INTERPRETIVE SUMMARIES, JUNE 2014

Invited review: **Enteric methane in dairy cattle production: Quantifying the opportunities and impact of reducing emissions.** *By Knapp et al., page 3231.* Over the past 2 decades, most research and reviews on reducing methane emissions from the gastrointestinal tract of cattle have focused on manipulating rumen fermentation through feeding practices or the use of feed additives. Although feeding and nutrition can reduce methane emissions by 2.5 to 15% on a per-unit-of-milk basis, genetic selection and herd management practices have greater potential, in the range of 15 to 30% reductions. Approaches and technologies that improve livestock productivity provide the most cost-effective means to reduce methane emissions per unit of milk. Research leading to improvements in animal health and welfare and dairy profitability is likely to concomitantly enhance environmental sustainability and consumer acceptance of dairy production practices and products.
http://dx.doi.org/10.3168/jds.2013-7234.

Use of just-about-right scales and penalty analysis to determine appropriate concentrations of stevia sweeteners for vanilla yogurt. *By Narayanan et al., page 3262.* As the use of stevia sweeteners extends to functional foods such as yogurt, it is essential to document their effect on yogurt quality. The present study aimed to determine the appropriate concentration levels of 4 processed stevia sweeteners or supplements in low-fat vanilla yogurt. Two sensory tests were conducted to determine the just-about-right (JAR) level for each sweetener, along with consumer acceptability of the same yogurts. These data were analyzed using penalty analysis with significant differences among JAR levels. Levels from 0.7 to 5.5% (wt/wt) of stevia sweeteners (depending on source) may be appropriate for use in commercial vanilla yogurt. The various bulk fillers in commercial stevia sweeteners, which influenced perceived sweetness and sourness, contributed to the variability observed in consumer acceptability of yogurt with commercial stevia sweeteners.
http://dx.doi.org/10.3168/jds.2013-7365.

Rheological and structural properties of differently acidified and renneted milk gels. *By Liu et al., page 3292.* Milk gelation is an important step in the manufacture of fermented dairy products. Milk gels can be produced by acid, rennet, or a combination of both. The mechanism and behavior of acid-induced or rennet-induced gelation have been extensively studied. However, the contribution of each on combined acid- and rennet-induced gels is not clear. The objective of this study was to assess how acid and rennet affect the behavior of combined acid- and rennet-induced gels by studying the rheological and structural properties. The findings will be useful in the production of combined acid- and rennet-induced gels.
http://dx.doi.org/10.3168/jds.2013-7568.

Preventive effect of fermented Maillard reaction products from milk proteins in cardiovascular health. *By Oh et al., page 3300.* Milk proteins have many important health benefits and considerable nutritional value. Additionally, milk proteins are precursors of a diverse group of bioactive compounds. These compounds can be released by enzymatic proteolysis during food processing, including intestinal digestion and the process of milk fermentation. The bioactive compounds derived from milk proteins may have antioxidant, immune-modulating, antithrombotic, antihypertensive, and antibacterial properties. In particular, Maillard reaction products (MRP), which are produced by reactions between carbonyl and amine groups, not only have organoleptic properties, but also increased antioxidant activity compared with typical milk proteins. In this study, we investigated whether the fermented MRP of milk proteins by lactic acid bacteria have preventive effects in cardiovascular disease as a result of activity as antioxidants, antithrombotics, 3-hydroxy-3-methylglutaryl-coenzyme A reductase inhibitors, and cholesterol-lowering compounds. Interestingly, MRP showed a significant increase in activities related to reduction of cardiovascular risks, and fermentation of MRP synergistically improved the activities. Our findings indicate that MRP and their hydrolysates could be recommended for use as potential antioxidants and cardiopreventive ingredients for various functional, pharmaceutical, and dairy applications.
http://dx.doi.org/10.3168/jds.2013-7728.

Raw milk from vending machines: Effects of boiling, microwave treatment, and refrigeration on microbiological quality. *By Tremonte et al., page 3314.* In Italy, raw milk sales from vending machines has been allowed since 2004. Unpasteurized milk must be boiled before consumption, because it could be a source of pathogens and thus a health hazard. This study evaluated the microbiological quality of raw milk from vending machines located in Molise (Italy), and assessed a domestic boiling treatment and 2 microwave treatments on the safety and quality of milk. The microbiological characteristics of raw milk observed in this study fully justify the need to boil raw milk from vending machines before consumption.
http://dx.doi.org/10.3168/jds.2013-7744.

Short communication: **Norbixin and bixin partitioning in Cheddar cheese and whey.** *By Smith et al., page 3321.* The removal of norbixin colorant present in Cheddar cheese whey by chemical bleaching

negatively affects the flavor of dried whey ingredients. A better understanding of the primary colorant in annatto, norbixin, along with cheese color alternatives would help improve the quality of dried whey ingredients. This study determined norbixin partitioning in Cheddar cheese and whey and established the viability of bixin, the nonpolar form of norbixin, as an alternative Cheddar cheese colorant
http://dx.doi.org/10.3168/jds.2013-7614.

Short communication: **Incorporation of inulin and transglutaminase in fermented goat milk containing probiotic bacteria.** *By Mituniewicz-Małek et al., page 3332.* The aim of this study was to determine the effect of inulin and microbial transglutaminase on the viability of *Lactobacillus acidophilus* La-5 and *Bifidobacterium animalis* ssp. *lactis* Bb-12 in fermented goat milks. No positive influence of inulin or microbial transglutaminase was observed on the viability of probiotics in fermented goat milks. Nevertheless, the population of probiotics remained above 6 log cfu/g after 8 wk of storage at 5°C.
http://dx.doi.org/10.3168/jds.2014-7892.

Short communication: **Monitoring the presence of perfluoroalkyl substances in Italian cow milk.** *By Barbarossa et al., page 3339.* The purpose of the present work was to monitor the presence of perfluoroalkyl substances, a class of emerging pollutants, in a large number of cow milk samples from northern Italy. The study demonstrated that contamination was often present, although at low concentrations. These outcomes, in line with data reported in literature, support that milk does not seem to be a major source of perfluoroalkyl substances, although surveys including derived products would be helpful to better define the risk for consumers.
http://dx.doi.org/10.3168/jds.2014-8005.

Comparison of modeling techniques for milk-production forecasting. *By Murphy et al., page 3352.* Effective milk-production forecasting is very beneficial for farm management and economic planning. An easily implementable milk-production forecast tool for multiple temporal horizons would be valuable to dairy farmers, researchers, and dairy product factories. In this study, 3 different modeling techniques were used to forecast the annual milk production of a herd of pasture-based dairy cattle using 4 yr of previous milk production data. The accuracy of the 3 models was compared over short-, medium-, and long-term horizons.
http://dx.doi.org/10.3168/jds.2013-7451.

Accuracy of milk ketone bodies from flow-injection analysis for the diagnosis of hyperketonemia in dairy cows. *By Denis-Robichaud et al., page 3364.* Results from flow injection analysis for milk β-hydroxybutyric acid (BHBA) and acetone were compared with blood BHBA values (reference test). Measurement of milk BHBA and acetone concentrations were highly correlated with blood BHBA concentration. Moreover, the milk BHBA and acetone test results were able to accurately detect hyperketonemia in dairy cows. Milk BHBA and acetone values from flow injection analysis could be used in herd surveillance programs for hyperketonemia.
http://dx.doi.org/10.3168/jds.2013-6744.

Early warnings from automatic milk yield monitoring with online synergistic control. *By Huybrechts et al., page 3371.* Today, a broad range of novel sensors are in use on the modern dairy farm, generating large amounts of data. Translating these data into practical information, however, is a challenge due to inter- and intra-cow variability. In this study, the concept of synergistic control was used on milk yield production data of dairy cows for the early detection of anomalies.
http://dx.doi.org/10.3168/jds.2013-6913.

Increased blood-circulating interferon-γ, interleukin-17, and osteopontin levels in bovine paratuberculosis. *By Dudemaine et al., page 3382.* Plasma interferon-γ, osteopontin, and interleukin-17 levels of dairy cows infected with *Mycobacterium avium* ssp. *paratuberculosis* (MAP) were higher in serum ELISA-positive cows, whereas interleukin-4 and interleukin-10 levels were not found to differ by disease status. These results indicate a T helper type 17 (Th17) response similar to that in many chronic inflammatory diseases. This Th17 response was supported by a gene-expression study of in vitro MAP-infected macrophages, suggesting a shift toward a Th17 immune response early in infection.
http://dx.doi.org/10.3168/jds.2013-7059.

Quantifying veterinarians' beliefs on disease control and exploring the impact of new evidence: A Bayesian approach. *By Higgins et al., page 3394.* Veterinarians' clinical beliefs concerning herd-level interventions to reduce 3 key endemic diseases of dairy cattle were captured numerically as probability distributions. Major differences in beliefs were revealed. By incorporating the beliefs into Bayesian statistical models, the strength of new data needed to change veterinary opinion was explored. The results have important implications for designing future research studies. The wide variation in beliefs also raises concern over the extent to which a broadly consistent approach to disease control is currently being achieved; it is argued that more clinical trials and national disease control programs are needed.
http://dx.doi.org/10.3168/jds.2013-7087.