

ABSTRACT

The present research was intended at the discernment of the impacts and potential role of exogenous application of ascorbic acid on growth attributes and physiological parameters of NaCl-stressed *Triticum aestivum* L. cultivar Punjab-11 plants and specifically the participation of ascorbic acid in the amelioration of the inimical effects of salinity. Two modes of ascorbic acid application were used as seed priming agent and foliar spray. Seed priming was carried out with multiple concentrations of ascorbic acid i.e., 0ppm, 100ppm and 200ppm. When the wheat plants reached their vegetative stage, 2nd application of ascorbic acid was given to the plants in the form of foliar spray. Response of ascorbic acid was determined at four levels of NaCl viz. control, 4dSm⁻¹, 8dSm⁻¹ and 12dSm⁻¹. With increasing salinity, there was a marked dwindle in germination and additionally the lengths and weights of seedlings were also noted to be decreased. The toxic effects of salt stress greatly interrupted all the under observed parameters of wheat plants. There was a considerable deduction in plant height, number of leaf, number of tillers, chlorophyll contents, productivity and also the fresh and dry weights of plants. A sharp reduction in the photosynthetic efficiency and the rate of transpiration was also recorded. Use of ascorbic acid both as priming agent and as foliar spray seemed to be beneficial in the amelioration of hazardous effects of NaCl-stress. Treatment of plants with ascorbic acid showed maximum results in terms of growth, productivity in contrast to those plants who were not given any ascorbic acid concentration. Under all the conditions, the use of 200ppm ascorbic acid being as priming agent and foliar spray remained most efficient. The seed germination, height, number of leaves, root length, number of spikelets per ear, number of grains per ear and total chlorophyll was reduced to 10.11%, 13.16%, 42.14%, 27.46%, 16.73%, 19.22% and 27.28% respectively at 4dSm⁻¹ in comparison to control. The antioxidant activities (DPPH (2,2-Diphenyl-1-picrylhydrazyl free radical scavenging activity), TAA (Total Antioxidant Activity) and TPC (Total Phenolic Content)) of wheat improved greatly under higher salt stress e.g. the DPPH activity was recorded as 42.46% for shoot extracts at 4dSm⁻¹, while at 12dSm⁻¹ it was recorded as 232.18% for the shoot extracts of Wheat. At all salt levels there is a significant increase in total antioxidant activity for both shoot and fruit. TAA for shoot was 159.49% for S₄A₂ plants but for S₁₂A₂ it was observed to be 270.56%.

Under non saline conditions, least activity of total phenolic content was recorded i.e., 63.33% for shoot and 69.33% decrease for fruit respectively. While 200ppm ascorbic acid intensified height, rachis length per ear, number of tillers and photosynthetic rate upto 22.72%, 65.40%, 100.59% and 28.14% respectively at 4dSm^{-1} as compare to control. Hence it can be deduced that the external supply of 200ppm ascorbic acid found to be the best source in the fight against detrimental consequences of salinity.