INTERPRETIVE SUMMARIES, AUGUST 2014

Invited review: **Palmitic and stearic acid metabolism in lactating dairy cows.** *By Loften et al., page 4661.* Dry inert fat supplements have gained popularity in lactating dairy cow diets to improve the cow's energy intake. These inert fat supplements contain primarily palmitic and stearic acids that have specific properties and functions. Feeding high levels of either fatty acid may affect utilization, proportions, and yield of the other in milk fat and may affect de novo synthesis of other short- and medium-chain fatty acids. The lactating cow maintains a balance of high- and low-melting-point fatty acids in milk fat to ensure its fluidity. Improving our understanding of these fatty acids is needed to better delineate their roles in optimizing milk production and milk fatty acid composition and yield.
http://dx.doi.org/10.3168/jds.2014-7919.

Free and immobilized *Lactobacillus casei* ATCC 393 on whey protein as starter cultures for probiotic Feta-type cheese production. *By Dimitrellou et al., page 4675.* In the present study, we evaluated the use of whey protein as support for *Lactobacillus casei* cells and its use in cheese production. The produced cheeses had improved physicochemical and microbiological characteristics and cheese aroma was also affected positively. *Lactobacillus casei* cells were detected, using a molecular technique, at levels that confirm the probiotic character of cheeses.
http://dx.doi.org/10.3168/jds.2013-7597.

Effect of whey concentration on protein recovery in fresh ovine ricotta cheese. *By Salvatore et al., page 4686.* Ricotta cheese is a dairy product made by thermal coagulation of whey proteins. The typical yield of ricotta cheese is only about 5 to 6% relative to initial whey, and this highlights the very low efficiency of the process. In particular, significant loss of proteins with high nutritional and biological value occurs. This study aimed to evaluate the effect of whey concentration on protein recovery in ricotta cheese, and to better understand the behavior of each protein fraction during thermal coagulation. High recoveries of all proteins were obtained by concentrating the whey protein, resulting in a consequent increase of ricotta cheese yield.
http://dx.doi.org/10.3168/jds.2013-7762.

Seasonal variation in the composition and melting behavior of milk fat. *By Larsen et al., page 4703.* Milk was sampled during 1 yr from 3 Danish dairies and analyzed for fat content, fatty acid composition, triglyceride composition, and melting behavior. Results indicated seasonal variation in milk fat composition for all dairies, but the variation was highest for organic milk. Melting properties differed between dairies, which should be taken into account in butter production.
http://dx.doi.org/10.3168/jds.2013-7858.

Comparison of analytical and predictive methods for water, protein, fat, sugar, and gross energy in marine mammal milk. *By Oftedal et al., page 4713.* The accuracy and performance of analytical methods may differ depending on the type of mammalian milk that is assayed. When methods were applied to high-fat milk of the Weddell seal, we found that the Dumas (CHN) method gave satisfactory results for milk nitrogen, but a stoichiometric approach to estimation of fat and sugar from carbon content was not reliable. In analysis of nonbovine milks, methods of analysis should be chosen carefully and validated against reference methods and materials.
http://dx.doi.org/10.3168/jds.2014-7895.

A physicochemical investigation of membrane fouling in cold microfiltration of skim milk. *By Tan et al., page 4759.* This work aimed to elucidate the mechanisms of membrane fouling in cold microfiltration of skim milk. Internal and external foulants were extracted from a ceramic membrane both after a brief contact between the membrane and milk, and after microfiltration. Fouling was primarily caused by proteins: serum proteins preferentially adsorbed onto the membrane surface upon contact, whereas caseins were introduced into the fouling layer by microfiltration. Fouling by caseins also resulted in irreversible changes of membrane properties. This study will advance the understanding of fouling mechanisms in cold microfiltration of skim milk, and will help develop solutions for minimizing membrane fouling.
http://dx.doi.org/10.3168/jds.2014-7957.

Lactobacillus helveticus **SBT2171, a cheese starter, regulates proliferation and cytokine production of immune cells.** *By Yamashita et al., page 4772.* Consumption of a cheese containing *Lactobacillus helveticus* SBT2171 (LH2171) has been reported to exhibit immunoregulatory actions, including reduction in proinflammatory cytokine production in mice. The aim of this study was to examine the in vitro effects of LH2171 cells per se on immune cell functions. Out of 41 bacterial strains tested, LH2171 significantly suppressed immune cell proliferation and proinflammatory cytokine production. These inhibitory actions were not due to cytotoxicity to immune cells, suggesting that LH2171 is a dairy *Lactobacillus* with beneficial immunoregulatory properties.
http://dx.doi.org/10.3168/jds.2014-8041.

Effect of sodium, potassium, magnesium, and calcium salt cations on pH, proteolysis, organic acids, and microbial populations during storage of full-fat Cheddar cheese. *By McMahon et al., page 4780.* Cheese was made with different combinations of sodium, potassium, magnesium, and calcium. A low-sodium salt was also made. Substituting up to 75% of sodium with potassium increased survival of the starter culture, as shown by a prolonged time (from about 4 to 6 mo) for nonstarter lactic acid bacteria to grow to higher levels than the starter culture. We observed a corresponding lowering of cheese pH with the reduction in sodium. Proteolysis did not differ with sodium substitution. Organic acids were measured during storage, with an increase in propionic acid observed in conjunction with nonstarter bacteria becoming predominant.
http://dx.doi.org/10.3168/jds.2014-8071.

Comparison of emulsifying properties of milk fat globule membrane materials isolated from different dairy by-products. *By Phan et al., page 4799.* In this study, the properties of emulsions prepared with different milk fat globule membrane (MFGM) materials and mixtures of MFGM and buttermilk powder were investigated. We found no evidence of competitive displacement between proteins and polar lipids, but emulsifying properties were affected by the presence of components such as whey proteins, caseins, MFGM-specific proteins and minerals, and especially by their concentrations.
http://dx.doi.org/10.3168/jds.2014-8030.

Short communication: **Determination of lactoferrin in Feta cheese whey with reversed-phase high-performance liquid chromatography.** *By Tsakali et al., page 4832.* This paper describes a new reversed-phase (RP) high-performance liquid chromatography protocol for the determination of lactoferrin in sweet whey. It is a simple, one-step method (pretreatment and separation steps are not included). Based on the developed method, lactoferrin content in Feta cheese whey was assessed throughout the peak Feta cheese-making period (January to June).
http://dx.doi.org/10.3168/jds.2013-7526.

Short communication: **Biofilm production characterization of *mecA* and *mecC* methicillin-resistant *Staphylococcus aureus* isolated from bovine milk in Great Britain.** *By Prenafeta et al., page 4838.* This study aimed to determine the staphylococcal protein A (*spa*)-type and the biofilm formation ability of *mecA* and *mecC* methicillin-resistant *Staphylococcus aureus* (MRSA) isolated from bovine milk in Great Britain. All MRSA isolates tested were positive by PCR for the *ica* (intercellular adhesion) genes and 50% produced biofilm in a microtiter plate assay. This is the first demonstration of biofilm production by *mecC* MRSA.
http://dx.doi.org/10.3168/jds.2014-7986.

Effect of recombinant bovine granulocyte colony-stimulating factor covalently bound to polyethylene glycol injection on neutrophil number and function in periparturient dairy cows. *By Kimura et al., page 4842.* Cows often have poor immune function around the time of calving. Cows with more pronounced decreases in neutrophil function have an increased incidence of mastitis, metritis, and retained placenta. In this study, 2 injections of recombinant bovine granulocyte colony-stimulating factor covalently bound to polyethylene glycol (~6 d before calving and on the day of calving) markedly increased neutrophil numbers in the blood and potentiated the release of myeloperoxidase from stimulated neutrophils. This may help reduce periparturient immunosuppression.
http://dx.doi.org/10.3168/jds.2013-7242.

The effect of routine hoof trimming on locomotion score, ruminating time, activity, and milk yield of dairy cows. *By Van Hertem et al., page 4852.* All cows in this Israeli-Holstein herd were routinely trimmed, and the effect of trimming on dairy cow behavior and performance was quantified with the use of commercial sensors. The sensor output data of 288 cows were used to develop a general linear mixed model to quantify the main and interaction effects of trimming and fixed factors on cow behavior and performance. Our results indicate that trimming affects dairy cows in their routine behavior.
http://dx.doi.org/10.3168/jds.2013-7576.

Immune response against *Treponema* species and ELISA detection of digital dermatitis. *By Gomez et al., page 4864.* A study was performed to evaluate the immune response against *Treponema* spp. organisms in dairy heifers affected with digital dermatitis and to assess the validity of an ELISA test as a diagnostic tool. A group of 688 pregnant dairy heifers was followed for a period of 6 mo, during which time they were clinically inspected for the presence of digital dermatitis. A positive immune response was observed upon clinical identification of an acute digital dermatitis lesion. The ELISA showed excellent performance and its use as a tool to improve the understanding of digital dermatitis pathophysiology is discussed.
http://dx.doi.org/10.3168/jds.2013-7616.

Association of coagulase-negative staphylococcal species, mammary quarter milk somatic cell count, and persistence of intramammary infection in dairy cattle. *By Fry et al., page 4876.* Coagulase-negative staphylococci (CNS) have become