

## CONTINUOUS CONTROLLED-RELEASE ADMINISTRATION OF CHROMIC OXIDE TO SHEEP

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In nutritional studies with grazing animals, chromic oxide ( $\text{Cr}_2\text{O}_3$ ) is usually administered once or twice daily (Corbett 1978), and variation in its concentration in digesta and faeces may be large. The variation in the faeces of sheep that received 5 g  $\text{Cr}_2\text{O}_3$  over 15 d from a controlled release device (CRD) (Laby 1978) was examined and compared with that observed with twice daily administration of 1 g in a gelatin capsule.

In Expt. 1, a CRD was suspended per fistulam in the rumen of each of six grazing sheep; loss of  $\text{Cr}_2\text{O}_3$  plus carrier matrix was measured daily and faeces samples were taken manually from the rectum twice daily near the time of capsule expiry. One of the six CRD failed to work, but each one of the remainder released  $\text{Cr}_2\text{O}_3$  at a uniform daily rate. The overall mean rate was  $0.36 \pm 0.02$  g  $\text{Cr}_2\text{O}_3$ /day, the variation occurring principally between CRD, not between days. Their life varied from 13.4 to 15.1 d, and in all animals the faecal  $\text{Cr}_2\text{O}_3$  concentration dropped markedly within 24 h of expiry of the capsule load.

In Expt. 2, two non-cannulated sheep were fed 25 g of lucerne pellets each hour. One animal received one CRD by mouth and the other was dosed orally with 1 g  $\text{Cr}_2\text{O}_3$  in a gelatin capsule twice daily. After a preliminary 5 d period, faeces were collected daily for one week including, on one day, collections made every 2 h in an 8 h period. After mixing, 10 sub-samples each of 2 or 3 faecal pellets were taken for analysis from each daily collection. The average within-day coefficient of variation (CV) for faecal concentration in the small sub-samples was 6.2 per cent with CRD and much greater, 20.1 per cent, with gelatin capsule administration. The CV for the mean concentrations in all of the total daily collections were 16 and 18 per cent respectively, and for the 2 h collections were 8 and 21 per cent.

In Expt. 3, six sheep grazed as one flock. Three received a CRD, and the other three were dosed twice daily as in Expt. 2. After 5 d, faeces were taken manually from the rectum of each sheep twice daily for 7 d. The CV for faecal concentrations in these samples were 31, 24 and 23 per cent for the CRD sheep and 41, 46 and 62 per cent for those dosed with gelatin capsules.

Expt. 1 showed that devices with reliable release characteristics can be made and that, if necessary, the rate of release of  $\text{Cr}_2\text{O}_3$  and time of expiry can be confirmed by monitoring faecal concentration. Expts. 2 and 3 demonstrated that the chromium is more uniformly dispersed in the faeces when administered by CRD than by gelatin capsule and that fewer replicate analyses of a sample are required. The diurnal variation associated with twice-daily dosing is removed so that any variation in the rate of passage and excretion of  $\text{Cr}_2\text{O}_3$  will be more closely associated with the pattern of feed intake and flow of digesta.

CORBETT, J.L. (1978). 'Measurement of Grassland Vegetation and Animal Production', p. 163, editor L. 't Mannetje. (CAB: Farnham Royal, UK).  
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