

The effect of high fat sunflower meal treated with formaldehyde and sodium hydroxide on milk yield and composition of Holstein dairy cows

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Introduction Sunflower meal is entirely adequate as the sole source of supplemental protein in dairy rations. Owing to the relatively high protein degradability of sunflower meal, dietary inclusion levels are limited in dairy cattle diets (Erasmus *et al.*, 1988). Treating proteins have been used to reduce their degradation in the rumen, formaldehyde that combined with proteins and sodium hydroxide denatures protein (Cozzi *et al.*, 1995). The objective of this study was to determine the influence of high fat sunflower meal (containing 165 g fat /kg DM) as untreated or treated with formaldehyde or NaOH on dry matter intake (DMI) and milk yield and composition.

Material and methods Twenty-one multiparous early lactation Holstein cows averaging 620 kg of body weight were allotted at day 25 to 35 of lactation to three groups of seven cows. Cows were fed individually a total mixed diet based on corn silage and supplements for *ad libitum* intake over a 7-weeks period (1-week adaptation). Treatments included untreated sunflower meal (USM), sunflower meal treated with 30 g/kg DM formaldehyde (FSM), or sunflower meal treated with 40 g/kg DM sodium hydroxide (SHSM). The composition of concentrate of experimental diets was 10.69 % untreated and treated sunflower meal, 2.76% soy bean meal, 4.88 % canola meal, 6.96 % cotton seed, 14.07 % barley grain, 15.66 % corn grain, 6.2 % wheat bran, 0.24 % D calcium phosphate, 0.54 % NaHCO₃ and 0.78 % vitamin-mineral supplement (DM basis). Diets were fed twice daily at 0900 and 2100 h for 10%orts. Milk yield and DMI was recorded daily. Milk samples were obtained weekly from each cow for three consecutive milkings and after mixed and get a sample were analyzed to determine fat, protein, lactose and SNF percentage. All results were subjected to least squares ANOVA for a completely randomized design. Data were analysed using the general linear models procedure of SAS (1991) as repeated measurements using covariance analysis.

Result The effect of treatment on milk yield and composition and dry matter intake (DMI) of cows was significant (Table 1). Milk yield and DMI for treatments containing formaldehyde and NaOH was the highest. Formaldehyde and NaOH treatment significantly increased protein and lactose percentage of milk in compared with untreated sample ($P < 0.05$).

Table 1 Dry matter intake, milk yield and compositions of lactating dairy cows fed diets containing sunflower meal

	Experimental diets			s.e.d	P
	USM	FSM	SHSM		
Milk yield (kg/d)	41.0 ^b	42.8 ^a	42.4 ^a	0.04	0.04
Milk protein (%)	2.48 ^b	2.67 ^a	2.62 ^a	0.03	0.003
Milk fat (%)	2.85	2.9	2.85	0.06	0.71
Milk lactose (%)	4.49 ^c	4.65 ^b	4.58 ^a	0.02	0.002
SNF (%)	7.73 ^b	7.88 ^a	7.78 ^b	0.04	0.03
DMI kg/d	27.92 ^b	28.69 ^a	28.52 ^a	0.02	0.02

Conclusions It appears formaldehyde and NaOH increased DMI, milk yield, percentage of fat, protein and lactose in cows fed with high fat sunflower meal, and the effect of formaldehyde was more than sodium hydroxide. Wilson (1970) reported that increase milk protein percentage by formaldehyde due to the protection of the protein from rumen microbial degradation.

References

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