of the selective media during aging. Probiotic adjunct cultures can be detected in cheddar cheese out to 90-120 d when growth of nonstarter LABs obfuscates results on selective media. Some adjunct cultures can be detected beyond this time, particularly *Lb. casei* and *Lb. paracasei*. Results indicate selected probiotic adjuncts can survive for at least 90 d in low-fat, reduced-fat, and full fat Cheddar cheese.

Key Words: probiotic, cheese, lactic acid bacteria

527 Intrinsic resistance and stress responses to hydrogen peroxide in bifidobacteria. T. S. Oberg*[1], S. C. Ingham[2], J. L. Steele[2], and J. R. Broadbent[2], [1]*Utah State University*, *Logan*, [2]*University of Wisconsin*, *Madison*.

The interest and use of bifidobacteria as a probiotic in function foods has increased dramatically in recent years. Due to the anaerobic nature of bifidobacteria, however, oxidative stress can pose a major challenge to the viability of bifidobacteria during storage in functional foods. To better understand oxidative stress resistance in two industrially important species of bifidobacteria, we examined the response of three strains of *Bifidobacterium longum* and three strains of *Bifidobacterium animalis* subsp. *lactis* to hydrogen peroxide. Each strain was exposed to a range of hydrogen peroxide concentrations (0.1mM to 10mM) to evaluate and compare intrinsic resistance to H_2O_2. Next, strains were tested for the presence of an inducible oxidative stress response by 20 or 60 min exposure to a sublethal level of H_2O_2 followed by challenge at a lethal H_2O_2 concentration. Results showed *B. longum* subsp. *infantis* ATCC 15697 and *B. lactis* D2908 had the highest level of intrinsic H_2O_2 resistance among tested strains of *B. longum* and *B. lactis*, respectively. Inducible H_2O_2 resistance was only detected with two strains; *B. longum* NCC2705 showed a 17-fold increased survival in 5.25mM H_2O_2 after a 60 min induction in 1.25mM H_2O_2, and survival of *B. lactis* D2908 increased 2.5-fold in 5.25mM H_2O_2 after 20 min induction in 1.25mM H_2O_2. Other strains showed either no difference or increased sensitivity to H_2O_2 after induction treatments. These data indicate that intrinsic and inducible resistance to hydrogen peroxide is strain specific in *B. longum* and *B. lactis* and suggest that for some strains, sublethal H2O2 treatments could help increase cell resistance to oxidative damage in production and storage of probiotic foods.

Key Words: bifidobacteria, probiotic, oxidative stress

528 Cholesterol removing ability and bile tolerance of lactic acid bacteria isolated from fermented yak milk. Y. Jiao[1], L. Zhang*[2], and H. Yi[2], [1]*Heilongjiang University of Chinese Medicine*, *Harbin, China*, [2]*College of Food science and engineering, Harbin Institute of Technology*, *Harbin, China*.

Cholesterol assimilating ability and bile tolerance of 23 strains of lactic acid bacteria isolated from fermented yak milk of Gansu province were examined. All strains have varying capabilities to remove cholesterol in vitro. The ability of cholesterol assimilation of most of the strains in the media with oxgall was better than without. The heat killed strains assimilated less cholesterol than the normal ones. All types of bile salts could inhibit the growth of strains, the most powerful of which was sodium glycocholate, bile acid took the second place, oxgall was the weakest. There was no relationship between bile salts tolerance and cholesterol assimilation. Finally, it was found that the strains of H1, I10,and W2 acted better, indicating that these strains may be promising candidates for use as a dietary adjunct to lower serum cholesterol in vivo.

Key Words: fermented yak milk, lactobacillus, cholesterol removal

529 Factors affecting the total bacteria count of raw milk preserved with azidiol (liquid or tablet) and bronopol. M. O. Leite*[1,2], N. J. Andrade[3], M. M. O. P. Cerqueira[1,2], L. M. Fonseca[1,2], and R. Rodrigues[1,2], [1]*Federal University of Minas Gerais (UFMG), School of Veterinary Medicine, Department of Food Technology and Inspection*, *Belo Horizonte, MG, Brazil*, [2]*Laboratory of Milk Quality Analysis, UFMG*, *Belo Horizonte, MG, Brazil*, [3]*Federal University of Viçosa*, *Viçosa, MG, Brazil*.

The objective of the present work was to evaluate the influence of several parameters on the milk quality results of electronic analyses for total bacteria count (TBC), somatic cell count (SCC) and composition. The parameters were: storage time and temperature, azidiol (liquid and tablet), and bronopol. Six samples were collected, subdivided, added preservative and stored at room temperature for up to eight days, and incubated under three different temperatures (4, 7, and 10°C) for until ten days. An electronic equipment, Bentley CombiSystem 2300® was used for the composition and SCC analyses. The total bacterial counting (TBC) was analyzed using an electronic equipment Bactocount IBC (Bentley®) and standard plate counting for mesophilic aerobic microrganisms. The design was split-plot, and the results were evaluated by Analysis of Variance with analysis of minimal significant difference by Duncan Test. The results showed that samples kept at 30°C can be analyzed, for composition and SCC until the fourth and fifth day, respectively, after collection. Cooled samples can be analyzed for composition, SCC and TBC until 10 days after collection. However the samples can not be stored at room temperature for TBC. There was a significant statistical difference on the levels of lactose and SCC for samples preserved with azidiol instead of bronopol. Therefore azidiol is not suitable for sample preservation in the electronic analysis for composition and SCC. Sample preserved with bronopol is not indicated for TBC because it underestimates the bacterial population. The results indicated that the tablet of azidiol can be used to replace the liquid presentation of this preservative in raw milk samples. *Acknowledgements: FUNDEP/UFMG; FAPEMIG; CNPq; CAPES.*

Key Words: azidiol tablet, milk quality, bronopol

Extension Education

530 A diagnostic tool to assess calf welfare and management on-farm. E. Vasseur*[1], J. Rushen[2], A. M. de Passillé[2], D. Lefebvre[3], G. Fecteau[4], and D. Pellerin[1], [1]*Université Lavalé*, *Quebec city, Quebec, Canada*, [2]*Pacific Agri-Food Research Centre, Agriculture and Agri-Food Canada*, *Agassiz, British Columbia, Canada*, [3]*Valacta, Dairy Production Centre of Expertise Quebec-Atlantic*, *Sainte-Anne-de-Bellevue, Quebec, Canada*, [4]*Veterinary Faculty, Université de Montréal*, *Sainte-Hyacinte, Quebec, Canada*.

Unweaned calf morbidity remains high, which is a costly animal welfare concern. A previous survey, of 115 Quebec dairy farmers found mean perinatal calf mortality of 8.8%, which was underestimated by 20 to 50% by producers with 94% believing calf morbidity was not a problem.

Diagnostic tools to assess calf health and welfare on-farm are needed to improve production and consumer assurance. From this survey, we identified 10 areas of concern: calving management, care of the newborn and painful procedures, colostrum management, calf-dam separation, weaning, calf feeding, calf housing, heifer feeding, heifer housing, and health. We then developed a diagnostic and intervention tool with recommended goals for each area of concern and material was assembled to explain on-farm those goals. An expert committee validated the scoring system and recommendations. The tool was tested in 28 Quebec dairy farms for feasibility, producer satisfaction and repeatability. Farmers were asked to take colostrum and blood samples, and record health data. The on-farm evaluation included an interview on management practices and in-barn measurements related to calf and heifer welfare. The efficiency and usefulness of the tool was evaluated by the producers during a final debriefing. The visit required 3:38±1:07 h (Mean±SD). We found that 100% of producers were convinced of the effectiveness of our diagnostic tool for identifying areas in need of improvement, and that our tool was useful as an advisory tool for technical advisors and veterinarians. Involving producers in the collection of data (e.g. checking colostrum quality by using a colostrodoser) and providing realistic targets, helped in putting emphasis on problem areas and in discussing ways of improvement. Thus, 75% of producers would continue using in routine the colostrodoser and keeping stock of colostrum. Although 65% found it useful to keep health records, only 32% continued to do so over a 6-month period. Voluntary improvements in animal welfare can be facilitated by using appropriate tools to educate producers and help them change their attitudes towards management and animal welfare.

Key Words: on-farm tool, welfare, calf

531 Expanding use of high accuracy AI sires in Missouri beef cattle enterprises. D. C. Busch*, N. R. Leitman, D. A. Mallory, J. F. Bader, D. J. Wilson, S. E. Poock, M. F. Smith, J. L. Parcell, and D. J. Patterson, *University of Missouri*, *Columbia*.

Implementation of existing and emerging reproductive technologies (fixed-time AI; FTAI) in beef cattle enterprises affords producers a competitive advantage over beef enterprises that do not implement these same technologies. Field demonstrations involving 34 cow-calf producers across Missouri were conducted to demonstrate the feasibility of using FTAI. In addition, 14 educational meetings with ~ 650 people in attendance were held to review results highlighting successes in using FTAI in cows. These programs reviewed criteria for implementing a FTAI program, and the expected improvement in calving distribution, genetics, and carcass quality of calves that result from AI sires with high accuracies for various production and carcass traits. Based on pregnancy diagnosis performed with transrectal ultrasonography, 2420/4083 (59%) cows conceived to a single FTAI (CO-Synch + CIDR with FTAI at 66 h) among the 34 farms. Calving data summarized from these demonstrations show an increase in calf age ranging from 6 to 22 days in comparison to the previous year′s calving profiles; resulting in older, heavier, and more uniform calves at weaning. A group of steers (n = 145) resulting from FTAI and subsequent natural service (NS) matings were weaned and preconditioned for 45 d before placement in the same feedlot. Sires of these steers were categorized on the basis of EPD accuracies: High Accuracy AI (HA; n = 42); Low Accuracy AI (LA; n = 62); Calving Ease AI (CE; n = 27); or NS (n = 14). The HA sire group had EPD accuracies ≥ 0.85 for BW, WW, and YW. Individual carcass data was collected for all steers at harvest. The number of steers grading Choice or better was increased in the HA sire (78%) and CE sire groups (84%) compared to the LA sire (59%) and NS groups (27%). In summary, beef operations in Missouri are realizing improvements in reproductive management and genetics resulting from FTAI to genetically proven superior sires. *This project was supported by National Research Initiative Competitive Grant No. 2007-55618-18238 from the USDA Cooperative State Research, Education, and Extension Service.*

Key Words: artificial insemination, beef cows, estrus synchronization

532 On-line access to the Cattle Producer's Library for disseminating beef cattle educational information. J. C. Whittier[1], J. W. Oltjen*[2], J. A Paterson[3], D. R. Zobell[4], and Western Beef Resource Committee[5], [1]*Colorado State University*, *Fort Collins*, [2]*University of California*, *Davis*, [3]*Montana State University*, *Bozeman*, [4]*Utah State University*, *Logan*, [5]*WBRC*, *12 Western USA States*.

Our objective is to report on-line use of The Cow-Calf Management Guide & Cattle Producer's Library (CL) during 2008. The CL is an educational resource for cattle producers and educators prepared by the Western Beef Resource Committee (WBRC) comprised of extension specialists in 12 western states. The first printed edition of the CL was in 1980, with a second edition in 1992. In 1999 a CD-ROM version was added. The CL contains approximately 250 factsheets in sections on quality assurance, nutrition, reproduction, range and pasture, animal health, management, marketing, finance, genetics, drought and other natural disasters. The CL is revised annually by WBRC. In 2005, Colorado State University (CSU) was charged by WBRC to develop a site for on-line electronic access to the CL. Concurrently, CSU was enhancing their web delivery of beef cattle information as the URL CSUBeef.Com. The CL was added as a menu item and requires users to have a user name and password to access the CL. This on-line CL is in Adobe PDF format and registered users can download and print factsheets individually. The site contains a search function to find terms and phrases in the CL. During 2008, Google and similar search engines were allowed search capabilities of the CSU CL site. By February 2008 there were 399 registered on-line CL users and 11,117 total factsheet downloads. This increased to 496 users by February 2009 with cumulative downloads increasing to 55,710, over a 5-fold increase in 1 year. The on-line CL contains 15 factsheets translated into Spanish. Of the top 10 downloads, 4 were Spanish, including the Spanish table of contents as the most frequent download (1,243 downloads). This report demonstrates that the internet provides an effective tool for disseminating information about beef cattle production and management topics.

Key Words: Cattle Producer's Library, on-line, internet

533 Using audience response software in equine extension programs. K. Martinson*, *University of Minnesota*, *St. Paul*.

The use of audience response software is an effective tool in encouraging audience participation and interaction. Audience response software can also be used to collect survey data, evaluate teaching effectiveness, and ensure that important concepts are understood. The objectives of using audience response software at Extension programs were to encourage participation, evaluate teaching effectiveness, determine nutrition knowledge, collect data on hay preferences, and determine demographics of horse owners. The use of audience response software began in February 2008. A total of 50 horse owners at three different locations used audience response software during a basic horse hay presentation. Participants were asked the same pre and post presentation questions

to assess nutrition knowledge, determine teaching effectiveness, and to ensure that important concepts were learned. Throughout the presentation, additional questions were asked to determine horse owner hay preferences and collect demographics. Pre-presentation questions demonstrated the lack of horse owner's nutrition knowledge, but provided the ability for the presenter to immediately focus on certain concepts and correct any misconceptions. The survey data showed that a majority of horse owners (69%) bought all of their hay, fed small square bales (57%), and fed a mixture of grass and alfalfa (78%). When asked why participants fed the type of hay they did, 45% indicated they fed what they thought was best for their horse, 42% fed whatever was available, and only 5% had ever worked with an equine nutritionist. A majority of participants (78%) had never had their hay tested for nutritional quality. A majority of participants (72%) owned between one and five horses, 66% were female, 80% were 30 to 69 years old, and 43% had owned horses for less than 5 years. The use of audience response software has resulted in audience participation and interaction, provided immediate feedback regarding teaching effectiveness and participant learning, identified future educational and research needs, and has given insight to horse owner hay preferences and demographics.

Key Words: audience response software, extension, equine

534 Partnering with outside entities to broaden extension's reach: Theory, practice, challenges, implications, and impact. E. A. Greene*[1], R. E. Greene[2], and R. L. Parsons[1], [1]*University of Vermont, Burlington*, [2]*Kleine Lelli Consulting, Wayland*.

With decreasing funding, Extension professionals constantly seek innovative means to produce and provide effective programming that demonstrates impact and meets the needs of the clientele. One potential avenue is to partner with strategic community entities to provide mutually beneficial opportunities for all parties involved. Everything Equine, one of New England's largest equine educational events, is a collaboration between University of Vermont Extension, Champlain Valley Exposition, and other equine businesses that combines a consumer trade show with 75 educational seminars/demonstrations over two days. This collaboration provides a measure of program impact and an opportunity to link Extension, 4-H, the community and equine businesses. Due to sponsors and the enormity of this event, Extension clientele are able to learn from national experts, whose normal fees can exceed entire equine extension budgets. Publicity, educational material, volunteer instructor time contributed to Extension for this event is worth more than $50,000. Commercial exhibitors and equine professionals benefit from interaction with thousands of attendees, while participants benefit from exposure to multiple workshops at one location. For educators, this is a rare opportunity to offer a smorgasbord of educational workshops that would not normally be possible. Extension gains economical and educational benefits while also reaching a large crowd. In 2008, over 8,500 equine enthusiasts attended with at least 1,100 participating in workshops. Calculations indicate that workshops cost less than 40% of traditional Extension workshops, and equine extension received a donation for planning the program. These events have challenges. Partners' roles must be clearly identified and respected by the team and communication is critical. Extension administrators covet monetary benefits but fail to recognize financial risk involved. At such large events, change in behavior can be difficult to measure; we use prize drawings incentives, evaluation cards, and computer surveys.

Key Words: extension, collaboration, programming

535 Maximizing reach via the internet while providing tools for information dissemination in traditional extension environments. E. A. Greene*[1], A. S. Griffin[2], K. P. Anderson[3], and C. D. Skelly[4], [1]*University of Vermont, Burlington*, [2]*University of Kentucky, Lexington*, [3]*University of Nebraska, Lincoln*, [4]*Michigan State University, Lansing*.

eXtension is an online resource transforming how faculty can collaborate and deliver equine education. As the first Community of Practice launched from eXtension, HorseQuest (HQ) offers free, interactive, peer-reviewed, on-line resources on a variety of equine related topics at www.extension.org. This group has learned how to adapt traditional content to the online environment to maximize Search Engine Optimization (SEO), in order to be more discoverable and relevant in the online world. This means that HQ resources are consistently being found on the first page of search results. Also, by researching keywords searched by Internet users, HQ has guided new content direction and determined potential webcast topics based on relevance and frequency of those searches. In addition to establishing good SEO, HQ has been utilizing the "viral networking" aspect of the popular social network, YouTube™. By uploading clips of existing equine educational videos to YouTube™, HQ content appears in mainstream media, is passed on by the user, and helps HQ effectively reach their community of interest (horse enthusiasts). HorseQuest partners with My Horse University to produce webcasts that combine concise knowledge exchange via a scripted presentation with viewer chat and incoming questions. Locally, multiple specialists have used the 24/7/365 web resource in classrooms and programming throughout their states. Examples include using archived webcasts to bring national talks to local audiences (e.g. Dr. Lenz on The Unwanted Horse), video clips to show digesta moving through the horse's system, or showing examples of equine artificial gaits (e.g. rack), which can be difficult to find. Additionally, animations of the parts of the hoof and the interactive learning lesson for body condition scoring have been used in the field and classroom to supplement presentations. HorseQuest is a resource for several state 4-H advancement and competition programs, and will continue to be incorporated into traditional extension, while reaching and impacting global audiences.

Key Words: eXtension, HorseQuest, social networking

Growth and Development: Fetal Development

536 Inadequate protein levels during gestation in gilts affect gestation body mass and fatness as well as offspring birth weight and insulin sensitivity at 10 wk of age. C.C. Metges*, I.S. Lang, S. Goers, P. Junghans, U. Hennig, B. Stabenow, F. Schneider, W. Otten, and C. Rehfeldt, *Research Institute for the Biology of Farm Animals (FBN), Dummerstorf,MV,Germany*.

We have studied whether maternal gestational protein supply affects glucose metabolism in pig offspring. Isoenergetic diets with low (LP, 6% CP; n=15 sows), high (HP, 30%; n=15) or adequate protein (AP, 12%; n=15) levels were fed to German Landrace gilts (age ≈ 8 mo, 149 kg BW) from insemination to parturition. Gilt gestation BW, backfat thickness (BFT; ultrasound) and offspring birth weight were recorded. Piglets were cross-fostered to control sows (standardized litters, 11 piglets), weaned at 28 d and fed according to recommendations. Two pigs per litter (age ≈70 d, ≈23 kg, n=10 litters/diet) were fitted with venous and arterial catheters and received an i.v. bolus of 200 mg/