Southeastern Sun Grant Center Quarterly Progress Report

Project Title: Evaluation of Reduced Lignin Softwood and Hardwoods for Improved Conversion to Bioethanol

Recipient Organization: University of Florida
Principal Investigator: Gary F. Peter
Project Location: Gainesville, FL

Reporting Period: October 1, 2007 to March 31, 2008
Date of Report: April 18, 2007]
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Planned Activities:

Quantify the composition and yield of hemicelluloses extracted during pretreatment of wild-type and reduced lignin wood from loblolly pine and Eucalyptus.

1. **Actual Accomplishments**:

CONFIDENTIAL INFORMATION-START

Confidential Information Redacted

CONFIDENTIAL INFORMATION-END

Explanation of Variance: Overall the project is slightly behind. We anticipated that we would have completed analysis of the lignin reduced Eucalyptus lines. The reduced lignin Eucalyptus samples are now being pretreated and the yields of hemicelluloses are being determined. In addition, we are extracting and characterizing the hemicellulose composition after alkaline extraction. However, we are now currently catching up and plan to meet our objectives for the project on schedule

Plans for Next Quarter:

The conditions for the H_3PO_4 pretreatment used for cottonwood will now be applied to the different lines of Eucalyptus. Previous studies have demonstrated that the hemicellulose composition of Eucalyptus to be very similar to cottonwood, with xylan representing 16.6% of the dry weight (Garrote and Parago, 2002). The yields (total carbohydrate and/or dry weight) of the hemicellulose hydrolysates and cellulose residues, and ratios of individual sugars (xylose, glucose, mannose and arabinose) will be determined. The glucuronoxylan fractions will be extracted with KOH and analyzed by ^{13}C and ^{1}H NMR to evaluate the substitutions of the xylan chain with 4-O-methylglucuronic acid residues before and after treatment with GH5 endoxylanase (St. John et al., 2006).

The residues from the acid hydrolysis of the cottonwood and Eucalyptus lines will be evaluated for glucose concentration by hydrolysis in 70% H_2SO_4 and by release of glucose by the action of cellulose (Ladish et al., 1982; Patel et al., 2005).

We also plan to conduct the ethanol yield trials.

The hemicellulose fractions from genetic lines of loblolly pine will also be extracted and compared using these same procedures.

Patents: None

Publications / Presentations: None

References:

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