

Problem E4

You conduct two steady-state experiments with ^{13}C -labeled glucose, and you assume that flux ends at pyruvate. One experiment will use glucose enriched at C-1, and the second experiment will use glucose enriched at C-2.

Fraction of carbon labeled:

Experiment #1:

C-1: 0.825
C-2: 0.0224
C-3: 0.0134
C-4: 0.0139
C-5: 0.0122
C-6: 0.0228

Experiment #2:

C-1: 0.0224
C-2: 0.825
C-3: 0.0134
C-4: 0.0139
C-5: 0.0122
C-6: 0.0228

Assume that

- 1) the molar glucose consumption rate is 100 units.
- 2) no biomass is formed.
- 3) all the fluxes are unidirectional. (there is no exchange)

Vary the fraction of glucose-6P entering the pentose phosphate pathway from 0% to 100% in 5% increments. For each fraction, calculate the molar rate of pyruvate formation, and the fractional enrichment at each of the three carbon positions in pyruvate. Make plots of these four variables as a function of pentose phosphate pathway fraction.