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Evaluation of Biofungicide Activity of Endophytic Bacteria Isolated from Blackberry Bush (*Rubus ulmifolius* Schott) against Two Phytopathogenic Fungi [†]

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Abstract: Agriculture is one of the main human activities, supplying food for a human population which is continuously growing. Crop diseases are responsible for huge economic losses and they are caused for different types of organisms such as fungi. *Botrytis cinerea* and *Fusarium* sp. are two of the most dangerous due to their ability to expand and colonize different crops. Pesticides have been used to control them, but the overuse has resulted in the development of resistances. Thus, biopesticides have risen as a potential alternative against these phytopathogens since their use decrease the negative effects and increase the positive responses by the plants. The main objective of this work is the isolation of endophytic bacteria from blackberry bush and the evaluation of their activity against both *B. cinerea* and *Fusarium* sp. Firstly, we evaluated different mechanisms in vitro. The production of enzymes with hydrolytic activities against fungal cell wall components and the production of diffusible and volatile organic compounds (VOCs) with antifungal activity. Results showed 54% of isolates produced diffusible molecules against *B. cinerea* and 51% against *Fusarium* sp. While 19% produced VOCs against *B. cinerea* and 16% against *Fusarium* sp. Secondly, genomes of selected strains were sequencing and studied to find those molecules which are responsible for the activities seen in vitro. Operons involved in biosynthesis of molecules such as PKS (polyketide synthases), NRPS (NonRibosomal Peptide Synthetase) and phenolic compounds, known for their antifungal activity, were found their genomes. In conclusion, selected strains isolated from blackberry bush may represent a strong ally against some of the worst pathogens that agriculture faces, such as *Botrytis cinerea* and *Fusarium* sp.

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