CONTINUOUS ADMINISTRATION OF CHROMIC OXIDE TO GRAZING CATTLE

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Controlled release devices (CRD) to administer chromic oxide (Cr_2O_3) continually to sheep have been described (Ellis et al. 1981; Harrison et al. 1982). Those devices were formed from syringe barrels and sucrose monostearate was used as carrier material. Linear release rates up to 360 mg/d were achieved for 10 to 20 d. The spring-loaded variable geometry device (Laby 1978) is now being developed commercially to deliver monensin to cattle (Schlink and Ellis 1982), and this report refers to the use of commercially manufactured casings for the CRD, and Cr_2O_3 cores moulded as for monensin CRD.

Twenty-one Hereford steers and five rumen-fistulated cows grazing drought-affected pastures were dosed orally with one Cr_2O_3 CRD. Total Cr_2O_3 release in steers was calculated from change in CRD plunger position at dosing and at slaughter 15 d later. The plunger position of the CRD in fistulated cows was also measured at 1- or 2- d intervals for 19 d. Eight days after dosing, a faecal sample was collected from each of the steers for Cr_2O_3 assay.

Plots of plunger position against time for each CRD in the fistulated cows show that, after 2 d, the release of Cr_2O_3 was then linear ($r^2>0.99$) until at least day 17. The mean rate of Cr_2O_3 release from day 3 to day 15, calculated by linear regression, was 0.926 (SD 0.048)g/d. During the first 15 d the CRD from the steers and the fistulated cows lost 11.20 (±0.94) and 12.75 (±1.05)g Cr_2O_3, respectively. While it is recognised that this difference may be due to differences in physiology or rumen environment between the herds, it is more probable that the greater release from the oft-recovered CRD in the fistulated animals resulted from disturbance of the releasing surface of the CRD. In both groups, the coefficient of variation (CV) was 8.4%, but the loss over the period day 3 to day 15 in the fistulated animals exhibited a CV of only 6.5%, suggesting that a significant proportion of the between-device variability resulted from fluctuations in the first few days. As expected, linear regression analysis removed much of the error associated with the individual measurements and resulted in the lower CV (5.2%).

Mean Cr_2O_3 concentration in the faeces from the 21 steers was 303 ppm (SD 82). Allowance for individual CRD variations was made by calculating the ratio faecal Cr_2O_3/Cr_2O_3 released. This correction failed to reduce the between-animal variation, suggesting again that most of the between-CRD variation is a result of measurement techniques, and that a release rate applicable to the complete batch of devices can be used. The observed variation of faecal Cr_2O_3 concentration between the steers is within the limits usually obtained using twice-daily dosing with capsules containing Cr_2O_3, confirming that the CRD technique has further potential for exploitation.

ELLIS, K.J., LABY, R.H. and BURNS, R.G. (1981). Proc. Nutr. Soc. Aust. 6: 145.
HARRISON, F.A., LABY, R.H. and MANGAN, J.L. (1982). Proc. Nutr. Soc. 41: 55A.
LABY, R.H. (1978). Australian Patent Application No. 35908/78.
SCHLINK, A.C. and ELLIS, K.J. (1982). Proc. Aust. Soc. Anim. Prod. 14: 615.

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Dr. A.C. Schlink (Elanco Products Company, Australia) provided valuable technical advice on CRD formulation and assembly.