557 Acidosis challenge effects on ruminal pH and temperature in beef cattle. D. L. Christensen*, J. L. Wahrmund, A. K. Sexten, C. L. Goad, C. R. Krehbiel, and C. J. Richards, *Oklahoma State University, Stillwater.*

Twelve ruminally cannulated steers with ruminal pH and temperature monitoring devices were used to determine the effects of an acidosis challenge on ruminal pH and temperature. Steers were offered the control diet at 2% BW/d before the challenge and starting 24 h after the challenge. Challenges were ruminal dosing of 2% BW of 62% concentrate diet (CON), mixture of 50:50 dry rolled corn:wet distillers grains (MIX), or 100% dry rolled corn (DRC) at 0 h. Bolus readings for pH and temperature were recorded every minute for 72 h after dosing and compiled in 3 h increments for repeated measures analysis. Ruminal fluid samples were obtained every 3 h for 72 h after dosing and analyzed with a repeated measures analysis. For ruminal fluid samples, pH of MIX was lower ($P < 0.05$) than CON for h 3 to 27, 57 and 63. DRC pH was lower ($P < 0.05$) than CON for h 3 to 27 and 57. MIX pH was lower ($P < 0.05$) than DRC for h 3 to 15. All ruminal temperatures less than 37.8°C were considered to be associated with water consumption and were removed before analysis. Continuous ruminal pH measures resulted in significant treatment and sampling time effects ($P < 0.01$) with CON > DRC > MIX. Continuous ruminal temperatures resulted in a sampling time ($P < 0.08$) trend and significant treatment ($P < 0.01$) effect with DRC greater ($P < 0.01$) than CON or MIX. These results indicate that increased availability of highly fermentable substrates in the rumen that result in decreases in rumen pH also result in increases in ruminal temperatures. However, the type of fermentable substrate may change the relationship between ruminal temperature and pH, particularly when substrates such as distillers grains that have a low pH are included in the diet.

Key words: acidosis, beef cattle, body temperature

558 Fatty acid profile of muscle and subcutaneous fat of Red Norte bulls fed ionophores and lipids sources. M. M. Ladeira, L. C. Santarosa, O. R. Machado Neto, M. L. Chizzotti*, T. M. Gonçalves, E. M. Ramos, L. S. Lopes, J. S. F. Hostalácio, D. M. Oliveira, and M. C. L. Alves, *Federal University of Lavras, Lavras, MG, Brazil.*

The objective was to determine the fatty acids (FA) profile of muscle and subcutaneous fat of Red Norte bulls fed ground soybean grain (GSG) or rumen protected fat (RPF), with or without the inclusion of the sodic monensin. Forty animals, with initial LW of 359 kg, were allotted in a completely randomized design using a 2x2 factorial arrangement. The diets had 12.7% CP, 29.0% NDF and 7.2% EE. When the ionophore was supplemented, the dosage used was 230 ppm/day. The concentrate:forage ratio was 60:40 and it was used corn silage as roughage. The diets was fed ad libitum, and presented 17.2% of GSG or 4.2% of RPF, as DM basis. The duration of the experiment was 112 d, and the animals were slaughtered with on average 497 kg. The determination of FA was performed using GC. The data were analyzed using PROC GLM of SAS 9.1. There was no effect of monensin on FA profile ($P > 0.05$). The diets do not affected the C14:0 (2.3%) and C16:0 (22.7%) contents ($P > 0.05$). The meat of animals that received RPF had higher C18:1 content in muscle (38.1% vs. 34.5%, ($P < 0.01$), which can be explained by partial protection to rumen biohydrogenation. The CLA (cis-9, trans-11 C18:2) content was higher in muscle from animals fed soybean (0.72% vs. 0.60%, ($P < 0.01$), which can be justified by the higher exposure of FA from soybean to biohydrogenation. The GSG diet promoted greater concentration of linoleic acid in the muscle, than RPF (10.1% vs. 7.51%, ($P < 0.01$). However, linolenic acid was found in higher concentration in muscle of animals feeding RPF (0.48% vs. 0.31%, ($P < 0.01$), despite the higher concentration of this FA in soybean, which can be also justified by the partial protection of this ingredient. Subcutaneous fat from animals fed GSG presented lesser C12:0 and C14:0 content ($P < 0.01$), and had a greater C18:0 content (21.1% vs. 18.3%, ($P < 0.05$). The inclusion of RPF increased levels of C18:1 (41.3% vs. 38.3%, ($P < 0.01$) and CLA (0.84% vs. 0.37%, ($P < 0.01$) in subcutaneous fat. The concentrations of C18:2 and C18:3 were increased with the use of GSG, compared with RPF. The monensin did not affect the FA profile of meat. Funded by Fapemig, CNPq, CAPES and INCT-CA

Key words: cla, monensin, soybean

559 Effects of energetic supplementation strategies on performance of growing cattle grazing tropical forage and on animal performance during the feedlot finishing phase. L. R. D. Agostinho Neto, J. R. R. Dorea, V. N. Gouvea, A. L. Marra, and F. A. P. Santos*, *University of Sao Paulo/ESALQ, Piracicaba, São Paulo, Brazil.*

The objective of this study was to evaluate the effect of strategies of energetic supplementation to growing cattle grazing well managed tropical pastures during the summer and fall season on animal ADG, pasture stocking rate and on animal performance during the feedlot finishing phase. Seventy 6 crossbred bull calves, averaging 208 kg initial BW and 8 mo of age, were used in a randomized block design trial to compare 3 energetic supplementation strategies: T1) Control: grazing animals fed only a mineral mixture; T2) Constant level: constant daily feeding of energetic supplement at 0.6% of BW; T3) Increased level: daily feeding of energetic supplement at increasing levels of 0.3, 0.6, and 0.9% BW, according to the experimental period. Animals were allocated in a 8.5 ha area of *Brachiaria brizantha* 'Marandu' pasture under a rotational grazing system with a variable defoliation interval. Supplemented animals had greater ADG ($P < 0.05$) than animals not supplemented (0.535, 0.787, and 0.867 kg/animal per d), respectively for the control, constant, and increasing treatment levels. Furthermore, animals in the increasing supplementation group presented a higher ADG when compared with the constant supplementation, although animals from both treatments have consumed similar amounts of supplement. Supplementation also increased ($P < 0.05$) the pasture stocking rate, which averaged 5.94, 7.13, and 6.90 AU/ha, respectively for the control, constant, and increasing treatment levels. Supplementation strategies during the grazing period had no effect ($P > 0.05$) on animal DMI, ADG and feed efficiency during the feedlot finishing phase.

Table 1. Animal performance, pasture stocking rate, dry matter intake, ADG:DMI

	Pasture Phase				
	Control	Constant level	Increased level	*P*-value	SEM
ADG (kg/d)	0.535c	0.787b	0.867a	*	0.016
Stocking rate (AU/ha)	5.94b	7.13a	6.90a	*	0.01
	Feedlot Phase				
	Control	Constant level	Increased level		
ADG (kg/d)	1.07	1.02	1.08	ns	0.05
DMI (kg/d)	7.89	8.04	8.34	ns	0.32
ADG/DMI (g/kg)	0.136	0.127	0.130	ns	0,005

*$P < 0.05$; ns = not significant.

Key words: supplementation, beef cattle, tropical grasses

560 Effect of rate of gain on fat deposition during grazing and final carcass characteristics in growing beef cattle. E. D. Sharman*, P. A. Lancaster, C. P. McMurphy, G. G. Hilton, C. R. Krehbiel, and G. W. Horn, *Oklahoma Agricultural Experiment Station, Stillwater.*

Recent evidence suggests that a moderate rate of gain is required throughout an animal′s life to achieve desirable quality grades in beef cattle. The objective of this study was to determine the effect of rate of gain to similar initial finishing BW on fat deposition during grazing and final carcass characteristics in growing beef cattle. Angus steers (n = 72; 259 ± 28 kg) were allotted on Dec. Four in a completely randomized design with 4 grazing treatments: (1) grazing dormant native range (NR) plus a protein supplement (1.0 kg•hd^{-1}•d^{-1}) followed by season-long grazing NR (CON); (2) grazing dormant NR plus a corn-based supplement (1% of BW) followed by short-season grazing NR (CORN); (3) grazing wheat pasture (WP) at a high stocking rate (3.0 steers/ha) for a moderate ADG (LGWP); and (4) grazing WP at a low stocking rate (1.0 steers/ha) for a high ADG (HGWP). Supplements met DIP requirements and were individually fed 5 d/wk during the first 130 d of grazing. When steers in each treatment reached an estimated carcass weight of 200 kg, 4 steers were randomly selected for intermediate harvest (Table 1). The remaining steers were transitioned to the finishing phase and fed to a backfat endpoint of 1.27 cm. At final harvest, steers had similar ($P > 0.14$) HCW, backfat, and marbling scores (456, 404, 421, and 426 ± 17.04; treatments 1–4, respectively). These data indicate that rate of gain during grazing does not significantly impact final marbling score suggesting that wintering beef steers at low rates of gain will not negatively affect final quality grade when cattle are fed to a similar backfat endpoint.

Table 1. Grazing performance and intermediate carcass characteristics

Item	CON	CORN	LGWP	HGWP
Grazing ADG, kg/d	0.49^{a}	0.63^{b}	0.84^{c}	1.41^{d}
HCW, kg	207^{ab}	201^{a}	226^{b}	204^{a}
Dressing %	52.08^{a}	52.29^{a}	59.23^{c}	54.98^{b}
Backfat, cm	0.38^{bc}	0.14^{a}	0.21^{ab}	0.51^{c}
KPH, %	0.65^{a}	0.58^{a}	0.98^{b}	1.42^{c}
LM area, cm^2	53.06^{a}	57.74^{ab}	60.64^{b}	55.16^{ab}
Marbling score[1]	158^{a}	143^{a}	315^{c}	228^{b}

^{a,b,c,d}Means within a row lacking a common superscript letter differ ($P < 0.05$).

[1]Marbling grid: 100 = Practically Devoid; 200 = Traces; 300 = Slight.

Key words: growing beef cattle, marbling deposition, winter grazing

561 Nutrient mass balance and performance of feedlot cattle fed barley based diets with and without dried distillers grains plus solubles. E. M. Hussey*[1], G. E. Erickson[1], R. E. Peterson[3], and L. O. Burciaga-Robles[2], *[1]University of Nebraska-Lincoln, Lincoln, [2]Feedlot Health Management Services Ltd., Okotoks, AB, Canada, [3]Western Feedlots Ltd., High River, AB, Canada.*

Crossbred yearling heifers (n = 9,538, 32 pens, 492 ± 50 kg initial BW, days on feed = 81) were assigned randomly at reimplant to a 2 × 2 factorial arrangement of treatments. Main effects included LOW or HIGH starch:NDF barley and 0 or 20% inclusion of dried distillers grains plus solubles (DDGS). Barley was determined to be HIGH (starch:NDF >3.25) or LOW (starch:NDF <3.25) at feedlot arrival based on values determined by Near Infrared Spectroscopy. The objective was to evaluate the impact of HIGH or LOW barley and 0% or 20% DDGS on feedlot performance, carcass characteristics and N and P mass balance. Data were analyzed using Proc Mixed, with fixed effects of treatments and the random effect of replicate. No barley x DDGS interactions were observed. Intake, ADG, and HCW were greater ($P < 0.02$) and carcass adjusted G:F tended to be greater ($P = 0.10$) for LOW starch:NDF barley. Barley treatment did not affect yield or quality grade ($P \geq 0.18$). Intake, retention, and excretion of N and P were greater ($P \leq 0.01$) and removal of N and DM from the pen tended to be greater ($P = 0.09$) for LOW. Loss and excretion of N on a kg per heifer basis was greater ($P = 0.05$) for LOW, but was not different when expressed as a % of N excretion, averaging 85%. Intake and G:F based on live ADG were greater ($P < 0.01$), and G:F tended to be greater on a carcass basis ($P = 0.07$) for 20% compared with 0% DDGS. Fat depth and the percentage of Yield grade 4 carcasses were greater ($P \leq 0.05$) for 20% DDGS compared with 0%, but no differences in quality grade were observed ($P \geq 0.25$). Intake and excretion of N and P were greater ($P < 0.01$) for 20% DDGS. Removal of N, P, and DM were not different ($P \geq 0.17$) between 0 and 20% DDGS. Losses of N (82% vs. 87%) and P were greater ($P \leq 0.01$) for 20% compared with 0%. Feeding low starch:NDF barley improved feedlot performance, increased DM removed from the pen, and increased N loss. Feeding 20% DDGS increased DMI, had a slight negative impact on G:F, and increased N and P losses.

Key words: barley, distillers grains plus solubles, mass balance

562 Effects of levels of energetic supplementation on forage intake and ruminal fermentation in beef cattle grazing tropical pastures. J. R. R. Dórea[1], L. R. D. Agostinho Neto[1], V. N. Gouvêa[1], M. A. C. Danés[1], L. G. R. Pereira[2], J. A. G. Azevêdo[3], and F. A. P. Santos*[1], *[1]University of Sao Paulo/ESALQ, Piracicaba, São Paulo, Brazil, [2]Embrapa Dairy Cattle, Juiz de Fora, Minas Gerais, Brazil, [3]State University of Santa Cruz, Ilhéus, Bahia, Brazil.*

The objective of this trial was to evaluate the effects of increasing levels of energetic supplementation on forage intake, ruminal parameters, microbial synthesis and N retention in beef steers grazing tropical pastures (12 to 15% CP), during the rainy season in the southeast region of Brazil. Treatments were: 0, 0.3, 0.6 and 0.9% BW of an energetic supplement containing fine ground corn plus monensin fed once a day. Eight Nellore steers (410 kg) with cannulas in the rumen were used in a replicated 4 × 4 Latin-square experiment. One hectare of pasture of *Brachiaria brizantha* ‘Marandu’ was used for the experiment. Chromium oxide was used as a digesta marker. Increasing levels

of supplementation decreased linearly ($P < 0.05$) forage DMI and increased total DMI. There was a dramatic decrease in forage intake with the low level of energetic supplementation (0.3% of BW) with subsequent smaller decreases with 0.6 and 0.9% BW levels. Because of the dramatic decrease in forage DMI the low level of supplementation (0.3% BW) had negligible effect on total DMI. However the 0.6 and 0.9% supplementation levels were very effective to increase total DMI of grazing steers. Ruminal pH and total VFA concentration were not affected by treatments ($P > 0.05$). Increasing levels of energetic supplementation increased linearly ruminal propionate ($P < 0.05$). The concentrations of rumen ammonia were decreased linearly ($P < 0.05$) and microbial synthesis and N retention were increased ($P < 0.05$) with energetic supplementation. The decrease on forage DMI caused by the energetic supplementation was not associated to inadequate ruminal pH or impairment of fiber degradation (in vitro gas production method).

Table 1. Forage and total intake, ruminal parameters, microbial synthesis and nitrogen retention

	Levels of supplement (%BW)				*P*-value	Contrast	
	0	0.3	0.6	0.9	trat	Linear	SE
Forage intake, %BW	1.90	1.64	1.55	1.50	*	*	0.11
Total intake, %BW	1.90	1.94	2.10	2.35	*	*	0.12
pH	6.51	6.42	6.38	6.37	ns	ns	0.03
NH_3,mg/dL	7.88	6.58	5.55	5.46	*	*	0.69
Propionate, mmol/mL	18.32	19.57	20.08	20.72	*	*	0.58
Microbial synthesis, g/d	448.58	591.12	593.14	981.84	*	*	114.6
Nitrogen retention, %N intake	20.07	19.10	33.32	47.09	*	*	5.85

*= significant, Ns=not significant, SE=standard error.

Key words: beef cattle, grazing cattle, supplementation

563 The relationship between rumen acidosis resistance and expression of genes involved in regulation of intracellular pH in rumen epithelial cells in steers. N. Schlau*, L. L. Guan, and M. Oba, *University of Alberta, Edmonton, AB Canada.*

The objective of this study was to compare the expression of genes involved in regulating intracellular pH in rumen epithelial cells between acidosis-resistant (AR) and acidosis-susceptible (AS) steers. Acidosis indexes (area under pH 5.8 divided by DMI) were measured for 17 steers, and the 3 steers with the lowest (1.4 ± 1.2) and the 3 with the highest (23.9 ± 7.4) values were classified as AR and AS, respectively, and used for the subsequent study. The steers were force-fed a meal consisting of a diet containing 85% grain at 60% of expected DMI (5.8 ± 0.8 and 5.6 ± 0.6 kg for AR and AS, respectively). Rumen papillae were biopsied at 0, 2, 4, and 6-h after feeding, and RNA was extracted and quantified using quantitative real time reverse transcriptase PCR. Mean rumen pH over the 6-h period was higher for AR compared with AS steers (6.02 vs. 5.55; $P < 0.01$). Relative mRNA abundance of monocarboxylate cotransporter isoform 1, sodium hydrogen exchanger isoform 2, and downregulated in adenoma (an anion exchanger) did not differ between AR and AS groups or among time points relative to feeding. However, an hour by group interaction ($P < 0.05$) was detected for relative mRNA abundance of sodium hydrogen exchanger isoforms 1 and 3 (NHE1 and NHE3), both of which import Na^+ to the cell and export H^+ to the rumen. Relative expression of NHE1 and NHE3 did not differ between AR and AS group at 0 and 6-h after feeding, but that of NHE1 was 56% ($P = 0.05$) and 72% ($P = 0.04$) greater, and that of NHE3 was 17% ($P < 0.001$) and 235% ($P < 0.001$) greater in AR compared with AS group at 2 and 4-h after feeding, respectively. Additionally, relative mRNA abundance of putative anion transporter isoform 1 (PAT1), which imports dissociated VFA to the cell and exports HCO_3^- to the rumen, and that of NHE1 increased linearly ($P < 0.001$) for the 6-h period. These results suggest that genes coding for transport proteins involved in intracellular pH regulation can be upregulated by supply of fermentation substrates, and the extent can differ between AR and AS steers.

Key words: acidosis resistance, gene expression, ruminal acidosis

564 Evaluation of diet net energy calculations on intake and gain compared to prediction equations for finishing steers. M. F. Wilken*, L. L. Berger, G. E. Erickson, and K. J. Hanford, *University of Nebraska-Lincoln, Lincoln.*

Four years of data collected at the University of Illinios-Urbana were utilized to evaluate 3 intake prediction equations (NRC, 1996; Galyean et al., 2009; Owens et al., 2002) calculated one of 2 ways: diet energy determined by hand (HAND = feedstuff inclusion*feedstuff NE (NRC, 1996)) or by a quadratic equation (QUAD; Zinn et al., 2003). Individual DMI and ADG were analyzed for 1,794 individually fed calf-fed steers. Thirteen treatments were utilized containing corn, dry and modified wet distillers grains plus solubles, dry and wet corn gluten feed, soybean hulls, corn silage, and/or brome hay. Observed DMI (ObsDMI) was compared with the 6 intake prediction equations (PredDMI). Observed ADG (ObsADG) was also compared with a predicted ADG (PredADG) calculated using HAND or QUAD from ObsDMI. Analysis of ObsDMI vs PredDMI showed that all 3 equations overestimated intake ($P < 0.01$), regardless of energy value calculation for all treatments. The NRC QUAD PredDMI was not different from ObsDMI within 5 treatments ($P > 0.05$) and was closest to the ObsDMI for 12 of the 13 diets consumed. The Galyean QUAD PredDMI was statistically similar to the NRC QUAD PredDMI for steers consuming byproduct containing diets ($P > 0.05$). The Owens PredDMI was the most overestimated and was statistically different ($P < 0.05$) for all treatments regardless of HAND or QUAD. For steers fed diets containing corn, there was no difference ($P > 0.05$) in ObsADG vs PredADG and energy value calculation was not significant ($P > 0.15$). However steers consuming diets containing byproducts, PredADG was overestimated compared with ObsADG ($P < 0.05$) for both HAND and QUAD. These findings suggest that the NRC equation is the most accurate but overestimation from calculations containing HAND energy values could be from inaccurate byproduct energy values in the NRC. Additionally, QUAD energy values are more accurate but vary with animal response and does not allow for a defined diet energy value.

Key words: dry matter intake, feedlot cattle, prediction equation

565 Effect of finishing system (feedlot or pasture) on energy requirements of Zebu cattle. M. L. Chizzotti*[1], M. I. Marcondes[2], S. C. Valadares Filho[2], M. P. Gionbelli[2], P. V. R. Paulino[2], and M. F. Paulino[2], *[1]Universidade Federal de Lavras, Lavras, MG, Brazil, [2]Universidade Federal de Viçosa, Viçosa, MG, Brazil.*

The aim of the present study is to evaluate the effect of the finishing system, pasture or feedlot, in the energy requirements of Zebu cattle. A database of 20 feedlot finishing studies (n = 626) and 5 pasture finishing studies (n = 127) with Zebu cattle using the comparative slaughter technique was used in a meta-analysis using PROC MIXED of SAS 9.1 to evaluate the fixed effect of finishing system on net energy requirements for maintenance and growth, assuming random effect of studies. Breed (Nelore purebred or Nellore crossbred with Bos Taurus) and gender (bulls, steers and heifers) effects were also tested and included as fixed effect if they are significant at $P < 0.10$. The coefficients AIC and BIC were used to choose the best structure of the variance-(co)variance matrix. Net energy requirements for maintenance (NEm) was obtained by the regression of heat production (HP) on metabolizable energy intake (MEI), on Mcal/kg $EBW^{0.75}$/d basis: $HP = NEm \times e^{B \times MEI}$. The metabolizable energy requirement for maintenance (MEm) was calculated by iteration to equals MEI to HP. The net energy for gain (NEg) was obtained by a multiple regression on equivalent $EBW^{0.75}$ ($eqEBW^{0.75}$) and empty body gain (EBG), according to: $NEg = C \times eqEBW^{0.75} \times EBG^{D}$. There was effect ($P < 0.05$) of finishing system in the relation empty body weight/ shrunk body weight, which was of 0.895 for feedlot and 0.863 for pasture finishing system. The relation of MEI and HP for feedlot and pasture were $HP = 0.0742 \times e^{3.703 \times MEI}$ and $HP = 0.0717 \times e^{4.439 \times MEI}$, respectively. There was no difference ($P > 0.05$) for NEm between finishing system but there was a difference ($P < 0.05$) for MEm which was of 112 and 125 kcal/$EBW^{0.75}$/d for feedlot and pasture finishing systems, respectively. There was gender effect for C coefficient of NEg for feedlot, which was of 0.053, 0.064 and 0.072 for bulls, steers and heifers, respectively. There was effect of finishing system on D coefficient of NEg, which was of 1.095 and 1.062 for feedlot and pasture, respectively. Pasture finishing Zebu cattle presented MEm 11% greater than feedlot and lower energy concentration in the gain. Funded by INCT-CA CNPq, CAPES, FAPEMIG.

Key words: growth, maintenance, Nellore

566 A chemical evaluation of the chemical composition of four corn milling co-products with focus on fatty acids. C. S. Dose*[1], P. J. Kononoff[1], T. C. Jenkins[2], L. O. Tedeschi[3], and K. Karges[4], *[1]Department of Animal Science, University of Nebraska-Lincoln, Lincoln, [2]Department of Animal and Veterinary Sciences, Clemson University, Clemson, SC, [3]Department of Animal Science, Texas A&M University, College Station, [4]Dakota Gold Research Association, Sioux Falls, SD.*

Technological advancements in ethanol production have resulted in corn milling co-products that, when compared with those most commonly produced, may differ in chemical composition. The objectives of this study were to further characterize major nutrient fractions and evaluate differences in fatty acid profile of a range of corn milling co-products. The 4 corn milling co-products evaluated in this study were: corn bran (BRAN), dehydrated germ (GERM), high protein dried distillers grains (HP), and dried distillers grains and soluble (BPX) which were produced without exposure to heat before fermentation. Over the course of 4 mo, samples of each feedstuff were collected weekly until a total of 30 replicate samples of each feedstuff were collected. Data was analyzed as a completely randomized design with treatment (feedstuff) considered as a fixed effect. The average CP was significantly different ($P < 0.01$) among the co-products and was highest for HP (44.06 ± 0.227) followed by BPX (31.17 ± 0.227), GERM (15.74 ± 0.227), and BRAN (14.45 ± 0.227). The average NDF content, with sodium sulfite, of the co-products were similar ($P < 0.01$) between HP (29.42 ± 0.5195) and BPX (29.27 ± 0.5195), with BRAN (25.70 ± 0.5195) and GERM (24.36 ± 0.5195) to follow. The average ether extract (EE) of GERM was the highest value (19.48 ± 0.1607) and HP had the lowest (4.67 ± 0.1607), with BPX (11.63 ± 0.1607) and BRAN (10.27 ± 0.1607) being similar ($P < 0.01$). Similarly, the mean concentration of total fatty acids (TFA) was also different ($P < 0.01$) and observed to be 15.7, 6.00, 9.84 and 8.3 ± 0.125% DM for GERM, HP, BPX and BRAN respectively. The proportions of C16:0, C18:0, C18:1, C18:2 and C18:3 were also different ($P < 0.01$) and averaged as follows (% TFA): GERM = 11.9, 1.65, 26.3, 55.4, and 1.11; HP = 16.2, 2.47, 22.8, 52.9, and 2.00; BPX = 13.7, 2.06, 25.0, 54.8, and 1.44; BRAN = 14.1, 2.21, 24.7, 53.3, and 1.62., respectively. Our analyses defined differences of CP, NDF, TFA, and the profile of TFA.

Key words: chemical composition, co-products, fatty acid

567 Evaluation of polyclonal antibodies in cattle adapted or not to highly fermentable carbohydrates diets. T. Barros[1], C. Marino*[1], R. Pacheco[2], F. Ferreira[1], F. Perna Jr.[1], E. Cassiano[1], M. Martins[1], M. Arrigoni[2], and P. Rodrigues[1], *[1]University of Sao Paulo, FMVZ-USP, Pirassununga, Sao Paulo, Brazil, [2]University of Sao Paulo State, FMVZ-UNESP, Botucatu, Sao Paulo, Brazil.*

The objective of this work was to evaluate the effect of polyclonal antibodies (PAP) against specific rumen bacteria *Streptococcus bovis*, *Fusobacterium necrophorum* and *Lactobacillus* on rumen fermentation parameters (pH, total volatile fatty acids (tVFA) and ratio acetate:proprionate Ac:Pr) in ruminally cannulated cows adapted or not to highly fermentable carbohydrates diets (HFC). The experimental design was 2 Latin squares 3 × 3 in a factorial arrangement of treatments 3 × 2 regarding 2 feed additives (PAP in powder presentation (PAPP) and PAP in liquid presentation (PAPL)) plus control group (CON) and 2 managements of diets adaptation resulting in 6 treatments. The first Latin square had a step-up adaptation diet: from D0 to D4 – 100% forage; D5 to D9 – 30% HFC and D10 to D14 – 60% HFC. The second Latin square received 100% forage from D0 to D14 (no adaptation). Each experimental period had 15 d, where rumen fluid samples for pH and volatile fatty acids analysis were collected from D0 to D14 at 3 h postfeeding. Data were analyzed by MIXED procedure with a significance level of 0.05. It was observed an interaction between time and adaptation ($P < 0.0001$) for rumen pH in the d 2 and 4–14, where the non-adapted group had higher values compared with adapted (6.80 vs. 6.34, respectively). It was observed an interaction between time and adaptation ($P < 0.0001$) for total VFA at D1 to 14, where the group adapted had higher values when compared with non-adapted animals (99.72 vs. 74.96 mM, respectively). It was also observed an interaction between time and adaptation ($P < 0.0001$) to ratio Ac:Pr, in D2, 5 to 7 and 12 to14, where the adapted group had lower values than non-adapted group until D7 (1.96 vs. 2.29) and after D12 (2.69 vs. 2.33) the position reversed and the adapted group had greater values. From these results, it was concluded that step-up adaptation reduced rumen pH and increased total VFA as expected by the total highly fermentable carbohydrate available. This effect was dependent on time and independent from feed additive used.

Key words: acidosis, feed additive, passive immunization

568 Evaluation of polyclonal antibodies in cattle adapted or not to highly fermentable carbohydrates diets after an acidosis challenge. T. Barros[1], C. Marino*[1], R. Pacheco[2], F. Ferreira[1], F. Perna Jr.[1], E. Cassiano[1], M. Martins[1], M. Arrigoni[2], and P. Rodrigues[1], *[1]University of Sao Paulo, FMVZ-USP, Pirassununga, Sao Paulo, Brazil,*

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The objective of this work was to evaluate the effect of polyclonal antibodies (PAP) against specific rumen bacteria Streptococcus bovis, Fusobacterium necrophorum and Lactobacillus on rumen fermentation parameters (pH, volatile fatty acids (VFA)) in ruminally cannulated cows adapted or not to highly fermentable carbohydrates diets (HFC) after an acidosis challenge. The experimental design was 2 Latin squares 3 × 3 in factorial arrangement of treatments 3 × 2 regarding 2 feed additives (PAP in powder presentation (PAPP) and PAP in liquid presentation (PAPL)) plus control group (CON) and 2 managements of diets adaptation resulting in 6 treatments. The first Latin square had a step-up diet adaptation: from D0 to D4 – 100% forage; D5 to D9 – 30% HFC and D10 to D14 – 60% HFC. The second Latin square received 100% forage from D0 to D14. For pH and total concentration of VFA analysis, samples of rumen fluid were collected at 0 and every 3 h postfeeding totalizing 36 h (D15 and D16) of challenge with a diet of 80% of HFC. Data were analyzed by MIXED procedure with a significance level of 0.05. It was observed an interaction between time and adaptation for pH ($P < 0.0001$). The adapted group had lower values of pH than non-adapted until 24 h and at 36 h after the start of challenge (6.18 vs. 6.55 and 5.92 vs. 6.08, respectively). For VFA total concentration, it was also observed an interaction between time and adaptation ($P < 0.0001$), where from 0 to 9 h (109.38 vs. 82.26 mM) and at 36 h (121.11 vs. 107.62 mM) after the start of challenge the adapted group had greater values compared with non-adapted group. At 24h and 27h, the non-adapted group had greater values compared with adapted (114.75 vs. 127.4 mM). From these data, it is concluded that step up adaptation was not efficient in preventing the drop of rumen pH in conditions of great availability of highly fermentable carbohydrates. High total VFA concentration was expected in adapted group due to the adaptation of rumen microbial population to the substrate, increasing their fermentative capacity.

Key words: feed additive, passive immunization