

The Genus Bacillus, Effect on Commercial Crops of Colombia

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Abstract : The importance of environment friendly alternatives in agricultural processes is the reason why the research group Ceparium, the Colegio Mayor de Cundinamarca University, Colombia, investigated the genus Bacillus and its applicability for improving crops of economic importance in Colombia. In this investigation, we presented a study in which the genus Bacillus plays a leading role as beneficial microorganism. The objective was to identify the biochemical potential of three indigenous species of Bacillus, which were able to carry out actions for biological control against pathogens and pests or promoted growth to improve productivity of crops in Colombia. The procedures were performed in three phases: first, the production of biomass of an indigenous strain and a reference strain starting from culture media for production of spores and toxins were made. Spore count was done in a Neubauer chamber, concentrations of spores of Bacillus sphaericus were prepared and a bioassay was done at the Laboratory of Entomology at the University Jorge Tadeo Lozano of Plutella xylostella larvae, insect pest of crucifers in several Colombian regions. The second phase included the extraction in the liquid state fermentation, a secondary metabolite that has antibiosis action against fungi, call iturin B, and was obtained from strains of Bacillus subtilis. The molecule was identified using High Resolution Chromatography (HPLC) and its biocontrol effect on Fusarium sp fungus causes vascular wilt in economically important plant varieties, was confirmed using testing of antagonism in Petri dish. In the third phase, an initial procedure in that let recover and identify microorganisms of the genus Bacillus from the rhizosphere in two aromatic herbs, Rosmarinus officinalis and Thymus vulgaris L. was used. Subsequently, testing of antagonism against Fusarium sp were made and an assay was done under greenhouse conditions to observe biocontrol and growth promoting action by comparing growth in length and dry weight. In the first experiment, native Bacillus sphaericus was lethal to 92% Plutella xylostella larvae in 10 DDA. In the second experiment, iturin B was identified and biological control of Fusarium sp was demonstrated. In the third study, all strains demonstrated biological control and the B14 strain identified as Bacillus megaterium increased root length and productivity of the two plants in terms of weight. It was concluded that the native microorganisms of the genus Bacillus has a great biochemical potential that provides a beneficial interactions with plants, improve their growth and development and therefore a greater impact on production.

Keywords : genus bacillus, biological control, PGPRs, biochemical potential

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