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Abstract

Remediation and cultivation of salinized soils are regarded as a significant solution for increasing the agricultural production. However, crops are dramatically injured by salts that accumulate in the root zone layer. The current investigation is an attempt to protect dill (*Anethum graveolens* L.) plants from the hazards of salinity via soil amendments (SA), i.e. sulphur (S) and humic acid (HA) or their combinations (SHA), as well as β -carotene (β C). SA involved S at a rate of 500 kg/ha, HA at a rate of 20 kg/ha, and SHA (10: 1 (w/w)), in addition to the control (without amendments). β C was foliar sprayed at concentrations of 50, 150 μ M, and distilled water (0.0 μ M). SHA \times β C practice exhibited the highest increases in all plant pigments contents and shoot dry weight. Soil applied-SHA \times 150 μ M β C reduced hydrogen peroxide and malondialdehyde and increased both aglycon and glycon compared to the control. Salty-lime soil applied-SHA plus 150 μ M β C generated the highest significant increases in ascorbate peroxidase, catalase, ascorbic acid and glycine, respectively. Furthermore, soil treated-SHA \times 150 μ M β C surpassed soil treated-HA \times 150 μ M β C or soil treated-S \times 150 μ M β C combinations for increasing nitrogen, phosphorus, potassium and calcium while decreasing sodium in dill leaf. Under 150 μ M β C application, SHA and HA were the potent treatments for improving dill seed yield and oil yield in saline soil. In conclusion, for boosting plant tolerance to salinity while obtaining high yielding and quality, it should perform supply plants with 150 μ M β C and amending soil by SHA in dill cultivation practices.