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Physiology and Biochemical Aspects of the Edible and Medicinal Mushroom *Lentinus edodes* (Berk.) Sing. Strains Growing on Grape Pomace Extract

Nina A. Bis'ko,[1] Asya S. Buhalo,[1] Irina A. Dudka,[1] Larisa P. Dzygoon,[2] Irina R. Klechak,[2] and Vita M. Linovitska[2]

[1]N. G. Kholodny Institute of Botany, National Academy of Science of Ukraine, 2 Tereshchynkivska Str., Kiev, 01601 Ukraine, and [2]NTUU "KPI", Faculty of Biotechnology and Biotechnique, 37 Peremogy Ave., Kiev, Ukraine

Ecologically Higher Basidiomycetes are considered saprophytes lacking chlorophyll. Specific substrates of these mushrooms are wood and plant wastes. Among these groups of mushrooms, of special interest are wood-destroying Basidiomycetes—fungi of wood white-rot because they are able not only to hydrolyze the cellulosic and pectic parts of the substrate but also to oxidize lignin.

For this reason investigation of its physiology and biochemical properties is a prerequisite for creation of waste management technologies. These technologies are orientated both toward producing different enzymes, rich in mushroom proteins biomass, and utilization of lignocellulosic wastes.

Of particular interest is the mushroom *Lentinus edodes* (Berk.) Sing., which has immunologic, antitumor, as well as other successful properties. Great food value and pharmacological properties of *L. edodes* have generated interest in design of cultivation technology on a base of different lignocellulosic substrates including solid and liquid winemaking wastes.

This work is devoted to studying the particulars of growth physiology, consumption of ingredients of the nutrient medium, and activity of enzymatic complexes by Higher Basidiomycetes. The mushrooms were cultivated on a nontraditional substrate—grape pomace extract. Screening criteria for 19 strains were maximum biomass and activities of hydrolytic enzymatic complexes.

Maximum biomass ranges from 0.99 (366 str.) to 4.08 (351 and 353 str.) g/dm^3. In most cases the activity of enzymes was similar in all strains.

Four strains were selected: 352 (high-level activity of proteinase and monophenolmonooxygenase), 360 [high-level activity of carboxymetyl cellulase (CMC)], 364 (high-level activity of CMC and endo-1,4-β-glucanase), 374 (maximum biomass and maximum activity of monophenolmonooxygenase).

The enzyme activities and maximum biomass of selected strains grown on two substrates were compared. The substrates were extract of grape pomace and optimized nourishing medium. The composition of the substrate was: dry residuum—15.9 g/dm^3; diammonium phosphate—1.8 g/dm^3; dry grape pomace—1.8 g/dm^3; pH 4–5.

It was determined that activities of cellulolytic, pectolytic, and proteolytic enzymes are 1.6–3.5 times higher and the activity of oxidative enzymes is suppressed. The latter effect probably resulted from the addition of a nitrogen source to the nourishing medium.

The results obtained gave us the possibility of substantiating the technology of producing of physiologically active mycelium of the Higher Basidiomycetes *L. edodes* using grape pomace extract.

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