

Effect of short-term fasting on plasma amino acids, glucose and insulin in non-pregnant and non-lactating Friesian cows

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Four mature cows (± 516 kg) were sampled at hourly intervals in the jugular vein from 1200 on d 1 to 0800 h on d 2 (fed state: 20 h) and from 1200 on d 2 to 0800 h on d 3 (fasting: 20 h).

The first day, the cows received in 2 equal meals given at 06.15 and 15.30 3 kg meadow hay, 2.5 kg dried beet pulp and 1.8 kg concentrate diet, covering 1.3 times their energy and nitrogen maintenance requirements. On the second day, half of this ration was given at 06.15, after which only water was available. Plasma amino acids (PAA) were measured by HPLC, glucose (Glc) by the hexokinase method, and insulin (Ins) by RIA. Mean data were compared (Student's *t*-test, paired data).

Fasting resulted in slight increases in PAA that were significant for Ala, Gln and Ser. Both Glc ($P > 0.05$) and Ins ($P < 0.01$) concentrations decreased during fasting. This is in agreement with the results of De Boer *et al* (1985), who reported increased PAA in Holstein cows during early lactation. Similarly, Rule *et al* (1985) noticed decreased Ins concentrations after 24 h fast-

ing in steers. The PAA increase indicates that the rate of AA entry into plasma exceeded their rate of withdrawal. The labile protein reserve could be an intermediate source of energy and serve as a gluconeogenesis (GN) precursor in order to avoid a drop in glycemia. The decline in Ins levels is thought to be involved in the increased release of AA to the circulation and might have resulted in a decrease of both peripheral uptake of AA and proteosynthesis, thereby making available more AA for GN.

In conclusion, changes in protein, Glc and Ins metabolism may be observed in short-term fasting (20 h) in dry cows. Ins seems to play a major role in protein metabolism during fed and fasting states.

De Boer G, Trenkle A, Young JW (1985) *J Dairy Sci* 68, 326-337

Rule DC, Beitz DC, De Boer G, Lyle RR, Trenkle AH, Young JW (1985) *J Anim Sci* 61, 868-875

Table 1. Effect of fasting on PAA ($\mu\text{mol/l}$), Glc (mg/100 ml) and Ins ($\mu\text{U/ml}$).

	Ala		Gln		Gly		Ser		Asp		Glc		Ins	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
a	143	34	199	48	196	38	77	12	72	17	94	15	46	10
b	158**	39	212*	49	210	44	84*	19	78	18	90	16	40**	15

a Fed state (20 h); b Fasting (20 h); * $P < 0.05$; ** $P < 0.01$; SD: standard deviation.