by the change in elastic modulus (G′). Maximum G′ was used as a measure of coagulum firmness. Coagulation rate was evaluated using the time constant of the Scott-Blair model. For both fresh retentates and reconstituted MCC the degree of SP removal did not affect coagulum firmness. Fresh retentates had significantly higher G′max (1351±75Pa) than reconstituted MCC (1062±83Pa). Coagulation rate was higher for 95% SP reduced as compared to 65% SP reduced MCC. Reconstituted 95% SP reduced MCC formed weaker coagulum than 65% SP reduced MCC, possibly due to a lower calcium content of the 95% SP reduced caused by the use of diafiltration in the manufacturing process. This study provides processors with useful information for the processing, storage and use of MCC.

Key Words: casein concentrate, rheology, coagulation

Food Safety

T76 A modeling system to predict *S.aureus* growth and SEA production in milk. F. Zhao, X. Qu, X. Lv, L. Xiang, B. Yan, and Y. Jiang*, *Northeast Agricultural University*, *Harbin, China*.

Staphylococcus aureus food poisoning often breaks out among patients who ingest dairy products. The main cause of this food poisoning was staphylococcal enterotoxin A (SEA). So it is an importance to predict *S.aureus* growth and SEA production in contaminated milk. The objective of this study is to provide a modeling system to predict the growth and SEA production of *S.aureus* in milk. Growth and SEA production of *S.aureus* 13565 in milk were studied at constant temperatures of 10-30 centi-degree. At each temperature, pure culture of strain 13565 was added to bacteriologically negative and SEA-free sterilized liquid milk to obtain an initial inoculum of 10^2-10^3 cfu/ml. The inoculated milk was then dispensed to sterile tubes and placed in a controlled temperature incubator. The incubation time was determined by temperature. After each incubation period, duplicate sample tubes were removed from incubator. Viable cell counts of samples were determined with the spread plate method (three plates per dilution). Averages and standard deviations of the transformed values were then calculated. SEA in samples was measured by VIDAS Staph Enterotoxin Test. The SEA concentration was determined by a standard curve developed using purified SEA in milk. The averages of two measurements were calculated for each data point. Growth curves can be described with the modified logistic model and the modified Gompertz model at high temperatures, such as 20-30 centi-degree, but the former described more accurately than the latter model. The amount of toxin in milk increased linearly with time from the time the cell population reached about $10^{6.4}$ cfu/ml. And the rate of toxin production increased linearly at these temperatures. The modeling system for *S.aureus* growth and SEA production has been roughly established in the study. The predictions of the system can be used as an indication, and also as reminder. *This work was supported by the National Key Technology R&D Program of China (2006BAD04A08-13) and the Key Project of Chinese Ministry of Education (208036). Corresponding Author: Dr. Yujun Jiang.*

Key Words: *Staphylococcus aureus*, enterotoxin, modeling system

T77 *Salmonella* serotype shift during an endemic dairy infection. J. Van Kessel* and J. Karns, *USDA-ARS*, *Beltsville, MD*.

Dairy farms are known reservoirs for *Salmonella* spp. and control of this organism is challenging. Salmonellae have been shown to be endemic in herds in part because they are easily spread between animals and throughout the farm environment. The impact of the infection on the herd is variable and dependent, in part, on the serotype. More than 2500 serotypes are known and animal carriers can be difficult to identify because they are often asymptomatic. As part of a multi-herd study, a dairy herd with an endemic, asymptomatic *Salmonella* infection was monitored extensively for 4 years. Bulk milk and in-line milk filters were collected weekly, and individual fecal samples were collected from all adult animals every 6 to 8 weeks. *Salmonella* detection was based on traditional culture methods. Prevalence of fecal *Salmonella* shedding in the 105 cow herd averaged 56% (range 10-95%) during this time. Although several *Salmonella* serotypes were identified over the course of the study, the initial dominant (>99% of isolates) serotype was Cerro. After 1.5 years into the outbreak, the serotype Kentucky began to gradually increase in prevalence, and at 2 years 39% of the fecal isolates were Kentucky. Over the next six months Kentucky became the dominant serotype representing >85% of fecal isolates. The serotype conversion from Cerro to Kentucky was first detected via analysis of the weekly milk filters. However, while monitoring of the milk filters was useful for detecting major shifts in serotype dominance, serotype prevalence in the individual milk filters was not predictive of the concurrent fecal serotype prevalence. This is the first detailed description of an endemic *Salmonella* infection in a dairy herd that undergoes a gradual shift from one serotype to another.

Key Words: *Salmonella*, dairy, serotype

T78 Determination of the mechanism(s) by which direct-fed microbials control *Escherichia coli* O157:H7 in cattle. L. M. Guillen*, S. McCoy, M. R. Bible, L. O. Burciaga-Robles, M. M. James, C. R. Krehbiel, and S. E. Gilliland, *Oklahoma State University*, *Stillwater*.

The objective of this experiment was to determine if immune enhancement may be responsible for the success of the direct-fed microbials, *Lactobacillus acidophilus* and *Propionibacterium freudenreichii*, in reducing the carriage of *Escherichia coli* O157:H7 in live cattle. To examine this, 10 steers were fed a pelleted growing diet ad libitum. Five steers received the direct-fed microbials (1 x 10^9 cfu) while the control group received only lactose (carrier). Day 0 baseline weights, fecal samples, rectal swabs, and blood samples were taken prior to the initiation of treatments. Treatments were fed once daily for 14 days after which they were transported to a bovine BSL-2 barn for *E. coli* O157:H7 inoculation and for the rest of the trial. All 10 steers were rectally inoculated with *E. coli* O157:H7 ATCC 43894 (10 ml of 2×10^7 cfu/ml) and housed in separate pens. Feeding and treatments were continued as before. After inoculation the previously mentioned samples were taken every 12 hours for 48 hours, then daily until 7 days post-inoculation, and then weekly until day 42. After the day 14 samples were taken the animals were reinoculated with a higher dose of *E. coli* O157:H7 (10 ml of 1×10^9 cfu/ml). Performance, immunological, and microbial plating data were analyzed using Proc Mixed ANOVA, repeated measures ANOVA, and Fischers exact test respectively. The dry matter intake was higher in the control group at weeks 4 ($p=0.03$) and 6 ($p=0.0004$). The feed:gain was higher in the control group at weeks 4 ($p=0.03$) and 6 ($p=0.0002$). Average daily gain for the control group was higher at week 4 ($p=0.04$). The immunological results of the trial showed higher levels of serum IgA, granulocytes, and monocytes as a percentage of

white blood cells in the treatment group at 36 hours (p=0.04), 48 hours (p=0.006), and day 7 (p=0.04) post-challenge respectively. There were no significant differences between treatments for animals that were negative or positive for *E. coli* O157:H7 throughout the trial.

Key Words: direct-fed microbials, *E. coli* O157:H7, cattle

T79 PCR analysis of pathogenic *E. coli* on three dairy farms in the northeastern US. J. Karns* and J. Van Kessel, *USDA/ARS/BA/ANRI/EMFSL, Beltsville, MD*.

Cattle are considered a significant reservoir of pathogenic *Escherichia coli* that cause food borne illness in humans. The association of enterohemorrhagic *E. coli* O157:H7 with beef cattle is well known but less is known about the occurrence of this organism in dairy cattle. In this study real-time PCR assays were used to detect virulence genes associated with pathogenic forms of *E. coli* in feces and environmental samples collected bi-annually from 3 dairy farms in the northeast US over a three year period. The *eaeA* gene encoding intimin was detected in the feces of 79% (range 54-97%), 73% (54-89%), and 92% (75-100%) of the cows on Farms A, B, and C, respectively. The gamma allele of the translocated intimin receptor (*γ-tir*), that is associated with O157:H7 was detected in 28% (6-64%), 28% (2-58%), and 42% (3-90%) of the fecal samples from the respective farms. The *stx1* and *stx2* genes encoding shiga-like toxins were found less frequently in fecal samples from Farm A (*stx1* 47% [22-77%]; *stx2* 37% [25-57%]) than in those from Farm B (*stx1* 68% [53-84%]; *stx2* 69% [52-79%]) or Farm C (*stx1* 63% [39-88%]; *stx2* 62% [32-74%]). The combination of virulence factors suggestive of the presence of O157:H7 (*eaeA+, γ-tir+, stx2+, stx1+or -*) was found in numerous samples from farms B and C but O157:H7 was isolated from few fecal samples and only from environmental manure samples associated with young animals. O157:H7 did not seem to persist in individual animals as cows which yielded positive samples at one sample time tested negative for this organism in subsequent samplings. These results suggest that *E. coli* O157:H7 is somewhat rare on these dairy farms but that other types of shiga-toxin-producing *E. coli* are more frequent and may present risks to the public.

Key Words: EHEC, STEC, pathogenicity

T80 Effect of a mycotoxin deactivating feed additive on the transfer of aflatoxin from dairy feed into milk. U. Hofstetter*[1], I. Rodrigues[1], A. Pietri[2], and T. Bertuzzi[2], [1]*Biomin Holding GmbH, Herzogenburg, Austria*, [2]*Istituto di Scienze degli Alimenti e della Nutrizione - Facoltà di Agraria U.C.S.C., Piacenza, Italy*.

Aflatoxin B1 (AFB1) in animal feed and its metabolite aflatoxin M1 (AFM1) in milk for human consumption are regulated worldwide. Aflatoxins represent a worldwide problem in many agricultural commodities. The most common method to protect animals against aflatoxicosis and to avoid carry-over of aflatoxin into meat, milk and eggs is the use of adsorbents to reduce the bioavailability of the toxins. This study was carried out to test the carry-over of alfatoxin from naturally contaminated maize meal into milk. Eighteen disease-free animals were divided in 3 groups of 6 animals each and given the following treatments: 1) control diet without feed additive (CRT); 2) control diet with 20 g/cow/day of a mycotoxin deactivator (T1) and 3) control diet with 50 g/cow/day of the feed additve (T2). Each animal of the control group received one kg/day of the contaminated maize meal without product added to the total mixed ration (TMR); each animal of the T1 group received one kg/day of the contaminated maize meal with 20 g/cow/day of the feed additive and each animal of the T2 group received one kg/day of the contaminated maize meal with 50 g/cow/day of product added. The experimental design was a 3x3 Latin square with periods of 7 days each without washout periods. Morning and evening milk samples from each cow were collected on day 3 and 7 of the first week and on day 7 of the following weeks. Samples derived from individual cows were mixed in proportion to the morning and evening milk production and then again combined in proportion to the daily milk production of each cow to constitute a representative bulk milk sample of each group; these samples were analyzed for AFM1. The mean content of AFB1 in maize meal fed to the animals was 91.7 ± 4.4 µg/kg; this value was also the mean individual daily ingestion of AFB1. The addition of the mycotoxin deactivator reduced significantly ($P<0.01$) the milk AFM1 content from 120 ng/kg (CRT group) to 83 ng/kg (- 31%; T1 group) and to 72 ng/kg (- 41%; T2 group).

Key Words: aflatoxin B1, aflatoxin M1, carry over

T81 Food crisis consumer information needs. K. E. Olson*[1], D. Pelzer[2], and S. Stevens[2], [1]*KEO Consulting, Schaumburg, IL*, [2]*DMI, Rosemont, IL*.

Dairy Management, Inc. (DMI) conducted research designed to assess consumer emotions, reactions and questions during a hypothetical large scale outbreak of food-borne illness related to contaminated dairy products and to an outbreak of foot-and-mouth disease. The objective was to help prepare the dairy industry and its partners to communicate effectively with consumers during a fast moving crisis involving milk or dairy products. Qualitative and quantitative studies were conducted with consumers to determine the most effective responses to the types of outbreaks described. Focus groups, conducted in Chicago and Baltimore in April 2008, provided the qualitative results. The quantitative research consisted of an in-depth online survey conducted between late June and early July 2008. A total of 1,102 responses from adults 18 and over were included. A subgroup that was evaluated included 227 moms with children 17 years of age and younger. Data was weighted to reflect the demographic composition of the adult US population. Basic findings: – Consumers are confident in the safety of milk and dairy products with only 10% indicating they do not feel confident in the safety of the products. – Food contamination is a major concern with approximately 1/3 of the total population and 1/2 of the moms indicating concern – Consumers are most reassured when communication about food safety comes from government health or food safety agencies, medical professionals and academic experts in addition to industry – Consumption will be impacted in a crisis. Approximately 50% of the survey group would stop drinking milk in the case of a food-borne illness and 42% with an FMD outbreak. – Industry needs to be prepared to deliver straightforward, easily understood information to consumers Conclusions: – Industry must respond quickly with specific information to help consumers assess personal risk and how the situation is being handled – The industry must work actively with third party experts to ensure that consumers receive consistent, accurate, useful, easily understood information delivered in a timely manner during a crisis. – Consumers have a high degree of trust in dairy products that must be maintained.

Key Words: consumer, messaging