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THE PERCEPTION OF INDOLE NEGATIVELY MODULATES BIOCONTROL ACTIVITIESIN THE PLANT BENEFICIAL RHIZOBACTERIUM *LYSOBACTER CAPSICI* AZ78

Stefano Nadalini[1,2], Ana Bejarano[1,2], Michele Perazzolli[1,2], Ilaria Pertot[1,2], Gerardo Puopolo[1,2]

(1) Agriculture Food Environment Center, University of Trento - San Michele all'Adige (Italy)
(2) Agrosystem and Bioeconomy Department, Research and Innovation Center Fondazione Edmund Mach - San Michele all'Adige (Italy)

The rhizosphere is a dynamic environment characterised by multiple and complex microbial interactions where diffusible communication signals (DCS) continuously influence the expression patterns of the microbiome, hence regulating fundamental traits for adaptation to the rhizosphere.
In particular, plant-associated bacteria release indole, a Volatile Organic Compound (VOC) that acts asan interkingdom signal able to influence antibiotic resistance, motility, biofilm formation and virulence. *Lysobacter* spp. are commonly found in the rhizosphere and have been frequently associated to disease suppression. For instance, the biocontrol activity of the plant beneficial bacterium *Lysobactercapsici AZ78* (AZ78) has been reported against the phytopathogenic oomycetes *Phytophthora infestans*, *Plasmopara viticola*, *Pythium ultimum* and the Gram-positive bacterium *Rhodococcus fascians.*
However, there is scarce information about *Lysobacter* spp. ecology and how DCS, and in particular indole, may affect their behaviour in the rhizosphere.
To investigate the aspects determining rhizosphere competence and functioning of *Lysobacter* spp., this work presents a functional and transcriptomic analysis performed on AZ78, which was grown in the presence indole.
The presence of indole significantly reduced the inhibition capacity of AZ78 against *P. ultimum* and *R. fascians* by 47 and 31%, respectively.
Moreover, RNA-Seq analysis revealed that nearly 12% of all genes in AZ78 genome were modulated by indole.
In particular, indole downregulated the expression of the heat-stable antifungal factor (HSAF) biosynthetic gene cluster, which may affect AZ78 antioomycete and antimicrobial activity. Moreover, in the presence of indole, AZ78 downregulated several signal transduction pathways responsible for nutrients uptake, resulting in reduced growth.
Finally, indole downregulated several genes related to type IV pilus functionality, which might lead to impaired twitching motility.
This study sheds light on the key role of DCS such as indole in shaping AZ78 behaviour in the rhizosphere and suggests that, manipulating DCS levels may alter the persistence and functioning of several plant-beneficial rhizobacteria, such as *Lysobacter* strains.

Key words: Lysobacter – Biocontrol – Indole - Transcriptome