ABSTRACTS (MASTER THESIS)

Screening and characterization of candidate genes involved in the biosynthesis of ceriporic acid B from *Ceriporiopsis subvermispora*, a selective lignin-degrading fungus

(Graduate school of Agriculture, Laboratory of Biomass Conversion, RISH, Kyoto University)

Akito Morita

A white-rot fungus, *Ceriporiopsis subvermispora*, is characterized as one of the best bio-pulping fungi because it can selectively degrade lignin without serious damage to cellulose. This fungus extracellularly produces a series of itaconic acid derivatives, ceriporic acids A-C, having a long alkyl and alkenyl side chain at the C3 position (Figure 1). In particular, ceriporic acid B suppresses iron redox reactions to inhibit the production of cellulolytic hydroxyl radicals by the Fenton reaction [1-2]. However, its biosynthetic pathway remains to be elucidated although its model pathway is proposed [3]. Therefore, it is of interest to characterize the biosynthetic genes of ceriporic acids for the elucidation of the molecular mechanism of the selective lignin degradation. So far, we previously found 10 candidate genes from the genome of *C. subvermispora* and cloned 6 genes of them. In this study, we tried to clone the remaining 4 genes, to express all candidate genes heterologously, and also measure the activities of their recombinant enzymes.

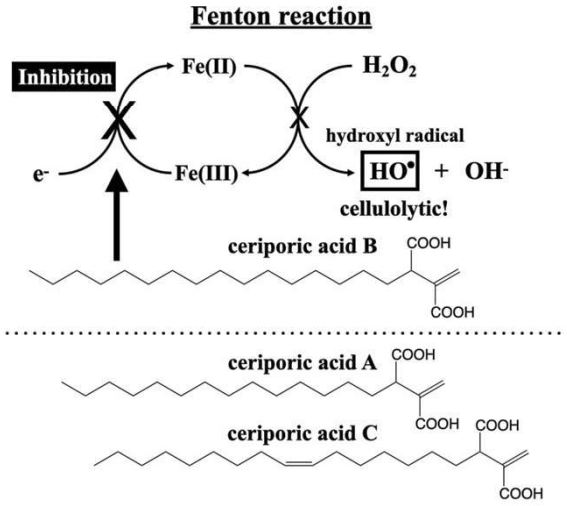

Figure 1. Suppression of the production of cellulolytic hydroxyl radicals by ceriporic acids

References

[1] Watanabe, T., Teranishi, H., Honda, Y., Kuwahara, M., 2002. A selective lignin-degrading fungus, *Ceriporiopsis subvermispora*, produces alkylitaconates that inhibit the production of a cellulolytic active oxygen species, hydroxyl radical in the presence of iron and H_2O_2. *Biochem. Biophys. Res. Commun*. 297, 918-923.

[2] Ohashi, Y., Kan, Y., Watanabe, T., Honda, Y., Watanabe, T., 2007. Redox silencing of the Fenton reaction system by an alkylitaconic acid, ceriporic acid B produced by a selective lignin-degrading fungus, *Ceriporiopsis subvermispora*. *Org. Biomol. Chem*. 5, 840-847.

[3] Gutierrez, A., del Rio, J.C., Martinez-Inigo, M.J., Martinez, M.J., Martinez, A.T., 2002. Production of new unsaturated lipids during wood decay by ligninolytic basidiomycetes. *Appl. Environ. Microbiol.* 68, 1344-1350.