Efficient fumaric acid production using *E. coli* with a re-designed TCA cycle

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In this work, *E. coli* was engineered to produce fumaric acid. The *iclR* gene was deleted to redirect the carbon flux through the glyoxylate shunt. This, together with the deletion of *fumA*, *fumB* and *fumC,* resulted in production of fumaric acid to 1.45 g/L. Plasmid-based overexpression of the *ppc* gene further increased the titer to 4.09 g/L. Next, *arcA* and *ptsG* were deleted to reinforce the oxidative TCA cycle, and *aspA* was deleted to block the conversion of fumaric acid to L-aspartate. Finally, *galP* was overexpressed to improve the glucose uptake. Fed-batch culture of the final strain produced a fumaric acid titer of 28.2 g/L. [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-2012-C1AAA001-2012M1A2A2026556). MG was additionally supported by the Swedish research council Formas].