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Poster Communication Abstract – PH.46

TOMATO PROSYSTEMIN CONTAINS MORE THAN ONE BIOLOGICALLY ACTIVE REGION ABLE TO PROTECT PLANTS AGAINST DIFFERENT PESTS

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In Solanaceae, a family of defence-related peptide hormone called systemins is involved in the activation of defence genes in response to injury. In tomato, systemin (Sys) is a 18-amino acid peptide released from a larger precursor protein of 200 amino acids called ProSystemin (ProSys). Tomato genome contains one copy of the ProSys gene; it is composed of 4176 bp and is structured into 11 exons, of which the last one codes for Sys. This small peptide was traditionally considered as the principal actor of the resistance triggering multiple defence pathways in response to a wide range of biotic/abiotic stress agents. The mechanisms that underpin such a large plant protection effect are possibly linked to the intrinsical disorder of ProSys sequence that promotes the binding of different molecular partners. To contribute to this knowledge, the ProSys N-terminal region, deprived of Sys (PSdel), was expressed in E. coli cells, purified and then characterized by a biophysical and functional point of view. Results showed that the recombinant deleted ProSys keeps a disordered structure and protects tomato plants against the lepidopteran pest Spodoptera littoralis and the fungus Botrytis cinerea. This is likely the consequence of the activation of the observed defence-related genes and, in particular, of genes encoding for polygalacturonase associated with the production of oligogalacturonides (OGs) which activate the plant innate immunity. These results shed lights on the large 'anti-stress' activity of ProSys that modulates plant immunity not only through the well-known Sys-dependent pathway connected with the induction of JA biosynthesis but also by the Sysdel-dependent pathway associated with OGs production. Taken together, our results demonstrated that ProSys is not a mere scaffold of Sys peptide but contains itself other regions biologically active. Our data give a significant contribution to the understanding of the functional mechanism of ProSys, important tool of tomato defence.