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IMPROVING SUGAR BEET PRODUCTION GROWN ON A NEWLY RECLAIMED SALINE SOIL BY APPLYING INORGANIC AND ORGANIC NITROGEN FERTILIZATION

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ABSTRACT

Inoculation with PGPR (Plant Growth–Promoting *Rhizobacteria*) as biofertilizers, application of mineral N fertilizer at rates (80,100 and 120 kg N fed⁻¹), and compost (5 ton fed⁻¹) were used to study their effects on growth, some chemical compositions, yield and quality of sugar beet grown under newly reclaimed saline soil at Gelbana district, Sahl El-Tina (longitudes 32° 20' and 32° 33' E and latitudes 30° 57' and 31° 04' N), North Sinai Governorate in 2013/2014 and 2014/2015 seasons, at twelve treatments : 80 kg N fed⁻¹ ,100 kg N fed⁻¹ ,120 kg N fed⁻¹ ,Compost + 80 kg N fed⁻¹ ,Compost + 100 kg N fed⁻¹ ,Compost + 120 kg N fed⁻¹ , bio-fertilizer + 80 kg N fed⁻¹ ,bio-fertilizer + 100 kg N fed⁻¹ ,bio-fertilizer + 120 kg N fed⁻¹ , 80 kg N fed⁻¹ + Compost+ bio-fertilizer ,100 kg N fed⁻¹ + Compost+ bio-fertilizer and 120 kg N fed⁻¹ + Compost+ bio-fertilizer. The treatments were arranged in a randomized complete block design with three replicates.

Results showed that plants treated with compost or bio-fertilizer (PGPR) combined with mineral N fertilizer at various levels showed a significant promotion in all studied characters in both growing seasons as compared to using mineral N fertilizer alone. Application of 120 kg N fed⁻¹ and compost plus inoculation with (PGPR) was significantly associated with the highest values of photosynthetic pigments, average leaf area/plant, root yield (ton fed⁻¹), macro and micronutrients concentration in root and K/Na ratio on the other hand, decreased Na⁺ content in root as compared to the other treatments followed by application of 100 kg N fed⁻¹ + Compost + PGPR which recorded the maximum sugar yield (ton fed⁻¹) in the two seasons. The highest means of sucrose % and purity % resulted from treated beet plants with 80 kg N fed⁻¹ + Compost +PGPR in both seasons. Insignificant differences were noticed between 100 and120 kg mineral N fertilizer fed⁻¹either used it alone or in combined with organic (compost) and bio-fertilizers (PGPR). Proline content in leaves showed a markedly and significantly decrease in all treatments inoculated with PGPR or supplemented with compost as well as their combination compared to inorganic N fertilizer alone, the lowest decrease in proline content during the two study seasons was due to treatment (80 kg N / fed + compost + PGPR) as a result of reducing the soil salinity effect with which proline accumulation decreases.

Key words: *Bio-fertilizer; compost; productivity; soil salinity; sugar beet.*