

## PATTERNS OF APPEARANCE OF PARTICULATE AND SOLUTE MARKERS IN THE FAECES OF ALPACAS AND SHEEP

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The solute marker chromium ethylenediamine tetraacetic-acid (Cr-EDTA) appears in the faeces of sheep faster than the particulate marker cerium-144-praseodymium-144 (Grovm and Williams 1973). The time that the particulate phase of digesta is retained in the rumen accounts for most of the time it spends in the digestive tract (Faichney 1980). Comparison of the studies reviewed by Warner (1981) shows similar retention times of markers in the rumens of animal species of similar body size, which suggests that the patterns of appearance of markers in the faeces would be similar.

Three male alpacas (49.5-71.5 kg) and 3 Merino wethers (49.0-56.0 kg) were housed in individual pens outdoors, and offered rations of 14.3 g/kg bodyweight at 12-hour intervals. The diet comprised equal parts of oaten and lucerne hays plus a complete mineral mix (1% of dry matter) which was either ground (5 mm screen) and pelleted (diet A), or chopped (20 mm) and pelleted (diet B). The modulus of fineness of particles in diet A ( $2.9 \pm 0.04$ ) was less than that of diet B ( $3.5 \pm 0.04$ ) ( $P < 0.05$ ). Each morning oaten hay also was offered, either long (with diet B) or chopped (with diet A). Feed intake was measured daily. After a 7-day preliminary period, the animals were fed diet A or B for 8 days. The particulate and solute phases of digesta were marked by YbCl<sub>3</sub> (281 mg Yb/L) and Cr-EDTA (5.13 mg Cr/L) respectively in a 50 mL dose via a stomach tube. Total faeces (collected 6-hourly for 3 days and 12-hourly for 5 days) were measured for Cr and Yb by atomic absorption spectrophotometry. Gompertz curves were fitted to the cumulative appearance of each marker (Y) in the faeces with time (X):  $Y = P1 + P2 * \exp[-\exp\{-P3 * (X - P4)\}] - P5 * X$ , where P1, P2, P3, P4, P5 are the Y intercept, base, point of inflection, top and linear components of the curve respectively. The pattern of appearance of Cr in the faeces was the same for sheep and alpacas (Table 1).

The pattern of appearance of Yb differed at P3 ( $P < 0.05$ ) between species and between diets; the transit time of the particulate phase of digesta was faster in sheep than in alpacas for each diet and was faster with diet A than with diet B. These differences were not reflected in differences in dry matter digestibility in either species (data not shown) and do not support the hypothesis that the pattern of appearance of particulate markers in the faeces of animal species of similar size is the same.

**Table 1. Parameters (P1-P5) to describe the patterns of appearance of Cr and Yb in faeces**

Species	Diet	P1	sem	P2	sem	P3	sem	P4	sem	P5	sem	
Yb	Alpaca	A	-0.9	0.51	93.5	1.92	0.100	0.0081	20.7	1.66	0.054	0.0158
	(n=3)	B	-0.4	0.51	94.1	1.92	0.137	0.0066	20.0	1.66	0.047	0.0158
	Sheep	A	-1.7	0.51	93.8	1.92	1.101	0.0066	21.9	1.66	0.056	0.0158
	(n=3)	B	-1.4	0.51	94.1	1.92	0.092	0.0066	24.6	1.66	0.053	0.0158
Cr	Alpaca	A	0.3	0.52	91.0	1.45	0.123	0.0191	16.9	1.24	0.061	0.0090
	(n=3)	B	-0.9	0.52	96.0	1.45	0.149	0.0156	17.5	1.24	0.035	0.0090
	Sheep	A	-1.0	0.52	92.7	1.45	0.149	0.0156	18.8	1.24	0.060	0.0090
	(n=3)	B	-1.4	0.52	94.6	1.45	0.114	0.0156	22.0	1.24	0.048	0.0090

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