

ers) from a same contemporary group were used, being individually fed during 112 days and slaughtered at the end of the trial. The diets had 12% CP, and were corn silage based. The bulls were more efficient and had heavier ($P<0.05$) BW, empty body weight (EBW) and carcass weight, as a result of their increased rate of growth in comparison with the heifers ($P<0.05$). Dry matter and nutrients intakes were superior in the heifers ($P<0.05$) when compared with the bulls, whereas the steers had intermediate values. The digestibilities of all the nutrients, except EE, were not affected by gender ($P>0.05$). Only DM and OM digestibilities were affected by concentrate allowance levels, being greater ($P<0.05$) for the diet in which the concentrate allowance was 1.2% of the BW. Bull's carcasses were heavier and leaner ($P<0.05$) than the heifer's, with steer carcasses obtaining intermediate values. The subcutaneous depot of fat in the heifers was more pronounced than that of the males ($P<0.05$). Visceral and subcutaneous fat in the EBW (%) were greater for the heifers ($P<0.05$), although the rates of fat deposition in the different body depots were not influenced by gender ($P>0.05$). Concentrate allowance level did not affect ($P>0.05$) carcass traits and body and carcass composition of the animals. Protein and ether extract contents of the EBW of the bulls were, respectively, greater and smaller ($P<0.05$), than that of the heifers, with the steers presenting intermediate values. The bulls had more pronounced accretion rates ($P<0.05$) of muscle in the carcass and protein in the EBW than the heifers and steers. The carcass yield of commercial cuts was not affected by concentrate allowance levels ($P>0.05$), but by gender ($P<0.05$). Heifers and steers had higher yields of hind quarter ($P<0.05$) than the bulls, which had fore quarters more developed.

Key Words: Beef Cattle, Performance, Digestibility

TH219 Polynomial regression between ruminal bacteria population and pH in beef steers fed high forage diets. S. J. Liu, J. Q. Wang*, D. P. Bu, S. Liang, L. liu, H. Y. Wei, L. Y. Zhou, and K. L. Liu, *Chinese Academy of Agricultural Sciences, Beijing, China.*

The objective of this study was to evaluate regressive relationship between population of ruminal *F. succinogenes*, *B. fibrisolvans*, *R. albus* bacteria and ruminal fermentation parameters including pH value and volatile fatty acids (VFA). Four steers with ruminal cannulas were fed a high forage diets (forage to concentrate ratio 65:35). Ruminal fluid was collected on d 26, 27 and 28 of experimental period, starting at 0730 pre-feeding and at 1130 and 1730 post-feeding from the anterior, dorsal, and mid-ventral region of the rumen and pooled. Subsequently, this mixture was filtered through four layers of sterile cheesecloth, and immediately stored at -70 degrees C. Residual ruminal fluid was used to determine pH at sampling. A 100 mL sample of residual ruminal fluid was analyzed for VFA. Bacteria population was determined by real-time quantity PCR method. All data were analyzed using the MIXED procedure of SAS 8.2, and regression analysis adopted the polynomial regression procedure of SAS 8.2. Significance was declared at $P < 0.05$.

Steers fed high forage diet had no significant change relative to time in rumen acetate, propionate and the ratio of acetate to propionate, while pH significantly decreased over time ($P<0.05$). Our study showed that there existed a polynomial regression between the sum of *F. succinogenes*, *B. fibrisolvans*, *R. albus* number and rumen pH ($y = 397.89421 + 124.9846x + 9.35447x^2$; $R^2=0.55$, $P<0.05$). The relationship between *F. succinogenes*, *B. fibrisolvans*, and *R. albus* population and ratio of propionate to acetate and butyrate content was not strong ($R^2=0.29$, $P>0.05$). These results indicate that pH value is a sensitive index to reflect change of ruminal bacteria population compared with VFA.

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Key Words: Ruminal Bacteria Population, Ferment Parameter, Beef Steer

TH220 Effect of substitution barley grain with dried sugar beet pulp on venous blood gas of Holstein steers. M. Mojtahedi, M. Danesh Mesgaran*, A. Heravi Moussavi, and A. Tahmasebi, *Ferdowsi University of Mashhad, Mashhad, Iran.*

The objective of the present experiment was to evaluate the effect of substitution of barley grain with dried sugar beet pulp (SBP) on venous blood gas (VBG) of Holstein steers. Four Holstein steers with initial body weight of 368 ± 8 kg fitted with ruminal fistulae were used in a 4x4 Latin square design (28 days of each period). Basal experimental diet consisted of 15% corn silage, 20% alfalfa hay, 33% barley grain, 17% soybean meal, 13.8% wheat bran, 0.5% calcium carbonate, 0.2% salt, and 0.5% mineral and vitamin premix on dry matter basis. Barley grain was substituted with SBP as 0.0%, 33%, 66% or 100% (SBP0, SBP33, SBP66, and SBP100, respectively). Steers were fed 9.5 kg of DM as total mixed ration twice daily at 0800 and 1600 h. At the last day of each experimental period, blood samples were taken from Jugular vein after 4 h the morning feeding. Samples were immediately analyzed using Stat Profile pHox Plus blood analyzer (Nova Biomedical, USA) for pH, CO₂ pressure (pCO₂), O₂ pressure (pO₂), oxygen saturation (O₂Ct), base excess of extracellular fluid (BE_{ecf}), base excess of blood (BE_b), bicarbonate (HCO₃⁻), total carbon dioxide (TCO₂), and total hemoglobin (Hb). Data were analyzed using the GLM procedure of SAS ($Y = \text{Mean} + \text{Treatment} + \text{Animal} + \text{Period} + \text{residual}$) and the means compared by the Duncan test ($P < 0.05$). There were no significant differences ($P > 0.05$) between treatments in any of the blood biochemical parameters studied. Means of pH, pCO₂, pO₂, O₂Ct, BE_{ecf}, BE_b, HCO₃⁻, TCO₂, and Hb were 7.335, 47.28 mmHg, 29.08 mmHg, 6.53 ml/dl, -0.56 mmol/L, 0.26 mmol/L, 25.47 mmol/L, 26.94 mmol/L, and 8.97 g/dl, respectively. Results of the present study demonstrated that partial substitution of barley grain with sugar beet pulp in Holstein steers did not significantly affect blood pH and VBG values.

Key Words: Sugar Beet Pulp, Venous Blood Gas, Steers

TH221 Ruminal, fecal and urine pH of Holstein steers fed diets containing barley grain and(or) sugar beet pulp. M. Mojtahedi, M. Danesh Mesgaran*, A. Heravi Moussavi, and A. Tahmasebi, *Ferdowsi University of Mashhad, Mashhad, Iran.*

The aim of this study was to investigate the effect of diets containing barley grain and/or dried sugar beet pulp (SBP) on ruminal, fecal and urine pH of Holstein steers. Four Holstein steers with initial body weight of 368 ± 8 kg fitted with ruminal fistulae were used in a 4x4 Latin square design (28 days of each period). Basal experimental diet consisted of 15% corn silage, 20% alfalfa hay, 33% barley grain, 17% soybean meal, 13.8% wheat bran, 0.5% calcium carbonate, 0.2% salt, and 0.5% mineral and vitamin premix on dry matter basis. Barley grain was substituted with SBP as 0%, 33%, 66% or 100% (SBP0, SBP33, SBP66, and SBP100, respectively). Steers were fed 9.5 kg of diet DM as total mixed ration twice daily at 0800 and 1600 h. At day 25 of each experimental period, rumen fluid samples were collected, by suction,

before the morning feeding and during 8 hours post feeding (every 30 minute). Fecal and urine samples were collected during the last 7 d of each period. Sample pH was immediately recorded using a portable pH meter (Metrohm 744). Data were analyzed using the GLM procedure of SAS ($Y = \text{Mean} + \text{Treatment} + \text{Animal} + \text{Period} + \text{Time} + \text{Time} \times \text{Treatment} + \text{residual}$) and the means compared by the Duncan test ($P < 0.05$). Mean rumen pH was improved by inclusion of SBP in the diets ($P < 0.05$). Rumen pH for SBP0, SBP66, SBP100, and SBP33 was 6.22, 6.35, 6.36, and 6.49, respectively (SEM= 0.02). Fecal pH of steers fed SBP66 (7.01) and SBP100 (6.93) was significantly higher than SBP0 (6.65) ($P < 0.05$). Additionally urine pH of steers fed SBP66 (8.28) and SBP33 (8.14) was markedly higher compared with those fed SBP0 (7.83) ($P < 0.05$). Results from this study suggested that the inclusion of sugar beet pulp might improve ruminal, fecal and urine pH of Holstein steers fed high level of concentrate.

Key Words: Sugar Beet Pulp, pH, Steers

TH222 Feedlot performance, carcass traits and meat tenderness of *Bos indicus* type bullocks fed high concentrate diets. T. de O. Cucki¹, M. D. B. Arrigoni¹, C. L. Martins¹, L. A. L. Chardulo¹, A. C. Silveira¹, H. N. de Oliveira¹, R. da C. Cervieri¹, D. D. Millen¹, R. D. L. Pacheco^{*1}, S. R. Baldin¹, J. P. S. T. Bastos¹, T. M. Mariani¹, L. M. N. Sarti¹, R. S. Barducci¹, T. C. B. de Silva², ¹FMVZ/UNESP, Botucatu, São Paulo, Brazil, ²Faculdade de Zootecnia/UNESP, Dracena, São Paulo, Brazil.

This study, conducted at São Paulo State University (UNESP) feedlot, Botucatu Campus, Brazil, was designed to evaluate the effect of *Bos indicus* breeds on performance, carcass traits and meat tenderness of bullocks fed high concentrate diet. It was used 96 8-mo-old bullocks (279.9±24.5 kg) of four *Bos indicus* based types (BT): 24 BNA (1/2 Brahman, 1/4 Nellore, 1/4 Angus), 24 PNA (1/2 Braunvieh, 1/4 Nellore, 1/4 Angus), 24 Brangus (5/8 Angus, 3/8 Brahman (BR)) and 24 Nellore (NE). BNA, PNA and BR were fed for 120 days, but NE was 184 days on feed. Rib eye area (REA) and back fat thickness (BFT) were taken by ultrasound. Meat samples were harvested between 12th and 13th ribs for shear force (SF), miofibrillar fragmentation index (MFI) and total lipids (TLIP) analysis. PNA and BR presented greater ($P < 0.05$) average daily gain in kilos (ADG) than BNA and NE (PNA=1.47, BR=1.52, BNA=1.28, NE=1.11). PNA, BR and BNA presented better ($P < 0.01$) feed conversion than NE (PNA=5.54, BR=5.35, BNA=5.43, NE=6.71). PNA and BR had greater ($P < 0.05$) dry matter intake (DMI) in kilos than BNA, but NE did not differ ($P > 0.05$) between BT (PNA=8.11, BR=8.14, BNA=6.98, NE=7.46). When analyzed as percentage of BW, PNA, BR and NE consumed ($P < 0.05$) more feed than BNA (PNA=2.14, BR=2.21, BNA=1.82, NE=2.15). NE presented heavier ($P < 0.05$) hot carcass weight in kilos than BR, but PNA and BNA did not differ between BT (PNA=250.04, BR=245.64, BNA=248.01, NE=252.48). No differences were observed ($P > 0.05$) for dressing percentage (PNA=53.45, BR=53.33, BNA=53.97, NE=56.11) and BFT in millimeters (PNA=5.06, BR=5.14, BNA=5.17, NE=5.05), but NE presented larger ($P < 0.05$) REA in cm² than PNA, BNA and BR (PNA=70.10, BR=72.65, BNA=69.10, NE=75.30). SF in kilograms (PNA=3.48, BR=3.15, BNA=3.75, NE=3.30), MFI (PNA=86.11, BR=78.41, BNA=69.80, NE=73.36) and TLIP in percentage (PNA=1.65, BR=1.65, BNA=1.85, NE=1.99) did not show differences ($P > 0.05$) between BT. Even presenting smaller REA, PNA and BR performed better than NE and BNA, but no effects on meat tenderness and fat deposition were observed.

Key Words: Carcass Traits, Feedlot, Performance

TH223 Frothy bloat-related shifts in the ruminal bacterial population in steers fed Bermuda grass hay and grazing wheat forage. W. E. Pinchak^{*1}, B. R. Min^{1,3}, C. Hernandez², and M. E. Hume², ¹Texas AgriLife Research, Vernon, TX, ²USDA-ARS, Southern Plains Agricultural Research Center, Food and Feed Safety Research Unit, College Station, TX, ³Ichthus Education Center, La Trinitaria, Chiapas, Mexico.

Seven strains of ruminal bacteria (*Streptococcus bovis* strain 26, *Prevotella ruminicola* strain 23, *Eubacterium ruminantium* B1C23, *Fibrobacter succinogenes* ssp. S85, *Ruminococcus flavefaciens* C94, *Selenomonas ruminantium*, and *Ruminobacter amylophilus*) were used to determine the relationships of select individual bacterial populations associated with changes in diet (Bermuda grass hay vs. wheat forage) and bloat severity on individual bacterial populations in the rumen of steers grazing wheat forage. Twelve ruminally cannulated steers grazing wheat forage for 70 day were used to evaluate the influence of bloat on the ruminal microbial biodiversity patterns. Steers were classified as non-bloat and bloat prone post-hoc after bloat was manifested and the classification applied retrospectively. The bacterial DNA density was greatest for *R. flavefaciens*, *S. bovis*, and *E. ruminantium* among tested strains when steers fed Bermuda grass hay (day 0). Steers grazed wheat forage for 50 days prior to the peak bloat period (day 50) resulted decreased density of six bacterial populations in non-bloated steers rumen fluid, but increased the bacterial density of 6 major rumen bacterial populations in bloated steers, indicating that frothy bloat may be associated with species-specific bacterial population. Steers grazed wheat forage over 70 days increased the density of *S. bovis* and *P. ruminicola* bacterial populations in non-bloated steers rumen fluid. The data collectively suggest that ruminal bacterial populations changed when steers experienced frothy bloat.

Key Words: Ruminal Bacteria, Frothy Bloat, Forages

TH224 Beef heifers performance fed with different forage sources. G. R. Siqueira^{2,1}, R. A. Reis^{*1,4}, R. P. Schocken-Iturrino^{1,4}, F. Dutra de Resende², T. T. Berchielli^{1,4}, M. de Toledo Piza Roth^{1,4}, and A. P. de Toledo Piza Roth^{1,3}, ¹São Paulo State University, Jaboticabal, São Paulo, Brazil, ²APTA Regional de Colina, Colina, São Paulo, Brazil, ³Fundaç o de Amparo Pesquisa do Estado de São Paulo, São Paulo, São Paulo, Brazil, ⁴Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brasilia, Distrito Federal, Brazil.

This research aimed to evaluate the Nellore x Angus beef heifers performance fed with different forage: in nature sugar cane (*Sacharum officinarum* L)- ISC, and different silage: corn (CS), in natura sugar cane (ISCS), ISCS plus *Lactobacillus buchneri* NCIMB 40788 -LB (ISCS-LB), burned sugar cane (BSCS), and BSCS plus LB (BSCS-LB). On the CS, and sugar cane (in natura, or silage) diets it were utilized, respectively 44%, and 37% of forage. Total mixed ration content 70.0% TDN, and 13.5% protein was used on the experiment. The trial was conducted during 127 days, using 54 beef heifers 12 months old, distributed in six treatments. The data were analyzed according a randomized block design with nine replications. Burned sugar cane silage showed highest DM losses (47.3%), compared to the ISCS (33.4%). LB reduced the DM losses of the BSCS in 11 unities. The DM intake (Table 1) were highest in CS treatment (7.36a) compared to the silage ISCS (6.32 bc), ISCS-LB (6.56 bc), BSCS (6.23 c). On the other hand, the intake, expressed like % BW (Table 1), showed highest values on the CS (2.62 a), ISC (2.45 ab), and BSCS-LB (2.45 ab). The data related