

Effect of lipids on rumen fermentation and kinetics of rumen digesta in sheep fed a restricted diet *

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Soya oil hydrolysate has been found to decrease the fractional outflow rate of solids in the sheep rumen (Broudiscou *et al*, 1990). In this study, the effect of soya oil (SO) and tallow (TA) on rumen fermentation and on liquid and particle outflow rates and volumes has been investigated.

Three rumen-cannulated sheep were fed (latin-square design) the following rations: BR (300 g concentrates and 300 g hay administered at 8.30 h and 20.30 h); SO (BR with 40 g SO twice daily) or TA (BR with 40 g TA twice daily). Fractional outflow rates of rumen liquid (D) and particles (K) were measured (twice/animal/ration) using PEG or Cr-mordanted hay. Rumen liquid volume (V) and dry matter pool (M) were calculated from the marker dilution curves. Fermentation pattern and protozoal counts (3 times/animal/ration) and *in sacco* degradation of soya bean meal (incubation time: 6 h) and hay (incubation time: 24 h) (4 times/animal/ration) were also determined.

Table I shows some of the results. Molar percentages of propionate were significantly

increased while butyrate percentages decreased, but not in a statistically significant manner, whilst pH remained unchanged.

Total rumen volatile fatty acids (VFA) were decreased by SO and rumen NH₃-N concentration by SO and TA. Apart from differences in absorption (unlikely), the latter is probably associated with decreased protozoal numbers while the former must be related to lower *in sacco* degradabilities and increase in rumen particle pool size and outflow, according to models of rumen bacterial growth and digestion. Lower protozoal numbers were indeed associated with higher values for microbial protein synthesis and its efficiency (g N incorporated per kg organic matter fermented) (Sutton *et al*, 1983).

Broudiscou L, Van Nevel CJ, Demeyer DI (1990) *Anim Feed Sci Technol* 30, 51-67

Sutton JD, Knight R, McAllan AB, Smith RH (1983) *Br J Nutr* 49, 419-432

Table I. Effect of lipids on rumen fermentation and kinetics.

Ration	ΣVFA (mmol/l)	NH ₃ -N (mg/l)	Kinetics				Degraded <i>in sacco</i>		
			D (%/h)	V (l)	k (%/h)	M (g)	Soya-TN (%)	Hay-NDF (%)	Protozoa x 10 ⁶ /ml
BR	91 ^a	129 ^a	7.4 ^a	8.7 ^a	3.4 ^a	1232 ^a	29.3 ^a	39.7 ^a	1.01 ^a
SO	75 ^b	65 ^b	7.3 ^a	9.2 ^a	3.9 ^a	1287 ^a	36.3 ^a	36.8 ^a	0.61 ^a
TA	84 ^{ab}	66 ^b	8.0 ^a	8.9 ^a	3.8 ^a	1282 ^a	33.2 ^a	35.2 ^a	0.82 ^a
RSD	0.5	2	1.7	0.8	0.0	255	11.4	8.9	0.21

V, M, TN, NDF: respectively liquid volume, dry matter pool, total nitrogen, neutral detergent fibre. ^{a,b}: P < 0.05; ΣVFA: sum of the volatile fatty acids.

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