Comparative Chromatographic Profiling of Wild and Cultivated Macrocybe Gigantea (Massee) Pegler & Lodge

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Abstract : Macrocybe gigantea was collected from the wild, growing as pure white, fleshy, robust fruit bodies in caespitose clusters. Initially, the few ladies collecting these fruiting bodies for cooking revealed their edibility status, which was later confirmed through classical and molecular taxonomy. The culture of this potential wild edible taxa was raised with an aim of domesticating it. Various solid and liquid media were evaluated for their vegetative growth, in which Malt Extract Agar was found to be the best solid medium and Glucose Peptone medium as the best liquid medium. The effect of different temperatures as well as pH was also evaluated for the vegetative growth of M. gigantea, and it was found that it shows maximum vegetative growth at 30° and pH 5. For spawn preparation, various grains viz. Wheat grains, Jowar grains, Bajra grains and Maize grains were evaluated, and it was found that wheat grains boiled for 30 minutes gave the maximum mycelial growth. Mother spawn was thus prepared on wheat grains boiled for 30 minutes. For raising the fruiting bodies, different locally available agro-wastes were tried, and it was found that paddy straw gives the best growth. Both wilds as well as cultivated M. gigantea were compared through HPLC to evaluate the different nutritional and nutraceutical values. For the evaluation of different sugars in wild and cultivated M. gigantea, 15 sugars were taken for analysis. Among these Melezitose, Trehalose, Glucose, Xylose and Mannitol were found in the wild collection of M. gigantea; in the cultivated sample, Melezitose, Trehalose, Xylose and Dulcitol were detected. Among the 20 different amino acids, 18 amino acids were found, except Asparagine and Glutamine in both wild as well as cultivated samples. Among the 37 tested fatty acids, only 6 fatty acids, namely Palmitic acid, Stearic acid, Cis-9 Oleic acid, Linoleic acid, Gamma-Linolenic acid and Tricosanoic acid, were found in both wild and cultivated samples, although the concentration of these fatty acids was more in the cultivated sample. From the various vitamins tested, Vitamin C, D and E were present in both wild and cultivated samples. Both wild as well as cultivated samples were evaluated for the presence of phenols; for this purpose, eleven phenols were taken as standards in HPLC analysis, and it was found that Gallic acid, Resorcinol, Ferulic acid and Pyrogallol were present in the wild mushroom sample whereas in the cultivated sample Ferulic acid, Caffeic Acid, Vanillic acid and Vanillin are present. The flavonoid analysis revealed the presence of Rutin, Naringin and Quercetin in wild M. gigantea, while 5 Naringin, Catechol, Myrecetin, Gossypin and Quercetin were found in cultivated one. From the comparative chromatographic profiling of both wild as well as cultivated M. gigantea, it is concluded that no nutrient loss was found during its cultivation. An increase in percentage of secondary metabolites (i.e., phenols and flavonoids) was found in cultivated one as compared to wild M. gigantea. Thus, from future perspective cultivated species of M. gigantea can be recommended for the commercial purpose as a good food supplement.

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