



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

Cultivation experiments were performed in two different mediums with more intensive mixing. As a result, it became possible to keep the dissolved oxygen (DO) above 30% during the process. As a result, elevated levels of chlamydo spores were observed in one of the mediums. This strategy is planned to be tested in all previously selected mediums. The level of energy / C-source was also varied in the experiments.

An experiment was performed to determine the viability and activity of *T. asperellum* biomass (paste). The viability and topsoil activity of *T. asperellum*, treated with various chemicals, at different times were determined, and the biomass was microscopied and photographed. The antifungal effect of *T. asperellum* biomass and its persistence against phytopathogenic fungi of *Fusarium graminearum* at different times were analyzed. The area of the colonized surface of *T. asperellum* and *F. graminearum* on the plate was measured with *Malt Extract* (ME; Biolife, Italy). Further studies are planned to further analyze the viability of differently treated *T. asperellum* biomass.

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

Solid phase cultivation experiments were performed with 100% wheat bran substrate using a previously made static, vertical aerobic solid phase cultivator. Two solid phase experiments were performed using *Trichoderma spp.* an inoculant with a moisture content of different substrates in each of the experiments at constant aeration and inoculum volume to determine the cumulative microbiological activity in the sample after (CO₂ / O₂) production / consumption. Final processing of solid phase culture data process data has been performed and factors that increase microbiological activity in solid phase culture have been identified. Further, solid-phase cultivation experiments with pea bran admixture of wheat bran and determination of physical parameters of pea bran are planned.

Bacillus spp. extraction in the depth cultivation process

A series of experiments are performed in flasks to obtain the optimal medium composition, which is suitable for cultivation processes in laboratory and pilot-scale bioreactors. The medium contains industrial reagents such as molasses and soy flour. Based on the obtained results, it has been decided to perform experiments with other flours as well - pea and bean flour, which are locally sourced raw materials. The experimental results are analyzed by accumulating data on changes in optical density over time, the number of colony forming, incl. vegetative cells and spores, etc. methods.



I E G U L D Ī J U M S T A V Ā N Ā K O T N Ē

The suitability of the respective optimal composition medium for cultivation in the bioreactor, determined by flask experiments, was tested. The cultivation process was carried out without additional substrate feeding in a 5L mixing bioreactor and after 48 hours the result was obtained - $1.4 \cdot 10^9$ CFU / ml and $8.38 \cdot 10^8$ spores / ml. The data obtained during the cultivation process on cell biomass growth, spore formation, agitator speed range and aeration will be used in further experiments.