Fruiting Body Quality and Phenoloxidases of Edible and Medicinal Mushroom *Hericium erinaceus* (Bull.: Fr.) Pers.

Andrej Ph. Grygansky,[1] Hans-Peter Molitoris,[2] and Burkhard Kirchhoff[3]

[1]N. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, 2 Tereshchenkivska Str., 01601 Kiev, Ukraine; [2]Botanical Institute, University of Regensburg, Universitatstr. 31, 93040 Regensburg, Germany; and [3]WESER-CHAMPIGNON, Neue Heerstr. 35, 31840 Hessisch-Oldendorf, Germany

Cultivation trials of 14 heterocaryotic strains of the edible and medicinally relevant mushroom *Hericium erinaceus* (Bull.: Fr.) Pers. have shown a large variation in yield, quality, and color of the fruiting bodies. To determine the reasons for different fruiting body colors, phenoloxidases in the vegetative mycelium on agar and liquid media were investigated. It was shown that the color of the fruiting bodies correlates with the presence and activity of laccase. The results obtained on the agar medium correspond generally with those in liquid culture. Temperature treatment (10 min at 60°C) of enzyme solutions did not destroy the laccase. It may be speculated that the laccase of *H. erinaceus* is more thermostable than in other mushrooms.

There is no correlation between fruiting body color and presence of tyrosinase, responsible for browning of white button mushroom fruiting bodies, *Agaricus bisporus* (J. Lge) Imbach.

For production of white fruiting bodies of *Hericium erinaceus* it is recommended that strains be used in which laccase activity in liquid culture (culture filtrate or mycelial extract) is below 0.6 E/ml (in this study strains He1, He2, He6, He8, He9, and He13). An easy way to determine laccase activity would be to use qualitative tests with guajacol in an agar medium. Strains with low overall laccase activity showed no or only weak enzyme reaction in this test. Four strains of *H. erinaceus* with no or weak enzyme reaction in qualitative tests (He1, He2, He6, and He13) produced fruiting bodies of good quality in cropping experiments. Strains He1 and He2 showed also both rapid mycelial growth and a high yield of fruiting bodies. The latter two strains we therefore recommend for commercial cultivation.

Determination of the presence of laccase during growth on agar media and/or in liquid culture may constitute a good method to select better strains of *H. erinaceus* more suitable for commercial use. These strains should have good growth characteristics and a first grade fruiting body quality. The enzyme tests could also be important in selection and breeding experiments. In future experiments for production of new strains that produce white, and thus high-grade fruiting bodies, the use of homocaryons with low laccase activity could reduce the number of trials and necessary investigations and thereby avoid expensive and time-consuming fruiting body tests.

1521-9437/00/$5.00