

JOINT EVENT

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Exploring unique compounds from lignin degradation using mutated DyP-type peroxidase enzymes**Sharon Mendel Williams**
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Lignin is an organic polymer found in the cell walls of plants. Lignin can be used to create biofuels, or used as an organic hydrocarbon source for a large variety of chemicals and polymers. However, lignin is very robust and current industrial processes for using it are inefficient. Therefore, a useable biological process for degrading lignin would be of great benefit. Microbial degradation of lignin has been mainly studied in basidiomycete fungi: white-rot fungi such as *Phanerochaete chrysosporium* produce extracellular lignin peroxidase and manganese peroxidase enzymes that can oxidize lignin and some fungi produce extracellular lactases that can also attack lignin. Despite reports of bacterial oxidation of lignin until recently the enzymology of bacterial lignin breakdown was poorly understood. Using a colorimetric assay method, it has been reported a screening method for isolation of lignin-oxidizing bacterial strains from environmental soil samples. In the current project DyP-type peroxidases from gram-negative *Pseudomonas fluorescens* Pf-5 and different mutants were created around the Mn active site and cloned into *E. coli*. The expressed enzymes were purified and characterized and the kinetic parameters were measured with different substrates. Other reaction compounds were tested after mixing with lignin, hard wood and soft wood. The reaction compounds were analyzed by reverse phase HPLC/GC-MS. Some interesting results have been observed and will be presented in the conference. The goal is to improve the effectiveness of the enzymes, increase the production of the enzymes, or degrade the lignin into different and more useable compounds. Any of these goals would be of valuable scientific and commercial benefit.

Biography

Sharon Mendel Williams has joined Coventry University as a Lecturer in the School of Life Sciences in 2014. She has worked as a Post-doctoral Research Fellow in both departments of Chemistry and Biology at Warwick University. Her research focuses on biophysics and biochemistry of proteins, and understanding the mechanisms of enzymes. She has a wide range of experience in molecular biology, biochemistry and chemistry. She is a Member of the Royal Society of Chemistry and has been awarded a grant from the RSC research fund to accomplish her research work.

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