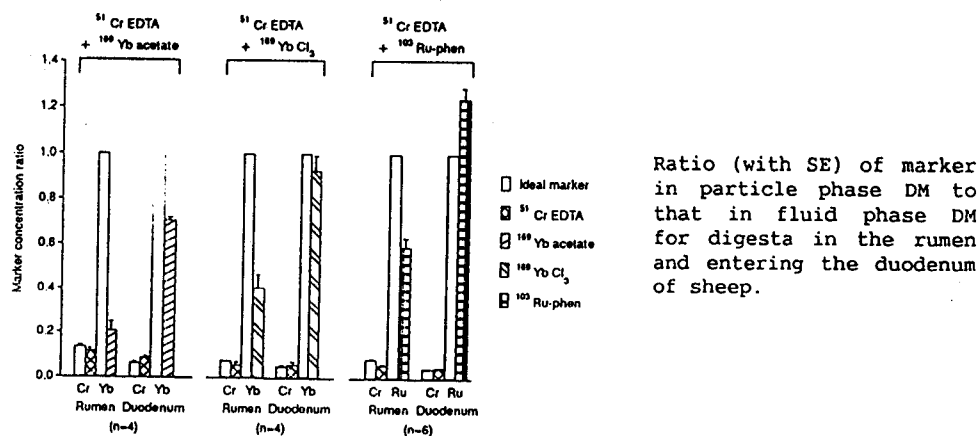


YTTERBIUM ACETATE IS NOT A SATISFACTORY MARKER OF PARTICLES IN THE RUMEN WHEN INFUSED IN SOLUTION

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When solutions of the solute marker CrEDTA and either the phenanthroline complex of Ru (Ru-phen) or a salt of Yb are infused continuously into the rumen, the deviations of Ru-phen and Yb from the ideal of uniform distribution throughout digesta solids result in only small errors (1-2%) in dry matter (DM) flow to the duodenum (Faichney 1992). However, the form in which Yb is infused affects its distribution in rumen digesta more seriously than that in duodenal digesta.

The ratio of marker concentration in the DM of particle phase (PP) and fluid phase (FP), prepared by straining digesta through Terylene cloth, must be one for an ideal particle marker. By contrast, the ratio for an ideal solute marker equals $(1-DM.PP) \times DM.FP / (1-DM.FP) \times DM.PP$. Ideal values are compared in the Figure with those obtained in sheep during the plateau phase of the intra-ruminal infusion of $^{51}\text{CrEDTA}$ with ^{169}Yb acetate, with $^{169}\text{YbCl}_3$ (Faichney et al. 1989a) or with $^{103}\text{Ru-phen}$ (Faichney et al. 1989b).



Non-ideal solute markers may be excluded from part of the digesta water and/or adsorbed to solids to a small extent (<5%). The small deviations from ideal for $^{51}\text{CrEDTA}$ indicate the predominance of exclusion over adsorption in rumen digesta and of adsorption over exclusion in digesta entering the duodenum in the experiments reported. The deviations from ideal of the particle markers entering the duodenum were within the range examined by Faichney (1992). In the rumen, there was a stronger bias towards FP solids (small particles), particularly with Yb. In fact, Yb infused as the acetate behaved as a quasi-solute marker and could not be used to correct for errors in sampling rumen digesta by the double-marker method.

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