



## Lignin from Transgenic Poplar Is Easier to Process

[View U.S. Patent No. 9,487,794 in PDF format.](#)

**WARF: P100281US03**

Inventors: John Ralph, Curtis Wilkerson, Saunia Withers, Shawn Mansfield

**The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a method to modify fertile poplars and other plants to contain feruloyl-CoA:monolignol transferase, making them easier to digest and ferment.**

### Overview

Lignin is an important plant cell wall component that provides structural support and vascular functions. It is one of the most abundant organic polymers on Earth, constituting about 30 percent of non-fossil organic carbon. However, the chemical structure of lignin is difficult to break down by chemical and enzymatic means, posing a challenge to bioenergy processing and papermaking.

An enzyme called feruloyl-CoA:monolignol transferase (FMT) has been found and isolated from the *Angelica sinensis* plant. It is known that this enzyme produces chemicals that weaken lignin structures. Genetically engineering other species to contain this enzyme could lead to more easily digested and fermented plant matter.

### The Invention

UW-Madison researchers and others have developed genetically modified poplars with lignin that is less resistant to alkaline degradation.

Having previously identified and isolated the gene for FMT, the researchers introduced the nucleic acid sequence into poplar tissue. The enzyme produced lignin rich in monolignol ferulates, including coniferyl ferulate and sinapyl ferulate. The transformed lignin thus contained ester bonds that cleaved under relatively mild ammonia conditions.

The poplar cells were modified using standard genetic techniques.

### Applications

- Conversion of poplar and lignocellulosic biomass for biofuels and industrially important chemicals
- Production of pulp for papermaking

### Key Benefits

- Poplar lignin is easier to break down.
- Plants are fertile and pass FMT gene to next generation.
- Lignin exhibits up to 30 percent increase in monolignol ferulate content.

### Stage of Development

The development of this technology was supported by WARF Accelerator. WARF Accelerator selects WARF's most commercially promising technologies and provides expert assistance and funding to enable achievement of commercially significant milestones. WARF believes that these technologies are especially attractive opportunities for licensing.

## Additional Information

### For More Information About the Inventors

- [John Ralph](#)

### Related Technologies

- [For more information about FMT transgenic plants for bioenergy and papermaking, see WARF reference number P100281US02.](#)

### Tech Fields

- [Clean Technology : Biobased & renewable chemicals & fuels](#)
- [Clean Technology : Energy storage, delivery & resource efficiencies](#)

For current licensing status, please contact Jennifer Gottwald at [jennifer@warf.org](mailto:jennifer@warf.org) or 608-960-9854