BRC Science Highlight
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Xylose Assimilation Enhances Production of Isobutanol in Engineered *Saccharomyces cerevisiae*

Background/objective

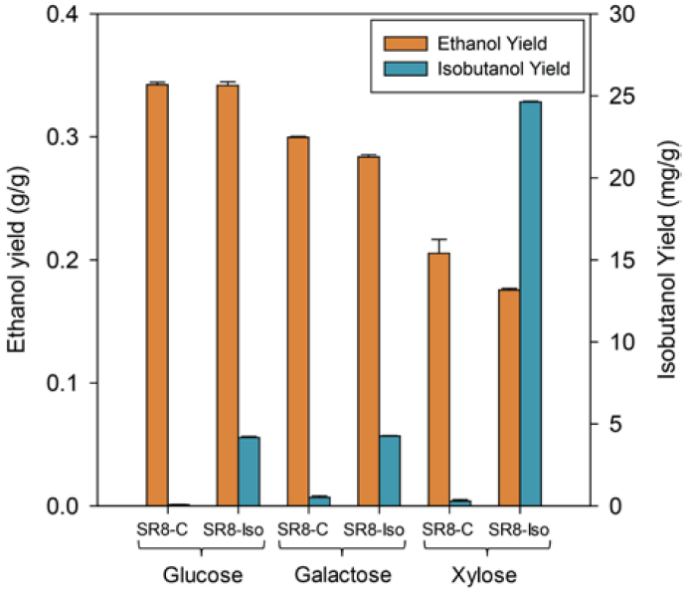
Lignocellulosic biomass, an abundant source of hexose and pentose sugars, is a valuable, largely untapped resource for biofuel production. Additionally, while ethanol has been produced in abundance as a first-generation biofuel, longer-chain alcohols have superior fuel properties but are more difficult to produce. Here, researchers address both of these challenges by engineering *S. cerevisiae* for isobutanol production from xylose.

Approach

- Generated *S. cerevisiae* strain SR8-Iso by modifying strain SR8 via deletion of the *URA3* gene and addition of a mitochondrial-localized isobutanol pathway.
- Optimized culture conditions to maximize isobutanol production from xylose.
- Used metabolite profiling to understand metabolic underpinnings of improved xylose yields.

Results

- The engineered strain SR8-Iso yielded a maximum isobutanol titer of 2.6 g/L when grown on xylose, a 23-fold improvement over previously reported results.
- Metabolite profiling indicated that correcting redox imbalance and deleting *BAT1* could further enhance isobutanol production.



Isobutanol production was maximized in the mutant SR8-Iso strain using xylose as a substrate.

Significance

Incorporation of lignocellulosic biomass into the bioeconomy will yield abundant glucose and xylose for conversion to advanced biofuels. This work improves upon previous engineering efforts to produce isobutanol from xylose and serves as a building block to generate yeast strains capable of using both glucose and xylose for isobutanol production.

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