Biosynthesis of quercetin-D-glucopyranosides by glucosidase from a newly isolated dimethylformamide-tolerant strain *Bacillus licheniformis*

Lanlan Zhou¹, Jianghua Li¹,², Long Liu¹,², Guocheng Du¹,², Jian Chen

1. Key Laboratory of Industrial Biotechnology, Ministry of Education, Jiangnan University, Wuxi 214122, China
2. School of Biotechnology, Jiangnan University, Wuxi 214122, China
3. State Key Laboratory of Food Science and Technology, Jiangnan University, Wuxi 214122, China

*Corresponding authors:
E-mail: lijianghua@jiangnan.edu.cn
E-mail: jchen@jiangnan.edu.cn

In this work, a *dimethylformamide* (DMF) tolerant strain harboring glucosidase was isolated from the distiller's yeast samples. The isolated strain was identified as *Bacillus licheniformis* by biochemical test and 16S ribosomal DNA sequence analysis. As revealed by HPLC and LC-MS analysis, the DMF-tolerant *B. licheniformis* can be used to synthesize quercetin-D-glucopyranoside via transglycosylation with quercetin and maltose as the substrates. Higher yields were obtained after optimizing the medium ingredients with response surface methodology. Optimum media parameters were 0.5g/L sucrose, 39g/L tryptone, 3g/L yeast extract, 0.15g/L FeSO₄·7H₂O, 0.4g/L CaCl₂, and 0.00135mol/L NaCl. The transglycosylation rate reached 54% and the quercetin-D-glucopyranoside concentration was 0.81 g/L. This is the first report regarding the enzymatic synthesis of quercetin-D-glucopyranoside with DMF-tolerant glucosidase from *B. licheniformis*, and the obtained results provides a novel approach for the biosynthesis of quercetin derivatives.

**Keywords:** Glucosidase; Organic solvent tolerant; Quercetin; Transglycosylation; Response surface method