Effect of Adding Some Amendments on Soil and Plant Under Irrigation with Saline Water

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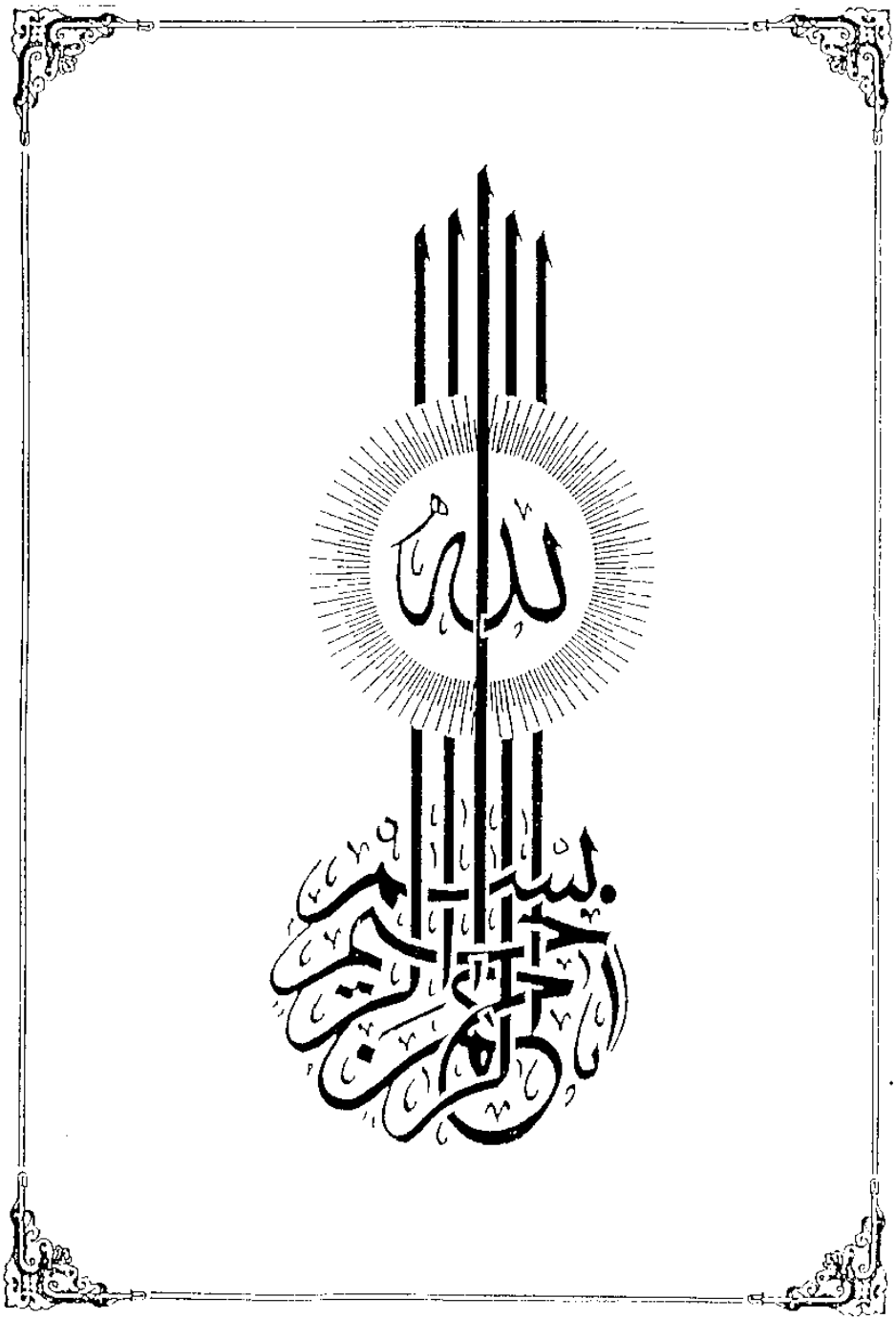

Approval sheet

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ABSTRACT

Abd-Allah Hussin EL-Sayed. Effect of adding some amendments on soil and plant under irrigation with saline water. Ph. D. Ain Shams Univ. Agric. Fac. Soil. Dep. 1997.

The main objectives of the present is study adding some soil amendments (Polyacrylamide (PAM) as synthetic polymer, biogas manure as natural material and gypsum) under irrigation with saline water on physical and chemical properties of the soil also . Nutrient uptake and yield of tomato and wheat plants were also studied . In order to achieve the objectives of this investigation three soils, differing in their texture, salt content and exchangeable sodium percentage were used.

The obtained results showed that the addition of soil amendment caused a pronounced decrease in the values of soil bulk density and increase in total soil porosity. Soil hydraulic conductivity, soil moisture retention points and constants (field capacity, wilting point and available water), water stable aggregates and aggregation parameters (state, degree and index) were increased as a result of soil conditioning by using the two soil amendments individually or in combination. The obtained results indicated also that soil conditioning improved pore size distribution in the soil particularly in sodic soil that led in increase its permeability.

Concerning the effect of soil amendments on some soil chemical properties, the obtained data indicated that application of these amendment caused a decrease in the values of pH and EC, soluble sodium, CL, and Mg while soluble K remained more or less stable. consequently SARe, ESP, as well as exchangeable Na, Mg were decrease while soluble Ca^{+2},So_4^{--} exchangeable calcium, and availability Fe, Mn, Zn , Cu, N and K

were increased as result of amendments application but P was decreased .

Data also indicated that soil amendments resulted in increase seed germination, plant growth and both grain and straw yield of the plants under study. It is worthy to note that soil conditioning increased the content and uptake of macro and micronutrient (N, P, K, Fe, Mn, Zn and Cu) in the plants under study. Similar results were obtained in the two cultivation seasons, whereas, mean values after 2nd cultivation season either with adding or without adding new treatments are slightly less than those recorded in the first season . This may be due to increase of ECe, ESP and pH values in the 2nd season as result of saline irrigation. These results may be attributed to short time effect of soil amendments, that means the used soils, are in need of adding new treatments annually.

A conclusion was drawn that using gypsum for the reclamation of sodic soils would be facilitated by amendments application. and also the combination effect of PAM and organic manure improved the undesirable action of PAM on the physical properties of the sandy soil .

Key words : Amendments as polyacrylamide, biogas manure and gypsuum, Saline water, Physical and Chemical properties, Nutritional status, tomato, wheat plant, sandy, alkali and non alkali soil .

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