Project Title: Functional Characterization of Transgenic Tomato Plants Over-Expressing SpERD15-2 gene

Principal Investigator: Dr. Khurram Ziaf, Assistant Professor, Institute of Horticultural Sciences, University of Agriculture, Faisalabad

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Abiotic stress, such as drought, salinity and alkalinity of soils, extremes of temperatures, heavy metals, ultra-violet and excessive sunlight, and strong winds are serious threats to agriculture and the environment. Mankind has been exploring tolerance to these stresses and trying to utilize the natural resources. Different strategies have been used to develop cultivars tolerant to different stress factors. Major development in this field has come from the application of molecular biology. Understanding of the structure of genome and function of individual gene of concerned species is necessary prior to designing a rational breeding strategy to utilize the natural stress tolerance present in the wild relatives of that cultivated species. We had also cloned and sequenced another *ERD15-2* gene, a member of *ERD15* gene family, from *Solanum pennelli*, and got transgenic tomato plants. Gene expression analysis through quatitative real-time PCR (qRT-PCR) revealed different transcript level of several lines. Furthermore, expression analysis of genes involved in the synthesis of different antioxidant enzymes revealed altered expression of some of these genes, which had significant role in enhancing stress tolerance of plants. But, estimation of actual enzymatic activity was necessary to correlate it with the data of QPCR and to establish the actual mechanism of stress tolerance in these transgenic plants. Therefore, we have completed this project in which mechanism of tolerance to drought and salinity was assessed by collecting data regarding morphological, physiological and biochemical parameters. The activities of antioxidant enzymes, catalase (CAT) and ascorbate peroxidase (APX), were estimated. Moreover, MDA and proline as well as Na^+, K^+, CA^{2+} and Cl^- contents in roots and shoots were also assayed under both control and stress conditions.