Metabolically Engineered *Escherichia coli* for Production of 1,3-Diaminopropane: A Linear C3 Diamine

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Biological chemical production is essential for sustainable chemical industry. Here, Escherichia coli is metabolically engineered to produce 1,3-diaminopropane (1,3-DAP). Comparison of heterologous C4 and C5 pathways for 1,3-DAP production by in silico flux analysis revealed that the C4 pathway using Acinetobacter baumannii dat and ddc genes was more efficient. In a strain harboring feedback resistant aspartokinases, the ppc and aspC genes were overexpressed to increase flux towards 1,3-DAP synthesis. Also, pfkA deletion was found to increase 1,3-DAP production by applying 128 synthetic small RNAs. Overexpression of the ppc and aspC genes in the pfkA deleted strain resulted in even higher production of 1,3-DAP. Fed-batch fermentation of the final strain achieved 13 g/L of 1,3-DAP production in a glucose minimal medium. [This work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries from the Ministry of Science, ICT and Future Planning (MSIP) through the National Research Foundation (NRF) of Korea (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557)]