All photos: Society of Dairy Technology

Sensing the shifts

The Society of Dairy Technology's Summer Symposium in Stafford, UK tackled pivotal moments for processors. **Suzanne Christiansen** reports

The dairy industry is ever-evolving, and the challenges facing it currently were the topics of the Society of Dairy Technology's summer symposium, held at the Stafford County Showground in June. Topics ranging from listeria management, to new equipment, to optimising coagulation for cheese were examined.

SDT president Mike Pinches, observed that the dairy industry is at, "A pivotal moment – producers have significant headwinds and a complex environment, but our collaboration is a core value. We have challenges and opportunities, and there is modest but steady growth, especially in value added and exports. All of us are working in concert to streamline operations. Innovation and working as one, to ensure dairy remains a cornerstone in the food economy. It's about driving the industry forward, together."

New equipment

Rasmus Mortensen, CEO and founder of Lyras (in conjunction with Sycamore Process Engineering), was up first, to discuss, "Capitalising on improved product quality and energy savings in whey processing," with raslysation, which he notes is "casting a new light on microbial inactivation. The Raslysation Castor system is the newest system and the largest UK unit for the treatment of opaque liquids. The modular unit ensures full scalability to fit any product flow size and capacity, and users can either rent or buy the system. It is also based on easy maintenance principles, meaning that all vital parts can be easily maintained or replaced through an easy click and replace system.

"One very good customer is FreislandCampina, which looked extensively at commercialising whey. The treatment of whey with raslysation is very effective to inactivate microoragnisms. It is estimated it saves €250,000 per year by replacing the former steps for whey processing," he noted, with no thermal impact in processing. "In whey with low quality, it can upgrade it for other uses. The industry is adapting to our technology and what it can achieve on whey products," he added.

Listeria management

Paul Gregory, technical services manager at Kersia, examined listeria and the controls available to contain it. He noted, "Listeria is fairly tolerant to some of the environmental controls we have in place, and around 10-12 per cent of people working in the industry carry listeria on their selves. A control plan includes barrier control for people and the containers being brought in. Crossing barriers to get into the high risk environment helps with

Kersia's Paul Gregory

Mike Pinches, SDT president, addresses the assembled


Wayne Johnson of Faedah Solutions

Jonathan Goodwins of IFF

psychology, with controls put in place to prevent listeria going across the barriers. We have to make sure we understand the risks, with minimal moisture into high risk areas. At the wall to floor junctions, the weakest point is the fire exit. If high risk is a couple of inches above the other areas, it will prevent listeria. The walls should be solid."

Another issue is fixed points, he observes, "What's happening in the low risk areas could affect the high risk areas. For example, air blowing through the low risk area to the high risk area. Drains are very important, and misaligned pipework can lead to persistent listeria problems. A gap between two pieces of metal is where listeria can be pinned in. One solution is an elastomer seal for the gaps, to stop listeria hiding in the gaps. As for equipment, have we sited it in the right area so it doesn't get contaminated? Ingressive debris in dead spaces on pieces of equipment does need to be rectified. We can engineer out some of the challenges – design the buttons so that they're easily gripped, but they can be contaminated. There are a lot of challenges around buttons," he observed.

The questions that arises is, "How do we control the movement of the listeria vector and lessen the amount of contamination from one surface to the other?" Gregory points out. Even cleaning tools and utensils can be contaminated. "The key people need to be aware, we can't do it in isolation. It's about cleaning and disinfection, and to re-set the environment moving forward. When reducing costs in cleaning, and reducing water temperature, see how it affects the cleaning. Detergent and disinfectant is not enough on its own, it's a collection of steps. We need to make sure, are we still in control? It's important to update the environmental sampling plans accordingly. One shouldn't see listeria present following a clean. However, don't panic if you find listeria in a drain, it's about understanding when to push the panic button. Ultimately, all the teams have to work together – the technical team, senior management, and hygiene. If two or three departments are working in isolation, it will fail."

Optimising coagulation

Optimising the coagulation step in cheddar cheese manufacture was the topic of Jonathan Goodwins of IFF's presentation. He noted, "Enzymes are proteins, or edible bio-catalysts. When using enzymes, here's what to consider: milk coagulants and mode of action, and aspects that will generate variations in the cheese making process, such as seasonal variations of milk compositions. It's about making allowances for these variations to ensure stability of design. Nine times out of ten, when there's a significant variation in cheese vats, it's due to pH. Pasteurisation times and temperatures, and standing conditions, shouldn't have a significant difference.

"However, there is no perfect cheese. You have to decide on a compromise between fat content and the right moisture content on cheese. In order to optimise fat retention, you'll want to cut as soon as possible. The consequences of cutting at the wrong firmness of the final cheese is this – cutting too early means a weak curd, while cutting too late, is a firm curd. A coagulation probe by axiom, is very useful in establishing the point of flocculation.

"Biological proteins are sensitive to things that impact functionality. Bitterness is not a simple matter and many factors can impact it, chiefly through the interactions of the matrix of the cheese. At the end of the day, there is never a standard approach in cheese. On a good day, sensory analysis confirms your biochemistry. On a bad day, it doesn't."

Dr Ken Burgess, of Ken Burgess Consulting, detailed, "Cheese yield: Moving on from Van Slyke." He noted the importance of yield modelling, budgeting and forecasting, compositional payment, target setting, process efficiency monitoring, and very importantly, flagging measurement errors. "The basic yield model is the sum of the components, with the key process parameters affecting recovery factors being protein to fat ratio, whey protein denaturation, gel firmness, cutting intensity and stirring speed, and post vat curd handling," he observes. The basic yield model of van Slyke can be augmented by two alternative models looking at high moisture and the relative value of casein and fat. "Yield modelling has value as a tool in yield improvement," he states.

Wayne Johnson, managing director of Faedah Solutions, asked the audience whether they were ready for the 2D barcode revolution. By 2027, there is an aim for all barcodes to move from GS1 barcodes to 2D, which offer a lot more data than a standard 1D barcode, including the GTIN (global trade item number). "The new 2D can handle a lot more information: batch information, expiry dates, and so forth, and 2D barcodes are a lot easier to read. The consumer can scan it and get more information than what you can see in-store. It works for stock control and management, and encourages waste prevention, as it can let people know the product is running out. Manufacturers can use inspection systems and scanners to collect the data," he observes. Dii