

## DIGESTION KINETICS OF UNTREATED AND ALKALI-TREATED OAT STRAW IN CATTLE

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Intakes of low quality forages were shown to be limited by low clearance rates from the rumen of particles <1 mm maximum dimension (Thiago and Kellaway, unpublished). An experiment was carried out to determine the role of contractions of the reticulo-rumen on clearance rates of undigested forage material, and data presented here was collected as part of this study. Clearance rates were calculated from ruminal measurements and compared with measurements of abomasal flows of digesta made concurrently in the same animals.

Chaffed or hammer-milled oat straw was sprayed with a solution supplying (g/kg straw) 100 H<sub>2</sub>O, 12 N, 1 S and (mg/kg straw) 5 Cu, 0.1 Co, 40 Fe and 45 Zn and sprinkled with dicalcium phosphate to supply (g/kg straw) 2.5 P and 3.2 Ca. Alkali and salt treatment were achieved by adding (g/kg straw) 45 NaOH and 66 NaCl respectively to the spray solution. Steers aged 6 months, c. 110 kg live weight, were housed in individual metabolism crates and fed *ad libitum* at 3 h intervals for periods of 14 days, after which rumen contents were removed and sampled. Digestion rates and clearance rates of cell walls (CW) were calculated as described by Dunlop and Kellaway (1980). Digesta flows through the abomasum were measured in each animal using radioactive markers. Particle size distribution in feed samples and rumen contents was measured by wet sieving.

TABLE 1. Digestion kinetic measurements in steers fed oat straw milled (M) and chaffed (C) with (A) or without (U) alkali treatment and with salt treatment (S)

	MU	MA	CU	CA	CS	F	P
No. observations	3	6	4	7	6		
Straw DM intake (g/kg <sup>0.75</sup> /d)	46.8	68.7	37.8	60.1	42.0	A>U,S M>C	0.001 0.05
Rumen DM pool size (g/kg <sup>0.75</sup> )	79.2	82.0	79.6	73.4	68.9	NS	
Proportion of particles <1 mm							
Feed	0.32	0.58	0.03	0.14	0.04	M>C	0.05
Rumen	0.82	0.71	0.82	0.66	0.79	A<U	0.01
Clearance rate of undigested CW (g/kg <sup>0.75</sup> /d)	23.9	29.2	17.2	27.2	24.0	A>U,S M>C	0.001 0.05
Abomasal flow of CW (g/kg <sup>0.75</sup> /d)	15.9	19.2	13.0	16.5	15.6	A>U,S	0.05

Pool size of dry matter in the rumen was similar on the five diets although dry matter intake was 53% higher on alkali-treated diets than on untreated and salt diets. The proportion of particles <1 mm in the rumen was lower on alkali-treated diets. Abomasal flows of CW (Y) were related to ruminal clearance rates of CW (X) by regression analysis:

$$Y = 0.53X + 3.73 \quad (r^2 = 0.86; P < 0.01).$$

DUNLOP, A C, and KELLAWAY, R C (1980). Proc. Nutr. Soc. Aust. 5:200

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