

Glucose Metabolism in Escherichia coli and the Effect of Increased Amount of Aldolase

Babul, Jorge

Clifton, Drago

Kretschmer, Matthias

Fraenkel, Dan G.

We present a comparative study of Escherichia coli with normal and increased amounts of fructose-1,6-bisphosphate aldolase. Most experiments employed a resting cell system involving a high cell density (so as to obtain the soluble pool by direct extraction) and anaerobic incubation in the presence of chloramphenicol. Glucose use is linear with time with a rate ca. half of that in growth, fermentation is almost quantitative, and metabolite concentrations reach a quasi steady state. Increased amount of aldolase had little effect on glucose flux; fructose-1,6-P₂ concentration decreased by ca. one-third, and the extent of equilibration of its two halves, measured by a dismutation procedure on samples taken during metabolism of [6-¹⁴C]glucose, increased from 0.33 [(cpm in C1-3)/(cpm in C1-6)] to 0.43. Using the simplest model, that increased amount of aldolase does not perturb net flux or later metabolites, together with the steady-state rate equations for aldolase and triose-P isomerase, w