Europe and other countries

Probiotics and cheese were featured in the latest *International Journal of Dairy Technology*, Andrew Wilbey reports

The final issue of Volume 69 of the *International Journal of Dairy Technology* marked a changeover of editors and included a review of probiotic research by Dr Linda Thomas, the incoming editor, based on papers from the Society of Dairy Technology's spring conference. This included a comparison between the EU's legislative approach and those of other countries. A second review covered whey protein polymerisations and their application to making environmentally safe adhesives for wood and paper products.

In addition to an update on the UK milking machine test survey, 13 reports of original research were published, with cheese being the most popular topic.

Cheese

Propionic acid is a contributor to the characteristic flavour of Emmental types of cheese, and melting properties are critical to some applications – for instance, as pizza toppings. Thermo-physical tests were used to discriminate between experimental and commercial cheeses, to enable a small-scale manufacturing protocol to be developed.

Bovine milk is less expensive than caprine and ovine milks, so less scrupulous cheese makers have been tempted to include bovine milk in premium-priced cheeses. Detection of such mixtures has used immunological and electrophoretic methods, but these can be difficult to use quantitatively.

A quantitative method was developed to discriminate between bovine, caprine and ovine milk DNAs and to quantify the proportion of bovine milk that had been used in mixtures, using a quantitative real-time polymerase assay. Trials with commercial cheeses indicated that seven of the 41 cheeses tested had been made with more than 5% bovine milk, indicating fraudulent rather than an accidental trace contamination.

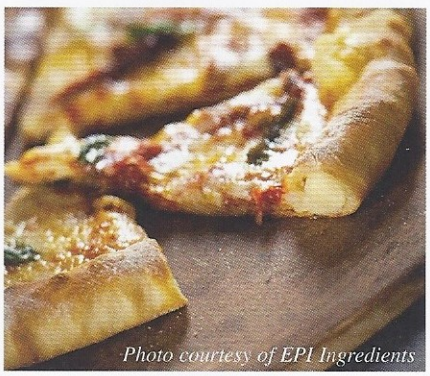

Photo courtesy of EPI Ingredients

Cheese analogues continue to generate interest, whether for economic or nutritional reasons. The degree of replacement of milk fat by sunflower oil and optimum cooking conditions were investigated in a spreadable cheese analogue based on UF white-brined cheese. Partial replacement of the milk fat was associated with increased adhesiveness, oiling-off and spreadability. The optimum product was estimated to be at 27% sunflower oil substitution, with cooking conditions of 85°C for 14 minutes.

Ezine is a protected name for white Turkish cheese produced from raw milk and relying on its native microflora. A study of the milk, intermediates and cheese from three sources used a combination of PCR, denaturing gradient gel electrophoresis and single-strand conformation polymorphism to look at the bacterial ecosystem. *Lactococcus lactis* strains and *Streptococcus thermophilus* were predominant throughout manufacture and ripening of the cheeses.

Milk fermentation

There is a continual search for suitable starter bacteria. Mesophilic lactic acid bacteria (LAB) were isolated from traditional Spanish cheeses made from raw milk without starter addition. These were characterised for their growth characteristics and production of potential flavour compounds, while minimising production of biogenic amines. Four apparently appropriate combinations were subsequently tested in pilot-scale cheese trials, two of which produced cheeses of high flavour and taste quality. In a separate report, 191 presumptive LAB were isolated from goat colostrum and 30 representative cultures were identified and assessed for potential application in food fermentations. These isolates were identified as strains of *Leuconostoc mesenteroides*, *Leu. lactis* and *Lac. garvieae*, of which *Lac. garvieae* had a high resistance to low pH. Most of the isolates retained viability after exposure to bile salts and four were susceptible to eight of the 13 antibiotics tested, suggesting that they might be useful.

Photo courtesy of Orm

Dextran is a polysaccharide commonly produced by *Leu. mesenteroides* and composed largely of a-(1-6) linked dextrose units. Production from a whey-based medium was optimised to ensure that the resulting product would be acceptable in food after scale-up. The production of expolysaccharides (EPS) can be useful in increasing viscosity in stirred and drinking yogurts. A total of 139 strains of *Streptococcus thermophilus* were screened using PCR techniques, targeting genes involved in EPS production. It showed 39 strains were EPS-positive and three strains produced significantly higher viscosities when grown in skim milk, producing 84-309mg EPS per litre.

An in-vitro study used two probiotic strains of *Lactobacillus rhamnosus* and a strain of *Lb. casei* to test their adherence to human colon epithelial cells and the extent of their ability to inhibit adherence of enteric pathogens. All of the lactobacilli exhibited inhibition, the greatest being against *Salmonella enterica* serovar *Typhimurium* and to the least extent against *Candida albicans*. This illustrated the potential for probiotic cultures to reduce the risk of enteric infections.