

The winds of change

The first issue of the *International Journal of Dairy Technology* this year (72) coincides with a change in the editorship, from Dr Linda Thomas to Dr Michael Mullan. Andrew Wilbey reports

Seventeen reports of original research, plus one review along with a summary of the 2018 British Mastitis Conference are included in the latest edition. Polycyclic aromatic hydrocarbons are the topic of this issue's review paper. These carcinogens are environmental pollutants that may be secreted into milk or be created by severe heat treatments. The review covers their formation, determination in dairy products and health implications.

Milk production

A study of the relationship of gene polymorphisms in Holstein cows with milk yield and composition indicated significant relationships with growth hormone, leptin and myogenic factor five polymorphisms. It was suggested that these genes could be used as yield indicators.

The diets of lactating cows were supplemented with high-oleic sunflower oil over two years to yield milks with partial substitution of the saturated fatty acids by monounsaturated fatty acids. These milks were processed into UHT milk, butter and cheddar cheese with lower levels of saturated fatty acids and higher levels of *cis*- and *trans*- monounsaturates than in

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the standard products.

A preliminary study of volatile organic compounds in herbage and the milks produced by sheep grazing at 800m and 1300m identified common compounds plus those characteristic of the locality. This was suggested as a potential basis for identification of a cheese with its region.

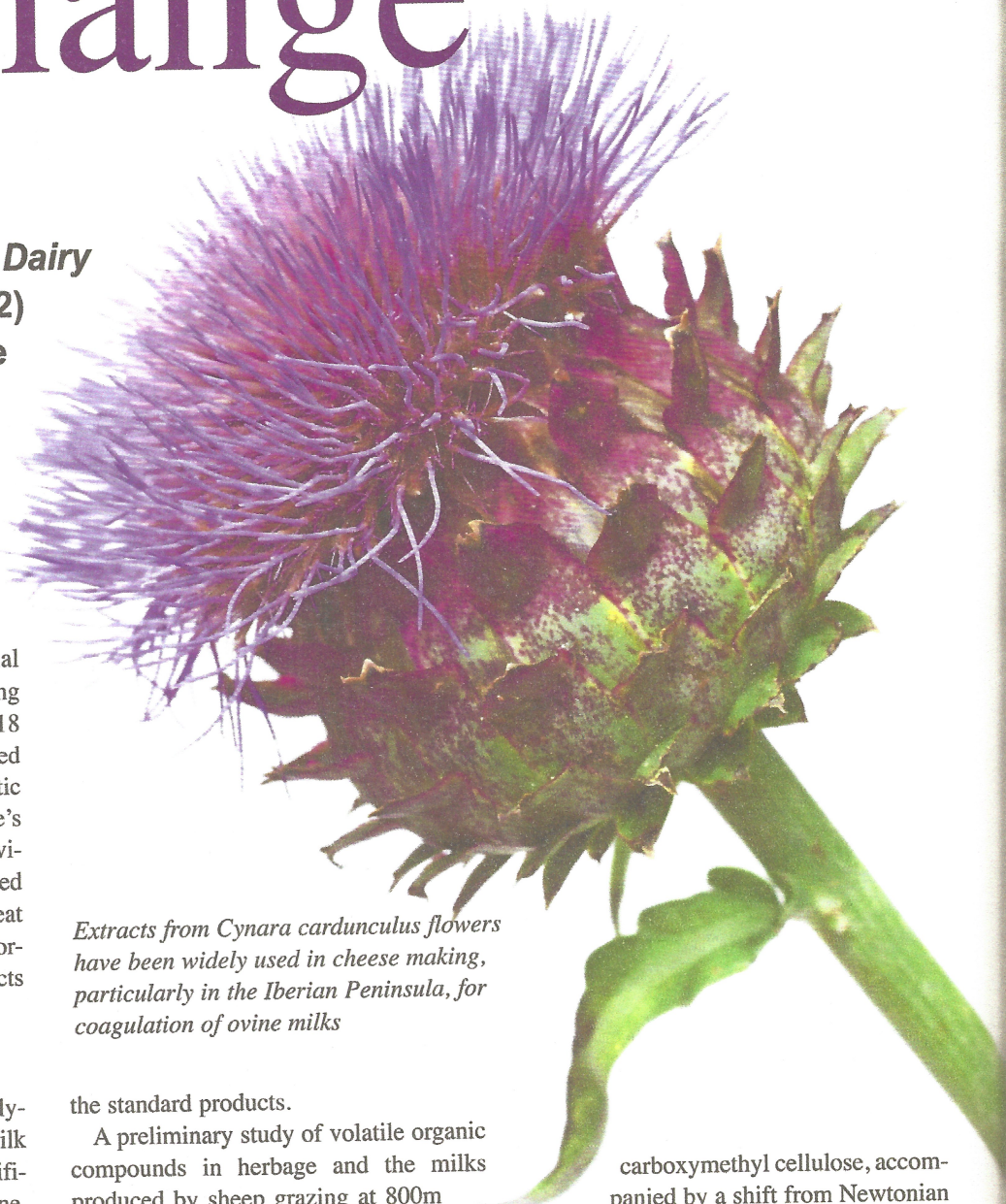
Fermented milks

Doogh, a diluted fermented milk drink, is susceptible to separation. Trials with stabilisers on non-fat doogh gave improved rheological and sensory properties when using a mixture of locust bean gum and

carboxymethyl cellulose, accompanied by a shift from Newtonian to pseudoplastic flow properties.

An evaluation of a synbiotic fermented milk containing *Lactobacillus acidophilus*, fructo-oligosaccharide and isomalto-oligosaccharide showed antimicrobial potential against *Escherichia coli* and *Staphylococcus aureus*. The same fermented milk also demonstrated reductions in blood glucose, urea and creatine levels in diabetic rabbits.

In a separate report, a synbiotic product was produced in a two-stage



fermentation using *Pseudomonas taetrolens* to produce lactobionic acid, followed by heat treatment then fermentation with a probiotic strain of *Lactobacillus casei* to yield a fermented milk containing 30g per litre of the lactobionic acid and less than one per cent lactose.

Sugar levels

Concern over sugar levels in foods was addressed by trials with incorporation of a freeze-dried stevia extract into yogurt. The addition had a buffering effect on the yogurt, but did not affect total counts, acidity or syneresis. In simulated digestion tests, the total phenolic content and antioxidant activity increased.

An assessment of antioxidant capacity in buffalo kefir between that produced using kefir grain and a commercial starter culture indicated that the use of kefir grain was associated with higher scavenging activity and lower ferric-reducing antioxidant power on storage.

In a separate study of donkey kefir, fortification with sulla honey or rosemary oil, showed it decreased the thiol content, explained by formation of polyphenol-protein complexes. Antioxidant activity increased on storage with maximum at 15 days. The kefir flavoured with sulla honey was preferred to that containing the rosemary oil.

Walnut slurry at 10 to 50 per cent was used to enrich yogurt formulations using skim milk powder as the milk source. The resulting products had a higher level of polyunsaturated fatty acids than would be expected with milk fat. Mineral levels were changed by the additions and protein levels were lowered though syneresis was improved.

Probiotic *Bifidobacterium animalis subsp. lactis* was encapsulated in an alginate-caprine milk-inulin matrix then added to a caprine yogurt. The encapsulation led to better survival of the probiotic under simulated gastrointestinal conditions and slower acidification on storage.

Lactose intolerance

Encapsulated lactase may be a potential treatment for those lactase-deficient individuals. Optimisation trials conducted with microencapsulated lactase indicated that hydroxypropylmethyl cellulose phthalate and shellac coated microcapsules were superior to those coated with zein. These microcapsules were resistant

to simulated gastric juice, yet released most of their contents within two hours in simulated intestinal fluid.

Dairy microbiology

The correlation between bacterial counts and the generation of volatile organic compounds (VOC) in whole pasteurised milk was investigated using storage conditions between 7° and 19°C. VOCs were measured by gas chromatography following solid-phase microextraction and concentrations increased with higher total counts at 5-7 log₁₀ cfu per millilitre. This effect was correlated with increases in lipase and protease activity and may form the basis of a method for monitoring temperature abuse on storage.

Some Italian protected designation of origin (PDO) hard cheeses use a deproteinised whey starter culture containing *streptococci*, *enterococci* and/or *lactobacilli*. Since the traditional medium of scotta only gives relatively low cell counts, M17 and MRS growth media were tried for reactivating cultures. The composition and acidification characteristics of the cultures were found to vary depending on the media used.

Cheese and by-products

Harzer cheese pieces were subjected to microwave vacuum drying in order to produce pure cheese puffs, at up to 1,000

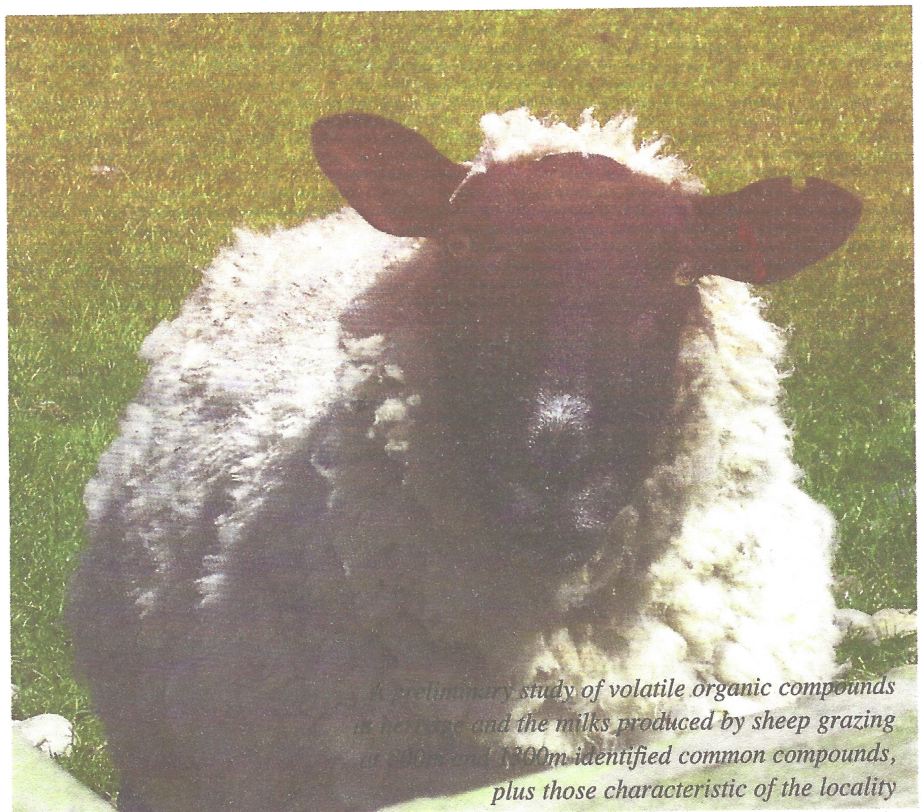
per cent of their original size. Water activity was reduced to 0.35 and hardness, brittleness and colour data were also reported.

Extracts from *Cynara cardunculus* (globe artichoke) flowers have been widely used in cheese making, particularly in the Iberian Peninsula for coagulation of ovine milks.

A similar extract was made from Algerian flowers, its proteases characterised and the extract used in the preparation of a Camembert-type cheese that was reported to be similar to that using a normal commercial rennet.

By-products can be difficult to recover economically from acid whey. One approach is to heat to 60°C and neutralise to precipitate calcium phosphate as a potential food ingredient. A study used a liquid-solid hydrocyclone for size classification of the calcium phosphate. The hydrocyclone was also integrated into a membrane filtration-based process to recover milk mineral powders from the two hydrocyclone fractions. **Dii**

The SDT Spring Conference 2019 will take place in Whitchurch, UK on 9-10 May 2019 with a product and process development theme. For further information, visit www.sdt.org



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