

## Nutritional and Medicinal Benefits of *Pleurotus ostreatus* (Jacq.: Fr.) Kumm. Submerged Cultures

Elvira F. Solomko

N. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, 2 Tereshchenkivska Str., Kiev 01601, Ukraine

Production of food protein and mushroom products from the large quantity of carbohydrate waste is creating worldwide interest. The problem of food and dietary supplements production from waste involves economic, technological, and medico-biological aspects. The edible and medicinal mushroom genus *Pleurotus* is especially highly acclaimed for its nutritional and pharmacological value and economic advantages. Polysaccharides isolated from mycelia and cultural broth *Pleurotus* species have shown anti-tumor, antiviral, and other activities. As a matter of course, in this case it is necessary to use sterol-submerged conditions for the organism growth.

Using 3l and 10l fermenters we investigated the growth parameters and factors affecting the biomass yield, chemical composition, and extracellular metabolite production of *P. ostreatus* (Jacq.: Fr.) Kumm. in submerged conditions. As a result, complex and chemically defined nutrient media for laboratory and pilot-scale cultivation were optimized and proposed. A method for estimating the effectiveness of the complex nutrient media was devised. It ensures the accumulation of 16–18 g of dry biomass per liter during 4–5 days of cultivation.

Some technological investigations were carried out in stainless steel fermenters LKB "Electrolux," and some in the pilot-scale 240- and 630-liter fermenters. The effect of seed homogeniza-

tion and factors affecting the structure of pellets were defined. During cultivation the following parameters were monitored: pH, temperature, velocity of stirrer revolution, aerating air inlet, and partial pressure of dissolved oxygen. The obtained data were used to elaborate the process. The technological aspects of large-scale production of mushroom biomass were solved.

The medico-biological aspects of the problem deal with the chemical composition of nutrients, nutritional and biological value, color, taste, and safety of dry mushroom powder, produced by nontraditional technology. The results of 5-year estimations in animal experiments showed the safety of this mushroom product and its antisclerotic and radioprotective actions.

The dry biomass is a standardized biotechnological product obtained in sterile conditions in liquid nutrient media. A well-balanced amino acid composition, complex of B vitamins, macro- and microelements, and other biologically active compounds make the biomass of *Pleurotus ostreatus* suitable as food additive, or dietary supplement. Depending on the technology, some fermentation byproducts, such as extracellular polysaccharides, may be extracted from liquid broth. The antitumor and interferon induction effects of extracellular polysaccharides of *P. ostreatus* were determined.