Identification of Enzymes that Produce Acylated Monolignols: Progress in the Pursuit of Zip-Lignin™

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Project Goals: The project is aimed at overcoming the recalcitrance of biomass toward processing by altering lignin composition and structure.

Lignin is an essential polymer in plant cell walls, providing structural support to cells, strength to stems, lining to the vascular system, and many other functions. However, the strong interunit linkages in lignin and its cross-linking with other plant cell wall polymers make it the most important factor in the recalcitrance of lignocellulosic biomass to processing and enzyme digestion. Plants make lignin from a variety of monolignols including *p*-coumaryl alcohol, coniferyl alcohol, and sinapyl alcohol. We have previously shown that the inclusion of a Zip-lignin™ replacement monomer, that is, a monomer conjugate such as coniferyl ferulate that introduces readily cleavable ester bonds into the lignin backbone, allows significantly decreased processing severity. Here we report our efforts on identifying genes producing transferase enzymes that produce acylated monolignols, and toward engineering plants to contain Zip-lignin™.

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