

## Graduate Student Seminar Series

### “Kinetic Studies of Laccase-Catalysed Reactions”

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#### **Abstract**

Laccases (EC 1.10.3.2) are members of blue multi-Copper oxidases (BMCO), which are mainly produced by fungal species and to a lesser extent by higher plants. They catalyze the oxidation of a wide range of substrates including phenols, alcohols, substituted phenols as well as non-phenolic substrates (in the presence of mediators). Interest on these enzymes increased due to environmental concerns over the use of chlorinated organics for pulp bleaching purposes as well as their applications in various fields such as dye industry, ethanol production and drug analysis. Some compounds are however found to inhibit their catalytic efficiency. The Lineweaver-Burk plot, which is a modified form of the Michaelis-Menton equation for enzyme kinetics is an important tool for analyzing kinetic data and investigate enzyme inhibition. In this project, we are studying the kinetics of laccase-catalysed reactions in the presence of some non-reducing sugar molecules and determine the effect of these lignin fragments in the catalytic efficiency of this biological catalyst.

#### Selected References:

- Piontek, K., Antorini, M., Choinowski, T. (2002). Crystal Structure of a Laccase from the Fungus *Trametes versicolor* at 1.90- Å Resolution Containing a Full Complement of Coppers. *The Journal of Biological Chemistry*, 277(40), 37663-37669.
- Bourbonnais, R., Leech, D., Paice, M.G. (1998). Electrochemical Analysis of The Interactions of Laccase Mediators with Lignin Model Compounds. *Biochim. Biophys. Acta*, 1379, 381-390.
- Mayer, A.M., Staples, R.C. (2002). Laccase: New Functions for an Old Enzyme. *Phytochemistry*, 60, 551-565.
- Xu, F. (1996). Oxidation of Phenols, Anilines, and Benzenethiols by Fungal Laccases: Correlation Between Activity and Redox Potentials as well as Halide Inhibition. *Biochemistry*, 35, 7608-7614.