

Effects on milk protein yield of graded levels of lysine infused into the duodenum of dairy cows fed diets with two levels of protein

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Lysine and methionine seem to be the limiting amino acids for dairy cows eating maize diets (Schwab *et al*, 1988; Le Henaff *et al*, 1990). In order to determine lysine requirements, graded levels of lysine (0, 15, 30, 45 g/d) were infused into the duodenum of dairy cows. Milk yield and composition responses were tested in two trials with protein allowances of either 90 or 105% of the requirements (diets with 14 or 16% CP in DM).

Eight ruminally and duodenally fistulated *Holstein* cows were used in mid-lactation in two 4 x 4 latin squares. During each period (2 wk) they received a duodenal infusion of one dose of lysine + 11 g of methionine and enough glutamate to reach 9.7 g N/d. The diet consisted mainly of maize silage, maize gluten meal and grain concentrate in respective ratios of (54, 3.3, 36% DM) for the trial with the low protein allowance and (54, 8, 32%) for the

other. Milk potential was increased by daily injections of 30 mg of bovine somatotropin (Lilly, France).

Lysine infusions did not affect milk yield or fat content. In each trial, both protein and casein contents increased, especially at the high protein allowance (up to 3.6 g/kg). The response reached a plateau at a lower dose of lysine (15 vs 30 g/d) with the low rather than with the high protein allowance. This indicates that lysine is limiting with maize diets. However, benefit from a lysine supplement might be rapidly limited at low protein levels.

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Le Henaff L, Rulquin H, Vérité R (1990) *Reprod Nutr Dev* suppl 2, 237s
 Schwab CG, Bozack CK, Mesbah MMA (1988) *J Dairy Sci* 71 (suppl 1), 160

Table I. Determination of the lysine requirement of lactating cows given either 90 or 105% protein allowance (PA) diets.

	90% of PA requirements					105% of PA requirements				
	0	15	30	45	SE	0	15	30	45	SE
Milk yield (kg/d)	30.0	30.0	30.4	30.5	0.40	33.5	33.6	35.0	33.8	0.79
Milk fat content (g/kg)	46.2	45.1	45.1	44.2	0.59	42.5	40.8	42.0	45.5	0.94
Milk protein content (g/kg)	31.8a	32.7b	32.7b	32.7b	0.14	29.0a	30.3b	32.0c	32.6c	0.21
Casein content (g/kg)	24.8a	25.7b	25.7b	25.7b	0.23	23.0a	24.1a	25.5b	26.2b	0.31

Within trial and row, means followed by different letters differ at $P < 0.05$.