Sektion 46
Biologischer Pflanzenschutz III

46-1 - Optimierung nachhaltiger entomopathogener Pilze durch wirksame formulierung zur Überwindung von Umweltstress

Optimization of sustainable entomopathogenic fungi by effective formulation to overcome environmental stress

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Currently, sustainability in agroecosystem by developing microbial-based insecticides in both agricultural land and forest has been receiving interest worldwide. The main goal of the bilateral project "Bio-Entosource" is to study the biodiversity of entomopathogenic fungi (EPF) in order to develop new conceptual strategies for a biological pesticide for sustainable use in agriculture and forestry. The scientific cooperation between Germany and Brazil serves to validate the optimization of EPP in interaction with harmful insects in apple, soybean and eucalyptus in two different ecoclimatic zones.

About 45 new EPF have been isolated from soil samples of organic apple orchard by using insect Bait-method. These new EPF serves as the research basis for the various experiments regard to their functional biodiversity. Consequently, standardized pathogenicity assay, agar-chitin plate assay and influence of 7 different temperature experiment have been carried out to select potential EPF. The aim of these tests is to gain an appropriate understanding in order to overcome the limiting factors of in-field environmental stress such as UV radiation, drought, rain etc. In this regard, bilaterally used model system soy, white flies (*Bemisia tabacii*, *Trialeurodes vaporariorum*) and, in the perennial system, apple codling moth (*Cydia pomonella*) have been examined.

Depending on the fungal strain, various procedural measures have been carried out to optimize the biological effectiveness of the EPP. For this purpose, various factors such as media composition, oxygen concentration, pH value and temperature are being examined through liquid fermentation. Biological efficiency of potential EPF (JKI-BI 1496) is now being evaluated through several experiments of production and formulation with different media composition consist of polysaccharides (0.5% and 1% chitin, chitosan and colloidal chitin) to achieve the potential efficacy against *Cydia pomonella.* Later on, with the selected EPF, several environmental conditions (temperature, humidity, CO2, UV spectra) will be simulated and modulated under standardized conditions using a UV environmental simulator. Various natural UV-protectants (lignin alkali, humic acid, sesame oil and green tea) will be experimented to prolong the persistence of EPF spores exposed to UV radiation not only in the laboratory, but also in the field. These findings serve as the basis for enhancing the efficacy of EPF treatments that maintain their good biological activity even in complex agro-ecosystems.

A suitable formulation is also to be found that stabilizes the EPF product in order to ensure its effectiveness under various environmental conditions for a defined period. In addition, these findings can be used to better estimate the consequences of climate change.

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46-2 - A split-root setup to study local and systemic interactions between rhizospheric entomopathogenic fungi and oilseed rape pests and diseases

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