Utilization of Switchgrass, *Panicum virgatum L.*, as a Biofuel Feedstock

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**PROGRAM DESCRIPTION**

- Developing technologies for biofuel production from lignocellulosics requires suitable bioresource, tunable pretreatment technology, enhanced enzymatic hydrolysis and fermentation system, and efficient process for ethanol production.
- Thesis research emphasizes studies of switchgrass, pretreatment chemistry and bioethanol production from switchgrass.

**TECHNICAL DETAILS**

- **Feedstock selection**
- **Biomass characterization**
- **Pretreatment technologies**
- **Pretreatment chemistry**

**PAYOFF**

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**KEY ACCOMPLISHMENTS**

- Feedstock selection: Chemical profiles of morphological portion of switchgrass, leaf, stem, and knot, have abnormal features
- Pretreatment technologies: ongoing
- Pretreatment chemistry: ongoing

\[
\text{Enzymatic Hydrolysis} \quad \text{Fermentation}
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\text{Acid pretreatment} \quad \rightarrow \quad \text{Base pretreatment} \quad \text{Steam pretreatment} \quad \text{Wet air oxidation pretreatment}
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**Diagram:**

- Simultaneous Saccharification and Fermentation
- Pretreatment (Solubilization of hemicellulose)
- Enzymatic hydrolysis (Conversion of cellulose to sugars)
- Fermentation (Conversion sugars into bioethanol)

**Figure:**

- Principle component analysis of py-MBMS spectra of four genotype switchgrass
- Optimized pretreatment technology for switchgrass
- Enhanced conversion of biomass to bioethanol

Professor AJ Ragauskas, Supervisor