CORRECTION OF ^{51}CrEDTA MEAN RETENTION TIMES TO OBTAIN THOSE FOR UNABSORBED SOLUTES IN CONTINUOUSLY FED SHEEP

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^{51}CrEDTA is absorbed from the gastro-intestinal (GI) tract to a small extent so its mean retention time (MRT) underestimates that of unabsorbed solutes. Since the proportion of the total ^{51}CrEDTA absorption occurring in a section of the GI tract can be assumed to be the same as the proportion of its MRT spent in that section (Faichney 1975a), its rumen (R) MRT can be corrected if both urine ^{51}CrEDTA excretion (equivalent to absorption) and its RMRT as a proportion of its GI tract MRT are known. As it is not always possible to collect urine for 7-10 days after a dose of ^{51}CrEDTA into the rumen, we have examined the relationships between its % recovery in the urine in the first day after the dose (UCr(d1)), total urine % recovery (UCr), its RMRT (h) and total MRT (h).

Six 3-year-old Border Leicester x Merino wethers (34 to 41 kg during the experiment) fitted with rumen cannulae were given continuously by conveyor belt a pelleted mixture of lucerne and oats (3:2) at intakes of 28 to 81g DM/(d.kg$^{3/4}$); each sheep received two different intakes. Water was freely available. In each period, after 2 weeks preliminary feeding an intraruminal dose of ^{51}CrEDTA (100 µCi; 20 mg) was given. ^{51}CrEDTA MRT's were calculated from its disappearance from rumen fluid during the 2-3 days, and its appearance in the faeces collected at intervals during the 7-10 days following dosing; urine ^{51}CrEDTA excretion was recorded daily. All ^{51}CrEDTA concentrations were expressed as fractions of the dose.

Total ^{51}CrEDTA recovery (faeces + urine) was 100.6 ± SE 0.7%. One sheep in one period had aberrant urine recoveries (UCr(d1) 15.4;UCr 17.1) and one sheep in another period lost its rumen cannula; values from these sheep were omitted from the relationships established which were:

I UCr = 7.89 - 10.22 exp(-0.158 RMRT), R^2 = 0.756,rsd = 0.665, 7df
II UCr = 8.42 - 7.655 exp(-0.0383 MRT), R^2 = 0.697,rsd = 0.741, 7df
III UCr/UCr(d1)= -6.691 + 7.144 exp(0.01336 RMRT), R^2 = 0.974,rsd = 0.0945, 7df
IV RCr/UCr(d1)= 0.154 + 0.0408 RMRT, r^2 = 0.956, rsd = 0.0475, 8df
V UCr/UCr(d1)= -1.290 + 1.943 exp(0.01289 MRT), R^2 = 0.971,rsd = 0.0995, 7df
VI RMRT = 0.640 + 0.351 MRT, r^2 = 0.986,rsd = 0.643, 8df

The tendency for RMRT/MRT to decline as MRT increased was not significant; its mean value was 0.378 (± SE 0.009).

The corrected (solute) RMRT can be obtained as ^{51}CrEDTA RMRT/(1-RCr/100). RCr, the % absorbed from the rumen, can be obtained from UCr(d1) and RMRT using equation IV. Solute MRT can be obtained as described by Faichney (1975a) or, in the absence of total faecal collections, using equation 9 from Faichney (1975b) and dividing by (1-UCr/100). Equations I-VI may not apply if the feeding regime causes fluctuations in rumen osmolality, and hence rumen ^{51}CrEDTA absorption (Dobson et al. 1976).

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