

Effect of *Mannheimia succiniciproducens* MBEL55E Malic Enzyme Overexpression on Succinic Acid Production

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Mannheimia succiniciproducens MBEL55E produces a large amount of succinic acid under anaerobic environments. Malic acid is one of the key metabolites for succinic acid production, because it is converted to fumaric acid, which is subsequently used for succinic acid formation by a fumarase. Malic acid also can be converted to pyruvic acid, a precursor of by-products such as formic, acetic, lactic acids and ethanol, by a malic enzyme. Also, it has been known that its reversible reaction is mediated by the malic enzyme. In order to characterize the malic enzyme and investigate the effect of its overexpression on succinic acid production, the overexpression of *maeB* gene in *M. succiniciproducens* MBEL55E was performed by using a genetic manipulation. An anaerobic batch fermentation was carried out in a 5-L reactor with continuous CO₂ supplementation. A genetically engineered strain showed around 1.6 times lower malic acid concentration than that of the wild type. The enzyme activity of a recombinant strain was 25 times higher than that of *E. coli*.

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