673 Feeding monensin or functional oils in high corn finishing diets for Nellore bulls. L. J. Chagas, R. S. Marques, C. Sitta, C. Guerra, V. N. Gouvea, J. Souza, F. Batistel, and F. A. P. Santos,* *University of São Paulo, Piracicaba, SP, Brazil.*

A feedlot experiment was conducted to evaluate the effects of functional oils in substitution of monensin on feedlot cattle performance and carcass characteristic. Two hundred forty Nellore bulls (339 ± 18 kg initial BW) were blocked by initial BW and allotted to 40 dry lot pens (6 head/pen). The animals received their respective dietary treatment for 124 d (including 21 d of adaptation). Treatments were: 1) control (CON), no additives; 2) monensin (MON), 30 mg/kg of DM (Rumenpac); 3) Functional oil (FO3), 0.3 g/kg of DM (commercial additive extracted from castor and cashew oils, Essential); and 4) Functional oil (FO5), 0.5 g/kg of DM. The diets contained 80.6% ground corn, 12% Tifton 85 hay, 4% soybean meal, 0.9% urea, and 2.5% minerals (DM basis). During the 21 d adapting period (step up), when comparing CON, MON, FO3 and FO5 treatments respectively, monensin (MON) decreased ($P < 0.01$) DMI (7.96, 6.49, 7.83, 7.71 kg/head/d) and ADG (0.95, 0.76, 1.11, 1.12 kg/head) ($P < 0.06$) compared with other treatments. Supplementing functional oils at 0.3 g/kg of DM (FO3) increased ($P < 0.06$) G/F (Gain/Feed) (0.120, 0.105, 0.141, 0.145) compared with MON treatment. Supplementing functional oils at 0.5 g/kg of DM (FO5) increased ($P < 0.06$) G/F compared with CON and to MON treatments. Considering the whole feedlot period (124 d), when comparing CON, MON, FO3 and FO5 treatments respectively, no treatment effects ($P > 0.05$) were observed for DMI (9.84, 9.52, 10.28, 10.26 kg/head/d), for ADG (1.27, 1.24, 1.31, 1.34 kg/head), for G/F (0.129, 0.131, 0.128, 0.131) and for carcass characteristics. In conclusion, functional oils from castor and cashew oils may have some beneficial effect on cattle performance during the first 21 d adapting period to high grain diets. In this trial the feed additives tested did not improve cattle performance during the whole feedlot period.

Key Words: antibiotics, feedlot, ionophores

674 Feeding monensin, functional oils and combination of feed additives in high by-products finishing diets for Nellore bulls. L. J. Chagas, R. S. Marques, C. Sitta, C. Guerra, V. N. Gouvea, J. Souza, F. Batistel, and F. A. P. Santos,* *University of São Paulo, Piracicaba, SP, Brazil.*

Monensin, functional oils and a combination of both were evaluated in diets for feedlot cattle for 102 d. One hundred seventy-six Nellore bulls (310 ± 29 kg initial BW) were blocked by initial BW and allotted to 16 dry lot pens. The animals were fed once a day and treatment diets were restricted to 1.5% of BW at the first experimental day. The amount fed was increased 0.4 kg of DM/head per day whenever the feedbunk was clean. Treatments were: 1) control (CON), no additives; 2) monensin (MON), 25 mg/kg of DM (Rumensin); 3) Functional oil (FO5), 0.5 g/kg of DM (commercial additive extracted from castor and cashew oils, Essential); and 4) (M+FO3) monensin, 25 mg/kg of DM plus functional oil, 0.3 g/kg of DM. The 4 treatment diets contained 5% sugar cane bagasse, 50% wet corn gluten feed, 43.5% soybean hulls and 1.5% mineral-vitamin mix and the respective fee aditive. Data were analyzed using the mixed procedure of SAS (1999) with pen as experimental unit. During the first 34 experimental days, comparing CON, MON, FO5 and M+FO3 respectively, cattle fed FO5 diet presented greater DMI (8.95, 8.62, 9.38, 8.69 kg/animal per day) than cattle fed MON and M+FO3 diets ($P < 0.05$). The ADG (1.66, 1.60, 1.75, 1.79 kg/animal per day) was greater for FO5 and M+FO3 than for MON ($P < 0.08$). No differences ($P > 0.05$) were observed for G/F (ADG/DMI) (0.186, 0.186, 0.187, 0.206). During the 102 d of the whole experimental period, comparing CON, MON, FO5 and M+FO3 respectively, DMI (10.30, 10.30, 10.54, 10.46) was not affected by treatments ($P > 0.05$), ADG (1.73, 1.86, 1.77, 1.82 kg/animal per day) was greater for MON and M+FO than for CON treatment ($P < 0.05$) and G/F (0.171, 0.183, 0.171, 0.177) was greater for MON than for CON and FO5 treatments ($P < 0.08$). In conclusion, during the adapting period to high concentrate diets, feeding functional oils or the combination of both feed additives was superior to feeding monensin alone. During the whole feedlot period, monensin was superior to control and to functional oils as a feed additive for feedlot cattle fed high by-product diets.

Key Words: antibiotics, feedlot, ionophores

675 Effect of Rumensin, Micotil, and Component TE-G with Tylan on health, growth performance, and carcass merit of stocker cattle grazing wheat pasture. E. D. Sharman*[1], P. A. Lancaster[1], B. D. Wallis[1], G. W. Horn[1], and G. D. Hufstedler[2], *[1]Oklahoma Agricultural Experiment Station, Stillwater, [2]Elanco Animal Health, Guthrie, OK.*

Crossbred steers (n = 207; 200 ± 22 kg) were used in a split plot design to determine the additive effects of metaphylactic treatment with Micotil on arrival, inclusion of Rumensin in an energy supplement, and use of a combination grazing implant on wheat pasture growth performance and carcass merit. On arrival, half of the steers were randomly treated with Micotil (1.5 mL/cwt BW) and held in receiving pens for 42 d. Following receiving, steers were stratified by BW and randomly assigned to 1 of 16 wheat pastures (7.3 to 9.7 ha) at a stocking rate of 1.5 steers/ha for a 112-d winter grazing phase. Pastures were blocked and randomly assigned to 1 of 2 supplement treatments that consisted of a corn and wheat middling-based energy supplement that contained 0 or 220 g/metric ton monensin fed at a rate of 0.91 kg/steer per day. Prior to turnout, half of the steers within each pasture and within Micotil treatment were implanted with Component TE-G with Tylan. Steers were then transported to a commercial feedlot, implanted with Component TE-S with Tylan and fed in a single pen for 137-d before harvest. Growth performance and carcass merit were analyzed using PROC MIXED procedure of SAS. The model included Rumensin treatment as the whole-plot and Micotil and implant treatments as the sub-plot. The 2- and 3-way interactions were not significant ($P > 0.10$). There were no differences ($P > 0.87$) in receiving health parameters or economic impact among Micotil treatments, but no steers were treated for respiratory issues. Inclusion of Rumensin in the supplement increased ($P < 0.01$) final BW and grazing ADG compared with the non-medicated supplement (349 vs. 340 kg; 1.07 vs. 1.01 kg/d, respectively). The grazing ADG of implanted steers was 0.13 kg/d greater ($P < 0.01$) than non-implanted steers (1.10 vs. 0.97 kg/d). Steers implanted during grazing had greater HCW and REA compared with non-implanted steers with no differences in backfat, marbling score, or quality grade distribution. Since the interactions between Micotil, Rumensin, and implant were not significant, we conclude that these technologies are independent and, therefore, additive.

Key Words: grazing implant, Micotil, Rumensin

676 Effects of dietary *Aspergillus oryzae* extract containing α-amylase activity on feedlot performance and carcass characteristics of finishing beef cattle fed steam-flaked corn-based diets. K. A. White*[1], J. J. Wagner[2], T. E. Engle[1], D. R. Woerner[1], T. C. Bryant[3], J. S. Jennings[4], and K. M. Brennan[4], *[1]Animal Sciences Department, Colorado State University, Fort Collins, [2]Southeast Colorado Research Center, Colorado State University, Lamar, [3]JBS Five Rivers Cattle Feeding, Greeley, CO, [4]Alltech Inc., Nicholasville, KY.*

Two hundred seventy crossbred yearling steers were used in a randomized block study to evaluate the effects of supplementing steam-flaked corn-based finishing diets with *Aspergillus oryzae* extract containing α-amylase activity on feedlot performance and carcass characteristics. Steers were ranked by weight and allocated into 15 weight block replicates (9 steers/pen). Within each weight block replicate, steers were randomly assigned to one of 2 treatments. The treatment diet (AMZ) contained 5 g/head daily *Aspergillus oryzae* extract containing α-amylase (Amaize, Alltech Inc., Nicholasville, KY). The control diet (CON) provided 5 g/head daily of a corn meal placebo. Each gram of Amaize provided 750 fungal α-amylase units (FAU) which was defined as the amount of enzyme that will dextrinize soluble starch at the rate of 1 mg/min at 30°C and pH 4.8. Individual full weights were obtained on d −1, 0, 33, 70, 105, 159, and 160. All weight data were subjected to a 4% pencil shrink before analysis. Treatment differences for final BW, ADG, DMI, and gain-to-feed ratio were not significant ($P > 0.10$). Steers consuming AMZ achieved greater ($P < 0.07$) dressing percentage (63.7 versus 63.2%); greater ($P < 0.05$) hot carcass weight (358.4 versus 352.1 kg); and greater ($P < 0.08$) kidney, pelvic and heart fat (2.08 versus 1.99%) as compared with controls. Steers fed the AMZ diet also exhibited a reduced ($P < 0.10$) liver abscess rate (17.7 versus 27.7%) as compared with steers receiving the CON diet. Remaining carcass variables were not affected ($P > 0.10$). Data indicate that AMZ supplementation has minimal effects on live cattle performance but alters dressing percentage and carcass weight. Additional research studying the mode of action for this response is warranted.

Key Words: beef feedlot, carcass merit, α-amylase

677 Accelerated step-up regimens for feedlot heifers following oral dosing with Lactipro (*Megasphaera elsdenii*). K. A. Miller,* C. L. Van Bibber-Krueger, and J. S. Drouillard, *Kansas State University, Manhattan.*

A finishing study was conducted using crossbred heifers (n = 378; 385 ± 10.9 kg BW) to evaluate the potential for employing accelerated step-up regimens following oral dosing with *Megasphaera elsdenii* (Lactipro; MS-Biotec, Inc., Wamego, KS). Upon arrival at the feedlot cattle were given *ad libitum* access to alfalfa hay, and 36 h later were stratified by weight and randomly assigned to 54 pens (7 cattle/pen) within strata. Pens were randomly assigned to one of 6 step-up regimens that utilized between 1 and 5 diets. Diet 1 = 50% corn silage (CS) and 50% concentrate; 2 = 40% CS and 60% concentrate; 3 = 30% CS and 70% concentrate; 2 = 20% CS and 80% concentrate, and the final finishing diet (F) contained 10% CS and 90% concentrate. The control treatment (1234F; no Lactipro) consisted of feeding diets 1 through 4 for 5 d each before feeding F on d 21 and thereafter. Accelerated regimens consisted of a single oral dose (100 mL; 109 cfu/mL) of Lactipro drench administered at processing, followed by the following diet regimens: 234F, 34F, 3F, 4F, and F. Diets 2 through 4 were fed 5 d each before progressing to the next diet in sequence. All diets were based on dry-rolled corn and wet corn gluten feed. Treatment tended (quadratic effect, $P = 0.07$) to influence DMI, with cattle started on intermediate diets (3F and 34F) having lower DMI than other groups. Heifers fed 1234F or F tended to have greater ADG (quadratic, $P = 0.10$) and were more efficient than other groups (quadratic, $P < 0.01$). Treatments did not differ with respect to liver abscess incidence or severity, HCW, dressing percentage, yield grade ($P > 0.10$) or digestive upsets. Treatment affected LM area (quadratic, $P = 0.01$), and was smallest for carcasses from heifers fed the 4F regimen. Marbling score generally increased with the accelerated step-up regimens (linear, $P = 0.12$; quadratic $P = 0.02$) with the greatest improvement in carcasses of heifers placed directly onto the finishing diet. Heifers can be transitioned rapidly to high concentrate diets following oral administration of *Megasphaera esldenii* without compromising performance or carcass quality.

Key Words: diet adaptation, *Megasphaera elsdenii*

678 Oral dosing with Lactipro (*Megasphaera elsdenii*) decreases roughage required for feedlot finishing. K. A. Miller,* C. L. Van Bibber-Krueger, and J. S. Drouillard, *Kansas State University, Manhattan.*

A completely randomized study with crossbred steers (n = 443; initial BW = 400 ± 2.4 kg) was used to evaluate performance and carcass traits after oral dosing with *Megasphaera elsdenii* (Lactipro; MS-Biotec, Wamego, KS) and placed directly onto finishing diets. Steers grazing pastures in Wells, NV were transported to the Beef Cattle Research Center in Manhattan, Kansas, placed into feedlot pens, and provided ad libitum access to brome hay and water. Approximately 24 h after arrival, steers were weighed and randomly assigned to one of 2 treatments based on order of processing. Steers were placed in 36 pens, 24 containing 14 or 15 steers/pen and 12 containing 7 or 8 animals/pen (18 replicates/treatment). A traditional, 4-diet step-up regimen (control) utilizing 3 step-up diets (40, 30, and 20% corn silage and the balance as concentrate) fed for 6 d each, followed by a finishing diet (10% corn silage and 90% concentrate) fed for the remainder of the study was compared with a Lactipro treatment, which consisted of a single oral drench of Lactipro (100 mL, providing 109 cfu/mL *Megasphaera elsdenii* strain NCIMB 41125) and direct placement onto the finishing diet. Diets contained steam-flaked corn and wet corn gluten feed, and were fed once daily ad libitum. Lactipro steers consumed 17% less silage than control steers over the 115-d feeding period ($P < 0.01$). Dry matter intake tended to be lower for steers in the Lactipro group ($P = 0.07$), but gain and gain efficiency were not different ($P > 0.10$). Dressing percentage, HCW, LM area, 12th-rib fat thickness, and incidence of liver abscess were unaffected by diet regimen. Percentage of YG 1 carcasses tended to be higher for steers in Control group ($P = 0.10$) compared with cattle placed directly onto the finishing diet. Dosing with Lactipro and placing cattle directly onto the finishing diet yielded more Choice ($P = 0.07$) and fewer Select carcasses ($P = 0.06$) compared with the control treatment. Steers receiving Lactipro at processing can be placed directly onto a finishing diet, decreasing roughage use while maintaining acceptable cattle health, performance, and carcass quality.

Key Words: diet adaptation, Lactipro, roughage

679 Effect of Optaflexx level on growth performance and carcass characteristics of feedlot steers. J. W. Homm,* G. J. Vogel, N. A. Pyatt, and R. L. Botts, *Elanco Animal Health, Greenfield, IN.*

Three thousand and twenty-four steers (588 kg) were allotted to 40 pens in a randomized complete block design of 4 treatments at 2 trial sites with 5 replications per site to evaluate the effects of differing levels of Optaflexx on growth performance and carcass characteristics of finishing steers. Experimental treatments included: 1) Non-medicated control; 2, 3 and 4) Optaflexx fed continuously at 10.0, 20.1 and 30.1

mg/kg of the diet DM, respectively. Optaflexx was fed during the final 28 d before harvest. The basal diet contained Rumensin at 36.7 mg/kg and Tylan at 9.8 mg/kg of the diet DM. Data were analyzed using a mixed model with treatment as a fixed effect and site, block and site by block as random effects. Pen served as the experimental unit and initial weight was used as a covariate. Feeding Optaflexx resulted in improved ($P < 0.01$) average daily gain, harvest weight, feed conversion, carcass weight, dressing percentage and LM area compared with control. Feeding 20.1 or 30.1 mg/kg diet DM Optaflexx increased ($P < 0.05$) daily gain, harvest weight, feed conversion and carcass weight compared with 10.0 mg/kg diet DM. Optaflexx fed at 30.1 mg/kg diet DM resulted in increased dressing percentage and LM area compared with 10.0 and 20.1 mg/kg diet DM. Marbling score, quality grade and yield grade were not affected by feeding Optaflexx. Feeding Optaflexx increases daily gain, harvest, and carcass weight and improves feed efficiency while having minimal effects on carcass quality.

Table 1. Effect of Optaflexx level

	Treatments					
Item	Control	10.0 mg/kg	20.1 mg/kg	30.1 mg/kg	SEM	*P*-value
Final BW, kg	618.2[a]	622.3[b]	626.9[c]	627.3[c]	2.5	<0.01
DM Intake, kg/d	9.36	9.28	9.36	9.24	0.16	0.38
Daily gain, kg	1.08[a]	1.23[b]	1.38[c]	1.41[c]	0.09	<0.01
Feed/gain	8.71[a]	7.63[b]	6.84[c]	5.70[c]	0.33	<0.01
Carcass Wt, kg	397.8[a]	401.2[b]	404.0[c]	406.3[c]	0.9	<0.01
Dressing percent	64.3[a]	64.5[a]	64.5[a]	64.8[b]	0.1	0.02
LM area, cm^2	91.0[a]	92.5[b]	93.2[b]	94.8[c]	1.7	<0.01
Marbling	small[29]	small[22]	small[24]	small[19]	3.7	0.07

[a–c]Row means without a common superscript differ ($P < 0.05$).

Key Words: Optaflexx, ractopamine, steers

680 Effect of an injectable amino acid solution in calves fed barley-based rations with supplemental lysine and methionine during a 65-d preconditioning program. C. F. O'Neill*[1], C. L. Maxwell[1], S. L. Parr[2], M. L. May[2], E. J. Behlke[2], C. W. Booker[2], G. K. Jim[2], C. R. Krehbiel[1], and L. O. Burciaga-Robles[2], *[1]Department of Animal Science, Oklahoma State University, Stillwater, [2]Feedlot Health Management Services Ltd., Okotoks, Alberta, Canada.*

High-risk steer calves (n = 160; BW = 297 ± 10.6 kg) were allocated to evaluate the effect of an injectable amino acid solution in combination with supplemental lysine and methionine in barley-based rations during a 65-d preconditioning program. The trial was conducted in Alberta, Canada. Animals were randomly assigned to a 2 × 2 factorial arrangement of treatments: saline × injectable amino acid (INJ-AA) versus control (CON) × dietary amino acid (DIET-AA) in a completely randomized block design. Animals were blocked by placement weight. Administration of saline or Vitamaster-NF (NF; Vétoquinol N.A. Inc., Lavaltrie, QC, Canada) was done intramuscularly at a dosage of 1 mL/45 kg of BW. Cattle receiving DIET-AA were fed supplements providing 15 mg/steer per day of both methionine (MetaSmart, Adisseo, Alpharetta, GA) and lysine (AminoShure-L, Balchem Corporation, Animal Nutrition and Health, New Hampton, NY). Cattle from the same treatment group were randomly allocated to one of 4 pens (40 steers/pen) equipped with individual feed intake data collection systems (GrowSafe Systems Ltd., Airdrie, Canada) and fed for 65 d. Performance was calculated with deads (2) and removals (6) excluded; only 6.0% morbidity and 1.3% overall mortality was experienced with no health differences across treatments ($P > 0.10$). Animal performance was analyzed using PROC GLIMMIX (SAS Institute, NC). Animal was the experimental unit, and the model included the fixed effect of treatment and the random effect of block nested within pen. There were no differences in placement BW ($P > 0.30$) or 65-d BW ($P > 0.30$). There were no effects of treatment on ADG ($P > 0.26$) or G:F ($P > 0.60$), throughout the 65-d period. A decrease in DMI was observed in animals receiving DIET-AA compared with CON (5.97 vs. 6.40 kg; $P < 0.01$) in the 65-d preconditioning program. These data indicate that dietary supplementation of amino acids resulted in a decrease in DMI in high-risk steer calves without hindering ADG. However, it should be noted that morbidity was only 6.0%.

Key Words: amino acids, cattle, feedlot performance