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Y Chilliard, C Audigier, Denys Durand, S Auboiron, Dominique Bauchart. Effects of portal infusions of methionine on plasma concentrations and estimated hepatic balances of metabolites in underfed preruminant calves. *Annales de zootechnie*, 1994, 43 (3), pp.299-299. hal-00889038

**HAL Id: hal-00889038**

**<https://hal.science/hal-00889038>**

Submitted on 11 May 2020

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## Effects of portal infusions of methionine on plasma concentrations and estimated hepatic balances of metabolites in underfed preruminant calves

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The effects of portal infusions of methionine (Met) were studied in 6 preruminant male calves fed a conventional milk replacer in order to allow a daily body gain of 650 g (days 8–15 after birth) except during the experimental period (days 18–25 after birth) when the growth rate was lowered to about 200 g/d (instead of 1 000 g/d at this age) by a 45% restriction in feed allowance. Animals were fitted with catheters in the mesenteric artery (MA), the portal vein and one of the hepatic veins at 8 days of age.

After 5 d of feed restriction, metabolite concentrations were determined in the 3 blood vessels 7 h after the morning feeding with a view to calculating the estimated hepatic balances (EHB) using estimates of blood flows, according to body weight and previous equations (Durand *et al*, 1988). After a control measurement on day 23, Met was infused in the portal vein for 7 h after the morning feeding at dose 1 (day 24) and dose

2 (day 25). Met allowances were 2.4, 3.0 and 3.6 g/100 g of protein in the milk replacer (control, dose 1 and dose 2, respectively).

Met infusion at dose 2 decreased triglyceride, non-esterified fatty acid and 3-hydroxybutyrate plasma concentrations in the mesenteric artery. The EHB of glucose was significantly increased by this infusion. There was a trend to decrease the apparent captation of triglycerides and to decrease the apparent productions of non-esterified fatty acids and 3-hydroxybutyrate. These results suggest that an increase in Met availability in the energy- and protein-underfed calf can increase hepatic gluconeogenesis, without increasing ketogenesis, perhaps because of a stimulation of triglyceride secretion (thus decreasing the apparent triglyceride capture).

Durand D, Bauchart D, Lefaivre J, Donnat JP (1988) *J Dairy Sci* 71, 1632–1637

**Table 1.** Effects of methionine (Met) infusions on hepatic metabolism of plasma metabolites.

Metabolite	Control		Met-dose 1		Met-dose 2	
	MA <sup>1</sup>	EHB <sup>2</sup>	MA	EHB	MA	EHB
Glucose <sup>3</sup>	0.90	1.5	0.92	1.5	0.87 <sup>b</sup>	1.9 <sup>*</sup>
Triglycerides <sup>3</sup>	0.31	–3.7	0.29	0.8	0.21 <sup>**a</sup>	–0.5
Non-esterified fatty acids <sup>4</sup>	1.40	29.2	1.05 <sup>+</sup>	0.6	0.55 <sup>+</sup>	3.2
3-Hydroxybutyrate <sup>4</sup>	0.07	1.0	0.05 <sup>+</sup>	0.4	0.04 <sup>**</sup>	0.5
Urea <sup>3</sup>	0.15	0.3	0.15	0.1	0.15	0.4

<sup>1</sup> Concentration in the mesenteric artery ( $n = 6$ ); <sup>2</sup> estimated hepatic balance: apparent production, or (–) capture. Due to failure in the hepatic vein catheter, EHB balances were only available on 5 (control) and 4 (Met-dose 1 and Met-dose 2) calves; <sup>3</sup> mg/ml (MA) or mg/min/kg body weight (EHB); <sup>4</sup> mM (MA) or  $\mu$ mol/min/kg body weight (EHB); <sup>+</sup>, <sup>\*</sup>, <sup>\*\*</sup> significantly different from control-value,  $P < 0.11$ , 0.06, 0.03, respectively; <sup>a,b</sup> = significantly different from dose 1–value ( $P < 0.11$ , 0.03, respectively).