BRC Science Highlight
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Improving Ethanol Yields with Deacetylated and Two-Stage Pretreated Corn Stover and Sugarcane Bagasse by Blending Commercial Xylose-Fermenting and Wild Type *Saccharomyces* Yeast

Background/objective

The ability to efficiently convert abundant lignocellulosic biomass to ethanol could substantially expand biofuel production. However, the success of this approach has been hampered by challenges including substrate recalcitrance, toxic byproduct formation, and difficulty fermenting pentose sugars. Here, researchers test combinations of pretreatment and fermentation conditions to address these challenges.

Approach

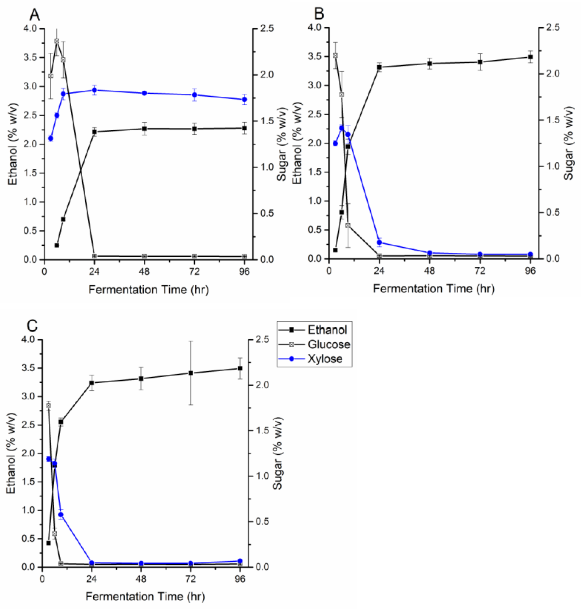
- Deacetylation (DEA), liquid hot water pretreatment, and disk milling were used to pretreat both corn stover and sugarcane bagasse.
- Native *Saccharomyces* yeast, which ferment only hexose (C6) sugars, and a strain engineered to consume both C6 and pentose (C5) sugars were employed to ferment the resulting hydrolysate.

Results

- DEA decreased acetic acid formation during two-stage pretreatment and resulted in increased sugar content of enzymatic hydrolysate, although sugar recovery was slightly reduced for bagasse due to mass loss during DEA.
- Combined C6 and C6/C5 fermenting yeast strains allowed for conversion of both glucose and xylose to ethanol.

Significance

- This study addresses key challenges in the cellulosic ethanol pipeline, demonstrating how the combination of improved novel pretreatment steps with engineered yeast strains can incrementally improve ethanol yields from the biomass left over from the production of traditional feedstocks such as corn and sugarcane.



Ethanol, glucose, and xylose profiles of deacetylated and two-stage pretreated bagasse during simultaneous saccharification/ cofermentation by (A) C6, (B) C6: C5/C6 = 5:1, and (C) C6: C5/C6 = 1:1 yeast cultures.

*Wang et al. 2019. "Improving Ethanol Yields with Deacetylated and Two-Stage Pretreated Corn Stover and Sugarcane Bagasse by Blending Commercial Xylose-Fermenting and Wild Type Saccharomyces Yeast." **Bioresource Technology.** 282:103-109 DOI:10.1016/j.biortech.2019.02.123*

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