M328 Milk fatty acids composition responses to dietary short-medium chain fatty acids and long chain fatty acids in lactating dairy cows. Y. Sun, D. P. Bu, J. Q. Wang,* H. Cui, X. W. Zhao, X. Y. Xu, P. Sun, and L. Y. Zhou, *State Key Laboratory of Animal Nutrition, Institute of Animal Science, Chinese Academy of Agricultural Sciences, Beijing, China.*

De novo synthesis of short-medium chain fatty acids (SMCFA), which inhibited by the exogenous long chain fatty acids (LCFA), might be promoted by dietary addition of SMCFA. Our objective was to evaluate the effects of different ratios of SMCFA to LCFA on milk fatty acids (FA) composition in dairy cows. The experiment lasted for 9 wks. Thirty-six lactating Holstein dairy cows (183 ± 46 DIM) were blocked base on average daily milk yield, DIM and parity, and were randomly assigned to 1 of 3 treatments. Cows were fed total mixed ration with 1 of 3 fat supplements: 80 g/d SMCFA and 320 g/d LCFA (20S80L); 400 g/d of butterfat (40S60L); 240 g/d SMCFA and 160 g/d LCFA (60S40L), and the ratios of SMCFA to LCFA were 20:80, 40:60, and 60:40 respectively. The FA compositions of the SMCFA mixture (a blend of 6% caproic acid, 4% caprylic acid, 9% capric acid, 10% lauric acid, 32% myristic acid and 39% palmitic acid) and the LCFA mixture (a blend of 59% cocoa butter, 16% olive oil, and 25% palm oil) were identical to those found in milk fat. Analysis of data was conducted using the MIXED procedures of SAS 9.0. As the ratios of SMCFA to LCFA in the supplements increased, concentrations of C < 16:0 (25.39, 27.58, and 27.39%; $P = 0.08$) tended to increase linearly ($P = 0.06$), C14:0 percentage (10.39, 11.18, and 11.90%; $P < 0.05$) increased linearly ($P < 0.05$), and polyunsaturated FA percentage (4.12, 4.68, and 4.31%; $P < 0.05$) was increased quadratically ($P < 0.05$). However, concentration of C16:0 (32.16, 32.01, and 31.91%; $P > 0.05$), C > 16:0 (42.08, 39.78, and 40.28%; $P > 0.05$), saturated FA (68.26, 69.81, and 69.10%; $P > 0.05$), and monounsaturated FA (27.64, 25.51, and 26.59%; $P > 0.05$) were not affected. In conclusion, dietary supplementing different ratios of SMCFA to LCFA influenced milk FA synthesis and caused the alteration of milk FA composition.

Key Words: long chain fatty acids, milk fatty acids composition, short-medium chain fatty acids

M329 Effect of sorghum grain supplementation levels on ruminal volatile fatty acids: Comparison between cattle and sheep. M. Aguerre*[1], C. Cajarville[2], L. Assandri[2], A. Gonzalez[1], and J. L. Repetto[1], *[1]Departamento de Bovinos, Facultad de Veterinaria, Universidad de la República, Montevideo, Uruguay, [2]Departamento de Nutrición Animal, Facultad de Veterinaria, Universidad de la República, Montevideo, Uruguay.*

Crossbreed heifers (n = 16; 210 ± 42.5 kg), and lambs (n = 16; 45.6 ± 6.2 kg), were used to compare the response on ruminal VFA concentration and profile to increased levels of sorghum grain supplementation (0, 0.5, 1.0 and 1.5% BW). Heifers and lambs were fed ad libitum fresh *Lotus corniculatus* (31.8% DM, 12.6% CP, 41.8% NDF). After 30d, ruminal liquor samples were taken every 1h from 0 to 6h post-supplementation, to determine acetate, propionate and butyrate concentrations by HPLC, while total VFA (TVFA) were determined as the sum of the above VFA. Mean values and linear regressions were compared between species with the MIXED procedure (SAS). Mean TVFA was lower in cattle than in sheep (94.4 vs. 112 ± 6.81 mMol/L; $P = 0.008$). Increasing supplementation levels similarly increased TVFA in both species (Table 1). Proportion in TVFA of acetate was higher (70.7 vs. 63.7 ± 0.70 mMol/100mMol; $P < 0.001$), while propionate and butyrate were lower in cattle than in sheep (15.8 vs. 20.6 ± 0.83 mMol/100mMol and 13.5 vs. 15.9 ± 0.62 mMol/100mMol; $P < 0.001$, propionate and butyrate respectively). Increasing supplementation levels affected differently acetate and butyrate proportion in TVFA in both species (P<0.001; Table 1), leading to more pronounced changes in acetate and butyrate proportions in sheep than in heifers. However, propionate proportion in TVFA was not affected. In conclusion, increasing levels of sorghum supplementation determined a similar rose in TVFA in cattle and in sheep. However, sheep showed more drastic changes in VFA profile than heifers.

Table 1.

Item	Cattle	Sheep	*P*-value[1]
Total VFA (mmol/L)	y = 77.6 + 23.0x; $R^2 = 0.12$, P < 0.001	y = 108 + 30.7x; $R^2 = 0.21$, P < 0.001	0.355
VFA, mmol/100 mmol			
Acetate	y = 72.7 - 2.49x; $R^2 = 0.13$, P < 0.001	y = 68.8 - 6.48x; $R^2 = 0.40$, P < 0.001	<0.001
Butyrate	y = 12.1 + 1.92x; $R^2 = 0.09$, P = 0.003	y = 10.9 + 6.72x; $R^2 = 0.53$, P < 0.001	<0.001

[1]*P* of the comparison of regressions.

Key Words: bovine, ovine, fresh pasture

M330 Effects of different ratios of short-medium chain fatty acids to long chain fatty acids on milk composition in dairy cows. Y. Sun, D. P. Bu, J. Q. Wang,* H. Cui, X. W. Zhao, X. Y. Xu, P. Sun, and L. Y. Zhou, *State Key Laboratory of Animal Nutrition, Institute of Animal Science, Chinese Academy of Agricultural Sciences, Beijing, China.*

Dietary addition of long chain fatty acids (LCFA) inhibits milk fat de novo synthesis in dairy cows, whereas short-medium chain fatty acids (SMCFA) may promote this process. This study evaluated the effects of supplementation of different ratios of SMCFA to LCFA on milk composition in dairy cows. Thirty-six lactating Holstein cows (183 ± 46 DIM) blocked by average daily milk yield, DIM and parity, were randomly assigned to 1 of 3 treatments. During the 9 wks experimental period, cows were fed total mixed ration 3 times daily, and supplemented with 1 of 3 supplements: 80 g/d SMCFA and 320 g/d LCFA (20SM80L); 400 g/d of butterfat (40SM60L); and 240 g/d SMCFA and 160 g/d LCFA (60SM40L). The ratios of SMCFA to LCFA in the supplements were 20:80, 40:60, and 60:40 respectively. The FA composition of the SMCFA mixture (a blend of 6% caproic acid, 4% caprylic acid, 9% capric acid, 10% lauric acid, 32% myristic acid and 39% palmitic acid) and of the LCFA mixture (a blend of 59% cocoa butter, 16% olive oil, and 25% palm oil) were representative of those found in milk fat. Data was analyzed by MIXED procedures of SAS 9.0. Dry matter intake (16.3, 16.1, and 16.0 kg/d; $P > 0.05$), milk yield (23.5, 23.9, and 21.8 kg/d; $P > 0.05$), 3.5% fat corrected milk (25.9, 26.8, and 25.4 kg/d; $P > 0.05$), milk protein percentage (3.46, 3.43, and 3.48%; $P > 0.05$) and yield (0.83, 0.82, and 0.76 kg/d; $P > 0.05$) were not affected among the treatments. As the ratios of SMCFA to LCFA increased in the supplements, milk fat percentage (4.01, 4.20, and 4.41%, $P = 0.06$) tended increase in a linear fashion ($P < 0.05$) and milk total solids proportion (13.09%, 13.26%, and 13.55%; $P < 0.05$) increased linearly ($P < 0.05$), while

milk fat yield (0.97, 0.99, and 0.97 kg/d; $P > 0.05$) was not different. In conclusion, dietary supplementing SMCFA might compensate the inhibitory effects of LCFA on milk fat synthesis.

Key Words: short-medium chain fatty acids, long chain fatty acids, milk composition

M331 Effects of different fatty acid mixtures on milk fatty acid composition and oxidative stability of milk fat. X. W. Zhao, J. Q. Wang,* D. P. Bu, Y. Sun, H. Cui, X. Y. Xu, L. Y. Zhou, and P. Sun, *State Key Laboratory of Animal Nutrition, Institute of Animal Science, Chinese Academy of Agricultural Sciences, Beijing, China.*

Unsaturated fatty acids (UFA) as the main function components in milk fat, have beneficial effects on health maintenance and disease prevention. More and more people are concerning to improve UFA content in milk. However, the rich content of UFA, especially polyunsaturated fatty acids (PUFA) in milk fat will increase the risk for developing spontaneous oxidized off-flavor (SOF). The experiment was carried out to determine the effects of different fatty acids mixture on milk fatty acids composition and milk fat oxidation changes. Thirty 6 dairy cows were used in a completed design experiment for 8 wk. Cows supplement 3 types of dietary fatty acids mixture: 1) short- and medium-chain fatty acids (SMCFA), 2) butterfat, and 3) long-chain fatty acids (LCFA). Data were analyzed using the MIXED procedure of SAS. Relative to SMCFA, the C12:0, C14:0 and C16:0 concentration in milk fat from cows on butterfat and LCFA were significantly decreased ($P < 0.05$). The proportions of *cis*-C18:1, *trans*-C18:1 and *cis*-C18:2 were increased by 16.0, 45.6, and 8.8% ($P < 0.05$) in milk fat from cows on LCFA compared with cows on SMCFA. Similar increases in *trans*-C18:1, *cis*-C18:2 and C18:3 were 31.6, 11.9 and 13.6% ($P < 0.05$) in butterfat treatments, respectively. Furthermore, the activities of superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GSH-Px) tended to decrease when increased long-chain FA in cow′ diet, while the concentration of malondialdehyde (MDA) tended to increase in bovine milk. Our results indicated that long-chain FA tended to exhibit positive effects on milk fatty composition, but may decrease the oxidative stability of milk fat.

Key Words: milk fatty acids composition, oxidation changes, milk fat

M332 Endogenous contribution and urinary recovery of purine derivatives in Nellore cattle. A. M. Barbosa*[1], R. F. D. Valadares[2], S. de C. V. Filho[2], D. do Santos Pina[3], and M. A. Fonseca[2,4], *[1]Universidade Federal da Bahia, Salvador, Bahia, Brazil, [2]Universidade Federal de Viçosa, Viçosa, Minas Gerais, Brazil, [3]Universidade Federal do Mato Grosso, Sinop, Mato Grosso, Brazil, [4]Texas A&M University, College Station.*

This study was conducted with the objective to evaluate the endogenous contribution of purine derivatives (PD) urinary excretion in Nellore cattle, fed in a single diet with different levels of DM. The trial was performed using 8 cannulated (rumen and abomasum; moreover 4 of those had ileum cannula) heifers with average BW of 258 ± 20 kg. The animals were allocated on individual stalls and fed twice a day. The statistical analyses were performed using 2 balanced Latin square designs (4 × 4). Treatments were constituted of 4 DM offer levels: 1.2, 1.6, 2.0 and 2.4% of BW. The endogenous losses of PD and the purine bases recovery as PD were estimated by the regression between the daily excretion of PD (dePD) in urine, and purine bases in the abomasum (X), expressed as mmol/kg$^{0.75}$. The endogenous contribution and the purine recovery of PD are represented by the coefficient of the regression and the intercept, respectively. Additionally, the endogenous losses were evaluated by the regression between excretion of PD, in mmol/kg$^{0.75}$, and DMI, in g/kg$^{0.75}$. The equation obtained ($P < 0.001$) was: dePD = 0.0196 X + 0.2421. Daily excretion of PD, mmol/kg$^{0.75}$, as a function of RNA flux into the abomasum, mmol/kg$^{0.75}$, was adjusted ($P < 0.001$) to the regression, dePD = 0.8601 X + 0.4603 ($r^2 = 0.661$) where 0.86 represents the recovery of DP in urine, and 0.4603 represents the endogenous contribution. The conclusion was for the different methods utilized was found the estimatives of 0.46 mmol/kg$^{0.75}$ and 0.24 mmol/kg$^{0.75}$ for endogenous excretion of PD in Nellore cattle; the true digestibility of RNA in small intestine was 0.93, which is higher than the classic value adopted in the literature for microbial production calculation.

Key Words: flux RNA abomasum, level of intake, ruminant nutrition

M333 Effects of dietary inclusion of tannin and polyethylene glycol supplementation on nitrogen metabolism in Saanen dairy goats. A. Rahimi[1], A. A. Naserian[1], R. Valizadeh[1], A. Tahmasbi[1], B. Saremi*[2], and A. R. Shahdadi[3], *[1]Ferdowsi University of Mashhad, Mashhad, Khorasan Razavi, Iran, [2]Institute of Animal Science, Physiology & Hygiene Unit, University of Bonn, Germany, [3]Agricultural Sciences & Natural Resources, University of Gorgan, Gorgan, Golestan, Iran.*

Tannins reduce the protein degradation in the rumen, shift the site of N metabolism from rumen to the lower digestive tract and large intestine. Shifting excretion pattern of nitrogen from urine to faces and formation of tannin–protein complex are beneficial environmentally. High levels of tannins in the diet may have negative effects on feed intake and digestibility of nutrients and polyethylene glycol (PEG) could eliminate it. We aimed to evaluate the effects of feeding pistachio hull (PH, source of tannin) and PEG on nitrogen metabolism in Saanen dairy goats. Nine animals were used in a 3 × 3 Latin square design. Treatments were: T1) Control, without PH, T2) 30% PH (DM basis) that provided 18.1 g condense tannin per kg DM of diet, and T3) 30% PH + 1% PEG (DM basis). In T2 and T3, PH replaced alfalfa hay. Statistical analysis was performed using the MIXED procedure of SAS ($P < 0.05$). Addition of PH in T2 and T3 (despite of addition PEG) reduced the nitrogen intake. In addition, urinary nitrogen excretion was significantly decreased and fecal nitrogen excretion was increased by addition of PH in T2 and PEG supplementation in T3 increased or decreased them respectively but not to the similar values like control group. Milk nitrogen excretion was not affected by experimental diets. Nitrogen digested was significantly decreased by substitution of PH in diet in T2 and T3 (despite of addition PEG). Nitrogen retained was not affected by experimental diets. To sum up, using of high levels tannin in the diet could alter protein metabolism positively from an environmental aspect and supplementation with PEG could reduce possible negative effectsof tannin on performance.

Table 1.

Nitrogen metabolism	Alfalfa	30% PH	30% PH+PEG	SEM	*P*-value
Nitrogen Intake (g/d)	54.47^{a}	53.01^{b}	53.96^{b}	0.360	0.050
Nitrogen excretion from urine (g/d)	12.42^{a}	9.90^{b}	11.52^{ab}	0.553	0.049
Nitrogen excretion from fecal (g/d)	14.46^{b}	15.43^{a}	15.00^{ab}	0.135	0.011
Nitrogen excretion from milk (g/d)	7.21	6.63	7.18	0.427	0.102
Nitrogen digested (g/d)	38.52^{a}	35.51^{b}	36.73^{b}	0.448	0.013
Nitrogen retained (g/d)	20.36	21.03	20.25	0.794	0.820

^{a,b}Means within the same row with different letters are significantly different ($P < 0.01$).

Key Words: tannin, nitrogen metabolism, goats

M334 Intake and apparent total tract digestibility of dry matter and nutrients in Nellore steers fed with whole raw soybean. N. R. B. Cônsolo*[1], A. S. C. Pereira[1], J. R. Gandra[1], F. P. Rennó[1], R. Gardinal[1], J. E. Freitas Junior[2], C. S. Takiya[1], and R. D. Mingoti[1], *[1]Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo (FMVZ-USP), Pirassununga, SP, Brazil, [2]Universidade Estadual Paulista (UNESP), Jaboticabal, SP, Brazil.*

This study was conducted to evaluate the effects of whole raw soybean on intake and apparent total tract digestibility of dry matter and nutrients in Nellore steers. Twelve steers were assigned to 3 Latin squares in individual pens. Based on dry matter the diets were: T0 with 0% of soybean, T8 with 8% of soybean, T16 with 16% of soybean and T24 with 24% of soybean. Fourteen days were necessary for adaptation and 4 d for evaluation. The individual intake was evaluated by weighing the leftovers of the previous day. Leftovers and feces were collected in the d 14 to 16 to determine the intake and the apparent total tract digestibility of dry matter and nutrients. This material was dried and sampled for posteriori analysis on dry and mineral matter, ether extract, neutral detergent fiber, acid detergent fiber, crude protein and lignin. The total amount of excreted fecal dry matter was estimated by the method of acid detergent fiber indigestible (FDAi). Samples of feces, food and leftovers were placed and subsequently incubated in 3 cannulated Nellore for 312 h. Treatment effects were evaluated by Proc Mixed SAS software. The inclusion of whole raw soybean provided linear effect ($P < 0.05$) for intake of dry matter, organic matter, non-fibrous carbohydrates and total carbohydrates. There was a quadratic effect on crude protein ($P < 0.05$) and the lowest value on the diet with 16% soybean differing from the one with 24% and total control. There was a linear increase ($P < 0.001$) for ether extract intake and all treatments differed. There was no effect ($P > 0.05$) on apparent total tract digestibility of dry matter, organic matter, crude protein, neutral detergent fiber and non-fibrous carbohydrates. However, there was a quadratic effect of soybean on the total apparent digestibility in ether extract with highest digestibility for the 24% soybean. There was a linear decrease ($P < 0.05$) of total carbohydrate in apparent digestibility. Changes in the dry matter and nutrient intake in digestibility were noticed according to the levels of inclusion of whole raw soybean but these effects were not negative to the animals.

Key Words: digestibility, protein source, ruminant

M335 Evaluation of published models for predicting dry matter intake of lactating dairy cows. J. Lee* and S. Seo, *Chungnam National University, Daejeon, Republic of Korea.*

Accurate prediction of dry matter intake (DMI) is pre-requisite for ration formulation software and a precision feeding program. The equations commonly used for predicting DMI are empirical models, developed on the basis of experimental data obtained more than a decade ago. Considering increases in genetic potential of dairy cows and dairy management, there is an interest in evaluating the model using recent data to see if the published models are still applicable to the field. The objective of this study was thus to evaluate 6 published empirical equations widely used for predicting DMI of lactating dairy cows using recently published experimental observations. A literature database based on the research articles published in the *Journal of Dairy Science* from January 2006 until June 2011 (volumes 89 through 94) was constructed. The database is composed of a total of 525 treatment means from 143 studies, and contains wide ranges of DMI, milk yield and week of lactation. Six published models include NRC (NRC, 2001), Brown (Brown et al., 1977), Chase (Chase and Sniffen, 1985), Rayburn (Rayburn and Fox, 1993), Roseler (Roseler et al., 1997) and Fuentes-Pila (Fuentes-Pila et al., 2003), and they were statistically evaluated using the constructed database. The coefficient of determination and root mean square prediction error (RMSPE) were used to examine precision and accuracy of the model, respectively. Residual analysis was also conducted to assess the mean and slope bias of a model. The NRC, Brown, Chase, Rayburn, Roseler and Fuentes-Pila models explained 49, 39, 48, 41, 51 and 41% of the variations in the evaluation data set, and the RMSPE were 2.59, 2.97, 2.75, 2.08, 3.44 and 3.61 kg, respectively. All of the models showed significant mean bias ($P < 0.01$): the highest absolute mean bias was observed with the Roseler equation (2.336) while the lowest value with the NRC equation (0.450). Among the equations, only the Roseler and the NRC predicted the observed DMI without slope bias ($P > 0.05$). The NRC model was highly ranked among the tested models in all of the evaluation criteria. The accuracy of the NRC model prediction, however, may be reduced with recent observations.

Key Words: dairy cows, dry matter intake, evaluation

M336 Effects of roughage source and dietary level of inclusion on total tract apparent digestibility in Nellore cattle. R. S. Goulart*[1,2], L. G. Nussio[1], R. A. M. Vieira[3], J. L. P. Daniel[1], R. C. Amaral[1], V. P. Santos[1], and A. V. Pires[1], *[1]University of Sao Paulo, ESALQ, Piracicaba, SP, Brazil, [2]Department of Animal Sciences, North Dakota State University, Fargo, [3]Universidade Estadual do Norte Fluminense, Campos dos Goytacazes, RJ, Brazil.*

Six ruminally cannulated Nellore steers were allotted in a 6 × 6 Latin square to investigate the effects of roughage source and dietary inclusion on nutrient digestion. The 6 diets were composed of fiber sources: negative control (NC) with 10% NDF from corn silage (50.2% NDF, DM basis), positive control (PC) with 20% NDF from corn silage and 4 diets containing 10% NDF from corn silage and 10% NDF from: sugarcane (SC; 46.8% NDF); sugarcane bagasse (SCB; 81.0% NDF); soybean hulls (SH; 75.1% NDF) and low oil cottonseed meal (LOCM; 49.2% NDF). Total fecal collections, during 4 d consecutively in each period, were used to determine total tract apparent digestibility coefficients (TTAD) of DM, CP, NDF, ADF. Lower inclusion of forage fiber (CN) in the diet presented higher digestion coefficients of DM ($P \leq 0.05$) in comparison with diets containing double amount of fiber sources (20% of NDF). When fiber sources with low amount of CP (SC and SCB) were included in the diets, TTAD of CP were 12.32% lower than diets containing corn silage, SH or LOCM. Fiber digestibility was influenced ($P \leq 0.05$) by roughage sources and inclusion level on TTAD. Although similar DMI ($P \leq 0.05$) was observed between treatments CP, SC, SH e HOCM, differences among TTAD values can be explained either by differences in solid passage rate, ruminal retention time or chemical composition of fiber when different roughage sources replaced each other. In spite of the lower TTAD values of NDF of NC in comparison to PC (6 percentage units), the higher inclusion of concentrate (NC) improved the DM digestibility by 8.3 percentage units.

Table 1. Effects of roughage source and level on total-tract apparent digestibility in Nellore cattle

Total-tract apparent digestibility, %	Diet[1]						SE
	NC	PC	SCB	SC	SH	LOCM	
DM	77.1[a]	68.7[b]	69.6[b]	70.2[b]	71.9[b]	70.8[b]	1.8
CP	74.4[a]	68.3[a]	58.2[b]	58.4[b]	71.0[a]	68.8[a]	1.9
NDF	60.3[bc]	66.3[a]	53.8[bc]	52.3[bc]	61.7[ab]	50.5[c]	2.5
ADF	47.4[abc]	52.6[ab]	45.4[bc]	45.8[bc]	54.8[a]	43.6[c]	2.3

[abc]Means lacking common superscripts differ ($P \leq 0.05$).

[1]NC = negative control; PC = positive control; SCB = sugarcane bagasse; SC = sugarcane; SH = soybean hulls; LOCM = low oil cottonseed meal.

Key Words: digestibility, forage, Nellore

M337 Intake and digestibility of diets with different levels of concentrates in cattle feedlot Nellore. C. S. Ribeiro Junior,* Y. T. G. Salcedo, R. C. Canesin, T. T. Berchielli, M. Machado, L. M. Delevatti, E. San Vito, I. P. C. de Carvalho, J. F. Lage, and G. Fiorentini, *São Paulo State University, Faculty of Agriculture and Veterinary Sciences, Jaboticabal, São Paulo, Brazil.*

The increased meat demand in the world market amplified the production system. For that reason, the use of confinement systems is an option and the inclusion of grains in the diet is essential. Based on these assumptions, this study aimed is to evaluate the intake and digestibility of diets with different forage: concentrate. We used 8 Nellore, male, castrated, with an average weight of 320 ± 44 kg. The animals were divided into 2 latin square 4x4, with 4 treatments and 4 replications. The treatments consisted of 4 diets with different forage: concentrate (70:30, 60:40, 40:60, 20:80), balanced to maximize microbial protein synthesis and increase the use of urea. The forage used was fresh chopped sugar cane and the concentrates consisting of corn bran, soybean meal, urea and mineral salt. The experiment was divided into 4 periods of 22 d each: the first 15 d for the diet adaptation of animal and the other days for data collection. Data were analyzed statistically by SAEG statistical program (Statistical Analysis System), using the Tukey test at 5% probability in comparison of means. The dry matter intake as a function of body weight was greater in relations 60:40 (1.9%) and 40:60 (1.8%), differing significantly ($P < 0.05$) dry matter intake in relations 70:30 (1.6%) and 20:80 (1.7%). The organic matter intake was higher in the 60:40 ratio (6.3 kg/d), differing from the others ($P < 0.05$). As for the digestibility of dry matter and organic matter the highest values were observed in the 40:60 ratio, and the smaller the ratio 20:80. It is concluded that the forage: concentrate ratio 40:60 had a better digestibility of dry matter and organic matter and a higher dry matter intake, with high nutritional value. In this experiment 40:60 ratio is more suitable for feeding beef cattle.

Key Words: digestibility, sugar cane, nutritive value

M338 Voluntary intake, apparent digestibility and blood urea levels in hair sheep fed *Cynodon nlemfuensis* grass mixed with *Leucaena leucocephala* and supplemented with rumen fermentable energy. V. A. Arjona-Alcocer, A. Ruiz-Gonzalez, E. Briceño-Poot, A. J. Ayala-Burgos, N. Ruz-Ruiz, and J. C. Ku-Vera,* *FMVZ-Universidad Autonoma de Yucatan, Merida, Yucatan, Mexico.*

Tropical grasses supply insufficient amounts of energy and protein for grazing sheep, resulting in low productive performance. Silvopastoral systems supply good quality forages (CP, fermentable energy) to grazing sheep. However, in silvopastoral systems there may be an imbalance among energy and nitrogen availability in the rumen leading to the loss of nitrogen from this organ. Four hair lambs housed in metabolic crates were used in a 4 × 4 Latin square design. Sheep were fed *Cynodon nlemfuensis* grass and foliage of the legume *Leucaena* leucocephala mixed in a ratio 50:50 on a dry matter basis. Increasing levels of cane molasses were supplied: 0, 0.24, 0.72 and 1.2 Mcal per lamb daily. The ration was served twice daily at 10:00 and 15:00 h divided in 2 halves. Response variables were DM intake, DM digestibility and concentration of urea in blood and excretion of urea in urine. The experiment lasted for 48 d with 4 periods of 12 d, 7 d for adaptation and 5 d for sampling. Results were analyzed with the statistical package SAS. DM intake was increased by energy supplementation, although DM digestibility was unaffected by treatment (Table 1). There was a trend for energy supplementation to decrease urea concentration in blood and urinary excretion of urea in sheep.

Table 1. DM intake, apparent digestibility of DM and levels of urea in blood and urine of lambs fed a mixture of C. nlemfuensis and L. leucocephala and supplemented with three levels of energy

	ME (Mcal/d) supplied as molasses			
Item	0	0.24	0.72	1.2
DMI, g/head/d	1047.91^{c}	1184.13^{b}	1268.46^{ab}	1316.17^{a}
DMI, g/kg$^{0.75}$/d	93.14^{c}	103.66^{b}	109.72^{ab}	115.43^{a}
ADDM, %	66.62	63.93	63.85	63.97
Blood urea, mg/dL	68.25^{a}	60.27^{ab}	56.45^{bc}	48.25^{c}
Urinary urea, g/sheep/d	42.34	41.72	36.67	28.34

^{a,b}Different superscripts in the same row differ ($P < 0.05$).

Key Words: hair sheep, energy, supplementation

M339 Rumen ammoniacal nitrogen and pH from cattle supplemented with levels of replacement of soybean meal by sunflower cake. R. G. F. Silva,* J. T. Zervoudakis, L. S. Cabral, D. P. Sousa, L. K. H. Zervoudakis, M. F. Costa Filho, R. S. Gomes, F. M. Negrão, and J. F. W. Koscheck, *Federal University of Mato Grosso, Cuiabá, Mato Grosso, Brazil.*

This study aimed at evaluating the replacement levels of the protein from soybean meal by the protein from sunflower cake in multiple supplements on the rumen ammoniacal nitrogen (RAN) and rumen pH of beef cattle. The experiment was conducted during the Brazilian rainy season. Five Nelore breed animals, uncannulated, submitted to grazing *Brachiaria brizantha* 'Marandu' were used, they were divided into individual paddocks of 0.24 ha. The average initial age and weight were 15 mo and 257 kg, respectively. The treatments were: 0% of replacement (0%SC), 25% of replacement (25%SC), 50% of replacement (50%SC), 75% of replacement (75%SC) of the protein from soybean meal by the protein from the sunflower cake, isoprotein with 30% crude protein and one more control treatment of commercial mineral mixture (MM). One kg of fresh matter/animal/day was provided for the supplemented treatments and the control treatment was provided ad libitum. A Latin square design 5x5 was used. Rumen fluid was collected and the pH was measured right before the supplementation (0 h) and 4 h after the supplementation. The availability of forage in the dry matter ranged on average from 5678 kg in the 1st period to 9743 kg in the 5th period. There was no effect of the treatments on rumen pH ($P > 0.05$), however there was a time effect on rumen pH ($P < 0.05$), in which at time 0 the average was 6.75 and 6.50 at time 4, both within the levels considered physiologically normal. For RAN, there was effect of treatment and time ($P < 0.05$), in the study within the time the RAN concentrations were 5.42 and 12.22 mg/dL for the time 0 and 4 respectively. In the study within the treatments the RAN concentrations were 9.38; 9.89; 9.25; 9.98 and 5.61 mg/dL, respectively, for the treatments 0% SC, 25% SC, 50% SC, 75% SC and MM. Therefore, it is concluded that the inclusion of sunflower cake for beef cattle grazing in the rainy season can be carried out without affecting the activity of rumen microbiota. Furthermore, fermentation quality improves when supplemented, as compared with the control treatment.

Key Words: grazing, forage, supplementation

M340 Comparison of three different methods in determination of accurate soluble fraction in feeds for CPM Dairy formulation to improve efficiency and milk prediction accuracy. P. Yu, B. Liu,* Z. Niu, and D. A. Christensen, *Department of Animal and Poultry Science, University of Saskatchewan, Saskatoon, SK, Canada.*

The CPM dairy software is the major software used in Saskatchewan for milk production prediction and diet formulation for dairy producers and

for researchers. However, the key information that we need to accurately predict the milk production is lacking, which is the soluble protein fraction. Without accurate feed soluble fractions in the CPM model, we get the poor milk predictions because we only estimate soluble fractions in Saskatchewan feeds. The objectives of this study were to compare 3 available methods to determinate accurate soluble fractions in dairy feed and diet for the CPM dairy formulation to improve feed utilization efficiency and prediction accuracy of milk production. The 3 methods that were accessed to determine protein soluble fractions in Saskatchewan feeds included (1) CNCPS V6.1 method; (2) Dutch 2007 DVE method; (3) In situ Method. The 14 different types of feeds were used in this study. The data normality, correlation, CRD and paired-*t*-test were analyzed using SAS. The results showed that the CNCPS method and In situ method produced similar soluble protein fractions, both methods produced higher soluble fractions than the Dutch-2007 DVE method (35.6 vs. 34.2 vs. 18.0% of CP, $P < 0.05$). Paired-*t*-test between any 2 methods also showed significant differences ($P < 0.01$) between the CNCPS and Dutch-2007 DVE method and between the In situ method and Dutch-2007 DVE method, but showed no difference between the CNCPS and In situ Methods. Although there were significant differences between the methods, the correlation analysis showed significant correlated between any methods with correlation coefficients r = 0.82 (between the CNCPS and in situ methods), 0.81 (between the CNCPS and Dutch-2007 DVE methods) and 0.59 (between the Dutch-2007 DVE method and in situ method).

Key Words: solubility methods, soluble protein fractions of Saskatchewan feeds, dairy cows

M341 Economic analysis of the inclusion of macauba pie of dietary lactating dairy cows. C. S. Ribeiro Junior*[2], R. A. de Azevedo[1], A. C. R. dos Santos[1], L. C. Gerassev[1], R. N. Bahiense[1], L. Araújo[1], and A. R. C. Lima[2], *[1]Federal University of Minas Gerais, Montes Claros, Minas Gerais, Brazil, [2]São Paulo State University, Faculty of Agriculture and Veterinary Sciences, Jaboticabal, São Paulo, Brazil.*

The objective of this study was to analyze the economic feasibility of substitution of corn meal for macauba pie (MP) in the total diet of lactating dairy cows. We used 8 animals with a live weight of 480 kg and average production of 25 kg of milk per day. The animals were divided into 2 4x4 Latin square with 4 treatments with 4 levels of inclusion of in dry matter (0, 10, 20 and 30%) and 4 periods of 21 d, 14 adaptation and 7 d of evaluation. The animals were kept in tie stall and fed ad libitum corn silage and concentrate, the concentrate was composed of corn, soybeans, cottonseed, and increasing levels of macauba pie. Intake of total dry matter (DMI), milk yield (MY), the daily cost of each diet and economic return of the diets. Data were analyzed statistically by SAEG statistical program (Statistical Analysis System), using the tukey test at 5% probability in comparison of means. The dry matter intake as a function of body weight was higher with 0% (4.07%), decreasing significantly in the treatment 30% (3.46%) ($P < 0.05$), the same was observed in the production of milk, where the animals who received treatment 0% produced 26.20 kg of milk per day, against 18.36 kg of milk per day treatment in 30% ($P < 0.05$). The reduction of DMI decreased cost of maintenance, however, this result was not sufficient to compensate the decline shown in milk production, resulting in reduced net margin per kg of milk and less profit for the inclusion in diets for MP dairy cows. For the production of milk, it is necessary that the price adopted per kg dry matter MP is 68.35% of corn.

Key Words: dairy cattle, economic analysis, macauba pie

M342 Survey of nutritional recommendations used by feedlot nutritionists in Brazil in 2011. C. A. Oliveira[2], M. D. B. Arrigoni[1], J. T. Vasconcelos[3], R. D. L. Pacheco[1], T. V. B. Carrara[2], L. L. Cursino[2], A. L. N. Rigueiro[2], and D. D. Millen*[2], *[1]São Paulo State University (UNESP), Botucatu, São Paulo, Brazil, [2]São Paulo State University (UNESP), Dracena, São Paulo, Brazil, [3]Elanco Animal Health, Greenfield, IN.*

This survey was designed to describe nutritional and management recommendations of Brazilian feedlot nutritionists in 2011. Thirty-three feedlot nutritionists, responsible for about 2,658,000 animals, completed the survey within 1-mo, which was available on line (www.surveymonkey.com) and consisted of 81 questions. The mean inclusion of roughage and inclusion in finishing diets by nutritionists was 21.0 ± 10.2% and 79.0 ± 19.4%, respectively. The level of grains included in the finishing diets recommended by 12 nutritionists (36.4%) ranged between 51% and 60%, but 11 (33.3%) nutritionists recommended diets with 61% to 80%, and 10 (30.3%) used less than 51% grains. Corn was the primary source of grain used in feedlot diets (n = 29; 87.9%), followed by sorghum (n = 4; 23.1%). Most of the corn fed in Brazilian feedlots was of the flint type (n = 28; 96.5%). The primary grain processing method adopted was coarsely grinding and fine grinding, which were used by 19 (57.6%) and 12 (36.4%) nutritionists, respectively. Whole cottonseed was the primary co-product included in finishing diets, being used by 17 (41.5%) of the nutritionists. Use of soybean hulls was reported by 8 (24.2%) nutritionists, whereas citrus pulp pellets was reported by 7 (21.2%), and soybean residues were used by 1 (3%) of the participants. Corn silage was the primary roughage source, being used by 9 (27.3%) of the respondents, followed by sorghum silage, which was used by 8 (24.2%) of the nutritionists, and sugarcane bagasse by 7 (21.2%), fresh chopped sugarcane by 5 (15.2%), and grass silage by 4 (12.1%) of the nutritionists. In addition, average recommended concentrations of NDF for finishing diets in Brazil were 21.1 ± 12.3%. The average CP, urea and true protein concentrations (DM basis) recommended for finishing diets in Brazil was 13.4 ± 2.5%, 1.4 ± 0.3% and 8.1 ± 1.7%, respectively. The primary source of plant-based protein used by the nutritionists was cottonseed meal (n = 19; 57.6%). The present survey provides an overview of nutritional recommendations currently applied by feedlot nutritionists from all regions in Brazil. These data may facilitate the design of industry-oriented research.

Key Words: Brazil, feedlot, survey

M343 Effects of different ratios of short-medium chain fatty acids to long chain fatty acids on plasma fatty acids profiles in lactating dairy cows. Y. Sun, D. P. Bu, J. Q. Wang,* X. W. Zhao, H. Cui, X. Y. Xu, P. Sun, and L. Y. Zhou, *State Key Laboratory of Animal Nutrition, Institute of Animal Science, Chinese Academy of Agricultural Sciences, Beijing, China.*

The objective of this current study was to evaluate the response of plasma fatty acids (FA) profiles to different ratios of short-medium chain fatty acids (SMCFA) to long chain fatty acids (LCFA) in lactating dairy cows. Thirty-six lactating Holstein dairy cows (183 ± 46 DIM), blocked by average daily milk yield, DIM and parity, were randomly assigned to 1 of 3 treatments and fed total mixed ration, which supplemented with 1 of 3 lipids supplements. The supplements were: 80 g/d SMCFA and 320 g/d LCFA (20S80L; the ratio of SMCFA to LCFA is 20:80); 400 g/d of butterfat (40S60L; the ratio of SMCFA to LCFA is 40:60); 240 g/d SMCFA and 160 g/d LCFA (60S40L; the ratio of SMCFA to LCFA is 60:40). The FA compositions of SMCFA mixture (a blend of 6% caproic acid, 4% caprylic acid, 9% capric acid, 10% lauric acid, 32% myristic acid and 39% palmitic acid) and LCFA mixture (a blend of 59% cocoa

butter, 16% olive oil, and 25% palm oil) were identical to those found in milk fat. Blood samples were collected from the coccygeal vein at 3 h after the morning feeding. Data was analyzed as a randomized block design with repeated measures using MIXED procedure in SAS 9.0. As the ratios of SMCFA to LCFA in the supplements increased, percentages of C > 16:0 (85.66, 86.75, and 85.75%; $P < 0.05$), saturated FA (27.68, 25.55, and 27.85%; $P < 0.05$), and polyunsaturated FA (62.31, 66.05, and 62.49%; $P < 0.05$) increased quadratically ($P < 0.05$). Concentrations of C < 16:0 (2.81, 2.21, and 2.69%; $P > 0.05$) and monounsaturated FA (10.00, 8.40, and 9.66%; $P > 0.05$) were not different among the treatments. The results suggested that changes of blood FA composition, which induced by lipid supplements, might be one of the reasons for milk FA profile alternation.

Key Words: long chain fatty acids, plasma fatty acids profiles, short-medium chain fatty acids

M344 Effects of total solids in drinking water and milk yield per cow on milk mineral concentrations from California dairy farms. A. R. Castillo*[1], N. S. del Rio[2], N. R. St-Pierre[3], and W. P. Weiss[3], *[1]University of California, Cooperative Extension, Merced, [2]University of California, Cooperative Extension, Tulare, [3]The Ohio State University, Department of Animal Science, Columbus.*

Knowing the quantity of specific minerals secreted in milk by dairy cows is important to comply with Nutrient Management Plans. Forty dairies in Merced, California (mean 787 ± 592 lactating cows/farm) were selected to study the effect of drinking water total solids (TS) contents and milk yield per cow (MY) on milk mineral content. Data was analyzed as 2 × 2 factorial with high TS (HTS; average 809 mg/L) and low TS (LTS; average 307 mg/L), and high MY (HMY; average 36 kg/d) and low MY (LMY; average 27.6 kg/d) as main factors. Milk yield was estimated from DHIA records. Dairy farm water troughs and am-pm bulk tank milk samples were taken by duplicate on 2 non-consecutive days and assayed for TS (water) and concentrations of Ca, P, Mg, Cl, K, Na, S, Cu, Fe, Mn, Se, and Zn (milk). Average milk mineral composition (mg/L) and standard deviation was: Ca 1008 ± 34.8; P 906 ± 34.4; Mg 100 ± 5.4; K 1534 ± 50.1; Na 397 ± 28.1; Cl 1045 ± 79.7; S 308 ± 11.3; Cu 0.036 ± 0.010; Fe 0.159 ± 0.020; Mn 0.016 ± 0.003; Zn 3.28 ± 0.208; Se 33.4 ± 7.54. No interactions between water TS and MY were observed. Milk from dairies with HTS water had lower ($P < 0.1$) concentrations of K (−2%), S (−2%), and Mn (−15%). In dairies with HMY, milk had significantly lower concentrations of Ca (−2.3%), P (−3.1%), Na (−5%), S (−3%), and Cu (−14%). The MY response was likely associated with dilution. More research is needed to evaluate water TS effects. Our results indicate that milk mineral contents might be affected by drinking water TS contents and MY.

Key Words: milk mineral contents, milk yield, drinking water

M345 Effects of supplementing different sources of fatty acids on lipid metabolism and endocrine responses in mid-lactation dairy cows. X. Y. Xu, J. Q. Wang,* D. P. Bu, H. Cui, X. W. Zhao, Y. Sun, L. Y. Zhou, and P. Sun, *State Key Laboratory of Animal Nutrition, Institute of Animal Science, Chinese Academy of Agricultural Sciences, Beijing, China.*

The objective of this study was to evaluate the effects of supplementing different sources of fatty acids on lipid metabolism and endocrine responses in mid-lactation dairy cows. Thirty-six Chinese Holstein cows were blocked based on milk yield, DIM and parity and randomly assigned in 3 groups. The animals were fed with diets containing 0 or 400g/d short and medium chain fatty acids(SMCFA, containing 6.0% C6:0, 4.0% C8:0, 9.0% C10:0, 10.0% C12:0, 32% C14:0 and 39% C16:0) and 400g/d long chain fatty acids (LCFA, containing 59% cocoa butter, 16% olive oil, and 25% palm oil) for group1(control), group2 and group3, respectively. The experiment lasted 8 weeks and at the last day of the experiment, blood samples were collected from tail vein of the cows. The results showed that serum triglyceride, high-density lipoprotein, low-density lipoprotein, growth hormone and insulin were not affected by supplementing different fatty acids ($P > 0.05$). The concentration of cholesterol increased by supplementing fatty acids, but no differences were observed among all the groups ($P > 0.05$). In group 3, the concentration of non- esterified fatty acid was significantly higher than that in group1 ($P < 0.05$). Compared with the control and group3, supplementing SMCFA significantly decreased the concentration of insulin-like growth factor by 16.9% ($P < 0.05$) and 9% ($P > 0.05$). In conclusion, supplementing SMCFA significantly decreased insulin-like growth factor, which may suggest SMCFA may have some negative effects on lipid metabolism.

Key Words: endocrine, fatty acids, metabolism

M346 Effect of replacing legume/grass silage with corn silage in dairy cow diets on enteric methane production. F. Hassanat*[1], R. Gervais[2], P. Y. Chouinard[2], C. Julien[3], F. Tremblay[1], D. I. Massé[1], and C. Benchaar[1], *[1]Dairy and Swine Research and Development Centre-Agriculture and Agri-Food Canada, Sherbrooke, QC, Canada, [2]Département des Sciences Animales, Université Laval, Québec, QC, Canada, [3]INRA-Université de Toulouse, Castanet-Tolosan, France.*

The objective of this study was to determine the effect of replacing legume/grass silage with corn silage in the TMR of dairy cows on enteric CH_4 emissions. Nine lactating cows (DIM = 75 ± 19; BW = 688 ± 66 kg) used in a triplicated 3 × 3 Latin square (31-d periods, 14-d adaptation) were fed (ad libitum) TMR (60:40, forage:concentrate ratio) with the forage portion being either legume/grass silage (0% CS), corn silage (100% CS) or a 50:50 mixture (50% CS). Diets were formulated to be isonitrogenous (CP = 16.4%) and isocaloric (NE_L = 1.62 Mcal/kg). Production of CH_4 was determined (3 consecutive days) using respiration chambers. Digestibility and milk performance were determined over 6 consecutive days. Linear (L) and quadratic (Q) contrasts (Proc MIXED; SAS) were used to determine the effects of treatments. Significance was declared at $P \leq 0.05$. Dry matter (DM) intake (21.7, 23.0, and 22.8 kg/d) and DM digestibility (69.7, 70.6 and 71.3% for 0, 50 and 100% CS, respectively) increased linearly as the proportion of CS in the diet increased while a quadratic effect ($P_Q < 0.01$) was observed for milk yield (32.3, 35.3, and 34.3 kg/d for 0, 50 and 100% CS, respectively). Milk protein yield increased ($P_L < 0.01$) and milk fat yield decreased ($P_L < 0.01$) as the proportion of CS increased in the diet. Fat corrected milk (FCM) yield was not affected by treatments and averaged 31.3 kg/d. Methane emissions were lower ($P_Q < 0.01$) in cows fed 0% CS (440 g/d) and 100% CS (434 g/d) than in cows fed 50% CS (483 g/d). When adjusted for DM intake, CH_4 production was lowest ($P_Q < 0.01$) with 100% CS than with the 2 other treatments (20.3, 20.7, and 17.7 g/kg for 0, 50 and 100% CS, respectively). When expressed relative to FCM, CH_4 production was lower ($P_Q = 0.01$) in cows fed 0% CS (14.3 g/kg) and 100% CS (14.6 g/kg) compared with cows fed 50% CS (15.3 g/kg). Results from this study suggest that using corn silage as the sole forage source in dairy cow diets offers a means to decrease (−13%) enteric CH_4 emissions (g/kg DM intake) compared with using legume/grass silage or 50:50 mixture of both forages.

Key Words: corn silage, legume/grass silage, methane

M347 Effects of supplementing different ratios of short-medium chain fatty acids to long-chain fatty acids on the immune function in mid-lactating dairy cows. X. Y. Xu, J. Q. Wang,* D. P. Bu, H. Cui, X. W. Zhao, Y. Sun, L. Y. Zhou, and P. Sun, *State Key Laboratory of Animal Nutrition, Institute of Animal Science, Chinese Academy of Agricultural Sciences, Beijing, China.*

It is well known that fatty acids as the composition of immune cell membrane can modulate immune functions. The objective of this study was to investigate the effects of supplementing different ratios of short-medium chain fatty acids (SMCFA) to long-chain fatty acids (LCFA) on the immune function in mid-lactating dairy cows. Seventy-two Chinese Holstein cows were blocked based on milk yield, DIM and parity and randomly assigned in 6 groups. The animals were fed 0g/d, 400g/d LCFA, 80g/d SMCFA and 320g/d LCFA, 400g/d butter fat, 240g/d SMCFA and 160g/d LCFA and 400g/d SMCFA respectively on the basis of ordinary diets for group1 (control), group2 and group3, group4, group 5 and group 6. The supplementing mixtures consisted of different ratios of fatty acids: 1) SMCFA (C6:0–6.0%, C8:0- 4.0%, C10:0- 9.0%, C12:0- 10.0%, C14:0- 32%, and C16:0- 39%), 2) butter fat (amount to 40% SMCFA plus 60% LCFA), and 3) LCFA (59% cocoa butter, 16% olive oil and 25% palm oil). The experiment lasted 8 weeks and on the last day, blood samples were collected to determine the concentrations of serum immunoglobulin (Ig) A, IgG, IgM, prostaglandin (PG) E2 and cytokines. The results showed that the concentrations of IgA in group 2 and group 5 were higher than that in group 6; but no differences were observed with the control ($P > 0.05$). Among all the groups, IgM and PGE2 were not affected by supplementing fatty acids ($P > 0.05$). Compared with the control, the concentrations of IgG, interleukin 4 and 10 increased after supplementing fatty acids, especially in group 5. In conclusion, supplementing fatty acids which consisted of 240g/d SMCFA and 160g/d LCFA can improve the immune functions in mid-lactating dairy cows well.

Key Words: fatty acids, Holstein cows, immune function

M348 Effects of supplemental extruded full-fat soybean (ESB) on ruminal fermentation, nutrient digestion, blood parameters and productive performance of early lactation dairy cows. H. Su*[1], F. Wang[1], Y. Zou[1], Z. Cao[1,2], M. Ma[1,2], and S. Li[1,2], *[1]State Key Laboratory of Animal Nutrition, College of Animal Science and Technology, China Agricultural University, Beijing, China, [2]Sino-US Dairy Research and Development Center, Beijing, China.*

Four ruminally cannulated early lactation Holstein dairy cows, with similar days in milk (DIM, 23.6 ± 4.4), body weight (BW, 587 ± 46 kg) and body condition score (BCS, 2.95 ± 0.08), were used a in 4 × 4 Latin square design to determine the effects of supplemental ESB [0 kg/d (control), 1.0 kg/d, 2.0 kg/d or 3.0 kg/d] on ruminal fermentation, nutrient digestion, blood parameters and productive performance. The basal TMR diet was formulated to meet or exceed the predicted requirements (NRC, 2001), contained (DM basis) 13.6% alfalfa hay, 22.8% corn silage, 13.7% Chinese wildrye, and 49.9% concentrate mainly from corn, bran, rapeseed meal, cottonseed meal, soybean meal and DDGS. Extruded full-fat soybean contained 91.0%DM, 38.7% crude protein (CP), 20.6% ether extract (EE), 23.6% neutral detergent fiber (NDF), 12.4% acid detergent fiber (ADF) and 6.20%Ash. Each experimental period was 21-d, including 10-d adaptation period and 7-d sampling period. With the increase of the supplemental ESB, ruminal pH tended to decrease ($P = 0.062$), but ruminal NH3-N, propionate, valerate and isovalerate concentrations increased significantly ($P < 0.05$). Compared with control, test group′s dietary apparent digestibility of CP and EE increased ($P < 0.001$), and that of DM tended to increase ($P = 0.061$), N retention increased significantly ($P < 0.01$). Milk yield tended to increase after ESB supplementing ($P < 0.10$), while milk solids-not-fat (SNF) percentage and milk urea nitrogen (MUN) concentration increased significantly ($P < 0.05$), but milk fat content tended to decrease ($P = 0.081$). Test group′s plasma urea nitrogen (PUN) concentration increased significantly ($P = 0.002$), and the 2.0 kg/d group plasma total bilirubin concentration tended to decrease ($P = 0.072$), indicated that cows′ liver injury was alleviated. Under the conditions of this trial, supplementing ESB during early lactation could improve cows′ productive performance and healthy condition, and 2.0 kg/d amount might be appropriate choice.

Key Words: early lactation, extruded full-fat soybean

M349 Intake and digestibility by lactating cows fed different levels of palm kernel cake. R. L. Oliveira*[1], R. L. N. V. Silva[2], A. C. Ferreira[1], A. G. Leão[1], M. C. A. Santana[1], A. A. Pinheiro[1], G. G. P. Carvalho[1], and L. F. B. Pinto[1], *[1]Universidade Federal da Bahia, Salvador, BA, Brazil, [2]Instituto Federal Baiano, Catu, BA, Brazil.*

Sixteen multiparous dairy cows of the Holstein × Gir crossbreed, with an average weight of 436.6 kg (±59.7), were tested to determine the most appropriate amount of palm kernel cake in a dietary supplement for lactating cows at pasture. The experiment was conducted at the Experimental Farm of the Federal University of Bahia, Brazil, during August to October 2009. A Latin square design was utilized, with the cows distributed in 4 Latin squares (4 × 4 simultaneous; 4 treatments × 4 periods × 4 animals in each treatment). Intake and digestibility were analyzed for cattle with a dietary supplement containing 0, 25, 50, and 75% palm kernel cake, and grazing Massai grass (*Panicum maximum* 'Massai'). Indigestible neutral detergent fiber (iNDF) was used as an internal indicator of the measure of intake. Intake of DM, CP, ether extract, NDF, NFC, total carbohydrates, and total digestible nutrients within the supplement, as well as the intake of total crude protein, total ether extract, and total NFC, were negatively influenced by level of palm kernel cake supplementation. The forage mass during the experiment was, on average, 8.72 kg DM/ha, with an average supply of 8.32% of live BW in forage DM. The digestibility of DM, OM, CP, NFC, and total carbohydrates was significantly reduced with an increased percentage of palm kernel cake in the supplement. A decrease in the digestibility of CP and NFC indicates that palm kernel cake is not an adequate ingredient in nutritional supplements for dairy cows at pasture. Thus, one should be cautious in using supplements with palm kernel cake and its use must to be very careful. The high fiber content (NDF, 71.13%) and the expressive content of lignin (17.03%), that together comprise a difficult material degradation, associated with the low NFC (12.10%) of palm kernel cake, create the need for a greater period of residence in the rumen to provide a greater degree of breakdown. Therefore, lower percentages of palm kernel cake in the supplement result in a greater availability of nutrients.

Key Words: Massai grass, nutrients, pasture