INTERPRETIVE SUMMARIES, JANUARY 2016

Invited review: **Recommendations for reporting intervention studies on reproductive performance in dairy cattle: Improving design, analysis, and interpretation of research on reproduction.** *By Lean et al., page 1.* Understanding the causes of reproductive success in dairy cattle will be advanced by well-designed and well-reported intervention studies. We provide guidelines and a checklist for investigators and reviewers that are intended to assist in better design of reproductive studies. As part of these guidelines, definitions of reproductive outcomes and peri-parturient disorders are provided.
http://dx.doi.org/10.3168/jds.2015-9445.

Angiotensin-I-converting enzyme-inhibitory peptides in commercial Wisconsin Cheddar cheeses of different ages. *By Lu et al., page 41.* We identified peptides in commercial Cheddar cheese made in Wisconsin that exhibited high angiotensin-I-converting enzyme-inhibitory (ACEI) activity, which could influence the hypertension of consumers. The concentrations of ACEI peptides increased with ripening time, at least up to a certain level of ripening. Aged Cheddar cheese appears to be a rich source of ACEI peptides and might have an antihypertensive effect.
http://dx.doi.org/10.3168/jds.2015-9569.

Lipid complex effect on fatty acid profile and chemical composition of cow milk and cheese. *By Bodkowski et al., page 57.* The aim of this study was to determine lipid complex (LC) effect on cow milk and cheese characteristics, in particular the fatty acids profile. Polish Holstein Friesian cows were supplemented with 400 g/d of LC (containing 38% conjugated linoleic acid and 36.5% eicosapentaenoic acid + docosahexaenoic acid). Lipid complex supplementation had no effect on milk yield and composition, except for a decrease in fat content. Milk and cheese from LC-treated cows had greater amounts of unsaturated fatty acids, including conjugated linoleic acid, eicosapentaenoic acid, and docosahexaenoic acid, and lesser amounts of saturated fatty acids. Lipid complex supplementation of dairy cows produced considerable changes in biological value of milk and cheese fat.
http://dx.doi.org/10.3168/jds.2015-9321.

Quantification of whey proteins by reversed phase-HPLC and effectiveness of mid-infrared spectroscopy for their rapid prediction in sweet whey. *By Sturaro et al., page 68.* A reverse-phase HPLC method was developed for quantification of whey proteins (WP) in sweet whey and it was used as the reference method to evaluate the effectiveness of WP prediction by mid-infrared spectroscopy (MIR). Repeatability and reproducibility test for the reverse-phase HPLC method was stable for retention time and area; better MIR predictions were obtained for fractions present in whey in large amounts (e.g., β-lactoglobulin, total, α-lactalbumin), whereas minor WP were predicted with less accuracy.
http://dx.doi.org/10.3168/jds.2014-9077.

Short communication: **Identification of iron-binding peptides from whey protein hydrolysates using iron (III)-immobilized metal ion affinity chromatography and reversed phase-HPLC-tandem mass spectrometry.** *By Cruz-Huerta et al., page 77.* For the first time, the identification of peptide sequences with iron-binding capacity from whey proteins has been performed. Better knowledge of the relationship between peptide structure and iron-chelating activity has been provided. The enrichment of iron-chelating amino acids (Asp, Glu, and Pro) and the existence of favoured protein domains have been established. This study endorses the promising role of whey protein hydrolyzates as functional ingredients in iron supplementation treatments.
http://dx.doi.org/10.3168/jds.2015-9839.

Short communication: **Physicochemical and antioxidant properties of Cheddar-type cheese fortified with *Inula britannica* extract.** *By Lee et al., page 83. Inula britannica* flower extracts was added to the milk used to make Cheddar-type cheese. The resulting fortified cheeses did not show differences in physicochemical properties but had increased antioxidant activity relative to unfortified controls. Our results demonstrate potential antioxidant effects in Cheddar-type cheese fortified with *I. britannica* flower extracts.
http://dx.doi.org/10.3168/jds.2015-9935.

Effect of the absence of the *CcpA* gene on the growth, metabolic production, and stress tolerance in *Lactobacillus delbrueckii* ssp. *bulgaricus*. *By Li et al., page 104.* We investigated the effect of inactivation of catabolite control protein A (CcpA) and aerobic conditions on the growth, metabolic production, and stress tolerance to heat, oxidative, and cold stresses in *Lactobacillus bulgaricus*. Although *CcpA* gene deletion and aerobic cultivation did not significantly improve growth, it did improve stress tolerance.
http://dx.doi.org/10.3168/jds.2015-10321.

Transformation of serum susceptible *Escherichia coli* O111 with p16S*lux* plasmid to allow for real-time monitoring of complement-based inactivation of bacterial growth in bovine milk. *By Maye et al., page 112.* Our recent published work

showed that complement (a component of the innate immune system) activity of lactating dairy cows was detectable in milk and had a potency similar to that of human milk. The evidence for this relied on the unique growth inhibition of *Escherichia coli* strain O111 by complement. The present paper describes how the *E. coli* strain was adapted by integrating a plasmid to confer bioluminescent properties, thus enhancing the functionality of the biological assay for complement detection in milk
http://dx.doi.org/10.3168/jds.2015-10244.

Survival of the functional yeast *Kluyveromyces marxianus* B0399 in fermented milk with added sorbic acid. *By Tabanelli et al., page 120.* The commercialization of functional foods including probiotics requires that their viability be maintained during shelf life. The aim of this study was to optimize the formulation of a fermented milk containing the functional yeast *Kluyveromyces marxianus* B0399, in order to maintain the effective dose of 20 million viable cells per serving throughout 30 d of refrigerated storage. The addition of proper amounts of sorbic acid allowed this goal to be reached while avoiding growth of yeasts, which could alter the quality and stability of the product.
http://dx.doi.org/10.3168/jds.2015-10084.

Identification and characterization of psychrotolerant coliform bacteria isolated from pasteurized fluid milk. *By Masiello et al., page 130.* Postpasteurization contamination of fluid milk with psychrotolerant coliform bacteria indicates processing plant hygiene issues and can lead to product quality loss. Identifying taxonomic diversity, cold growth, and enzymatic capabilities of these contaminants is essential for understanding how these organisms affect the final product. Eleven coliform genera were represented by isolates obtained from 21 dairy processing plants. Representative isolates for each genus displayed at least 2 log growth over 10 d (6°C), with a considerable proportion of isolates exhibiting lipolytic and proteolytic activity. Thus, these coliform contaminants have potential to lead to physical degradation and unacceptable sensory characteristics of fluid milk
http://dx.doi.org/10.3168/jds.2015-9728.

***Short communication:* Typing and tracking *Bacillaceae* in raw milk and milk powder using pyroprinting.** *By VanderKelen et al., page 146.* Spore-forming bacteria affect milk product quality, and contaminants come from the farm, transportation equipment, or milk processing machinery. Tracking the origins of bacterial contamination requires a reliable "fingerprinting" method. We describe a new method for spore-forming bacteria called pyroprinting. A collection of spore-forming bacteria was isolated from raw milk and its finished powder, and the DNA from these bacteria was used to produce a pyroprint. Bacteria with matching pyroprints were placed into groups from raw milk only, powdered milk only, or from both sources. This study confirmed pyroprinting to be a rapid, reproducible tool for determining likely origins of bacterial contamination in powdered milk.
http://dx.doi.org/10.3168/jds.2015-9656.

Effect of heating strategies on whey protein denaturation—Revisited by liquid chromatography quadrupole time-of-flight mass spectrometry. *By Akkerman et al., page 152.* The effect of heating strategy on the degree of denaturation of β-lactoglobulin and α-lactalbumin was determined using liquid chromatography quadrupole time-of-flight mass spectrometry. Increasing heating temperature for heat treatment of milk had a great effect on whey protein denaturation in milk and achieving rennet induced coagulation. Direct steam injection heating resulted in the least degree of whey protein denaturation and had the least effect on rennet-induced coagulation properties. Our results can help to determine a suitable heating system and heating conditions to achieve desired functionalities of the milk
http://dx.doi.org/10.3168/jds.2015-9924.

Effect of ceramic membrane channel diameter on limiting retentate protein concentration during skim milk microfiltration. *By Adams and Barbano, page 167.* Skim milk was filtered using two 100-nm ceramic microfiltration membranes with different retentate flow channel diameters (4 or 6 mm) to remove soluble proteins from the milk. When operated at the same temperature, flux, and cross-flow velocity, the pores of both membranes began to plug quickly at the same retentate protein concentration (11.5%). The pressure drop along the membrane length was lesser when using 6-mm membranes under the conditions studied. This difference allowed membranes with larger channel diameters to be operated using less energy or to produce retentates with higher protein concentrations, depending on the process variables controlled.
http://dx.doi.org/10.3168/jds.2015-9897.

The effect of extrinsic attributes on liking of cottage cheese. *By Hubbard et al., page 183.* This study evaluated the role of extrinsic product attributes on consumer liking of cottage cheese. Branding influenced overall liking and purchase intent for cottage cheeses to differing degrees. For national brands, acceptance scores were enhanced in the presence of the brand. Conjoint analysis showed that an all-natural claim was more appealing than organic and this result was confirmed by consumer acceptance testing.
http://dx.doi.org/10.3168/jds.2015-9547.