

ABSTRACTS STUDENT AFFILIATE DIVISION

* Author Presenting Paper

DAIRY FOODS UNDERGRADUATE PAPER PRESENTATIONS

SAD1 Is milk really the problem? Lactose intolerance products. M. D. Browning*, *Virginia Tech, Blacksburg.*

Lactose intolerance in humans has become a regular occurrence in today's population. It is more common to be lactose intolerant than it is to be lactose tolerant. A deficiency or lack of lactase, the digestive enzyme responsible for the breakdown of lactose into glucose and galactose in the digestive tract, causes lactose intolerance. There are three main forms of lactose intolerance which are congenital, primary acquired, and secondary acquired. Some areas of importance in understanding lactose intolerance are its chemical background, symptoms, diagnosis, and treatment.

Treatment of lactose intolerance has become a new technology in the manufacturing of dairy products. Our increasing awareness of this problem has sparked a surge in the development of dairy products, which have been altered in such a way as to facilitate the breakdown of lactose by the human digestive tract. Such products include Lactaid, Ensure, and Isocal, just to name a few. This new technology in the manufacturing of dairy products has enabled people, who had been unable to digest lactose; to continue to enjoy the wonderful products produced by the dairy industry.

SAD2 Can milk-fat fight cancer? J.L. Lannes*, *Louisiana State University, Baton Rouge.*

Cancer is a leading cause of death each year among Americans. Considerable progress has been made in fighting this disease, but treatments are still not as effective as once hoped. The effort in conquering cancer has shifted from treatment to prevention. Research has shown that nutrition can play a vital role in cancer prevention. Some foods cause cancer to develop and spread, while others help to prevent and even combat cancer development. Recent research indicates that milk fat contains potential anticarcinogenic compounds, including conjugated linoleic acid (CLA), sphingomyelin, and butyric acid. CLA has been shown to inhibit proliferation of human malignant melanomas and colorectal, breast and lung cancer cell lines. Sphingomyelin, through its biologically active metabolites, ceramide and sphingosine, participates in three major antiproliferative pathways of cell regulation: inhibition of cell growth, induction of cell differentiation and induction of apoptosis. These pathways are believed to suppress oncogenesis. Butyric acid also offers promising anticarcinogenic effects as a potent inhibitor of proliferation and inducer of differentiation and apoptosis in a number of cancer cell lines. The

results obtained from research appear promising, but there is still much to be learned. Research continues to determine what levels of these compounds are necessary to achieve the desired effects and at what stage of life these levels need to be introduced. The dairy food industry is also working closely with the animal science industry to try to increase these compounds on an individual animal level.

SAD3 Lacticin 3147: a new approach to pathogen control. D. W. Koontz*, *The Pennsylvania State University, University Park.*

Bacteriocins represent a new approach to control growth of pathogens without using antibiotics, therefore reducing the risk of antibiotic residues in our food system. One bacteriocin attracting interest worldwide is Lacticin 3147. This natural inhibitory agent is produced by a subspecies of the *Lactococcus lactis* bacteria. Lacticin 3147 has been shown by Irish scientists to inhibit *Listeria* growth in cottage cheese. In one specific case it lowered a certain *Listeria* strain by 99.9%. Because it reduces the growth of organisms involved in the spoilage of cheese, it allows for elevated ripening temperatures with faster aroma and flavor development. One research study in Ireland found that using Lacticin 3147 could increase ripening temperatures from 7 to 12 ° C, which can mean reduced cost to the manufacturer and increased quality and value to the consumer. Lacticin 3147 may have uses in other foods such as meat, eggs, and additional dairy products that are prone to high levels of *Listeria*. An additional study found Lacticin 3147 was effective in controlling some types of mastitis caused by gram-positive bacteria. The end result of Lacticin 3147 may be reduced antibiotic residue risk in the food system and increased value to the producer, processor, and consumer. However, use of bacteriocins in the food industry should not replace proper handling and hygiene practices.

Keywords: bacteriocin, Lacticin 3147

SAD4 Salmonella: Are dairy products a concern for foodborne illness?. M. Miller*, *University of Kentucky, Lexington.*

Foodborne illness is a general concern with all food products. *Salmonella* Typhimurium DT104 has caused illness in humans and animals in Europe, but this phage type of *Salmonella* has emerged as an increasing health concern for people in the United States. Concern in

the dairy industry has focussed on the risks associated with consumption of products that are made from unpasteurized milk. Some Mexican-style soft cheeses made from this unpasteurized milk have caused outbreaks of salmonellosis in the Hispanic population. Another outbreak occurred when a farm family consumed raw milk and had contact with sick dairy cattle. *Salmonella* Typhimurium DT104 is resistant to the antimicrobial agents, ampicillin, chloramphenicol, streptomycin, sulfonamides, and tetracycline. Antibiotic resistance causes the greatest con-

cern at this time. This resistance may allow cattle or humans infected with DT104 to be unresponsive to therapy and would increase the risk of serious illness. Prevention is a key to reducing the risk of foodborne illness. Improved farm animal hygiene would help reduce incidence of salmonellosis in cattle and reduce milk contamination. Consumption of raw milk products must be discouraged. Post-pasteurization contamination can be prevented by strict adherence to HACCP programs in the dairy plant.

DAIRY PRODUCTION UNDERGRADUATE PAPER PRESENTATIONS

SAD5 Feeding and management practices for the transition dairy cow. J.D. Brixey*, *California Polytechnic State University, Dairy Science Department, San Luis Obispo.*

Feeding and management practices during the transition period (last three weeks before parturition to three weeks post partum) influences a cow's health, reproduction and potential milk yield. Failure to provide a well designed transition program may lead to the reduction of 10 to 20 pounds of peak milk production in the subsequent lactation. Increased health disorders (milk fever, ketosis, and fat cow syndrome) may result in declining revenues resulting in economic losses of up to \$334/cow/year. During this period, the dry cow is routinely fed a diet relatively high in fiber and low in protein. Upon calving, the lactation cow is fed a ration relatively low in fiber and high in protein, carbohydrates, minerals and vitamins. Improper feeding can prevent the cow from meeting her nutrient requirements, reduce rumen microorganism efficiency and alter rumen pH resulting in decreased milk production and an increase in metabolic disorders. Meeting nutritional needs of the cow during the transition period is challenging with decreasing dry matter intake prior to parturition. Addition of anionic salts and proper dry cow diets has assisted in reducing the early metabolic challenges of lactation. Fresh cow feeding programs should be designed to provide adequate protein and fiber, while meeting energy demands. Feeding and management practices are an important issue within dairy herds today, and careful consideration must be used to determine the best strategy for each individual dairy producer.

SAD6 Efficacy of an *Escherichia coli* J5 bacterin in the prevention of coliform mastitis in dairy cattle. M.L. Telfer*, *University of Wisconsin, River Falls.*

The most common disease facing the dairyman today is mastitis. As producers continue to improve the control of contagious *Staphylococci* and *Streptococci* infections, mastitis caused by environmental agents like *Escherichia coli* have increased. In fact, well managed herds with somatic cell counts below 200,000 may actually be more susceptible to the disease. It is estimated that as much as 40% of all clinical mastitis is caused by environmental bacteria. These bacteria can be picked up in places like bedding, lofting areas, and standing water. This is why environmental mastitis is nearly impossible to eliminate. The best treatment for this type of mastitis is prevention.

Developed and approved in the 1980's, *Escherichia coli* J5 Bacterin vaccines have been proven to effectively reduce the incidence and severity of clinical mastitis in multiparous cows. The J5 vaccine is made from the cell walls of specific *Escherichia coli* bacteria, which effectively induce an immune response, thereby reducing a vaccinated animal's risk of contracting coliform mastitis by up to 80%. There have been many field investigations designed to measure the *Escherichia coli* J5 Bacterin's effectiveness in preventing coliform mastitis in dairy cattle.

SAD7 Uncommon problems with common pests. I.A. Norris, *Louisiana State University, Baton Rouge.*

Leptospirosis, anaplasmosis, rabies, and mastitis are only a few of the many diseases that can cause problems in dairy cattle. While these diseases are different in their effects on the animals, they all are similar in that they can be introduced to the dairy farm by everyday visitors and residents on the premises. Insects, rodents, wild animals, and dogs are among the most common of these disease carrying pests. Insects are not only annoying to dairy cattle but are also capable of transmitting disease-causing organisms to the animals on the farm. Rodents may act as vectors for disease by serving as intermediate hosts for internal and external parasites. Other forms of wildlife, especially birds, are also known to transmit numerous diseases to dairy cattle. While rodents, insects, and wild animals are commonly thought of as pests,

dogs typically are not considered as such. However, dogs can pose potential threats to the health and productivity of the dairy herd because they are known carriers of several disease causing organisms. While vaccines are an important component of preventive medicine in dairy herd health programs, pest management practices are equally important in the control of parasites and disease.

SAD8 Nutritional considerations for the close-up dry cow. S. Oak*, *University of Kentucky, Lexington.*

Dry cows should be managed as two separate groups to accommodate the changes seen in the close-up dry cow during the last twenty-one days of the dry period. As calving time approaches, dry matter intake (DMI) may decrease at the same time as nutrient needs are increasing. A properly implemented close-up dry cow program can help transition the cow back into the milking herd by improving DMI after calving, preparing the cow's rumen for a higher concentrate diet, minimizing metabolic disorders, and improving immune status to decrease health problems. Some of the nutritional approaches used with close-up dry cows include increasing the energy density of the diet, including forages and other feedstuffs similar to those fed to the milking herd, adjusting the amounts of trace minerals and vitamins in the diet, and considering macro-mineral adjustments (dietary cation-anion difference). Dry cows with a good close-up dry cow program will reach higher peak production, produce more milk in that lactation, and potentially make more profit for the producer.

SAD9 Effective cow-side antibiotic testing in milk. J. M. Middour, *The Pennsylvania State University, University Park.*

Because of consumer allergies to antibiotic residues and the interference with certain dairy product manufacturing, one goal of dairy producers is to prevent antibiotic contamination in raw milk. Improper use of antibiotics in the control of mastitis is the major source of antibiotic residues in the milk supply. When used correctly, the cow-side antibiotic test kit is an important management tool to prevent antibiotic residues. Sischo (J. Dairy Sci. 79:1065-1073) stated that these tests have not been objectively evaluated for individual cows. Therefore, sampling individual cows may result in false-positives, which lead to producers discarding acceptable milk based on regular withdrawal times. A study in California found that four out of five commercially available B-lactam (penicillin and its derivatives) antibiotic detection kits yielded false positive results in milk from individual cows. In addition, the detection limits vary from test to test. The Milk and Dairy Beef Quality Assurance Program (MD-BQAP) is designed to eliminate antibiotic residues in consumers' milk. The MDBQAP producer manual suggests cow-side antibiotic testing become routine to protect a producer from accidentally contaminating milk with antibiotics. If proper recommendations and guidelines are followed and the limitations of these tests are recognized, the benefits will greatly outweigh the drawbacks. Antibiotic test kits are valuable tools in maintaining a safe supply of dairy products to consumers.

Key Words: antibiotic test, drug residues

SAD10 The effects of bovine somatotropin on dairy cattle. L. Wright*, *Virginia Tech, Blacksburg.*

The use of recombinant bovine somatotropin (bST) in dairy cattle has become a profitable management tool for many dairy farmers across the United States. Studies have shown that injecting cows with bST nine weeks after calving can increase milk production 5 to 15 pounds a day. Therefore this tool has become a widely used practice for attaining more milk from the cow after she has reached peak production. Some people however feel that there are negative side effects to cows that receive

bST injections, such as an increased chance of mastitis and an increase in reproduction problems. In my presentation I will address the effects of bST on milk production, body weight (BW), feed efficiency, somatic cell count (SCC), and days in milk.

A study by Cornell University done on 80,000 cows over 8 years showed that by using bST on 100% of all applicable cows an increase of 894kg of milk, 27kg of fat, and 31kg of protein could be expected in a 305 day lactation. This study also showed that bST improved persistency of the lactation, while SCC were just slightly higher for those herds using bST. The research also showed that days in milk and average age of animal were not affected by the use of bST during the lactation.

The University of Arizona did a study to determine if the use of bST on lactating dairy cows had any effect if used in consecutive lactations. In this research groups of cows were injected with bST every two weeks for a varying number of consecutive lactations, while the control group did not receive a bST injection. When comparing the control group to the group of cows that received bST for four lactations, the group that received bST out produced the control group by 14%, and gained 37% more body weight than the controls. Therefore previous bST injections had no negative effects on milk yield in subsequent years. These researchers also stated that bST increases milk production by increasing the feed efficiency of the animal.

ORIGINAL RESEARCH/INDEPENDENT STUDY PAPER PRESENTATIONS

SAD12 Garlic as a nutritional adjunct in cheese. C. A. Boenke, J. P. Istre*, J. Istre, A. B. Nichols, and D. T. Do, *Louisiana State University, Baton Rouge.*

Queso Blanco style cheeses were manufactured using balsamic vinegar, red wine vinegar, and garlic. Treatments included cheese made with balsamic vinegar and garlic, balsamic vinegar without garlic, red wine vinegar with garlic, and red wine vinegar without garlic. Samples were analyzed for pH, total solids, fat content, and nitrogen content. Gel electrophoresis was also run on each treatment to compare protein fractions in the cheese. No significant differences were detected in the pH and total solids content between samples. A consumer panel scored the cheeses for texture, taste, overall liking, garlic flavor, and purchase preference. Significant differences were detected among each of these variables ($p < .05$). Cheese manufactured with red wine vinegar and garlic had the highest mean values for texture, taste, and overall liking. Consumers rated this cheese as having an acceptable garlic flavor and indicated purchase tendency if it were commercially available.

SAD13 FlyCracker as a natural house and stable fly larvae control: Duration of effectiveness as a larvicide. S.E. Bedgar*¹, T.M. Moreland², D.L. Owings³, and J. Saunders⁴, ¹University of Maryland, College Park, ²University of Maryland, Agriculture Experiment Station, ³Virginia/Maryland Regional School of Veterinary Medicine, ⁴Biospherics Inc.

Two experiments were conducted to evaluate the potency and frequency of application of FlyCracker (citric acid developed by Biospherics Inc.) as a larvicide when used in granular form in animal bedding. In the first experiment, FlyCracker was applied at rates of 0, 15, and 30 grams per 26.4 square cm (1 square foot) of bedding area. Using a shaker container, FlyCracker was sprinkled around the edges of calf hutches and pen pack bedding. Sample areas were 13 cm W x 13 cm L x 4.5 cm D (Williams et al 1980). Larvae were counted to evaluate concentrations of flies and percent control. Samples were collected every three to four days along the treatment areas. The second experiment used twenty 1.5 m x 1.5 m (4.5' x 4.5') calf pens bedded with roughly 25% sawdust and 75% straw to maintain a bedding of more than 60% dry matter. The pens were allowed to develop adequate organic matter and more than 100 larvae per sample to assure an optimal fly breeding environment and ample larvae infestation. Using a calibrated shaker container, FlyCracker was applied at a rate of 25 grams per 26.4 square cm (1 square foot). Treatments were made every seven days and samples were collected weekly. These experiments demonstrated FlyCracker to be a completely effective larvicide for fly control in bedding with dry matter of greater than sixty percent, when applied at the rate of 25 grams per 26.4 square cm (1 square foot) at 7 day intervals.

In conclusion bST is a very useful tool for dairy farmers today. If managed correctly it will increase milk production, and feed efficiency, with little effect on a farm's reproductive efficiency and SCC.

SAD11 Retained fetal membranes in cattle: causes and treatments. B. MacKie*, *Washington State University, Pullman.*

The assurance of maximal milk production is accomplished through a successful pregnancy that results in an offspring. This cycle is repeated every year when a calf is born. Effective uterine involution and expulsion of fetal membranes must take place in order for a cow to successfully achieve a subsequent pregnancy. Producers are faced with the predicament of understanding causes and treatments of retained fetal membranes. Treatments range from exogenous hormone therapy, manual removal of the membranes or waiting for natural expulsion. It has been determined that the presence of retained fetal membranes in the reproductive tract increases the occurrence of uterine infections and secondary metabolic problems such as hypocalcemia or ovarian cysts. Much of the research is inconsistent, however there is an understanding that the preferred method of treatment requires two administrations of exogenous hormones, either two doses of prostaglandin F2a or gonadotropin releasing hormone and prostaglandin F2a. The causes and treatments of retained fetal membranes will be reviewed from existing research.

SAD14 Processing method to improve the aesthetic quality of skim milk. C.M. Pinto and S.K. Sharma*, *Cornell University, Ithaca, NY.*

The skim milk consumption trend is increasing to meet the nutritional demand and to reduce the fat calorie intake among a large section of the US population. However, the lack of quality attributes such as color, appearance and texture/ mouthfeel are of major concerns to the consumers and to the dairy industry. Therefore, the objective of this research work was to explore processing methods to improve the aesthetic quality of skim milk for its overall acceptance.

Whey protein isolates (WPI) in the concentrations ranging from 0.5 to 2.5% and various gums such as xanthan, carageenan and guar gum (0.05 to 0.15%) were mixed with skim milk, and the mixture was heated at different temperatures (80 to 90°C) and time (5 to 15 min) combinations to obtain an acceptable quality. The quality of the resulting product was evaluated in terms of color parameters (L, a & b) using Macbeth Color Eye spectrophotometer, apparent viscosity using Hake viscometer and sensory characteristics such as color, appearance, texture/ mouthfeel, aroma and flavor, and overall acceptance by sensory panelists on a hedonic scale.

Heating skim milk at 90°C for 10 min was most appropriate to improve the product color. Adding WPI concentration higher than 1.5% and gums higher than 0.1% caused the product to form gel during overnight storage at refrigeration temperature (5°C). It was observed that skim milk containing 1.5% WPI with or without 0.05% xanthan gum improved the appearance, color and texture/ mouthfeel, and its flavor & aroma was not significantly different ($P > 0.05$) from the control sample which was heated under the same conditions. The color parameter such as 'L' value of heated skim milk containing WPI was significantly higher ($P < 0.05$) than the control sample and it was very close to the value of milk containing 2% fat ($P > 0.05$). The viscosity of skim milk containing 0.05% xanthan gum was significantly higher ($P < 0.05$) than skim milk containing 1.5% WPI alone, whole milk sample and 2% fat milk sample. Whereas the viscosity of skim milk containing 1.5% WPI was not significantly different from whole milk samples. It was concluded that aesthetic quality of skim milk could be easily improved by adding 1.5% WPI and heating to 90°C for 10 min.

SAD15 Comparison of bovine serum (LifeLine) versus colostrum on the efficiency of IgG absorption and attainment of passive immunity in newborn dairy bull calves. B. Branek*¹, M. Cattell², and J. Quigley³, ¹Chadron State College; Chadron, NE, ²Dairy Research and Technology; Loveland, CO, ³APC, Inc.; Ames, IA.

The objective of this study was to compare the efficacy of two supplemental spray-dried bovine serum products versus colostrum on the

attainment of passive immunity in newborn dairy bull calves. Seventy-five (n=25/treatment) newborn Holstein calves were collected at birth and prior to consumption of dam's colostrum. The calves were assigned to one of three treatments using a predetermined randomized allocation schedule. Each of the treatments were administered in a volume of two liters per feeding. Treatments were given within 2h of birth and again within 12h of administration of the first treatment. Any volume not consumed was recorded and administered via esophageal tube. Calf birth weights were also recorded. Blood samples were collected at birth (prior to administration of the first treatment), and at 24+/-1h after birth. Serum was harvested, split and frozen in duplicate for later IgG analysis. The study was divided into two blocks, with the second block beginning with the use of material from a second shipment. No calves that received maternal colostrum were tubed, and there was little difference in IgG levels at 24h in the two blocks (10.47 and 10.73 g/L respectively). Calves in this group had an average efficiency of IgG absorption (AEA) of 25% and 27% for the two blocks respectively. One half of the calves enrolled in the second group (LifeLine at 45g/dose) were tubed in the first block, while 12.5% were tubed in the second block. IgG levels at 24h among these calves were 4.70 and 6.44g/L respectively. The AEA for this group was 19% and 27% respectively. The final group was given LifeLine at 50g/dose. 60% of calves in the first block and 10% in the second block were tubed. 24h IgG levels among these calves were 3.37 and 6.80g/L for the two blocks respectively. Their AEA were 12% and 25% respectively.

SAD16 Using process control to monitor bulk tank somatic cell count. D. A. Schreiner* and P. L. Ruegg, *University of Wisconsin, Madison*.

Bulk tank somatic cell count (BTSCC) has become an important component of monitoring milk quality. Differentiating "real change" in SCC from normal variation can be difficult. Process control charts are a method used to differentiate natural variation from outside influence such as increased mastitis. The objective of this study was to apply concepts of process control analysis to BTSCC. The four basic questions investigated in this study were: 1) How many data points needed to be used to determine significant variation on each farm? 2) What was the sensitivity of this method of analysis? 3) Can a rolling average be used in order to see trends? 4) Could SCC signals be explained by environmental changes or changes in parlor procedure? Three WI dairy herds participated in the study between June and August of 1999. Parlor procedures and mastitis data were recorded on each farm, and BTSCC's were obtained from the processor. Holding pen temperature and humidity was collected on farm every 30 minutes. Signals were detected by following the nine rules detected by Statistix analytical software. Signals could be either single point signals or trend signals. Single point signals occurred when one point exceeded a predetermined interval surrounding the mean BTSCC. Trend signals were detected by a gradual consistent change in the process over a series of data points. A 20 or 30 data point set was effective in detecting the desirable number of signals on these three farms, but was dependent on the amount of variation occurring on each farm and the desired sensitivity. There was no significant relationship between farm management data and the occurrence of a signal. This may have been due to the trend signals overlap into weeks that did not contain signals. The rolling average method detected an equivalent number of signals as the standard method of analysis. In addition, the rolling average method had the ability to detect gradual trends that the tests would not detect, due to the slight changes over broad periods of time.

SAD17 Effectiveness of tempering barley with yeast culture and fibrolytic enzymes for lactating dairy cows. D.B. Carlson*, J.W. Schroeder, M.S. Laubach, D.E. Schimek, W.L. Keller, and C.S. Park, *North Dakota State University, Fargo*.

The objectives of this research were to determine if tempering barley and adding a combination of a live yeast culture and a fungal extract preparation promote enhanced feed utilization and alter the yield or composition of milk from cows fed barley-based diets. Barley was tempered for 24 h at 20% moisture and rolled before adding to completely blended diets. Twenty-four primiparous and multiparous Holstein cows averaging 575 kg body weight and 46 d in lactation were stratified by age, days in milk, and milk yield and randomly assigned to one of four isonitrogenous, isocaloric diets: 1) tempered rolled barley (TRB-W) and 2) dry rolled barley (DRB-W) both with additives (a yeast culture and

a fibrolytic enzyme, 9 and 15 g/d per cow, respectively) and 3) tempered rolled barley (TRB-O) and 4) dry rolled barley (DRB-O) without additives. Cows were offered the respective diets twice a day in Calan gates for nine wk. A repeated measures analysis was conducted for a fixed model with three, 21-d collection periods. Substituting tempered for dry rolled barley did not alter dry matter intake (DMI), milk yield, or body condition. However, cows fed diets with the combination of additives had greater milk yield ($P < 0.05$) during the first 21 d and lower ($P < 0.002$) DMI when compared to those cows fed diets without the additives during the last 21 d on these diets. Cows in the TRB-O and TRB-W groups had lower rumen ammonia ($P < 0.007$) and milk urea nitrogen (MUN) ($P < 0.07$) during the first 21-d period, while cows fed DRB-W and TRB-W diets had lower ($P < 0.01$) rumen ammonia and lower MUN ($P < 0.03$) during the last 21 d collection period. No difference existed among diets during period 2. An interaction existed for milk lactose ($P < 0.004$) and SNF ($P < 0.02$) between barley form and inclusion of additives. No differences existed among treatments for fat-corrected milk yield, but diets supplemented with the additives had greater energy use ($P < 0.008$) and protein ($P < 0.001$) efficiency, especially when used in combination with barley that was tempered versus dry rolled prior to feeding.

SAD18 Effect of estradiol cypionate in early postpartum dairy cattle. J. M. Haughian*, R. Sartori, J. N. Guenther, A. Gumen, and M. C. Wiltbank, *University of Wisconsin, Madison*.

Treatment with the long-acting estradiol-17 β , estradiol cypionate (ECP), is frequently used to treat uterine problems in early postpartum cattle; however, there are concerns that ECP may increase ovarian disorders, such as follicular cysts. This study characterized the effects of ECP on follicular growth, ovulation, and reproductive hormone patterns in dairy cattle. Lactating Holsteins received 25 mg ECP (ECP; n=17) or placebo (CON; n=16) on d 7 postpartum. Data were collected from d 5-90 of lactation and included daily serum samples and daily (d 5-30) or every other day (d 30-90) ultrasound examinations of follicular and luteal activity. After d 90, all animals were bred using the Ovsynch protocol (GnRH-7d-PGF2 α -2d-GnRH-1d-AI). The ECP group had elevated ($p < .05$) serum estradiol on the day after treatment (ECP: 27.1 \pm 3.6 pg/ml; CON: 6.7 \pm 1.1 pg/ml) until 11 d post-treatment (ECP: 12.4 \pm 1.2 pg/ml; CON: 8.9 \pm 1.2 pg/ml). Detection of the first postpartum follicle > 10 mm was later ($p < .01$) in ECP (29.1 \pm 7.1d) than CON (12.4 \pm 3.1d). Time to first ovulation (from ultrasonography and progesterone) was delayed ($p < .01$) in ECP (55.6 \pm 4.1d) vs. CON (37.9 \pm 4.9d). Mean size of the first ovulatory follicle was not different ($p > .10$) between ECP (14.6 \pm 3.5mm) and CON (15.7 \pm 3.9mm). Ovulation prior to 30 d in milk occurred in 38% of CON but in none of the ECP cows ($p < .01$). A total of 69% of CON cows had ovulated at least once by 50 d; whereas, only 35% of ECP cows ($p < .10$). Nevertheless, when cows were evaluated at the time of Ovsynch (90 d) regular estrous cycles were found in only 50% of CON but in 88% of ECP cows ($p < .05$). The reasons for lack of cyclicity were no ovulation by 90 d postpartum (3 CON, 1 ECP), ovulation followed by anovulatory follicular waves (3 CON, 1 ECP), and persistent corpus luteum (>50d; 2 CON). Only 3 cows developed follicular cysts (follicle > 25mm; 2 CON, 1 ECP). Thus, although treatment with ECP on day 7 postpartum delayed the time to first ovulation, it did not induce follicular cysts, and it decreased cows with reproductive problems at 90 d postpartum.

SAD19 Changes in amino acid composition of milk replacer fed bull calves from birth to 105 kg. J.M. Kelsey*, M.C. Diaz, D.A. Ross, and M.E. Van Amburgh, *Cornell University, Ithaca, NY*.

Sixty calves were assigned to a comparative slaughter study to determine energy, protein and amino acid (AA) composition from birth to 105 kg bodyweight (BW). Six calves were slaughtered before reaching 24h of age and served as a baseline for a comparison of potential changes. Calves were fed a milk replacer that contained approximately 30% protein, 20% fat and 4.6 Mcals/kg metabolizable energy, three times per day to achieve a target rate of liveweight gain. Calves were assigned to three treatments of 500 (Low), 950 (Medium), and 1400 (High) g/d rates of gain and three slaughter points at 65, 85 and 105 kg BW. Actual rates of BW gain were 597 (Low), 1000 (Medium) and 1202 (High) g/d. At slaughter, tissues were split into four fractions: carcass, organs, liver and head, hide, feet and tail (HHFT), freeze dried, defatted and hydrolyzed in either 6 N HCl, HCl after performic acid oxidation

or barium hydroxide for AA analysis. Twelve of these calves were randomly chosen for AA analysis, six each from Low and High treatments at slaughter weights 65 kg (three) and 105 kg (three). The AA composition of the separate fractions (g amino acid/100g protein) was compared among the baseline and treatment animals. There were differences ($P < 0.05$) in the carcass AA composition between baseline and treatment calves in the following amino acids: Asp, Thr, Ser, Glu, Pro, Ile, Leu, Tyr, Phe, His and Arg. In the organ fraction Glu and Val differed ($P <$

0.05). In the liver fraction Glu, Val, Ile, Leu, Phe, His and Arg differed ($P < 0.05$). There were no differences in AA composition in the HHFT fraction. There is a peak that represents the ammonia content of the tissues and was eluted with the AA's. In all tissues except carcass, there were large ($P < 0.05$) differences in the ammonia concentration between baseline and treatment calves. These differences in ammonia might possibly be attributed to the shift in energy sources the calf experiences after birth.