Lipid metabolites produced by the selective white rot fungus, *Ceriporiopsis subvermispora*

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Wood biomass, which is a noteworthy resource for recyclable and substitute petroleum, includes polysaccharides (cellulose and hemicellulose) and lignin. For making use of wood biomass as resources, delignification is necessary. A selective lignin-degrading basidiomycete, *Ceriporiopsis subvermispora* is able to degrade lignin in wood without intensive damage of cellulose. During wood decay by this fungus, extensive delignification was observed without penetration of extracellular enzymes into wood cell wall regions [1]. This indicates that *C. subvermispora* has unknown delignification systems catalyzed by low molecular weight metabolites. We demonstrated that *C. subvermispora* produced saturated and unsatulated free fatty acids during the early stage of wood decay. We also isolated a series of novel alk(en)ylitaconates (ceriporic acids) that inhibit cellulose degradation by the Fenton reaction [2, 3]. The objective of this study is to elucidate correlation between fatty acid metabolism and alk(en)ylitaconate biosynthesis. Production of lipid-related metabolites and transcription of fatty acid desaturases (FAD) were investigated.

C. subvermispora was cultured in a liquid medium at 28°C for 1 month. Intracellular and extracellular metabolites were extracted with methanol and methanol/chloroform (1:2) for the metabolite analysis, respectively. Extracts were analyzed by gas chromatography/mass spectrometry (GC-MS) and liquid chromatography/electrospray ionization mass spectrometry (LC-ESI-MS). Transcription of FAD was investigated by reverse-transcription polymerase chain reaction (RT-PCR).

In the present study, linoleic acid production and transcription of Δ9-fatty acid desaturase were increased at an early stage of cultivation, while alkenylitaconate (ceriporic acid C) production was increased after 1 week. These results suggest that the cloned FAD gene was not involved in the ceriporic acid desaturation.

REFERENCES

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