

Reconstruction of a Genome-scale Metabolic Network for *Clostridium acetobutylicum* ATCC 824 and an Investigation of Its Metabolic Features

Sang Yup Lee^{1,2}
leesy@kaist.ac.kr

Joungmin Lee¹
leejm516@naver.com

Hongseok Yun^{1,2}
hsyun@kaist.ac.kr

- ¹ Department of Chemical and Biomolecular Engineering (BK21 Program), Metabolic and Biomolecular Engineering National Research Laboratory, Center for Systems and Synthetic Biotechnology, Institute for the BioCentury, Korea Advanced Institute of Science and Technology, Daejeon 305-701, Republic of Korea
- ² Department of Bio and Brain Engineering, BioProcess Engineering Research Center and Bioinformatics Research Center, Korea Advanced Institute of Science and Technology, Daejeon 305-701, Republic of Korea

Abstract

Clostridium acetobutylicum is an attention-grabbing bacterium in that it produces several solvents, especially butan-1-ol. We reconstructed a genome-scale metabolic network of *C. acetobutylicum* ATCC 824 which comprises 502 reactions and 479 metabolites. Then, we carried out flux balance analysis using both linear and non-linear approach which is a modification of previous studies. Here, we present metabolic features and feasibilities of *C. acetobutylicum*, and hypothetical annotations derived during the reconstruction of the network.

[This work was supported by the Korea–Australia Collaborative Research Project on the Development of Sucrose-Based Bioprocess Platform (N02071165) from the Korean Ministry of Knowledge Economy. Further support by LG Chem Chair Professorship and Microsoft are appreciated.]

Keywords: *Clostridium acetobutylicum*, genome-scale stoichiometric model, constraints-based flux analysis, Butanol

References

- [1] Desai, R.P., Nielsen, L.K., and Papoutsakis, E.T. Stoichiometric modeling of *Clostridium acetobutylicum* fermentations with non-linear constraints, *J. Biotechnol*, 28;71(1-3):191-205, 1999.
- [2] Segrè, D., Vitkup, D., and Church, G.M. Analysis of optimality in natural and perturbed metabolic networks, *PNAS*, 12;99(23):15112-7, 2002.