

EFFECT OF SOME ORGANIC AND NATURAL CONDITIONERS ADDITION ON PHYSICAL AND CHEMICAL PROPERTIES OF SOIL, ITS NUTRITIONAL STATUS AND ZEA MAIS YIELD

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ABSTRACT

Two field experiments were carried out for two successive summer seasons at Ismailia Agric. Res. Station (ARC) El- Ismailia Governorate to study the effect of some organic and natural conditioners on physical (field capacity, wilting point and available water) and chemical properties of soil (pH, EC and availability of macronutrients), its nutritional status and yield and yield components of maize. The experiments were designed in a randomized complete block design with three replicates. Three forms of organic conditioners (compost, FYM and compost extract) were applied at two rates. Also two natural minerals (bentonite and dolomite) were applied at two rates each alone or both in combination.

Data indicated that values of FC, WP and AW increased significantly by increasing the rate of organic and natural conditioners. Compost treatments were superior in increasing values of FC, WP and AW at both seasons. Data also show a slight increase in soil moisture content in case of application of both bentonite and dolomite, the same trend was observed with bentonite combined with dolomite at both applied rates. Values of pH decreased with increasing the rates of organic conditioners but increased with increasing the rates of natural minerals at both tested seasons. Also, available N, P and K increased significantly with increasing the rate of organic manures (FYM, compost and compost extract) and minerals (bentonite, dolomite). High rate of organic conditioners (especially compost extract) or natural minerals (especially bentonite combined with dolomite) increased significantly macronutrients in soil for both growing seasons.

With regard to N, P and K contents in plant parts for maize, increased significantly with application of both organic and natural conditioners. N, P and K uptake increased gradually by increasing the rate of organic conditioners. Moreover, compost extract treatment was superior for increasing the uptake of macronutrients. Macronutrients uptake of maize straw and grain increased significantly with the application of natural conditioners alone (bentonite or dolomite) and/or in combination (bentonite + dolomite). This trend was more pronounced for dolomite.

The values of yield components increased significantly with the application of both organic and natural conditioners, also they increased gradually by increasing the rates of organic and natural conditioners. Compost extract treatment recorded the highest values of straw and grain yields. Natural mineral (bentonite and dolomite) application increased significantly yield components either they applied alone or both in combination. This finding was more pronounced in the case of dolomite treatment. On the other hand, the decreases of yield components were observed with increasing the rates of bentonite for both growing seasons.