

Analysis of Lactate Production Network of Lactococcus Lactis using in Silico Simulation Experiment

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In this research, we build and simulate the metabolic network of Lactococcus lactis using mathematical modeling in order to estimate the effect of lactate production and dynamic response of Lactococcus lactis. Using metabolic control analysis, so called flux-control coefficients, which quantify the importance of an enzyme for the magnitude of a flux, are obtained and analyzed that the most important enzyme of producing lactate is Phosphotransferase. And other 4 major enzyme, Pyruvate kinase, Lactate dehydrogenase, Pyruvate dehydrogenase, Adenosine triphosphatase, Nicotinamide adenine dinucleotide oxidase are also suggested. Finally, the flux distribution of carbon flux of Pyruvate branch is closely examined and the effects to flux distribution of branch from the activity of enzyme which are obtained from MCA analysis are studied. In this analysis, we can obtain the effect of enzyme activity are closely related to the result of MCA analysis of Lactate dehydrogenase.