Session 08 – Abstract 0997

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THE INFLUENCE OF DIFFERENT DIETARY VEGETABLE OILS ON MILK FATTY ACID COMPOSITION OF GRAZING DAIRY COWS.

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INTRODUCTION

Cardiovascular risk might be reduced by lowering intake of undesirable saturated fatty acids (FA) or by making alterations in the FA profile through cow diet manipulation. Cows fed pasture-based diets have been shown to have consistently more conjugated linoleic acid (CLA), trans-vaccenic acid (TVA) and unsaturated FA in their milk fat than cows fed TMR diets. Supplementation of dairy cows with vegetable oils improves milk FA profiles relative to their impacts on the health of humans that consume them. The objectives of this work were to study the effect of supplementation of grazing dairy cows with rapeseed oil (oleic acid), sunflower oil (linoleic acid) and linseed oil (linolenic acid) on performance and milk fat FA composition.

MATERIALS AND METHODS

Sixteen multiparous Holstein cows (140 DIM; 27 kg mil/day) were assigned to dietary treatment sequences in a changeover design (4 × 4 Latin Square). Each experimental period lasted 4-wk. Cows grazed as a group at a stocking rate of 2.5 cows/ha, during summer. Treatments were as follows: 5 kg cow/day of ground maize (C); 4.5 kg of ground maize plus 0.5 kg of rapeseed oil (RSO); 4.5 kg of ground maize

plus 0.5 kg of sunflower oil (SFO) and 4.5 kg of ground maize plus 0.5 kg of linseed oil (LSO).

RESULTS AND CONCLUSIONS

Data of animal performance are shown in Table 1. Milk yield and milk protein content and yield were not statically different among treatments. Milk fat content and yield were significantly lower in RSO and SFO as compared with C and LSO treatments. Oil supplemented cows significantly attained higher BW than unsupplemented cows.

Table 1 – Animal performance

	C	**RSO**	**SFO**	**LSO**	**SEM**
Milk Yield ($Kg.d^{-1}$)	22,2	22,0	21,9	22,2	0,23
Fat Yield ($g.d^{-1}$)	820^{b}	715^{a}	702^{a}	781^{b}	0,03
Fat ($g.Kg^{-1}$)	$37,5^{b}$	$33,3^{a}$	$32,7^{a}$	$35,9^{b}$	1,03
Protein Yield ($g.d^{-1}$)	776	748	754	756	0,02
Protein ($g.Kg^{-1}$)	35,1	34,6	34,5	34,3	0,54
BW (Kg)	555^{a}	565^{b}	564^{b}	566^{b}	12,5

Table 2 presents results of milk FA composition. SFO and LSO increased significantly *cis*-9, *trans*-11 CLA and TVA in milk fat, while RSO had no effect. Unexpectedly, supplementation with linseed oil decreased the concentration of 18:3 n-3 in milk fat, as compared with control, most probably due to an increase of biohydrogenation in the rumen. This hypothesis is supported by the observed increase in the 18:2 *trans*-11, *cis*-15, an intermediate of the biohydrogenation process.

Table 2 – Milk fat FA profile.

(g/100g FA)	**C**	**RSO**	**SFO**	**LSO**	**SEM**
12:0	2.76^{c}	1.58^{a}	1.47^{a}	1.70^{ab}	0.050
14:0	10.80^{c}	7.28^{b}	6.80^{a}	7.43^{b}	0.160
14:1 *cis*-9	0.97^{b}	0.72^{a}	0.76^{a}	0.69^{a}	0.03
16:0	25.50^{b}	18.98^{a}	18.77^{a}	18.75^{a}	0.250

16:1 *cis*-9	1.06^{c}	0.94^{ab}	1.01^{bc}	0.88^{a}	0.040
18:0	15.06^{a}	18.21^{b}	17.29^{b}	17.35^{b}	0.419
18:1 *trans*-10	0.29^{a}	0.78^{b}	1.24^{c}	0.61^{b}	0.065
18:1 *trans*-11 (TVA)	**2.86^{ab}**	**2.66^{a}**	**3.43^{bc}**	**3.85^{c}**	**0.230**
18:1 *cis*-9	24.44^{a}	32.81^{c}	32.71^{c}	29.75^{b}	0,412
18:2 *trans*-11, *cis*-15	0.23^{b}	0.15^{a}	0.11^{a}	0.65^{c}	0.026
18:2 n-6	1.19^{b}	1.03^{a}	1.29^{c}	1.04^{a}	0.022
18:3 n-3	**0.63^{c}**	**0.40^{a}**	**0.43^{a}**	**0.56^{b}**	**0.016**
CLA *cis*-9,*trans*-11	**1.30^{a}**	**1.32^{a}**	**1.76^{b}**	**1.70^{b}**	**0.070**
SFA	58.28^{c}	49.21^{b}	47.30^{a}	48.38^{ab}	0.806
MUFA	32.49^{a}	42.63^{c}	43.94^{d}	41.36^{b}	0.710
PUFA	3.74^{a}	3.52^{a}	4.21^{b}	4.80^{c}	0.128
Total 18:1 *trans*	4.12^{a}	5.53^{b}	6.67^{c}	6.86^{c}	0.311
Branched FA	2.87^{b}	2.21^{a}	2.26^{a}	2.24^{a}	0.042
h	26.45^{a}	34.37^{c}	34.54^{c}	31.46^{b}	0.698
H	39.06^{b}	27.84^{a}	27.04^{a}	27.89^{a}	0.578
P/S	0.034^{b}	0.031^{a}	0.039^{c}	0.036^{b}	0.001
n-6/n-3	2.19^{a}	2.95^{b}	3.33^{c}	2.11^{a}	0.104
h/H	0.68^{a}	1.25^{cd}	1.30^{d}	1.15^{b}	0.041

h – hypocholesteremic FA; H – hypercholesteremic FA

Overall, supplementation with vegetable oils enhanced dietetic value of milk fat of grazing dairy cows.