INTERPRETIVE SUMMARIES, DECEMBER 2014

Stability of fatty acid composition after thermal, high pressure, and microwave processing of cow milk as affected by polyunsaturated fatty acid concentration. *By Rodríguez-Alcalá et al., page 7307.* There is a general concern about saturated and *trans* fatty acid contents in foods, particularly in milkfat. One strategy is feeding cows to increase concentrations of healthy polyunsaturated fatty acids (PUFA) as conjugated linoleic acid (an anticarcinogenic fatty acid) in milk. However, these compounds are prone to oxidation. This study aimed to determine whether fatty acids in naturally PUFA-enriched milks are altered after heating, high pressure, or microwave processing. Our results indicate that high temperature-short time pasteurization and sterilization processing of milk affect conjugated linoleic acid as a result of oxidation and isomerization reactions. These results will help to improve the stability of PUFA-enriched dairy products.
http://dx.doi.org/10.3168/jds.2013-7849.

Validation of radio-frequency dielectric heating system for destruction of *Cronobacter sakazakii* and *Salmonella* species in nonfat dry milk. *By Michael et al., page 7316.* Because of low heat transfer rates, conventional heating of low-moisture foods requires a long time to reach temperatures necessary for adequate destruction of foodborne pathogens. This can result in unacceptable changes in product quality (e.g., color and texture), as well as functionality (e.g., solubility and flowability). Radio-frequency dielectric heating (RFDH) can increase the temperature of low-moisture foods faster, thus minimizing the risk of quality deterioration while achieving the required pathogen lethality. This study validated the RFDH process for destruction of *Cronobacter sakazakii* and *Salmonella* spp. in nonfat dry milk.
http://dx.doi.org/10.3168/jds.2013-7862.

Antioxidant and antibacterial activities of exopolysaccharides from *Bifidobacterium bifidum* WBIN03 and *Lactobacillus plantarum* R315. *By Li et al., page 7334.* The purpose of this study was to investigate the antioxidant and antibacterial activities of exopolysaccharides from *Bifidobacterium bifidum* and *Lactobacillus plantarum*. Five assays were performed for antioxidant abilities, including scavenging of 3 types of free radicals, inhibition of erythrocyte hemolysis, and inhibition of lipid peroxidation. Antibacterial capacity was also measured by agar diffusion method. Both exopolysaccharides showed pronounced antioxidant and antibacterial activities and might have potential applications in the food industry.
http://dx.doi.org/10.3168/jds.2014-7912.

Powder X-ray diffraction can differentiate between enantiomeric variants of calcium lactate pentahydrate crystal in cheese. *By Tansman et al., page 7354.* Powder X-ray diffraction has been used for decades to study calcium lactate pentahydrate crystals in cheese. Although enzymatic analyses of lactate in cheese crystals suggest that calcium lactate pentahydrate occurs in 2 enantiomeric forms, only 1 X-ray diffraction pattern is currently recognized as corresponding to calcium lactate pentahydrate. This report documented 2 distinct diffraction patterns that correspond to the 2 enantiomeric forms of calcium lactate pentahydrate. This information was used to distinguish between the 2 enantiomeric variants in crystals harvested from Cheddar cheeses, demonstrating that powder X-ray diffraction can serve as a rapid tool for differentiating calcium lactate pentahydrate crystals.
http://dx.doi.org/10.3168/jds.2014-8277.

Volatile compounds and sensory properties of Montasio cheese made from the milk of Simmental cows grazing on alpine pastures. *By Bovolenta et al., page 7373.* Montasio is one of the most important Protected Designation of Origin cheeses produced in northeast Italy. It is a semicooked pressed cheese, produced from the milk of the dual-purpose Italian Simmental cows grazing on alpine pastures. The aim was to increase the added value of the product in an area where husbandry is often based on local breeds and where production costs tend to be higher. Pasture type affected volatile fraction and physical characteristics, with a limited effect on chemical properties of cheese. Trained panelists were able to detected physical but not odor and flavor differences between cheeses.
http://dx.doi.org/10.3168/jds.2014-8396.

Effects of probiotic yogurt consumption on metabolic factors in individuals with nonalcoholic fatty liver disease. *By Nabavi et al., page 7386.* Nonalcoholic fatty liver disease (NAFLD) is the most common form of chronic liver disease in the world. In recent years, probiotics have been discussed as alternatives in treatment of various diseases. To our knowledge, no reports are available about the effects of probiotic products, including yogurt, in NAFLD patients. This study was designed to investigate the effects of probiotic yogurt containing *Lactobacillus acidophilus* La5 and *Bifidobacterium lactis* Bb12 on liver enzymes, fasting blood sugar, and serum lipid profile in NAFLD patients. Probiotic yogurt consumption had beneficial effects on metabolic risk factors of NAFLD.
http://dx.doi.org/10.3168/jds.2014-8500.

Prevalence and characterization of foodborne pathogens from Australian dairy farm environments. *By McCauley et al., page 7402.* Understanding the occurrence of pathogenic microorganisms in the dairy farm environment has many benefits, including identifying risks to milking hygiene, maintaining herd health, preventing zoonotic infection, and contributing to production of safe-to-eat dairy products. This study examined the prevalence of 9 pathogens in dairy farms, and revealed a low incidence of *Listeria monocytogenes*, Shiga-toxigenic *Escherichia coli* (STEC), *Campylobacter*, and *Yersinia enterocolitica*. The highest prevalence was noted for *Bacillus cereus* group and *Clostridium perfringens*. *Staphylococcus aureus* was exclusively associated with milk and milk filters. This study identified areas to focus on in order to ensure production of high quality, pathogen-free milk.
http://dx.doi.org/10.3168/jds.2014-8735.

Proteome analysis of *Lactobacillus helveticus* H9 during growth in skim milk. *By Chen et al., page 7413. Lactobacillus helveticus* H9 was isolated from traditionally fermented yak milk in Tibet (China) with the ability to produce the antihypertensive peptides Val-Pro-Pro (VPP) and Ile-Pro-Pro (IPP) during milk fermentation. We used proteomic methods to study changes in the protein expression of *L. helveticus* H9 during the fermentation of skim milk, attempting to reveal overall comprehensive metabolism changes in *L. helveticus* H9. Additionally, it may be helpful to further understand the processes of bioactive peptides that are associated with health benefits.
http://dx.doi.org/10.3168/jds.2014-8520.

Effect of cooling during the dry period on immune response after *Streptococcus uberis* intramammary infection challenge of dairy cows. *By Thompson et al., page 7426.* Heat stress in the dry period affects immune status of dairy cows in the subsequent lactation. We hypothesized that dry period cooling improves immunity to postpartum intramammary infection (IMI) with *Streptococcus uberis*. Cows were dried off and assigned to cooling or heat stress. *Streptococcus uberis* IMI was induced at 5 d postpartum. Blood was collected, neutrophils isolated, and immune response gene expression was evaluated. Cooled cows had greater white blood cell count, more neutrophils, and greater toll-like receptor-2 (*TLR2*) mRNA expression than did heat-stressed cows. Cooling cows during the dry period alters immune function and neutrophil response to IMI in early lactation.
http://dx.doi.org/10.3168/jds.2013-7621.

Biomarkers of inflammation, metabolism, and oxidative stress in blood, liver, and milk reveal a better immunometabolic status in peripartal cows supplemented with Smartamine M or MetaSmart. *By Osorio et al., page 7437.* The period around parturition in dairy cattle is characterized by different degrees of inflammation, oxidative stress, and impaired liver function. Biomarkers in blood and tissue can be used to assess the degree to which these physiological events are altered in the cow, especially as it relates to nutritional management. Rumen-protected methionine (Smartamine M and MetaSmart; both from Adisseo Inc., Antony, France) was fed around parturition to evaluate concentrations of biomarkers in blood and liver tissue. Supplemental methionine enhanced antioxidant capacity and reduced inflammatory signaling within the liver. Biomarkers indicated that a better immunometabolic status is part of the mechanism benefitting postpartal cow performance when supplemental methionine is fed.
http://dx.doi.org/10.3168/jds.2013-7679.

Hormonal treatment before and after artificial insemination differentially improves fertility in subpopulations of dairy cows during the summer and autumn. *By Friedman et al., page 7465.* Reduced dairy cow fertility in summer and autumn is a worldwide phenomenon. Although evaporative cooling systems greatly increase milk production, fertility remains low compared with that in winter. We examined combined hormonal administration—induction of 2 consecutive 9-d cycles (gonadotropin-releasing hormone administration followed by prostaglandin $F_{2\alpha}$ injection) to induce follicular turnover before insemination, and progesterone supplementation on d 5 postinsemination to support early embryonic development—in cows subjected to intensive cooling management. Reproductive performance was improved in cows with postpartum uterine disease, low body condition score at peak lactation, or low milk production. Hormonal treatment is suggested, along with the use of an efficient cooling system to improve fertility in these subgroups during the hot season.
http://dx.doi.org/10.3168/jds.2014-7900.

Lameness detection challenges in automated milking systems addressed with partial least squares discriminant analysis. *By Garcia et al., page 7476.* Lameness is often a painful condition that decreases milk yield and it represents an animal-based indicator of poor health and welfare. This feasibility study explores data from a robotic milking system in one commercial farm for the purpose of early lameness detection in dairy cows. Robot data from 88 cows were collected and analyzed by using multivariate approaches. The models developed in this preliminary study correctly identified around 80% of the lameness scores obtained by visual clinical assessments.
http://dx.doi.org/10.3168/jds.2014-7982.