the level of water soluble nitrogen, was also higher in cheese made with JFR1 than in all other reduced fat cheeses. However, cheese made with JFR1 contained the least amount of free amino acids among all cheeses. RP-HPLC analysis showed a significant increase of hydrophobic peptides (causing bitterness) during storage of cheese made with JFR1. The results showed that bitterness in reduced fat Cheddar made with EPS-producing cultures resulted from the high moisture level and chymosin activity. This study recommends using debittering cultures in conjugation with EPS-producing strains in making reduced fat Cheddar.

Key Words: Reduced Fat Cheddar Cheese, Exopolysaccharides, Bitterness

W55 *Propionibacterium freudenreichii* growth is differentially affected by the serum of Swiss cheese slurries prepared with different *Lactobacillus helveticus* strains. P. Limpisathian*, W. J. Harper, and P. D. Courtney, *The Ohio State University*, *Columbus*.

Swiss cheese makers report that some combinations of *L. helveticus* and *P. freudenreichii* cultures result in poor eye and flavor formation, whereas other combinations perform well. The objective was to develop a rapid method to predict successful strain pairings. Cheese curds were prepared aseptically from UHT milk using *S. thermophilus* alone (control) or *S. thermophilus* plus one of four *L. helveticus* strains. Curds were homogenized into a slurry with 60% moisture and 1% salt in moisture. The slurries were centrifuged, and the resulting serum was filtered. Each sterile slurry serum was added to chemically defined medium (CDM) lacking amino acids. One of five *P. freudenreichii* strains was inoculated into CDM containing each slurry serum, and growth was monitored spectrophotometrically. Maximum growth rate and lag phase were calculated using the Richards model. Peptide profiles of slurry sera were observed using HPLC. *Propionibacterium freudenreichii* growth was not observed in CDM lacking slurry serum. CDM supplemented with slurry sera, including the control serum prepared without *L. helveticus*, supported the growth of four of the five *P. freudenreichii* strains to different extents. *Propionibacterium freudenreichii* P764M1 did not grow with any slurry serum. *Lactobacillus helveticus* L350 slurry serum stimulated growth of four *P. freudenreichii* strains beyond that observed with the control serum. In contrast, *L. helveticus* L346 slurry serum inhibited growth of these four strains in comparison to the control serum. L887 slurry serum slightly stimulated *P. freudenreichii* P873 growth, but delayed ATCC9614 growth. L856 slurry serum also slightly delayed ATCC9614 growth compared with the control serum. Slurry sera from different *L. helveticus* strains differed in their peptide profiles, which may contribute to the observed differences in *P. freudenreichii* growth. The slurry serum model has potential for screening *P. freudenreichii* and *L. helveticus* pairings for Swiss cheese manufacturing.

Key Words: *Propionibacterium freudenreichii*, *Lactobacillus helveticus*, Swiss Cheese

W56 Processing factors that affect the quality of pilot plant scale Swiss type cheese. C. J. Kuo*, N. Koca, T. Ji, V. B. Alvarez, and W. J. Harper, *The Ohio State University*, *Columbus*.

Industry reports frequent problems with overset eyes when using the Kosher requirement of cooking to less than 49 deg. C. Work with Swiss cheese made under pilot plant conditions showed that overset eyes occurred in most cheese being cooked at 48 deg. C and not in cheese cooked at 53 deg. C, a standard make procedure. Twenty-six blocks of Swiss type cheese were made at the university pilot plant over 6 processing days as an attempt to find the most important processing factors that affect the cheese quality. Combination of different ratios of starter organisms, method of placing curds into molds, and method of pressing were selected as the variables for the trials. After 21 days in the warm room (22°C), the products were compared based mainly on the quality of eye formation. Changes in starter culture ratio and in curd placing method did not improve the eye quality significantly. At the same curd pH at dipping (6.4), increase weight to more than two folds during pressing made marked improvement on eye quality. Higher pressure (not vacuum) also resulted in higher acetic and propionic acid contents. The data suggested that overset is primarily related to the greater number of nucleation sites due to a difference in curd textural properties. Preliminary treatment with vacuum in between first and second pressing appeared to reduce overset and make for a denser structure. Optimization of the vacuum treatment in respect to time and degree of vacuum requires additional work. The vacuum treatment is not practical commercially, but can provide an understanding of the mechanism of overset eyes common in Kosher cook Swiss cheese.

Key Words: Swiss Type Cheese, Pilot Plant, Processing

Food Safety: Control of Hazards

W57 Effects of in-feed anti-salmonella egg yolk antibodies on shedding and antibiotic resistance of bacteria in swine. S. Rattanatabtimtong*, A. Mathew, S. Chattin, E. Jarboe, and R. Clift, *University of Tennessee*, *Knoxville*.

Two experiments were conducted to determine effects of anti-salmonella egg yolk antibodies (ASEYA) on shedding of *Salmonella enterica* Typhimurium and antibiotic resistance of *E. coli*. In Experiment 1, 132 weaned pigs in 2 replicate trials were randomly assigned to 6 dietary treatments including a control without additives or similar diets containing apramycin followed by carbadox, or oxytetracycline, or ASEYA, or dried egg yolk lacking ASEYA, or spray dried plasma protein. Following initiation of treatments, pigs were challenged with a *S.* Typhimurium. Fecal samples were collected prior to treatments, just prior to challenge, and on various days until pigs reached market weight, for isolation of salmonella and *E. coli* to determine shedding and antibiotic resistance patterns. In Experiment 2, 64 market-age pigs in 2 replicate trials were randomly assigned to 4 treatments, including a control diet without additives, or diets containing ASEYA, or dried egg yolk without ASEYA, or IM injections of ceftiofur. Treatments were continued for 2 days, after which pigs were challenged with *S.* Typhimurium then mixed and transported to a holding facility to simulate shipping to market. Fecal samples were obtained prior to initiation of treatments, just prior to challenge and transport, immediately following transport, and at 24 and 48 hours following transport, for recovery of salmonella. In Experiment 1, the percentage of pigs shedding salmonella was decreased (P<.05) for antibiotic treatments compared to other diets; however, resistance was higher (P<.05) in *E. coli* from pigs fed antibiotics. In Experiment two, although a treatment effect was observed immediately after transport (P<.001), neither ASEYA nor ceftiofur were effective in reducing salmonella shedding. These studies indicate that in-feed addition of anti-salmonella egg yolk antibodies may not be effective in controlling shedding of salmonella in swine.

Key Words: Salmonella, Egg Yolk Antibodies, Swine

W58 Effect of grain processing on performance and fecal shedding of E. coli O157 in finishing feedlot heifers. B. E. Depenbusch*, E. R. Loe, M. C. Corrigan, T. G. Nagaraja, and J. S. Drouillard, *Kansas State University*, *Manhattan*.

Ninety-two crossbred yearling heifers (initial BW = 347 kg) were fed diets containing dry-rolled corn (DRC) or steam flaked corn (SFC) to assess the impact of grain processing on prevalence of E. coli O157. Steam flaking typically results in more extensive ruminal digestion, and thus less substrate flow to the hindgut, potentially altering populations of flora in the hindgut. During the prescreening phase, heifers (n=92) were fed a common DRC finishing diet. Heifers were screened for presence of E. coli O157 using a fecal grab sample (FECAL) and by swabbing the rectoanal mucosa (RAMS). Animals that tested

positive by either sampling technique (TOTAL; n=30) were randomly assigned to individual pens and fed diets consisting primarily of DRC or SFC. Animals assigned to the SFC diet were transitioned from the DRC diet over a 9-d period. Animals were again sampled using both techniques on days 14, 21, 28, 36, 43, and 50. Average daily gains during the study were 1.75 and 1.43 kg/day for cattle fed SFC and DRC, respectively ($P < 0.01$). No differences in DMI were detected ($P < 0.85$) between SFC and DRC (8.44 and 8.52 kg/day, respectively), but gain efficiency was improved ($P < 0.01$) with SFC compared to DRC (0.207 and 0.168 kg/day, respectively). E. coli prevalence for TOTAL remained above 50% for the first 14 days, and then declined over time (53, 33, 0, 27, 6, and 13% for DRC and 67, 27, 40, 40, 20, 6% for SFC on days 14, 21, 28, 36, 43 and 50, respectively). No treatment × day interactions were detected for TOTAL, RAMS, or FECAL ($P > 0.70$, $P > 0.60$, and $P > 0.30$, respectively). Feeding SFC improved performance of heifers compared to DRC, but did not impact E. coli O157 prevalence rates. This study does demonstrate that it is feasible to utilize pre-screening as a method for identifying cattle that are positive for E. coli O157, and to subsequently use these animals to investigate the impact of preharvest intervention strategies on E. coli O157 prevalence rates.

Key Words: E. coli O157, Steam-Faked Corn, Dry-Rolled Corn

W59 Effect of monensin and tylosin on shedding of *Escherichia coli* O157:H7 by feedlot cattle. T. A. McAllister*[1], S. J. Bach[2], and T. R. Callaway[3], [1]*Agriculture and Agri-Food Canada Research Centre*, *Lethbridge, AB, Canada*, [2]*Agriculture and Agri-Food Canada Research Centre*, *Summerland, BC, Canada*, [3]*USDA-ARS*, *College Station, TX*.

In North America, monensin and tylosin are routinely included in diets for feedyard cattle. These antibiotics have activity against Gram-positive bacteria, and it has been theorized that their effects on the intestinal environment may promote proliferation of Gram-negative bacteria such as *Escherichia coli*. The effects of these additives on fecal shedding of *E. coli* O157:H7 were studied in a feedyard environment using 32 finishing steers randomly assigned to four treatments. A diet containing 85% barley grain, 10% barley silage, and 5% supplement was amended with 33 ppm monensin (M); 11 ppm tylosin (T); both additives (M+T); or no additives (control, C). All steers were orally inoculated with 10^{10} cfu of a mixture of four strains of nalidixic acid-resistant *E. coli* O157:H7. Fecal (rectal grab), oral (mouth swab) and environmental (water, water-bowl interface, feed, and pen floor fecal pat) samples were collected weekly for 12 wk to track the inoculant strains. Prevalence of *E. coli* O157:H7-positive fecal samples did not differ ($P = 0.26$) among treatments, nor did the rate ($P = 0.81$) or duration ($P = 0.85$) of fecal shedding of the organism. Fecal samples were positive for *E. coli* O157:H7 more frequently ($P < 0.001$) than were oral swabs. More ($P = 0.02$) *E. coli* O157:H7-positive oral swabs were recovered from group T than from the controls. *Escherichia coli* O157:H7 was not detected in any water samples (0/47). It was present in 1 of 47 water bowl swabs, 7 of 48 feed samples (C, 2/12; M, 2/12; T, 2/12; M+T, 1/12), and 36 of 48 fecal pats (C, 6/12; M, 10/12; T, 10/12; M+T, 10/12). Feed and water were not significantly contaminated even when cattle were dosed orally with 10^{10} cfu of *E. coli* O157:H7. There was no evidence that dietary inclusion of monensin or tylosin, alone or in combination, increased fecal shedding of *E. coli* O157:H7.

Key Words: *E. coli* O157:H7, Fecal Pat, Oral Swab

W60 Clinical trial testing the effect of vaccination and direct-fed microbials on prevalence of *E. coli* O157:H7 in commercial beef feedlots. R. Peterson*, D. Smith, R. Moxley, T. Klopfenstein, G. Erickson, and S. Hinkley, *University of Nebraska*, *Lincoln, NE.*

A clinical trial was conducted to field test the effect of vaccination against EHEC type III secreted proteins or feeding a direct-fed microbial product (DFM) on the prevalence of *E. coli* O157:H7 (EC) in commercially fed cattle. Feedlots were classified as either feeding or not feeding a DFM (Lactobacillus acidophilus and Propionibacterium freudenreichii). Within feedlots, pens of vaccinated (VAC) and nonvaccinated (NOVAC) cattle were matched by time of testing. Two doses of vaccine were given, one at initial processing and another at reimplant. Each pen of cattle enrolled in the study was sampled for EC starting at least one week after the second dose of vaccine was given, and continued every three weeks for four test period samplings. EC test samples were ropes hung from the neckrail of the feedbunks overnight where cattle could easily lick, chew, or rub on them. Culture of EC from at least one rope classified the pen as EC-positive. The outcome variable was the probability for pens to test EC-positive. Data was analyzed using the GENMOD procedure of SAS accounting for clustering by matched pair and repeated measures. We studied 148 pens of cattle (n=21,691 head of cattle) in 19 commercial feedlots; 49 paired pens in feedlots feeding DFM and 25 pairs in feedlots not feeding DFM. VAC pens of cattle were less likely to test ROPES-positive than their matched NOVAC pens of cattle (OR=0.63, P=0.009). However, there was no difference (P=0.14) in the probability for pens to test EC-positive in feedlots feeding DFM compared with feedlots not feeding DFM. Additionally, month (P<0.001), region (P<0.001), and pen condition (P=0.03) helped to explain the probability for pens of cattle to test positive for EC. These data suggest that vaccination may be a promising pre-harvest intervention for the control of EC in commercially fed cattle.

Key Words: Direct-Fed Microbial Product, *Escherichia coli* O157:H7, Vaccination

W61 Inhibition effects of phage displayed peptides against *E. coli* O157:H7. C. J. Fu*, F. J. Schmidt, and M. S. Kerley, *University of Missouri*, *Columbia*.

Eight phage clones, identified from 80 phage clones selected against pathogenic E. coli O157:H7 by phage display technology, were tested for their inhibiting or killing effects in 96-well microplate incubations. The PEG/NaCl purified phages (10^{12}) and the bacteria (10^{3}) were inoculated in tryptic soy broth (TSB) in each well. The growth of the bacteria was determined by reading OD at 630 nm from 0-h to 24-h (0, 4, 6, 8, 12, and 24 h) at 37°C. The OD was corrected by the blanks which were inoculated with only the phage clones. The results indicated that the OD decreased by 40-60% from 8-h to 24-h when phage clones were incubated with bacteria compared to bacteria incubated without clones or compared to the incubation of library phages with the bacteria. The CFU was determined from the 24-h incubation well. The results were in agreement with the OD changing. The bacterial morphology was observed by confocal microscope at 2000x. The results indicated that bacterial morphology was changed from rod to round. We concluded from these experiments that the selected phage clones might inhibit the bacteria by binding their cell surface proteins or receptors and interrupt growth and differentiation. Further information is needed to elucidate the possible receptors.

Key Words: E. coli O157:H7, Phage Clones, Phage Display

W62 Effect of spraying acetic acid and refrigeration on microbial load in beef cattle carcass. F. G. Rios*, E. Ley, R. Verdugo, and G. Contreras, *FMVZ-Universidad Autónoma de Sinaloa*, *Culiacan, Sinaloa, Mexico*.

With the objective of determinate the effect of spraying acetic acid and refrigeration on microbial load in beef cattle carcass, an experiment was conducted. Forty beef carcass were used in a randomized experiment design, twenty carcass were processed as regular management system; the other twenty carcass were sprayed with 20 mL of acetic acid 2% (vol/vol), solution before entering in the cold room. All carcass were stored at 4°C. After five minutes in cold room, using hisopes, the samples were take from surface leg, flank, and shoulder of each carcass. After 22 h, the same surfaces in carcasses were sampled. The samples were incubated (35°; 24 h). To relationship environmental condition with carcass surface microbial content, 40 plates were exposed five minutes in cold room, after were closed and incubated (35°C; 24 h). After incubation were read searching for growth of Salmonella spp., Escherichia coli, mesophylus aerobes, and coliforms. Results were recorded as CFU, data were transformed to log of CFU+1 and analyses of variance were performed and data are show as log CFU/cm2. Effect of refrigeration was analyzed by T-Test, and relationship between data carcass and data cold room, were analyzed by correlation test. Salmonella spp. and E. coli were not found in carcass and environment. Acid acetic diminished (P<0.01) account of meshophylus in leg (2.39 vs. 1.26 CFU/cm2), flank (2.51 vs. 1.26 CFU/cm2), and shoulder (2.88 vs. 1.36 CFU/cm2), and diminished (P<0.01) coliforms load (2.64 vs. 2.08 CFU/cm2) in shoulder; not effect was observed (P<0.05) in leg and flank. Was observed tendency (P=0.07) to reduced account of meshophylus (2.60 vs. 2.41 CFU/cm2) and diminished (P<0.01) coliforms load (2.48 vs. 1.68 log CFU/cm2) by

refrigeration effect. Not was found correlation (P>0.10), between microbial load of beef cattle carcass and cold room. Its concluded, that spraying acetic acid 2% solution and refrigeration, reduce microbial contamination of beef carcass surface and inhibit presence of E. coli and Salmonella.

Acknowledgements: SIMAC-CONACyT and Abbatoir Municipal Culiacan

Key Words: Beef Carcass, Microbial Contamination, Acid Acetic

W63 Relationship between kind, repose time and ruminal content consistence on bovine regurgitation at slaughter. F. G. Rios*, M. F. Moreno, J. J. Portillo, and G. Contreras, *FMVZ-Universidad Autónoma de Sinaloa, Culiacan, Sinaloa, Mexico*.

The objective of this experiment was determine the relationship between kind, repose time at ruminal content in head of bovine slaughtered. The bovine monitored, Brahman breed, were 5,188 animals, with 2611 calves, 1755 bull calves, 564 veals and 258 heifers. The repose time were classified in three categories: 1) animals with repose time less at three hours; 2) animals with repose time major three hours and less at twelve hours, and 3) animals with major repose time at twelve hours. After of insensibilitation procedure was registered the presence of ruminal content in throat and mouth in head of beef and carcass was identified to evaluated the consistence of ruminal content as: 1) watery, 2) semi-watery, and 3) dense. Data were disposed in frequency tables and analyzed by X2 Test. In the male group (calves and bull calves), the regurgitation (8.65 %) was less (P=0.10), that female slaughtered (11.5 %) (veal and heifers). Not was observed relationship (P=0.58) between repose time and kinds, in regurgitation. Whit repose time major than twelve hours increased (P<0.01) the presence of ruminal contente in head, when ruminal content was watery (75.1 %) and semi-watery (19 %).

It is concluded that at major repose time increases the regurgitation when content ruminal consistence is watery and semi-watery, and is higher the proportion in females that regurgitates than males.

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Key Words: Ruminal Content, Bovine Head, Repose Time

W64 Lead levels in three commercial brands of pasteurized milk from northern Mexico. J. A. Sosa-Garcia[1], M. Garcia-Carrillo[1], M. C. Hernandez-Serrano[2], and R. Rodriguez-Martinez*[1], [1]*Universidad Autonoma Agraria Antonio Narro - Unidad Laguna, Torreon, Coahuila, Mexico*, [2]*Universidad Autonoma de Coahuila, Torreon, Coahuila, Mexico*.

Lead, one of the most important heavy metal contaminants, is mainly derived from industrial processes. When lead is in high levels in animal tissues, it may cause health problems with serious social and economical consequences. Both for animals and humans, foods is one of the most common channels for lead poisoning, and in humans, milk is very likeable to cause such poisoning due to its metabolic pathway. Therefore, lead levels were measured in three different commercial brands of pasteurized milk, identified as A, B, and C, which were collected in three cities (Torreon, Coahuila; Gomez Palacio and Lerdo, Durango) from Region Lagunera in Mexico (LN 25º 00' LO 103º 14' and 1320 msnm). In order to collect 30 ml from each liter, one liter from each brand was obtained from stores located in each one of the cardinal points from each one of the cities. Samples were carried out at 4ºC to the Biochemistry Laboratory from University Autonomous of Coahuila, where they were stored at -18ºC until 48 h later, when they were analyzed by atomic absorption spectrophotometry (AAS) to determine their lead levels. The results were compared against the levels established in the Norma Oficial Mexicana (NOM) and the World Health Organization (WHO), and they were contrasted with another two international organizations (Brazilian and Romanian Norms). Two of the 36 samples from a commercial brand (B) showed upper levels (0.115 y 0.104 mg/kg) to those allowed for NOM and WHO norms (0.1 mg/kg). On the other hand, 6 samples (17%) were higher than the allowed for the Romanian regulation and 21 samples (58%) exceed the Brazilian norm. This results show that even though in a general way, the lead levels in pasteurized milk for human consumption in Region Lagunera, are below allowed limits (NOM and WHO norms), they are very close to the limits; beside that, in some cases they are higher, and this fact could be a serious health public problem since lead is a metal which accumulates in animal tissues in a chronic way. Consequently, it is necessary to continue with researches that allow us characterize the role milk and other foods of animal origin has in the epidemiology of this metal.

Key Words: Lead, Milk, Pasteurization

W65 Application of automatic flow cytometry as a conventional method for determination of total bacterial count in Brazil. L. D. Cassoli[1], A. C. O. Rodrigues*[1], A. Coldebella[2], L. C. Roma, Jr.[1], and P. F. Machado[1], [1]*University of Sao Paulo (USP), Piracicaba, SP, Brazil*, [2]*EMBRAPA Suinos e Aves, Concordia, SC, Brazil.*

Brazilian dairy industry has experienced great changes in milk quality during the last years. The approval of the National Plan of Milk Quality Improvement that will be introduced in July 2005 brings new evaluation parameters and regulatory limits for the Brazilian milk. Total bacterial count (TBC) was included as one of the new evaluation parameters for the entire produced milk. A well-known automatic equipment (Bactocount-Bentley Instruments) which determines TBC by flow cytometry was adopted for monitoring. However, the regulatory limit for TBC was established in colony forming units (cfu) and the Bactocount gives bacteria number by counting individual bacteria cells which can be 2 to 3 times higher than a TBC result in cfu. In this case there is the necessity to develop a transformation equation from individual bacterial count (IBC) to cfu according to Brazilian levels of TBC. The objective of this study was to create an equation to associate IBC with cfu and, consequently, express TBC results as cfu. Bulk tank milk samples (n = 219) from 57 dairy farms located in Sao Paulo and Minas Gerais state were collected from June to December 2004. Milk samples were split and used to run standard plate counts and Bactocount readings. Milk analyses were performed in duplicate. Average TBC was 630,000 cfu/ml. The equation was defined as $LOG_{10}(cfu) = 0.722 \times LOG_{10}(IBC) + 1.474$ with coefficient of correlation of 0.81 and accuracy of estimate $s(y,x) = 0.312$. Correlation was uniform for the whole TBC range. The coefficients indicated a great correlation between methods. The equation has been used to transform IBC results in cfu and additional research has been done to evaluate seasonal influence in the correlation between IBC and cfu.

Key Words: Flow Cytometry, Bacterial Count, Milk Quality

W66 Milk quality and new regulations in Brazil. A. C. O. Rodrigues*, L. D. Cassoli, and P. F. Machado, *Clinica do Leite, ESALQ, USP, Piracicaba, SP, Brazil*.

Milk production continues to grow in Brazil enhancing the national dairy industry. However, Brazilian milk quality needs to be improved to achieve international standards. Since 1997, the Brazilian Department of Agriculture has discussed milk quality issues which resulted in the creation of the National Plan of Milk Quality Improvement. This plan determines new rules for production, shipment, quality and grade of milk which will be effective on July 2005. One of the most important rules for milk quality is that all produced milk will have to be cooled in the farm and be shipped in bulk to dairy plants. Changes will be implemented progressively and will have different deadlines according to the milk production region of Brazil. Sao Paulo state is part of the most productive region of Brazil and, after July 2005, will need to supply milk produced under the new milk quality standards. The objective of this study was to determine raw milk quality in Sao Paulo state and to verify the amount of produced milk that could follow the new regulations. Each month during the year of 2004, bulk milk samples of Sao Paulo dairies (4004 per month) were sent to an official laboratory (Clinica do Leite) and analyzed for milk composition, somatic cell count (SCC) and total bacterial count (TBC). Average milk composition was 3.48% (SD = 0.45) of fat, 3.18% (0.20) of protein and 12.12% (0.57) of total solids. Fourteen percent of the produced milk could not be sold according to the new minimum limit for fat content of 3.00%. Both SCC and TBC showed a high average of 469,000 cells/ml (median = 343,000) and 443,000 cfu/ml (238,000), respectively. There was no relationship between SCC and TBC. Brazilian regulatory limit of raw milk for SCC and TBC was initially defined as 1,000,000 units; 8% and 15% of the produced milk would exceed the limit for SCC and TBC, respectively. Fat, protein, SCC and TBC had seasonal patterns.

The study showed that Brazilian dairies need improvement to attend the new milk quality standards. Research, extension and experience of other countries that have already passed through this process are important to guide the Brazilian dairy industry.

Key Words: Milk Quality, Regulation

W67 HACCP and GMP paper free management. B. M. de O. Ramos[1], R. Ramos[2], V. C. Oliveira[2], and L.H. da S. Miglioranza*[1], [1]*Universidade Estadual de Londrina*, *Londrina, Paraná, Brazil*, [2]*VRSys*, *Londrina, Paraná, Brazil*.

Our work presents a software for HACCP/GMP management in the milk industry. The aim was the development of a diagnostic instrument to assess the performance of those food quality tools, based on the paper free management concept. It is easy to deal with the software, not requiring advanced computer knowledge. The GMP management is quite difficult because there is subjective element in the evaluation. Rules and scores attributed involves different environment, proposal and goals. They must be adapted to any situation before and inside the industry, respecting the particular characteristics presented by any critical points in the milk production. Moreover, the conventional HACPP management generates great amounts of paper archives, records and reports, becoming a non practical and suitable work. In the proposed software, the subjective variables are transformed in objective variables that can be measured, plotted and graphically registered. The system identifies the objective variables and develop procedures appropriated to monitor them as basis for any evaluation of strategy implementation in the milk quality control. The program uses mechanisms of scoring, divided in three levels: low risk (0 - 3), medium risk (4 - 6) and high risk (7 - 10). The input data and all the added information are managed by the MySQL database. The system permits also a visual description and generates a computational formula for a resultant graphic. The report and the statistical data are modeled according to the manufacturer needs. There is also an automatic backup tool, and is available the update for the internet. As a final result, a higher assurance of milk quality can be obtained, by the comparisons of graphic results in time intervals.

Key Words: Objective Variables, Quality Control, Performance of Quality

Forages and Pastures: Feeding and Management

W68 A quick test for estimating added water or feeding adjustments for corn silage and haylage. R. Norell*[1], J. Packham[2], and S. Parkinson[3], [1]*University of Idaho*, *Idaho Falls*, [2]*University of Idaho*, *Paris*, [3]*University of Idaho*, *Preston*.

A critical quality control point in TMR management is to monitor dry matter content of ensiled forages. TMR feeders need to adjust feed loading amounts when forage dry matter declines. The objectives of this study were to: 1) develop regression equations for predicting added water and feeding adjustments using silage density measurements and 2) evaluate repeatability of density determinations. Samples from 6 haylages (mean DM = 43%) and 6 corn silages (mean DM = 32%) were collected from commercial dairies. Samples were split into five sub-samples and water was added (wt/wt) in the following water to silage ratios: 0/100; 10/90; 20/80; 30/70, and 40/60. Density was determined by weighing a shallow, flat container (volume =1.18 l), filling with silage, weighing in grams, and converting to density (g/l). Dry matter contents were obtained from Utah State University feed testing laboratory. Percent added water can be modeled with a quadratic equation using sample density minus initial density as the independent variable ($P<0.0001$, $R^2=0.92$). Feeding adjustment can also be modeled with a quadratic equation using sample density minus initial density as the independent variable ($P<0.0001$, $R^2=0.86$). Feeding adjustment (Y variable) was initial dry matter divided by test sample dry matter. Slopes and intercept did not differ ($P>0.4$) between haylage and corn silage for either model. Repeatability was assessed with 5 technicians measuring silage density 10 times each for 3 corn silages and 3 haylages. CV was below 6% in all 30 test combinations. Variation within forage differed between technicians ($P<0.05$) in 4 out of 6 forages. Two technicians consistently averaged higher densities. Density determinations at the farm level should be conducted by the same person or each tester should establish their respective initial density measurement. Accuracy would be improved by weighing 3 or more samples and calculating mean density. Measuring silage density is a quick, easy test for estimating added water or estimating required feeding adjustments for corn silage and haylage at the farm level.

Key Words: Dry Matter, Corn Silage, Haylage

W69 Nutritive value and proper level of mixed feeding of *Atriplex cancsens* and *Panicum antidotale* in Balouchi sheep. V. Kashki* and H. Tavakoli, *Agriculture and Natural Resources Research Center of Khorasan*, *Mashhad, Khorasan, Iran*.

Atriplex cancsens is one plant species that is widely used for range reclamation but it does not satisfy total animal requirements; therefore, in this experiment it was used as a complement with *Panicum antidutale*. *Panicum* was replaced by *Atriplex* at levels of 0, 25, 50, 75 and 100 percent of dry matter. Apparent digestibility of feeds (In vivo), digestible dry matter (DDM) digestible organic matter (DOM) digestible crude protein (DCP) digestible cell wall content (DNDF) and digestible gross energy (DE) were determined by using 20 male Balouchi lambs. Animals were randomly assigned to 5 groups and studied in a complete randomized design with 5 treatments. Data were analyzed using the GLM procedure of SAS. Chemical characteristics of species were measured with AOAC methods. Crude protein, cell wall content and gross energy for *Atriplex* were 13.72 %, 32.75 %, 16.43 %, 3720 (kcal/kg), for Panicum they were 12.2 %, 62.03 %, 29.17 % and 3845(kcal/kg) respectively. Results showed that there were significant differences in digestibility of dry matter (DM), organic matter (OM), crude protein (CP), cell wall content (NDF) and Energy between treatments ($P<0.05$). Treatment with 75% *Atriplex* and 25% *Panicum* had greatest in DDM and DOM. Dry matter intake, water daily intake, urine daily excretion, rumen N-NH3 and rumen liquid pH were significant between treatments ($P<0.05$). There was no significant difference between blood glucose and sheep live weight changes. Mixed consumption of *Atriplex* and *Panicum* in the ratio of 50:50 increased dry matter intake relative to other treatments in sheep.

Table 1. Apparent nutrient digestibility of plants in sheep

A.ca/P.an	Treatment	DDM (%)	DOM (%)	DCP (%)	DNDF (%)	DE (%)
0:100	1	34.39^{d}	40.25^{c}	63.70^{b}	43.76^{bc}	29.73^{b}
25:75	2	45.46^{c}	46.59^{b}	70.76^{b}	43.33^{bc}	39.59^{b}
50:50	3	52.54^{b}	50.61^{ab}	84.97^{a}	48.25^{b}	46.92^{b}
75:25	4	57.99^{a}	54.47^{a}	86.63^{a}	57.21^{a}	53.97^{a}
100:0	5	56.43^{a}	49.10^{a}	91.79^{a}	40.39^{a}	52.49^{a}
SE		1.139	1.487	2.884	2.265	1.279
P		0.0001	0.0001	0.0001	0.0011	0.0001

Means in columns within a category with unlike superscripts differ significantly ($p<0.05$).

Key Words: Atriplex Cancsens, Panicume Antidotale, Balouchi Sheep