

Production of 3-HP and malonic acid by metabolically engineered *Escherichia coli* via B-alanine route김제웅, 송찬우¹, 조인진, 이상엽[†]KAIST; ¹GS Caltex(leesy@kaist.ac.kr[†])

Escherichia coli was metabolically engineered for the production of industrially important chemicals, 3-hydroxypropionic acid (3-HP) and malonic acid (MA). First, to produce 3-HP and MA from BA, downstream enzymes were screened for the efficient production of MSA. Among them, *pa0132* from *P. aeruginosa* was chosen to generate MSA from BA. This platform strain was further engineered by introducing *ydfG* from *E. coli* to reduce MSA into 3-HP. Additionally, *sdhC* gene was overexpressed by replacing with the strong *trc* promoter in the genome leading to produce 3-HP to 3.69 g/L in shake flask culture. To produce MA, *E. coli yneI* gene was overexpressed which oxidize MSA to MA. *ydfG* gene was further deleted, giving the titer of 0.450 g/L in shake flask culture. Fed-batch cultures of these final engineered strains resulted in production of 31.1 g/L 3-HP or 3.60 g/L MA from glucose. (This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries from the Ministry of Science and ICT through the National Research Foundation (NRF) of Korea (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557)).