

Crompton, L. A.; McKnight, L. L.; Reynolds, C. K.; Mills, J. A. N.; Ellis, J. L.; Hanigan, M. D.; Dijkstra, J.; Bequette, B. J.; Bannink, A.; France, J.

An isotope dilution model for partitioning of phenylalanine and tyrosine uptake by the liver of lactating dairy cows. (English) [Zbl 1397.92184](#)

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Summary: An isotope dilution model to describe the partitioning of phenylalanine and tyrosine in the bovine liver was developed. The model comprises four intracellular and six extracellular pools and various flows connecting these pools and external blood. Conservation of mass principles were applied to generate the fundamental equations describing the behaviour of the system in the steady state. The model was applied to datasets from multi-catheterised dairy cattle during a constant infusion of [$1\text{-}^{13}\text{C}$]phenylalanine and [$2,3,5,6\text{-}^2\text{H}$]tyrosine tracers. Model solutions described the extraction of phenylalanine and tyrosine from the liver via the portal vein and hepatic artery. In addition, the exchange of free phenylalanine and tyrosine between extracellular and intracellular pools was explained and the hydroxylation of phenylalanine to tyrosine was estimated. The model was effective in providing information about the fates of phenylalanine and tyrosine in the liver and could be used as part of a more complex system describing amino acid metabolism in the whole animal.

MSC:

92C40 Biochemistry, molecular biology

Cited in 1 Document

Keywords:

isotope dilution; kinetic model; liver; phenylalanine; tyrosine

Software:

UniProt

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