

Poster

Characterization of entomopathogenic fungi as biocontrol agent for codling moth: insights into their variation in growing parameters

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Use of entomopathogenic fungi (EPF) as control agents for pest insect is a promising alternative to chemical pest control. As a resource of biodiversity, EPF function as natural antagonists of pest species. They can be found in different climatic zones and agroecosystems. The bilateral German-Brazilian project Bio-Entosource, therefore, aims to assess the biodiversity of EPF in two different climatic zones (Germany and Brazil) in apple, soybean and in eucalyptus. The main goal is to develop new microbial control strategies bilaterally for sustainable agriculture and forestry to promote the use of new efficient microbial-based insecticides.

The current study aimed to characterize the entomopathogenic fungi against the larvae of *Cydia pomonella*, a serious pest of perennial fruit industry in Germany. About 38 EPF have been isolated from organic apple orchard soil samples by using insect Bait-method. For molecular and morphological characterization, isolated EPF were identified by microscopic examination and genetic sequencing of the ITS region.

Initial screening based on the virulence against *C. pomonella* was performed by using standardized pathogenicity assay. 13 strains showed >80% mortality. Later, these 13 strains were tested for chitinase activity through agar-chitin plate assay and four potential strains showed higher (>1) chitinase activity. After these two primary experiments, four strains, JKI-BI-1496 (*Cordyceps spp.*), JKI-BI-2620 (*Beauveria spp.*), JKI-BI-2642 (*Beauveria spp.*) and JKI-BI-2647 (*Metarhizium spp.*) have been selected for further growing parameter analysis under laboratory conditions.

As the importance of environmental factors in the development of microbial-based insecticides is greatly increasing. Therefore, in next step, thermo-tolerance at 7 different temperature (5° C, 10° C, 15° C, 20° C, 25° C, 30° C, 35° C) and sunlight tolerance (four hours exposure) were evaluated simultaneously through germination rate analysis for these four strains. Additionally, various factors, such as spore count, optical density, wet and dry biomass measurement in four different media (malt peptone, malt peptone with 1% chitin, potato dextrose and potato dextrose with 1% chitin) were evaluated to observe the influence of media composition with four selected strains.

The results suggest that these four strains differ in virulence and growth factors at different environmental conditions. Therefore, the characterization of EPF will allow us to obtain potential strains, which can be needed for sustainable production of microbial-based insecticides.