



جامعة الفيوم

كلية الزراعة

قسم الاراضي والمياه

ملخصات الابحاث المقدمة من الدكتور/ عبد الناصر أمين أحمد عبد الحفيظ

المتقدم للجنة العلمية الدائمة للأراضي والهندسة الزراعية لترقية الأساتذة المساعدين والأساتذة

### البحث الثاني

Ewees, M. S. A. and Abdel-Hafeez, A. A. A., (2012). Effect of some organic soil conditioners under drip irrigation system on improving quantity and quality of maize yield. Egypt. J. Soil Sci. 52, No. 4, pp.559 – 582.

تأثير بعض مصلحات التربة العضوية تحت نظام الري بالتنقيط لتحسين كمية ونوعية محصول الذرة.

### الملخص باللغة الانجليزية

The main purpose of this work was to evaluate the possible use of some organic soil conditioners under drip irrigation system to improve the quality and yield of maize crop (*Zea mays* L., cv. single cross 10 hybrid. To achieve this target a field experiment was carried out on a private farm at Sedmant El Gabal village, Beni-Suef Governorate, Egypt, which represents one of those are occupying the desert zone adjacent to the western edge of the Nile Valley during the summer seasons of 2010 and 2011. The irrigation water resource was used as a mixture of agricultural drainage saline water with the Nile water at a ratio of about 1:1 (C2S1, ECiw = 1.89 dS/m and SAR = 5.35). The applied organic soil conditioners individual or in combined treatments were solid K-humate (12% K<sub>2</sub>O) at a rate of 1.50 kg fed-1, and 3.00 kg fed-1 solid calcium alginate, which were thoroughly mixed with the 5 cm soil surface layer.

The obtained data reveal that the studied soil is mainly encompassing the wind blown sand deposits as a parent material, and it is classified as Typic Torripsamments, siliceous, hyperthermic and it could be evaluated as marginally suitable. The results also show that usage of saline water resulted in relative increases of the ECe and ESP values in the root zone reached 18.60 and 32.75 % as compared to the initial state of soil, respectively. Meanwhile, the corresponding relative increases of the ECe in case of soils amended with K-humate, calcium alginate and K-humate + Calcium alginate were 4.56, 11.23 and 2.46 %, vs 10.12, 3.47 and 1.16 % for the ESP values, respectively, with its optimal case at K-humate + Calcium alginate. Moreover, the applied K-humate and calcium alginate individually or in combined treatments played an important role in improving the values of soil bulk density, total porosity, field capacity, available water, hydraulic conductivity, organic matter content, pH, CEC and available nutrients. The latter may be due to modified air-moisture regime that leads to alleviate the depressive effect of salinity stress on the released nutrient from organic residues.

These favourable conditions of the improved soil due to amendments or conditioners treatments positively reflected on the maize vegetative growth characters (i.e., plant height, dry weight of leaves/plant, leaf contents of chlorophyll a & b, total carbohydrates and sugars); ear characters and grain yield (i.e., ear length, ear diameter, ear weight, grain number/ear, grain

number/raw, grain number/ear, weight of 100 grain and grain yield/fed.) and grain quality parameters (i.e., its contents of reducing sugars and crude protein % as well as macro- & micronutrient contents of N, P, K, Fe, Mn, Zn and Cu), with superiority to the combined treatment (Khumate + Calcium alginate). It is evidently that such beneficial effect of K-humate and Calcium alginate on the dry matter production was more attributed to the leaves area and number, which are contributed to more photosynthesis and better carbohydrates yield. Also, the ability of Khumate and calcium alginate for increasing plant nutrient uptake which may be rendered to its chelating property that resulted in significant increases for N, P and K in maize leaves. On the other hand, the reverse was true for Na and Cl, probably due to alleviate the harmful effect of saline irrigation water. The parameters of maize quality, i.e. contents of reducing sugars and crude protein % showed significantly increased when treating the soil with saline irrigation water treatments with K-humate and calcium alginate as compared to the control treatment (saline water solely). Thus, the present study shows that the best applied treatment was K-humate + calcium alginate for achieving the greatest maize yield of high quality.