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Brown mycelial mat as an essential morphological structure of the shiitake medicinal mushroom lentinus edodes (Agaricomycetes)

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Abstract

© 2017 Begell House, Inc. We show here, to our knowledge for the first time, that the brown mycelial mat of the xylotrophic shiitake medicinal mushroom, Lentinus edodes, not only performs a protective function owing to significant changes in the ultrastructure (thickening of the cell wall, increased density, and pigmentation of the fungal hyphae) but also is a metabolically ac tive stage in the development of the mushroom. The cells of this morphological structure exhibit repeated activation of expression of the genes lcc4, tir, exp1, chi, and exg1, coding for laccase, tyrosinase, a specific transcription factor, chitinase, and glucanase, which are required for fungal growth and morphogenesis. This study revealed the maximum activity of functionally important proteins with phenol oxidase and lectin activities, and the emergence of additional laccases, tyrosinases, and lectins, which are typical of only this stage of morphogenesis and have a regulatory function in the development and formation of fruiting bodies.

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Keywords

Basidiomycetes morphogenesis, Brown mycelial mat, Lectins, Lentinus edodes, Medicinal mushrooms, Phenol oxidases, Ultrastructure

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