

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  $10.1 \pm 1.1$  kg of body weight and  $2.8 \pm 1.6$  years of age were assigned to one of three diets for 14 days in a  $3 \times 3$  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 Culiacán, Sinaloa.** M. C. Rubio Robles\*, S. M. Gaxiola, N. Castro, I. Padilla, J. Raygoza, E. D. Vega, F. Valdez, and B. A. Zazueta, *Universidad Autonoma de Sinaloa, Culiacán, 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:  $n = [t \cdot SD / L]^2$ . 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  $4^\circ\text{C}$  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%), *Dipylidium* 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\*<sup>1</sup>, J. A. Smith<sup>2</sup>, and T. Rehberger<sup>1</sup>, <sup>1</sup>Agtech Products, Inc., Waukesha, WI, <sup>2</sup>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

associated with GD. The objective of this study was to assess the clostridial challenges present in asymptomatic broilers raised under different feeding regimes: a conventional program, including non-endemic and endemic GD sites, and an antibiotic free (ABF) program. Three birds from seven different flocks from each of the three groups were sampled at approximately five weeks of age to obtain gastrointestinal tract (GIT), liver, and spleen samples from 63 total birds. The samples were plated on selective media and multiplex PCR was performed to verify toxigenicity. Of the total birds sampled in each group, 33.3% from the conventional GD broilers, 19.0% from the conventional non-endemic broilers, and 38.1% from the ABF broilers were positive for toxigenic *C. perfringens* but not for *C. septicum*. All livers and spleens were negative for known toxigenic *Clostridium*. RAPD PCR was performed on the *C. perfringens* isolates and used to construct a dendrogram to determine genetic diversity. Isolates from different birds within a site, as well as isolates from different sites in the same program showed genetic relatedness, however, no clear correlation could be made to identify pathogenic lineages. The most notable finding in this study was that an unidentifiable anaerobic gram positive rod-shaped organism, possibly a unique toxigenic *Clostridium* species was found in 28.6% of endemic GD birds, 23.8% of nonendemic birds, and 14.3% of ABF birds. Future research will focus on obtaining samples of live birds with symptoms of GD from endemic sites to determine if this unknown organism is involved in GD disease.

**Key Words:** Poultry, *Clostridium*, Broilers

**T88 Prevalence of unusual viral RNA, enteropathogens, Cryptosporidia in poultry litter, pig wastes and waterways of Ireland and their impact on environmental health.** J. R. Rao<sup>1,2</sup>, D. W. A. Nelson<sup>2</sup>, L. Xiao<sup>3</sup>, M. Matsuda<sup>4</sup>, T. Sekizuka<sup>4</sup>, C. J. Lowery<sup>6</sup>, J. S. G. Dooley<sup>6</sup>, B. C. Millar<sup>5</sup>, P. J. Rooney<sup>5</sup>, and J. E. Moore<sup>5</sup>, <sup>1</sup>*Environmental and Public Health Microbiology Unit, Agri-Food & Biosciences Institute, Belfast, Northern Ireland, UK*, <sup>2</sup>*The Queen's University of Belfast, Belfast, Northern Ireland, UK*, <sup>3</sup>*Division of*

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Contaminated straw and water used in the poultry houses were among the most likely sources suggested for the entry of viruses including highly pathogenic H5N1 (AIV) in France or Germany. We found (see review Rao et al 2007 CIMB, 9: 103-122) that mushrooms and substrate composts (raw ingredients straw and poultry litter) carried unusual compendium of dsRNAs associated with mushroom virus (X). In Ireland, a viable option for disposal of raw or composted animal agriculture farm waste is land spreading as a cheap nutrient supplement but many are unaware of the silent dangers of pathogen spreading from this practice. Our results indicated that a number of novel eubacteria together with faecal parasites (e.g. *Cryptosporidium* spp) and some complex viral RNA components were prevalent in mostly wet straw / compost wastes arising from poultry litter and slurry or slurry solids from pig farms, particularly of those located in the vicinity of the mouth of rivers. Our model study was carried out in Lough Neagh, County Antrim, Northern Ireland as it enters into the province's largest watercourse, a niche for flocks of mute swans (*Cygnus olor*) from north-western continental Europe which are partially migratory or nomadic. The migratory bird populations inhabit surface waters, including rivers, ponds and lakes. Following varying degrees of water treatment, the water is utilized for animal production, particularly poultry and/or pig farms; the Lough itself is frequently used for recreational purposes, including wind-surfing and water/jet-skiing. We also report our findings on the potential risk of avian carriage of viral elements, bacteria or parasitic faecal pathogens and emerging zoonoses that could be potentially transmitted via poultry dwellings in contact with the water and the impending risk to plant, animal and human health.

**Key Words:** Unusual Viral RNA, Enteropathogens, Avian Influenza

## Dairy Foods: Cheese, Dairy Products and Chemistry

**T89 The impact of fat reduction on flavor and flavor chemistry of Mozzarella cheeses.** A. J. Krause\*, R. E. Miracle, J. P. Evans, and M. A. Drake, *North Carolina State University, Raleigh*.

Mozzarella cheese is available on the market in whole milk, part-skim milk, and fat-free varieties. Fat-free Mozzarella lacks the milkfat flavor and richness of its whole and part-skim milk counterparts. It has been theorized that lactones may be responsible for the delicate sweet aromatic flavor in full fat Mozzarella cheeses and their addition to lower fat cheeses could produce more desirable flavors. In this study, the sensory profiles and volatile compounds in all three types of Mozzarella cheese were characterized. Whole milk, part-skim, and fat-free Mozzarella cheeses were obtained from a commercial supplier on multiple occasions. Cheeses were evaluated by a trained descriptive panel and by instrumental volatile analysis. For instrumental analysis, volatiles were extracted by solid phase micro-extraction (SPME) and solvent extraction followed by solvent assisted flavor evaporation (SAFE). SPME samples were injected on a gas chromatograph with mass spectrometry detection (GC-MS). Duplicate samples extracted

with diethyl ether and concentrated were evaluated by subsequent GC-olfactometry and GC-MS with aroma extract dilution analysis (AEDA). Compounds were identified by retention index, aroma of reference compounds and mass spectra. The mozzarellas were differentiated by both sensory and instrumental volatile analyses ( $p < 0.05$ ). Descriptive panelists differentiated the full fat, part-skim and fat-free cheeses by the attributes cooked, milkfat, and sour taste. Fat free cheeses lacked milkfat flavor and exhibited lower cooked flavor and sour taste when compared to the other cheeses. Volatile flavor compounds that differed significantly ( $p < 0.05$ ) among the cheeses included: esters, sulfur compounds, and lactones which corresponded to the main flavor variables from the trained panel. Direct injection of solvent extracts showed higher levels of delta lactones in whole milk cheese versus part-skim or fat-free product. These results suggest that lactones contribute to the characteristic sweet aromatic flavor of whole milk Mozzarella cheese.

**Key Words:** Mozzarella, Flavor Chemistry, Flavor