

PROJECT FACTS

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National Science
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PROJECT VALUE

\$ 1,984,322

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BIOFUELS & ENVIRONMENTAL CATALYSIS

Lignin Deconstruction for the Production of Liquid Fuels

Given the promise of biofuels derived from plant material, it is important to find creative and efficient ways of utilizing all of the potential energy sources contained within this form of biomass. Lignin, one of the three primary constituents of most plant material, is still relatively poorly understood and is highly resistant to deconstruction by chemical means. As the biofuels industry continues to grow, huge quantities of waste lignin will begin to be produced unless effective methods of using this material are found. Despite its recalcitrance, lignin contains component monomers that could potentially function as platform molecules for the synthesis of high-value chemicals, in addition to liquid fuels.

At its core, this project has three primary goals which require the cooperation of a number of scientific disciplines. At the biological level, lignin-containing plants will be bio-engineered to maximize biomass output, maximize lignin production, and produce lignin which is less resistant to deconstruction. Second, the chemical make-up of lignin will be studied in detail both to facilitate the production of chemicals and fuels, and also to help guide the bio-engineering aspects of this project. Finally, several approaches for lignin conversion will be studied to find cost-effective and energy-efficient procedures for producing high-value products from this abundant and underutilized material.

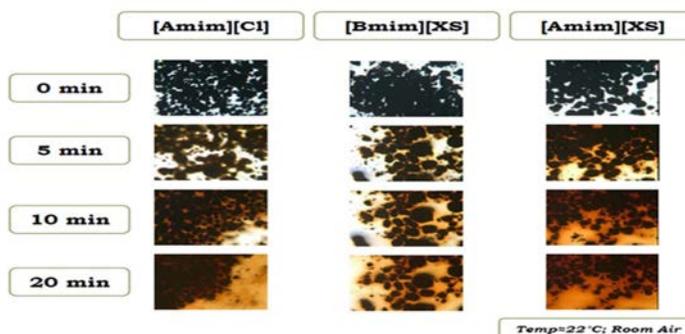


Figure 1. Rapid dissolution of lignin in ionic liquids

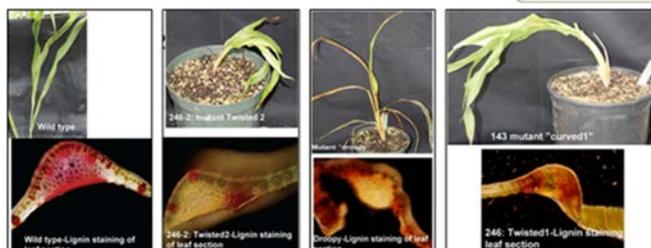


Figure 2. Production of lignin (red stain) in both wild and engineered sorghum