

Effect of feeding red clover, lucerne and kale silage on the voluntary intake and liveweight gain of growing lambs

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Introduction Despite a need for alternative forages to provide home-grown sources of protein (Wilkins & Jones, 2000), there have been few studies comparing the effects of such forages on lamb production when fed as silage. In this experiment the effects of offering ensiled red clover (*Trifolium pratense*), lucerne (*Medicago sativa*) and kale (*Brassica oleracea*) on voluntary intake and liveweight gain in growing lambs were compared.

Material and methods Silages were produced from 0.5 ha plots of red clover (cv. Merviot) and lucerne (cv. Vertus) (*Rhizobium meliloti* inoculated seed), sown on 2 September 2002 at a rate of 14.5 kg/ha and 18.5 kg/ha respectively, and kale (Kaleage, a blend of Pinfold and Keeper) sown on 22 April 2003 at a rate of 7.5 kg/ha. The red clover and lucerne plots were harvested on 29 May 2003 and 13 July 2003 (first and second cut silage, respectively) and the kale was harvested on 12 August 2003. After wilting for 24 h, all forages were chopped, treated with Sil-all 4x4™ (Alltech, Stamford, UK; applied at a rate of 10⁶ colony forming units/g fresh matter) and ensiled in large round bales. Sixty Suffolk-cross lambs aged 8 months were restrictively allocated to each forage treatment according to gender and live weight. After a 5-wk covariate period on grass silage, animals were group housed for 14 d and offered *ad libitum* access to their treatment silage. The lambs were then split into four groups of five lambs for each forage treatment. Dry matter (DM) intake and live weight were recorded every 7 d over an 8-wk period. Lambs on red clover and lucerne silage were fed first cut silage during weeks 1-4 and second cut silage during weeks 5-8. Silage and DM intake data were analysed by analysis of variance and liveweight gain data were analysed as a complete block with group pens as the blocking structure.

Results DM content differed among all silages, but kale had a notably lower DM content than lucerne or red clover (Table 1). All forages were well preserved, although the higher pH and lower lactate concentrations of red clover and lucerne silage indicate a more restricted fermentation during ensiling compared to kale. Lambs offered red clover and lucerne silage had a higher DM intake and a tendency for a higher liveweight gain than lambs offered kale silage (Table 2).

Table 1 Chemical composition (all values g/kg DM, except DM content (g/kg FM) and ammonia-N (NH₃-N) (g/kg TN)) of different silage treatments as fed to growing lambs

	Kale	Red Clover	Lucerne	s.e.d.	F effect
DM	187 ^a	410 ^b	508 ^c	26.9	***
pH	3.97 ^a	4.18 ^b	4.63 ^c	0.047	***
NH ₃ -N	53	49	46	6.76	NS
Crude protein	161 ^a	188 ^b	222 ^c	7.21	***
ME	11.2 ^a	10.6 ^b	10.4 ^c	0.07	***
Lactate	42 ^a	25 ^b	21 ^b	3.06	***
Acetate	19 ^a	6 ^b	8 ^b	1.4	***
Propionate	0.8 ^a	0.3 ^b	0.3 ^b	0.12	***
Butyrate	0.16 ^a	1.29 ^b	0.25 ^a	0.401	*

F effect; forage effect; NS, not significant; * = $P < 0.05$; *** = $P < 0.001$

Table 2 Lamb dry matter intake (DMI) (g/d) and liveweight gain (LWG) (g/d)

	Kale	Red Clover	Lucerne	s.e.d.	F effect
DMI (g/d)	738 ^a	1012 ^b	1053 ^b	33.6	***
LWG (g/d)	103	132	137	14.3	†

F effect; forage effect; † = $P < 0.10$; *** = $P < 0.001$

Conclusions Lambs fed red clover and lucerne silage had a higher DM intake and a tendency for a higher liveweight gain than lambs fed kale silage. These effects are probably due to the lower DM content and crude protein concentration of the kale silage compared to the legume silages.

References

Wilkins, R & R Jones. (2000). Alternative home-grown protein sources for ruminants in the United Kingdom. *Animal Feed Science and Technology*, 85, 23-32.