DEVELOPMENT OF BIOCONTROL STRATEGIES BASED ON ANTAGONISTIC *TRICHODERMA* STRAINS

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Species of the genus *Trichoderma* (Hypocreaceae, Ascomycota) play important roles in various agricultural environments, therefore the genus has a long history as a popular subject of basic and applied mycology research. Several *Trichoderma* species have the potential to act as biocontrol agents of plant pathogenic fungi and nematodes by antibiosis-, competition-, and/or mycoparasitism-based antagonistic action. Environmentally friendly agricultural practices may also benefit from the ability of certain *Trichoderma* species to induce systemic resistance and promote growth of the crop plants.
The development of *Trichoderma*-based biocontrol strategies generally starts with the isolation of *Trichoderma* strains, which is preferably performed at the agricultural habitat of the crop plants to be protected. This is followed by laboratory screening of the isolates for antagonistic potential against the target plant pathogens, in order to select potential biocontrol agents (BCAs). As a key step of the process, the *Trichoderma* strains selected as BCA candidates should be subjected to an exact, species-level identification by sequence-based molecular tools, to avoid biocontrol product development from potentially harmful members of the genus, like the causal agents of green mould infections affecting cultivated mushrooms, or the species capable of causing opportunistic infections in humans. Genetic transformation, protoplast fusion and classical mutagenesis are potential tools for improvement of BCA candidate *Trichoderma* strains, however, the application of genetic manipulation for this purpose may result in restriction of the resulting BCA's applicability in countries with strict GMO regulations. Further crucial steps of the biocontrol strategy development are the optimization of fermentation conditions for the

selected BCA and the development of proper strategies for formulation and delivery. Greenhouse and field trials should confirm the beneficial effects of the *Trichoderma* strain(s) as BCA candidate(s) before the procedure continues with the registration process, market introduction and commercialization. The development of specific monitoring tools for the applied *Trichoderma* strains could be useful tools to study the population dynamics and performance of the BCA in different agricultural habitats.

This presentation aims to provide an overview of the above-mentioned procedure of *Trichoderma*-based biocontrol strategy development, with examples deriving from the experience accumulated at the Department of Microbiology, Faculty of Science and Informatics, University of Szeged, including the development of the multicomponent soil biofertilizer product BioeGO, as well as the efforts aimed at the biological control of forest-damaging white rot fungi from the genus *Armillaria*.

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