

Effect of Foliar Application of Calcium Chloride in Mitigating Salt Stress in Tomato Plants

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Salinity in soil adversely affects crop productivity and quality. One of the key constraints of expanding tomato cultivation in Dry Zone of Sri Lanka is high salt concentrations prevails in soil. Calcium plays an important role in plant tolerance to stresses including salt stress mainly attributing to modifications in enzymatic and non-enzymatic antioxidants, osmolytes and metabolites. The objective of this study was to enhance the tolerance of tomato plants to salt stress by exogenous foliar application of CaCl_2 . Tomato variety "Rajitha" was used for the study. Tomato plants were either treated with water only, water and CaCl_2 , NaCl only or NaCl and CaCl_2 . Each treatment contained five replicates. After 15 days of transplanting in pots, salt stress was imposed by treating soil with 150 mM NaCl weekly. Foliar application of 20 mM CaCl_2 solution was carried out at 6-day intervals. Morphological parameters and total chlorophyll content were measured weekly. The growth and yield were slightly declined in plants subjected to NaCl stress. Foliar application of CaCl_2 to salt stress induced plants led to improvement in vegetative growth and fruit yield in comparison to salt stressed plants where no CaCl_2 was applied. In comparison to CaCl_2 not applied NaCl -treated plants, CaCl_2 applied NaCl -treated plants showed 40-45% increase in average fruit yield ($p < 0.05$), 26-30% increase in number of branches ($p < 0.01$), increase in fresh/dry weights of shoot and root ($p < 0.05$), 13-19% increase in number of flowers (ns) and 3-4% increase in average height of plants (ns). In conclusion, the data showed positive effects of CaCl_2 in improving growth and yield of NaCl -stressed tomato plants. It can be suggested that exogenous application of CaCl_2 plays an important protective role in enhancing salt stress tolerance in tomato plants.

Keywords: Calcium, Foliar application, Growth, Salt stress, Tomato