Posted on Authorea 2 Jul 2020 — The copyright holder is the author/funder. All rights reserved. No reuse without permission. — https://doi.org/10.22541/au.159373002.29482054 — This a preprint and has not been peer reviewed. Data may be preliminary.

Exploiting xylose metabolism for the efficient production of biofuels and chemicals by engineered *Saccharomyces cerevisiae*

Liang Sun[1] and Yong-su Jin[1]

[1]University of Illinois at Urbana-Champaign

July 2, 2020

Abstract

Microbial conversion of plant biomass into fuels and chemicals offers a practical solution to global concerns on limited natural resources, environmental pollution, and climate change. Pursuant to these goals, researchers have put tremendous efforts and resources towards engineering the yeast *Saccharomyces cerevisiae* to efficiently convert xylose, the second most abundant sugar in lignocellulosic biomass, into various fuels and chemicals. Although many challenges remain, these research investments have facilitated efficient and rapid fermentation of xylose, simultaneous co-consumption of xylose with carbon sources in lignocellulosic hydrolysates, and enhanced production of a wide range of valuable chemicals from xylose. In particular, understanding of xylose-induced metabolic rewiring in engineered yeast has stimulated the use of xylose as a preferred carbon source for the production of various non-ethanol bioproducts. Here, we summarize recent advances in metabolic engineering in yeast to address bottlenecks of xylose assimilation, and to enable simultaneous co-utilization of xylose and other cellulosic carbon sources. We also highlight distinct characteristics of xylose metabolism which can be harnessed for the production of advanced biofuels and chemicals.

Hosted file

`Sun et al Biotechnol J Xylose review Manuscript.docx` available at https://authorea.com/users/295465/articles/465531-exploiting-xylose-metabolism-for-the-efficient-production-of-biofuels-and-chemicals-by-engineered-saccharomyces-cerevisiae