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ESTIMATING DELIVERY RATES OF INTRA-RUMINAL CONTROLLED RELEASE DEVICES USING FAECAL EXCRETION CURVES

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Intra-ruminal controlled release devices (CRDs) are plastic winged capsules containing an active ingredient which is slowly extruded by a spring-loaded plunger. They were originally developed to administer anthelmintics to ruminants at a known and constant rate. More recently the technology has been used to administer mineral markers (Parker, 1990), as well as n-alkanes (Dove *et al*. 1991) to ruminants in order to estimate faecal output. This method of marker administration minimises the labour requirement and animal disturbance associated with daily marker dosing.

The CRD delivery rate used in calculations is usually determined by the manufacturer on a batch sub-sample utilising plunger travel and matrix ingredient concentration following a period suspended in the rumen of test steers. If rumen-fistulated animals are not available then plunger displacement and a delivery rate estimate can only be calculated following slaughter and CRD recovery.

The study reported here formed part of an experiment to measure the effectiveness of n-alkane dosing methods to estimate feed intake. Two Brahman cross-bred steers, (286 kg and 212 kg) were fed a chopped buffel-grass hay *ad libitum* in individual partially covered pens. Each steer was dosed with an n-alkane CRD (Captec Ltd, Auckland, New Zealand) designed for animals 100-300 kg liveweight. Each capsule contained 4g n-dotriacontane (C32) and 4g of n-hexatriacontane (C36) and was designed to release 200 mg of both n-alkanes each day.

Total faeces were collected manually from the pen floor at 0800 h each day for 20 d, mixed, weighed and sub-sampled. Sub-samples were dried at 60°C for 48 h to determine DM content, ground in a ring mill and n-alkane composition determined using gas chromatography. Daily faecal DM output and C32 and C36 concentrations were used to estimate daily excretion (mg) of C32 and C36. A logistic curve was fitted to the daily marker output data, and this (mean ± s.e.) is presented in Figure 1.

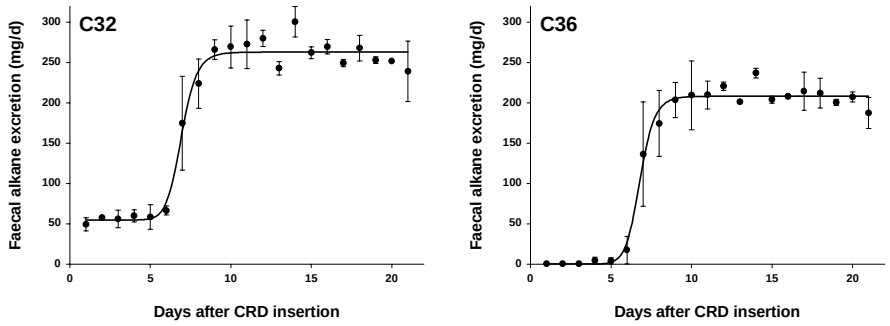

Figure 1. Average daily faecal excretion of C32 and C36 for steers fed a buffel grass hay

Estimates determined in this way show a capsule delivery rate (mean ± s.e.) of 209 ± 8.5 mg/d C32 and 215 ± 7 mg/d C36, after correction for alkane contributions from the hay which provided 54 ± 7 mg/d of C32 but no C36. In this instance, the data indicate release rates marginally, but consistently higher than those estimated by the manufacturer (200 mg/d) which would have contributed to errors in intake estimation. The approach used here provides a useful method for estimating CRD delivery rate for a particular feeding situation.

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