endosperm treatments, while diets containing dry-rolled corn tended to have higher ruminal passage rates of starch. Total molar proportion of volatile fatty acid tended to be greater for diets including grain comprised of floury endosperm. While ruminal pH was unaffected by treatments, diets consisting of flinty endosperm resulted in greater ruminal ammonia levels ($P < 0.05$). Dry-rolled corn treatments tended to result in higher molar concentrations of lactate. Relative to nitrogen digestibility, diets containing high moisture corn resulted in greater amounts of microbial nitrogen flow to the duodenum, greater apparent post-ruminal nitrogen digestibility, and greater microbial efficiency ($P < 0.05$). Preservation method of corn grain appears to have a more profound impact on site and extent of nutrient digestibility than corn grain endosperm type.

Key Words: Corn Hybrid, Digestibility, Processing

159 The effects of feeding ground flaxseed on morbidity, mortality, and performance in receiving heifers and subsequent feedlot performance. M. J. Quinn*, E. S. Moore, B. E. Depenbusch, M. L. May, J. J. Higgins, and J. S. Drouillard, *Kansas State University*, *Manhattan*.

Two trials were conducted at the Kansas State University Beef Cattle Research Center to determine the effects of feeding ground flaxseed during the receiving period on growth, health, and subsequent feedlot performance of finishing heifers. Crossbred heifers (trial 1 n=363, initial BW 214±1 kg; trial 2 n=377, initial BW 222±1 kg) were purchased from salebarns in Edmonton, KY during January and March of 2006. Heifers were fed receiving rations based on steam-flaked corn with 0 (Control), 2, 4, or 6% ground flaxseed (DM basis) for 56 d. Following the receiving period, cattle were fed steam-flaked corn based diets until slaughter for 150 d and 147 d, respectively. Heifers were implanted 91 and 109 d prior to slaughter, respectively. In trial 1, DMI during the receiving period tended to increase linearly with increasing flaxseed in the diet ($P<0.10$). ADG was 1.46, 1.56, 1.58, and 1.61 kg/d for heifers fed 0, 2, 4, and 6% flax, respectively (linear, $P<0.03$). Final BW after the finishing period was significantly increased with increasing inclusion of flax in the receiving diets (linear $P<0.05$). In trial 2, growth performance, morbidity, or mortality during the receiving period were not different between treatments ($P>0.05$). During the finishing period DMI were 8.4, 8.4, 8.0, and 8.1 kg/d for 0, 2, 4, and 6% flax, respectively (linear, $P<0.05$). In trial 2, LM areas were greatest for cattle fed 2% flax at receiving (quadratic, $P<0.05$). In general, feeding flaxseed during the receiving period may improve growth performance and carcass weights through finishing. However, there is some variation that exists, and cattle fed flax may not always respond similarly.

Key Words: Flax, Receiving, Heifers

160 Effect of feeding das-59122-7 corn grain and non-transgenic corn grain to finishing feedlot steers. T. J. Huls*[1], G. E. Erickson[1], T. J. Klopfenstein[1], M. K. Luebbe[1], K. J. Vander Pol[1], D. W. Rice[2], B. L. Smith[2], M. A. Hinds[2], F. N. Owens[2], and M. K. Liebergesell[2], [1]*University of Nebraska*, *Lincoln*, [2]*Pioneer Hi-Bred Internation, Inc.*, *Johnston, IA*.

An experiment was designed to evaluate the performance of steers fed grain produced from a non-segregating transgenic maize line containing event DAS-59122-7 (59122). 59122 expresses the Cry34Ab1 and Cry35Ab1 proteins from *Bacillus thuringiensis* strain PS149B1. These proteins control corn rootworms. 59122 also contains the phosphinothricin acetyltransferase (*pat*) gene from *Streptomyces viridochromogenes* for herbicide tolerance. Sixty steers (initial BW = 396 ± 15 kg), individually fed using Calan gates, consumed finishing diets containing either transgenic corn (59122), or a non-transgenic, near isoline hybrid (Control), or a conventional non-transgenic corn hybrid (Pioneer hybrid 35P12) for 109 d to determine nutritional equivalency. Dry rolled corn comprised 82% of diet DM along with 8.5% alfalfa hay, 5% molasses, and 4.5% supplement containing monensin and tylosin. Steer performance and carcass traits were statistically compared between steers consuming diets produced with 59122 corn and steers consuming diets produced with Control corns. False discovery rate was used to control for multiplicity. Steers fed diets produced with the conventional corn were used as an additional comparator creating tolerance intervals to evaluate the biological significance of any statistical differences. Dry matter intake, ADG, and G:F for steers fed diets containing the 59122 corn were not significantly different from steers fed Control corn, and fell within the tolerance intervals. Similarly, carcass characteristics were not different between Control and 59122. Feeding 59122 did not impact steer performance or carcass quality.

Table 1. Performance and carcass characteristics of steers fed different corn hybrids.

Item	CONTROL	59122	SEM	P-value
Final BW, kg [1]	553	562	7	0.357
DMI, kg/d	9.51	10.11	0.25	0.083
ADG, kg	1.45	1.53	0.06	0.377
G:F	0.153	0.151	0.006	0.799
Marbling score [2]	463	475	19	0.651
Fat depth, cm	1.04	0.95	0.06	0.294

[1] Final BW calculated from HCW/0.63. [2] 400 = Slight°, 450 = Slight^{50}, 500 = Small°

Key Words: Beef Cattle, Transgenic, Maize

Ruminant Nutrition: Ruminal Fermentation - Dairy

161 Effects of *Saccharomyces cerevisiae* on ruminal pH and microbial fermentation in lactating dairy cows. M. Thrune[1], A. Bach[2], M. Ruiz-Moreno[1], M. D. Stern*[1], and J. G. Linn[1], [1]*University of Minnesota*, *St. Paul*, [2]*IRTA-Unitat de Remugants*, *Spain*.

An experiment was conducted with eight ruminal fistulated cows using a cross over design with 2 periods to determine the effects of yeast supplementation on rumen fermentation. Holstein dairy cows in late lactation were either supplemented with 0.5g/head/day of *Saccharomyces cerevisiae*, an active dry yeast (CNCM-1077, Levucell SC20 (r)SC, Lallemand Animal Nutrition) or not supplemented (control). A basal diet consisting of 60% forage and 40% concentrate (DM basis), was fed once daily to both groups of cows throughout the entire experiment. Ruminal pH was measured continuously every 22 min using a pH probe that was placed in the ventral rumen sac for 6 d. Volatile fatty acid and ammonia N concentrations in the rumen were

measured on day 5 or 6 of the 12-d period for each cow and DMI was monitored throughout the experiment. Data were analyzed using a mixed-effects model with repeated measures. There was no difference in DMI between treatments. Mean ruminal pH was greater ($P < 0.05$) when yeast was supplemented (6.53±0.07) compared with the control (6.32±0.07). Average maximum and minimum ruminal pH were also greater ($P < 0.05$) when yeast was supplemented (7.01±0.09 and 5.97±0.08, respectively) compared with the control (6.80±0.09 and 5.69±0.09; respectively). Time spent under the subacute acidosis threshold, pH less than 5.6, was lower ($P < 0.05$) with yeast supplementation compared with the control cows. No difference was observed for ruminal ammonia N concentrations (mean = 14.0 mg/dL) between treatments. Total VFA concentration (m*M*) in the rumen was lower ($P < 0.05$) in the yeast supplemented cows (107.8) compared with the control cows (122.8), which can be related to the greater pH observed with yeast supplementation. Supplementing dairy cows with active dry yeast in the current experiment increased the mean, minimum and maximum ruminal pH; decreased time spent in subactute acidosis; and decreased total VFA concentration in the rumen compared with control cows.

Key Words: Rumen, *Saccharomyces cerevisiae*, Fermentation

162 Impacts of a *Yucca schidigera* extract on rumen fermentation and *in vitro* gas production and NDF digestion. M. D. Singer*[1], P. H. Robinson[1], A. Z. M Salem[2], and E. J. DePeters[1], [1]*University of California*, *Davis*, [2]*University of Alexandria*, *Alexandria, Egypt*.

Yucca schidigera(YS) is native to the arid Sonoran deserts of the Southwest USA and Mexico, and its extracts have been used to modify rumen microbial fermentation. Our objective was to determine effects of feeding increasing doses of YS extract (9.5% Sarsaponin) to dairy cows on rumen fermentation, as well as 24 h *in vitro* gas production and 27 h *in vitro* NDF digestion, of 11 feedstuffs. The principle was to assess the ability of YS to modify rumen fermentation and the subsequent impact of the adapted rumen fluid on feedstuff fermentation *in vitro*. Ruminally cannulated lactating Holstein cows (4; 810 average kg BW) were used in a 4*4 Latin Square design experiment with 14 d periods. Cows were housed in pens equipped with Calan gates with *ad libitum* access to water. The TMR was fed twice daily and contained 36% alfalfa hay (ALF), 9.6% whole cottonseed (WCS), 2% soybean meal (SBM), 12% almond hulls (AH), 1.8% mineral mix, .9% Energy II, .4% salt, and 64% of a corn grain based concentrate (as fed basis). The study occurred in June/August 2006, when daytime high temperatures averaged 35C. YS was added to the TMR to provide approximately 0, 5, 10, 15 g of sarsaponin/cow/day. Rumen fluid from each cow in each period was utilized in an *in vitro* gas run to measure gas production and digestion of NDF for corn silage, ALF(high and low NDF level), beet pulp, corn grain, distillers grains, SBM, AH, barley grain, wheat silage and WCS. Rumen pH, concentrations of total VFA (and their molar proportions), and ammonia N, were not impacted (P>0.05) by level of sarsaponin. In spite of the lack of differences in parameters of rumen fermentation due to increased levels of sarsaponin, gas produced at both 4 and 24 h of *in vitro* fermentation increased linearly (6.3 and 5.6% mean increase with 15 g/d of sarsaponin for 4 and 24 h; both P<0.01), and there were no treatment by feed interactions (i.e., both P>0.05). *In vitro* digestion of NDF was not impacted (P>0.05) by sarsaponin level. Sarsaponin addition at high levels, compared to previous studies, had a modest positive impact on gas production of 11 common feedstuffs.

Key Words: *Yucca Schidigera*, *In Vitro* Gas Production

163 Yeast culture supplementation prevented milk fat depression from a fermentable carbohydrate challenge. R. A. Longuski*, Y. Ying, and M. S. Allen, *Michigan State University*, *East Lansing*.

Effects of yeast culture (YC) on responses to a fermentable carbohydrate challenge were evaluated using eight ruminally cannulated mid-lactation multiparous Holstein cows in a crossover design experiment with 28 d periods. Treatments, top dressed at 56 g per head/d, were Diamond V XP™ Yeast Culture and control (mix of dry ground corn and soybean meal). A common base diet was fed to all animals from d 1 through 26 of each period followed by a two-day dietary challenge in which finely ground high moisture shelled corn (HMC) replaced dry ground shelled corn (DC) in the base diet on an equal DM basis. Milk fat concentration decreased from 3.31% to 3.03% for cows fed the control treatment when challenged with HMC compared to DC but remained unchanged (mean = 3.33%) during the dietary challenge for the YC treatment (interaction P = 0.10). This, combined with numerical differences in milk yield among treatments, resulted in significant interactions (P < 0.03) of main effects of YC supplementation and diet fermentability for yields of 3.5% FCM, milk fat, and SNF. Fat corrected milk yield was decreased by the HMC challenge from 38.5 to 37.0 kg/d for the control treatment but was increased from 38.0 to 40.0 kg/d for the YC treatment. Yields of milk fat and SNF followed the same trend. No treatment interactions were observed for any measure of ruminal pH, total or individual VFA concentrations in ruminal fluid, acetate to propionate ratio, or individual fatty acid isomers in milk fat (P > 0.15). Although DMI was not affected by YC, meal frequency (# of meals/d) tended to be reduced by the YC treatment (P = 0.08). The YC treatment decreased ruminating time (P = 0.05) and number of chews per day (P = 0.04) by decreasing the number of ruminating bouts from 15.7 per day for control to 12.8 per day for YC (P < 0.001). The mechanism by which YC increased milk fat concentration and yield when cows were challenged with a highly fermentable diet requires further investigation.

Key Words: Lactating Cow, Rumination

164 The effect of yeast culture and enzymatically hydrolyzed yeast supplementation on performance of dairy cattle. J. E. Nocek*[1], J. Oppy[2], and M. G. Holt[2], [1]*Spruce Haven Farm and Research Ctr*, *Auburn, NY*, [2]*Varied Industries Corporation*, *Mason City, IA*.

One hundred and fifty multiparous cows were balanced to one of three treatment groups (2 pens/trt) according to previous lactation 305d ME to evaluate yeast culture (YC) and enzymatically hydrolyzed yeast (EHY) supplementation on production performance in dairy cattle. Cows entered the groups at calving and remained through 14 weeks postpartum. Groups were randomly assigned throughout the barn. Pens were identical in layout and each pen contained an exit alley so that it would not interfere with an adjacent pen when animals were moved for milking. The three treatments were: Control: no YC or EHY, YC: same as control with YC (Amax, 28g/d), and YC-EHY: same as control plus YC and EHY manufactured as a combined supplement (Celmanax, 28g/d). Mean group dry matter intake was similar across treatments. Milk yield variables were affected by treatment (P<.01). Cows supplemented with YC and YC-EHY produced more (P<.01) milk than control cows (41.9, 42.1 and 40.5kg, respectively). There was no difference between YC and YC-EHY. These same significant production differences were revealed for 3.5 FCM and ECM. Milk fat,

SNF or lactose percentages were not affected (P>.05) by treatment. However protein percentage was higher (P<.01) for cows supplemented with YC-EHY than YC and control (2.98, 2.93 and 2.91%) with control and YC supplemented cows not being different than either. Differences in fat, protein and SNF yields were primarily reflective of milk yield (P<.05). There was no effect of treatment on MUN, with all treatments ranging from 11.1-11.4. Somatic cell count was higher (P<.01) for cows supplemented with control and YC compared to YC-EHY. These results demonstrate that cows supplemented with YC produced more milk than non supplemented cows and supplementing YC with EHY as a combined manufactured supplement increased milk protein percentage.

Key Words: Dairy Cattle, Yeast Culture, Hydrolyzed Yeast

165 Effect of pasteurized waste milk, medicated milk replacer, mannan oligiosaccharide and enzymatically hydrolyzed yeast on neonatal calf performance. J. E. Nocek*[1], J. Oppy[2], and M. G. Holt[2], [1]*Spruce Haven Farm and Research Ctr*, *Auburn, NY*, [2]*Varied Industries Corporation*, *Mason City, IA*.

This study was conducted to determine the effect of: 1) pasteurized waste milk (PWM) with no antibiotic vs. medicated milk replacer (MR) 2) mannan oligosaccharide (MOS) and enzymatically hydrolyzed yeast (EHY) sources and 3) two levels of liquid EHY on grain intake, growth and fecal scores of neo-natal calves. One hundred and twenty-five female Holstein calves were randomly assigned to the following treatments at birth: Control: PWM, MR: MR with antibiotics (North American Nutrition Companies, Lewisburg, OH), LEHY4 and 8: Liquid Celmanax at 4 or 8ml/d (Varied Industries Corporation, Mason City, IA) and DMOS: Dry MOS (Bio-MOS, Milk-Pak at 14 g/d, Altech, Inc, Nicholasville, KY). Calves were removed from their dams and fed pooled colostrum within 2h of birth. Calves remained on respective treatments 42d and abruptly weaned. All calves received the same calf starter from day one. Calves were housed in individual calf hutches. Body weights and wither heights were recorded at trial initiation, day 21 and 42. Calf starter offering and refusals were recorded daily. Fecal consistency scores (FCS) were recorded for each calf daily. Calves receiving DMOS consumed more grain during the first 5wk on treatment than those receiving MR, with others not being different. There were no differences (P>.10) among treatments for total starter intake during wk 6, There were no differences (P>.10) among treatments in growth performance parameters measured. During wk 1, treatment had no effect on FCS. However, during wk 2, calves receiving MR had a higher (P<.01) FCS than other treatments. During wk 5, those receiving MR had higher (P<.01) FCS than those receiving LEHY4, however, neither were different from the other treatments. The overall 6 wk mean showed calves receiving MR to have a higher (P<.01) FCS than other treatments. This study showed in environments of low disease challenge, the use of enteric antibiotics or the addition of MOS and EHY products may not be warranted.

Key Words: Neonatal Calves, Pasturized Milk, Hydrolyzed Yeast

166 Effects of feeding rumen-protected choline (RPC) on lactation and metabolism. F. S. Lima*[1], M. F. Sa Filho[1], L. F. Greco[1], F. Susca[1], V. J. A. Magalhaes[1], J. Garrett[2], and J. E. P. Santos[1], [1]*Veterinary Medicine Teaching and Research Center, University of California Davis*, *Tulare*, [2]*Balchem Corporation, Animal Nutrition & Health*, *New Hampton, NY*.

Objectives were to determine the effects of feeding RPC on lactation and metabolism in dairy cows. In Experiment 1 (E1), 369 cows were fed 15 g/d of RPC (Reashure, Balchem) from 25 d prepartum to 80 d in milk (DIM). In E2, 578 primigravid cows were fed 15 g/d of RPC in the 21 d prepartum. Blood was sampled from 80 cows in E1 and 47 cows in E2, and analyzed for concentrations of nonesterified fatty acids (NEFA) and glucose at 1, 14 and 21 DIM. Blood from all cows was analyzed for concentrations of 3-OH-butyrate (BHBA) at 1 and 14 DIM. Subclinical ketosis was considered when BHBA was greater than 1.0 mMol/L. Hepatic tissue from 46 cows in E1 sampled at 8 DIM was analyzed for concentrations glycogen and triglycerides. Body condition was scored at enrollment, 1, 30, 60, and 90 DIM in E1, and at enrollment and calving in E2. Monthly yields of milk and milk components in E1 and weekly yields of milk in E2 were measured for 90 DIM. Prepartum DM intake was similar (P>0.15) between treatments and averaged 12.5 and 10.5 kg/d for E1 and E2, respectively, but intake tended (P = 0.10) to be greater for cows fed RPC (23.9 vs 22.6 kg/d) in E1. In E1, yields (kg/d) of 3.5% FCM (44.6 vs 42.8), ECM (40.1 vs 38.5), and milk fat (1.61 vs 1.52) were greater (P<0.05), and of milk (43.1 vs 42.1) and true protein (1.21 vs 1.17) tended (P=0.08) to be greater for RPC than control. Energy output in milk was greater (P=0.03) for RPC than control (30.0 vs 28.8 Mcal/d), although milk NEL content was similar and averaged 0.70 Mcal/kg. In E2, milk yield tended (P=0.07) to be greater for RPC than control (28.7 vs 27.9 kg/d). Body condition was improved (P =0.01) postpartum for RPC in E1. Concentration of glucose tended to be greater (P=0.10) in E1 and of NEFA was smaller (P=0.05) at calving in E2 for RPC compared with control. Prevalence of subclinical ketosis tended (P=0.07) to be smaller at calving in all cows (28.5 vs 37.2%) and was smaller (P=0.05) in multiparous cows (22.1 vs 40.0%) fed RPC in E1, but did not differ between treatments in E2. Feeding RPC improved lactation and metabolism of dairy cows, but benefits were enhanced when it was fed prior to and after calving.

Key Words: Choline, Dairy Cow, Subclinical Ketosis

167 Effect of feeding Fermenten® on the productivity of cows fed different concentrations of sucrose. G. B. Penner* and M. Oba, *University of Alberta*, *Edmonton, Alberta, Canada*.

A study was conducted to determine the effect of feeding Fermenten® on the productivity of lactating Holstein cows fed diets differing in sucrose concentration. We hypothesized that Fermenten® would increase productivity with this response being more prominent when fed in a high sucrose diet. Eight multiparous ruminally cannualted cows (163 ± 55 DIM) were used in a replicated 4 × 4 Latin square design with 21-d periods. Treatments were arranged in a 2 × 2 factorial arrangement with the main effects of Fermenten® inclusion (FERM vs. control) and dietary sucrose concentration (6.5 vs. 2.0%). Diets were formulated to contain 18.7% CP, 23.2 % forage NDF and were offered ad libitum. Cracked corn replaced sucrose for the low sugar diets, and urea and soybean meal replaced Fermenten® in the control diets. Treatments did not affect DMI and averaged 22.8 kg/d. Significant interactions were detected for milk yield, milk component yields and BCS ($P \leq 0.05$). For cows fed low sucrose diets, FERM treatment increased milk yield (26.4 vs. 24.1 kg/d), milk fat yield (0.92 vs. 0.82 kg/d), and milk CP yield (0.91 vs. 0.83 kg/d), but decreased BCS gain (0.08 vs. 0.25/21d) compared to control whereas, cows fed

a high sucrose diet without FERM increased milk yield (26.4 vs. 24.3 kg/d), similar milk fat yield (0.91 vs. 0.85 kg/d), and milk CP yield (0.86 vs. 0.90 kg/d), but decreased BCS gain (0.06 vs. 0.19 /21d) compared to FERM. There was a tendency for an interaction (P = 0.07) for plasma glucose concentration; for cows fed low sucrose diets, FERM increased plasma glucose concentration compared to the control (65.23 vs. 64.58 mg/dl) but cows fed the high sucrose diet without FERM had higher plasma glucose concentration compared to cows fed FERM (67.14 vs. 64.96 mg/dl). In this study, effects of FERM supplementation had variable effects on nutrient partitioning in lactating dairy cows depending on the dietary sucrose concentration. Contrary to the hypothesis, high sucrose diets may not optimize the utilization of Fermenten®.

Key Words: Fermenten, Sucrose, Milk Production

168 Effect of monensin feeding and withdrawal on ruminal populations of individual bacterial species in cows fed high-starch diets. P. J. Weimer*[1,2], D. M. Stevenson[1], D. R. Mertens[1], and E. E. Thomas[3], [1]*United States Department of Agriculture*, *Madison, WI*, [2]*University of Wisconsin*, *Madison*, [3]*Elanco Animal Health, Inc.*, *Greenfield, IN*.

Monensin is known to improve ruminant animal production, purportedly by inhibition of H_2-producing Gram-positive bacteria, yet there is no *in vivo* evidence for shifts in populations of specific microbial taxa. We used real-time PCR with relative quantification to assess the fraction of 16S rRNA gene copy number (F) attributable to *Prevotella* and to each of 13 classical, well-studied ruminal bacterial species in rumen contents from 2 lactating dairy cows fed a TMR containing primarily alfalfa silage, corn silage, and ground high-moisture corn. Diets averaged 30% NDF, 41.1 % NFC (26.8% starch) and 17.4% CP (DM basis). PCR was conducted on DNA from rumen samples collected 6 h after feeding on 2 successive days prior to monensin feeding, after 28 d of monensin feeding (at 0.014 g/kg of diet DM), and at six weekly intervals after monensin withdrawal. Mean values of F attributable to genus *Prevotella* increased ($P < 0.05$) from 41.8% without monensin to 49.2% with monensin, and declined to 42.5% after monensin removal. Less than 10% of the *Prevotella* were present as classical ruminal species *P. rumincola*, *P. brevis*, or *P. bryantii*. Mean values of F attributable to 4 cellulolytic species and 4 starch- or dextrin-fermenting species were not altered ($P > 0.10$) upon monensin feeding or withdrawal. Mean values of F attributable to two biohydrogenating species (*Megasphaera elsdenii* and *Butyrivibrio fibrisolvens*) were low (< 0.4%) and declined several-fold in response to monensin, in accord with observed decreases in milk fat. No changes were observed in mean values of F for a third biohydrogenating species, *Eubacterium ruminantium*. The 13 species together contributed <10% of the bacterial 16S gene copy number. The data suggest that monensin in high starch diets does not suppress populations of classical ruminal Gram-positive bacteria, though it may affect bacteria involved in biohydrogenation of lipids that regulate bovine mammary lipogenesis.

Key Words: Monensin, PCR, Rumen Bacteria

169 Effects of nitroethane and monensin on ruminal CH_4 production and nitro-degrading bacterial populations in vitro. H. Gutierrez-Bañuelos*[1], R. C. Anderson[2], G. E. Carstens[1], L .O. Tedeschi[1], E. Cabrera-Diaz[1], T. R. Callaway[2], and D. J. Nisbet[2], [1]*Texas A&M University*, *College Station,*, [2]*USDA/ARS, Food & Feed Safety Research Unit*, *College Station, TX.*

The objectives of this study were to examine the effects of nitroethane (NE) and monensin (M) on methane production, NE-degradation and NE-degrading bacterial populations using a consecutive batch culture technique. Treatments included rumen fluid, basal medium and 0.2 g of ground alfalfa, supplemented with water (Control; C), 4.5 µmol NE (1NE), 9 µmol NE (2NE), 5 µmol M (M), and 9 µmol NE plus 5 µmol M (2NEM) in triplicate. Treatment cultures were incubated at 39°C under H_2:CO_2 (1:1) and tranferred at 24 h intervals in 16 incubation series. Methane production was determined after series 1, 2, 3, 6, 10, 13 and 16, NE degradation after series 1, 2, 3, 6 and 10, and most probable number of NE-degrading bacterial populations after series 6. Daily CH_4 production was affected ($P<0.01$) by treatment, series, and treatment by series interaction, with accumulations averaging 13.65, 2.93, 1.16, 0.80 and 0.79 after the first and 7.47, 2.93, 0.92, 0.87, and 0.79 ± 0.4 µmol/ml after the 16th incubation series for C, M, 1NE, 2NE and 2NEM, respectively. Nitroethane containing treatments (1NE, 2NE, 2NEM) maintained methane production at low levels for all incubation series. Monensin treatment had a quadratic pattern in which methane levels initially declined but increased ($P < 0.01$) after series 13. Effects of treatment, series, and treatment by series interaction were observed ($P < 0.01$) on NE degradation. Residual NE concentrations were lower for 1NE than 2NE or 2NEM treatments during the first and tenth series (0.35, 0.73, and 1.06 for the first and 0.27, 1.02, and 0.95 ± 0.4 µmol/ml for the tenth, respectively. Most probable numbers of NE-reducing bacteria were increased ($P<0.01$) in 1NE and 2NE (6.9 and 5.9 $\log_{10}$ cells/ml, respectively) compared to those in C, M and 2NEM treatments (<2.5 $\log_{10} \pm 0.8$ cells/ml). These results confirm the CH_4-inhibiting activity of NE and suggest that ruminal adaptation of bacteria to NE is likely due to an enrichment of NE-reducing bacteria. The results further demonstrate that ruminal bacteria adaptation may be overcome with 2NE, and that M treatment negatively affected NE-reducing bacteria populations.

Key Words: Methane, Monensin, Nitroethane

170 Effect of monensin concentration in starter feed on feed intake and growth of young dairy calves. E. E. Thomas*, *Elanco Animal Health*, *Greenfield, IN*.

Monensin is an ionophore cleared by FDA for increasing daily gain and prevention and control of coccidiosis in growing cattle including those maintained in a dry lot. The objective of the 3 trials was to determine the effect of monensin concentration in starter feed (33, 50, 66 ppm) on feed intake and daily weight gain in newborn Holstein dairy calves. Milk replacer was fed at a rate of 0.86 kg/hd/d in trial 1 and 0.45 kg/hd/d in trials 2 and 3. Calves were weaned at 5 or 6 wks of age and were individually housed for 12 wks (trial 1, 72 heifers) or 8 wks in trials 2 (100 bulls) and trial 3 (48 bulls). In trial 1, calves were then grouped and fed a common grower feed (38 ppm monensin) for 8 wks. During that time, 4 pens per original treatment group were maintained. Trials were statistically analyzed separately. Starter feed intake and daily gain (kg/d) during the individual housing period for 33, 50, and 66 ppm treatments, respectively, by trial were: (trial 1, 1.32, 1.18, 1.32; 0.67^{ab}, 0.63^{b},0.71^{a}) (trial 2, 1.32^{a}, 1.22^{b}, 1.22^{b}; 0.56, 0.52, 0.54) (trial 3, 0.82, 0.77, 0.77; 0.59, 0.57, 0.56). In trial 1, feed intake and daily gain (kg/d) following grouping for the original 33, 50, and 66 ppm treatment groups, respectively, were: 3.90, 3.86, 3.95;

1.03, 1.05, and 0.97. The FDA cleared dose range for controlling coccidiosis is .06 to 0.45 mg/kg body weight in calves. At the end of 8 wks in trial 3 the monensin intake (mg/kg body weight) was 0.19, 0.26 and 0.36 for the 33, 50, and 66 ppm treatments, respectively. In conclusion, during the individual housing period there were no differences in feed intake between 33, 50 and 66 ppm treatment groups with the exception of trial 2 in which 33 ppm calves ate more (P<.05) than 50 or 66 ppm calves. There were also no differences in growth rate between 33, 50 and 66 ppm treatment groups with the exception of trial 2 in which calves fed 66 ppm grew faster (P<.05) than calves fed 50 ppm but similar to the 33 ppm calves. After grouping in trial 1, there were no differences in feed intake or daily weight gain.

Key Words: Rumensin, Monensin, Growth

171 Deactivation of aflatoxin B1 in animal feed by using a selected bentonite. G. Schatzmayr*[1], S. Fruhauf[2], and E. Vekiru[2], [1]*BIOMIN Research Center*, *Tulln, Austria*, [2]*Christian Doppler Laboratory for Mycotoxin Research*, *Tulln, Austria*.

Aflatoxin B1 (AFB1) is a mycotoxin produced by *Aspergillus* fungi on a great variety of agricultural commodities. AFB1 impairs health of different animal species. In dairy cows this hepatotoxic and carcinogenic toxin can be metabolized to aflatoxin M1 and secreted into milk. It is known that hydrated sodium calcium aluminosilicates (HSCAS) in animal feed can reduce the adsorption of AFB1 in the gastrointestinal tract. The aim of this study was to select an enterosorbant out of more than 60 bentonites with a high selectivity for AFB1. As reference material in this screening study a commercially available HSCAS and charcoal were used. The evaluated chemisorption index (Cα) showed that bentonites can bind AFB1 very strongly, a fact that indicates an adsorption process due to chemisorption. From the tested bentonites only a few reached or exceeded the Cα value and the maximal adsorption capacity (Qmax) of the reference binders. Tests in real gastric juice and in vitamin solutions were used to determine selectivity of the binding agents. Charcoal proved to be a very unselective binder that definitely binds vitamins to a greater extent than bentonites. AFB1 adsorption of the reference materials was clearly decreased in real gastric juice. Only a few of the investigated binders performed better than the reference materials. This showed us that not only AFB1 binding capacity can be used as selection criterion for clay minerals as feed addtives but also parameters like binding behavior in complex environments (gastrointestinal juice) and binding of essential nutrients have to be considered. Mineralogical studies did not lead to any parameter which could be used to correlate AFB1 adsorption. One of the most promising materials was part of a feeding trial with dairy cows aiming to determine carry over of aflatoxin into milk (3 groups: control diet + AFB1; control diet + AFB1+ material at two concentration levels). The addition of the bentonite to the diet significantly reduced the milk aflatoxin M1 content at both concentrations (20g per cow and day and 50g, respectively). Feed intake and milk production were not negatively influenced by the bentonite.

Key Words: Aflatoxin, Mycotoxin, Deactivation

172 Adding liquid feed while reducing non-fiber carbohydrates (NFC) enhances feed intake and milk fat production. J. L. Firkins*, C. Reveneau, L. E. Gilligan, and A. Sprunger, *The Ohio State University*, *Columbus*.

Liquid feeds (LF) reduce forage particle sorting, improve palatability, and increase energy density of TMR. However, excess sugars could promote rumen acidosis or could reduce milk fat production, particularly if combined with Rumensin (R). Our objectives were to add LF at two concentrations while reducing NFC concentration to optimize the use of LF in dairy rations. Diets had 30% corn silage, 15 % chopped alfalfa hay, and 8% whole cottonseeds (21% forage NDF). A control was balanced for 40% NFC. Two diets with 3.25% LF (DM basis) had 40 or 37 % NFC. Two more 37% NFC diets had 6.5% LF, but the second also had R at 11.5 g/909kg of DM in the TMR. Diets contained similar CP to formulations (17.3%). Compared with formulations, forage NDF was 1% unit lower; and NFC, 1% higher. Treatments lasted 12 wk after an initial 2-wk covariate period. Treatment n = 8 multiparous and 4 primiparous Holsteins. Although repeated measures were used in a mixed model (random effect of cow), no treatment x time interactions were detected. Means were separated by protected LSD. Milk protein % was higher (P<0.01) for control (2.93%) than the LF diets (averaged 2.84%), but protein yield, milk production, and milk fat were not affected (averaged 1.15 kg/d, 40.4 kg/d, and 3.33%). Production of milk fat, 3.5% FCM, and energy-corrected milk (ECM) were higher (P<0.09) for cows fed 3.25% LF in 37% NFC diets than the control or 3.25% LF diet with 40% NFC. ECM was 26.2, 25.7, 27.4, 26.5, and 26.2 kg/d, respectively, for control, 3.25 % LF in 40% NFC and 37% NFC diets, and 6.5% LF in 37% NFC diets without or with R. The DMI were 23.9, 23.9, 25.2, 25.9, and 24.5 kg/d, respectively. DMI was greater (P<0.10) when 3.25 and 6.5% LF was added to the 37% NFC diets than the control. The ECM/DMI was not different (averaged 1.10). Because total tract OM digestibility was not affected, LF appear to be best used when replacing starch and with decreased NFC to maintain comparable rumen carbohydrate digestibility. LF did not depress milk fat, even at high levels or when R was included.

Key Words: Liquid Feed, Milk Fat, Dairy Cattle