

Biologically Active Substances of Mycelia and Fruiting Bodies of Mushrooms *Lentinus* Fr. and *Pleurotus* (Fr.) P. Karst.

Valentina G. Babitskaya, Tatiana A. Puchkova, Victor V. Scherba, and Olga V. Osadchaya

Institute of Microbiology, National Academy of Sciences of Belarus, 2 Kuprevich Str., Minsk 220141, Belarus

Lentinus edodes (Berk.) Sing. and *Pleurotus ostreatus* (Jacq.: Fr.) Kumm. are popular cultivated edible mushrooms of high nutritional value and excellent medicinal properties. The mushrooms have been applied in treatment of chronic rheumatism, heart disease, lack of stamina, and other disorders. The immune stimulating properties of *L. edodes* have proven effective in cancer and AIDS treatment.

In most cases biological activity of the mushrooms is associated with polysaccharides. Some strains of the mushrooms studied were able to synthesize up to 3 g/liter of exopolysaccharides. It was found that synthesis and composition of the biopolymers depended on available sources of carbon in the nutrient medium. Exopolysaccharides of both species consisted of galactose, mannose, and glucose, with a prevalence of the latter. The content of individual components varied.

In addition to polysaccharides a number of low molecular weight organic substances reinforce medicinal properties. A higher content of polyphenols and considerably more antioxidant activity was noted in fruiting bodies compared with mycelia extracts and cultural liquid of *L. edodes* and *P. ostreatus*. The antioxidant effect of phenolic substances may be related to their ability to neutralize active oxygen forms and bind iron ions. Infraed spectra of some substances from fruiting bodies and mycelium extracts showed

that they include mainly phenolic, carbonyl, and methoxyl groups. The effect of the fruiting body extracts of *P. ostreatus* was similar to the antioxidant activity of ascorbic acid and niacin.

Differences in antioxidant activity between the extracts of fruiting bodies, mycelium, and cultural liquid may also be related to different fatty acid compositions of lipids. Investigation of the fatty acid composition of the lipids extracted from fruiting bodies and mycelia of *L. edodes* and *P. ostreatus* indicated that the content of unsaturated fatty acids in fruiting body extracts was higher than in mycelium and cultural liquid extracts (the unsaturated fatty acids predominated over the saturated in all samples). The content of linoleic acid was highest in lipids of mycelia and fruiting bodies of *P. ostreatus* as well as in fruiting bodies of *L. edodes*. In contrast, oleic acid dominated in the lipid composition of *L. edodes* mycelium.

The mycelial proteins of the species studied showed a higher content of total essential amino acids compared to those of fruiting bodies. They differed from plant proteins in a high content of lysine. The sulfur-containing amino acids (leucine and isoleucine) were mainly responsible for decrease of biological value of proteins in fruiting bodies and mycelia of *P. ostreatus* and *L. edodes*. At the same time, the proteins were rich in the aromatic amino acids phenylalanine and threonine.