

Studies on Medicinal Mushrooms at the National Ukrainian Culture Collection

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Special culture collections today constitute the important condition for carrying out fundamental studies and biotechnological applications of medicinal mushrooms. About 350 species (800 strains) of mushrooms including more than 100 species with known medicinal properties are maintained at the Culture Collection of mushrooms of N. G. Kholodny Institute of Botany of the National Academy of Sciences of Ukraine. Special attention is paid in the collection to the creation of taxonomic and strain diversity. Species of the genera *Pleurotus*, *Lentinula*, *Agaricus*, *Flammulina*, *Ganoderma*, *Grifola*, *Hericium*, *Piptoporus*, *Marasmius*, *Oudemansiella*, *Coprinus*, *Lycoperdon*, *Cyathus*, *Hypsizygus*, *Omphalotus*, *Schizophyllum*, *Trametes*, *Suillus*, and others, including strain diversity, are represented in the collection. Methods of obtaining and storing pure cultures of various taxons and ecological groups of mushrooms were improved. The stepped screening program was worked out and includes determination of morphological peculiarities, parameters of mycelial growth on various nutrient media and at the temperature interval 4–37°C, and production of enzymes and other biological active substances. Morphological characteristics of mycelial colonies and their variability depending on different cultivating conditions are described. Enzyme and chemical tests in mycelial colonies were investigated. The influence of the cultivating period on growth and morphological characteristics in some species was also studied. The morphology of mushrooms in pure culture is studied; information is insufficient on what leads to mistakes in the interpretation of the taxonomic

status of cultures. Microstructures of vegetative mycelium in about 100 species were studied using scanning electron microscopy. It was shown that for establishing the taxonomic characteristics of cultures the following morphological criteria should be considered: presence, position, and shape of clamp connections; type of anamorph (arthroconidia, blastoconidia, coremia, etc.); special hyphal structures (crystals, spines, hairs, etc.); growth rate; color; morphology; and enzymatic reactions of fungal colonies. New data were obtained on microstructures in cultures of medicinal mushrooms (*Hericium erinaceus* (Bull.: Fr.) Pers., *Grifola frondosa* (Dicks.: Fr.) S. F. Gray, *Hypsizygus marmoreus* (Peck) Bigel., *Lepista nuda* (Bull.: Fr.) Cke, *Coprinus comatus* (Müll.: Fr.) S. F. Gray, *Piptoporus betulinus* (Bull.: Fr.) S. F. Gray, *Pleurotus* spp., *Auricularia* spp., *Agaricus* spp., etc.). Morphogenesis of a wide range of species has been studied in submerged culture. It was stated that under submerged cultivation the type of vegetative and asexual reproduction was similar to that which was observed on agar media. It has been proved that the hypotheses of some authors on basic morphological changes in mycelial morphology under submerged cultivating conditions and the appearance of uncharacteristic sporulations are erroneous. Strains of medicinal mushrooms that are promising for biotechnological application in the Ukraine as producers of fruiting bodies, biomass, and metabolites were selected. The original technology to obtain in submerged culture the biomass of *Pleurotus ostreatus* (Jacq.: Fr.) Kumm. with medicinal properties was created.