L-valine production in *E. coli* based on in silico flux response analysis

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Amino acids are commercially important as they are used as precursors in industries of foods, pharmaceutical, and cosmetics as well as animal feed additives. We have previously developed 100% rationally engineered *E. coli* strain capable of 0.38 g L-valine per gram glucose (0.58 mol L-valine per mol glucose) by batch culture. In this study, systems biological strategy of employing flux response analysis in bioprocess development was reported for high-level L-valine production. There existed a trade-off between L-valine production and biomass formation, which was optimized for the most efficient L-valine production. Moreover, acetic acid feeding strategy was optimized based on flux response analysis. The final fed-batch cultivation strategy allowed production of 32.3 g/L L-valine, the highest concentration reported for *E. coli*.
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