Scaling study for obtaining microbiological fertilizers and plant protection products in depth and surface cultivation processes, no. 1.1.1.1/19/A/150

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Trichoderma spp. extraction in the process of depth cultivation

Depth cultivation experiments on the scale of a 5 L bioreactor have been started. 3-4 selected medium in which further work off process parameters as the oxygen level in the culture medium (DO) mixing shovel type (Rushton or propeller type) mixer rotation speed, pH and temperature. A series of experiments were performed in all study mediums under gentle mixing conditions (propeller type turbines and low rotational speeds). To ensure a sufficient level of DO, experiments with limited energy / C-source supply were initiated. Standard analyzes were performed on the samples: measurements of cell dry matter concentration, CFV concentration and antifungal activity. Experiments with more intensive mixing are planned for the next quarter to ensure higher DO levels during cultivation. An experimental plan for the study of deep cultivation culture storage has been drawn up.

Trichoderma spp. extraction in the surface (solid phase) cultivation process

An experimental plan for solid phase cultivation processes has been prepared. Developed 5L solid phase cultivator based on Raimbault column principles. The parameters of the experimental plan work and process evaluation have been determined. Technical preparations have been made to ensure the recording of process temperature and flue gas analysis (CO2 / O2) data. For wheat bran, the physical parameters are water content, water absorption capacity and the required wetting rate. In the future, it is planned to perform solid phase cultivation experiments using *Trichoderma spp.* microorganism with wheat bran and pea bran with different degrees of aeration and initial moisture levels of the substrate.

Bacillus spp. extraction in the depth cultivation process

An in-depth study of the scientific literature is carried out on the properties of *Bacillus subtilis*, mechanisms of action, aspects of cultivation, formulation of microbiological preparations and their mechanisms of action in nature. The collected information has been used to compile / adjust the experimental plan of the respective project activity, as well as will be used in the development of the scientific publication. The theoretical acquisition of the necessary planned experimental analyzes of *Bacillus subtilis* cultivations has also been implemented, incl. development of protocols for analysis. An in-depth analysis of the medium compositions described in the scientific literature has been performed, the results and cultivation conditions have been summarized, which has allowed the identification of effective cultivation protocols on an industrial scale. In the next activities, it is planned to carry out flask / bioreactor experiments with the aim to check and compare the efficiency of the identified cultivation protocols, as well as to evaluate the efficiency of the medium made of local food production and agricultural by-products.