

Application of Engineered *Escherichia coli* for Secretary Heme Production

박다현, Xin Rui Zhao, 최경록, 이상엽[†]
한국과학기술원
(leesy@kaist.ac.kr[†])

Heme has been considered as one of the important bioproduct with its wide usage in healthcare and food supplement. Here we demonstrate production of free heme by secretion using engineered *E. coli* strains, through the C5 pathway with optimized downstream pathway for heme biosynthesis. Furthermore, inactivation of several genes encoding potential heme-degrading enzymes showed a result of 7.88 mg/L of total heme with 1.26 mg/L of extracellular portion in flask cultivation. Fed-batch fermentations of strain with heme exporter CcmABC overexpression from glucose only and glucose supplemented with L-glutamate secrete 73.4 and 151.4 mg/L of heme, respectively, which takes 63.5% and 63.3% of total heme produced for each. The engineered *E. coli* strain presented here would be valuable for microbial production of free heme. [This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries (Grants NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557) from the Ministry of Science and ICT through the National Research Foundation (NRF) of Korea]