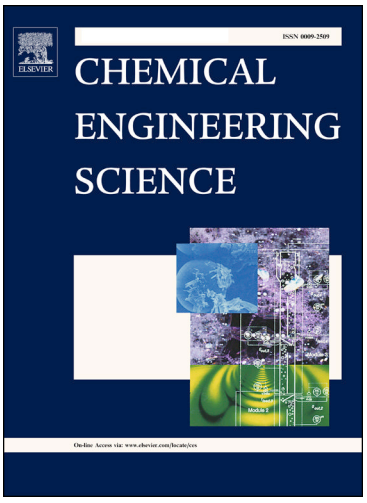

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Improving the thermo-tolerance of yeast base on the antioxidant defense system

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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

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