

Production, Management and the Environment: Diet and Forage

T353 Effect of vitamin E and R-carnitine on beef cattle finishing performance and profitability. E. Ponce-Cruz¹, J. R. Garduño-Juárez¹, G. Aranda-Osorio*¹, O. Hernandez-Mendo², J. C. Garcia-Ortiz¹, M. Cordoba-Alvarez¹, and J. M. Monzon Armenta¹, ¹Universidad Autonoma Chapingo, Texcoco, Mexico, ²Colegio de Postgraduados, Montecillo, Mexico.

The aim of this study was to evaluate the effect of vitamin E and R-carnitine supplementation on feedlot performance of beef cattle and profitability. Twenty-four commercial crossbred (*Bos taurus* × *Bos indicus*) young bulls initially weighing 425.3 ± 31.3 kg were used, which were homogeneously divided into 4 groups and randomly assigned to the following treatments: (T1) Control (no supplement added), (T2) vitamin E (3,000 IU/animal/d) for 71 d, (T3) R-carnitine (5 ppm) for 45 d, and (T4) combination of T2 and T3. Cattle received a reception management (identified, vaccinated, dewormed, vitaminized and implanted). They were housed in individual pens. The chemical composition of the basal diets was: 13.13% CP; 1.79 and 1.16 Mcal/kg of NEm and NEg, respectively, 11.16% CF, and Ca:P of 1.94. A completely randomized design with the GLM procedure of SAS was used, and when statistical differences were observed, a Tukey test was carried out. The response variables were: dry matter intake (DMI), average daily gain (ADG), feed conversion (FC), feed efficiency (FE) and benefit/cost ratio (BC). There were found not differences ($P > 0.05$) among treatments in any of the variables evaluated, with mean of 12.25 kg/animal/d, 1.65 kg, 7.85 kg, 0.134 g/kg, for DMI, ADG, FC, and FE, respectively. The BC was slightly better for the vitamin E and R-carnitine treatments (1.07) than for the control treatment (1.05). The inclusion of vitamin E at 3,000 IU/hd/d showed not to have negative effect on feedlot performance, thus, it could be used as an antioxidant for beef. R-Carnitine at 5 ppm does not improved animal performance, thus the concentration probably must be increased to find a positive response.

Key Words: bullock, additive, feedlot performance

T354 Influence of prepartum dietary energy on cow and progeny performance. T. B. Wilson*, D. B. Faulkner, and D. W. Shike, *University of Illinois, Urbana-Champaign.*

The objectives of this study were to evaluate the effects of prepartum dietary energy on cow performance, lactation, and reproduction, as well as progeny performance and carcass traits. Spring-calving, mature cows ($n = 106$; BW = 690 ± 76 kg) were blocked by BW and allotted to 2 dietary treatments: 1) 93% ground hay and 7% dried distillers grains plus solubles (REQ), or 2) 50% corn bran and 50% ground cornstalks (HE). Treatment diets were formulated to be isonitrogenous with REQ and HE providing 100% and 125% of TDN requirements, respectively, and were fed from 90d prepartum to calving. All cows were fed a common diet postpartum. Cow BW and BCS were recorded at 90d prepartum, 24h post-calving, and breeding. Milk production was estimated by the weigh-suckle-weigh technique at 65 ± 9 and 120 ± 9d of age. Calf BW was measured at birth and at weaning (120 ± 9d of age). Calves ($n = 86$) were fed a common feedlot diet 28d after weaning and individual feed intake was monitored using GrowSafe. Progeny were harvested in 3 groups to target a 12th rib fat thickness of 1.3 cm, determined via ultrasound. From 90d prepartum to breeding, change in BW was greater ($P < 0.01$) for cows fed HE and BCS change tended ($P = 0.07$) to be greater. Birth BW tended ($P = 0.10$) to be heavier for calves born to cows fed HE with no increase ($P \geq 0.18$) in dystocia. There was no

effect ($P \geq 0.43$) of dietary treatment on milk production or conception rates. Marbling score, measured via ultrasound, was greater ($P = 0.03$) at weaning for calves born to cows fed HE. Calf weaning BW, initial feedlot BW, final BW, and days on feed were not affected ($P \geq 0.12$) by cow treatment. Feedlot DMI and ADG were not different ($P \geq 0.20$); however, calves born to cows fed REQ tended ($P = 0.06$) to be more efficient. There was no effect ($P \geq 0.29$) of cow treatment on calf mortality or morbidity. Although marbling score was different at weaning, there was no effect ($P \geq 0.20$) of cow treatment on final marbling score or other progeny carcass traits. Feeding cows 125% of TDN requirement from 90d prepartum to calving increased cow BW change with no effect on conception rates, or progeny health, growth and DMI.

Key Words: prepartum, energy, progeny

T355 Effect of ration composition on income over feed cost and milk yield. M. H. Buza*, L. A. Holden, R. A. White, and V. A. Ishler, *The Pennsylvania State University, University Park.*

Feed is the greatest expense in the cost of milk production. With volatility in feed and milk markets, income over feed cost (IOFC) may be a more advantageous measure of profit than feed cost per cow. The objective of this study was to evaluate the effects of ration cost and ingredient composition on IOFC and milk yield. The Pennsylvania State Extension Dairy Team IOFC tool was used to collect data from 91 Pennsylvania farms from 2009 to 2011 and determine IOFC per cow per day. The data collected included average milk yield, milk income, purchased feed cost, ration ingredients, ingredient cost per ton, and amount fed. Feed costs were based on market values rather than on-farm cost. Actual costs were used for purchased feed. Mean lactating herd size was 169.4 ± 10.55, and milk yield was 31.7 kg ± 0.19. Mean IOFC was \$7.71 ± 1.006 ranging from -\$0.33 in March, 2009 to \$16.60 in September, 2011. Data was analyzed using a one-way ANOVA in SPSS. Values were grouped by quartiles and analyzed by individual year and all years combined. Purchased feed cost per cow per day averaged \$3.16 ± 1.07 from 2009 to 2011. Milk yield and IOFC did not significantly differ with purchased feed cost, suggesting that purchased feed cost per cow was not a key factor in high milk yield or IOFC. Intermediate levels of forage cost between \$1.45 and \$1.97 per cow per day resulted in the highest ($P < 0.01$) average IOFC of \$8.19 and the highest ($P < 0.05$) average milk yield of 32.3 kg. This suggests that optimal ration formulation was key to increasing milk yield and IOFC. Total feed costs in the top quartile (\$6.27 or more per cow per day) resulted in the highest ($P < 0.01$) IOFC showing that minimizing feed cost per cow per day did not result in the highest IOFC. In 2010, the IOFC was highest ($P < 0.01$) at \$8.09 for dairies that fed one or more by-products. Intermediate levels of forage cost and higher levels of total feed cost per cow per day resulted in both higher milk yield and higher IOFC suggesting that profit margin was affected by more than just feed cost per cow.

Key Words: income over feed cost, profitability, dairy management

T356 Evaluation of Kemtrace brand chromium propionate on milk production by Holstein cows under heat stress conditions in Pennsylvania. J. Ferguson*, *University of Pennsylvania, Kennett Square.*

A field trial was conducted from June through October 2012 on an 800-cow Holstein dairy in Pennsylvania to evaluate the effect of Chromium Propionate (CrPr, KemTRACE Chromium Propionate 0.4%, Kem

Industries Inc., Des Moines, IA) on milk production by second lactation and greater cows between 14 and 150 DIM. Two parallel treatment groups, Control (no CrPr) and CrPr (supplemented to provide 8 mg Cr/h/d), were populated by random assignment one wk before trial start. Subsequently, cows leaving the post-fresh group entered treatment groups on an alternating basis while cows with the greatest DIM were removed to maintain pen size at 104 to 116 cows. At the trial start, pre-fresh (–21 d to calving) and post-fresh (≤ 14 d postpartum) groups received CrPr, supplemented to provide 8 mg Cr/h/d. Data for milk yield, milk components, and DIM were analyzed using PROC MIXED in SAS. The model included fixed effects for treatment, time, DIM, and the interaction of treatment by time, and the random effect of cow within treatment group. Milk yield, kg/h/d, was greater (48.8 vs. 46.2, $P < 0.0001$) for CrPr cows compared with control cows. Milk fat % was lower (3.63% vs. 3.75%, $P < 0.001$) for CrPr cows compared with control cows, but milk fat yield, kg/h/d, was not different (1.76 vs. 1.71, $P > 0.10$). Milk protein % was not different (2.90% vs. 2.91%, $P > 0.10$) between treatment groups, but milk protein yield, kg/h/d, was greater (1.41 vs. 1.33, $P < 0.02$) for CrPr cows compared with control cows. For cows randomized to treatment at the trial start, CrPr supplementation supported 3.6 kg more milk/h/d ($P < 0.05$) than cows receiving no CrPr during heat stress. A treatment by time interaction existed where cows supplemented for < 4 wk with CrPr before entering treatment groups were not different ($P > 0.05$) in milk yield between treatments, and cows supplemented for > 4 wk with CrPr before entering treatment groups produced 4.8 kg/h/d more milk ($P < 0.05$) from wk 3 to 11 postpartum. These results suggest CrPr supplementation from –21 d pre-fresh through 150 DIM may help maintain milk yield during periods of heat stress.

Key Words: heat stress, chromium, milk yield

T357 Evaluation of KemTRACE brand chromium propionate on reproductive performance of Holstein cows in Pennsylvania. J. Ferguson*, *University of Pennsylvania, Kennett Square.*

A field trial on an 800-cow Holstein farm in Pennsylvania evaluated the effect of Chromium Propionate (CrPr, KemTRACE Chromium Propionate 0.4%, Kemin Industries Inc., Des Moines, IA) on reproductive performance. The trial was conducted from January to October 2012; the dairy was naïve to supplemental Cr. Lactating cows received 8 mg Cr/h/d as CrPr in a base corn mix. Reproductive performance over the previous 6 years served as a baseline for treatment comparisons, and binomial trend analysis with Chi-Square values was used to compare changes in conception rate (CR). Body condition score (BCS) was assessed on post-fresh and high group cows before and during CrPr supplementation and compared by Chi-Square test. Pregnancy rate (PR), determined by life-test method using 21-d intervals post-calving, had increased from 17% in October 2006 to a plateau of 27% from January 2010 through December 2011. This improvement corresponded to an increase in first service CR (FSTCR) from 30% to 45%, which plateaued with the PR. Second, 3rd and 4th service CR were typically below 30% over this period. Following initiation of CrPr supplementation in January, PR began to increase in March, and continued to increase to 31.5% by July and remained over 30% through October. The FSTCR remained at 45%, but 2nd, 3rd, and 4th insemination CR increased from 25, 28, and 33% to 32, 37, and 45%, respectively. The binomial trend for CR from 1st to 4th service was significantly reduced ($P < 0.05$) from a chi-squared value of 11.9 in January to 6.8 in October. Changes in CR for repeat services were not associated with transition cow health, parity or milk yield. Mean BCS for post-fresh cows was similar ($P = 0.22$) from January to May (3.5 vs. 3.5, ± 0.02 SEM), but mean BCS in high group cows significantly increased ($P = 0.023$) over the same period (2.5 vs.

2.8, ± 0.03 SEM). In conclusion, based on the improvement in BCS and the increase in CR for repeated services, the results would suggest that CrPr supplementation ameliorated negative energy balance in cows possibly associated with failure to conceive at FSTCR and with lower CR for subsequent services.

Key Words: reproduction, chromium, dairy

T358 Supplementation with soybean oil increases milk fat and improves milk fatty acid profile in heat-stressed dairy goat. S. Hamzaoui*¹, A. A. K. Salama^{1,2}, G. Caja¹, E. Albanell¹, and X. Such¹, ¹*Group of Ruminant Research (G2R), Universitat Autònoma de Barcelona, Bellaterra, Spain,* ²*Animal Production Research Institute, Dokki, Giza, Egypt.*

In a previous work we observed that heat-stressed goats suffered reductions in milk yield, milk fat, and milk protein. Supplementation with soybean oil may be a useful way to enhance milk quality. Eight multiparous Murciano-Granadina dairy goats (42.8 \pm 1.3 kg BW; 99 \pm 1 DIM) kept in metabolic cages were used in a replicated 4 \times 4 Latin square design with 4 periods; 21 d each (14 d adaptation, 5 d for measurements, and 2 d transition between periods). Goats were allocated to one of 4 treatments in a 2 \times 2 factorial arrangement. Factors were no oil (C) or 4% of soybean oil (S), and thermal neutral (TN; 15 to 20°C) or heat stress (HS; 12 h/d at 37°C and 12 h/d at 30°C) conditions. This resulted in 4 treatment combinations: TN-C, TN-S, HS-C, and HS-S. The humidity was maintained at 40 \pm 5%. Feed intake, milk yield, milk composition, milk fatty acids, and digestibility were measured. Compared with TN, HS goats had lower ($P < 0.05$) feed intake, milk yield, and milk protein. Soybean oil increased ($P < 0.01$) milk fat by more than 30% and conjugated linoleic acid (CLA) by more than 360%. The Soybean oil supplementation increased milk fat with the same magnitude regardless the ambient temperature. Goats under HS had 5 to 9 points greater ($P < 0.05$) digestibility coefficients than TN goats. In conclusion, feeding soybean oil to heat-stressed dairy goats was a useful way to increase milk fat, CLA, without any effects on intake, milk yield, or milk protein content.

Table 1.

Item	Treatment				SEM
	TN-C	TN-S	HS-C	HS-S	
DMI, kg/d	2.26 ^a	2.26 ^a	1.47 ^b	1.34 ^b	0.09
Milk, L/d	1.88 ^{ab}	1.99 ^a	1.79 ^b	1.75 ^b	0.11
Fat, %	3.98 ^b	5.07 ^a	3.64 ^b	4.85 ^a	0.14
Protein, %	3.40 ^a	3.40 ^a	2.85 ^b	2.96 ^b	0.07
Fatty acids ¹					
<C16	37.4 ^a	29.7 ^b	34.0 ^c	23.4 ^d	0.82
C16 + C16:1	39.2 ^a	26.3 ^c	31.2 ^b	22.6 ^d	1.36
>C16	22.9 ^d	43.6 ^b	34.0 ^c	53.6 ^a	1.40
CLA ²	0.47 ^b	2.17 ^a	0.37 ^b	1.95 ^a	0.38
Digestibility, %					
DM	67.8 ^b	68.5 ^b	74.0 ^a	72.6 ^a	1.35
CP	73.4 ^b	74.7 ^b	78.8 ^a	78.6 ^a	1.26
NDF	50.5 ^b	50.2 ^b	58.1 ^a	56.6 ^a	2.39
ADF	43.5 ^b	43.6 ^b	52.5 ^a	52.8 ^a	2.90

^{a-d}Different superscripts indicate significant differences between treatments.
¹<C16 de novo synthesis, >C16 taken up by the gland, C16 + C16:1 de novo and preformed.
²Conjugated linoleic acid.

Key Words: heat stress, soybean oil, milk fatty acid

T359 Effects of dietary sea urchin shell powder supplementation on growth performance and ammonia emissions in broilers.

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A 4-wk trial was conducted to evaluate the effect of diet supplementation with sea urchin shell powder and vitamin D on growth performance and ammonia fluxes in broilers. A total of 240 broiler chickens (Arbor Acres) were allocated in 4 treatments with 3 replicates of 20 birds and fed diets supplemented with 0 (control), 0.1% (T1) and 1.0% (T2) sea urchin shell powder or 1% (T4) vitamin D. The feeding program consisted of a starter diet until 3 wk of age and a finisher diet until 4 wk of age. All broilers and feed were recorded for calculation of growth performance at 1 and 28 d. A 100 g litter sample was collected weekly from 4 random locations within each pen to measure pH. Ammonia fluxes of 4 different sampling locations sampling location were analyzed using a multi-gas analyzer. During the experimental period, there were significant differences ($P < 0.05$) among all treatments with and no sea urchin shell powder (0.1% and 1%) or vitamin D (1%) in body weight, feed intake, and feed conversion (feed:gain ratio), except for initial body weight. Litter pH values in treatments with 0.1% and 1% sea urchin shell powder and 1% vitamin D (pH 5.87 to 6.77) were significantly lower ($P < 0.05$) than the control treatment (pH 7.60 to 7.73) at 2 through 4 wk. Ammonia fluxes were reduced by 0.1% and 1% sea urchin shell powder and 1% vitamin D treatment ($P < 0.05$) at 2 and 4 wk. When compared with the controls at 4 weeks (25.11 ppm), 0.1%, and 1% sea urchin shell powder (17.78 ppm and 15.67 ppm) and 1% vitamin D (18.11 ppm) resulted in reduction ammonia fluxes from litter by as much as 29.2%, 37.6%, and 27.9%, respectively. Based on the results of this experiment, adding 0.1% and 1% sea urchin shell powder to poultry diets holds great promise for feed additive in broilers or for reduction in environmental impacts, suggesting that a decrease in ammonia fluxes was chiefly related to the lower litter pH.

Key Words: sea urchin shell powder, growth performance, ammonia

T360 Effect of oral supplementation with colostrum and cross-fostering on gilt's litter performance focused on low birth weight piglets.

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The experiment studied the effect of oral supplementation of small piglets, born weighing less than 1.35 kg (CON: control group; COL: 15 mL of sow colostrum fed within 4 h after birth), and the effect of cross-fostering 24 h after farrowing on litter performance (litters fixed at 11 piglets, with 3 piglets being born weighing less than 1.35 kg, HL; or with all the piglets being born weighing less than 1.35 kg, LL). Fourteen litters from primiparous sows with 154 piglets (81 small piglets) were used. Litters were allocated to 1 of the 4 treatments: CON-HL, CON-LL, COL-HL, COL-LL. Piglets were weighed on d 1 and 19 postpartum. Mortality was recorded. Data was analyzed using GLIMMIX procedure of SAS with litter as experimental unit and treatment effects and their interaction introduced in the model. At d1, gilts did not differ for litter

average piglet BW or CV of litter BW, although HL gilts had quantitatively higher litter average piglet BW than LL gilts (1.52 vs. 1.23 ± 0.028 kg; $P = 0.214$). As expected, HL gilts had higher litter average piglet BW than LL gilts at d 19 (5.43 vs. 4.38 ± 0.267 kg; $P < 0.001$), in addition, LL gilts increased litter average piglet BW when combined with COL rather than with CON (4.81 vs. 3.96 ± 0.153 kg; $P = 0.035$). Compared with CON, COL supplementation reduced CV of litter BW at d19 ($P = 0.076$), especially when combined with LL (18.9 vs. $10.1 \pm 1.37\%$; for CON-LL and COL-LL respectively; $P = 0.025$). No small piglets died in HL litters during lactation, and CON-LL nearly doubled COL-LL small piglet mortality rate (8.0 vs. $4.6 \pm 0.67\%$) although such differences were not significant. Allocating small piglets in the same litter through cross-fostering reduced litter growth with numerical negative effect on mortality. Nevertheless, colostrum supplementation of small piglets to improve growth and survival is especially recommended in litters fixed with all of the piglets being small.

Key Words: pig, colostrum, cross-fostering

T361 Forage intake by grazing lactating cows kept in creep-feeding system.

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The objective was to evaluate the milk production, the change in body weight (BW) and body condition score (BCS), forage intake, and digestibility of dietary components by lactating Nelore or crossbred cows, with zebu blood predominance, kept under creep-feeding system from 4 to 8 mo of lactation. Forty-one cows and their respectively calves were used. Each set (dam and calf) was randomly assigned to one of 5 supplementation strategies of energy-protein supplement, as follows: control (without energy and protein source, mineral mixture only fed ad libitum), T250 (0.250 kg/animal), T500 (0.500 kg/animal), T750 (0.750 kg/animal), and T1000 (1.000 kg/animal). The forage DM intake, as well as other dietary components were not ($P > 0.10$) affected by treatments and was on average 10.171 kg/day or 22.734 g/kg of BW. No differences were observed ($P > 0.10$) for total digestible nutrients (TDN) intake by the cows with increasing levels of supplementation of the offspring. The digestibility of organic matter, crude protein and neutral detergent fiber did not differ ($P > 0.10$) among treatments. A quadratic effect was observed ($P < 0.10$) for variation of BW gain with a maximum gain of cows when the calves are supplemented with 0.598 kg of concentrate. There was an increase in BW ($P < 0.10$), on average 13.8 kg in cows which calves were supplemented, to the control treatment, this variation was only 1.9 kg throughout the experimental period. There was a linear decrease in milk intake as it provided the concentrate to calves ($P < 0.02$) for each kg of supplement provided to offspring, 2.088 kg of milk was no longer consumed by these calves. The supplementation of suckling calves with protein-energy sources results in lower milk production by the dams and consequently allows an increase in BW of the cows.

Key Words: *Brachiaria decumbens*, energy supplementation, protein supplementation

T362 Heart rate and energy expenditure in pure and crossbred beef cows grazing two allowances of native pastures in Uruguay.

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There is information that have demonstrated that heart rate (HR) is an appropriated estimator of energy Expenditure (EE, or heat production) in dairy and beef cows. The objective of this work was to estimate the EE from HR in multiparous beef cows of 2 genotypes: purebred Angus and Hereford (PB), and crossbred F1 (AH and HA; CB) grazing high (HI) or low (LO) forage allowances (6 and 10 kg DM/100 kg LW/day, respectively) of native grasslands in Uruguay. The HR (beats/min) was measured in 24 beef cows (4/treatment) during 5 consecutive days in the summer (lactation period) and registered with individual radio transmitters each 15 s. The EE was estimated using predefined equations relating O₂ pulse and HR and assuming a constant value of O₂ uptake-bit between and within cows (HR/day × 0.343 mL O₂/(beat × kg LW^{0.75}) × (21.47 J/mL O₂) × (1440 min/day)/1000 J/kJ). The effects of cow genotype, forage allowance and their interaction were analyzed by ANOVA and adjusted Tukey LSmeans were obtained. The HR and EE were affected ($P < 0.05$) by cow genotype, forage allowance and their interaction. CB and LO cows had greater ($P < 0.05$) EE than PB and HI (1174 ± 85 and 1160 ± 72 for CB and LO, vs. 920 ± 59 and 933 ± 74 kJ/day/kgLW^{0.75} for PB and HI, respectively). Those values result as consequence of greater ($P < 0.05$) HR (109 ± 8 and 107.7 ± 7 vs. 86 ± 6 and 87 ± 7 bits/minute). However, the HR was greater ($P < 0.05$) for CB-LO than PB-HI, PB-LO and CB-HA (133 ± 12, 85 ± 8, 83 ± 8 and 86 ± 11 kJ/day/kgLW^{0.75}, respectively). The greater EE probably were related to the longer daily grazing time, and consequently dry matter intake, in these cows.

Key Words: beef cow, energy expenditure, forage allowance

T363 Effect of forage allowance on individual and per area production of primiparous beef cows grazing Campos native pastures.

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The objective of this study was to evaluate 2 levels of forage allowance (FA) on forage mass (FM) and productivity of primiparous beef cows grazing Campos native pasture. The study took place in Facultad de Agronomia, Uruguay (31°S 57°W). Eighty primiparous cows were assigned to a completely randomized experiment of 2 FA in spatial replication on 2 blocks during 2 years. The experiment started in autumn -150 d postpartum (dpp) and finished 190 dpp. Annual FA averaged 6 and 10 kg DM/100kg liveweight (LW)/d for low (L) and high (H) FA, respectively. The grazing system was continuous. Cow BW and FM were measured monthly and used to adjust FA using the “put and take” method. At 82 ± 12 dpp, cows were exposed to bulls for 80 d. Calf suckling was restricted with a nose plate for 12 d and cows were offered 2 kg/d during 20 d of whole rice middling at 76 ± 12 dpp. Pregnancy diagnosis (PRE) was performed at 205 ± 12 dpp. To use PRE in individual production a reduction of 10% was applied to include calf losses from pregnancy to weaning. Calf weaning weight was adjusted to 205 d (CW). Individual production (kgLW/cow) was calculated as PRE × CW. SR (kgLW/ha) was calculated with testers plus grazers cows × testers weight/plot area. Production/ha was calculated as SR in animal units (380 kg/cow) × individual production. The experimental unit was the plots and group of cows for FM and animal measurements, respectively. Effect of FA on PRE was analyzed by generalized linear mixed model using the logit link function for a binomial distribution. CW and SR were analyzed using a generalized linear model and repeated measurements respectively. Greater FA improved FM (L = 1212 vs. H = 1474 ± 33

kg/ha, $P < 0.004$), PRE (L = 0.6 vs. H = 0.9 ± 0.04; $P = 0.07$) and CW (L = 175 vs. H = 194 ± 16 g, $P < 0.05$). FA did not affect SR but values were quite different (L = 437 vs. H = 339, $P < 0.12$). However H FA increased production/ha (L = 100 and H = 138 kg/ha). In conclusion, greater FA increased production and reproduction of primiparous cows grazing Campos native pastures.

Key Words: forage allowance, stocking rate, beef cow

T364 Natural occurrence of mycotoxins and toxigenic fungi on corn and sorghum silage in Sao Paulo State, Brazil. C. A. R. Rosa^{*1,2}, L. A. K. Keller^{1,2}, M. Aronovich³, and L. R. Cavaglieri⁴, ¹University Federal Rural of Rio de Janeiro (UFRRJ), Seropédica, RJ, Brazil, ²Conselho Nacional de Pesquisas Científicas (CNPq), Belo Horizonte, MG, Brazil, ³Agricultural Development Company of the Rio de Janeiro State (PESAGRO), Niteroi, RJ, Brazil, ⁴Universidad Nacional de Río Cuarto (UNRC), Río Cuarto, Cordoba, Argentina.

Silage is a common widespread practice to preserve forages in Brazil. Poor storage conditions can lead to mold contamination and mycotoxin production. The aim of this study was to establish the occurrence of toxigenic fungal species and to determine aflatoxins (AFs), ochratoxin A (OTA), fumonisin B₁ (FB₁) and deoxivalenol (DON) in corn and sorghum silages intended for bovines before and after fermentation in farms located São Paulo State in Brazil during period of 2009 to 2012. Fungal counts were done by surface-spread method and toxigenic ability of isolates strains was evaluated with in vitro conditions. AFs and OTA natural contamination was determined by TLC and HPLC. DON and FB₁ was determinate by ELISA. Total fungal counts were generally high (molds that exceeded 1 × 10⁴ cfu/g). *Aspergillus flavus*, *Penicillium citrinum*, and *Fusarium verticillioides* were the prevalent toxigenic strains were isolated. Aflatoxin levels differed ($P < 0.0001$) from 2 to 45 µg/kg and from 2 to 100 µg kg⁻¹ in pre and post-fermentation samples, respectively (Table 1). OTA, FB₁ and DON levels found in pre-fermentation samples were higher than in post-fermentation (Table 1). Mycotoxins and toxigenic fungi are present before and after fermentation in silages. Aflatoxin B₁ (AFB₁) increased during storage whereas OTA, FB₁ and DON had a little decrease. Determination of mycotoxin levels and their frequency of occurrence in corn and sorghum silage (the main substrates used in Brazil) are important to provide information so that the assessments of risk for animal feed and livestock environment can be made.

Table 1. Mycotoxin levels found in silages samples before and after fermentation (pre- and postfermentation)

Sample	Mycotoxin	Contamination frequency (%)	Level range (µg/g)	Samples exceeding regulation limits ¹ (%)
Prefermentation	AFB ₁	31	0.002 – 0.045	0
	OTA	9.5	2.00 – 30.00	100
	FB ₁	20	0.31 – 2.00	0
	DON	26	0.50 – 2.00	0
	AFB ₁	40	2.00 – 100.00	84
	OTA	7	4.47 – 20.39	100
Postfermentation	FB ₁	30	0.32.- 2.00	0
	DON	20	0.30 – 1.00	0

¹Limits: 0.02 µg/g AFB₁ (GMP, 2008), 0.25 µg/g OTA, 50 µg/g FB₁, 12 µg/g DON (EU, 2006).

Key Words: aflatoxin, feedstuffs, mycotoxin