BIOLOGICAL CONTROL OF SMUT IN SUGARCANE: SELECTION AND CHARACTERISATION OF TRICHODERMA STRAINS FOR THE CONTROL OF SPORISORIUM SCITAMINEUM

Melissa Amanda Marzolo Bown [a,b], Rafaela Rossi Rosolen [a,b], Wanderson Lima Cunha [a,b] , Paulo Campiteli [a,b], Luciana Rossini Pinto Machado Da Silva [c], Maria Augusta Crivelente Horta [b], Anete Pereira de Souza [a,b]

[a] *Center for Molecular Biology and Genetic Engineering (CBMEG), Universidade Estadual de Campinas, Campinas, São Paulo, Brazil*

[b] *Plant Biology Department, Biology Institute, Universidade Estadual de Campinas, Campinas, São Paulo, Brazil*

[c] *Instituto Agronômico - Centro de Cana - Ribeirão Preto (SP), Brazil.*

*e-mail: melissa.marzolo.bown@gmail.com

Sugarcane is essential to Brazil's economy and is widely used to produce sugar, ethanol and biofuels. However, this industry faces threats such as climate change and diseases. Among them, sugarcane charcoal, caused by the fungus Sporisorium scitamineum, reduces productivity and product quality, requiring effective control strategies. Chemical control is widely used, but has limitations in terms of effectiveness and environmental impacts. In view of this, studies on biocontrol, especially those involving antagonistic fungi such as Trichoderma harzianum, have great potential[1] . This fungus acts through mechanisms such as mycoparasitism, production of secondary metabolites and induction of resistance in the host plant.

Therefore, the general objective of this work seeks to investigate the potential of Trichoderma species as biological control agents for sugarcane charcoal (S. scitamineum), evaluating their efficacy in suppressing infection and characterizing the molecular and physiological mechanisms involved in the interaction between Trichoderma spp. and the pathogen. The specific objectives are: Evaluate the efficacy of different Trichoderma species in controlling sugarcane smut (S. scitamineum), through in vitro and in vivo biocontrol trials; Characterize the antagonistic properties of Trichoderma species against S. scitamineum, analyzing the production of bioactive compounds such as enzymes and secondary metabolites; Select the most effective Trichoderma strain in controlling S. scitamineum based on the results of the study. scitamineum based on the performance results obtained in the antagonism trials and the production of bioactive compounds; Carry out experiments in sugar cane houses, using susceptible and resistant varieties, to assess the effectiveness of the selected Trichoderma strain in controlling charcoal.

First to investigate the interaction between these fungi especes the selected strains of trichoderma will be identified and then evaluated for their antagonistic potential against S. scitamineum using in vitro biocontrol assays, and the production of bioactive compounds, will be analyzed to identify those that could play an important role in controlling the pathogen. The strain of Trichoderma most effective in controlling S. scitamineum will be selected and with the aim of evaluating its application it will be performed greenhouse experiments with susceptible, intermediate and resistant varieties of sugarcane infecting with Trichoderma and S. scitamineum, and monitored over time to assess the evolution of the infection and the impact on plant growth[2].

The results of this investigation will contribute to understanding the potential of Trichoderma spp. in the biological control of sugarcane smut, reducing dependence on chemical fungicides and their environmental impacts.

[1] ROSOLEN, R et al. whole-genome sequencing and comparative genomic analysis of potential biotechnological strains of Trichoderma harzianum, Trichoderma atroviride, and Trichoderma reesei.. Molecular Genetics and Genomics: MGG:*198 (3)* 2023. 735–754. https://doi.org/10.1007/s00438-023-02013-5

[2] L., DA SILVA, , Fátima et al. Screening of Sugarcane Genotypes for Smut (Sporisorium scitamineum) Resistance Under Greenhouse Conditions. Agronomy. Molecular Genetics and Genomics: MGG: Editora, 2025. ISBN https://doi.org/10.3390/agronomy15020448., *15*(2), Article 2.

Apoio: **CAPES**