20th International Symposium on the Biology of Actinomycetes

June 15 - 19, 2025

ISBA
2025

ISBA20 Website

P088

Streptomyces hydrogenans strain DEF17: A Plant Growth-Promoting and Biocontrol strain in *Solanum lycopersicum*

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Streptomycetes have a potential role as plant growth promoters and plant protection agents. *Streptomyces sp.* DEF17 is a barley endophytic strain with promising plant growth promotion (PGP) and biological control potential. When applied to tomato seeds, DEF17 significantly increased plant height during early developmental stages.

To further explore its genetic potential, a hybrid Illumina-Nanopore genome assembly was performed, allowing the complete reconstruction of the bacterial chromosome and the identification of a 34 kb plasmid. Genome mining with AntiSMASH and PLAbase confirmed the presence of gene clusters responsible for siderophore production, including desferrioxamine, suggesting a role in improving plant iron nutrition. Furthermore, functional annotation of the plasmid revealed its potential involvement in phosphate solubilization, including phosphonate degradation pathways, and in bacterial fitness mechanisms, such as a toxin-antitoxin system (TypeIV AbiEii), which could contribute to competitive exclusion and microbial resilience in the rhizosphere.

Based on these results, the siderophore activity of DEF17 was investigated in planta under two growth conditions: one with Fe(III)-supplementation and one with a standard substrate. In this regard, DEF17-treated plants accumulated significantly higher levels of Fe, Mn, and K in leaves under Fe(III)-supplemented conditions, highlighting the effect of DEF17 on nutrient homeostasis.

To further characterize DEF17, a test was performed to investigate the plant-mediated DEF17 biocontrol potential against *Fusarium oxysporum* f. sp. *lycopersici* (FOL) through chemotropism assays. Results showed that root exudates from DEF17-treated plants were able to repel FOL germ tubes, suggesting an active role of DEF17 in plant modulation of fungal behavior. Preliminary metabolomic data of root exudates obtained from treated plants also indicated an increase in glycosylated alkaloids, such as tomatine, which may contribute to the protective effects induced by DEF17.

Overall, this study describes the potential of DEF17 to contribute to sustainable agriculture by increasing crop fitness and resilience, thus reducing in-field chemical inputs.