

Analyzing the Metabolic Network of *Zymomonas mobilis* ZM4 by Genome-scale Reconstruction for Overproducing Ethanol and Succinic acid

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Zymomonas mobilis ZM4 is Gram-negative bacterium that can efficiently produce ethanol from glucose, fructose, and sucrose by utilizing the *Entner-Doudoroff* pathway. To improve its industrial application, the genome-scale metabolic model of *Z. mobilis* is reconstructed and examined using constraints-based flux analysis. First, the physiological changes of *Z. mobilis* shifts from anaerobic to aerobic environments were investigated. Then the intensities of flux-sum, and the maximum *in silico* yields of ethanol for *Z. mobilis* and *Escherichia coli* were compared. Furthermore, the substrate utilization range of *Z. mobilis* was expanded to pentose sugar metabolism. Finally, double gene knock-out simulations were performed to suggest a strategy for overproducing succinic acid. [This work was supported by the Korean Systems Biology Research Project (20110002149) of the Ministry of Education, Science and Technology (MEST) through the National Research Foundation of Korea. Further support by the World Class University Program (R32-2008-000-10142-0) through the National Research Foundation of Korea funded by the MEST is appreciated.]