

Effect of some soil amendments and boron content of water on soil properties and the biochemical components of sugar beet yield under irrigation with saline water

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plants grown under such conditions. The experiments were carried out in a split plot design in which the boron levels, i.e. (B1), 1 ppm; (B2), 4 ppm; (B3), 7 ppm; and (B4), 10 ppm occupied the main plots whereas the sulphur levels, i.e. (S0), without sulphur application, (S1), 0.25 ton/fed.; and (S2), 0.5 ton/fed. occupied the submain plots. Sugar beet seeds (*Beta vulgaris* L.) var. Desperz poly N, at the rate of 5 kg/fed. was the tested crop. All plots received N, P, and K at the rates of 70, 24 and 60 units/fed., respectively. Surface irrigation from well was applied every week after the addition of boron levels in the form of boric acid. Also, the necessary management practices were conducted at the appropriate time. The crop was harvested at maturity and the yield of roots and leaves were recorded in which the biochemical composition and nutrients content were determined for each season. 113 Soil samples were taken at the end of harvesting each season from equal depths of 0-5, 5-15 and 15-30 cm depth for the chemical analysis. The obtained results can be summarized as follows: 1- The application of sulphur resulted in decreasing soil pH, EC, SAR and ESP values with different magnitudes. Also, the concentrations of soluble Ca+Mg, Na, K, and Cl were remarkably decreased, whereas the concentrations of soluble SO_4^{2-} and HCO_3^- ions were increased with increasing sulphur application rates. However, boron application led to increase the EC, SAR and ESP values as well as the concentrations of soluble Ca+Mg, Na, K, HCO_3^- , Cl and SO_4^{2-} . 2- Total and water soluble boron concentrations increased with different magnitudes as a result of increasing boron level of the applied saline water, while the application of sulphur reduced such ions concentration. On the other hand, the sulphur-boron interaction indicated the positive role of sulphur on creating the hazards previously mentioned for boron. 3. The availability of Fe, Mn and Zn was increased as a result of sulphur and/or boron applications. The rate of increment was dependent upon the rate of sulphur and/or boron to be the highest under the S2B4 treatment in the two growing seasons. 1144. The yield of sugar beet roots and leaves significantly increased as a result of sulphur or boron application. However, the effect of combined treatments of sulphur and boron was not significant. 5. The nutrient contents, i.e. N, P, K, Ca and SO_4^{2-} of both roots and leaves were increased whereas Mg and Na contents were decreased due to increasing sulphur application rates. The same trends were also obtained except that the content of Na was increased whereas the SO_4^{2-} -S contents of both root and leaves were decreased due to boron application. 6. Increasing boron levels in water caused a gradual increase in boron content of both roots and leaves while the application of sulphur reduced such nutrient. 7. The micronutrients contents of Fe, Mn, Zn were increased in both roots and leaves of the two growing seasons due to sulphur and/or boron applications, the rate of increment was dependent upon the rate of S or/and B application. 8. The total soluble solids (TSS), sugar yield and juice purity of roots were affected favourably by sulphur and/or boron applications. 9. The soluble sugars, i.e. total, reducing and non reducing sugars of both roots and leaves were increased as a result of increasing sulphur application rates, while boron application increased both total and non reducing sugars of roots. 11510. The total protein of both roots and leaves

increased as a result of increasing rates of both sulphur and/or boron applications.¹¹ The proline content of sugar beet leaves increased by boron application. However the application of sulphur reduced such parameter.