

Redefining the Product Portfolio of Oilcane Bagasse Biorefinery: Recovering Natural Colorants, Vegetative Lipids and Sugars

Background/Objective

- Oilcane is a metabolically engineered sugarcane (*Saccharum spp.* hybrid) with the ability to accumulate lipids in its vegetative tissues.
- In this study, we studied redefining the product portfolio of oilcane bagasse. Anthocyanins, vegetative lipids and sugars were identified as the major streams of revenue in an integrated biorefinery.

Approach

- Hydrothermal pretreatment was evaluated as a sustainable process for recovering anthocyanins from oilcane bagasse.
- The spent biomass was subjected to enzymatic hydrolysis for the recovery of sugars along with a solid residue to enhance the concentration of vegetative lipids and lignin.

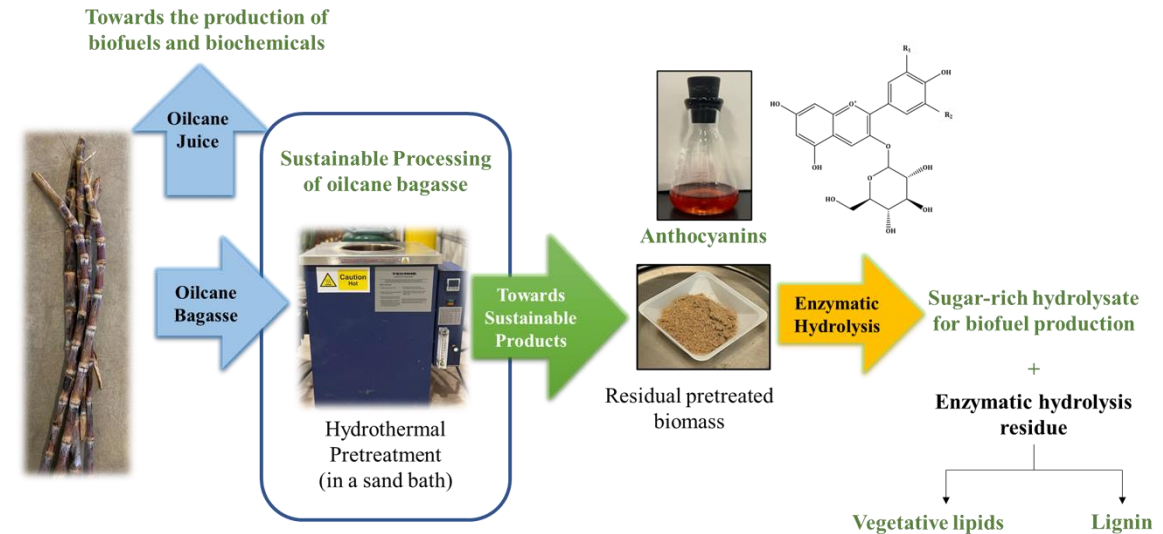
Results

- The total anthocyanin concentration in oilcane bagasse was $92.9 \pm 18.9 \mu\text{g/g}$ of dried biomass, with ~80% recovery after pretreatment.
- A 2-fold increase in the glucose yield was observed upon enzymatic hydrolysis of the pretreated residue along with a 1.5-fold increase in the vegetative lipid concentration in the pretreated oilcane bagasse.

Significance/Impacts

Based upon the high productivity of bioenergy crops, this re-defined biorefinery that completely utilizes oilcane bagasse is an opportunity to generate a diverse portfolio of industrially relevant biobased products along with the production of biofuels.

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The process design for recovering anthocyanins, vegetative lipids, sugars, and lignin from oilcane bagasse.