

Mycotoxins and fungal pathogens CONTROL by ACTinomyces – Potentialities of actinomyces from soils for the development of novel biocontrol products to manage cereals fungal diseases and mycotoxins risk

The main objective of this project is to propose a global approach to evaluate the potential of actinomyces isolates for the control of wheat fungal diseases from in vitro testing till in planta efficacy. Moreover, the identification of active metabolites will provide useful information about the mechanisms of inhibition, but will also offer the opportunity to discover new molecules of interest. This project gathers four complementary research teams from UMR Qualisud, UMR BGPI, and TUB (Germany) to build a pluridisciplinary consortium able to answer the whole problematic. This consortium is composed of microbiologists, molecular biologists, phytopathologists, biochemists and chemists, all expert in their domains. This multidisciplinary collaboration will allow to perform competitive and high quality research for the development of biocontrol solution based on actinomyces action.

ACTIONS

The overall approach will consist in the selection of actinomyces strains previously isolated by UMR Qualisud. In accordance with the convention on biological diversity (Nagoya Protocol) and to facilitate their putative industrial applications, all actinomyces strains used in this project were isolated in France.

Two main applications will be considered for the valorization of the strains: their potential as biocontrol agents and/or as producers of new metabolites of interest. Strains will be selected on the basis of in vitro and in silico criteria to reduce the number of studied strains to the most

promising ones regarding:

- ▶ their antagonist activity against the selected toxigenic and phytopathogenic fungi (direct confrontation and Cell-Free Extracts CFEs);
 - ▶ their enzymatic activities that could reflect a potential to degrade fungi cell wall, but also to grow on poor substrates such as residuals and wastes from agriculture (lignocellulosic residues from beetroots, grape pellicles, coffee pulps...);
 - ▶ Their technological properties (growth yield, sporulation, dehydration)
 - ▶ Their ability to colonize the rhizosphere, to ensure a sustainable effect (endophyte capacity).
 - ▶ Their potential as plant growth promoters (PGPR) mostly through in vitro and molecular method analysis
- Strains selected regarding their in vitro characteristics will then be studied for their in planta activity and active metabolites fractions.

Responsable :

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Montant :

