## Accepted Manuscript

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PII: S0009-2509(17)30624-3

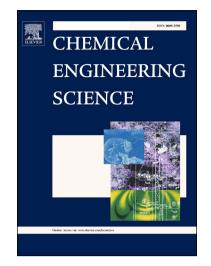
DOI: https://doi.org/10.1016/j.ces.2017.10.016

Reference: CES 13848

To appear in: Chemical Engineering Science

Received Date: 11 July 2017

Revised Date: 28 September 2017 Accepted Date: 12 October 2017



Please cite this article as: K. Xu, L. Gao, J. Ul Hassan, Z. Zhao, C. Li, Y-X. Huo, G. Liu, Improving the thermotolerance of yeast base on the antioxidant defense system, *Chemical Engineering Science* (2017), doi: https://doi.org/10.1016/j.ces.2017.10.016

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## **ACCEPTED MANUSCRIPT**

Improving the thermo-tolerance of yeast base on the antioxidant defense

system

Ke Xu<sup>1a</sup>, Liman Gao<sup>1a</sup>, Jalees Ul Hassan<sup>a</sup>, Zhiping Zhao<sup>b</sup>, Chun Li<sup>a</sup>, Yi-Xin Huo<sup>a</sup>, Guiyan Liu<sup>\*</sup>

a. School of Life Science, Beijing Institute of Technology, Beijing 100081, PR China

b. School of chemistry and chemical engineering, Beijing Institute of Technology, Beijing 100081, PR China

**Abstract:** 

Heat stress in yeast limits productivity in the industrial production of bio-ethanol.

One promising way for enhancing yeast resistance to heat is to strengthen the

antioxidant defense system. Herein, we developed an artificial antioxidant defense

system and used it to improve the thermo-tolerance of yeast for the first time.

Engineered strains not only exhibited high-performance on tolerance to high

temperature but also effectively improved the ethanol yield. A-SOD2-TTHA1300

showed the highest ethanol yield, 61.4 g / L at 60 h, which is increased by 66%

compared with the control. Furthermore, we explored the damage mechanism of cells

under heat stress and oxidative stress by detection of mitochondria and cell membrane

integrity. These results together demonstrated the great potential of artificial antioxidant

defense system in improving the thermo-tolerance in yeast.

**Keywords:** antioxidant defense system; thermo-tolerance; oxidative stress; yeast;

ethanol

Ke Xu and Liman Gao contributed equally to this work.

Corresponding author Tel: +86 10 68918203; fax: +86 10 68913171; E-mail address:

gyliu@bit.edu.cn

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