

AMMONIA TREATMENT OF WHOLE WHEAT GRAIN FOR CATTLE

S. LOW* and R.C. KELLAWAY*

Barley and wheat grains are digested much more efficiently by cattle when cracked than when fed whole. However, rapid fermentation of cracked grain in the rumen can depress pH, reduce cellulolysis, reduce forage intake and cause rumenitis and bloat. Whole cereal grains treated with NaOH solution are digested more slowly and depress forage intake less than cracked grains. The possibility of using NH₃ as an alternative alkali to NaOH was investigated in the present experiment. NH₃ is easier to apply in silos, it increases the nitrogen content of the grain and it avoids problems of Na toxicity.

Wheat grain was fed whole, cracked and NH₃-treated. The NH₃-treatment was carried out by mixing water with whole grain (150 g/kg grain), placing 25 kg batches of the moistened grain in plastic bins which were sealed and injected with gaseous NH₃ (40 g/kg grain). Treated grain was allowed to react with NH₃ in the sealed bin for 2 weeks at 20° before use. Grain was fed at the rate of 2.1 kg/day/calf to six steer calves aged 5 months, weighing c. 130 kg live weight, in a 3 x 3 latin square design with two replicates. No roughage was fed after a preliminary period of 2 weeks during which the proportion of roughage in the diet was reduced gradually.

TABLE 1. Digestion and utilization of whole (W), cracked (C) and NH₃-treated (N) wheat grain by calves

	Diets			SEM
	N	C	N	
Dry matter				
Intake (g/day)	1917	1888	1743	12.7
Digestibility	0.79	0.86	0.87	0.014
Whole grain in faeces (g/kg grain fed)	122.3	3.4	36.2	4.07
Nitrogen				
Grain (g/kg DM)	20.6	21.1	28.1	0.13
Intake (g/day)	39.6	39.9	48.6	0.25
Faeces (g/day)	12.4	10.1	9.7	0.45
Urine (g/day)	20.6	20.4	33.8	1.05
Balance (g/day)	6.6	9.4	5.4	0.70

During diet changeovers, all calves fed cracked grain showed anorexia and were fed roughage for a few days; this did not occur on the other diets. Two calves on diet N were fed grain which had not been aerated after treatment; their N balances were -4.9 and -3.5. The other four calves on diet N were fed aerated grain; their N balances were 5.8, 10.3, 10.3 and 14.6.

NH₃-treatment of whole wheat grain appears to be an effective way of increasing its digestibility in a way which avoids the digestive disorders which occur when cracked grain is fed.

* Dept. of Animal Husbandry, University of Sydney, Camden, N.S.W. 2570.