

## Effect of level and composition of VFA on their absorption by the rumen wall

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Two sheep fitted with rumen and abomasal cannulae were used. They were entirely fed by intragastric infusion (MacLeod *et al*, 1982) from no less than 10 d after surgery. A VFA solution containing buffer and minerals and a casein solution containing vitamins were infused in the rumen and the abomasum, respectively. Microelements were injected daily in the abomasum. The experiment comprised 3 periods of 5 d each. During P1 animals received nutrients satisfying half maintenance requirements (level 0.5) with a VFA solution containing acetic, propionic and butyric acids (6.37 gVFA/d kg<sup>0.75</sup>, molar percentages 51:42:7, respectively). During P2 the animals received nutrients satisfying maintenance requirements (level 1) with a VFA solution of molar composition 70:20:10 (13.48 gVFA/d kg<sup>0.75</sup>). During P3, the animals received nutrients satisfying maintenance requirements with the first VFA composition (12.75 gVFA/d kg<sup>0.75</sup>). The rate of infusion was constant (375 ml/h), only concentrations were changed. PEG was continuously infused in the rumen. Each day at 10 am, a basal sample of rumen liquid was taken then CoEDTA was injected. The rumen liquid was then sampled and at each hour until 5 pm. Variations in PEG con-

centration were considered to be related to volume variations. The decrease in CoEDTA concentration allowed to be calculated the outflow rate of liquid (%/h). Absorbed VFA were calculated as follows: VFA absorbed between  $t_1$  and  $t_2$  = VFA infused between  $t_1$  and  $t_2$  + VFA at time  $t_1$  - VFA at time  $t_2$  - outflowed VFA between  $t_1$  and  $t_2$ . One of the animals had to be replaced after P1 due to a cannula problem.

During measurement periods osmotic pressure varied from 123 to 305 mOsm and pH from 6.0 to 7.5. The outflow rate was higher ( $P < 0.01$ ) at level 1 than at level 0.5. VFA absorption was linked to water absorption probably via osmotic pressure. In the range of the VFA concentrations used, about 82% of the VFA infused would be absorbed if water net movement was zero and then 40% per litre of water absorbed. The order in the part of VFA absorbed was always butyrate > propionate > acetate. VFA absorption rates were different between compositions, demonstrating interactions among VFA absorptions.

MacLeod NA, Corrigan W, Stirton RA, Orskov ER (1982) *Br J Nutr* 47, 547-553

Table I. Main results of the experiment.

Period	Liquid outflow rate (%/h)	Rumen volume (l)	Absorption rate (mmol/h)			Part of absorption (% of infused)		
			C2 <sup>a</sup>	C3 <sup>b</sup>	C4 <sup>c</sup>	C2 <sup>a</sup>	C3 <sup>b</sup>	C4 <sup>c</sup>
P1	8.2	4.5	38.7	33.3	5.2	83.3	84.1	85.5
P2	13.8	3.9	97.2	27.8	14.4	72.4	74.8	78.2
P3	14.6	3.5	66.8	57.9	9.1	78.3	79.7	81.9

<sup>a</sup> Acetic acid; <sup>b</sup> propionic acid; <sup>c</sup> butyric acid.