INTERPRETIVE SUMMARIES, APRIL 2013

Invited review: **Sensors to support health management on dairy farms.** *By Rutten et al., page 1928.* This review presents an overview of the sensor systems (that is, sensors plus software) that have been published for dairy health management. Dairy farmers can use sensor systems to improve animal health and welfare on dairy farms, which in turn helps increase profitability. The usefulness of such sensor systems depends on the level of development, which is described here through a framework that includes 4 levels: technique, interpretation of data, integration of information, and decision making. The sensor systems are compared based on this framework. The review provides information about the possibilities and limits of published sensor systems, as well as suggestions for future research.
http://dx.doi.org/10.3168/jds.2012-6107.

Physicochemical and sensory characterization of Cheddar cheese with variable NaCl levels and equal moisture content. *By Møller et al., page 1953.* The effect of varying the level of NaCl (salt) on the flavor and texture of Cheddar cheese manufactured with equal amounts of moisture was thoroughly mapped using instrumental and sensory methods. Moisture adjustment contributed to largely unaffected textural properties upon a 50% salt reduction; however, the flavor deteriorated gradually with decreasing NaCl concentration. Above all, flavor restoration required careful engineering of the basic taste profile of the cheese. The present results aid the cheese industry in approaching significant salt reductions in Cheddar while preserving cheese flavor and texture, and thereby meet a global demand for lower sodium foods.
http://dx.doi.org/10.3168/jds.2012-5524.

Influence of fat replacement by inulin on rheological properties, kinetics of rennet milk coagulation, and syneresis of milk gels. *By Arango et al., page 1984.* Dairy products can provide major opportunities for the development of functional foods. We have evaluated the effect of replacing fat with inulin on the rheological properties, coagulation kinetics, and syneresis of milk gels. Inulin addition increased the rates of aggregation and curd firming reactions in the casein gels and produced a significant reduction in syneresis. Therefore, the use of inulin as a fat replacer on milk gels reduced cutting time and increased curd yield. These results may contribute to our understanding of the technological impact of the incorporation of inulin into milk products.
http://dx.doi.org/10.3168/jds.2012-5763.

Prevalence and antimicrobial susceptibility of *Acinetobacter* from raw bulk tank milk in Korea. *By Gurung et al., page 1997.* An increasing number of people consume unpasteurized milk despite the hazards associated with this practice. Examination of bulk tank milk (BTM) is important not only for foodborne pathogens but also for other gram-negative bacteria including *Acinetobacter* spp., which could be a public health concern. A better understanding of resistance profiles of BTM isolates would help us better understand treatment options of diseases caused by them. This is the first report to provide a prevalence of *Acinetobacter* spp., including *Acinetobacter baumannii*, and their resistance profiles in BTM samples from different provinces of Korea.
http://dx.doi.org/10.3168/jds.2012-5965.

Gravity separation of fat, somatic cells, and bacteria in raw and pasteurized milks. *By Caplan et al., page 2011.* Gravity separation concentrates somatic cells and bacteria more effectively than milk fat near the top of a tank of raw milk left undisturbed at 4°C overnight. Pasteurization at 72.6°C for 25 s improved the effectiveness of gravity separation of the viable bacteria and somatic cells. Pasteurization at higher temperatures prevented gravity separation. Gravity separation of milk has been used in the manufacture of traditional Italian cheeses to adjust the level of fat in cheese milk, but may provide additional cheese quality and safety benefits beyond fat adjustment.
http://dx.doi.org/10.3168/jds.2012-6006.

Serum protein removal from skim milk with a 3-stage, 3× ceramic Isoflux membrane process at 50°C. *By Adams and Barbano, page 2020.* Microfiltration can be used to remove serum proteins from skim milk. The removal efficiency of the process directly influences the technology's economic feasibility. Our objective was to quantify the capacity of 0.14-μm ceramic Isoflux microfiltration membranes to remove serum proteins from skim milk. Contrary to theoretical cumulative serum protein removal percentages of 68, 90, and 97% after 1, 2, and 3 stages of 3× microfiltration processing, respectively, the 3× Isoflux process removed only 39.5, 58.4, and 70.2% after 1, 2, and 3 stages, respectively. This serum protein removal was lower than reported values for other commercially available ceramic membranes.
http://dx.doi.org/10.3168/jds.2012-6007.

Effect of annatto addition and bleaching treatments on ultrafiltration flux during production of 80% whey protein concentrate and 80% serum protein concentrate. *By Adams et al., page 2035.* The goals of this study were to determine if adding annatto color to milk or bleaching whey or microfiltration permeate would influence ultrafiltration flux, diafiltration flux, or membrane fouling during

production of 80% whey protein concentrate or 80% serum protein concentrate. Addition of annatto color to milk had no effect on flux or fouling. Bleaching with or without added color improved flux during processing. Bleaching with hydrogen peroxide produced greater flux than bleaching with benzoyl peroxide. Bleaching with hydrogen peroxide led to the largest reduction in fouling.
http://dx.doi.org/10.3168/jds2012-6009.

Influence of casein on flux and passage of serum proteins during microfiltration using polymeric spiral-wound membranes at 50°C. *By Zulewska and Barbano, page 2048.* A study was carried out to determine the effect of fouling of polymeric microfiltration (MF) membranes on whey protein passage through the membrane. When processing skim milk with a spiral-wound polymeric MF membrane, casein was the major protein foulant that increased hydraulic resistance and reduced whey protein passage through the membrane. Isolation of whey proteins directly from skim milk produces a value-added milk protein ingredient for protein fortification of foods.
http://dx.doi.org/10.3168/jds.2012-6032.

Stability during in vitro digestion of lactoferrin-loaded liposomes prepared from milk fat globule membrane-derived phospholipids. *By Liu et al., page 2061.* Lactoferrin is considered to be an important protein for human health because it is able to bind ferric irons and has bacteriostatic, bactericidal, and fungistatic activities. In this study, we characterized the entrapment efficiency of lactoferrin in a liposome prepared from milk fat globule membrane-derived phospholipids and examined the stability of the lactoferrin loaded in the liposome during in vitro digestion in the gastrointestinal tract. Liposomes may prevent the gastric degradation of lactoferrin and may result in an increase in active lactoferrin for absorption in the intestine.
http://dx.doi.org/10.3168/jds.2012-6072.

Monitoring lactic acid production during milk fermentation by in situ quantitative proton nuclear magnetic resonance spectroscopy. *By Bouteille et al., page 2071.* During milk fermentation, microorganisms produce lactic acid, which causes the jellification of caseins, leading to dairy gels such as yogurts. The determination of lactic acid content is thus essential to control manufacturing processes and storage of dairy gels, in particular to evaluate bacteria efficiency. An easy-to-implement solvent-free experimental method was investigated to monitor lactic acid during fermentation: in situ quantitative nuclear magnetic resonance spectroscopy enabled quantification of lactic acid and lactose, allowing cross-validation.
http://dx.doi.org/10.3168/jds.2012-6092.

Starter cultures and cattle feed manipulation enhance conjugated linoleic acid concentrations in Cheddar cheese. *By Mohan et al., page 2081.* Conjugated linoleic acid (CLA) is a fatty acid associated with numerous health benefits, including an anticarcinogenic effect. The amount of CLA in the daily diet, however, remains low. We proposed to enhance the CLA content in Cheddar cheese produced with milk from cattle fed diets supplemented with fish oil and made with a CLA-producing starter culture. In cheeses ripened for 6 mo, the CLA content in cheese made using the CLA-producing culture and milk from cattle fed fish oil diets was 2.6 times that of cheese made using non-CLA-producing culture and milk from cattle fed unsupplemented diets.
http://dx.doi.org/10.3168/jds.2012-6101.

Influence of fresh forage-based diets and α_{S1}-casein (*CSN1S1*) genotype on nutrient intake and productive, metabolic, and hormonal responses in milking goats. *By Bonanno et al., page 2107.* Polymorphism at the α_{S1}-casein locus (*CSN1S1*) in goats influences several milk production traits that are also affected by nutrition. The aim of this study was to investigate how the interaction between diet characteristics and *CSN1S1* genotype affected the feeding behavior, milk production, and metabolic and hormonal parameters of Girgentana goats. Diet had a stronger effect than *CSN1S1* genotype. Goats with a greater capacity for α_{S1}-casein synthesis exhibited more efficient energy and protein utilization, which was evident at the digestive level, and had better productive responses to high-nutrition diets.
http://dx.doi.org/10.3168/jds.2012-6244.

Short communication: **Rapid detection of milk fat adulteration with vegetable oil by fluorescence spectroscopy.** *By Ntakatsane et al., page 2130.* Adulteration of high-value food products with cheap and readily available components is a serious concern for the food industry, and the lack of rapid detection techniques exacerbates the situation. In this study, we developed a rapid analytical technique based on front-face fluorescence spectroscopy (FFFS) for detection of milk fat adulteration with vegetable oil. The study demonstrated the ability and sensitivity of FFFS to rapidly discriminate between commercial and adulterated milk samples.
http://dx.doi.org/10.3168/jds.2012-6417.

Effects of bail activation sequence and feed availability on cow traffic and milk harvesting capacity in a robotic rotary dairy. *By Kolbach et al., page 2137.* This manuscript reports the effects of different bail activation sequences and feed availability on cow traffic and system efficiency in the world's first high-throughput automatic milking system, the robotic