T140 **The effect of induced ascites syndrome on blood gas parameters and internal organ weights in broilers.** M. Naghous[1], A. Pakdel[2], R. V. Torshizi[3], and H. Bazdidi*[1], *[1]Dept. of Animal Science, Faculty of Agriculture, Birjand University, Birjand, Iran, [2]Dept. of Animal Science, University College of Agriculture & Natural Resources, University of Tehran, Karaj, Iran, [3]Dept. of Animal Science, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.*

In order to evaluate the effects of induced ascites syndrome on blood gas parameters and internal organ weights, 149 male birds and 200 females birds were randomly selected from a commercial broiler strain and rearing under two normal and induced ascites condition. Several traits including body weight gain, feed intake (FI), food conversion ratio (FCR) between 23 and 54 d of age were evaluated. Moreover the blood gas parameters and hematocrit value were evaluated at 21, 35 and 54 d of age. At the end of experiment all the birds were slaughtered and the internal organs like liver, heart and spleen were inspected. There was no significant difference between two groups based on FCR and Body weight gain, while in the broiler males, FI was significantly different ($P < 0.05$). The result showed that liver and spleen weights were not significant different between two treatment in both sex. Right ventricle to total ventricle ratio (RATIO) of the male birds in the induced ascites treatment (T2), was higher than that of male birds in the control treatment (T1) ($P < 0.01$). However RATIO of females was not significantly different. The blood gas parameters including PH, $pvCO_2$, total CO_2, and pvO_2, were not significantly different between both groups of T1 and T2 in both sex However the O_2 saturation at 35 and 54 d of age in T1 group was higher than that of T2 group ($P < 0.05$). The results of current study indicated that O_2 saturation could be a useful measure for predicting ascites syndrome.

Key Words: ascites syndrome, blood gas parameter, broiler

T141 **The relationship between growth curve and ascites syndrome in broilers.** M. Naghous[1], A. Pakdel[2], R. V. Torshizi[3], and H. Bazdidi*[1], *[1]Dept. of Animal Science, Faculty of Agriculture, Birjand University, Birjand, Iran, [2]Dept. of Animal Science, University college of Agriculture & Natural Resources, University of Tehran, Karaj, Iran, [3]Dept. of Animal Science, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran.*

Ascites syndrome is a metabolic disorder in broilers. Birds that selected for higher body weight (BW) and lower feed conversion ratio (FCR) are more susceptible to this syndrome. The aim of present study was to investigate the relationship between growth curve and ascites syndrome in broilers. The BW at 1, 4, 7, 10, 14, 17, 21, 28, 35, 42, 49 and 54 d of age were measured on 299 male birds kept under normal (T1) and more susceptible condition to ascites syndrome (T2). The birds were chosen randomly from two sire lines A & B of a commercial broiler strain. These lines (A & B) were primarily selected for lower FCR and higher BW, respectively. Mortality in the induced ascites condition (T2) was higher than normal condition (T1) in both lines (mean 5.2% vs. 21.8%). Moreover right ventricle to total ventricle ratio of the induced T2 was higher than that of T1 ($P < 0.01$). The results of growth curve parameters in the sire line A showed that mature index and age at the inflection point between two treatments were significantly different ($P < 0.05$), but hatch weight, mature weight and weight at the inflection point weren't significantly different. The birds in T2 reached to the age at inflection point 1.55 d earlier than birds in T1, but weight at inflection point was similar in both treatments. The growth rate in T2 was higher than that of T1 until 35 d of age, but later on the growth rate was lower in T2 in compared to T1 ($P < 0.05$). Growth curve parameters in the sire line B showed that hatch weight, mature index, mature weight, weight and age at the inflection point between two treatments weren't significantly different. The growth rate in T2 was higher than that of T1 until 35 d of age, but later on the growth rate was lower in T2 in compared to T1. The results of current study indicated that induced ascites condition changed linear phase of growth in the male broiler chickens with lower FCR.

Key Words: ascites, low FCR, high body weight

T142 **Performance, gut morphology and meat quality characteristics of broilers fed diets with probiotics supplementation.** M. D. Olumide*, O. A. Adebiyi, and D. E. Bamisaye, *University of Ibadan, Ibadan, Oyo State, Nigeria.*

Large amounts of antibiotics have been used to control diseases and improve performance in livestock. However, due to growing concerns about antibiotics resistance and drug residues on carcass meat, bans had been placed on antibiotic growth promoters in many countries in the world. There is an increasing interest in finding alternatives to these antibiotics in poultry production. One alternative is beneficial bacterial-derived probiotics feed supplements. A total of 150 day-old Arbor Acre broiler chicks were distributed randomly into 5 treatments with 3 replicates (10 birds/replicate) in a completely randomized design. Treatments include: Control (0.00 g/kg), T1 (0.02 g/kg), T2 (0.04 g/kg), T3 (0.06/kg), and T4 (0.08 g/kg) of probiotics feed supplement. Data on performance, carcass quality and gut morphology were obtained. Data taken were subjected to statistical ANOVA procedure of SAS, 2010. No significant ($P > 0.05$) difference was observed in the final weight gain for all the birds on the respective treatment. Meat quality characteristics revealed significant ($P < 0.05$) differences in cooking loss, thermal shortening, cold shortening and water holding capacity of meat cuts from breast, drumstick and thigh areas. Birds fed the T4 diet had the lowest mean values for cooking losses (16.23%), thermal shortening (20.17%), cold shortening (0.20%) and water holding capacity (47.00%) for the thigh muscle when compared with birds on other treatments. Birds fed diet supplemented with 0.08 g/kg probiotics (T4) had a significant villus height and crypt depth compared to the others. Therefore, it can be concluded from this study that supplementing diets of broiler birds with 0.08 g/kg probiotics improves significantly the performance, meat quality and improve nutrient absorption of broilers.

Key Words: probiotic, broiler performance, gut morphology

T143 **Evaluating the effectiveness of *Bacillus subtilis* (DMF) and yeast cell wall (YCW) in the performance of broiler chickens.** M. Aronovich*[2], L. A. M. Keller[1], J. R. Sartori[3], J. E. Butolo[5], and A. N. Andrade[4], *[1]University Federal Rural of Rio de Janeiro (UFRRJ), Seropédica, RJ, Brazil, [2]Agricultural Development Company of the Rio de Janeiro State (PESAGRO), Niteroi, RJ, Brazil, [3]Universidade Estadual de São Paulo (UNESP), Botucatu, SP, Brazil, [4]Lesaffre Feed Additives (SAF), Rio de Janeiro, RJ, Brazil, [5]JEB Instituto de Biociências, São Paulo, SP, Brazil.*

Probiotics are live microorganisms that may confer a health benefit leading to increased performance. Lactic acid bacteria, bifidobacteria and certain yeasts are the most common types of microorganisms used. The functional capacity of the digestive tract of broilers during the first weeks of life can be considered a factor possible limiting to health and productivity. The focus of this study was determine if the use of *B. subtilis* and yeast cell

wall (Safmannan) offer benefits in production compared to antibiotic-based growth promoters (Virginiamycin). For this study 3,600 day-old male birds (Cobb) were acquired and randomly distributed in 5 treatments of 70 experimental units: Basal Ration (negative control); Basal Ration (positive control with growth promoter Virginiamycin-10g/ton); Basal Ration with *B. subtilis*-2g/ton; Basal Ration with *B. subtilis*-4g/ton; Basal Ration with Safmannan-500g/ton. Birds were observe daily and evaluated at d 0 (start), 21, 35 and 42 of treatment. The intestines of euthanized birds were collected and sectioned (duodenum, jejunum and ileum) for histopathological evaluation. All results were subjected to ANOVA with further tests of differences using Tukey analysis. Mean values for weight, weight gain, feed consumption, feed efficiency and mortality for treatment were not different from control values though tendencies towards reduced mortality were present for bacterial probiotics (Table 1). The data suggest that live culture *B. subtilis* probiotic treatment may be more beneficial towards reduced mortality than other tested options though more study is needed.

Table 1. Mean weight (MW), weight gain (WG), mean of feed consumption, feed conversion and mortality during the experimental period of 0 to 21 days

Treatment	MW and WG/ bird (kg)		Average consumption of feed (kg)	Feed conversion	Mortality (%)
T1- Negative Control	0.768	0.720	1.141	1.582	0.29
T2- Positive Control	0.773	0.725	1.144	1.574	0.57
T3- B. subtilis (2g/ton)	0.765	0.717	1.143	1.593	0.29
T4- B. subtilis (4g/ton)	0.760	0.713	1.142	1.602	0.14
T5- Safmannan (500g/ton)	0.780	0.732	1.142	1.556	0.49
P-value	0.0795	0.0759	0.0935	0.0755	0.0591

Key Words: *Bacillus subtilis*, *Saccharomyces cerevisiae*, food additive

T144 In vitro anthelmintic activity of crude aqueous extracts of *Pithecellobium dulce* and *Lysiloma acapulcensis* againts gastrointestinal nematodes in small ruminants. A. Olmedo[1], R. Rojo*[1], J. Arece[3], A. Salem[2], E. Morales[2], F. Aviles[1], J. Hernández[1], B. Albarrán[1], and F. Vázquez[1], *[1]Centro Universitario UAEM Temascaltepec, Temascaltepec, Estado de México, México, [2]Facultad de Medicina Veterinaria y Zootecnia, UAEM, Toluca, Estado de México, México, [3]Estación experimental Indio Hatuey, Central España Republicana, Matanzas, Cuba.*

An experiment was conducted to evaluate the effect two lyophilized aqueous extract of tree leaves of *Lysiloma acapulcensis* and *Phitecellobium dulce* on an in vitro assessment of hatching eggs, larval development and migration of gastrointestinal nematodes of small ruminants. Treatments were extracts from both species at different concentrations (0, 12.5, 25.0 and 50.0 mg/mL) and albendazole and levamisole were used as positive control (1%). A general lineal model test was used to determine the dose effect of each plant extract in the assays. The extracts of *L. acapulcensis*, compared with extracts of *P. dulce* showed better inhibition effect ($P < 0.05$) on the hatching of eggs (Table 1). Larval development in both extracts showed larvicidal effect ($P < 0.05$) on all larvae exposed to different doses of the extract. In the larval migration assay, we found a similar effect with levamisole doses of 25 and 50 mg/mL of the extract of *L. acapulcensis*. The extract of *P. dulce* presented a lower larvicidal effect ($P < 0.05$) of levamisole and the extract of *L. acapulcensis*. Aqueous extracts of both species have antiparasitic effect in small ruminants, and could be used as biological alternative to control gastrointestinal nematodes in sheep and goats under subtropical conditions.

Table 1. Mean inhibition (%) of egg hatch, larval development and migration of gastrointestinal nematodes by *L. acapulcensis* (LA) and *P. dulce* (PD) aqueous extracts

Treatment[1]	Eggs hatching	Larval development	Larval migration
PBS	96.68^{a}	86.38^{b}	79.31^{a}
LEV1.25			4.64^{gf}
LEV2.50			6.67^{ef}
LEV5.0			2.94^{g}
ALBZ	30.50^{e}	1.28^{c}	
DMSO	68.12^{b}	100.00^{a}	
LA 1.25	38.01^{de}	0.00^{c}	12.04^{cd}
LA2.50	32.58^{e}	0.00^{c}	8.98^{de}
LA5.00	47.40^{cde}	0.00^{c}	9.19^{de}
PD1.25	62.73^{bc}	0.00^{c}	13.95^{bc}
PD2.50	59.60^{bc}	0.00^{c}	11.96^{cd}
PD5.00	56.32^{bcd}	1.27^{c}	16.11^{b}
SEM	4.56	1.77	0.76

$^{a–e}$Different letters in the same column indicate significant difference ($P < 0.05$) between means.
[1]LEV = levamisole, ABZ = albendazole 1%; DMSO = dimethyl sulfoxide; LA = *Lysiloma acapulcensis*; PD = *Phitecellobium dulce*.

Key Words: biological control, nematode, small ruminant

T145 Anthelmintic and immunomodulating effects of *Moringa olifera* extracts in goats. M. Worku*, K. Gyenai, H. Ismael, and J. Reddy, *North Carolina Agricultural and Technical State University, Greensboro.*

Gastrointestinal parasites pose a serious threat to the US goat industry due to inefficacy of existing anthelmintic drugs. Alternative anthelmintics are being sought from plants such as *Moringa oleifera* (moringa). The objective of this study was to evaluate the effect of aqueous extracts of dried moringa leaves on adult Boer goats infected with gastrointestinal parasites. Following initial screening for infection goats were assigned to three groups of five each (n = 15). Powdered moringa leaves were soaked in hot or cold water with stirring. Sterile filtered extracts were prepared. Goats were drenched daily with 10 ML of the hot (Treatment I) or cold extract (Treatment II) daily for a 4 week period, a control group of five age matched goats received sterile water (Treatment III). Body weight, FAMACHA score, packed cell volume (PCV), white blood differential count (WBC), total white blood cell count (TWBC) and *Haemonchus* and coccidia fecal egg counts were determined once a week, for a 4 week period. Serum was evaluated for 8 pro-inflammatory cytokines using a commercial ELISA(Sygnosis). There was no treatment effect on coccidia egg counts, FAMACHA score, and PCV or body weight. Moringa treatment increased mononuclear cells and decreased *Haemonchus* eggs per gram feces. The hot extract had a greater anthelmintic effect than the cold extract and higher TWBC ($P < 0.05$). The hot extract increased and the cold extract decreased cytokine concentrations compared to controls. Aqueous extracts from moringa affect cell-mediated immunity in goats and may aid in the reduction of parasite burden in a species specific manner.

Key Words: goat, moringa, anthelmintic

T146 Sericea lespedeza diets modulate gene expression and rumen microbial diversity in goats. A. Abdalla, M. Worku*, H. Mukhtar, and N. Whitley, *North Carolina Agricultural and Technical State University, Greensboro.*

Sericea lespedeza (SL) is considered high-quality, low input forage that suppresses gastro-intestinal parasites in goats. The objective of this study was to evaluate the impact of a diet containing SL on goat rumen micro flora, and on transcription of markers of innate immunity in goats. Samples were collected from 16 Female goats fed a diet of 75% SL (n = 9) and a control group (n = 7), 0% SL. Rumen contents were collected at slaughter and stored at −20°C. Microbial DNA was isolated from frozen rumen samples using the QIAamp DNA kit (Qiagen) to test for the presence of bifidobacteria. General microbial 16S rDNA and targeted genus specific PCR primers for *Bifidobacteria* were used to amplify specific DNA. Amplified samples and DNA markers were separated by electrophoresis on a 2% agarose gel, stained with ethidium bromide and visualized. Denaturing gradient gel electrophoresis of PCR-amplified 16S rRNA gene segments was used to profile microbial populations in rumen fluid. Pooled serum samples collected from goats on SL or non-treated animals were used to determine total protein using the BCA assay. Blood collected in PAX gene tubes was used to isolate RNA. The concentration and purity of RNA were determined using a Nanodrop spectrophotometer. Quantitative real time PCR was used to evaluate expression of cytokine (TNF, IL8, INF and IL-10) and receptor (CD14, TLR 2, TLR4) genes. Data was analyzed by GLM of SAS 9.2. Variations were observed in microbial DGGE profiles indicating an impact of diet. Six animals out of the seven in the control group 0% SL showed *Bifidobacteria* genus specific band of 523 bp. Rumen samples from treated animals did not show any specific bands. SL decreased transcription of all cytokine genes (18% TNF, 24%IL8, 37%INF and 53%IL-10) and increased transcription of receptor genes (12%CD14, 21%TLR2, 6%TLR4). These differential effects of SL on goat innate immunity and rumen microbial diversity need further evaluation to maximize the benefits of feeding SL to goats.

Key Words: diet, sericea lespedeza, immunity

T147 Influence of probiotics on innate immune response in goats. K. Gyenai*[1], M. Worku[1], M. Tajkarimi[2], and S. Ibrahim[1], [1]*North Carolina Agricultural and Technical State University, Greensboro,* [2]*University of North Carolina at Greensboro, Greensboro.*

Immunostimulants can induce nonspecific resistance against parasites. The use of probiotics to control development of animal gastrointestinal parasites could help reduce the risks of infestation or complement anti-parasite treatments. In this study, we investigated the effects of probiotic administration on gastrointestinal parasites coccidia, *Haemonchus contortus* epg and markers of infection. Three month-old male Spanish Boer kid-goats (n=6) were used. A cocktail of probiotic mix including *Bifidobacterium longum* and *Bifidobacterium breve, Lactobacillus acidophilus, Lactobacillus reuteri* and *Lactobacillus rhamnosus* were used. Treatment animals were drenched daily with 10 CUF/ml of probiotic once a day, a control group age matched received sterile water for a 4 week period. Body weight, fecal egg count, FAMACHA scores, packed cell volume (PCV), and white blood cell differential count (WBCDC) was determined once a week, for a 4-wk period. Denaturing gradient gel electrophoresis (DGGE) was used to monitor fecal bacteria using bacteria 16S rDNA primers. Pro-inflammatory cytokines, prostaglandin (PGE) and immunoglobulin E levels in serum were evaluated using commercial ELISAs. Analysis of variance and GLM was used to evaluate differences between probiotic drenched and control. Results showed no significant difference in PCV, body weight, WBCDC, FAMACHA score, PGE and IgE levels between probiotic drenched and control. However, epg were increased significantly ($P < 0.05$) for probiotic drenched 100, 90 and 120% at wk 2, 3 and 4 for *Haemonchus* and 70% for coccidia at week 3 respectively. An increase of 50 to 300% in proinflamatory cytokines was observed for probiotic drenched over control at weeks 2, 3 and 4 with GM-CSF been highest. Results from PCR-DGGE analysis showed increased fecal microbial DNA for probiotic drenched, with no difference in band pattern and staining intensity. Although increase in fecal egg count levels initiated an increase in cytokine levels probiotics had no immunostimulatory effect against coccidia or *Haemonchus*. This study supports the idea that use of probiotics in ruminants may be impacted by lack of microbial retention in the rumen. Further studies on establishment and retention are needed.

Key Words: cytokine, goat, probiotic

T148 Evaluation of the protective effect of pelleted beet pulp as a substitution for ground corn fed to dairy cows during a subacute ruminal acidosis challenge. Y. Guo*, Y. Zou, S. Li, Z. Cao, X. Xu, and Z. Yang, *State Key Laboratory of Animal Nutrition, College of Animal Science and Technology, China Agricultural University, Beijing, China.*

Eight multiparous Holstein dairy cows (568.5±34.7 kg of BW; 164±15 DIM), 4 of them fitted with rumen cannulas, were assigned to the following experimental treatments during 4 successive periods designed: (1) control (W0); (2) TMR containing 10% finely ground wheat (FGW) (W10); (3) TMR containing 20% FGW (W20); and (4) the W20 diet was amended with 10% BP as a replacement for 10% ground corn (BP10). Each period consisted of a 12-d period of adaptation to the diets, followed by 5 d (d 13-17) for sample collection. Average ruminal pH was lower ($P <0.01$) during SARA (W20 treatment) than during the weeks of adaptation (5.94 versus 6.37). The substitution of BP for corn increased the daily mean ruminal pH by 0.11 pH units and the minimum ruminal pH by 0.22 pH units compared with the W20 treatment, and no ruminal pH values <5.6 were found during the BP10 treatment. Ruminal concentrations of total volatile fatty acid, propionate, butyrate, valerate, and isovalerate increased ($P < 0.01$) with the W20 treatment compared with the W0 and W10 treatments. The cows fed the BP10 diet had a higher ($P < 0.01$) molar percentage of acetate and a lower ($P < 0.01$) molar percentage of butyrate compared with the W20 treatment. The diets had no effect on the DMI and the milk yield, but the milk fat percentage, yield, and 3.5% FCM were reduced ($P < 0.01$) in the W20 and BP10 treatments. The cows fed the W20 diet had greater ($P < 0.05$) milk concentrations (g/100 g of FA) of C11:0, C13:0, C15:0, C14:1, C16:1, C17:1, C18:2n6c, C20:3n6, and lower ($P < 0.05$) concentrations of C18:0 compared with cows receiving the W0 diet. These results indicate that an increase in the concentration of odd-chain FA in milk could be a good candidate for the diagnosis of SARA and that the substitution of pelleted BP for ground corn could regulate rumen fermentation patterns and lower the risk of SARA.

Key Words: beet pulp, dairy cow, subacute ruminal acidosis

T149 Milk components predicted by mid-infrared spectrometry as indicators of the udder health status of the dairy cow. C. Bastin*, A. Lainé, and N. Gengler, *University of Liège, Gembloux Agro-Bio Tech, Animal Science Unit, Gembloux, Belgium.*

Mastitis affects milk composition. Hence, early detection of mastitis could be based on indicators present in milk. The objective of

this research was therefore to investigate components predicted by mid-infrared (MIR) analysis of milk as early indicators of the udder health status of the dairy cow. First, mastitis data collected in 26 herds from the Walloon Region of Belgium were merged with test-day data including milk composition data collected as a part of milk recording. Out of 762 mastitis events, 243 were associated with records from a test-day occurring before the infection (from 30 to 50 days before the event) and with records from a test-day occurring during the infection (from 10 days before to 10 days after the event). Milk components investigated were somatic cell score (SCS), somatic cell count (SCC), titratable acidity recorded as Dornic degree and the content in milk of fat, protein, urea, lactose, lactoferrin, minerals (Na, Ca, P, Mg, K), and 17 individual and groups of fatty acids. Paired t tests were performed on the dataset and showed significant differences before and during mastitis for SCC, SCS, titratable acidity and contents in milk of protein, lactoferrin, K, and lactose. While SCC, SCS, lactoferrin and protein increased during the infection, titratable acidity, K, and lactose decreased. These changes could be related to disease-combating response of the cow, reduced secretory activity and alteration of blood-milk barrier. This preliminary research substantiated the opportunity of using MIR-predicted milk components as mastitis indicators. Future research needs to be conducted on larger dataset and will further investigate the changes in milk composition before, during, and after mastitis. Also, differences in milk composition between cows that have experienced mastitis at least once during the lactation and healthy cows will be examined.

Key Words: mid infrared, mastitis, milk

T150 Gliotoxin occurrence in pre- and postfermented corn, sorghum and wet brewer's grains silage in Sao Paulo, Brazil. L. A. M. Keller*[1,2], M. Aronovich[3], L. R. Cavaglieri[4], and C. A. R. Rosa[1,2], *[1]University Federal Rural of Rio de Janeiro (UFRRJ), Seropédica, RJ, Brazil, [2]Conselho Nacional de Pesquisas Científicas (CNPq), Belo Horizonte, MG, Brazil, [3]Agricultural Development Company of the Rio de Janeiro State (PESAGRO), Niteroi, RJ, Brazil, [4]Universidad Nacional de Río Cuarto (UNRC), Rio Cuarto, Cordoba, Argentina.*

Silage is an important feed source for beef cattle in Brazil is a widespread practice to preserve forages. Poor storage conditions can lead to mold contamination and mycotoxin production. The aim of this study was to determine total fungal counts and the relative density of *A. fumigatus* in silage samples intended for bovines before and after fermentation in farms located in São Paulo State, Brazil, to monitor the natural occurrence of gliotoxin in silage samples (pre- and post-fermentation) and to evaluated the ability of strains of *A. fumigatus* to produce gliotoxin. A total of 300 samples were taken, immediately after opening of the silos (3-5 months) and during the ensiling period of years 2009 to 2012. Fungal counts were done by surface-spread method and the toxigenic ability of isolates strains was evaluated *in vitro* condition. Gliotoxin natural contamination was determined both by TLC and HPLC. All post fermented samples had total number of moulds that exceeded 1×10^4 cfu g^{-1} and *Aspergillus* sp. was the most prevalent genus in all materials evaluated (Table 1). Toxigenic *A. fumigatus* strains isolated produced more than one mycotoxin as shown by TLC. More than 50% of the samples showed contamination with gliotoxin with concentrations that exceeded the levels that are known to induce immunosuppressive and apoptotic effects in cells (level range 0.1 to 32 μg g^{-1}). The present data suggest that care should be taken because gliotoxin and the fungal levels contamination of in feedstuffs. Can could affecting productivity and present a health risk for the herd.

Table 1. Isolation frequency of *Aspergillus* spp. (%) and relative density of *Aspergillus fumigatus* (%)

		Aspergillus spp.		*A. fumigatus*	
Sample	Silage	No. of strains/total	Isolation (%)	No. of strains/total	Relative density (%)
Corn	Prefermented	52/136	38	18/55	32
	Postfermented	203/354	57	69/209	33
Sorghum	Prefermented	18/44	41	12/47	26
	Postfermented	42/84	50	19/44	43
Wet brewer grains	Prefermented	6/22	27	2/7	29
	Postfermented	12/40	30	5/19	26

Key Words: *Aspergillus fumigatus*, mycotoxin production, fungi

T151 Evaluation of β-hydroxybutyrate blood concentration in early lactation in a grazing Jersey herd and its effect on milk yield and reproduction. A. Saborio-Montero* and J. M. Sanchez, *University of Costa Rica, Animal Nutrition Research Center, San Jose, Costa Rica.*

The aim of this study was to analyze blood BHBA concentration in a commercial grazing Jersey herd in Costa Rica (9°55' N, 83°51' W, 2350 m of altitude), measured in 117 cows (24% primiparous, 76% multiparous) at 8±3 and 30±3 days in milk (DIM), to determine its relationship with actual milk yield, milk yield at 305d, open period length, services (AI) per conception and calving interval. The study was carried out from September, 2010 to August, 2012. The close-up period diet was based on grazing 30d regrowth kikuyu grass (*Kikuyuocloa clandestina*) and 4 kg of grain mixture (14% CP, 1.7 Mcal of NEL/kg, 35% starch, 0.2% Ca) per cow daily. The fresh period diet consisted of the same pasture and 4 to 6 kg of a concentrate mixture (20% CP, 1.9 Mcal NEL/kg, 48% starch, 1% Ca). Blood samples were taken from the coccygeal vessels of 117 and 114 cows at 8 ± 3 and 30 ± 3 DIM, respectively. Each sample was analyzed in situ for BHBA concentration using an electrochemical cowside test (Abbott Diabetes Care). Milk yield and reproductive data was registered weekly. Statistical significance was declared at $p<0.05$. BHBA concentration in multiparous cows at 8 ± 3 DIM (0.71 mmol/L) differed ($P < 0.01$) from those at 30 ± 3 DIM (1.03 mmol/L). BHBA concentration at 8 ± 3 DIM in primiparous cows was correlated to open period length (0.554, $P < 0.01$) and services per conception (0.486, $P < 0.05$). A lineal regression ($R^2 = 0.31$, $P < 0.05$) indicated that the open period length with a blood BHBA concentration of zero would be 57 days, and for each 0.1 units of increment in blood BHBA , the open period increases 10.2 days. Another lineal regression ($R^2 = 0.24$, $P < 0.05$) showed that the number of services per conception with a blood BHBA concentration of zero would be on average 1.24 and for each unit of increment in blood BHBA , 2.28 services per conception would be necessary in primiparous cows. No other traits were associated with blood BHBA concentration. Data suggest that elevated blood BHBA concentration at 8 ± 3 DIM may be an early indicator of future reproductive problems in primiparous grazing dairy cows.

Key Words: β-hydroxybutyrate, grazing cows, ketosis

T152 Evaluation of the accuracy of an electronic beta-hydroxybutyrate meter using fresh and stored whole blood and serum from dairy cows. J. L. Gordon*, S. J. LeBlanc, and T. F. Duffield, *University of Guelph, Guelph, Ontario, Canada.*

The purpose of this study was to determine the accuracy of an electronic handheld BHBA meter (Precision Xtra (PX); Abbott) under various

conditions. This meter was previously validated for measurement of BHBA in whole blood in cattle at time of collection, but it is unclear how this device will perform using stored whole blood or serum. Blood was collected into tubes without additive (NA, red top), with EDTA (purple top), or sodium heparin (NaHep, green top) from the same cows at the same time. All BHBA measurements were performed using one meter, test strips from one lot, and by one individual. Blood from all tubes was tested immediately for BHBA at the time of collection. EDTA and NaHep tubes were placed in a refrigerator (4°C) and tested 1 and 7 days after collection. Serum harvested from NA tubes was tested using the PX and submitted to a diagnostic lab to measure BHBA via colorimetric enzymatic reaction (gold standard). Subclinical ketosis (SCK) was defined as BHBA $\geq$1.2 mmol/L. In 98 samples collected from 80 cows, there was near perfect agreement among measurements taken from all 3 tube types at the time of collection ($R^2 = 0.99$, $P < 0.0001$). The correlation was high between the lab serum BHBA and fresh whole blood meter BHBA at time of collection ($R^2 = 0.98$, $P < 0.0001$) and within tubes tested over time compared to the time of collection of the same tube (EDTA: day+1 $R^2 = 0.97$, $P < 0.0001$, day+7 $R^2 = 0.82$, $P = 0.0003$; NaHep: day+1 $R^2 = 0.97$, $P < 0.0001$, day+7 $R^2 = 0.84$, $P = 0.0002$). The correlation between serum tested on the PX and in the lab was high ($R^2 = 0.98$, $P < 0.0001$). Using a threshold of 1.2 mmol/L, the sensitivity of SCK diagnosis using the PX to measure whole blood at the time of collection, whole blood on day+1 and serum was 93%, 100%, and 100% and the specificity was 96%, 86%, and 74% respectively. This suggests that the PX can be used to accurately measure BHBA in whole blood with various additives, even after storage. The PX is also an accurate tool for diagnosis of SCK in whole blood, but lacks specificity for SCK diagnosis in serum.

Key Words: Precision Xtra, β-hydroxybutyrate, ketosis

T153 Application of sodium chlorate to reduce coliform bacteria in rumen and feces of sheep: 1. Effects on ruminal and fecal coliforms. C. Arzola*[1], R. Copado[1], F. Rodriguez[1], C. Rodriguez-Muela[1], J. Salinas[2], A. Corral[1], O. Ruiz[1], and H. Gaytan[1], *[1]Universidad Autonoma de Chihuahua, Chihuahua, Chih., Mexico, [2]Universidad Autonoma de Tamaulipas, Cd. Victoria, Tamaulipas, Mexico.*

The use of chlorate is being investigated as a non-antibiotic alternative to control certain pathogenic bacteria capable of reducing chlorate to the autocytotoxic compound chlorite, but the lowest effective dose has not yet been clearly established. The objective of this study was to evaluate the efficacy of sodium chlorate administered orally as a regulator of total coliform populations in ewes. A 30% sodium chlorate product or a sodium chloride placebo was administered to twelve lactating Dorper × Blackbelly or Pelibuey crossbred ewes averaging 65 kg body weight. The ewes were acclimated to a balanced diet formulated to meet NRC requirements for production. Ewes were randomly assigned (4/treatment) to each of three treatments administered twice daily by oral gavage for 5 consecutive days: a control (Group 1) consisting of 3 g NaCl/animal/d, a 1× treatment (Group 2) consisting of 0.9 g of $NaClO_3$/animal/d, and a 3× treatment (Group 3) consisting of 2.7 g $NaClO_3$/animal/d; the latter was intended to approximate a lowest known effective dose. Ruminal samples collected by stomach tube and freshly voided fecal samples were collected daily beginning 3 days before treatment initiation and for 6 days thereafter. Contents were cultured quantitatively to enumerate total coliforms. There were no significant differences in colony forming units per gram (cfu) in the feces between treatment groups ($P = 0.832$). There were differences ($P < 0.02$) in ruminal cfu per gram between groups (4.1, 4.3 and 5.0 log10/g contents in Groups 1, 2 and 3, respectively) which tended to increase in cfu from the beginning until the 5th day of treatment ($P < 0.05$). Overall, we did not obtain the expected results with oral administration of $NaClO_3$ with the applied doses. By comparing the trends in coliform populations in the rumen contents in all treatments, there was an increase over the days. The opposite trend occurred in the feces, due mainly to differences among rumen contents and feces in Group 3 treated ewes ($P = 0.06$), suggesting that low chlorate doses used here were suboptimal for the control of coliforms in the posterior gastrointestinal tract.

Key Words: *E. coli*, coliforms, chlorate

T154 Sodium chlorate to reduce the carriage of coliforms in rumen and feces of sheep: 2. Effects on ruminal and fecal bacterial diversity. R. Copado*[1], C. Arzola[1], S. V. R. Epps[2], F. Rodriguez[1], C. Rodriguez-Muela[1], J. Salinas[3], A. Corral[1], O. Ruiz[1], and H. Gaytan[1], *[1]Universidad Autonoma de Chihuahua, Chihuahua, Chih., Mexico, [2]Department of Veterinary Integrative Bioscience, Texas A&M University, College Station, TX, USA., [3]Universidad Autonoma de Tamaulipas, Cd. Victoria, Tamaulipas, Mexico.*

Sodium chlorate is being investigated as a potential intervention to reduce the carriage of certain pathogenic bacteria in food-producing animals, but the minimal effective dose has not yet been clearly established. In this study, the effect of low potentially suboptimal oral chlorate administration to ewes was assessed by comparing the diversity of prominent bacterial populations in their gastrointestinal tract. Twelve lactating Dorper × Blackbelly × Pelibuey crossbred ewes averaging 65 kg body weight were acclimated to a balanced diet formulated to meet NRC production requirements. Ewes were randomly assigned (4/treatment) to receive a control (Group 1) treatment consisting of 3 g NaCl/animal/d, or either of two chlorate treatments (Group 2) or (Group 3) consisting of 0.9 g or 2.7 g $NaClO_3$/animal/d, respectively. Treatments were administered twice daily in equal amounts via oral gavage for 5 consecutive days. Ruminal and fecal samples were collected daily beginning 3 days before and ending 6 days after initiation of treatments and were subjected to denaturing gradient gel electrophoresis of the 16s rRNA gene sequence amplified from total population DNA. For populations of ruminal microbes, between group similarity coefficients varied from 23.0 to 67.5% and from 39.4 to 43.3% during pre-treatment and treatment periods, respectively. During the treatment period, within group similarity varied across days, ranging from 39.4 to 90.3%, 43.3 to 86.7% and 67.5 to 92.4% for Groups 1, 2 and 3, respectively. For fecal microbes, between group similarity coefficients varied from 38.0 to 85.2% and 38.0 to 94.2% during pre-treatment and treatment periods, respectively. Within group similarity coefficients for fecal populations during treatment were most varied for Group 1 (38.0 to 67.9%), intermediate for Group 3 (75.6 to 92.0%) and least varied for Group 2 (80.6 to 90.6%). We concluded, however, that the observed heterogeneity within and between groups before and after treatment provided little if any evidence of an effect of chlorate treatment on prominent ruminal or fecal microbial populations.

Key Words: coliform bacteria, DGGE, chlorate

T155 Effects of spray-dried whole colostrum and spray-dried plasma on veal calf health and performance. D. Wood*, R. Blome, and J. Sowinski, *Animix, Juneau, WI.*

Study objective was to evaluate effect on veal calf health and performance from supplementing whole spray-dried colostrum (SDC) and spray-dried plasma (SDP). Auction-sourced Holstein bull calves (n=120; app.1 wk of age) were randomly placed in individual, raised,

slatted stalls. Treatment pairs were equally placed within each row, i.e. calves in stalls 1 and 2 were fed supplemental SDP/dry fat blend, calves in stalls 3 and 4 were supplemented SDC, and calves in stalls 5 and 6 were supplemented WPC/dry fat blend (control). Each respective supplement contained 50% CP 20% fat. SDC contained min. 18% and SDP est. 11% IgG. Serum total protein averaged 4.68 g/dL (83% <5.5 g/dL) and there was no difference between groups. Calves were fed liquid milk replacer (all-milk, 17% CP 19% fat) and supplemented 50 gram (g)/feeding (2X/day) of respective supplement for weeks 1 to 6, then 40 g/feeding week 7, 20 g weeks 8 to 9, 10 g week 10 and 5 g weeks 11 to 12. Calves were harvested 19.9 weeks. Accounting for total solids intake, calves started on 26:20 (CP:Fat), increased to 1,330 g/day (d) of 20:19 by 28d and 1,871 g/d 18:19 by 56d. Milk replacer was medicated to 56d. Calves received no dry feed. Incidence of morbidity during the combined room-filling period (4 d) and the first week the barn was full, was lower in SDC (17%, $P < 0.028$) and SDP (19.5%, $P < 0.054$) vs. control (42%). During week 7 when feeding rate was reduced, incidence of morbidity was greater for SDC vs. control ($P < 0.048$). Average individual calf treatment costs were $4.26, $8.91 and $9.78/calf for SDP, SDC and control respectively. SDP tended ($P < 0.10$) to reduce medical treatment costs verses control. Data was analyzed using F-test for variances and student t-test comparing two means. Mortality/culls were 4.8% each for both SDP and SDC and 13.2% for control. In conclusion, SDC and SDP reduced morbidity during typical stressful first weeks of life in low-colostrum status, co-mingled auction-sourced calves treated prophylactically with antibiotics. Some difficulty was noted in weaning calves off SDC. No differences in ADG were noted.

Key Words: calf, colostrum, plasma

T156 Growth and health costs used to evaluate OmniGen-AF feeding strategies in Jersey heifer calves reared on a commercial dairy. A. E. Holland*[1], J. D. Chapman[1], L. O. Ely[2], and Y. Q. Wang[3], *[1]Prince Agri Products Inc., Quincy, IL, [2]University of Georgia, Athens, [3]OmniGen Research LLC, Corvallis, OR.*

The objectives were to determine growth, treatment costs and immune parameters in Jersey heifer calves fed diets supplemented with OmniGen-AF (OG) from birth to weaning or to 160 d of age. Newborn calves were randomly assigned to three groups: G1 controls (n = 50) no OG fed d 1 to 160 either in the milk replacer or pasteurized milk (MR) or starter feed (SF) or heifer TMR, G2 (n = 53) OG fed d 1 to 90 via MR (10 g/h/d) and SF (2 g/lb. of feed) only, G3 (n = 53) OG fed d 1 to 160 via MR, SF, and TMR (3 g/lb. DM). Each calf was housed in a hutch and body weights (BW), hip heights (HH), body condition scores (BCS), and blood were taken on d 1, 50, 90, and 160. Blood samples were analyzed for neutrophil L-selectin (NLS) and interleukin 8 receptor (IL8) mRNA using quantitative RT-PCR. Medications used and costs/treatment were recorded on each calf. Differences were tested using PROC GLM (SAS). Birth weights and HH of G1 (26.1 kg, 71.6 cm), G2 (26.3 kg, 71.1 cm) and G3 (25.6 kg, 70.9 cm) at start were not different. Average daily gain (ADG) for G1 (0.2 kg) from d 5 to 50 differed ($P < 0.05$) from G2 (0.30 kg) and G3 (0.30 kg). ADG were not different between groups at d 90 or 160. BW between groups at d 60 was not different. HH gains in G2 (25.7cm) and G3 (26.0cm) calves were greater ($P < 0.05$) than G1 (24.1 cm) at d 160. BCS at d 50 and 90 were not different between groups; however at d 160, G1 (3.04) and G2 (3.07) were different ($P < 0.05$) from G3 (2.92). Treatments differed between groups ($P < 0.05$), with G1 calves treated 2.3× more often than G2 and 4.7× more often than G3. Total medication costs/treated calf for G1 ($9.80) differed ($P < 0.05$) from G2 ($8.53) and G3 ($7.25). NLS levels were similar for all groups to d 50; however G2 and G3 at d 90 had NLS levels 2.5 times greater than G1. G3 NLS levels were 2 to 4 times greater than G1 and G2 at d 160. IL8 levels differed ($P < 0.05$) between groups at d 1, 90, and 160. Results from this study demonstrated that supplementing OG to pre- and postweaned calves improved growth and health resulting in reduced medication costs.

Key Words: calves, health, OmniGen-AF

T157 Ex vivo and in vitro effects of *Lactobacillus rhamnosus* in the control of gastrointestinal infections in calves. F. Fàbregas*[1], S. Genís[1], A. Bach[1,2], and A. Arís[1], *[1]Department of Ruminant Production-IRTA, Caldes de Montbui, Spain, [2]ICREA, Barcelona, Spain.*

The objective of this study was to assess the potential of *L. rhamnosus* to modulate the inflammatory response against gastrointestinal infections and its protective effect on intestinal cells. Jejunal bovine Peyer patches explants of 1 cm^2 were obtained from a 2-mo calf immediately after sacrifice. Tissue fragments were ex vivo cultured in 6-well plates with Krebs media. Explants were treated with 2×10^9 cfu/well of *L. rhamnosus* or control media (n = 6) for 1 h and infected for additional 8 h with 10^7 cfu/well of *Escherichia coli* EPEC at 37ºC at 5% CO_2. Supernatant and tissue samples were taken to analyze cytokines involved in inflammatory response by qRT-PCR and ELISA. To assess the effect of *L. rhamnosus* on the integrity of intestinal cells, a primary culture of jejunal epithelial cells was established and seeded at 5×10^4 epithelial cells/well. Primary cells were treated with 1, 2, 5, 10, 25, 50 and 100 MOI of *L. rhamnosus* or control media (n = 6), and incubated during 24h at 37°C at 5% CO_2 to further analyze the cell viability by lactate dehydrogenase assay (LDH). Data were analyzed using ANOVA. The EPEC infection caused an inflammatory response by increasing ($P < 0.05$) the levels of pro-inflammatory cytokines IFN-γ, IL-6, IL-1β, and TNF-α, and decreasing ($P < 0.05$) the levels of anti-inflammatory cytokines TGF-β and IL-10. *Lactobacillus rhamnosus* down-regulated the basal tissue inflammation level and the inflammatory response against EPEC by decreasing ($P < 0.05$) the levels of pro-inflammatory cytokines IFN-γ, IL-6, IL-1β, TNF-α, whereas the anti-inflammatory cytokines were unaffected. The LDH levels were less ($P < 0.05$) in *L. rhamnosus*-treated cultures at MOI = 25 (0.55 ± 0.10 mU/mL), MOI = 50 (0.75 ± 0.12 mU/mL), and MOI = 100 (0.58 ± 0.06 mU/mL) than in control cultures (24.72 ± 3.21 mU/mL). In conclusion, *L. rhamnosus* has a positive effect on ex vivo and in vitro bovine intestinal cultures, regulating not only the inflammatory response triggered by an infection, but also modulating the basal inflammatory response and enhancing cell viability.

Key Words: *Lactobacillus rhamnosus*, immunity, intestinal infection

T158 Application of intravaginal lactic acid bacteria improved reproductive performance of Holstein dairy cows. Q. Deng[1], J. F. Odhiambo[2], U. Farooq[1], T. Lam[1], S. Sharma[1], S. M. Dunn[1], Y. Wang[1], M. Gänzle[1], and B. N. Ametaj*[1], *[1]Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada, [2]Department of Animal Science, University of Wyoming, Laramie.*

The objective of this investigation was to test whether intravaginal infusion of lactic acid bacteria (LAB) around calving can improve reproductive performance in periparturient dairy cows. One hundred pregnant Holstein dairy cows were assigned (based on parity, body condition score, and milk yield) to 3 treatment groups at 2 wk before the expected day of parturition as follows: (1) 1 mL of LAB infused intravaginally on wk -2 and -1, and 1 mL of carrier (i.e., sterile skim milk) on wk +1 relative to the expected day of parturition (TRT1);(2) 1 mL of LAB

infused intravaginally on wk −2, −1, and +1 (TRT2); and (3) 1 mL carrier infused intravaginally on wk −2, −1, and +1 (CTR). Lactic acid bacteria were a mixture of *Lactobacillus sakei* FUA3089, *Pediococcus acidilactici* FUA3138, and *Pediococcus acidilactici* FUA3140 frozen in sterile skim milk with a cell count of 10^8 to 10^9 cfu. Insemination and pregnancy diagnosis records were analyzed retrospectively for all the cows enrolled in this experiment for 12 consecutive months. Data were analyzed with GLIMMIX procedure of SAS. Results showed that cows in the TRT1 had higher (46.9 ± 8.8% vs. 38.2 ± 8.3%, $P = 0.48$), while cows in the TRT2 had lower (28.0 ± 9.0% vs. 38.2 ± 8.3%, $P = 0.42$) first service conception rate than those in the CTR. Cumulative pregnancy rates up to five services were 84.4 ± 6.4%, 72.0 ± 9.0% and 76.5 ± 7.3% in TRT1, TRT2 and CTR, respectively ($P = 0.61$). Cows in TRT1 and CTR required less than 2, while those in the TRT2 required more than 2 services per conception. Consequently, cows in the TRT1 had shorter days open than those in the CTR (82.7 ± 8.0 vs. 109.7 ± 8.1 d, $P < 0.01$), but cows in the TRT2 had longer days open than those in the CTR (137.4 ± 8.4 vs. 109.7 ± 8.1 d, $P < 0.01$). In conclusion, the LAB treatment had distinct effects on reproductive performance. Cows benefited from 2 prepartum doses of LAB (TRT1) for shorter days open. However, the additional postpartum dose (TRT2) did not confer any benefit. The reason for this discrepancy is not clear at present and deserves further inquiry.

Key Words: dairy cow, lactic acid bacteria, reproductive performance

T159 Application of intravaginal lactic acid bacteria modified prostaglandin production of periparturient Holstein dairy cows. Q. Deng[1], J. F. Odhiambo[2], U. Farooq[1], T. Lam[1], S. Sharma[1], S. M. Dunn[1], Y. Wang[1], M. Gänzle[1], and B. N. Ametaj*[1], *[1]Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada, [2]Department of Animal Science, University of Wyoming, Laramie.*

The objective of this study was to test whether intravaginal infusion of lactic acid bacteria (LAB) around calving could modify prostaglandin production in periparturient dairy cows. One hundred pregnant Holstein dairy cows were assigned randomly (based on parity, body condition score, and milk yield) to 3 groups at 2 wk before the expected day of parturition as follows: (1) 1 mL of LAB infused intravaginally on wk -2 and -1, and 1 mL of carrier (i.e., sterile skim milk) on wk +1 relative to the expected day of parturition (TRT1); (2) 1 mL of LAB infused intravaginally on wk −2, −1, and +1 (TRT2); and (3) 1 mL carrier infused intravaginally on wk −2, −1, and +1 (CTR). Lactic acid bacteria were a mixture of *Lactobacillus sakei* FUA3089, *Pediococcus acidilactici* FUA3138 and FUA3140 with a cell count of 10^8 to 10^9 cfu. Blood samples from 10 cows in each group were used to quantify the concentrations of 15-keto-13,14-dihydro-$PGF_{2\alpha}$ (PGFM) and PGE_2 with enzyme immunoassay kits. Data were analyzed with MIXED procedure of SAS. Results showed that LAB treatment elevated serum PGFM relative to CTR, which were 1346.08 ± 172.21, 1600.02 ± 192.68, and 980.86 ± 220.37 pg/mL in TRT1, TRT2 and CTR, respectively ($P = 0.08$). Overall PGFM increased sharply from wk −1, peaked at parturition and dropped to the prepartum level by wk +2 ($P < 0.01$). Concentrations of serum PGE_2 were 384.97 ± 56.80 pg/mL in TRT1, 687.69 ± 65.21 pg/mL in TRT2 and 471.29 ± 58.52 pg/mL in CTR ($P < 0.01$). Serum PGE_2 dropped at parturition and wk +1, and then increased at wk +2 and +3 ($P < 0.01$). No significant difference was detected among groups regarding the ratio PGFM/PGE_2, but it increased sharply at parturition, and then decreased to a basal level by wk +2 ($P < 0.01$). In conclusion, cows in TRT2 had highest concentrations of both PGFM and PGE_2, while TRT1 had intermediate PGFM and lowest PGE_2, translating into higher PGFM/PGE_2 ratio in TRT1 and intermediate ratio in TRT2 relative to CTR. These findings suggest that postpartum infusion of LAB exerted a distinct effect on prostaglandin production from the prepartum infusion.

Key Words: dairy cow, lactic acid bacteria, prostaglandin

T160 The effect of late pregnancy supplementation of ewes with trace mineral on ewe hematology and lamb vigor. M. Mallaki*, M. A. Norouzian, A. A. Khadem, and M. M. Bardzardi, *The University of Tehran, Tehran, Iran.*

The present study was conducted to evaluate the effect of parenteral supplementation of cobalt, copper and iron in late pregnancy on ewe hematology parameters and lamb vigor. Twenty ewes were allocated to one of two groups (n = 10). In the test group, on d 120 of pregnancy, cobalt, copper and iron were injected at a dose of 0.1 mL/kg BW (Fercobsang, France, cobalt gluconate 5 mg/100 mL, copper gluconate 0.5 mg/100 mL and ferrous citrate 1000 mg/100 mL). Ewes in control group received equal amounts of normal saline as placebo. Blood samples were taken from the jugular vein at the beginning of the study (day 0, 40 ± 5 pre-partum, before injection of trace elements, and saline) and at 24 and 72h postpartum. Group had no significant effect on ewe hematological parameters ($P > 0.05$). There were no significant effects of parenteral mineral supplementation on lamb birth weight, rectal temperature and weaning weight after birth. Lamb viabilities are reported as scores as these gave a true representation of the effects of treatment on underlying measurements. However, there were no differences between groups in lamb vigor and sucking assistance score. It seems that using of additional trace elements in late pregnancy could be effective in deficiency situations.

Key Words: ewe hematology parameter, lamb viability, trace element

T161 From animal breeding to bio-medical research: Day-blind sheep as an animal model for restoration of visual function using gene therapy. E. Gootwine*[1], R. Ofri[2], E. Averbukh[3], H. Honig[1], A. Rosov[1], R. Ezra-Elia[2], A. Obolensky[3], E. Yamin[3], W. W. Hauswirth[4], and E. Banin[3], *[1]Institute of Animal Science, the Volcani Center, Bet Dagan, Israel, [2]Koret School of Veterinary Medicine, Hebrew University of Jerusalem, Jerusalem, Israel, [3]Hadassah Hebrew University of Jerusalem Medical Center, Jerusalem, Israel, [4]University of Florida, Gainesville.*

We reported on novel hereditary recessive day-blindness in sheep caused by a mutation in the *CNGA3* gene (Genomics 95:101–104, 2010). Mutations in this gene can also cause achromatopsia in humans. Culling carrier rams eliminated the birth of affected lambs in a commercial sheep flock. Following establishment of a day-blind sheep population, different types of adeno-associated viral (AAV) vectors carrying the intact human or mouse *CNGA3* gene under the control of a red-green Opsin promoter were delivered unilaterally into the subretinal or vitreal space of affected sheep. Animals were electrophysiologically and behaviorally assessed preoperatively and up to 12 months after treatment. Cone function was measured by electroretinography (ERG) following light adaptation (10 min, 30 cd/m^2). Responses to flash and flicker (10 to 80 Hz) stimuli were recorded at 4 intensities (1 to 10 cd × s/m^2). Behavioral assessment included scotopic (night time) and photopic (day time) maze testing, where passage times and number of fence collisions were recorded. Age-matched normal and non-treated day-blind sheep were similarly assessed as controls. Cone function was significantly depressed in affected sheep prior to surgery. Following surgery, there was significant improvement in eyes treated by either the human or the mouse *CNGA3* gene. Behaviorally, there were no differences between day-blind and normal controls in scotopic testing. While untreated affected animals failed to navigate the maze under photopic conditions, the ability of the day-blind treated sheep to navigate the

photopic maze improved dramatically, approaching that of normal controls. The electrophysiological and behavioral improvement in operated sheep persisted for at least 1 year post-op without affecting animals' health. The long-term electrophysiological and behavioral improvement in this naturally-occurring large animal model following gene therapy may pave the way to application of a similar treatment in human achromatopsia patients.

Key Words: sheep, achromatopsia, gene therapy

T162 OmniGen-AF supplementation improves leukocyte responses and hematology of multiparous peripartum cows. C. R. Nightingale*[1], M. D. Sellers[1], A. R. Pepper-Yowell[1], J. D. Chapman[2], D. L. O'Connor[2], and M. A. Ballou[1], *[1]Texas Tech University, Lubbock, [2]Prince Agri Products Inc., Quincy, IL.*

Objectives of the current study were to determine if supplementing OmniGen-AF (Prince Agri Products Inc.) during the peripartum period improved leukocyte responses and hematology of multiparous dairy cows. Forty-seven multiparous Holstein cows were randomly assigned to two treatments (Control; n = 24, Treatment; n = 23). Treatment cows were supplemented with 2 oz/cow/day of OmniGen-AF from dry-off through 28 d in milk of the subsequent lactation. On d −60 (dry-off), −30, 0, 14, and 28 relative to calving, peripheral blood samples were collected for measurement of hematology and leukocyte responses, which included: neutrophil surface L-selectin (CD62L) protein expression, neutrophil oxidative burst capacity in response to an *Escherichia coli*, plasma haptoglobin concentrations, and whole blood secretion of tumor necrosis factor-α and interferon-γ when co-cultured with lipopolysaccharide and phytohemagglutinin-P, respectively. A linear mixed model was fitted with the effects of treatment, time, and treatment × time, using baseline (−60 d) measurements as a covariate. Baseline measurements were not different between treatments for all variables ($P > 0.22$). Hemoglobin concentrations and hematocrit percentages decreased ($P < 0.01$) on d 14 and were lower among Control cows from d −30 to 28 (10.5 vs. 10.9 ± 0.12 g/dL and 33.5 vs. 34.3 ± 0.31%, for hemoglobin and hematocrit, respectively; $P < 0.01$). Neutrophil L-selectin protein concentrations were greater in Treatment cows on d 0 (769 vs. 431 ± 84.6 GMFI; $P < 0.01$). In contrast, neutrophil oxidative burst intensity was elevated among Control cows on d 0 (373 vs. 259 ± 28.1 GMFI; $P < 0.01$). Plasma haptoglobin concentrations were also elevated among Control cows on d 14 (1.6 vs. 1.2 ± 0.09 optical density; $P < 0.01$). These data indicate that supplementing OmniGen-AF attenuates the peripartum suppression of neutrophil L-selectin, hemoglobin concentrations, and hematocrit percentage. Moreover, treatment cows did not have an elevated neutrophil oxidative burst at parturition or haptoglobin concentrations on d 14, suggesting OmniGen-AF improved health status during this period.

Key Words: immune, OmniGen-AF, peripartum

T163 Water treatment by magnetic field on production and blood gas level in dairy cow. G. B. Neto*[1], N. J. Ramos[1], P. M. Graça[1], J. R. E. Filho[2], M. C. M. Coelho[2], and S. S. Luz[3], *[1]Agencia Paulista de Tecnologia dos Agronegocios, Ribeirão Preto, São Paulo, Brazil, [2]Faculdade de Ciencias Agrarias e Veterinarias da Universidade Estadual Paulista, Jaboticabal, São Paulo, Brazil, [3]Faculdade de Zootecnia e Engenharia de Alimentos da Universidade de São Paulo, Pirassununga, São Paulo, Brazil.*

Data suggest that the properties of magnetically treated water are different from the ones of untreated water. This fact is usually attributed to the weaknesses in or breaking of intermolecular interactions (hydrogen bonds) and nucleation processes (effect of impurity, frequency and growth of nuclei). Water treatment by magnetic field is an attractive but still controversial issue as might apply to animal production. The purpose of the present study was to investigate the effects of water treatment by magnetic field on milk production and blood gas and ionic character. The treatment of water was performed using a commercial magnetic conditioner (Sylocimol) designed to generate a strong magnetic monopole field. These devices were inserted into the water troughs (500 L); the strength of the static magnetic field was 32,400 Gauss. A completely randomized design was used. Twenty-six Jersey cows were allotted into two groups: control (C; n=13) and group consuming magnetic water (MW; n = 13) for 75 days to compare the milk production and blood gas level and Na ion concentration ([Na]). Blood samples were collected by caudal auricular artery using a blood sampling kit for blood gas analysis (3 ml ventilated syringes with 23 G 1 in needle, containing freeze-dried lithium heparin). All the samples were immediately analyzed in a calibrated blood gas analyzer set at the body temperature of cows. No significant difference was found on daily milk yield. However, higher pH and lower pCO2 levels were found in arterial blood of MW compared to C. Lower [Na] and [Cl] were associated with lower osmolality in MW compared to C. The test results suggested that animals consuming water conditioned by magnetic field technology have blood characteristics different from those consuming unconditioned water.

Table 1. Magnetic treatment of water on milk production and blood gas and ion content

	Control	Test	CV	MSE	Pr > F
Daily milk yield (kg/cow)	10.30	11,.40	21.14	2.309	0.357
Osmolality (mOsm/kg)	280.1[a]	273.3[b]	1.45	4.03	0.0007
pHt	7.41[b]	7.45[a]	0.28	0.02	0.0004
pO_{2t} (mmHg)	101.48	110.43	18.72	19.83	0.326
pCO_{2t} (mmHg)	42.47[a]	37.97[b]	7.58	3.05	0.002
Na (mmol/L)	141.10[a]	136.97[b]	1.55	2.16	0.0002
Cl (mmol/L)	101.89	99.25	1.95	1.96	0.0161

[a,b]Means not bearing the same superscript letters within rows are significantly different ($P > 0.05$).

Key Words: bovine, blood gas partial pressure, pH

T164 Evaluation of chlorine stability in a novel teat dip disinfectant system. L. L. Timms*[1], M. Pawlak[2], and C. Durham[2], *[1]Iowa State University, Ames, [2]Zurex Pharmagra, Middleton, WI.*

Objective was to evaluate chlorine stability of a novel germicidal product as well as dilutions developed for pre and post milking teat dipping with different additives. Initial base germicidal compound (ECAlogix System) was designed to have 8000 ppm chlorine. A teat dip cup filled with initial solution was placed in milking parlor and served as base control over time (all trials - never used for dipping). Pre (500 to 1000 ppm) and post (1000 to 2000 ppm) milking teat dips were made, used, and tested (trial 1: 14 days). 1000 ppm and 2000 ppm pre and post dips, respectively from trial 1, were chosen to evaluate different emollient levels (trial 2 – 21 days) and subsequent trial against commercial dip products (trial 3 – 49 days). Additives for prototype pre and post dips for trials 1-3 were PREP and POST, PREP/PRE-POST and POST+ / PRE-POST (different emollient levels), and PREP and POST/POST-Blue, respectively. Pre and post milking teat dips were made in 1 gallon quantities (last ~ 1 week). A single dip cup was used for each dip in each trial. Chlorine concentrations in all products were tested every 2-3 days by drawing directly from teat dippers used in the milking parlor. Samples

were tested in duplicate using a chloride titration kit (10 drops of 50% Potassium iodide; 3 drops of 50% sulfuric acid; 5 drops of 1% starch solution; drops of thiosulfate solution until sample turned colorless). Chlorine levels of pre dips (500 and 1000ppm + PREP), post dips (1000 and 2000 ppm + POST) and stock solution (8000 ppm) were stable and not significantly different within any product across Trial 1. In trial 2, pre (1000 ppm) and post (2000 ppm) dips with additives PREP and POST+, respectively, were stable and not significantly changed (21 d) while dips with PRE-POST additive resulted in significant reductions to 200 ppm chlorine within 24 h post mixing. In trial 3, pre (1000 ppm) and post (2000 ppm) dips with additives PREP and POST (same as trial 1), respectively, were stable and not significantly changed (49 d) while post dips with POSTBlue showed significant reductions to 200 ppm chlorine within 24 h post mixing. This novel technology shows excellent chlorine stability over time and importance of measuring potential effects of different solution additives.

Key Words: chlorine, teat dip, disinfection

T165 Development and evaluation of experimental chlorine technology pre and postmilking teat dips on teat end and teat skin condition and health. L. L. Timms*[1], M. Pawlak[2], and C. Durham[2], *[1]Iowa State University, Ames, [2]Zurex Pharmagra, Middleton, WI.*

Objectives were to evaluate pre and post teat dip formulations using a novel chlorine disinfectant technology (ECAlogix System) and their effect on teat health and integrity. There were 2 trials with 3 pens (10, 11, and 12) in both trials. Trial 1 (2 wk) was designed to evaluate maximal chlorine concentrations; trial 2 (3 wk) assessed emollient levels. Pen 12 (48 cows) had all teats dipped with current herd commercial pre and post dips (hydrogen peroxide pre and lactic acid barrier post- herd sentry pen). Pen 11 (48 cows) was pre-dipped in a half udder design and all teats post dipped with herd commercial product. Trial 1 compared 500 and 1000 ppm chlorine pre-dips. Trial 2 compared 1000 ppm predips with different emollient levels. In trials 1 and 2, Pen 10 (24 cows) was pre-dipped with commercial herd product and post dipped in a half udder design. Trial one compared 1000 and 2000 ppm. Trial 2 compared 2000 ppm postdips with different emollient levels. Teat skin (1 = normal, 2 = slightly dry; 3 = chapped) and teat end (1 to 1.5 = normal; 2 to 3 = smooth ring; 3.5 to 4 = rough ring; 4.5 to 5 very rough ring) scoring was performed twice per week. Mixed procedure of SAS with repeated measured (mixed model with quarter within cow as a repeated measure) were used to analyze average teat skin score (TSS), average teat end scores (TES), and % rough teats, with $P < 0.05$ considered significant. Prior to trial initiation, all pens had similar TSS (1.08; 3 to 16% scoring 2), with pen 10 having slightly lower TES and % rough teats (2; 50%) compared to pens 11 and 12 (2.5; 60%). Trial 1 showed no overall change in TSS, TES, and % rough teat ends for pen 12 (sentry) and 11 (prototype pre dips) with no differences between 500 and 1000 ppm chlorine pre-dips in Pen 11. Pen 10 (prototype post dips) showed significant improvements in TSS (1.01, < 1% score 2), TES (1.7), and % rough teat ends (30%), with no differences between 1000 and 2000 ppm chlorine post dips. Trial 2 showed similar results to trial 1 (improved teat integrity with prototype chlorine post dips) with no additional benefits seen to extra emollient addition to either pre or post chlorine dips. No adverse effects were seen at any chlorine concentration.

Key Words: chlorine, teat dipping

T166 Evaluation of experimental chlorine technology pre and post milking teat dips vs. a commercial hydrogen peroxide pre dip and iodine barrier post milking teat dip on teat end and teat skin condition and health. E. Smith[1], L. L. Timms*[1], M. Pawlak[2], and C. Durham[2], *[1]Iowa State University, Ames, [2]Zurex Pharmagra, Middleton, WI.*

Objectives were to evaluate (using half udder design model) a novel chlorine predip and postdip combination (ECAlogix System) versus a control commercial hydrogen peroxide premilking teat dip and iodine barrier postmilking teat dip on overall teat end and teat skin condition and health. There were 3 pens (10, 11, and 12) in the trial (7 weeks). Pen 12 (48 cows) had all teats dipped with current herd pre and post dips (herd sentry pen). Pen 11 (48 cows) and Pen 10 (24 cows) had left side teats dipped with commercial herd pre and post dips while right teats were dipped with 1000 ppm chlorine predip and 2000 ppm chlorine post dips (experimental prototypes). Teat skin (1 = normal, 2 = slightly dry; 3 = chapped) and teat end (1 to 1.5 = normal; 2 to 3 = smooth ring; 3.5 to 4 = rough ring; 4.5 to 5 = very rough ring) scoring was performed two times per week. Mixed procedure of SAS with repeated measured (mixed model with quarter within cow as a repeated measure) were used to analyze average teat skin score (TSS), average teat end scores (TES), and % rough teats, with $P < 0.01$) TSS, TES, and % rough teats than control dipped teats within 10 days of trial initiation (1.01, 2.0, 30 to 40% vs. 1.03, 2.6, and 60%, respectively) and maintained this improved teat integrity through the trial. Prototype chlorine teat dips were stable and provided significantly better teat skin and teat end health and integrity compared to commercial products.

Key Words: chlorine, postmilking teat dipping, premilking teat dipping

T167 Supplementation of organic selenium and its effect on productive and reproductive performance in grazing dairy cows in Costa Rica. J. Sanchez-Salas*[1], J. A. Elizondo-Salazar[1], C. Orozco-Vidaorreta[2], and E. Viquez-Matei[3], *[1]Estacion Experimental Alfredo Volio Mata. Facultad de Ciencias Agroalimentarias, Universidad de Costa Rica, [2]Alltech, Inc, Costa Rica, [3]Alimentos Balanceados, Cooperativa de Productores de Leche Dos Pinos, Costa Rica*

The objective was to evaluate the effect of supplementation of selenized yeast derived from a specific strain of *Saccharomyces cerevisiae* (CNCM I-3060) on productive and reproductive performance and on selenium concentrations in milk of grazing dairy cows. Multiparous Holstein cows (n=40) with an average body weight of 607 ± 62 kg and a body condition score of 3.1 ± 0.2 before parturition were randomly assigned to one of two treatments. Treatment 1 consisted of a basal diet supplying 0.7 mg of Se/kg dry matter. Treatment 2 consisted of the same basal diet supplemented with 3.0 mg of Se from d 5 to 56 of lactation. Milk production, milk composition, SCC, and Se content of milk from individual cows were determined at d 5, 14, 28, 42, and 56 of lactation. Blood samples from each cow were also taken during the same days to measure glutathione peroxidase (GSH-Px) and Se concentration. To evaluate reproductive performance the ovaries were examined by transrectal ultrasonography at d 22 and 57 postpartum. Days open, days to conception and services per conception were also recorded. Milk production (41.7 vs. 40.2 on d 56), milk composition, and SCC did not differ between treatments ($P > 0.05$) during the trial. Selenium supplementation increased ($P < 0.01$) Se apparent efficiency of transfer into milk (9.9 vs. 7.9%) and Se content of milk (20.5 vs. 12.7 µg/L). Selenium supplementation did not alter ($P > 0.05$) GSH-Px (220.3 vs. 199.0 U/g Hb) or Se concentration in blood (184.2 vs. 166.4 µg/L). There were no treatment effects on animal reproductive performance. Considering that 35% of Costa Rican population is Se deficient and taking into account the increase in Se content in milk, milk derived from cows supplemented with selenized yeast could contribute to a person's daily intake of Se.

Key Words: selenium, trace mineral, grazing cattle

T169 Inhibition of nuclear factor kappa B in duodenal mucosa of piglets by a grape seed and grape marc meal extract. D. K. Geßner[1], A. Fiesel[1], M. Lohölter*[2], B. Eckel[2], and K. Eder[1], *[1]Institute of Animal Nutrition and Nutrition Physiology, Universität Gieesen, Germany, [2]Dr. Eckel GmbH, Niederzissen, Germany.*

Enteric infections and the development of gut disorders commonly observed in piglets after weaning have negative effects on digestive capacity of the intestine, feed consumption, and growth of animals. The underlying molecular mechanism of this is an activation of nuclear factor kappa B (NF-κB), which leads to an increased expression of pro-inflammatory target genes. Studies in rodent models have shown that polyphenols have the ability to suppress inflammatory processes in the intestine by inhibiting NF-κB. The present study investigated the hypothesis that feeding a grape seed and grape marc meal extract (GSGME) as a dietary supplement has the potential to suppress the inflammatory process in the duodenum of piglets by modulating the activity of NF-kB polyphenols. Twenty-four crossbred (Danzucht × Pietrain) piglets, 6 weeks of age, were randomly assigned to a control group and a treatment group and fed a nutritionally adequate basal diet, based mainly on wheat, barley and soy bean meal for a period of 4 weeks. The control group received the basal diet; the treatment group received the basal diet supplemented with 1% of GSGME (AntaOx, Dr. Eckel GmbH, Niederzissen, Germany). There were no differences in average daily gains and daily feed intake between the two groups. However, the gain:feed ratio was increased in the treatment group ($P < 0.05$). Additionally, the treatment group had a lower activity of NF-κB and lower expression levels of NF-κB target genes such as TNFa, IL-8 and MCP-1 in the duodenal mucosa ($P < 0.05$). Moreover, the villus height:crypt depth ratio in the duodenum was increased in the pigs fed the GSGME, suggesting an increased absorptive capacity. In conclusion, the present study shows that a polyphenol rich GSGME has an anti-inflammatory effect in the small intestine of piglets. It is suggested that feeding of polyphenol rich plant extracts might provide a useful dietary strategy to inhibit inflammation in the intestine frequently occurring in piglets.

Key Words: grape seed and grape meal extract, anti-inflammatory, piglets

T170 Degradation of ergopeptines by *Rhodococcus erythropolis* MTHt3. M. Thamhesl*[1], E. Apfelthaler[2], E. Kunz-Vekiru[2], I. Schöner[3],H. Schwartz[3], F. Berthiller[3], R. Krska[2], G. Schatzmayr[1],and W.-D. Moll[1], *[1]Biomin Research Center, Tulln, Austria, [2]Christian Doppler Laboratory for Mycotoxin Research, Department for Agrobiotechnology (IFA-Tulln), University of Natural Resources and Life Sciences, Vienna, Tulln, Austria, [3]Christian Doppler Laboratory for Mycotoxin Metabolism, Department for Agrobiotechnology (IFA-Tulln), University of Natural Resources and Life Sciences, Vienna, Tulln, Austria.*

Ergot alkaloids are secondary metabolites produced by ergot fungi (*Claviceps* species) in cereals and endophytes (*Epichloë*, *Neotyphodium*, and *Balsania* species) in grasses. Ergot poisoning occurs predominantly in livestock after consumption of endophyte infected grasses and leads to reduced animal performance. Diverse strategies on pasture and animal management or feed treatments have been investigated. Ergot degrading microorganisms, which can be applied as feed additives and are active in the gastrointestinal tract, may be a technological solution to ameliorate the problem. The objective of this research was to isolate ergot alkaloid-degrading microorganisms from natural habitat. Strain MTHt3 was isolated from soil and identified by phylogenetic analysis based on 16S rRNA as member of the species *Rhodococcus erythropolis*. In comparison to a number of tested *R. erythropolis* strains the ability to metabolize ergopeptines was unique for strain MTHt3. In a degradation experiment with an extract from ground sclerotia (acetonitrile/water; 1:1; v/v; 2 hours at room temperature) strain MTHt3 was capable of converting all detected ergopeptines (ergotamine, ergovaline, ergocryptine, ergocristine, ergocornine, and ergosine) to ergine and cyclic dipeptides (diketopiperazines). Ergine was further de-amidated to lysergic acid. Cyclic dipeptides were completely catabolized by strain MTHt3, but not utilized by *R. erythropolis* type strain DSM 43066. Characterization of strain MTHt3 showed that conversion of ergopeptines to ergine occurred in a broad pH and temperature range whereas deamination of ergine to lysergic acid was strongly influenced by pH and temperature. Lysergic acid has lower vasoconstrictive activity compared to ergopeptines and simple lysergic acid amides. Hence, metabolization of ergot alkaloids to lysergic acid by *R. erythropolis* MTHt3 may reduce toxicity. Application as feed additive of strain MTHt3, however, seems to be difficult due to characteristics of the strain. Isolation of responsible enzymes combined with enzyme engineering and application as feed enzymes can be an alternative approach to reduce effects of ergot alkaloid-contaminated fodder on animals.

Key Words: ergot alkaloid, degradation