



Zip-Lignin™ Assay: An Analysis and Validation Tool

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WARF: P150118US02

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method for quantifying the amount of Zip-lignin molecules in biomass.

Overview

To produce pulp from wood, harsh chemicals are applied during cooking and bleaching mainly because lignin is tough to break down. To make it easier to degrade, Wisconsin researchers discovered how chemically reactive bonds can be introduced into the lignin backbone through genetic modification. This pioneering concept has been produced and patented as Zip-lignin™ hybrid poplar and may be extended to other plant species (for more detail see WARF reference number [P100225US02](#)).

One difficulty in validating this technology has been showing that the modified Zip-lignin molecules are present in the transformed plants – the levels are too low for existing detection methods.

The Invention

The researchers have now developed the most sensitive assay to date for detecting and quantifying Zip-lignin monomers in plants. They modified an existing lignin assay known as DFRC (Derivatization Followed by Reductive Cleavage) that has been in use for almost a decade. They incorporated several new features to improve the sensitivity of the assay, including extended incubation periods and an additional purification step.

The modified DFRC assay is currently the only known technique capable of determining levels of monolignol ester conjugates in plant lignin.

Applications

- Analysis and validation of Zip-lignin technology

Key Benefits

- First and most sensitive assay of its kind

Stage of Development

The researchers have shown that the new assay can distinguish changes in the amount of monolignol *p*-coumarate conjugates in the lignin of *Brachypodium distachyon* as a function of *p*-coumaroyl-CoA:monolignol transferase (PMT) activity. The strategy also was shown to distinguish levels of monolignol ferulate conjugates incorporated into Zip-lignin poplar.

Additional Information

For More Information About the Inventors

- [John Ralph](#)

Related Technologies

- [For more information on Zip-lignin technologies available for licensing please also see:](#)
- [WARF reference number P100281US02, which describes the *Angelica sinensis* gene that makes lignin easier to process.](#)
- [WARF reference number P100281US03, which describes a transgenic poplar containing that gene sequence.](#)

Tech Fields

- [Clean Technology : Biobased & renewable chemicals & fuels](#)
- [Research Tools : Detection](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854