

THE EFFECT OF FEEDING SODIUM HYDROXIDE TREATED WHEAT GRAIN
ON pH AND OUTFLOW RATE OF RUMINAL FLUID IN SHEEP

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Feeding of grain treated with up to 4 per cent (w/w) NaOH increased digestibility of the grain DM, and rate of growth in ruminants (Ørskov 1979). The effect of alkali treatment on production may result from the increased degradability of grain DM in the rumen (Fagan and Kempton 1981), or an effect of the additional sodium from the NaOH on the pH and outflow of ruminal fluid.

The aim of this study was to examine in sheep the effect of feeding NaOH-treated wheat on pH, the concentration and molar proportions of volatile fatty acids in ruminal fluid and the outflow of liquid from the rumen.

Four merino sheep fitted with rumen cannulae were given one of either of the two diets. The untreated group (UT) received (g/d) a basal diet of 300 oaten chaff, 300 whole-wheat grain, 30 urea and 5 minerals which included 3 g NaCl/d. The treated group (T) received a similar diet in which the wheat grain had been treated with NaOH (4% w/w). The animals were fed once per day. Fifty mg CrEDTA was injected into the rumen of each animal, and ruminal fluid samples collected at intervals over the following 36 h. Rumen fluid pool-size, fluid outflow-rate and fluid half-time were calculated from the Cr concentration vs. time relationship as described by Weston and Hogan (1967). Total concentration and molar proportions of individual volatile fatty acids, and pH, were determined on samples of ruminal fluid collected pre- and post-feeding for Cr analysis.

Treatment	No.	Rumen	Flow	T _{1/2}	Water	pH		Propionate	
		Volume	Rate			Intake	Pre-	Post-	(mol/100mol)
		(l)	(l/d)	(min)	(l)				
UT	4	4.2	6.1	699	1.3	6.7	6.1	19.2	27.6
T	4	6.2	8.9	702	1.9	6.8	6.7	14.3	22.0
SE		0.29	0.41	46	0.05	0.07	0.15	1.6	1.7

Feeding of wheat treated with NaOH significantly (1) increased water intake, rumen volume, and fluid flow rate, (2) prevented a post-feeding depression in pH, (3) reduced the molar proportion of propionate in ruminal fluid (4) had no significant effect on total VFA concentration or the molar proportions of the other individual fatty acids in ruminal fluid.

The increased water intake and fluid turnover may result from the increased degradability of the wheat grain, or in response to the additional Na (7 g/d) provided by the NaOH.

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