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Seminar of the AES PhD school in collaboration with Edmund Mach Foundation

Bacillus velezensis uses the same chemicals to toggle between immune activation and evasion

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Abstract

Root-associated rhizobacteria such as *Bacillus velezensis* produce cyclic lipopeptides that activate systemically induced resistance against microbial infection in various plants. How these molecules are perceived by plant cells remains elusive. In the first part of the talk, we will present results showing that immune activation in *Arabidopsis thaliana* by the lipopeptide elicitor surfactin relies on a unique mechanism of perception by plant cells, leading to host defense potentiation and resistance to the necrotrophy fungus *B. cinerea*. In the second part, we will present a novel strategy by which *B. velezensis* enhances plant defense mechanisms via oligogalacturonides generated from pectin backbone through the activity of two conserved pectinolytic enzymes. These OGs not only induce a systemic resistance in the plant when applied on the roots, but also modulate the plant immune reaction in response to its own perception. Our data emphasize the importance of surfactin and OGs as mediators in the intricate interplay between plants and beneficial bacteria, providing new insights into the interkingdom molecular interactions between plants and their bacterial associates.

The speaker

Marc Ongena obtained Doctor degree in Biochemistry at the University of Liège (Belgium) in the Microbial Technology lab of the Faculty of Sciences. He did a post-doc in the Lab of Prof. R. Bélanger at Laval University, Québec and got permanent position at FRS-FNRS in 2007. He is now Research Director at FRS-FNRS (and associate Professor at ULiège) and co-heads the Microbial Processes and Interactions laboratory (MiPI) at TERRA Research Center, Gembloux Agro-Bio Tech Faculty. His group conducts research on soil dwelling Plant Beneficial Bacteria that retain a strong potential to protect plants against diseases and therefore represent promising alternatives to chemicals. Focusing on *Bacillus* and *Pseudomonas* as typical plant-associated species, we investigate the molecular mechanisms underlying such biocontrol potential mainly based on a direct antagonistic activity toward pathogens and/or on the ability to trigger Induced Systemic Resistance. With the current and future research, we also want to tackle key questions such as “why the potential to form a wide array of these costly compounds has been conserved in rhizobacteria?” or “How do BSMs act according to the (micro)organism in interkingdom and interspecies interactions?”. These questions are crucial for better understanding bacterial chemical ecology in competitive niches such as soil and, from a more applied viewpoint, for implementing the use of these PBB as biocontrol agents