

Metabolic flux analysis at pyruvate branch point in *Lactococcus lactis* with *in silico* simulation and *in vitro* measurements

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Abstract

In this study we have constructed new lactic acid metabolic network which was composed of 24 enzymatic reactions and 29 metabolites. Adequate enzyme kinetic equations and parameters were collected from database and literatures. We could obtain the information on flux distribution, flux control coefficient of lactic acid metabolic network by simulation and predict the changes of metabolite concentration. Besides we have performed various fermentative experiments and metabolite measurements, and extensive simulation study has been done for obtaining more accurate information on lactate fermentation metabolic network. By analyzing the simulation and experiment results, it was revealed that enzymatic reactions in pyruvate branch point seems to be critical limiting steps for the production of lactate. We expect to be able to achieve more exact analysis of systemic approach in *Lactococcus lactis* metabolism and this technique could be applied to other species.

References

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