

Metabolic engineering strategy for the malic and fumaric acid production in *Mannheimia succiniciproducens*

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Fumarate and malate commonly used chemicals and are closely associated with everyday life. A Gram-negative rumen bacterium, *Mannheimia succiniciproducens*, produces mainly succinate using anaplerotic pathway under anaerobic condition. The wild type *M. succiniciproducens* can't produce malate and fumarate, but *M. succiniciproducens* ideal for producing fumarate and malate because its strong anaplerotic pathway under CO<sub>2</sub> condition. Recently, our group published papers about developing the high succinate production strain by gene knock-out. Based on this strain, fumarate and malate producing strains were constructed. Especially, when fumarate reductase was knock-out, the strain was found to produce malate and fumarate and not succinate. The results provide useful information for the rational metabolic engineering by optimizing metabolic fluxes to improve fumarate and malate production in species with strong anaplerotic pathway [This work was supported by the Genome-Based Integrated Bioprocess Development Project of the MEST through the National Research Foundation of Korea (#20090065578). Further supports by WCU program by MEST (R32-2008-000-10142-0) are appreciated.]