



U.S. Department of
Agriculture-NIFA



Project Title: Switchgrass and Sorghum Biomass Optimization for Staged Thermal Conversion to Biofuels

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Project Goal

The fundamental research goal of this project is to test relationships between switchgrass and sorghum biomass feedstock components and the generation of hydrocarbon fuels and chemicals under a staged thermochemical conversion regime.

Specific Objectives:

- 1) Test hypotheses regarding the relationships between biomass lignin and hydroxycinnamates and the products resulting from low temperature torrefaction and sequential torrefaction-pyrolysis, by isolating cell wall variation to these features through comparison of mutant and genetically similar wild type sorghum and switchgrass.
- 2) Test the application of staged thermal conversion to wild type and mutant sorghum and, as appropriate, switchgrass residues that remain after enzymatic treatments. In the extreme, this objective will determine the staged thermal products from residues remaining (i.e., bagasse) after biochemical conversion of polysaccharides to alcohols.

Expected Project Outcomes

- (i) Verified models that pinpoint relationships between product selectivity and biomass composition.
- (ii) Switchgrass and sorghum compositional variants (via chemical or genetic modification) with improved thermal conversion product streams. The successful application of this work will add significant economic value to the agricultural industry by providing economic support for perennial crops and crop residue, which may facilitate production of substantial new/recovered acreage, requiring more employment, equipment, etc. High value chemical feedstock production from phenylpropanoid-enriched thermal products is another promising outcome.



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