

## Characterization of Formate Dehydrogenase D and E of *Mannheimia succiniciproducens* MBEL55E

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*Mannheimia succiniciproducens* MBEL55E produces succinic acid as a major fermentation product during anaerobic cultivation. However, concurrent production of other organic acids including formic, acetic and lactic acid was also observed. Formic acid can be further converted to NADH and carbon dioxide by formate dehydrogenase D and E. *fdhD* and *E* genes encoding the formate dehydrogenase D and E in *M. succiniciproducens* MBEL55E were overexpressed in order to enhance the conversion of formic acid to NADH and carbon dioxide. The increased NADH and carbon dioxide will be reused for supplying a reducing power and CO<sub>2</sub>-fixation reactions, respectively. The formate dehydrogenase activity of a genetically engineered recombinant strain was about 3 times higher than that of the parent strain. Furthermore, the significant reduction in formic acid was observed throughout the fermentation. This study gives an insight into the development of a genetically engineered strain for the production of succinic acid by reducing by-products.

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