

ABSTRACTS (MASTER THESIS)

**Screening and identification of aldehyde dehydrogenases
in a white-rot fungus, *Ceriporiopsis subvermispora*****(Graduate school of Agriculture, Laboratory of Biomass Conversion,
RISH, Kyoto University)****Junseok Lee**

In these days, an interest in renewable energy becomes higher due to depletion of fossil resources and global warming by greenhouse gas. Many researchers have been focusing on utilizing carbon-neutral wood biomass for conversion to biofuels and valuable chemical products. Wood biomass is mainly composed of cellulose, hemi-cellulose and lignin. Lignin physically surrounds polysaccharides of plant cell wall; therefore, pretreatment steps should be conducted to remove lignin before ethanol production. Throughout the pretreatment process, however, phenolic byproducts—lignin-derived aromatic compounds—are released. Of these compounds, aryl-aldehydes, such as vanillin (Figure 1), are known to inhibit ethanol fermentation and growth rate of yeast. Particularly, this growth inhibition by vanillin is also reported even in various lignin-degrading white-rot fungi [1-2]. However, a selective lignin-degrading white-rot fungus, *Ceriporiopsis subvermispora*, increased growth rate, glucose consumption and lipid biosynthesis in the presence of vanillin [3]. In this study, we tried to screen and identify (aryl-)aldehyde dehydrogenases from *C. subvermispora* as part of the molecular elucidation of its vanillin metabolism.

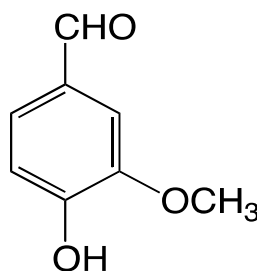


Figure 1. Chemical structure of vanillin

References

- [1] Shimizu, M., Yuda, N., Nakamura, T., Tanaka, H., Wariishi, H., “Metabolic regulation at the tricarboxylic acid and glyoxylate cycles of the lignin-degrading basidiomycete *Phanerochaete chrysosporium* against exogenous addition of vanillin”. *Proteomics* 5, 3919-3931 (2005).
- [2] Nakamura, T., Ichinose, H., Wariishi, H., “Cloning and heterologous expression of two aryl-aldehyde dehydrogenases from the white-rot basidiomycete *Phanerochaete chrysosporium*”. *Biochem. Biophys. Res. Commun.* 394, 470-475 (2010).
- [3] Watanabe, T., Yoshioka, K., Kido, A., Lee, J., Akiyoshi, H., Watanabe, T., “Preparation of intracellular proteins from a white-rot fungus surrounded by polysaccharide sheath and optimization of their two-dimensional electrophoresis for proteomic studies”. *J. Microbiol. Methods* 142, 63-70 (2017).