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CHEMICAL CHARACTERIZATION OF VOLATILE ORGANIC COMPOUNDS FROM Bacillus velezensis LGMB12 AND THEIR ANTIFUNGAL POTENTIAL

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Endophytic bacteria, known as Plant Growth Promoting Bacteria (PGPB), play a key role in sustainable agriculture, acting as biological agents of protection against pathogens. This protection occurs through the production of secondary metabolites such as the synthesis of phytohormones, volatile organic compounds (VOCs), non-volatile compounds, and facilitation of biological fixation of atmospheric nitrogen, which contribute to improving soil fertility. *Bacillus velezensis* is a rhizobacterium that has been gaining prominence as a biocontrol agent through the production of VOCs, and a new strain of Bacillus velezensis (LGMB12) was isolated from a collection of 217 endophytic bacteria from the roots of four lines and three hybrid genotypes of corn. The genome was sequenced by LabGeM. This study aims to extract and identify the VOCs from this new strain and evaluate its antifungal potential against the phytopathogens *Sclerotinia sclerotiorum* and *Monilinia fructicola*, both considered pests in crops such as soybeans and stone fruits. The bacterium *B. velezensis* LGMB12 was cultured in NA medium, the vials were prepared with solid medium, and the bacteria were incubated in an oven at 30°C. VOC collection was performed using headspace solid-phase microextraction (HS-SPME), and analysis was performed using gas chromatography coupled with mass spectrometry (GC-MS). The major compounds identified were 2-nonadecanone, 6,10,14-trimethyl-2-pentadecanone, 6,10-dimethyl-2-undecanone, *n*-pentadecanoic acid, and *n*-octadecanoic acid. Their antifungal potential was evaluated using paired plates (PDA medium) and Petri dishes with dividers (NA medium) against the two phytopathogens. In the plates without dividers, the colonies of both fungi were smaller ($p<0.05$; inhibition >98%) compared to the control, suggesting significant antagonism by diffusible metabolites. In the evaluation of volatile metabolites, the fungus *S. sclerotiorum* had its growth restricted in PDA medium, without invasion of the bacterial compartment, while in the control, total colonization of the plate was observed, exceeding the barrier (PDA and NA). Tests with *M. fructicola* showed changes in the morphology of the fungal colony in the presence of bacteria, indicating antagonist-pathogen interactions. The results reinforce the potential of the *B. velezensis* LGMB12 strain as a bioagent and its applicability in the development of bioinputs aimed at the sustainable management of phytopathogens in different agricultural crops.

Keywords: *Endophytic bacteria, antagonism, in vitro test, secondary metabolites.*