
ABSTRACTS (MASTER THESIS)

Stable-isotope labeling and analysis of extracellular metabolites, ceriporic acids, produced by *Ceriporiopsis subvermispora***(Graduate School of Agriculture, Laboratory of Biomass Conversion, RISH, Kyoto University)****Takaaki Kono**

Wood-rotting fungi are the only organisms that can decompose wood because the lignin in wood cell walls is hard to degrade. Biodegradation of lignin is an essential role and characteristic feature of wood-rotting fungi in the ecosystem. Lignin degradation by fungi is explained as mostly to the fungal enzymatic activity of ligninolytic enzymes. However, not only ligninolytic enzymes but also metabolites secreted by fungi have known to be important in the lignin degradation system.[1,2] Here, we have focused on a wood-rotting fungus, *Ceriporiopsis subvermispora*, which has the ability to decompose lignin in preference to cellulose. Thus, the fungus, *C. subvermispora*, is recognized as a selective lignin-degrading fungus. Previous studies reveal that the importance of secondary metabolites of *C. subvermispora*. [1,2]

Stable-isotope (non-radioactive) labeling has been used to study metabolites of *C. subvermispora* and has been determined the structure and diversity of them.[2] High-resolution mass spectrometry enables the establishment of incorporation of heavy atoms from precursor substrates into different metabolic products. Here, we try to understand metabolic dynamics of extracellular metabolites, ceriporic acids, by stable-isotope labeling experiments. We analyzed intra- and extracellular metabolites and observed several metabolites that can separate as isotopically labeled compounds based on the mass difference.

Acknowledgements

Collaborative programs, Development and Assessment of Sustainable Humano-sphere/Forest Biomass Analytical System (DASH/FBAS), and Analysis and Development System for Advanced Materials (ADAM), of Research Institute for Sustainable Humanosphere (RISH), Kyoto University are acknowledged.

References

- [1] Nishimura, H., Sasaki, M., Seike, H., Nakamura, M., Watanabe, T., “Alkadienyl and alkenyl itaconic acids (ceriporic acids G and H) from the selective white-rot fungus *Ceriporiopsis subvermispora*: a new class of metabolites initiating ligninolytic lipid peroxidation”, *Org. Biomol. Chem.* 10, 6432-6342, 2012.
- [2] Nishimura, H., Murayama, K., Watanabe, T., Honda, Y., Watanabe, T., “Diverse rare lipid-related metabolites including ω -7 and ω -9 alkenylitaconic acids (ceriporic acids) secreted by a selective white rot fungus, *Ceriporiopsis subvermispora*”, *Chem. Phys. Lipids*, 165, 97-104, 2012.