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# Resourceful and Economical Designing of Fermentation Medium for Lab and Commercial Strains of Yeast from Alternative Feedstock - Transgenic Oilcane

## Background/Objective

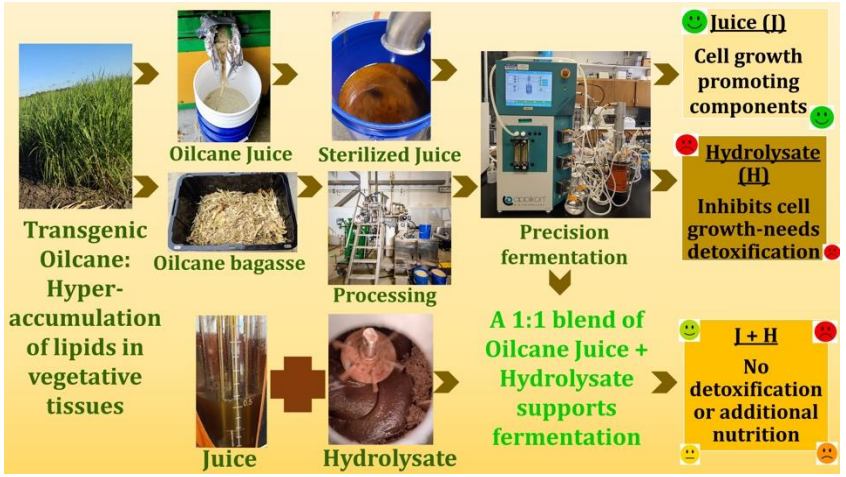
Transgenic oilcane (OC) plants are being developed as a new bioenergy crop and could supply juice, oil, and cellulosic sugars for fuel and bioproducts production. However, the fermenting microorganisms' limited tolerance to inhibitors in the lignocellulosic hydrolysates generated during biomass processing, such as phenolics and fatty acids, hinders scaling the process economically by inhibiting yeast growth and necessitating nutrient supplementation and/or detoxification. We demonstrated an economical approach for growing *Saccharomyces cerevisiae* yeasts aerobically and fermentatively on OC hydrolysates.

## Approach

A detailed compositional analysis of OC juice and hydrolysate quantified the sugars, nutrients, and inhibitory chemicals. Two laboratory and one commercial *S. cerevisiae* strains engineered for xylose metabolism were evaluated in aerobic and fermentative cultures for growth on hydrolysate, juice, and blends of the two.

## Results

An equal ratio of hydrolysate and juice averted the need for nutrient supplementation and/or detoxification of hydrolysate for optimal fermentation of *S. cerevisiae*. The commercial strain grew and fermented more efficiently under aerobic conditions, whereas the lab strain grew better under higher aeration.




**Process diagram of fermentation using equal blends of OC hydrolysate and juice.**

## Significance/Impacts

This study is the first to demonstrate the direct fermentation of OC hydrolysates without nutrient supplementation or detoxification, offering an economical solution to reduce industrial-scale fermentation costs.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