

FACTORS AFFECTING INTAKE AND DIGESTIBILITY OF CELL WALL CONSTITUENTS
IN SHEEP AND CATTLE FED NaOH-TREATED STRAW

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Intake and digestibility differences have been reported between sheep and cattle with the direction and magnitude of the difference being associated with the characteristics of the feed and nutrients involved (Schneider and Flatt 1975). In the present experiment we examined factors associated with species differences in cell wall digestibility.

Six each of yearling wethers (36 kg) and yearling heifers (227 kg), all fitted with rumen and abomasal cannulae, were housed in individual metabolism cages and fed diets of coarsely-milled wheat straw sprayed with NaOH solution (Amaning-Kwarteng et al. 1984). Animals within species were arranged in two 3 x 3 latin squares and fed treated straw ad libitum, either alone (W) or with supplements of cotton-seed meal (WC) or dry-rolled barley (WB); both supplements at 150 g/d for sheep and 700 g/d for cattle. Straw was also sprayed with Cr-EDTA (200 mg Cr/kg) and Yb(NO₃)₃ (150 mg Yb/kg) to measure the total digesta flow at the abomasum. The weight of rumen contents was measured after manually emptying the rumen. Sheep and cattle data were combined in a single analysis of variance to determine species (Sp), diet (D) and Sp x D effects.

Mean dry matter (DM) intakes and sites of cell wall (CW) digestion

	Species (Sp)		Diet (D)			SED [†]	Sig-nifi-cance
	Sheep	Cattle	W	WC	WB		
Total DM intake (g/kg ^{1.0})	30.4	28.7	27.9	30.7	30.1	0.97	D*
Wet rumen digesta (g/kg ^{1.0})	152	210	155	190	179	19.50	Sp**
Rumen DM pool (g/kg ^{1.0})	24.7	24.4	22.4	25.7	25.7	1.19	D*
Cell wall intake (g/kg ^{1.0})	19.2	18.3	18.6	19.4	18.3	0.90	NS
Apparent CW digestibility (%)	60.0	64.3	60.9	63.6	61.9	1.43	Sp*
Site of CW digestion							
Stomach (% of total)	83.8	84.6	82.7	85.6	84.3	3.81	NS
Intestine (% of total)	16.2	15.4	17.3	14.4	15.7	2.02	NS
DM retention time (h)	19.6	20.4	19.4	20.2	20.5	1.96	NS
NDF retention time (h)	25.8	28.8	27.0	27.4	27.6	1.18	Sp*
Lignin retention time (h)	33.7	36.2	34.7	35.1	35.1	1.09	Sp*

* P < 0.05; ** P < 0.01; NS, non-significant.

† For Sp x D interaction means (18 d.f.).

Intakes by sheep and cattle were only similar when expressed as g/kg^{1.0}. Neither supplement nor animal species affected site of CW digestion. The overall significantly higher CW digestion in cattle than sheep agrees with the observations of Ternouth et al. (1979) and may be attributed to the longer retention time of fibre in the rumen of cattle (P < 0.05) and the significantly higher rate of cell wall degradation in cattle than sheep (unpublished)

AMANING-KWARTENG, K., KELLAWAY, R.C. and LEIBHOLZ, J.M. (1984). Proc. Nutr. Soc. Aust. 9: 152.

SCHNEIDER, B.H. and FLATT, W.P. (1975). 'The Evaluation of Feeds Through Digestibility Experiments' (University of Georgia Press: Athens).

TERNOUTH, J.H., POPPI, D.P. and MINSON, D.J. (1979). Proc. Nutr. Soc. Aust. 4: 152.

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