



Università degli Studi di Napoli Federico II

PhD in Biotechnology - 35th cycle
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Novel plant peptides in combination with beneficial microorganisms for the promotion of sustainable protection of tomato crop

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The growing consciousness of the adverse effects of pesticides on the ecosystem have led to an increased social pressure to substitute them with safer and more sustainable crop protection strategies [1]. An interesting approach is based on the implementation of bioinspired strategies including living microbes and naturally occurring substances from plants. Many bio-formulates now available on the market are based on beneficial microorganisms such as *Trichoderma* and Arbuscular mycorrhizal fungi, they promote plant health and defenses against pathogens. A much smaller use is still being made of metabolites of plant origin, despite it has been proved that they are efficient in the frame of crop protection. In Solanaceae, an example is represented by systemins, a family of defense-related peptide hormones which are very effective in triggering defense responses in treated plants. Their precursor's structure characterization suggests the presence of several active, never described before regions, that could represent the starting point for the discovery of novel bioactive molecules suitable for tomato protection. The exploitation of these peptides in combination with beneficial microorganisms may offer a novel tool for disease control in tomato crop. So, the main goal of the present PhD project is to investigate the most efficient combination of different promoters of plant defense responses against biotic and abiotic stresses in tomato, one of the most widely cultivated vegetables in the world. Moreover, the possible transgenerational transmission of the activated defense will also be investigated in order not only to improve our knowledge about this mechanism, but also to exploit it to reduce the number of chemical treatments.

References

- [1] Carvalho F. et al, *Food and Energy Security*, 6: 48-60 (2017).
- [2] Coppola M. et al, *Plants*, 8: 395 (2019).