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Abstract – SY25

TOMATO SYSTEMIN: A POTENTIAL LINK BETWEEN BIOTIC AND ABIOTIC STRESSES

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Plant signaling peptides trigger signal transduction of external and internal stimuli that leads to the production of hormones and to the successive activation of genes modulating several physiological events in plants, including defense. Some of these peptides have been defined as plant resistance activators or elicitors that are released upon pest attacks triggering an amplification of the plant's own defense. Tomato Systemin (Sys) is one of the best characterized signaling peptide described in plants. This 18-amino acid peptide is released from a larger cytosolic precursor protein of 200 amino acids called ProSystemin (ProSys). Transgenic plants, constitutively expressing ProSys, have shown a wide transcriptome reprogramming which reflected in novel phenotypes resistant to different pests, salinity and heat stresses. Most recently, by combining gene expression studies and bioassay with different pests, we have already demonstrated that the exogenous supply of ProSys protein and Sys peptide to tomato plants enhance both direct and indirect defense barriers. However, little is known on the functional link between plant responses to biotic and abiotic stresses. To contribute to this knowledge, we investigated the effect of the application of the Sys peptide, via soil drench, on the regulation of the expression of abiotic stress-related genes, on plant growth characteristics and on metabolic parameters of tomato plants exposed to NaCl (80 mM). Our results indicate that the direct delivery of this peptide primed defense genes active in counteracting saline stress (catalase 1 (CAT1), 14-3-3 protein 1 (TFT1), Heat shock transcription factorA2 (HSFA2), Heat shock protein 70 (HSP70), Heat shock protein 90 (HSP90)) and that the subsequent administration of salt stress to the treated plants increased the expression of primed genes. In addition, under salinity conditions, Sys-treated plants exhibited no significant reduction in shoot biomass accumulation and a higher proline content in the leaf. The present study indicates that Sys peptide represents a link between biotic and abiotic stress resistance in tomato plants. From an applied perspective our data give a significant contribution towards the safe and sustainable strategies for crop protection.