Proceedings of the LXV SIGA Annual Congress
Piacenza, 6/9 September, 2022
ISBN: **978-88-944843-3-5**

Poster Communication Abstract – 5.10

NOVEL PROTEIN FRAGMENTS FOR TOMATO RESILIENCE TO SALT STRESS

MAGLIULO R.*, CIRILLO V.*, MOLISSO D.*, MONTI S. M.**, LANGELLA E.**, BUONANNO M.**, APRILE A. M.*, CRISCUOLO M. C.***, CASTALDI V.*, MAGGIO A.*, RAO R.*

*) Department of Agricultural Sciences, University of Naples Federico II, Portici (Italy)
**) Institute of Biostructures and Bioimaging, National Research Council, Naples (Italy)
***) MATERIAS S.r.l., Naples (Italy)

protein fragments, plant resistance, salt stress, biostimulants, eco-friendly tools

Environmental stresses are critical constraints to crop production. Novel tools, that may improve plant resilience to biotic and abiotic stressors, need to be developed to cope with a growing food demand due to an increasing world population. Understanding and exploiting intrinsic mechanisms of tolerance to multiple stresses in plants is the new frontier, since these often occur simultaneously in natural and agricultural systems. We recently identified two fragments, named PS1 and PS3, in the scaffold of Prosystemin (Prosys), the protein precursor of tomato systemin, a very well-known defense-signaling peptide that efficiently protect tomato plants against *Botrytis cinerea* and *Spodoptera littoralis* larvae by inducing defense-related genes. Both fragments belong to the N-terminal region of the scaffold, lacking of systemin sequence. Since it was previously demonstrated that Prosys protects tomato plants also against soil salinity, we analyzed the ability of PS1 and PS3 to confer salt tolerance. We demonstrated that plants treated with exogenous foliar spray of PS1 and PS3, followed by salt stress, were less affected in terms of plant biomass and root area compared to control plants. Treated plants showed a comparable stomatal density to plants non-irrigated with saltwater. Noteworthy, we observed an unexpected growth improvement effect on PS1/PS3-treated tomato plants in the absence of salt stress, making us hypothesize a further activity of these protein fragments as biostimulants and not only

as stress protectant. Finally, a gene expression analysis revealed the upregulation of salt stress-related genes such as CAT2 and APX2 in all treated plants, showing the activation of antioxidant and scavenging responses in stressed plant cells. Overall, these results lay the foundations for further investigations on the role of PS1 and PS3 in salt stress tolerance and growth enhancement. On a practical aspect, the two protein fragments may be exploited in plant protection strategies against multiple stresses.