

⁵¹CrEDTA RECOVERY AND RETENTION TIME IN THE HORSE

Z.G. CRUZ, J.H. TERNOUETH and K.F. DOWSETT

The use of ⁵¹Cr ethylenediamine tetra-acetic acid (⁵¹CrEDTA) as a soluble marker to study gastro-intestinal function in the horse does not appear to have been explored, except for the study by Argenzio et al. (1974).

An experiment was conducted to determine the recovery and retention time of ⁵¹CrEDTA in mature gelded horses. Three horses were fed three times each day on oaten chaff (85%), oats (12%) and soybean meal (3%). They were confined individually in metabolic crates and exercised once daily. A single dose of ⁵¹CrEDTA (Amersham International Ltd., UK) was given per os at the rate of $41.6 \pm 9.56 \mu\text{Ci/kg}$ dry matter intake on three occasions at intervals of 28 d. Total faeces and urine were collected for 7 d. Every defaecation and urination for the first 3 d and pooled samples for the last 4 d were timed, weighed and sub-sampled for counting ⁵¹CrEDTA activity using Rackgamma II (Linbrook International Ltd.). Recovery from the faeces and urine was calculated and the measures of retention time were estimated using the technique described by Warner (1981).

The total recovery of ⁵¹CrEDTA was $95.6 \pm 4.5\%$ in 7 d, 93.3 and 2.3% appearing in the faeces and urine, respectively.

Significant concentrations of isotope appeared in the voided faeces 4-16 h after feeding. The $t_{0.5}$ was 9.2 ± 1.7 h, t_{mean} was 33.5 ± 2.5 h, occurring shortly after t_{max} and t_{50} , which were 26.6 ± 1.8 and 28.6 ± 2.2 h, respectively. Commencing at or close to t_{mean} , the concentration of ⁵¹CrEDTA followed an exponential decay curve with a half-life of 12.5 ± 0.7 h, so that $t_{99.5}$ occurred 103.1 ± 0.7 h, after dosing.

As in sheep (Downes and McDonald 1964), the total recovery of ⁵¹CrEDTA was almost complete, 98% appearing in the faeces. The mean retention time was similar to those recorded in other studies in the horse, using styrofoam particles and chromic oxide as particulate matter markers (Hintz and Loy 1966; Vander Noot et al. 1967). The exponential decay curve, with a half-life of 12 h, indicates considerable intermixing of gastro-intestinal contents. In other experiments with the same diet, we have found that digesta spends 23 h of a total gastro-intestinal transit time of 33 h in the caecum and large colon. Thus this exponential decay curve occurs during the caeco-colic transit of the digesta.

We conclude that ⁵¹CrEDTA is a simple, easy to measure, soluble marker which may be used for gastro-intestinal studies in the horse.

ARGENZIO, R.A., LOWE, J.E., PICKARD, D.W. and STEVENS, C.E. (1974).

Am. J. Physiol. 226:1035.

DOWNES, A.M. and McDONALD, I.W. (1964). *Br. J. Nutr.* 18:153.

HINTZ, H.F. and LOY, R.G. (1966). *J. Anim. Sci.* 25:1059.

VANDER NOOT, G.W., SYMONS, L.D., LYDMAN, R.K. and FONNESBECK, P.V. (1967). *J. Anim. Sci.* 26:1309.

WARNER, A.C.I. (1981). *Aust. J. Zool.* 29:759.

Department of Animal Production, University of Queensland, St. Lucia, Queensland 4067.