

Development of chemically defined medium for high succinic acid production using  
*Mannheimia succiniciproducens* and its improvement

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A novel methodology for the development of a chemically defined medium (CDM) using genome-scale metabolic network and flux balance analysis is demonstrated. Using the genome-based in silico analysis, two amino acids and four vitamins were identified as non-substitutable essential compounds for the sustainable growth of *M. succiniciproducens*. Furthermore, an optimal CDM was developed with a single-addition technique to enhance the cell growth and the succinic acid production. Fermentation on the optimal CDM increased the succinic acid productivity by 36%, the final succinic acid concentration by 17%, and the succinic acid yield on glucose by 15% compared to the cultivation on the complex medium. In addition, metabolic engineering technologies were applied to improve the *M. succiniciproducens* for the further enhancement of CDM in an economical aspect. [This work was supported by the Genome-Based Integrated Bioprocess Development Project of the Ministry of Education, Science and Technology (MEST). Further supports by the LG Chem Chair Professorship, Microsoft, and WCU Program of MEST.]