RUMINANT NUTRITION I

0589 Feedlot performance and diet digestibility of feed efficiency-ranked beef steers fed corn or roughage-based diets and finished with corn or byproduct-based diets. J. R. Russell*[1], N. O. Minton[2], W. J. Sexten[2], M. S. Kerley[2], and S. L. Hansen[1], *[1]Iowa State University, Ames, [2]University of Missouri, Columbia.*

The objective was to determine effects of growing phase (GP) diet and feed efficiency (FE) ranking, as well as finishing phase (FP) diet, on beef steer diet digestibility and FP growth. At University of Missouri, 193 steers were fed whole-shell corn (GPC) or roughage-based (GPR) diets using GrowSafe individual feed intake system for 70 d and FE was determined. At Iowa State University, the 12 greatest (HFE) and 12 least (LFE) feed efficient steers from each GP diet (n = 48; 509 ± 7 kg) were blocked by GP diet and FE ranking into GrowSafe-equipped pens of six. Steers were fed 10 g titanium dioxide (TiO_2) daily in diets similar to GP diets for 14 d, followed by 2 d fecal collection to determine GP diet DM digestibility (GPdig). Steers were then transitioned to FP corn (FPC) or byproduct-based diets (FPB), receiving FP diets for 14 d before again being fed TiO_2 daily for 14 d followed by 2 d fecal collection to determine FP diet DM digestibility (FPdig). Data were analyzed using PROC MIXED of SAS. There was a tendency for greater (P = 0.07) GPdig in HFE versus LFE steers, and FPdig was greater (P < 0.05) for steers fed FPC versus FPB diets. There was no relationship between FPdig and finishing phase G:F. There was a positive correlation between G:F in GP and FP (R = 0.29; P < 0.05). A positive correlation between GPdig and FPdig (R = 0.31; P < 0.05) was driven by a strong positive correlation between GPdig and FPdig (R = 0.71, P < 0.05) in cattle grown and finished on corn diets. Compared to LFE, HFE steers had greater finishing phase G:F (P < 0.05) and tended to have greater FP final BW and ADG (P = 0.07), while DMI did not differ due to FE rank (P > 0.1). No differences in ADG, G:F, or DMI (P > 0.1) during FP were noted due to GP or FP diet effects. In this study, G:F during FP was positively related to growing phase FE ranking, and FP performance was greater in steers ranked as highly FE during GP. Differences in GPdig may help explain growing phase FE ranking. The strong correlation for diet digestibility in steers grown and finished on corn diets supports the assertion that cattle FE testing should likely be conducted using the diet most similar to the environment of interest.

Key Words: cattle, digestibility, feed efficiency

0590 Effects of processing of treated corn stover and distillers grains on intake and digestibility of feedlot diets. J. L. Harding*, M. L. Jolly, J. C. MacDonald, and G. E. Erickson, *University of Nebraska-Lincoln, Lincoln.*

Four ruminally fistulated steers were utilized in a 4 × 6 Latin rectangle design to evaluate the effects of replacing dry-rolled corn (DRC) with a pelleted feed containing treated corn stover and distillers grains (DGS). The control (CON) treatment contained 50.3% DRC, 40% DGS, 5% stalks, and 1.7% limestone. The first treatment (TRT 1) consisted of 27% DRC, 40% DGS, 25% treated stover pellet, and 5% stalks. The second treatment (TRT 2) contained 25.9% DRC, 40% DGS, 10% treated stover pellet, 10% DGS, 5% solubles, 5% stalks, and 1.1% limestone. Treatment 3 (TRT 3) contained 27% DRC, 40% DGS, 25% treated corn stover and distillers pellet, and 5% stalks. The diet for TRT 2 was formulated to be of similar energy value as the treated stover and distillers pellet in TRT 3. Pellets used in TRT 1 contained corn stover that had been processed differently compared to the pellets fed in TRT 3. All treatments contained 3% supplement. Data were analyzed using the PROC MIXED of SAS. There were no ($P \geq 0.15$) differences observed among the CON, TRT 1, TRT 2, or TRT 3 for DM (10.10, 7.45, 8.49, and 8.52 kg/d, respectively), OM (8.07 ± 2.15 kg/d), or NDF (2.71 ± 0.65 kg/d) intakes. Correspondingly, no differences ($P \geq 0.50$) were observed between the CON, TRT 1, TRT 2, or TRT 3 for DM (75.41 ± 5.21%), OM (78.59, 78.81, 77.40, and 79.98%, respectively), or NDF (62.35, 72.63, 68.35, and 68.11%, respectively) digestibilities. Proportions (mMol/100 mMol) of acetate (54.75 ± 0.72), propionate (26.71 ± 1.10), and butyrate (12.05 ± 0.72) were not different between the four treatments (P > 0.50). There was a difference (P < 0.05) in maximum ruminal pH recorded with the treatments having a maximum pH of 6.30 (CON), 6.66 (TRT 1), 6.29 (TRT 2), and 5.96 (TRT 3). There was a tendency (P = 0.09) for differences in average ruminal pH, with treatment differences following the same trend as seen in maximum pH. Differences in maximum pH were attributed to varying pH of the two pellet types. It was concluded that the DRC could be replaced with a pelleted stover and distillers in the finishing diet without altering total tract digestion.

Key Words: cattle, pellet, treated stover

0591 Effects of dietary glycerin inclusion at 0, 5, 10, and 15% of dry matter on energy metabolism and nutrient balance in finishing beef steers. *K. E. Hales*, A. P. Foote, T. Brown-Brandl, and H. C. Freetly, USDA-ARS-MARC, Clay Center, NE.*

Expansion of the biodiesel industry has increased the glycerin (GLY) supply. Glycerin is an energy-dense feed that

can be used in ruminant species; however, the energy value of GLY is not known. Therefore, the effects of GLY inclusion at 0, 5, 10, and 15% in dry-rolled corn (DRC)-based diets were evaluated in eight steers (BW = 503 kg) using a replicated Latin square design. Data were analyzed with the fixed effects of dietary treatment and period and random effects of square and steer within square were included in the model. Contrast statements were used to separate linear and quadratic effects of GLY inclusion. Diets were based on DRC and GLY replaced DRC at 0 (GLY-0), 5 (GLY-5), 10 (GLY-10), and 15% (GLY-15) of dietary dry matter. Dry matter intake decreased linearly ($P = 0.02$) as GLY increased in the diet. As a proportion of GE intake, fecal energy loss tended to decrease linearly ($P < 0.07$), and DE also tended to decrease linearly ($P = 0.07$) as dietary level of GLY increased. Urinary energy loss was not different ($P > 0.31$) as a proportion of GE as GLY increased in the diet. Methane energy loss as a proportion of GE intake tended to respond quadratically ($P = 0.10$) decreasing from 0 to 10% GLY inclusion and increasing thereafter. As a proportion of GE intake, heat production increased linearly ($P = 0.02$) as GLY increased in the diet Additionally, as a proportion of GE intake, retained energy (RE) tended to respond quadratically ($P = 0.07$) increasing from 0% to 10% GLY inclusion and decreasing thereafter. Total dry matter digestibility tended ($P < 0.01$) to respond quadratically. As a proportion of N intake, urinary and fecal N excretion increased linearly ($P < 0.04$) as GLY increased in the diet. Furthermore, g of N retained and N retained as a proportion of N intake both decreased linearly ($P < 0.02$) as GLY increased in the diet. Overall, RE tended to decrease as GLY increased in the diet in conjunction with a decrease in N retention. The increase in N excretion as GLY increased in the diet could indicate an increase in microbial N excretion caused by a shift from ruminal fermentation to post gastric fermentation. *USDA is an equal opportunity provider and employer.*

Key Words: cattle, energy metabolism, glycerin

0592 Intake and digestibility of diets without forage in Nellore and Angus young bulls. *M. M. Ladeira[*1], J. R. R. Carvalho[1], M. L. Chizzotti[2], D. R. Casagrande[1], P. D. Teixeira[1], M. C. L. Alves[1], R. A. Gomes[1], and L. A. Silveira[1], [1]Universidade Federal de Lavras, Lavras, Brazil, [2]Universidade Federal de Viçosa, Viçosa, Brazil.*

The objective was to evaluate intake and digestibility of nutrients in Nellore and Angus young bulls fed a corn silage/concentrate diet and a whole shell corn (WSC) diet without the use of forage. Thirty-six animals with average body weight of 381.2 ± 11.87 kg were used in a completely randomized design using a 2 × 2 factorial arrangement (two breeds and two diets). The corn silage/concentrate diet contained 30% silage and 70% of concentrate based on corn and soybean meal. The WSC diet had 85% whole shell corn and 15% of a pellet based on soybean meal and minerals. Both diets had 12.5% of crude protein and 2.88 Mcal/kg of ME. The animals were allocated in individual pens and fed during 81 d of experiment. However, the digestibility trial started at Day 65 with total collection of feces and orts for five consecutive days. Intake was measured daily. Data were analyzed using PROC GLM of SAS 9.3. Angus animals had greater nutrient intake (kg/d) due to their greater body weight, compared to Nellore (Table 0592). However, there weren't differences on dry matter (DM) and neutral detergent fiber (NDF) intake, when data were analyzed on live weight percentage. WSC diets decreased DMI on both breeds studied. Breeds affected digestibility of non-fiber carbohydrates (NFC) only when WSC diet was used, being greater in Angus animals. WSC diet had greater digestibility of NDF, less digestibility of NFC and a tendency to increase DM digestibility. In conclusion, Angus young bulls have more capacity to digest NFC than Nellore. *Funded by Fapemig, CNPq, CAPES and INCT-CA.*

Key Words: breeds, corn, feedlot

Table 0592. Intake and digestibility of diets without forage (WSC) and with 30% corn silage (30:70) in Nellore and Angus young bulls

	Nellore		Angus			*P*-value		
Item	30:70[1]	WSC[2]	30:70	WSC	SEM	Breed	Diet	B*D
DMI (kg/d)	14.1	7.5	16.2	9.6	0.71	< 0.01	< 0.01	0.97
DMI (%LW)	3.0	1.8	3.0	1.8	0.15	0.92	< 0.01	0.92
NDFI (kg/d)	4.7	1.7	5.2	2.2	0.20	0.02	< 0.01	0.93
NDFI (%LW)	1.0	0.4	1.0	0.4	0.04	0.83	< 0.01	0.67
NFCI (kg/d)	6.7	4.0	7.8	5.3	0.38	< 0.01	< 0.01	0.93
DMDig (%)	78.6	80.7	78.0	83.7	1.91	0.58	0.07	0.39
NDFDig (%)	68.8	78.5	64.0	81.7	2.35	0.73	< 0.01	0.12
NFCDig (%)	98.6 a	88.9 c	99.1 a	94.4 b	1.21	0.02	< 0.01	0.04
CPDig (%)	78.3	78.9	77.1	80.3	1.77	0.96	0.27	0.45

0593 A survey of dry-rolled corn particle size and fecal starch in U.S. feedlots. E. Schwandt*, *Kansas State University, Manhattan, KS.*

Optimizing grain processing practices in cattle feeding operations is critical to maximize feed efficiency. A survey was conducted to evaluate dry-rolled corn (DRC) processing practices on particle size distribution and fecal starch in finishing cattle. Twenty-four feedlots across South Dakota, Minnesota, Iowa, Nebraska, Kansas, and Colorado participated in the study. Samples of dry-rolled corn, freshly voided feces, and the finishing diet were collected from each feedlot. Particle size distribution of dry-rolled corn samples was determined at the Kansas State University Feed Technology Innovation Center (Manhattan, KS) using a Tyler Ro-Tap Sieve Shaker. The average geometric mean particle size across all operations was 4.6 ± 0.87 mm with a range of 3.2 to 6.8 mm. Fecal starch content averaged 18.2 ± 6.84%; by-product inclusion level averaged 27.0 ± 14.26%; roughage inclusion level averaged 8.3 ± 1.82%; NDF levels averaged 18.7 ± 4.02% on a dry matter basis. Fecal starch values indicate the amount of undigested starch in the feces, which may be influenced by corn particle size. There may be an opportunity to increase the degree of grain processing in some feedlot operations to improve total tract starch utilization.

Key Words: feedlot, grain processing, fecal starch

0594 Effects of feeding zilpaterol hydrochloride on feedlot performance and carcass characteristics of Nellore bulls and steers. A. L. Brichi[1], C. F. Costa[1], A. Perdigao[1], M. A. Factori[1], I. C. Pereira[1], D. D. Estevam[1], R. S. Goulart[2], C. L. Martins[1], D. D. Millen[*3,4], and M. D. Arrigoni[1], *[1]São Paulo State University (UNESP), Botucatu campus, Botucatu, Brazil, [2]MSD Saúde Animal, Sao Paulo, Brazil, [3]Supported by São Paulo State Foundation (FAPESP), [4]São Paulo State University (UNESP), Dracena, Brazil.*

This study, conducted at the São Paulo State University feedlot, Botucatu Campus, Brazil, was designed to determine the effects of feeding zilpaterol hydrochloride (ZH) on feedlot performance and carcass traits of Nellore steers and yearling bulls. The experiment was designed as a completely randomized block with a 2x2 factorial arrangement of treatments. Thirty-six 22-mo-old Nellore steers and 36 22-mo-old Nellore yearling bulls (483.9 ± 26.0 kg) were allocated in 24 pens and fed one of two finishing diets containing either 0.0 mg or 7.50 mg of ZH per kilogram of diet DM, replicated six times (three animals/pen), for 20-d before slaughter with a 3-d withdrawal. The finishing diet contained: 70.0% high moisture corn grain, 15.0% sugarcane bagasse, 5.5% peanut meal, 4.0% cottonseed hulls, 3.0% supplement, 1.0% Coast cross hay, 0.8% urea, and 0.7% limestone (DM basis). Cattle were fed ad libitum twice daily for 112 d, and feed offerings and refusals were weighed daily. Cattle were weighed 20 d before slaughter and at the end of the study. A significant ($P < 0.01$) ZH main effect was observed, in which cattle fed ZH had greater final BW (518.6 vs. 510.3 kg) and ADG (1.73 vs. 1.31 kg), improved F:G ratio (5.55 vs. 7.55), heavier HCW (292.7 vs. 280.0 kg), and increased dressing percentage (56.6 vs. 55.1%). In addition, a significant ZH x sex interaction was observed ($P = 0.04$) for DMI, expressed in kg, in which steers not fed ZH had greater DMI than steers fed ZH (9.88 vs. 9.00 kg). However, yearling bulls not fed ZH presented similar DMI when compared to yearling bulls fed ZH (9.61 vs. 9.47 kg). Likewise, a significant ZH x sex interaction was observed ($P = 0.03$) for DMI, expressed as % of BW, in which steers not fed ZH had greater DMI than steers fed ZH (2.00 vs. 1.81%). However, yearling bulls not fed ZH presented similar DMI when compared to yearling bulls fed ZH (1.91 vs. 1.87%). Thus, feeding ZH improves the feedlot performance, as well as carcass traits of Nellore cattle regardless of sex.

Key Words: intake, sex, Zebu

0595 Effects of Next Enhance concentrations in finishing diets on performance and carcass characteristics of yearling feedlot cattle. *C. J. Bittner*[*1], G. E. Erickson[1], K. H. Jenkins[2], M. K. Luebbe[2], G. I. Zanton[3], and M. A. Andersen[3], [1]University of Nebraska-Lincoln, Lincoln, [2]University of Nebraska, Scottsbluff, NE, [3]Novus International, Inc., St. Charles, MO.*

A feedlot study evaluated the effects of Next Enhance 300 (NEXT) essential oil concentration in finishing diets on yearling steer performance and carcass characteristics. Crossbred yearling steers ($n = 288$; BW = 446 ± 23 kg) were utilized in a randomized block design experiment. Cattle were separated into three weight blocks (light, medium, and heavy), stratified by BW, and assigned randomly within strata to 36 pens. Pens were assigned randomly to one of four treatments with nine replications per treatment and eight steers per pen. Treatments consisted of feeding NEXT at concentrations of 0, 16.5, 33.1, and 49.6 mg/kg of diet DM. Light, medium, and heavy blocks consisted of 3, 4, and 2 replications, respectively. Monensin and tylosin were provided in all treatments at 360 and 90 mg/steer daily, respectively. Steers were fed a common basal diet consisting of 54% dry-rolled corn, 25% wet distillers grains plus solubles, 15% corn silage, and 6% supplement (DM basis). Steers in the medium and heavy blocks were fed for 98 d, while steers in the light block were fed for 118 d. Animal performance and carcass characteristics were

analyzed using the PROC MIXED of SAS with pen as the experimental unit. Increasing NEXT concentration in the diet had no effect on DMI, ADG, or G:F ($P > 0.59$; linear or quadratic). Hot carcass weight, fat thickness, and calculated yield grade were not affected ($P > 0.21$; linear or quadratic) by NEXT concentration. As NEXT concentration increased, LM area tended ($P = 0.06$) to decrease quadratically. Greatest LM area were observed when steers were fed 0 or 49.6 mg/kg NEXT, while feeding 33.1 mg/kg NEXT produced the smallest LM area. These data suggest that feeding increasing concentrations of NEXT had little impact on feedlot performance of large yearlings.

Key Words: beef cattle, essential oil, feedlot performance

0596 Effects of plane of nutrition during late gestation and weaning age on transcriptome profiles of Longissimus muscle in Simmental x Angus offspring. S. Moisa*, L. M. Shoup, D. W. Shike, and J. J. Loor, *University of Illinois, Urbana, IL.*

The aim of this study was to evaluate potential carryover effects of maternal diet during late gestation and effects of weaning age on the transcriptome profiles of Longissimus muscle of Angus x Simmental offspring. Pregnant cows blocked by breed were utilized in a 2 × 2 factorial design. Three months before the projected parturition date, cows were assigned to diets (low or medium plane of nutrition). Low plane of nutrition was achieved by grazing endophyte-infected tall fescue/red clover pastures with no supplement, while medium plane of nutrition was achieved by grazing endophyte-infected tall fescue/red clover pastures supplemented with 2.3 kg of dried distiller's grains with solubles and soyhulls. Steer calves were randomly assigned to early or normal weaning treatments within each gestational diet ($n = 20$). At 80 d postpartum, early-wean offspring (EW) were weaned, and received a high-energy finishing diet. At 186 d postpartum, normal-wean offspring (NW) were weaned and joined EW steers at the feedlot where they received the same diet. Longissimus muscle (LM) biopsies were harvested on 81, 187, and 354 d of age. A 45,220 bovine microarray (Agilent) was used for transcript profiling ($n = 5$ steers/group). Functional analysis was performed by means of the Dynamic Impact Approach (DIA). ANOVA statistical analysis (FDR < 0.05 and $P < 0.05$) revealed 8400 differentially expressed genes (DEG) due to time alone and 856 DEG due to treatment alone. Treatment × time affected 33 genes and no DEG were detected for time × treatment × diet. Within the 8400 DEG, the functional analysis revealed that nitrogen metabolism and drug metabolism were the canonical pathways with the highest impact, specially comparing 81 to 354 d of age ($P < 0.05$). For the 856 DEG due to treatment, fatty acid biosynthesis, pyruvate metabolism and insulin signaling pathways were the most–impacted when comparing EW to NW at different time points. Within the 33 DEG due to treatment × time fatty acid biosynthesis was the only impacted canonical pathway ($P < 0.05$). Moreover, initial analysis based on expression pattern (i.e., up- or downregulation) of the 33 DEG indicated most were activated. Results indicated a minor response of the offspring transcriptome to level of maternal plane of nutrition at least when applied during the last 90 d of pregnancy. Post-natal nutritional management, however, led to marked differences in transcriptomics particularly between the growing (81 to 187 d) and finishing phases (187 to 354 d).

Key Words: nutrigenomics, bioinformatics, nutrition

0597 Post-natal nutritional management alters transcription regulator gene networks in Longissimus muscle of Angus x Simmental offspring. S. Moisa*, L. M. Shoup, D. W. Shike and J. J. Loor, *University of Illinois, Urbana, IL*

The aim of this study was to evaluate potential carryover effects of the maternal diet during late gestation and also effects of weaning age on the transcription regulator (TR) gene networks in Longissimus muscle. Angus x Simmental beef cows blocked by breed were utilized in a 2 × 2 factorial design. Three months before the projected parturition date, cows were assigned to treatments (low or medium plane of nutrition). Low plane of nutrition was achieved by grazing endophyte-infected tall fescue/red clover pastures with no supplement, while medium plane of nutrition was achieved by grazing endophyte-infected tall fescue/red clover pastures supplemented with 2.3 kg of dried distiller's grains with solubles and soyhulls. Steer calves were randomly assigned to early- or normal-weaning groups ($n = 20$). At 80 d of age, early-wean offspring were weaned and received a high-energy finishing diet. At 186 d of age, normal-wean offspring were weaned and joined early-wean steers at the feedlot where they received the same diet. Steers were group-fed and intake recorded using the GrowSafe system. Longissimus muscle (LM) biopsies were harvested at 81, 187, and 354 d of age. A 45,220 bovine microarray (Agilent) was used for transcript profiling ($n = 5$ steers/group). Differentially-expressed TR, ligand-dependent nuclear receptors, and their networks with differentially-expressed genes (DEG) were mined using Ingenuity Pathways Analysis (FDR < 0.05 and $P < 0.05$). The statistical model included treatment, maternal diet, time and its interactions, as fixed effects, and steer as random effect. Among the 8400 DEG ($P < 0.05$) affected by the overall effect of time IPA analysis revealed 625 TR and ligand-dependent nuclear receptors (NR). TP53 was the TR with the highest network of target genes. Considering only the DEG due to treatment ($P < 0.05$), among 856 DEG the IPA analysis revealed that 78 were classified as TR and NR. TP53 was also the TR with

the highest network of target genes. In the separate analysis of genes affected by time and treatment ($P < 0.05$) TP53, MYC, HTT, and ERS1 were the TR with highest networks of DEG in both analyses. Results suggest that different plane of nutrition during the last 90 d before calving did not markedly affect the expression of transcription regulators or ligand-dependent nuclear receptors in the offspring's skeletal muscle transcriptome. However, post-natal nutritional management seems to affect TR and NR by activating their expression at growthing stage (i.e., 81 to 187 d) especially when early-weaned.

Key Words: gene networks, nutrigenomics, bioinformatics

0598 Effect of ractopamine hydrochloride and dietary protein content on performance and carcass traits of Nellore bulls.

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The objective of this research was to evaluate the effects of ractopamine hydrochloride (RH) and dietary crude protein (CP) on performance and carcass traits of Nellore young bulls. Forty-eight Nellore bulls were grouped by BW, and randomly assigned to treatments in a 2x2 factorial arrangement of treatments. The factors were two levels of dietary CP (100 and 120% of MP requirement), and two levels of RH (0 and 300 mg/animal/d). Treated animal received RH for the final 35d before slaughter. Dry matter intake was measured and adjusted daily. The animals were weighed at intervals of 21 d, at the beginning of supplementation, after 18 d of supplementation and before slaughter. Feed efficiency was calculated from ADG and DMI. On d 113 hot carcass weights were recorded at slaughter. After 24 h of chilling, longissimus muscle area (LMA), and fat thickness were measured at the left half-carcass. The statistical analyses were conducted using SAS, version 9.1.2 for Windows. There was no effect of RH supplementation on final BW ($P = 0.26$). However, animals supplemented with RH had 19% greater ADG than control animals (1.51 vs. 1.27 kg/d, $P = 0.03$), this effect was not dependent on the level of CP in the diet ($P = 0.43$). Increasing dietary CP content above requirements had no effect on final BW, ADG or G:F ratio ($P > 0.05$). For DM intake, the RH x CP interaction was significant ($P = 0.01$), where RH supplementation had no effect on DMI at CP100 ($P = 0.12$) yet it reduced DMI at CP120 (1.95 vs. 1.81% BW for RH0 and RH300, respectively; $P = 0.03$). Addition of RH to the diet considerably improved G:F ratio, independently of the CP concentration of the diet (0.15 vs. 0.13, $P = 0.02$). Treatments had no effect on HCW or dressing percentage of the carcass ($P > 0.10$). There was a tendency ($P = 0.07$) for RH supplementation to increase LMA, independently of dietary CP levels (83.2 vs. 87.9 cm^2). Ractopamine did not alter fat thickness ($P = 0.29$); however, increasing dietary CP above requirements (CP120) decreased fat thickness (5.1 vs. 4.3 mm for CP100 and CP120, respectively). In conclusion, ractopamine supplementation increased gain, improved feed efficiency, and increased LMA even in intact Nellore young bulls.

Key Words: β-agonist, cattle, muscle growth

0599 Effect of 300 or 400 mg daily of ractopamine hydrochloride on growth performance and carcass characteristics of finishing steers during the last 14, 28, or 42 d.

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Crossbred yearling steers ($n = 576$; BW = 408 ± 29 kg) were utilized in a randomized block design ($n = 4$ BW blocks) with a 3 × 3 factorial treatment design to study the effects of ractopamine hydrochloride (RAC) dosage and duration on growth performance. Factors included RAC feeding duration (14, 28, or 42 d before harvest) and RAC dosage (0, 300, and 400 mg/hd/d). During the treatment phase, RAC dose was top-dressed daily using fine-ground corn as the carrier. There were no significant duration x dosage interactions ($P > 0.07$) for growth performance or carcass characteristics; however, simple effects will be presented. Live final BW was not different ($P > 0.44$) for steers fed 0, 300, or 400 mg RAC for 14 d. At 28 d, steers fed RAC at 400 mg were significantly ($P < 0.01$) heavier than steers receiving 0 mg. There was a tendency at 28 d for increased live final BW for steers fed RAC at 300 mg ($P = 0.07$) compared to 0 mg and steers fed 400 mg of RAC compared to 300 mg ($P = 0.07$). Live final BW was greater ($P < 0.01$) for steers fed RAC for 42 d at 300 and 400 mg compared to cattle receiving 0 mg; however, live final BW was similar ($P = 0.57$) between 300 and 400 mg of RAC. Between treatments, DMI was similar ($P = 0.27$). Hot carcass weight was similar ($P = 0.33$) between yearlings fed 0 and 300 mg of RAC for 14 d, but tended to be greater ($P = 0.07$) for steers fed 400 mg of RAC compared to 0 mg. Hot carcass weight was greater ($P < 0.01$) for steers fed 300 and 400 mg of RAC compared to cattle fed 0 mg for 28 d. Carcasses from yearlings fed RAC for 42 d at 300 and 400 mg were heavier ($P < 0.01$) than 0 mg fed steers. Feeding 300 mg of RAC for 28 or 42 d increased live final BW by 7 and 13 kg, while feeding RAC at 400 mg resulted in 14 and 11 kg increases relative to control steers. Feeding 300 mg of RAC for 28 or 42 d would suggest 4.9 and 7.5 kg improvements in HCW, while feeding 400 mg of RAC would suggest 8.7 and 9.3 kg heavier carcasses compared to steers fed no RAC.

Key Words: dose, duration, ractopamine

0600 Comparison of the total tract digestibility in feedlot cattle fed barley grain treated with lactic and citric acid. M. Nematpoor[*1], K. Rezayazdi[2], and M. Dehghan-Banadaky[1], *[1]University of Tehran, Karaj, Iran, [2]Dep. of Animal Science, Faculty of Agriculture, University of Tehran, Karaj, Iran.*