

Construction of *Lactococcus lactis* chassis cells with high nisin yield

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Abstract

Lactococcus lactis, a Gram-positive lactic acid bacteria, is generally recognized as safe (GRAS) status with probiotic properties. It is initially used in dairy product fermentation and is present applied in genetic engineering for the production of various recombinant proteins and metabolites. This have made *L. lactis* a desirable and promising host. However, the accumulation of lactic acid during fermentation will be the limiting factor. In our study, we screened to obtain high-acid resistance strains through multiple mutagenesis techniques, and investigated the acid tolerance mechanisms via multi-omics technique. Also, we revealed the regulation mechanism under acid stress, and several regulatory genes in response to acid stress were identified, such as transcriptional regulators and non-encoding small RNA. Based on the regulation mechanism and carbon metabolism modification, the robust *L. lactis* chassis cells were constructed via synthetic biology, which contributed to the use of *L. lactis* as a microbial cell factory.

Brief Biography

Prof. Jianjun Qiao is the Vice President of the School of Chemical Engineering & Technology and Ph.D. supervisor. He is the new century outstanding talent of the ministry of education, and the first-level talent of Tianjin "131" innovative program *et al.* His research mainly focuses on highly efficient biosynthesis of natural products. More than 50 SCI papers have been published in journals including *Chem Soc Rev*, *Metab Eng*, *Biotechnol Bioeng et al.* 41 national invention patents were applied and 14 were authorized. He has co-edited 2 Chinese textbooks. Currently, he is the chief director of one project of National Key R&D Program of China and two projects of national natural science foundation of China.

Brief CV

Jianjun Qiao, Ph.D.

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Education:

B.S. Biology, Inner Mongolia University, China, 1995

M.S. Microbiology, Inner Mongolia University, China, 1998

Ph.D. Industrial microbiology, Tianjin University of Science & Technology, China, 2001

Professional Career:

2001-2003: Biological pharmaceutical Engineering, Tianjin University, China, Postdoc.

2003-2014: Tianjin University, China, Associate Professor.

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Research Interests:

1. Synthetic Biology and Metabolic Engineering of Natural Products
2. Regulation mechanism of Small non-encoding RNA and transcriptional regulator under environmental stress

Selected publications

1. Qiao, JJ*. et al. *Biotechnol Bioeng*, 2019, 116(1): 110-120.
2. Qiao, JJ*. et al. *BMC genomics*, 2019, 20(1): 7.
3. Qiao, JJ*. et al. *J Dairy Sci*, 2019, 102(2): 1044-1058.
4. Qiao, JJ*. et al. *Metab Eng*, 2018, 47: 243-253.
5. Qiao, JJ*. et al. *Appl Environ Microbiol*, 2018, 84(6): e02483-17.
6. Qiao, JJ*. et al. *Mol Phylogenet Evol*, 2018, 127: 239-247.
7. Qiao, JJ*. et al. *Bioresour Technol*, 2017, 238: 690-697.
8. Qiao, JJ*. et al. *Scientific reports*, 2017, 7(1): 6189.
9. Qiao, JJ*. et al. *Appl Microbiol Biotechnol*, 2017, 101(15): 6137-6153.
10. Qiao, JJ*. et al. *Chem Soc Rev*, 2015, 44(22): 8350-8374.