BRC Science Highlight
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Vitamin A Production by Engineered *Saccharomyces cerevisiae* from Xylose Via Two-Phase *in situ* Extraction

Background/objective

Industrial production of vitamin A, an essential human micronutrient, currently relies on petroleum-based precursors, such as acetone. Here, researchers developed a novel, biotechnological vitamin A production method using engineered *Saccharomyces cerevisiae* to ferment xylose, an abundant biomass-derived sugar.

Approach

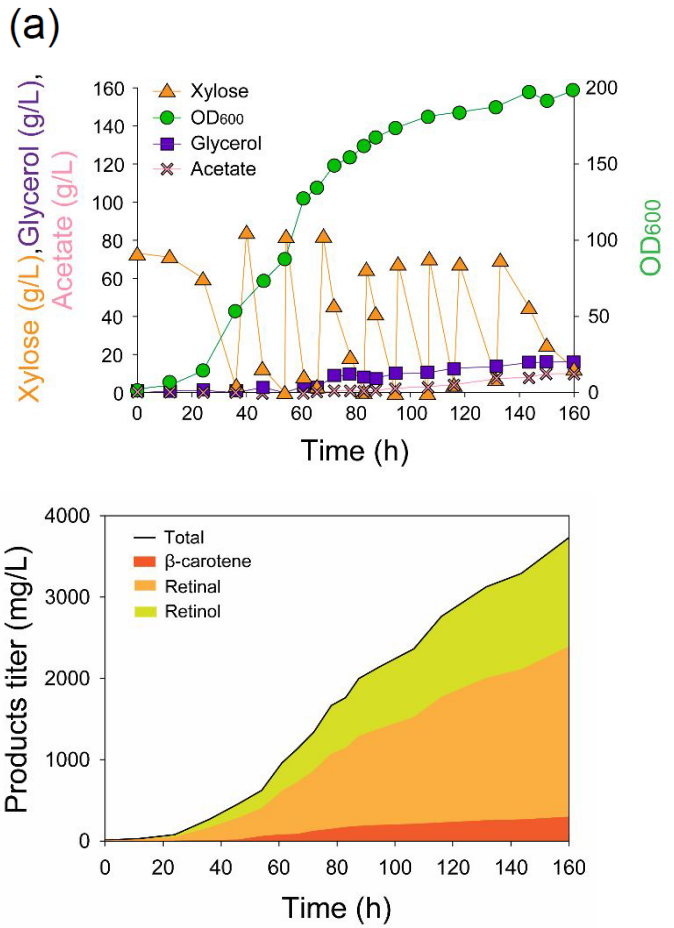
- The xylose-fermenting *S. cerevisiae* strain SR8 was engineered to express the heterologous vitamin A synthetic pathway.
- The strain was tested for vitamin A production on both glucose and xylose fermentation. Fed-batch operation was implemented to increase cell density, and two-phase *in situ* extraction was used to overcome intracellular storage limits.

Results

- Vitamin A titer was maximized at 3,432 mg/L, among the highest titers reported for high-value hydrophobic compounds produced in yeast.
- This maximum titer was achieved under xylose-fermenting fed-batch conditions with *in situ* dodecane extraction.

Significance

This study demonstrates the feasibility of using engineered yeast to convert xylose, an abundant byproduct of lignocellulosic biomass hydrolysis, to valuable lipid-based bioproducts, such as vitamin A.



Xylose fed-batch fermentation with *in situ* dodecane extraction achieved high cell density (a) and yielded total vitamin A production of 3,432 mg/L (b).

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