Rational engineering of the ethanol and the chorismate-related pathways in Saccharomyces cerevisiae for tyrosol production.

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Abstract

Tyrosol is a natural aromatic alcohol mainly present in olive oil, wine and plant tissues, and it is extensively applied in the pharmaceutical industry as the precursor of anti-cardiovascular and anti-neurodegenerative diseases agents, such as salidroside and hydroxytyrosol. In this study, two reported exogenous pathway involved in catalyzing tyrosine to tyrosol were separately introduced into *Saccharomyces cerevisiae*. The pathway with the aromatic aldehyde synthase from *Petroselinum crispum* (PcAAS) was better than the other exogenous pathway containing the tyramine oxidase from *Micrococcus luteus* (MlTYO) and the tyrosine/dopa decarboxylase from *Papaver sominiferum* (PsTDC). Furthermore, tuning down the ethanol branch and tuning up the Chorismate metabolism effectively directed the metabolic flux toward tyrosol production. A 235-fold increase in tyrosol production was obtained. The new synergetic engineering strategy could be further applied to enhance the production of aromatic compounds in *S. cerevisiae*.

Brief Biography

Professor Xu FANG is devoted to the degradation and utilization of lignocellulosic biomass. He obtained Ph. D. from Kyoto University, Japan in 2006. From 2006 to 2009, he worked as Researcher Scientist at Biomass Technology Research Center (BTRC), National Institute of Advanced Industrial Science and Technology of Japan (AIST). He joined State Key Laboratory of Microbial Technology and National Glycoengineering Research Center at Shandong University in 2009. He focuses on the fields of cellulase synthesis mechanism in filamentous fungi, cellulolytic enzyme system, modification of glycoside hydrolases, and utilization of lignocellulosic biomass. He has published more than 40 SCI papers and three book chapters. He received “New Century Excellent Talents”, “Shandong's Taishan Scholar”, “National Technology Invention” and “Shandong youth” Awards.

Brief CV

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B.S Food science and engineering, Tianjing University of Commerce, China, 1995

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1995-1999: Guangxi University, China, Assistant Professor.

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Research Interests:

1. Cellulolytic enzyme system and cellulase synthesis mechanism in filamentous fungi
2. Microbial Systems and Synthetic Biology
3. Utilization of lignocellulosic biomass

Selected publications

1. Zhang R. et al. ***Appl Microbiol Biot***, 2019, 103(14):5739–5750.
2. Guo, W. et al. ***Front Bioeng Biotechnol***, 2019, 7:152.
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4. Wang, M. et al. ***Biotechnol Biofuels.***, 2017, 10:99.
5. Jiang, Y. et al. ***ACS Sustain Chem Eng***, 2017, 5: 6116–6123.