INTERPRETIVE SUMMARIES, APRIL 2018

Invited review: **Mineral absorption mechanisms, mineral interactions that affect acid–base and antioxidant status, and diet considerations to improve mineral status.** *By Goff, page 2763.* This review highlights the mechanisms used by the body to obtain minerals from the diet and the factors found in the diet that can interfere with absorption of minerals across the digestive tract. Minerals that are absorbed play a major role in acid–base physiology, and the role dietary cations and anions play in the strong ion difference of the blood is explored. During metabolism many reactive oxygen species can be generated. Minerals play an important role in antioxidant mechanisms. However, when fed to excess they can also generate free radicals.
https://doi.org/10.3168/jds.2017-13112.

Hot topic: **Holder pasteurization of human milk affects some bioactive proteins.** *By Guerra et al., page 2814.* Holder pasteurization causes reduction of glutathione peroxidase activity in human milk, but lysozyme activity is not affected. Holder pasteurization also causes changes in lactoferrin and immunoglobulin-protein profiles. Human milk banks should add glutathione peroxidase activity inactivated by Holder pasteurization to recover this lost functionality of milk.
https://doi.org/10.3168/jds.2017-13789.

Randomized double-blind controlled clinical trial of the blood pressure–lowering effect of fermented milk with *Lactococcus lactis*: A pilot study. *By Beltrán-Barrientos et al., page 2819.* In vitro and in vivo studies have revealed that fermented milk with *Lactococcus lactis* NRRL B-50571 may generate antihypertensive bioactive peptides. Hence, we evaluated the blood pressure–lowering effect of fermented milk with *L. lactis* NRRL B-50571 in a double-blind randomized controlled clinical trial with prehypertensive subjects. Results revealed that after daily consumption of fermented milk, systolic and diastolic blood pressures were lower than those in the control group. This product may be regularly consumed as a potential functional food.
https://doi.org/10.3168/jds.2017-13189.

Peptidomic screening of bitter and nonbitter casein hydrolysate fractions for insulinogenic peptides. *By Murray et al., page 2826.* Casein hydrolysates contain biologically active peptides, which can positively influence human health. However, these hydrolysates taste extremely bitter, which hinders their incorporation into food products. The main objective of this research was to elucidate the relationship between bitterness and bioactivity in a casein hydrolysate. In order to achieve this objective, casein hydrolysate fractions (which differed in terms of bitterness and physicochemical properties) were screened for bioactive peptides. Our results showed that the most bitter fraction contained the highest concentration of insulinogenic peptides, suggesting a possible correlation between bitterness and bioactivity.
https://doi.org/10.3168/jds.2017-13853.

Short communication: **Probiotic induction of interleukin-10 and interleukin-12 production by macrophages is modulated by co-stimulation with microbial components.** *By Kaji et al., page 2838.* Some probiotics activate the host immune defense to prevent infections and cancers, whereas others downregulate excessive immune responses to avoid inflammatory diseases. Cytokines induced by probiotics, particularly IL-10 and IL-12, are considered to be crucial for determining the direction of the immune response. Our present data suggest that the IL-10– and IL-12–inducing ability of probiotics is not fixed but rather can be flexibly modified by microbial components provided by gut microbiota and others.
https://doi.org/10.3168/jds.2017-13868.

Characterization and milk coagulating properties of *Cynanchum otophyllum* Schneid. proteases. *By Luo et al., page 2842.* Milk cake is a traditional milk product that has been consumed for hundreds of years in Asia. *Cynanchum otophyllum* Schneid. has long been used to prepare solutions for use as a coagulant to make milk cake. However, the composition of milk-clotting proteases from this plant and their coagulation mechanism still remain unclear. We aimed to purify the *C otophyllum* proteases and reveal their milk clotting characteristics. Understanding these characteristics could contribute to the development of a plant rennet that would promote the industrial production of milk cake.
https://doi.org/10.3168/jds.2017-13888.

Short communication: **Development of a rapid laboratory method to polymerize lactose to nondigestible carbohydrates.** *By Kuechel and Schoenfuss, page 2862.* Acid-catalyzed polymerization of sugars, such as lactose, to oligosaccharides potentially is a way to produce nondigestible carbohydrates. Lactose-containing ingredients such as whey permeate have components that inhibit polymerization. A laboratory microwave method was developed that allows for investigation of the effects of formula constituents on oligosaccharide yield. The effects of moisture and calcium on oligosaccharide yield were evaluated. Increasing acid catalyst counteracted the inhibition by calcium with both pure sugars and whey permeate. The microwave method was found to correctly predict

oligosaccharide yields observed when extrusion trials were conducted.
https://doi.org/10.3168/jds.2017-13813.

Whole-genome sequencing reveals the mechanisms for evolution of streptomycin resistance in *Lactobacillus plantarum*. *By Zhang et al., page 2867.* In this study, combination of laboratory evolution and whole-genome sequencing was used to study evolution of the streptomycin resistance in *Lactobacillus plantarum* ATCC14917. Bioinformatic analysis of the high-throughput sequencing data showed that 5 gene mutations are detected in *L. plantarum* ATCC14917 following passage in streptomycin compared with the controls, which may explain the high resistance to streptomycin in *L. plantarum* ATCC14917. This research offers a way for selecting the isolates with high antibiotic resistance and evaluating antibiotic resistance and the adaptation mechanism in *L. plantarum*.
https://doi.org/10.3168/jds.2017-13323.

Characterization of a cryptic plasmid isolated from *Lactobacillus casei* CP002616 and construction of shuttle vectors based on its replicon. *By Song et al., page 2875.* We studied the characterization of cryptic plasmid pLC2W and constructed a new expression vector that can be used in different lactobacilli. We also tried 2 methods to cure the cryptic plasmid and explained the relationship between plasmid and exopolysaccharide synthesis.
https://doi.org/10.3168/jds.2017-13771.

Technological characterization of *Lactobacillus* in semihard artisanal goat cheeses from different Mediterranean areas for potential use as nonstarter lactic acid bacteria. *By Meng et al., page 2887.* Lactobacillus strains in semihard artisanal goat cheeses from different Mediterranean areas were characterized for use as nonstarter lactic acid bacteria. Goat cheese is gaining popularity because of its unique taste and flavor. Nonstarter lactic acid bacteria mainly consist of lactobacilli; however, limited knowledge regarding their exact composition hinders their application in industrial cheese manufacture. Twenty-five *Lactobacillus* strains were isolated from different artisanal goat milk cheeses, among which we identified 4 strains as promising candidates for nonstarter lactic acid bacteria.
https://doi.org/10.3168/jds.2017-14003.

Identification and proteolytic activity quantification of *Pseudomonas* spp. isolated from different raw milks at storage temperatures. *By Meng et al., page 2897. Pseudomonas* spp. are frequently linked to spoilage of raw milk under storage temperatures. Our results showed that many *Pseudomonas* spp. isolated from goat, buffalo, camel, and yak milks exhibited extracellular peptidase activity under storage temperatures ranging between 2 and 25°C. However, proteolytic activity varied widely among the peptidase-positive isolates. *Pseudomonas* spp. contribute to reduce the quality of bovine milk as well as non-bovine milk.
https://doi.org/10.3168/jds.2017-13617.

Frequency of extended-spectrum β-lactamase (ESBL)– and AmpC β-lactamase–producing *Enterobacteriaceae* in a cheese production process. *By Özdikmenli Tepeli and Demirel Zorba, page 2906.* Antibiotic resistance is a major public health threat. Extended-spectrum β-lactamase (ESBL)– and AmpC β-lactamase–producing bacteria may transfer to humans via direct contact with infected humans and contaminated medical equipment as well as via the food chain. The objective of this study was to investigate the ESBL and AmpC β-lactamase activity of *Enterobacteriaceae* isolated from a cheese production line and to determine the probability of transmitting these bacteria to consumers. Among the 173 samples, 4.64 and 15.6% of samples contained ESBL– and AmpC β-lactamase–producing isolates, respectively.
https://doi.org/10.3168/jds.2017-13878.

***Short communication:* Characterization of *Staphylococcus aureus* isolated along the raw milk cheese production process in artisan dairies in Italy.** *By Johler et al., page 2915. Staphylococcus aureus* is the most prevalent cause of foodborne illness worldwide. Data on *Staph. aureus* from artisanal raw milk cheese productions are scarce even though outbreaks caused by consumption of raw milk and artisanal cheeses were reported. In this study, we determined the population structure and enterotoxin gene profiles of *Staph. aureus* isolated from raw milk cheeses and artisanal cheese productions in Italy. Our findings show that enterotoxigenic *Staph. aureus* strains frequently occur in small-scale raw milk cheese productions and artisanal raw milk cheese, demonstrating the need for controlling growth and enterotoxin formation of *Staph. aureus* along the production chain.
https://doi.org/10.3168/jds.2017-13815.

***Short communication:* A comparison of biofilm development on stainless steel and modified-surface plate heat exchangers during a 17-h milk pasteurization run.** *By Jindal et al., page 2921.* Bacterial fouling that occurs during various stages of milk processing poses a great challenge in superior-quality dairy products with long shelf life. Plate heat exchangers generally show fouling and bacterial buildup, especially in the regeneration section during long runs. The frequent cleaning of plate heat exchangers calls for extra labor and proves to be rather expensive and time consuming. A modified surface that supports minimal