at 45 cm depth (LCM) compared with mineral fertilizer (MF) on the growth and nutrients uptake by tomato plants (Edkawy variety) under irrigation with different saline waters .

Results indicated that, at different growth periods, MF treatment was superior for increasing fresh and dry weights of tomato shoots and roots followed by DCM. While increasing salinity of irrigation water up to 15.8 mS cm^{-1} reduced it . However, diluted sea water seemed to be more effective in increasing fresh and dry weights of shoots and roots compared to NaCl solutions . The interaction effect showed that, the highest relative fresh and dry weights of shoots were obtained with chicken manure treatments especially at late growth periods under the conditions of irrigation with different saline waters .

In addition, tomato roots penetrated deeper (78 cm) as a function of MF and DCM treatment, while they can not penetrate more than 45 cm with LCM treatment . On the other hand, the interaction effect of fertilization and salinity of irrigation water on root development at all growth periods was insignificant .

Concerning the macronutrients status, the obtained results indicated that MF or LCM was superior for increasing N, Mg, K and Na concentrations in tomato shoots particularly at the late growth period . While the highest P and Ca-levels in shoots and roots were obtained with DCM treatment at the different growth periods.

With respect to macronutrients uptake, MF treatment was more effective in increasing them by shoots and roots, except P-uptake by shoot, at all studied growth periods .

Increasing salinity of irrigation water up to 15.8 mS cm^{-1} significantly decreased the concentrations of K, Ca and Mg but increased N and Na levels in tomato shoots and roots at all growth periods, while P-level in shoots and roots was not affected significantly at 80 days from transplanting compared with tap water treatment . In this respect, the uptake of all macronutrients by shoot and root except Na decreased with increasing salinity of irrigation water without any significant differences between the effect of NaCl solution or diluted sea water .

The interaction effect of fertilization and salinity of irrigation water on the studied macronutrients concentration and uptake by tomato shoots, at all growth periods, was almost insignificant . While its effect on P and Ca-uptake and Na and Mg concentration in roots at 80 days was significant .

Regarding the micronutrients status in tomato plants results showed that the highest Fe and Zn-levels in tomato shoots was obtained with chicken manure treatments . While (MF) treatment was superior for increasing Fe-level in roots. On the other hand, Mn level in shoots did not show definite trend, but in roots it was highest with LCM treatment .

(MF) treatment was more effective in increasing the concerned micronutrients uptake by shoots and roots at all growth periods .

Increasing salinity of irrigation water increased Fe and Zn levels in both shoots and roots at all growth periods but Mn level at 80 days was not affected significantly . On the other hand, micronutrients uptake by shoots and roots was decreased as a result of increasing salinity of irrigation water . In most cases, there were insignificant differences between the effect of NaCl solutions and diluted sea water on all micronutrients levels and uptake by both shoot and root, except Fe uptake which was increased with diluted sea water compared to NaCl solutions .

Fertilization with mineral or organic fertilizers decreased soil pH and increased soil EC values at different soil depths . In general, soluble ions were increased as a result of organic manure application compared to mineral fertilizer .

Increasing salinity of irrigation water either as NaCl solutions or diluted sea water decreased soil pH and increased EC values and soluble ions particularly at the lower layer as compared to the control treatment .

Under all fertilization treatments, soil irrigated with highly salty water achieved the lowest pH values and the highest EC values particularly at the lower depths . On the other hand, the interaction effects on HCO_3^- and Cl^- were insignificant at different soil depths .

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