EFFECT OF NATURAL ZEOLITE AND BENTONITE MINERALS ON SOME SANDY SOIL CHARACTERISTICS

By

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B.Sc. Agric. Sc. (Soil Science), Ain Shams University, 2001

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ABSTRACT

Manal Hassan Mohamed Ibrahim El-Mahdy: Effect of Natural Zeolite and Bentonite Minerals on Some Sandy Soil Characteristics. Unpublished M.Sc. Thesis, Department of Soil Science, Faculty of Agriculture, Ain Shams University, 2010.

One of the ways to improve sandy soils is the addition of natural inorganic deposits rich in clay minerals. The present study was carried out to investigate the effect of using natural clay minerals, (zeolite and bentonite rich deposits) for improving the availability of some nutrients (K, Zn, Mn and Fe) nutrient. Several analyses were carried out on the collected deposits and the studied soil to find out their physical, chemical and mineralogical properties.

Bentonite and zeolite samples were saturated with micronutrients from sulfate salts Zn, Mn, Fe and K using K_2SO_4 solution. Incubation experiment was carried out using a mixture of sandy soil and different rates of the nutrient saturated or unsaturated minerals. Wetting and drying cycles were followed under laboratory condition and the amount of lost water was monitored and calculated. After the incubation period (30 days) maize (Tri-hybrid 311) was planted in the pots, at the same time soil sample was taken for available nutrent analysis.

Results indicated that saturation of zeolite and bentonite with K, Zn, Mn and Fe increased the available levels of these nutrients. Rusults also revealed that treating sandy soil with zeolite or bentonite increased the levels of these nutrients when compared with untreated soil. The increase in the nutrient levels was higher in case of bentonite compared with zeolite

Results of pot experiment indicated that there was a beneficial effect for the application of natural clay mineral amendments, zeolite and bentonite. The contents of the studied nutrients ,K, Zn, Mn, and Fe were increased under the conditions of the experiment. Concentrations of th of the the studied minerals, in maize plants were affected by clay mineral type and different application rate of the fortified clay minerals .

These results may be of good potential for improving the available level of K, Zn, Mn, and Fe in sandy soils and bentonite was more efficient than zeolite in that regards.

Keywords:

sandy soil, zeolite, bentonite, maize plants, saturated zeolite, saturated bentonite.

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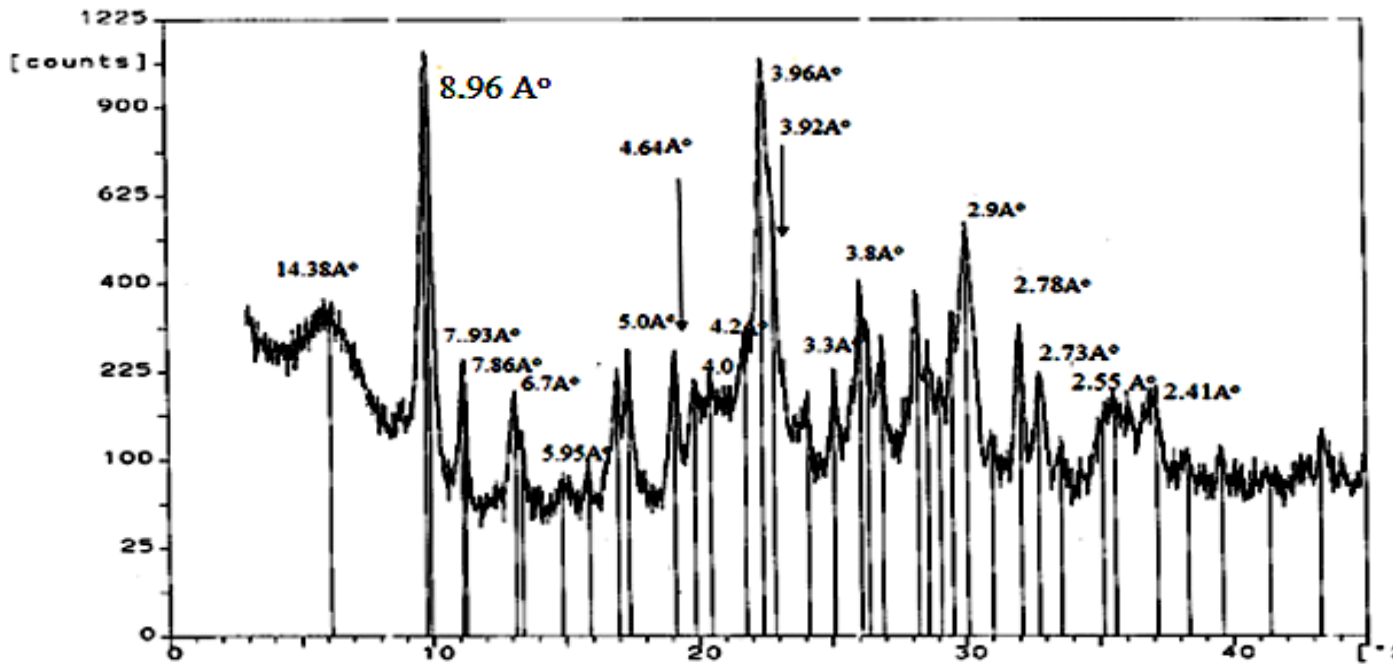

Fig (1): X-ray diffraction pattern of zeolite sample (powder mounting)

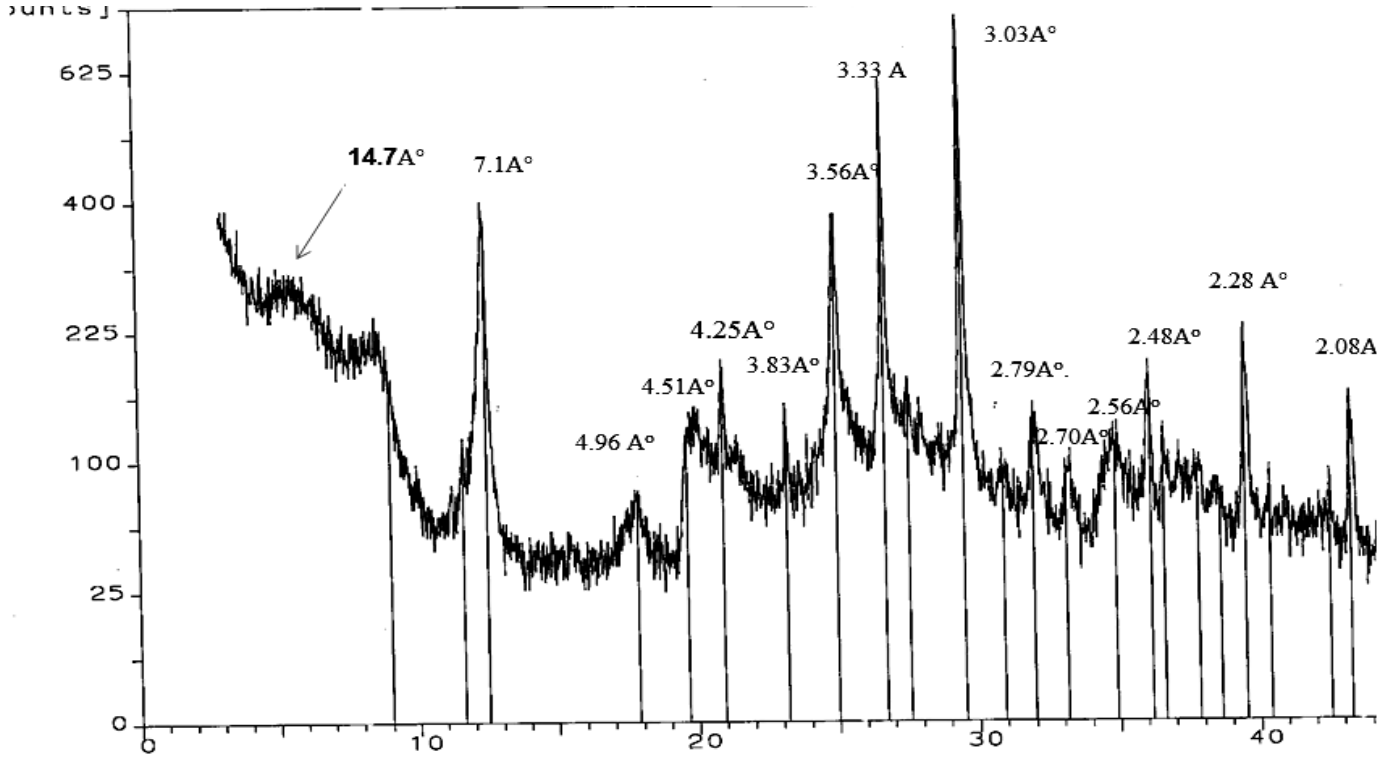

Fig (2): X-ray diffraction pattern of bentonite sample 1(Mg- saturated air dried treatment- Oriented mounting).