

Aerobic production of fumaric acid in metabolically engineered *Escherichia coli*

장재원, 송찬우, 김동인, 이상엽*
KAIST
(leesy@kaist.ac.kr*)

Fumaric acid is a naturally occurring organic acid which is a key intermediate of the tricarboxylic acid cycle. In this study, *Escherichia coli* was metabolically engineered for the production of fumaric acid under aerobic condition. After engineering glyoxylate shunt and TCA cycle, the resulting strain was able to produce 1.45 g/L of fumaric acid from 15 g/L of glucose in flask culture. Plasmid-based overexpression of the native *ppc* gene resulted in the production of 4.09 g/L of fumaric acid. Fed-batch culture of the final strain CWF812 allowed production of 28.2 g/L fumaric acid in 63 h with the overall yield and productivity of 0.389 g fumaric acid/g glucose and 0.448 g/L/h. This study demonstrates the possibility for the efficient production of fumaric acid by metabolically engineered *E. coli*. (Development of systems metabolic engineering platform technologies for biorefineries; NRF-2012-C1AAA001-2012M1A2A2026556) funded by the Ministry of Education, Science and Technology)