

Talk

Biocontrol characterization of a bacterial collection by means of enzymatic activities and confrontation assays



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ABSTRACT

Currently, there is an increasing agriculture demand, not only for human consumption, but also for feeding the cattle. This provokes an overuse of fertilizers and fungicides to maintain the standards of market and production which in turns causes serious environmental problems. Stimulated by these facts, we think that a possible solution could be the use of bacteria with PGPR activities (plant growth-promoting rhizobacteria) as well as biocontrol activities against pathogenic fungi, in order to reduce or to eliminate, in the future, the use of these harmful products.

Bacteria used in this work belong to the bacterial collection of the IFAPA the Torres-Tomejil Center, and have been previously characterized by their PGP activities and for their aptitude to inhibit the in vitro growth of the phytopathogenic fungus *Macrophomina phaseolina*. In this study, the bacterial isolated were screened for their biocontrol enzymatic activities (catalase, oxidase, protease, amylase, chitinase and β -glucanase), as well as for hydrocyanic acid production. After that, an in vitro confrontation assay was carried out against *F. oxysporum* and *F. proliferatum*, with the bacterial strains that gave good results in biocontrol activities.

From a total of 40 strains possessing enzymatic activities, the following strains have shown the higher values: strain Hr4b (nd) exhibited high cellulose, protease and amylase activities; strain B1-2a (*Bacillus erophilus*) possessed protease and amylase activities; C11 (non determined -nd-) and AdB1 (nd) enhanced in cellulase and protease activities; strain Hvs2 (*Bacillus licheniformis*) highlighted for its cellulose activity and CT197 (nd) for its chitinase one. In addition, all of them exhibited other enzymatic activities in a lesser extent. Regarding the in vitro confrontation experiment against *F. oxysporum* and *F. proliferatum*, the strains CT3 (*Pseudomonas fluorescens*), CT19 (*Pseudomonas fluorescens*), CT131 (*Pseudomonas fluorescens*), Hvs2, Hvs 6 (*Streptomyces fradiae*) and Hvs 8 (*Brevibacterium frigoritolerans*), were found to be highly inhibitory of both fungal strains growth.

As conclusion, strains CT3, CT19, CT131, Hvs2, Hvs6 and Hvs8 could be candidates to be used as biocontrol agents against phytopathogen fungi. Futures studies will be focused on investigating a commercial product able to be used under field conditions.

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