T77 Nutritive value of corn protein co-products from the ethanol industry. M. R. C. de Godoy*, L. L. Bauer, C. M. Parsons, and G. C. Fahey, Jr, *University of Illinois*, *Urbana*.

The objectives of this study were to determine the chemical composition and nutritive value of corn protein concentrates, (CPC_1, CPC_2), novel co-products from the ethanol industry, compared with conventional plant protein ingredients (soybean meal [SBM], distillers dried grains with solubles [DDGS], corn gluten meal [CGM], and corn germ meal [CGeM]). Protein efficiency ratio (PER), standardized amino acid digestibility, and true metabolizable energy (TME_n) data were obtained with chicks. Corn protein concentrates were produced from a pilot modified wet milling plant, with CPC_1 having a higher degree of purification than CPC_2. Crude protein values for CPC_1 and CPC_2 were 57.3 and 49.7%, respectively. Total dietary fiber concentration was 29% for CPC_1 and 23.5% for CPC_2. Acid hydrolyzed fat and gross energy concentrations were similar for these ingredients. No statistical differences in feed intake, weight gain, or protein intake were noted among CPC_1, CPC_2, and CGM. However, CPC_1 resulted in a higher gain/feed and PER ratio than CPC_2 and CGM. Overall, SBM was superior for all growth outcomes analyzed in this assay. For standardized amino acid digestibilities, CGM had the highest numerical values for total amino acids (TAA), total essential amino acids (TEAA), and total nonessential amino acids (TNEAA), but they were not statistically different from CPC_1 and SBM values. Corn germ meal resulted in the lowest values for the same criteria and were not significantly different from DDGS and CPC_2. Corn protein concentrates were not different from each other in TNEAA digestibility. Highest values for TME_n were obtained with CGM, followed by CPC_1, DDGS, CPC_2, SBM, and CGeM. Distillers dried grains with solubles and CPC_2 had similar values and were not different than CPC_1 and SBM. In conclusion, CPC_1 was of higher quality than CPC_2 and CGM in the PER assay. As regards amino acid digestibility, CPC_1, CGM, and SBM were of comparable quality, and CPC_2 was similar to DDGS and CGeM.

Key Words: Corn Protein, Nutritive Value, Ethanol

T78 Chemical composition of fiber rich corn co-products from the ethanol industry. M. A. Guevara*[1], L. L. Bauer[1], C. A. Abbas[2], K. E. Beery[2], M. A. Franklin[2], M. J. Cecava[2], and G. C. Fahey, Jr.[1], [1]*University of Illinois*, *Urbana*, [2]*Archer Daniels Midland Company*, *Decatur, IL*.

Understanding the impact of different processing methods and steps on preparation of fiber-rich corn co-products is a pre-condition to the interpretation and potential use of these products as fiber sources in dog foods. To determine the chemical composition of selected fiber-rich corn co-products from the ethanol industry, samples of native corn fiber (NCF), hydrolyzed corn fiber (HCF), and hydrolyzed extracted corn fiber (HECF) were analyzed for concentrations of total dietary fiber (TDF), acid hydrolyzed fat (FAT), crude protein (CP) , and hydrolyzed monosaccharides corrected for free sugars (HMC). Compositional data are presented in the following table. Values in parentheses represent the range in values among the co-products. Data indicate that compositional differences exist dependent upon processing methodology utilized. The desired outcome is to produce a consistent high fiber corn co-product with little variation in chemical composition and with a predictable physiological effect when incorporated into canine diets.

Table 1.

Co-Product	%TDF	%CP	%FAT	HMC, mg/g
NCF	67.3 (52.6-73.5)	12.3 (10.4-14.5)	6.8 (4.9-8.3)	683 (600-754)
HCF	57.3 (46.4-71.5)	14.4 (11.1-15.9)	7.2 (5.5-8.6)	473 (450-524)
HECF	70.8 (61.7-79.3)	12.5 (11.9-13.5)	2.4 (1.6-3.8)	575 (520-693)

Key Words: Corn Fiber, Composition, Ethanol

T79 Using ultrasound as an alternative method for determining body fat content in beagles. R. M. Yamka*, K. G. Friesen, C. A. Stiers, and B. A. Stone, *Hill's Pet Nutrition, Inc.*, *Topeka, KS*.

The objective of this study was to determine if % body fat content in beagles can be determined using ultrasound. Three hundred beagles (average age = 7.3 ± 2.7 years and average weight = 14.8 ± 3.1 kg) were identified for this study. All dogs underwent dual-energy x-ray absorptiometry (DXA; DXA-QDR-4500, Hologic, Inc., Waltham, MA) scans to determine body fat, muscle and bone content (average % fat = 35.6 ± 6.1). Prior to the DXA scans, each dog was weighed and back fat depth was measured three times via ultrasound at the spine between wings of the ileum (average back fat = 1.2 ± 0.4 cm). In addition, girth (average = 53.2 ± 5.6 cm) and femur length (average = 16.5 ± 1.6 cm) measurements were also taken. Through stepwise regression it was determined which measurements were important for predicting % body fat. Body weight was excluded from all models. The three models identified for predicting body fat, included: Equation 1) 24.99 + (9.12*back fat); R2 = 0.38; Equation 2) 24.13 + (0.72* girth) - (1.64*femur length); R2 = 0.39; Equation 3) 31.06 + (0.38*girth) - (1.43*femur length) + (6.73*back fat); R2 = 0.51. The results of this study indicate that ultrasound can be used to accurately predict body fat content in beagles.

Key Words: Dogs, Ultrasound, Body Fat

T80 Effects of feeding increasing levels of base excess on stool quality and output in dogs. R. M. Yamka*, K. G. Friesen, L. J. Kats, and T. G. Forster, *Hill's Pet Nutrition, Inc.*, *Topeka, KS*.

The objective of these studies was to determine the effects of feeding varying levels of base excess on stool quality and number of defecations (output). Seven foods varying in base excess (-107 to +62 meq) were fed to groups of 10 beagles (average age = 9.6 ± 2.0 years; average weight = 10.0 ± 1.2 kg) for a period of 7 days in order to determine the effect of base excess on stool quality and output. Base excess (in meq) was calculated as (Na + K + Ca + Mg) - (Cl + S + P). All foods were fed at maintenance level. Stool quality and output was determined daily. Stool quality was rated on a five point scale (5 = dry formed stool and 1 = unformed wet stool). The data from these stool studies

indicate that base excess is directly related to dog stool quality (R2 = 0.81) and to stool output or number of defecations (R^2= 0.69). Dogs fed foods with decreasing base excess (more positive) had higher stool scores and a reduction in total stool output. When formulating foods for dogs, base excess can be used to manipulate the type of feces desired. Foods with decreased base excess (positive) would be beneficial for increasing stool quality and foods with increased base excess (negative) could prevent constipation.

Key Words: Dogs, Stool, Base Excess

T81 Estimating intestinal protein digestion in the canine animal using a ruminant *in vitro* model. M. Thrune[1], M. D. Stern*[1], M. Ruiz-Moreno[1], and G. C. Fahey, Jr[2], [1]*University of Minnesota*, *St. Paul*, [2]*University of Illinois*, *Urbana-Champaign*.

An experiment was conducted to test the viability of using a modified three-step procedure for estimating intestinal crude protein in ruminants on intestinal digestion in the canine for a variety of dry kibble diets containing various protein sources. The original three-step *in vitro* procedure was developed to determine small intestinal crude protein digestion in ruminants. A modification of this published protocol was used in the present experiment, comparing measured values to *in vivo* values determined in experiments using dogs as the experimental animal. Nineteen different plant and animal by-product protein sources were used in this experiment: high protein corn (HP), high protein, low phytate corn (HPLP), high amylase corn (HA), conventional corn (CONV), amylomaize starch corn (AM), control (CON), 1% chicory (CH), 1% mannanoliogosaccharide (MOS), 1% chicory + 1% mannanoligosaccharide (CM), soy hull 1.86 (SH 1.86), soy hull 2.65 (SH 2.65), soy hull 3.17 (SH 3.17), soy hull 5.18 (SH 5.18), soy hull 7.21 (SH 7.21), beet pulp (BP), control (CONB), soybean meal (SBM), poultry meal (PM) and Profine-E (SPC2). Samples were exposed to a shaking water bath and a pepsin (1 hr, 38.6°C, pH=1.9)-pancreatin (24 h, 38.6°C, pH=7.8) enzymatic solution to mimic digestion in the small intestine. Simple regression analysis of *in vitro* protein digestibility versus *in vivo* protein digestibility was performed. *In vitro* intestinal protein digestion values were numerically similar ($P < 0.05$) to those measured *in vivo*, however there was not a high correlation between values ($r^2 = 0.41$). Results from this experiment do not substantiate the use of the *in vitro* intestinal ruminant protein digestion model to assess *in vivo* dietary crude protein digestibility in dogs.

Key Words: Canine, Intestinal Digestion, *In Vitro*

T82 The ameliorating effect of ascorbic acid on subacute sperm toxicity in male New Zealand White Rabbits treated with endosulfan. A. Ata, F. S. Hatipoglu, O. Y. Gulay*, and M. S. Gulay, *Mehmet Akif Ersoy University*, *Burdur, Turkey*.

Protective role of oral ascorbic acid (AA) was evaluated against changes in sperm parameters in New Zealand White (NZW) rabbits treated with endolsulfan. Rabbits (6 to 8 months old) were divided into four groups of six animals each. Rabbits in TRT-I served as control and received corn oil by oral gavage for 6 weeks. Rabbits in TRT-II received endolsulfan (1 mg/kg bw/day) in corn oil. TRT-III group received oral corn oil daily and ascorbic acid (AA; 20 mg/kg bw) every other day for 6 weeks. TRT-IV group received the same amounts of endosulfan and AA. Endosulfan alone significantly reduced the sperm count and motility and increased the presence of sperm with morphological problems ($P<0.01$). AA treatment showed significant amelioration on sperm count and motility decreased the presence of sperm with morphological problems when coupled with endosulfan ($P<0.01$). Ameliorations were up to control levels in all cases except for sperm motility. Data suggested that AA has beneficial influences in neutralizing the negative effects of endosulfan in the spermatologic parameters of NZW males.

Key Words: Ascorbic Acid, Endosulfan, Subacute Sperm Toxicity

T83 Subacute oral endosulfan toxicity in male New Zealand white rabbits. F. S. Hatipoglu*[1], M. S. Gulay[1], O. Y. Gulay[1], A. Balic[2], and S. Volkan[3], [1]*Mehmet Akif Ersoy University*, *Burdur, Turkey*, [2]*Sakarya State Hospital*, *Adapazari, Turkey*, [3]*Dunya Tip Center*, *Burdur, Turkey*.

The present study was conducted on 6 to 8 month old New Zealand white rabbits (9 rabbits per treatment group). Daily gavages of 3, 1.5, 0.75 or 0 mg endosulfan/kg resulted in the death of 5, 3, 0, and 0 animals, respectively, in each group of 9. All rabbits were monitored for any observable toxic symptoms throughout the experimental period (30 d) and they were also weighed weekly to monitor body weight gain. Nervine symptoms like tremor, head down condition and torticolis were noticed only for few minutes before death. All deaths occurred within the first 3 weeks. Some alteration had been recorded in hematological parameters within the groups (hemoglobin, packed cell volume, and total erythrocyte count) due to endosulfan exposure. Serum alkaline phosphatase (ALP) and aspartate aminotransferase (AST), but not Alanine aminotransferase (ALT), levels were significantly elevated in the 3 mg/kg dose group. Gross postmortem and histopathological changes in various organs (lung, liver, kidney, and testes) of rabbits treated with endosulfan were typical to dose dependent organochlorine insecticide toxicity signs. Thus, although some animals appear to adjust to relatively high daily doses of endosulfan, biochemical and histological evidence indicates varied liver and kidney damage according to dosage administered in these animals. Current subacute study suggested in a "no-observed-effect-level" of 0.75 mg endosulfan/kg in New Zealand white rabbits.

Key Words: New Zealand White Rabbits, Subacute Oral Endosulfan Toxicity, Blood Parameters

T84 Effects of feedborne Fusarium mycotoxins with and without a polymeric glucomannan mycotoxin adsorbent on body weight, feed intake, serum chemistry, and nutrient digestibility of mature beagles. M. C. K. Leung, T. K. Smith*, N. A. Karrow, and H. J. Boermans, *University of Guelph*, *Guelph, ON, Canada*.

There have been several mycotoxin outbreaks involving commercial cereal-based dog food in the recent years. While acute aflatoxicosis in dogs is frequently reported and studied, little canine research has been devoted to Fusarium mycotoxins which are commonly found in temperate regions, including Canada and United States. An experiment was, therefore, conducted (1) to investigate the effects of feeding

cereal-based diets naturally contaminated with a combination of Fusarium mycotoxins to dogs and (2) to test the efficacy of a polymeric glucomannan mycotoxin adsorbent (GMA) in prevention of Fusarium mycotoxicosis. Twelve mature beagle females averaging 10.1 ± 1.1 kg of body weight and 2.8 ± 1.6 years of age were assigned to one of three diets for 14 days in a 3 × 3 Latin square design. The diets included (1) control, (2) contaminated grains, and (3) contaminated grains + 0.2% GMA (Mycosorb, Alltech Inc., Nicholasville, KY). The two contaminated diets averaged 3.3 mg deoxynivalenol, 0.3 mg 15-acetyl deoxynivalenol, 0.4 mg zearalenone, and 9.2 mg fusaric acid per kg feed. Feed intake and body weight of dogs fed the contaminated diet were significantly reduced compared to controls. Reductions in serum concentrations of total protein, globulin, fibrinogen, alkaline phosphatase, and amylase were also detected ($P < 0.05$). The feeding of GMA did not ameliorate the effects of the Fusarium mycotoxins. Dogs fed the contaminated diet + GMA had higher digestibility of carbohydrate, protein and lipid as compared to controls, possibly due to physiological adaptation to reduced feed intake. It was concluded that the feeding of grains naturally contaminated with Fusarium mycotoxins can adversely affect feeding behavior and metabolism of dogs. The protective efficacy of GMA, however, was not seen at the current level of dietary inclusion.

Key Words: Dog, Fusarium Mycotoxin, Glucomannan Mycotoxin Adsorbent

T85 Prevalence of gastrointestinal parasites in dogs housed at the Animal Protection Association of Culiacan, Sinoloa. M. C. Rubio Robles*, S. M. Gaxiola, N. Castro, I. Padilla, J. Raygoza, E. D. Vega, F. Valdez, and B. A. Zazueta, *Universidad Autonama de Sinaloa*, *Culiacan, Sinaloa, Mexico*.

The objective of this work was to determine the prevalence of gastroenteric parasites in dogs housed at the animal protection association of Culiacán, Sinaloa. A representative sample with both sexes and cradle described by the technique of Thrusfield (1995) was used: n=[t*SD/L]2. Where n = sample size, t = value of the normal distribution (Student t) for a 95% confidence level (t = 1.96), L = accepted error or precision (5%), and SD = weighted disease prevalence (%). On the basis of the technique described, the total number of sample animals determined for random sampling was 25. For each dog feces were collected rectally by digital stimulus into previously identified plastic bags. The samples were transported under refrigeration at 4°C to the Parasitology Laboratory of the FMVZ-UAS, and processed by the flotation technique with sugar solution. The results indicate that of the data from the 25 dogs analyzed 12(48%) were positive for gastrointestinal parasites, with the following distribution: Isospora canis 4 (16%), Giardia spp., 3 (12%), Ancylostoma caninum 3 (12%), Dipylidiun spp. 2 (8%). This is a considerable number and proportion of animals testing positive continues to be an issue of importance in the local community because frequently these dogs are adopted and taken to different points throughout the city with new pet owners that are not informed about parasitisms afflicting these animals. Further, these adopted dogs can serve as vectors for the transmission of parasites to the broader community if left untreated.

Key Words: Parasites, dog, Prevalence

Contemporary & Emerging Issues - Livestock and Poultry

T86 Survey of *Clostridium septicum* isolated from market-age turkeys with cellulitis. T. Neumann*, D. Karanakarun, and T. Rehberger, *Agtech Products, Inc.*, *Waukesha, WI*.

Subcutaneous clostridial infections have become increasingly problematic for poultry producers in the United States. One of the most commonly implicated organisms is the anaerobic, spore-forming bacteria *Clostridium septicum*. Although poorly understood, *C. septicum* is regarded as the causative agent of atraumatic myonecrosis. Cellulitis is a disease of turkeys that is similar in its presentation to gangrenous dermatitis in broilers. Symptoms include severe necrosis of the subcutaneous tissues of the abdomen and inner thighs accompanied by edema and gas production. The disease occurs most often with no identifiable loss in the skin's integrity. This survey was conducted to gain a better understanding of the prevalence and diversity of *C. septicum* on endemic disease farms. A total of 189 tissue samples from turkeys suspected to have died from cellulitis were received from 62 endemic cellulitis farms. Turkeys sampled came from producers located in five states; Missouri (MO), Wisconsin(WI), Virginia(VA), North Carolina(NC) and Minnesota(MN). Isolates of *C. septicum* were cultured anaerobically on TSC agar and identified by PCR. DNA fingerprints of the isolates were generated by RAPD PCR. A family tree was constructed from the fingerprints to examine relationships among the strains. *C. septicum* was identified on 69.35% of the farms sampled. The prevalence in MO, VA and NC was 80% (24/30), 80% (8/10) and 100% (6/6) respectively. Only three WI farms out of thirteen sampled tested positive for *C. septicum*. Two out of three MN farms tested were positive. It is probable that the prevalence is actually higher than what is reported here due to low sample size from a number of farms. Interestingly, the WI farms sampled had a substantially lower prevalence of *C. septicum* than the other four states (23.1% vs. 81.6%). Field observations indicated a less severe manifestation of the disease at these WI farms, and most farms sampled (76.9%) were positive for *Clostridium perfringens* in examined tissues. Also interesting was the identification of two unique subtypes of C. septicum, one found in VA and NC and the other predominant in the Mid-West.

Key Words: Clostridium, Cellulitis, Turkeys

T87 Assessment of clostridial challenges present in asymptomatic birds raised in a commercial broiler facility. S. Dunham*[1], J. A. Smith[2], and T. Rehberger[1], [1]*Agtech Products, Inc.*, *Waukesha, WI*, [2]*Fieldale Farms Corporation*, *Baldwin, GA*.

Gangrenous dermatitis (GD) is a reemerging acute bacterial disease of poultry that causes necrosis of the skin, abdominal subcutaneous tissue, and underlying musculature that progresses rapidly. With mortality reaching as high as 1% each day for up to two weeks, GD is a significant concern for poultry producers throughout the U.S. *Clostridium* species, specifically *C. perfringens* and *C. septicum*, are the most common causative agents isolated from skin lesions