Three PM were considered: mean particle size (MPS; 3.72 ± 2.02 mm, n = 44), particles retained on a 2-mm sieve (P2; 42.4 ± 15.5% DM, n = 40) or on 19-mm and 8-mm sieves of the Penn State Particle Separator (P8; 49.5 ± 12.7% DM, n = 36). As the PM was not measured with the same criteria across the experiments, a dummy variable (0 or 1) was created to systematically code the short or long PM, respectively. The effects of NDF and PM were tested on chewing index (CI; 37.5 ± 11.9 min/kg DMI, n = 78), rumen pH (6.08 ± 0.26, n = 60), acetate to propionate ratio (A:P; 2.70 ± 0.73, n = 52), milk yield (MY; 29.0 ± 10.6 kg/d, n = 96) and milk fat percentage (MF; 3.75 ± 0.62%, n = 82). Meta analyses were carried out using GLM procedure including the effects of experiment, NDF, PM and the interaction. NDF was a continuous covariable. The mean differences between treatments were: NDF = 4.3%DM; MPS = 1.31mm; P2 = 7.5%DM; and P8 = 8.6%DM. Experiment was systematically significant ($P < 0.01$). For CI, pH and A:P, influences of NDF and PM were significant ($P < 0.01$), but there was no interaction between them. For MY and MF, only the effect of NDF was significant ($P < 0.01$). As expected, MF was negatively affected ($P < 0.01$) by pH (MF = −1.05 + 0.76 pH, n = 48, RMSE = 0.05%). In conclusion, the effects of NDF and PM appeared to be additive in published trials, which questions the principle and the validity of their product (peNDF) for predicting lactating cow responses.

Key words: effective fiber, meta-analysis, dairy cattle

M320 Effect of feeding *Camelina sativa* seeds or meal on lactation performance and milk fatty acid composition in lactating dairy cows. J. P. Sarramone*[1,2], C. Benchaar[3], Y. Lebeuf[1,2], R. Gervais[1], and P. Y. Chouinard[1,2], [1]*Département des sciences animales, Université Laval, Québec, QC, Canada,* [2]*Institute of Nutraceuticals and Functional Foods (INAF), Québec, QC, Canada,* [3]*Agriculture and Agri-Food Canada, Dairy and Swine R&D Centre, Sherbrooke, QC, Canada.*

Camelina sativa and flaxseed are both sources of *c*9,*c*12,*c*15–18:3. The objective of the current study was to evaluate the effects of feeding camelina seeds, camelina meal, flaxseed, or dried distillers grains with solubles (source of *c*9,*c*12–18:2) on milk yield and composition in lactating dairy cows. Four Holstein cows were used in a 4 × 4 Latin square design with 21-d periods, including 14 d of adaptation followed by 7 d of sampling. Four isolipidic dietary treatments (4.5% fat) were formulated: DDGS) 18% corn dried distillers grains with solubles; CM) 9.5% camelina meal; CS) 4.2% camelina seeds; FS) 4.7% flaxseed (DM basis). Differences between treatments were declared significant at $P \leq 0.05$ using the Tukey correction for multiple comparisons. Body weight, DM intake, milk protein content and yield, milk lactose content, MUN, and SCC were similar among treatments. Milk yield was higher for DDGS (37.4 kg/d;*b*), intermediate for CM (37.0 kg/d;*ab*), and CS (36.5 kg/d;*ab*), and lower for FS (35.6 kg/d;*a*). Milk fat content and yield were lower for CM (2.71%, 1000 g/d;*a*) compared with DDGS (3.63%, 1355 g/d;*b*), FS (3.73%, 1328 g/d;*b*), and CS (3.48%, 1258 g/d;*b*). Concentrations (mg/g FA) of *c*11–20:1 and *c*13–22:1 were lower for DDGS (0.9*c* and 0.2*c*), and FS (0.5*c* and 0.1*c*), intermediate for CS (3.4*b* and 1.0*b*), and higher for CM (8.1*a* and 1.8*a*). Cows fed FS had a higher content of *c*9,*c*12,*c*15–18:3 (6.4*a*) in milk fat compared with DDGS (3.5*c*), CM (4.5*bc*), and CS (5.0*b*). Feeding CM and FS increased milk fat content of *c*9,*t*11,*c*15–18:3 compared with DDGS and CS (0.4*a*, 0.4*a*, 0.2*b*, and 0.3*b*, respectively). Milk fat contents of *t*11,*c*15–18:2, *c*9,*t*13–18:2, and *t*13/*t*14–18:1 were higher for CM (7.2*a*, 2.9*a*, and 17.6*a*) intermediate for CS (2.3*b*, 1.9*ab*, 13.4*b*) and lower for FS (1.2*bc*, 1.5*b*, and 8.0*c*) and DDGS (0.8*c*, 1.6*b*, and 8.2*c*). Milk fat contents of *t*10–18:1 and *t*11–18:1 were higher for CM (22.0*a* and 29.2*a*) compared with DDGS (5.4*b* and 17.9*b*), CS (6.4*b* and 17.2*bc*), and FS (3.2*b* and 8.6*c*). In conclusion, FS was more efficient to increase *c*9,*c*12,*c*15–18:3 in milk fat compared with camelina fed as meal or seeds.

Key words: *Camelina sativa*, linseed, milk fatty acids

M321 Milk fatty acid profile of dairy goats fed increasing levels of an unprotected conjugated linoleic acid (UCLA) supplement. D. Fernandes[1], J. Souza[2], M. M. Almeida[3], M. Baldin[1], R. Dresch[1], F. Batistel[2], E. Ticiani[2], M. A. S. Gama[4], and D. E. Oliveira*[2,1], [1]*Centro de Ciências Agroveterinárias, UDESC, Lages, SC, Brasil,* [2]*Centro de Educação Superior do Oeste, UDESC, Chapecó, SC, Brasil,* [3]*Universidade Federal de Juiz de Fora, Juiz de Fora, MG, Brasil,* [4]*Embrapa, CNPGL, Juiz de Fora, MG, Brasil.*

The aim of this study was to evaluate the dose-response changes in milk fatty acid profile associated with the reduction observed in milk fat content and yield of dairy goats fed increasing levels of UCLA (Fernandes et al., 2010, JDS, 93:456). Eight Toggenburg goats (4 primiparous and 4 multiparous; 120–150 DIM) received 4 levels of UCLA in a 4 × 4 Latin square (LS) design. The treatments were: 1) Control: 45 g/d of calcium salts of soybean oil (CSSO); 2) CLA15: 30 g/d of CSSO plus 15 g/d of UCLA; 3) CLA30: 15 g/d of CSSO plus 30 g/d of UCLA and 4) CLA45: 45 g/d of UCLA. Each experimental period lasted 12 d, with 6 d of washout intervals. The UCLA contained 29% of t-10, c-12 CLA and 29% of c-9, t-11 CLA. Lipid supplements were mixed into the concentrate (1.0 kg/d) fed twice a day. Milk samples were collected on the last day of each experimental period for fatty acid analysis. Data were analyzed using GLM procedures, including animal, period, LS, and treatment as sources of variation. The UCLA reduced linearly the desaturase indexes (Table 1). Concentration of fatty acids < 16C in milk fat was linearly reduced as the CLA dose increased, suggesting that inhibition of de novo synthesis was more pronounced with the highest CLA dose. The secretion of t-10, c-12 CLA in milk increased with the CLA dose (Control = 0.02g/d; CLA15 = 0.08g/d; CLA30 = 0.13g/d; CLA45 = 0.17g/d; $r^2 = 0.77$; $P < 0.001$). The transfer efficiency of t-10, c-12 CLA into milk fat decreased with the CLA dose (CLA15 = 1.82%; CLA30 = 1.48%; CLA45 = 1.33%; $r^2 = 0.71$; $P < 0.001$). The milk fatty acid profile was changed in a dose-response way.

Table 1. Fatty acid profile of dairy goats fed increasing levels of UCLA

	Control	CLA15	CLA30	CLA45	SEM	*P*-value
g/100g of total FA						
CLA isomers						
cis-9,trans-11	0.5	0.6	0.7	0.8	0.03	0.001
trans-10,cis-12	0.03	0.1	0.3	0.5	0.02	0.001
Desaturase indexes						
14:1/14:0+14:1	0.01	0.008	0.006	0.005	0.0005	0.001
16:1/16:0+16:1	0.02	0.018	0.017	0.01	0.001	0.003
18:1/18:0+18:1	0.59	0.53	0.49	0.46	0.01	0.001
CLA/18:1t11+CLA	0.30	0.27	0.26	0.27	0.01	0.05
Ratios						
<C16	28.7	26.7	24.3	23.3	0.7	0.004
C16+C16:1	25.1	24.7	23.6	21.9	0.3	0.001
>C16	42.2	44.8	47.5	49.4	0.8	0.001

Key words: dairy products, fatty acid profile, desaturase index