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U.S. Department
of Transportation



Project Title: Can Understory from Managed Pine Forests be Used as Feedstock in the Biochemical Biorefinery?

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Project Goal

The overall goal of this project is to demonstrate the use of understory growth from southern pine forests as feedstock in the biochemical-based biorefinery.

The use of sweetgum from southern pine dominated forests as a biorefinery feedstock was investigated. The project also determined the effect of adding oak wood, sweetgum bark, or oak bark, to sweetgum wood on xylose and glucose yields, as addition of this material would be more representative of a natural harvesting operation.



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Co-PI: Dr. Matthew Pelkki

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Funded: \$70,000

Start Date: 12/01/2009

End Date: 11/30/2012

Project Outcomes

- Results showed that oak and sweetgum wood yielded 35% and 65% of their theoretical xylose content. Both woody species resulted in higher glucose and lower formic acid recoveries than their respective bark material.
- Analysis of data with the Dunnett Control's test in JMP 10.0 showed contamination of sweetgum wood did not have a significant effect ($P > 0.05$) on hydrolysis except with sweetgum bark, which exhibited a significantly higher xylose concentration than the control.
- Results showed that the inclusion of bark resulted in the generation of saccharified streams that contained higher concentrations of inhibitory compounds. Mixing hardwood woods, such as oak and sweetgum, had no effect on saccharification yields.
- Sweetgum wood was a good source of carbohydrate for a biorefinery, but the removal of bark may be necessary to achieve desirable yields, as hydrolysis of bark material resulted in higher inhibitory compound concentrations.

Other Sources of Funding

Dr. Carrier's cost-share amount came from tuition paid by the Biological and Agricultural Engineering Department. Dr. Pelkki's cost-share came from Department of Forestry expenditures, which are state funds. 25% F&A was applied to the cost-share