M284 Milk enterolactone concentration in response to sucrose and flaxseed oil supplementation to dairy cows fed flaxseed meal. C. P. Ghedini, A. Fonseca de Brito*, K. Krieger, and G. Tempera, *Department of Biological Sciences, University of New Hampshire, Durham, NH.*

Flaxseed meal (FM) is the richest source of secoisolariciresinol diglucoside (SDG), which is converted by microbes to enterolactone (EL), a metabolite with potential human health benefits. Flaxseed oil and sucrose may favor ruminal microbes involved in SDG metabolism. The objective of this study was to evaluate the effects of feeding sucrose and flaxseed oil on production and milk EL concentration in diets containing FM. Sixteen multiparous Holstein cows (94 ± 37.6 DIM and 680 ± 79.1 kg of BW) were assigned to treatment sequences in a replicated 4 × 4 Latin square with 18 d for diet adaptation and 7 d for data and sample collection. Diets were fed as TMR and included (DM basis): (1) 8% soybean meal + 23% ground corn (-control, -CRTL); (2) 15% FM + 10.7% ground corn + 5% sucrose (SUCR); (3) 15% FM + 15.4% ground corn + 3% flaxseed oil (FXO); (4) 15% FM + 10.2% ground corn + 5% sucrose + 3% flaxseed oil (SUCR+FXO). All diets contained 40% corn silage and 20% grass-legume haylage, had similar energy and RDP/RUP content and averaged 17.2% CP and 32.1% NDF. Cows fed diets containing FM had lower DMI (22.7 kg/d) than those fed the –CRTL diet (24.6 kg/d; $P < 0.001$). Within the FM diets, FXO and SUCR+FO had the lowest DMI (22.3 kg/d). Milk yield was greatest in cows fed –CRTL (36.2 kg/d) and lowest in those fed SUCR+FXO (33.4 kg/d; $P = 0.05$). Cows fed FXO and SUCR+FXO had lower ECM (31 kg/d) than those fed -CRTL (36.3 kg/d) and SUCR (36.4 kg/d; $P < 0.001$). Milk concentration of EL was lowest in cows fed -CRTL (76.8 n*M*), but no difference was observed in diets containing FM [293, 332, and 338 n*M* with feeding SUCR, FXO and SUCR+FXO, respectively ($P < 0.01$)]. Milk fat concentration and yield were lowest in diets with flaxseed oil and averaged: 3.66% and 1.33 kg/d; 3.69% and 1.32 kg/d; 2.96% and 1.03 kg/d; and 2.83% and 0.93 kg/d in cows fed -CRTL, SUCR, FXO, and SUCR+FXO, respectively ($P < 0.001$). Milk protein concentration and yield did not differ and averaged 2.95% and 1.01 kg/d, respectively. In conclusion, there were no synergistic effects of sucrose and flaxseed oil on the conversion of SDG to EL in the rumen.

Key Words: dairy cow, enterolactone, flaxseed meal

M285 Meta-analysis of the use of canola meal in diets for dairy cows. D. C. Moura, K. C. Alessi*, J. R. Assis, R. N. Torres, S. R. Soares, A. B. Donadia, H. M. Silva, L. Menegazzo, M. L. Marques, I. Martins, and A. S. Oliveira, *Dairy Cattle Research Lab, Universidade Federal de Mato Grosso, Sinop, Sinop, Mato Grosso, Brazil.*

Data from 37 peer-reviewed papers were summarized to examine the effect of canola meal (CM) in diet on the performance of dairy cows. The effects were compared by raw mean differences (RMD) between CM diet and control treatment means and weighted by inverse variance using random-effect models. Control treatments (28.6 ± 6.9 kg milk/d) were soybean meal (SBM; 57%), dried destillers grains and solubles (DDGS; 21%), corn gluten meal (7%), cottonseed meal (5%), sunflower meal (2%) and other protein sources (9%). Heterogeneity level was analyzed by I^2 statistic (low ≤25%; moderate = 26 to 50%; and high >50%). In overall, use of CM as protein source increased DM intake (RMD = 0.22 ± 0.12 kg DM/d; $P < 0.01$; n = 79; $I^2 = 9.1\%$) and crude protein (CP) intake (RMD = 0.14 ± 0.07 kg CP/d; $P < 0.01$; n = 33; $I^2 = 21.1\%$), but it did not affect organic matter total-tract digestibility ($P = 0.50$; n = 12; $I^2 = 29.2\%$). In overall, use of CM increased milk yield (RMD = 0.69 ± 0.35 kg/d; $P < 0.01$; n = 88; $I^2 = 74.9\%$), but its effect depends on protein sources comparation: replacement of CM versus SBM did not affect milk yield (RMD = 0.23 ± 0.66 kg/d; $P = 0.50$; n = 50), but milk yield increased with CM compare with DDG (RMD = 2.03 ± 1.67 kg/d; $P < 0.01$; n = 18) and other protein sources (RMD = 0.82 ± 0.43 kg/d; $P < 0.01$; n = 20). In overall, CM use did not affect milk protein content ($P = 0.08$; n = 60; $I^2 = 19.5\%$) and milk fat content ($P = 0.20$; n = 60; $I^2 = 16.9\%$), but CM increased milk protein yield (RMD = 0.02 ± 0.01 kg/d; $P < 0.01$; n = 60; $I^2 = 0\%$). Use of CM reduced milk urea nitrogen (N) (RMD = −0.98 ± 0.31 mg/dL; $P < 0.01$; n = 22; $I^2 = 32.2\%$) and increased N intake milk efficiency (RMD = 0.22% N milk/N intake ± 0.07 mg/dL; $P \leq 0.05$; n = 34; $I^2 = 0\%$), both with low heterogeneity. We concluded that CM is similar protein source to SBM and it is more effective than DDG and other sources (cottonseed meal, corn gluten meal and sunflower meal) to lactating dairy cows.

Key Words: canola meal, effect size, heterogeneity

M286 Effect of prepartal maternal diets supplemented with essential fatty acids and their preweaned calves on performance of the newborn calf. A. Jolazadeh[1], T. Mohammadabadi[1], M. Dehghan-Banadaky*[2], M. Chaji[1], and M. Garcia[3], [1]*Department of Animal Science, Khuzestan Ramin Agricultural and Natural Resources University, Mollasani, Ahvaz, Iran,* [2]*Department of Animal Science, Campus of Agriculture and Natural Resources, University of Tehran, Karaj, Iran,* [3]*Department of Animal Science and Industry, Kansas State University, Manhattan, KS.*

The objective was to evaluate the effect of supplementing Ca-salts of fish oil or Ca-salts of soybean oil during the last 3 wk of gestation and during the preweaning period of calves on growth performance of Holstein calves. During the last 3 wk of pregnancy, Holstein cattle (n = 120) were fed no fat supplement (CON), supplemented with Ca-salts of soybean oil (CSO, 140 g/cow/daily) or supplemented with Ca-salts of fish oil (CFO, 140 g/cow/daily). Eighty-four Holstein calves were used (n = 14 calves per treatment) in a completely randomized design, with dietary treatments in a 3 × 2 factorial arrangement (3 dam diets and 2 calf starters; n = 6). Newborn calves were fed a starter diet with either no fat supplement (FC-0) or supplemented with 2% Fat Ca-Salt (FC-2; contained 85% fat (1% C14:0, 28% C16:0, 3% C16:1, 5% C18:0, 26% C18:1, 30% C18:2, 3% C18:3, 4% others) and 9% Ca produced by Persiafat, Kimiya Danesh Alvand Co., Tehran, Iran). Total intake of starter during all the experimental period was not affected by type of calf starter (CS) or dam diets. Calves born from cattle fed CFO and CSO prepartum tended ($P = 0.07$) to have greater overall ADG compared with calves born from cattle fed no fat supplement prepartum (648, 643 versus 609 g/d, respectively). Calves fed the FC-2 CS had consistently greater ADG and feed efficiency (FE; kg of BW gain/kg of DMI) compared with calves fed the FC-0 CS (640 and 0.537 vs. 580 and 0.469, respectively). Calves born from dams fed fat tended ($P = 0.09$) to have greater weaning weight (WW) than those born from dams fed CON, but calves fed FC-2 CS had greater WW and final weight during the experimental period. Result indicated that feeding moderate amounts of polyunsaturated long-chain fatty acids during the last weeks of uterine life and preweaning time could improve ADG and FE on newborn calf.

Key Words: dairy calf, fatty acid, performance

M287 Effect of camelina meal and camelina expeller on rumen microbial fermentation and nutrient flow in a continuous culture system. H. Salas*, L. Castillejos, M. Lopez-Suarez, and A. Ferret, *Animal Nutrition and Welfare Service (SNIBA), Universitat Autònoma de Barcelona, Bellaterra, Barcelona, Spain.*