Recovery in faeces of alkanes from a controlled release device

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Knowledge of the n-alkanes found in pasture species combined with a known daily dose of synthetic alkanes and measurement of alkanes in faeces can be used to calculate intake of pasture. The extent of recovery in faeces of the different carbon chain–length alkanes needs to be known to make these calculations. Dosing of the synthetic alkanes C_{32} and C_{36} by intra–ruminal controlled–release device (CRD) is convenient and reduces disruption to grazing. This experiment was to determine the extent of recovery in faeces of C_{32} and C_{36} in ground alkane CRD matrix fed to cattle.

Eight Angus steers (ca. 300 kg; 10 months old) were individually penned and fed a ration of 60% rolled–barley, 32% chopped sorghum hay and 8% additives. After they were accustomed to the ration and to wearing a faecal collection bag they were fed a known weight (ca. 10 g) of ground CRD matrix mixed into feed, and then all faeces were collected over the next seven days. The ground matrix was prepared by grinding tablets from the core of two CRD (Captec Ltd, Auckland, NZ) to the consistency of table sugar. Total faeces for each animal each day was mixed and subsampled. Duplicate samples of dried (70°C) ground feed, feed spiked with known amount of CRD matrix, and faeces were analysed for their alkane contents using previously described methods (Herd et al. 2002).

The concentrations of C_{32} and C_{36} in the ground CRD matrix were equal, being 210 and 214 ppm dry matter (DM) when determined from the spiked feed samples, and 214 ppm for both when measured in ground matrix. Large amounts of C_{32} and C_{36} appeared in faeces over the first two days after dosing; their concentrations thereafter quickly approached background levels (Figure 1). Despite ingesting similar amounts of C_{32} and C_{36}, considerably less C_{32} than C_{36} was excreted. Recoveries for different chain–length alkanes are shown in Figure 2. Recoveries for C_{32} were 87 ± 19% (SD) and C_{36} were 63 ± 14%.

Whether these recoveries for ground, pulsed–dosed alkane apply in the field where CRD alkane–matrix is slowly eroded over time remains to be determined. Recoveries of C_{36} lower than for C_{32} from similar CRD reported by Herd et al. (2002) would, without compensation, lead to erroneous calculation of feed intake. This report confirms the need to validate recoveries under the conditions of each experiment.