

Poster

Endophyten

100 - Production of bioinsecticides with endophytes isolated from a tropical tree: first results

Produktion von Bioinsektiziden mit Endophyten isoliert aus einem tropischen Baum: erste Ergebnisse

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Today a lot of agrochemical and pharmaceutical compounds from plants are obtained via complex extractions in low concentrations. Due to the fact that plants contain endophytes, it can be hypothesized that some of these compounds are directly produced by endophytes. This offers new ways to produce chemical insecticides and antibiotics. An endophyte-containing tree produces insecticidal metabolites and therefore, this tropical tree shows an array of negative effects on insects including ovipositor deterrent, anti-feedant and other inhibitory activities. In a recently granted BMBF project we will examine the endophyte biodiversity in this tree, whether endophytes produce this bioinsecticide directly or associated with the plant metabolism and if so, how this secondary metabolite can be produced in a liquid culture. Based on these findings, an in vitro mass-production process in a 2 L stirred tank reactor will be developed (Figure 1).

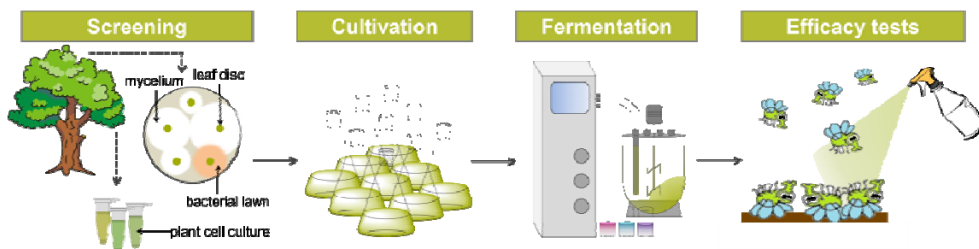


Fig. 1 Isolation of endophytes, cultivation in shake flasks, scale-up of the process to a 2 L stirred tank reactor and efficacy test on insects.

In total, 230 endophytes (91 bacteria and 139 fungi) were isolated from seeds, leaves, stems and roots of 16 tree samples. From 8 different German breedings 107 endophytes were isolated (leaves: 24 bacteria and 9 fungi, stems: 34 bacteria and 2 fungi, roots: 20 bacteria and 18 fungi). Samples from India yielded 65 endophytes (Seeds: 7 bacteria and 25 fungi, leaves: 21 fungi, stems: 6 bacteria and 31 fungi). Only fungi were obtained from Myanmar samples (seeds: 33 fungi).

Then, endophytic fungi and bacteria were cultivated in Sabouraud dextrose and in potato dextrose liquid media for 14 days at 25°C. Terpenoid secondary metabolites that indicate the production of bioinsecticides that so far have been thought to be produced by the tree were detected in the culture broth of one bacterium and three fungi with HPLC-DAD. Furthermore, we will present first data on classification of the endophytes, screening for technical media, identification of metabolites by HPLC-DAD-MS/MS and high sensitive bioassays with insects (*Agrotis segetum*), nematodes (*Caenorhabditis elegans*) and insect cell culture (SF9).