BRC Science Highlight
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Bioconversion of Pelletized Big Bluestem, Switchgrass, and Low-Diversity Grass Mixtures into Sugars and Bioethanol

Background/objective

Challenges in biomass storage, transport, and processing are impediments to large-scale ethanol production from perennial grasses cultivated on marginal land. This study explores biomass pelletization as a solution to these issues and compares sugar and ethanol yields among three pelletized feedstock grasses.

Approach

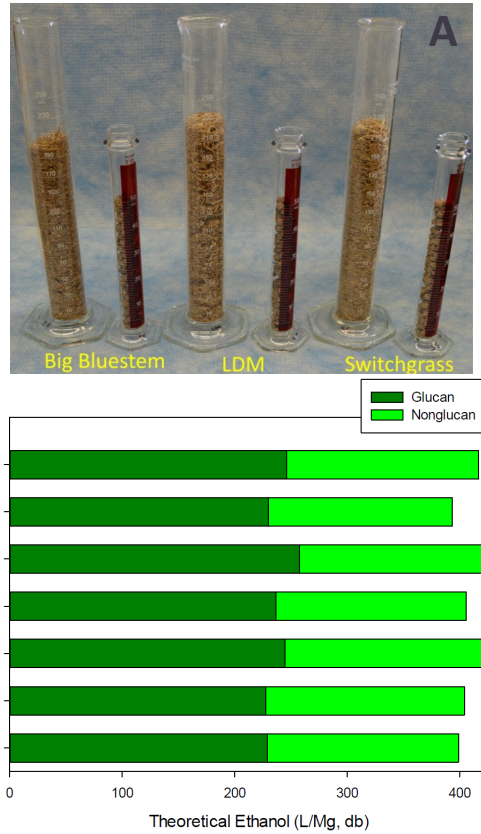
- Big bluestem, switchgrass, and a low-diversity grass mixture were grown on marginal land fields near Lincoln, NE.
- Harvested biomass was pelletized, pretreated with hot water or low-moisture ammonium, enzymatically hydrolyzed, and fermented to ethanol using a xylose-fermenting yeast.

Results

- Pelletization increased bulk density 5x, which is estimated to reduce feedstock transportation costs by up to 50%.
- Pelletization did not substantially affect sugar or ethanol yields when compared with non-pelletized biomass.

Significance

- This work successfully leveraged an existing feed plant to generate pelletized biomass, demonstrating the potential for integrating perennial grass feedstock processing with existing local infrastructure.
- Pelletization of biomass grasses cultivated on marginal land could address current challenges in feedstock transport, storage, and processing without detriment to sugar or ethanol yields.



(A) Visual comparison of 25g of pelletized and coarsely milled grass samples; (B) theoretical ethanol yields of pelletized and milled biomass grasses in comparison to corn stover

Dien et al. 2018. "Bioconversion of pelletized big bluestem, switchgrass, and low-diversity grass mixtures into sugars and bioethanol." ***Frontiers in Energy Research*** *6: 1-15.* doi: 10.3389/fenrg.2018.00129.

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