

Water kinetics in the rumen of two breeds of sheep

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Morphophysiological variations of the digestive system (digestive capacity, digesta flows, fermentation rates) of different species of ruminants, and between breeds within each species, are related to their feeding behaviour and digestive physiology (Hofmann, 1989, *Oecologia*, 78, 443-457), with possible differences between ruminant species and between breeds in the efficiency of digestive utilization of the feeds. The present work was conducted to study the differences between two breeds of sheep (Churra vs Merino) in their rumen volumes and in the water kinetics in the forestomachs.

Ten non-productive mature sheep (five Churra (mean LW = 44.0 kg ± 3.2) and five Merino sheep (mean LW = 46.7 kg ± 2.22)), each fitted with rumen cannula, were used in this study. Animals were fed once a day at 09:00 h, receiving 1 kg of alfalfa hay (877 g DM/kg). Daily water intake was recorded. Co-EDTA was used as liquid phase marker, being injected into the rumen through the cannula. Rumen fluid samples were obtained at 2, 4, 6, 9, 12, 15, 19, 24, 36 and 48 h after Co-EDTA dosing. Osmolarity (OP) and Co concen-

trations were determined in the rumen samples. Water absorption across the rumen wall (W) was estimated as $W = 395 - 1.16 \times OP$ (Lopez *et al*, 1994, *British Journal of Nutrition*, 71, 153-168). Rumen liquid volume and liquid outflow rates were estimated from the dilution rate of Co in the rumen. Saliva secretion was calculated as the difference between water outputs from (absorption through the rumen wall, outflow) and inputs to the rumen (drinking water, water ingested with food), taking into account the amounts of water added with the marker or removed with the rumen fluid samples. Rumen volumes and liquid flows into and out of the rumen are shown in the Table. Daily saliva flows estimated by this indirect method were similar to reported flows measured in sheep by direct methods, and therefore the model seems to be valid under these practical conditions. Although Churra sheep tended to show larger rumen volumes and higher liquid outflow rates and saliva flows than Merino sheep, the differences between breeds were not statistically significant ($P > 0.10$), due to the high variability between animals within each breed.

	Churra	Merino	SED (df = 8)
Rumen liquid volume (l)	7.99	6.98	0.844
Rumen volume as % of the LW	18.4	15.1	2.02
Water intake (l/d)	2.99	2.41	-
Fractional outflow rate (% per h)	5.75	5.80	0.532
Liquid outflow rate (l/d)	10.99	9.56	1.101
Water absorption (l/d)	2.22	1.96	0.331
Estimated saliva production (l/d)	11.64	10.50	1.055

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