

# EVALUATION OF THE RELATIONSHIP OF ONTOGENETIC PROCESSES IN THE MYCELIUM OF CELLULOSOLITIC AND LIGNOLYTHIC FUNGI WITH THE METHOXYL GROUPS CONTENT IN THE SUBSTRATE

G. V. Ilyina<sup>1</sup>, D. Yu. Ilyin<sup>2</sup>, A. A. Vorobieva<sup>3</sup>, A. R. Dashkina<sup>4</sup>

Penza State Agrarian University, 30 Botanicheskaya street, Penza, 440014, Russia

<sup>1</sup>ilyina.g.v@pgau.ru, <sup>2</sup>ilyin.d.u@pgau.ru, <sup>3</sup>vorobieva.a.a@pgau.ru, <sup>4</sup>albinadashkin99@gmail.com

**Abstract.** *Background.* The study of the role of the environment in implementing the ontogenetic program of organisms is an important aspect of modern ecology. Of particular interest is the study of the effect of trophic components of the nutrient substrate on metabolic processes and the rate of development of microorganisms, in particular, the role of lignin destruction intermediates as a regulator of metabolic processes and the development of cellulose and lignolytic fungi. The aim of the research was to study the role of methoxyl groups of lignin as a factor stimulating the transition to the stage of secondary metabolism and teleomorphism in fungi of various groups. *Materials and methods.* To achieve this goal, a series of laboratory experiments was carried out with mycelial cultures of fungi of various systematic groups with complexes of cellulose- and lignolytic enzymes. Works with fungal cultures were carried out according to generally accepted methods. The experiments were carried out using Klasson's lignin percolates. Determination of the content of ergosterol in the mycelium was carried out by gas chromatography. The ability of basidiomycetes to form a teleomorph was studied under sterile conditions. *Results.* The conducted studies made it possible to establish the features of the effect of the methoxyl groups of lignin introduced into nutrient media on the growth, development, and synthesis of ergosterol by mycelium. The results were obtained, indicating the stimulation of the transition of mycelial cultures to secondary metabolism due to the indicated components of the medium. The established facts of stimulation of ergosterol synthesis by mycelium, as well as the manifestation of characteristic morphological features, the biochemical equivalent of which is secondary metabolism, indicate the role of methoxyl groups as inducers of the onset of the reproductive phase of culture. The formation of developed fruiting bodies in basidiomycetes, as well as differentiated primordia on substrates enriched in methoxyl groups, indicates that these lignin components (the concentration of which is noticeably higher in wood that has already undergone degradation processes in nature) can serve as fruiting factors not only in artificial, but also in natural conditions. *Conclusions.* Such components of lignin as methoxyl groups can affect the rate of development and metabolic processes of the mycelium of destructor fungi. The established facts of stimulation of ergosterol synthesis by mycelium, as well as the manifestation of characteristic morphological features, the biochemical equivalent of which is secondary metabolism, indicate the role of methoxyl groups as inducers of the onset of the reproductive phase of culture.

**Keywords:** lignin, fungal metabolism, methoxyl groups, mycelial culture ontogeny, secondary metabolism, teleomorph

**For citation:** Ilyina G.V., Ilyin D.Yu., Vorobieva A.A., Dashkina A.R. Evaluation of the relationship of ontogenetic processes in the mycelium of cellulolytic and lignolytic fungi with the methoxyl groups content in the substrate. *Russian Journal of Ecosystem Ecology*. 2021;6(4). (In Russ.). Available from: <https://doi.org/10.21685/2500-0578-2021-4-4>