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Exploring unique compounds from lignin degradation using MnSOD and DyP-type peroxidase enzymes

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Lignin is an organic polymer found in the cell walls of plants. Lignin can be used to create biofuels, or 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. Understanding the pathway of lignin degradation, and the byproducts, is essential in order to be able to exploit the use of micro-organisms. Furthermore, we can characterize novel bio-products obtained by enzymatic oxidation of lignin, which could have very interesting applications for industrial biotechnology. In the current project, DyP-type peroxidases from Gram-negative *Pseudomonas fluorescens* Pf-5 and recombinant *Sphingobacterium* MnSOD1 and MnSOD2 cloned into *E. coli* and were investigated. These are bacterial enzymes that are already known to degrade lignin. Different genetic mutations were introduced, and the resulting enzymes were characterized by using them with different lignin substrates. The reaction compounds were analyzed by reverse phase HPLC/GC-MS. The goal is to improve the effectiveness of the enzymes, increase the production of the enzymes and 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 joined Coventry University as a Lecturer in the School of Life Sciences in the year 2014. She has worked as a Post-doctoral Research Fellow in both departments of Chemistry and Biology, 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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