The effects of feeding compound concentrate supplements with either a low or high level of true methionine digested in the small intestine (DVmet) to dairy cows.

R.L.G. Zom, E. Kamerman, G. Remmelink and G. van Duinkerken
Research Station for Cattle, Sheep and Horse Husbandry, PO Box 2176, 8203 AD Lelystad, the Netherlands

Introduction The Dutch DVE/OEB protein evaluation system (Tamminga *et al., 1994)* gives predictions for the concentration of whole true protein digested in the small intestine (DVE) in cattle feeds, but not for the concentration of single amino acids. Therefore, new standard methods has been introduced for the prediction of true methionine and lysine digested in the small intestine (DVmet and DVlys, respectively) in cattle feeds based on the principles of the calculation of DVE (van Duinkerken and Blok, 1998). These methods give the opportunity to select particular feeds and concentrate ingredients in order to manipulate the concentration of DVmet and DVlys in diets and compound concentrates. However, in the Netherlands, there are no recommendations for DVmet and DVlys in dairy cow rations established yet. An experiment was therefore conducted to study the effects of feeding compound concentrate supplements with either a low (L) or high (H) level of DVmet on feed intake and milk production in dairy cows fed a grass and maize silage mixture *ad libitum*

Materials and methods. Twenty-eight Holstein-Friesian cows were grouped in blocks of two according to variation in parity, milk yield and milk composition in the previous lactation. Within each block, the cows were randomly assigned to L and H. For each animal, the experimental period started the first week after calving with a 4 week standardisation period followed by a 11 week treatment period. Two compound concentrates were fed: *Low* and *High* that were different in the concentration of DVmet but not in DVlys, DVE and NE_L(net energy for lactation). One kg of concentrate *Low* consisted of 168 g lupine, 127 g formaldehyde treated soybean meal, 130 g tapioca, 115 g protapec and a total of 440 g of 13 other ingredients. One kg of concentrate *High* consisted of 321 g maize gluten feed, 152 g citrus pulp, 97 g soy hulls, 85 g DVlys; palm kernel exp., 57 g presscake fish meal and a total of 288 g of 11 other ingredients. During the standardisation period all cows were fed a *Low* and *High* intermediate. Throughout the experiment, the level of concentrate supplementation was 7.2 and 9 kg DM/day for heifers and multiparous cows, respectively. The cows received a forage mixture of grass and maize silage (ratio 1/1, on a dry matter basis) *ad libitum.* The nutritive value of the compound concentrates and forages is given in table 1. The forages and concentrate supplements were fed individually using transponder-controlled feed gates and out-parlour feeders. The intakes of concentrate supplement and forage were recorded daily. Milk yields were recorded twice daily at each milking and samples for milk composition were taken on four consecutive milkings each week. The data on feed intake and milk performance were analysed as a randomised block design using the means of feed intake and milk production data from each cow by analysis of variance. Data on feed intake and milk performance recorded during the standardisation period were used as covariates in analysis of variance. Treatment means were compared using Student's t-test.

Table 1 *Nutritive value feeds (g/kg DM)*

	Concentrate:		Silage:	
	Low	High	Grass	Maize
DM	904	904	388	352
CP	229	232	135	71
NE_L(MJ)	7.2	7.2	6.6	6.6
DVE	127	127	70	45
DVmet	2.18	2.95	1.78	1.15
DVlys	7.59	7.68	5.12	2.87

Results The effects on feed intake and milk performance are summarised in table 2 and 3, respectively. Different superscripts within one row indicate a significant difference ($p<0.05$). As expected the intake of DVmet was significantly increased on H. Between L and H, there were no significant differences in the intake of DM, NE_L, DVE and DVlys (table 2) and neither in the yields of milk, fat and protein corrected milk (FPCM), milk fat, protein and in the concentrations of milk fat and protein (table 3).

Table 2 *Daily intake of DM, NE_L, DVE, DVmet and DVlys*

	L	H	lsd	p
Concent. kg DM	8.4	8.2		
Forage kg DM	14.8	14.5	0.7	0.33
NE_L(MJ)	158	155	6.6	0.33
DVE g	1917	1875	75	0.24
DVmet g	40^a	45^b	1.6	<0.001
DVlys g	123	121	4.9	0.51

Table 3 *Daily milk and milk constituent yield and concentration*

	L	H	lsd	p
Milk kg	33.5	34.2	1.6	0.34
FPCM kg	36.4	36.8	2.2	0.73
Fat g	1562	1561	119	0.99
Protein g	1159	1177	76	0.62
Fat g/kg	46.7	45.9	2.6	0.37
Protein g/kg	34.6	34.4	1.3	0.98

Conclusion Feeding compound concentrate supplements with either a high or low concentration of DVmet has no effect on feed intake and milk production in dairy cows. The result suggest that supplementation with compound concentrates with a moderate concentration of DVE and numerous different ingredients as in this experiment, are sufficient to meet the cows' requirement for DVmet.

References

Duinkerken, G. van, and Blok, M.C., 1998. Berekening van het gehalte darmverteerbaar methionine en lysine in voedermiddelen voor herkauwers. *CVB-documentatie rapport 22*.
Tamminga, S., van Straalen, W.M., Subnel, A.P.J., Meijer, R.G.M., Steg, A., Wever, C.J.G. and Blok, M.C., 1994. The Dutch protein evaluation system: the DVE/OEB-system. *Livestock Production Science 40:* 139-155.