

DOSE OF VIRGINIAMYCIN REQUIRED TO CONTROL LACTIC ACID ACCUMULATION IN RUMEN AND CAECAL DIGESTA

G.R. THORNILEY, M.D. BOYCE and J.B. ROWE

Animal Industries Division, Dept of Agriculture, Baron-Hay Court, South Perth, W.A. 6151

Virginiamycin is a feed additive which has been shown to reduce lactic acid accumulation associated with fermentation of soluble carbohydrate in rumen digesta (Nagaraja *et al.* 1987). In animals fed high levels of grain, the accumulation of lactic acid in caecal digesta can be greater than in the rumen (Lee 1977; Godfrey *et al.* 1992). The aim of the experiments reported here was to examine the effect of different doses of virginiamycin on lactate accumulation in both rumen and caecal digesta and determine the appropriate dose of virginiamycin for control of lactic acidosis.

In experiment 1, digesta was collected from a steer immediately after slaughter, diluted 1: 1 with distilled water, and then incubated with glucose solution (4 mL digesta and 1 mL of 60 mg/L glucose solution) and varying amounts of virginiamycin (0-4 µg/mL) for 24 hours. In experiment 2, 30 sheep (50 kg liveweight), that had not previously been fed cereal grain, were dosed daily with different amounts of virginiamycin (0-160 mg/day) for 21 days before slaughter. Digesta samples were collected at slaughter, diluted and incubated as described above but without addition of virginiamycin. Following incubation, the tubes were acidified, centrifuged and analysed for lactic acid.

In the absence of virginiamycin, lactate accumulation in caecal digesta was 29% higher than that in rumen digesta (Table 1). This provides further evidence that accumulation of lactic acid and low pH during hind gut fermentation may be important in the pathophysiology of lactic acidosis. It is possible that the control of hindgut lactic acid accumulation could be even more important than the control of rumen lactic acid accumulation. In experiment 2, virginiamycin caused a greater reduction in lactate concentration in caecal digesta than in rumen digesta. Virginiamycin doses over 20 mg/day (0.4 mg/kg liveweight, or approximately 20 g/t of feed) had little further effect on lactate accumulation in rumen digesta and no further effect on lactate accumulation in caecal digesta. The inclusion of virginiamycin at a concentration of 20 g/t in a complete diet has been used in feeding barley to cattle (Rowe and Zorrilla-Rios 1993) without any signs of acidosis.

Table 1. Lactate concentration (mmol/L) in rumen and caecal digesta incubated with glucose. Virginiamycin (VM) was added *in vitro* in experiment 1 (µg/mL) or given to sheep prior to slaughter in experiment 2 (mg/day)

Experiment 1					Experiment 2				
VM dose	Rumen		Caecum		VM dose	Rumen		Caecum	
	Mean	sem	Mean	sem		Mean	sem	Mean	sem
0	58.1 ^a	0.33	65.5 ^a	0.57	0	23.1 ^a	2.28	29.7 ^a	3.84
0.5	51.8 ^b	0.61	62.0 ^a	0.58	20	11.7 ^b	1.07	6.1 ^b	0.98
1.0	39.9 ^c	0.73	57.5 ^b	1.67	40	11.1 ^{bc}	1.25	7.2 ^b	0.91
2.0	35.9 ^c	2.66	45.1 ^c	1.97	80	8.6 ^{bc}	0.88	4.7 ^b	0.43
4.0	1.0 ^d	0.28	14.2 ^d	0.46	160	7.9 ^c	0.45	6.5 ^b	1.47
Means with different superscripts are significantly different (P < 0.05).									

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