

Determination of the parameters of the submerged cultivation of micromycete *Trichoderma asperellum* VKPM F-1323 for obtaining spore forms of culture

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Abstract

The basic physical parameters of the cultivation of micromycete *Trichoderma asperellum* VKPM F-1323 are determined on complex nutrient media. The choice of the object of study was due to its antagonistic activity with attitude to many phytopathogenic fungi such as *Ascochyta pisi*, *Cercospora beticola*, *Claviceps purpurea*, *Sclerotinia sclerotiorum*, *Alternaria alternata*, *Botrytis cinerea*, *Fusarium graminearum*, *Passalora fulva*, *Verticillium dahliae*, as well as growth-stimulating activity with attitude to plants, suggesting a motivation for the use of *Trichoderma asperellum* VKPM F-1323 as the basis for biological products used in agriculture.

During the experiment, the nutrient medium composition (g/l) was used: molasses – 20, yeast extract – 7, NaNO₃ – 2, K₂HPO₄ – 1, KCl – 0.5, MgSO₄ – 0.5, FeSO₄ – 0.01. Before sterilization, the pH was adjusted to 7.5. Cultivation was carried out at a temperature of 27 °C with constant stirring and aeration in autoclaved laboratory fermenters with a working volume of 2l. The cultivation of micromycete in a liquid nutrient medium was chosen in connection with the rapid progress of the process. In addition, unlike solid-phase cultivation, the deep one allows accumulating in the finished product form numerous secondary metabolites with antagonistic activity against phytopathogens, as well as growth-stimulating activity with attitude to plants.

In the work, the values of mixing speed, aeration intensity, and initial pH of the medium are determined, which determine the maximum productivity of the process according to the conidia concentration (titer) of the studied culture. During the cultivation process, the pH level was monitored without maintaining it during the process, since it is known that a change in pH values characterizes the course of the cultivation process with the formation of spore forms, and the initial pH value is an important factor in the conidia formation of *Trichoderma* fungi. It is shown that during cultivation for 72 hours the maximum concentration of conidia is achieved for a stirring speed of 700 rpm, without reflective baffles (chippers) in the design of the fermenter, aeration intensity of 0.25 l/l of medium×min and the initial pH of the nutrient medium 7.0. Subject to the above conditions, the concentration of conidia is 1.35 ± 0.09 conidia/ml.

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