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This issue is available to read and download at www.foodprocessing.com.au/magazine

Former University of Sydney School of Chemical and Biomolecular Engineering student Sarah Qian is a self-confessed foodie and vegan whose graduation story is far from ordinary.

After deciding that working in the oil and gas, mining and industrial sectors weren’t for her, Qian became a management consultant, despite receiving several offers to work in engineering. However, management consulting didn’t feel right either. Then came the pandemic, and while the rest of the world was frozen in time by the first lockdown, Qian had a stroke of genius.

After seeing huge growth in the oat milk sector, she was inspired to take action and pivot into entrepreneurship. Armed with a blender and sacks of oats, the chemical engineering graduate turned her kitchen into a lab and began concocting her plan to make an oat-based cream cheese.

Eighteen months and 250 versions of R&D later, Compassion Creamery was born — a Sydney food startup that makes oat-based vegan cream cheese from culturing and fermenting methods traditionally used to make dairy cheese. The cheese contains no coconut oil, starches, nuts or soy.

“I wanted to replicate the chemical properties of dairy cheese using oats — which are more neutrally flavoured compared with other plant-based products on the market that use soy and cashews,” said Qian, who came from New Zealand to study at the University of Sydney.

“For so many people switching to plant-based diets, cheese is often the hardest thing to give up, with many alternatives just not hitting the spot. Most plant-based cheeses use a processed and deodorised combination of coconut oil, starch, added flavours and colours,” she said.

Using 100% Australian oats to manufacture the cheese, Qian hopes Australia’s status as a large-scale wheat producer will help buoy the nascent industry while minimising the environmental impacts of dairy production and reliance on international supply chains.

“Oat production has a significantly smaller environmental impact compared with dairy production, which, when accounting for greenhouse gas emissions and ecological impact, is a highly polluting food source,” she said.

“There are so many question marks hovering over international supply chains, with many products not produced ethically. Cashews, for example, require specialised and ethical farming practices due to the risk of chemical burns during harvesting.”

Qian has now set up a pilot plant with bespoke designed equipment and plans for her product to hit retail shelves soon.

“There’s already interest from distributors interstate, with several individuals signed up to a waiting list — which is wonderful to see. My focus now is to get production up and running in preparation for a retail release.”
No matter how big or small your food or beverage plant is, you can benefit from a **15% reduction in carbon emissions**, along with reduced energy consumption compared to our next best technology available.

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Australian beverage companies increase sugar reduction target

Australia’s largest beverage companies have now committed to increase their sugar reduction targets.

Back in 2018, Asahi Beverages, Coca-Cola South Pacific, Coca-Cola Europacific Partners and Pepsi Co Australia and New Zealand, committed to reducing sugar across their non-alcohol beverage portfolios by 20% from 2015–2025.

With more than 16% of sugar removed from their portfolios since January 2015, today (29 September), through the Australian Beverages Council Limited (ABCL), they have upgraded their target to a 25% reduction in sugar across their non-alcohol beverage portfolios from 2015–2025.

ABCL Chief Executive Officer Geoff Parker said: “Our Sugar Reduction Pledge signatories are accelerating their sugar reduction target not only because it’s the right thing to do, but also because they’re ahead on their current sugar reduction targets.

“Sugar reduction is being driven by a range of initiatives, including reformulation, smaller pack sizes and pledgees investing in more low- and no-sugar products to meet growing consumer demand.”

Progress against the Sugar Reduction Pledge will continue to be independently aggregated annually by KPMG and a report on progress towards the sugar reduction target made public.

Carman’s acquires snacking brand Fruit Wise

The founder of Australian business Carman’s, Carolyn Creswell, has announced the acquisition of family-owned snacking brand Fruit Wise.

“After a year of discussions, our unparalleled similarities and outlook on healthy snacking helped us finalise what is now Carman’s first ever acquisition. It’s truly a moment that I’m so proud of and I just can’t wait to watch Carman’s continue to grow,” Creswell said.

The two family-owned businesses will now be joined in producing 100% Australian owned and manufactured snacking products.

The Managing Director of Fruit Wise, Bridget Beal, said, “After speaking with Carolyn we knew straight away that this was the right move for Fruit Wise. We’ve been family owned for 15 years, so wanted to make sure we were passing over the reins to someone just like Carolyn, who shared the same outlook about delicious and healthy snacking and looking after Aussie families. We can’t wait to watch Fruit Wise grow under the care of Carman’s!”

After the acquisition, Fruit Wise will continue to operate in its current location in the Adelaide Hills.

$43 million kombucha manufacturing centre

A $43m kombucha manufacturing centre has been opened in Dandenong with support from the Andrews Labor government.

The centre was developed by Remedy Drinks, which produces kombucha drinks that can be stored at room temperature without needing refrigeration.

With fermented tea drinks growing in popularity around the world, the new centre will boost the company’s production and exports to the United States, Canada, United Kingdom and Asia.

Managing Director of Remedy Drinks Chris Gillard said: “The new Remedy Fermentary in Dandenong will allow us to deliver on significant increases in demand as well as provide opportunities for ongoing innovation, delivering better beverages across all drink categories.”

The company has combined all of its operations into the new 18,000 m² site — the same size as the MCG.

Minister for Industry Support and Recovery Ben Carroll said: “We’re proud to support local manufacturers with global ambitions like Remedy because their continued growth means more jobs for Victorians.”
$5 million investment in XXXX Brewery in Milton

In order to meet changes in consumer demands for beverages, Lion is set to invest nearly $5 million into the XXXX Brewery in Milton, which has been at this site for nearly 145 years. The investment will allow for expansion in production to enable mass production of seltzers and ready-to-drink adult beverages.

The Milton brewery is an integral part of Lion’s brewing network, producing beer brands such as XXXX, Hahn and James Squire. It will now also look to produce most of Lion’s portfolio seltzer brands, including its latest brand White Claw.

“The beer and alcohol beverages market continues to evolve, as do consumers’ tastes and preferences. It is important that we innovate and set the brewery up for long-term success,” said XXXX Sales Director Patrick Donohue.

“Mass production of seltzers and RTD beverages requires bulk ethanol storage, and so we will lodge a development application with Brisbane City Council in the coming weeks to build a new facility on the current site to ensure we’re doing this in the safest way possible.

“This represents a significant investment in the site and builds on our decade-long registration under state planning laws protecting the existing use of the brewery from encroachment from other development, which was extended in 2019.”

As part of its application, XXXX will conduct a period of community consultation, which will commence later this year.

Mars Wrigley unveils Ballarat investment

Mars Wrigley has announced a $25.5 million investment into its Ballarat factory in the next 12 months.

This marks a continuing pattern of significant development at the site to boost local production of chocolates like M&M’s, MALTESERS and PODS, with the company having invested $67 million over the last two years.

The investment will be used to boost the manufacturing capabilities for the plant, improving its raw cocoa and melted chocolate production, and increasing its work in using sustainable packaging. General operational efficiency upgrades will also be performed, as will modernisation of some manufacturing practices.

Andrew Leakey, General Manager — Mars Wrigley Australia, said: “We have a commitment of making the majority of our product portfolio here in Australia, and we are cementing this further by unlocking greater capabilities to create new consumer-led product innovation whilst accelerating our sustainable packaging focus locally.”

Mars Wrigley Australia has been manufacturing locally in Ballarat for more than 40 years.

BOC to build CO2 processing facility in Vic

BOC, a gas and engineering company owned by Linde, has announced that it will be building a carbon dioxide processing facility in Longford, Victoria, as part of a CO2 supply agreement with the Gippsland Basin Joint Venture.

The facility will be able to produce more than 60,000 tonnes of beverage-grade CO2 each year, making it one of the largest such facilities in the South Pacific region.

The Gippsland Basin Joint Venture is a 50-50 joint venture between Esso Australia (Esso) and Woodside Energy. As part of the agreement, Gippsland Basin Joint Venture will capture CO2 from its Longford Gas Conditioning Plant and send it directly to the new BOC facility.

John Evans, Managing Director of BOC South Pacific, said that the CO2 processing plant would allow BOC to supply customers in Australia and New Zealand with high-quality CO2 for their businesses.

“BOC is building new infrastructure to ensure long-term supply security of an essential gas used in many industries including food processing and packaging, beverage, hospitality, desalination, medical, manufacturing and water treatment,” Evans said.

“This significant investment is part of our commitment to develop local supply partnerships and expand our production capability to meet the future needs of our customers and support growth across the South Pacific Region.

“With the latest technologies and processes in quality control and efficiency, BOC’s new CO2 facility will exceed internationally recognised food and beverage standards.”

The facility is currently being scoped and construction is expected to commence this year, pending regulatory approvals, with completion set for 2024.
Fonterra enters alt-dairy market

Dairy co-op Fonterra has announced it is teaming up with Royal DSM, a health, nutrition and bioscience company, to establish a start-up dedicated to the development and commercialisation of fermentation-derived proteins that have dairy-like properties.

The two companies have worked together since 2019 to understand how precision fermentation can be used to make proteins that are similar to those found in dairy. This has resulted in patents being filed that will be used by the startup to enable the acceleration of commercial products. There will also be a focus on continued research and development of the technology.

While Fonterra remains focused on dairy products, the company said its work on the development of proteins using emerging technologies will complement the business.

Vow’s cultured meat facility unveiled in Sydney

Now that Vow’s Factory 1 cultured meat facility has been officially opened in Alexandria, Sydney, the company has already commenced development of its Factory 2 to produce 100x this scale.

Claimed to be the largest of its kind in the Southern Hemisphere, Factory 1 has the capability to produce as much as 30 tonnes of cultured meat annually.

Vow’s technology can leverage not only standard livestock cells such as pork and chicken, but also the cells of exotic and less conventional animals like kangaroo, alpaca and water buffalo. It then blends the technology with the culinary world to create new food products.

As the company’s products are approved for sale in Singapore, its Singapore factory will handle commercial production for its first cultured meat product. The Singapore factory is on track to launch before the end of the year.

Founded in April 2019, Vow now has a team of over 60 people in Sydney, and has submitted its first product for regulatory approval in Australia.

Magic Valley creates cultivated lamb-free prototype

A team of scientists at Australian food company Magic Valley have created a cultivated lamb meat prototype, completely free from animal by-products. The team is working towards transforming the future of large-scale protein production and removing animals from the supply chain.

The prototype — initially created in the form of burgers and tacos — is designed to look and cook just like real lamb yet has the potential for a healthier nutritional profile.

To create the prototype, a small skin biopsy was taken from ‘Lucy the lamb’, who is happily residing in a field in New South Wales. The cells from Lucy were then grown in Magic Valley’s Melbourne lab where they are made into cultivated meat products.

The process used by Magic Valley takes the skin cells and turns them into stem cells called induced pluripotent stem (iPS) cells. The IPS cells can grow in an unlimited and scalable way and can also be made into muscle and fat — the main components of meat. This is claimed to be the first time this technology has been used to make a cultivated lamb product.

Many other cultivated meats use foetal bovine serum — a by-product of the slaughter process — to grow the cells; however, this Australian technology means animals are not used anymore, other than the initial skin scraping.

The innovator, founder and CEO of Magic Valley Paul Bevan said: “By 2024, cultivated meat products will be indistinguishable from traditionally farmed meat, with the ability to enhance nutrients to positively impact the human population.”

Magic Valley is now looking to scale up its abilities to also create beef and pork prototypes, with a $5m seed capital raise ahead.
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Sustainable protection of everyday needs
Labelling nutrients on plant-based milk alternatives

Made from base ingredients such as soy, almonds or oats, plant-based milks provide an alternative to dairy milk for people with allergies or intolerances, or for those who choose dairy-free diets. Although non-dairy options are increasing in variety and availability, the nutritional content of certain minerals in each type largely remains unknown.

Researchers have now analysed plant-based beverages and found variability in mineral content by type and brand. The researchers presented their findings at the American Chemical Society (ACS) meeting held on 26 August, which featured nearly 11,000 presentations on a wide range of science topics.

The findings indicate that certain plant-based milk alternatives (PBMA) can be a source of magnesium, phosphorous, zinc and selenium, but that there are differences across PBMA types and potential variability within a PBMA type. Overall they report that pea-based drinks had the most phosphorus, selenium and zinc, while soy milks had the most magnesium.

In Australia, nutrition information panels (NIP) on food labels provide information on the average quantity of energy in kilojoules and these nutrients:
- protein
- fat
- saturated fat
- carbohydrate
- sugars
- sodium — a component of salt.

Essential minerals are only required to be included on the Nutrition Facts label under certain circumstances. For example, if a food is claimed to be a “good source of fibre” then the amount of dietary fibre in the food must be shown in the NIP.

The US researchers say micronutrients may need to be taken into account when considering the nutritional value of PBMS, especially when they are being used as a milk substitute.

“Although they can be voluntarily declared, from a regulatory perspective, these minerals are not always required to be on the Nutrition Facts label.”

Redan and his colleague Lauren Jackson, PhD, performed the study, and they are both at the Institute for Food Safety and Health, a research consortium that includes the Illinois Institute of Technology, FDA and the food industry.

Redan and Jackson chose to measure the amount of magnesium, phosphorus, zinc and selenium in plant-based milk alternatives because these essential minerals are not required on the Nutrition Facts label and are components of dairy milk. In fact, dairy milk is a key contributor of these micronutrients, and people’s bodies can’t make them. Because people must instead consume foods and beverages with these minerals in them, it’s important to know how much is provided by various milk alternatives.

The researchers analysed a selection of locally available plant-based beverages that were sold under a variety of brand names. Each product was made from a single base ingredient, such as almond, cashew, coconut, hemp, oat, pea, rice or soy. A technique called inductively coupled-mass spectrometry quantified the minerals present in a total of 85 samples. Using statistical analyses, the team found that the mineral content varied significantly across different product types — for example, soy-based versus almond-based drinks — and even between brands of the same type of product. When considering the amount of each specific mineral, they found that pea-based drinks had the most phosphorus, zinc and selenium, while soy drinks had the highest amounts of magnesium, on average.

Of all the samples analysed, only pea- and soy-based drinks had higher levels of the four essential minerals than cow’s milk, with pea-based drinks containing about 50% higher levels of phosphorus, zinc and selenium. “These plant-based milk alternatives could be important sources of these micronutrients if you’re trying to reach the recommended dietary allowances for them,” Redan said.

In the end, the researchers hope that their data about essential minerals will help consumers make informed dietary decisions about non-dairy plant-based drink products.
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Grant Verry, CEO of The FOODBOWL, said: “We are excited to be able to support global innovation here at The FOODBOWL to develop more nutrient-rich alternative proteins by utilising local waste streams.

“New Zealand and Singapore already have strong collaborative agreements in place and this project is another great example of the value such relationships can deliver for both country’s economies and overall food systems, with industry-led and government-enabled innovation for the food sector.”

The NTU product is said to taste similar to meat due to the presence of high levels of amino acids, and glutamic and aspartic acids, which all contribute to its distinctive meaty flavour. The scientists hope that this, plus its fibrous and meaty texture, will make it easier for consumers to embrace the alternative protein.

“Nature, in the form of fungi, is a powerful tool to help corporations not only cut down on waste but potentially improve human diets, but they require research and innovation, which we are glad to provide, to bridge that gap.”

The researchers are hoping to commercialise the product by 2024.
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PLANT-BASED/ALTERNATIVE FOOD

Improving the flavour of plant-based meats

Professor Ian Fisk, Director of the International Flavour Research Centre (IFRC) at the University of Nottingham, UK, and the University of Adelaide, Australia, talks about his exciting research on improving the flavour of plant-based alternative proteins, while shedding light on what’s in store for the institute’s new $2.5 million lab research facility located at the University of Adelaide’s Waite campus.

Introducing the International Flavour Research Centre (IFRC)
The IFRC performs flavour research to address the sustainability, health and nutrition needs of our global food chain, while developing novel flavour insights and applicable solutions and technologies for the food and beverage industry. “We’re privileged to have (IFRC) sites both in Australia and the UK; these are based at the University of Adelaide and the University of Nottingham, respectively,” Fisk said.

The IFRC takes a fundamental approach to understanding the basic mechanisms behind aroma development, stability and release, and uses these to solve industrial challenges such as developing reformulation strategies for salt, sugar and fat reduction; custom product design for plant-based meat alternatives; and developing novel technologies for rapid flavour profiling.

Last November, the IFRC announced its plan to launch a new $2.5 million research facility at the Waite campus, University of Adelaide, with investment from v2food, a plant-based meat producer. The (invite-only) opening launch for the new facility will take place in December this year. The facility hopes to bridge the technology gap between the flavour and nutritional values of meats versus plant-based meats — addressing the growing consumer demand for a wider range of plant-based meats.

Overcoming flavour challenges with plant-based alternative proteins
Those consumers who want to experience the same or a similar flavour of meat without necessarily eating animal products may turn towards plant-based meats, which is where Fisk’s research group comes into play.

“Many consumers want plant-based meats to taste like meat; however, due to the diverse range of meat and cooking methodologies, this is technically a very complex problem. This rapidly emerging challenge can’t be met by current solutions offered by the food or flavour industry. We use the
unique portfolio of skills, knowledge and analytical equipment within the IFRC to take a fresh approach to solve these and similar problems.”

Fisk’s research teams in Adelaide and Nottingham work on numerous similar projects, including the development of new flavour systems for plant-based meats; the enhancement of flavour of plant-based milks; understanding the flavour of alternative proteins, such as insect proteins; and developing flavour-enhancement systems to increase palatability and nutrition of alternative protein-rich crops.

**Technology behind the research**

To improve the flavour of plant-based alternative proteins that are currently available on the market, research scientists need to understand how flavour is perceived. “Flavour is a combination of aroma, taste, mouth feel, and other key attributes of food,” Fisk explained. “We need to zoom into each of these components individually and also in combination when analysing complex foods such as plant-based meats.”

To achieve this, the IFRC uses analytical techniques such as GC/MS/MS to identify volatile aroma compounds found in plant-based foods and their meat equivalents. When combined with complementary approaches such as GC-olfactometry, each aroma compound can be ranked and scored based on its importance and contribution to the aroma of the products.

Further to this, real-time mass spectrometry (MS-nose, APCI-MS) can be used to track flavour generation in situ, and aroma delivery during consumption. Due to the complexity of the systems, GC/Q-TOF is used to examine the more complex components within the flavour systems and track the development of key aroma compounds during processing. Advanced data analysis techniques such as machine learning can be used to explain which compounds drive flavour perception and identify novel ingredients that can potentially be used to enhance the aroma.

The IFRC (Nottingham) also uses technologies such as HPLC/MS/MS, e-tongue, taste fractionation and digital taste mapping to explain the contribution of key taste-active compounds to the taste of plant-based meats.
An active research team ready to expand

Other leading members of the IFRC (Adelaide) site include Co-Director Associate Professor Susan Bastian, Lab Manager Dr Ruchira Ranaweera, numerous research collaborators who are based in Adelaide, and a wide range of PhD students who sit in both the School of Agriculture, Food & Wine, and in other disciplines across the University of Adelaide. At Nottingham, Assistant Professor Ni Yang, Technical Specialist Mui Lim, Associate Professor Louise Hewson, and Jenny Drury form the UK team with 10 additional PhD and four research fellows under the overall lead of Fisk.

Visiting PhD students and technical team members have an opportunity to travel between both locations, transferring technologies, methodologies and valuable experiences to projects and applications in other areas of their research. Both the Adelaide and Nottingham IFRC sites have specific areas of expertise, with the UK focusing on real-time analysis, advanced aroma analysis, taste analysis, and in-mouth characterisation, and the Adelaide site focusing on advanced aroma analysis for complex foods.

Adelaide–Nottingham alliance

As part of the Adelaide–Nottingham alliance, the two research-intensive universities have a long-standing partnership in the areas of world-leading research, high-quality teaching, links with industry, and the ability to offer students and staff a global experience during their time at each institution. The IFRC is a leading centre that bridges the two institutions; however, there are also numerous other strategic links, including many joint PhD students who regularly exchange between the institutions and with industrial partners. The University of Adelaide is now recruiting high-quality postgraduate research candidates.

“These PhD students will receive a degree from both [the University of Adelaide, and the University of Nottingham] institutions, and have an opportunity to spend a minimum of 12 months working abroad in the other institution’s laboratory, often in partnership with industry,” Fisk commented, reinforcing the IFRC’s commitment to develop talent for the next generation of scientists and prepare them for a career within the global food and agritech industry.

With the new IFRC facility opening in Adelaide, Fisk and his research team are confident about improving the flavour of plant-based meats. “If we can develop a broad range of flavour systems for alternative proteins that are palatable, nutritious, enjoyable, and — more importantly — available at the right price, we hope they will be purchased and consumed.”

Professor Ian Fisk leads the IFRC and is Director of the Food and Feed Analysis Consultancy and Training Service. He has joint positions at the University of Adelaide and University of Nottingham and leads the Nottingham–Adelaide International Doctoral Training Programme. His research interests focus on designing effective and commercially viable flavour science solutions. This includes fundamental food chemistry to develop new ingredients or processes, flavour management during food production (plant biology, agricultural techniques, food processing, shelf life), and explaining the highly complex interaction of flavour with the oral–nasal environment during oral processing, while pioneering new approaches to increase sustainability across the food and flavour industries.
Flow conditioners for pumps

The efficiency and service life of pumps can be extended by following the manufacturer’s installation recommendation for pipe straight run entering the pump. When cramped pump houses or restricted pipe runs make this impractical and costly, Vortab Flow Conditioners from The Vortab Company can help to overcome this challenge by delivering a uniform, swirl-free flow profile to the pump inlet in as little as six pipe diameters.

Upstream flow disturbers, such as elbows, expanders or reducers, and valves, often produce non-uniform, non-repeatable and swirling fluid flow entering the pump that can lead to pump cavitation and other issues causing premature wear. The result is extra maintenance, expensive repairs and/or premature replacement, which can take equipment offline. Vortab products can provide effective process conditioning to protect pumps.

Vortab Company’s product line of process flow conditioners, with its exclusive flow profile and anti-swirl tab design, correct flow disturbances to mimic adequate pipe straight run and produce a highly repeatable, symmetrical flow profile. The pressure drop flow conditioning technology can reduce energy costs and minimise process design considerations. Their use can also eliminate the extra pipe cost and technician labour for additional lengths of pipe straight run and/or moving equipment around to accommodate new pumps.

Swirl reduction and velocity profile correction occur naturally in long lengths of straight pipe due to diffusion, friction and turbulent mixing. The flow conditioner’s anti-swirl and inclined vortex generating profile correction tabs, projecting from the inside pipe surface, generate vortices that accelerate these natural pipe effects to create a uniform, non-swirling, symmetrical flow profile in a much shorter section of pipe.

The simple, flexible designs of the Vortab Elbow (Model VEL) and the Vortab Insertion Sleeve (Model VIS) configurations can provide a cost-effective, easy-to-install solution that supports proper pump installation. They can be made from carbon steel, 316L stainless steel or Hastelloy C-276 and in almost any pipe size. A variety of process connections is also available — ANSI flanges, male NPT threads, butt welded preps or retaining wafers.

The Vortab range of flow conditioners is available from AMS Instrumentation & Calibration in a range of sizes and connections.

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As the world moves to a post-COVID new normal, let’s not forget about the challenges food producers faced with unexpected worker shortages, new procedures and even new regulations. All these challenges drive the need for digitalization and automation in the food factories. In the highly competitive food and beverage market, gaining an advantage with the customer begins with better control of packaging lines. Not only do improved packaging processes translate into increased production and operational efficiency, but they also mean greater customer satisfaction as food and drink stay fresh longer.

Most consumers who shop at their local supermarket judge foods based on the physical appearance of the food like uniform fill levels, firmly closed caps, dents or firmness of the packaging, instead of checking for micro leaks in the packaging that might indicate spoilage or contamination.

Leakage does not necessarily mean product spilling out; it is often more subtle like reduced shelf life and food spoilage when specialized gas inside the packaging escapes. Once oxygen enters the packaging, it can accelerate the growth of aerobic bacteria, mold and speed of food spoilage. Carbon dioxide (CO2) added into the packaging, displacing oxygen, drastically decreases reactivity, allowing ingredients to retain freshness and remain stable for a longer period.

This is true especially when modified atmosphere packaging (MAP) is used to improve shelf life and freshness. MAP options such as nitrogen and carbon dioxide are used for fresh or cooked meat packaging and shredded or sliced cheese packaging.

If the package is not fully sealed, either through an incomplete sealing process or a puncture, problems may arise like mold or shorter than labelled shelf-life, which will have a detrimental impact on the food company’s brand and reputation.

In the pursuit of operational excellence
Packaging assembly lines often run up to hundreds of items per minute, so any leak detection method must be able to keep up with the production. It has to be significantly more accurate than labor-intensive traditional methods where a random package is taken from the line and submerged in water to detect escaping bubbles. This is not an accurate method because it will most likely miss most of the leaks in the packages that do make it to the store shelves. If a leak is found, the line must be stopped, and operators have to hunt through the process to determine where the problem is.

Whether they dunk random individual or batches of packages, this time-consuming test method in water has another drawback which is product wastage as soggy packaging cannot be sent to the stores and gets thrown out.

Another method which is less wasteful and messy, puts each package or group of packages in a sealed chamber and exerts a controlled vacuum on the interior. If there is a leak, the chamber will not reach the prescribed negative pressure level. There are several drawbacks to this method:
The chamber must be sealed completely to avoid a false positive.
There’s no way to identify a single leaking package in batch checks.
There must be enough free gas inside the package to affect the overall pressure.
A start/stop action of the conveyor is required.
There must be enough time scheduled for the gas to escape through a small leak.
Finding the right method to test for leaky packaging is a key challenge for a food producer. Every producer hopes to find a method that can test each package for seal integrity that is accurate, automated and fast enough and to avoid slowing down the high-speed packaging lines.

Quickly detect leaks reliably
A technology that has gained growing acceptance in the food and beverage industry for detecting CO₂ leaks is quantum cascade laser (QCL) technology (Figure 1). It is particularly effective in CO₂ leak detection as the technology uses CO₂’s ability to absorb specific wavelengths in infrared (IR) light. The laser sends a beam covering a narrow range of IR wavelengths across an open space to a detector. A weakening of the critical wavelength that is greater than the overall output indicates the presence of CO₂. The degree of impact to the wavelength indicates the concentration. As CO₂ is the most commonly used MAP gas, QCL detector is a very useful tool for leak detection. A QCL detector can also act very quickly, allowing for 100 percent seal integrity, checking at an incredible speed of 200 packages per minute.

Steps to achieving speed and accuracy
The sophisticated methodology and mechanisms that go into an effective tool for CO₂ detection include the following:

- Packages pass through a purpose-built arch or hood over the conveyor.
- Air is drawn at a consistent rate through the arch and the QCL analyzer element.
- The laser pulses on for less than one millisecond, allowing more than one laser to be used at nearly the same time. Fast pulses are called “chirps”.
- Sequential firing of lasers allows detection of up to four gases at any one point in time.
- Even the smallest whiff of CO₂ can be detected as a package passes under the arch.
- A rejection mechanism is triggered by the control system, pushing the package off the conveyor belt, aligned with the speed of the conveyor.

Details of the mechanism vary and change according to the type of packaging. A bottle of beer will more likely push CO₂ out, given the nature of the beer, but a package of meat will need a gentle squeeze to release measurable CO₂. The adjustment can be built into the system while still maintaining a production speed of about 200 packs per minute.

The QCL system is customizable to accommodate a range of package sizes and types, including cartons, kegs, trays, pouches, bags, cans and bottles. An alarm stack-light can be programmed to flash for each rejection or an issue indicator that requires attention. The system can be programmed to trigger a line shutdown if a high number of rejects have been identified.

As mentioned earlier, CO₂ is not the only gas used for MAP. QCL system can detect as little as 20% of CO₂ in MAP to detect any leakage. Other gases and vapors are detectable using QCL by changing the laser to one capable of transmitting at a different frequency. A winery or distillery, for example, can use QCL to detect ethanol leakage from bottles or barrels.

Case studies from the plants
Keeping draft beer from arriving flat
North America’s largest brewery used the QCL solution to ensure their draft beer kegs were fully sealed before shipment to bars and restaurants. Initially, they used an in-line optical camera test solution, but it cannot provide the required degree of accuracy. It gave too many false positives and false negatives. After installing Rosemount CT4215 Packaging Leak Detection System, the plant saw a significant level of improved accuracy and reduced package leakage and waste with better product quality. After the initial success, the company is on track to outfit all its keg lines worldwide with the QCL system.

Reducing waste for meat packers
Immersion leak testing methods are used in various food packaging plants. The heavily manual process in meat packaging has remained in use because there is no suitable alternative method that can accommodate the different package sizes or volume of product that moved through. Large plants can have 30 or more packaging lines. The immersion method, however, is unreliable as there is to have a random test sampling of packaging from the lines which is thrown out afterward. The consumer will more likely be the one to find the leaking package after they come home with their purchase from the grocery store.

As a trial test, one plant installed a single Rosemount CT4215 Packaging Leak Detection System to perform 100 percent of inspections on a critical packaging line and ran it alongside their regular manual water immersion tank inspections. It allows the company to identify 1.5 percent of its production that otherwise would be wasted. The company found that many of their improperly sealed packages could be recovered because they were discovered quickly without immersion. A quick calculation across the plant output of 20 million pounds per year meant a yield of 300,000 pounds of recovered “free” products.

Consistent, Accurate and Reliable
In the new post-COVID world, a fast, in-line QCL-based leak detection system provides a reliable and repeatable solution to package inspection challenges, enabling food producers to effectively leverage the digitalization and automation technologies to ensure 100 percent inspection of packaged products.
NEWS

ADM partners with alt-dairy startup New Culture

Sustainable nutrition company ADM and New Culture, which specialises in animal-free dairy, have formed a strategic partnership to increase the development speed and commercialisation of non-animal dairy products.

The agreement will see the two companies sharing ingredients and development methodology, with ADM providing New Culture with its product development resources and capabilities, as well as its suite of sustainable ingredients, in order to help bring new alternative dairy products rapidly to market. Also on the table is the commercial scaling up of New Culture’s animal-free mozzarella.

New Culture’s animal-free mozzarella will be the initial focus for accelerating commercialisation, beginning with pizzerias in the US in 2023. As the commercial footprint grows, ADM’s production capacity for both fermentation and dairy operations will be made available to meet the demand for its stretchy cheese.

Ian Pinner, ADM’s senior vice president, Strategy and Innovation, said: “After tasting New Culture’s delicious animal-free mozzarella, we recognised that the company had the potential to play a central role in bringing great-tasting, breakthrough products to the dairy aisle, and we’re excited to bring our global precision fermentation and manufacturing expertise, and our extensive consumer product application capabilities to this effort. We look forward to working with New Culture to help meet fast-growing consumer interest in alternative dairy and cheese.”

Matt Gibson, co-founder and CEO of New Culture, said: “This partnership between New Culture and ADM gives our team the chance to accelerate our path to commercialisation and expand what’s possible for our product portfolio.

“Leading the transition to an animal-free dairy future requires partners every step of the way and we’re thrilled to have a committed partner in ADM, a global leader with deep expertise, reach and capabilities.”

European research organisations and businesses have launched a research project that is working to use sunflower press-cakes as a source of protein in meat alternatives.

VTT, DSM, DIL German Institute of Food Technologies, University of Helsinki and ABP Beef will all be working on the Taste2Meat project which is focused on the development of meat alternatives. The VTT Technology Centre of Finland is coordinating the project, which is funded by the EIT Food.

Sunflower press-cake is a side stream obtained from sunflower oil production so this project will help to upcycle this waste into a protein ingredient for meat alternatives. The project will also use pea and rapeseed proteins as co-ingredients together with sunflower protein.

Nesli Sözer, Research Professor at VTT, said: “Our food system is going through unprecedented crisis and there is even a higher risk of global food security compared to 2–3 years ago. Therefore, we must efficiently utilise existing plant-based side-streams as high-value protein ingredients for food.

“The Taste2Meat project contributes to zero waste and sustainable food system by upcycling sunflower press-cake as protein ingredient and designing both hybrid (meat and plant protein) and solely plant protein-based tasty meat alternatives to European consumers.

“We are especially interested in a rising number of flexitarians, who integrate plant-based products in their diet but consume mainly meat products. Tasty meat alternatives and hybrids create new business opportunities and enable smooth transition for people to increase the amount of plant-based ingredients in their diet.”

One of the goals of the project is to make it easy for products to enter the alternative protein market. During the project, consumer studies will be carried out to understand their perceptions of these products.

“Consumer acceptance has a key role in development of feasible business cases around meat alternatives. Sensory properties such as taste and meat-like texture are the most influential predictors of meat alternatives acceptance,” Sözer said.

More information about the Taste2Meat project is available on the EIT Food site.
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Exploring the growth of plant-based milk

The plant-based milk market in Australia was worth approximately $237 million in 2020, and the value of the market is predicted to continue to grow.

In fact, the plant-based milk market now accounts for around 10% of the global milk market, and the growing number of consumers of plant-based milks have more choice than ever before. The most popular plant-based milk in Australia is currently soy milk (which occupies almost half the market), followed by almond milk, rice milk and coconut milk. However, the sector is full of innovation, with new developments and products; plant-based milk alternatives, or ‘alt-milks’ as they are sometimes known, are being made from more raw ingredients than ever before, with oat-based drinks being among the most recent newcomers to the market.

There are many reasons for the popularity of plant-based milks. As well as a rise in the adoption of vegan and plant-based diets due to health and moral grounds, environmental concerns are also driving uptake with proponents claiming that plant milk has a lower greenhouse gas (GHG) footprint than dairy production — although the overall picture is highly complex, and the figures are disputed by the dairy industry. An apparent increase in the level of lactose intolerance in developed countries is also helping to increase demand.

The range of plant-based milks also allows for consumers to express their tastes and identities as cafes and restaurants open up after lockdown. As one industry analyst said earlier this year, “To choose your specific type of plant-based milk in Starbucks seems to be a way of identifying yourself.”

While dairy milk has long been seen as a drink or a meal accompaniment, for example being used as an ingredient or with cereal, there are increasing signs that plant-based drinks, particularly those with a thicker more yoghurt-like texture or those sold in individual portions, are being seen as a healthy snack. Research by the Brisan Group suggests that up to a third of these products are viewed as a snack, and 61% are viewed as ‘a treat’.

Globally, soy milk products remain the most popular (although the demand for oat-based products is growing) and they accounted for 29.5% of revenue globally in 2019. Coconut-based beverages are one of the fastest growing segments, predicted to increase 8.6% between 2020 and 2027. Across all types of plant milk, plain flavours dominate sales, accounting for 71.1% of the total value.

Production of plant-based milk
Contrary to public perception, the idea of plant-based milks is not new. ‘Milk’ made from soybeans has a long history in China (where recorded production dates to 1365), while almond milk was recorded in the Middle East in the 13th century. A commercial soy milk factory was established near Paris in 1910 and demand for soy milk rose through the 1970s and 80s due to increasing awareness of lactose intolerance.

These days there is a wide range of plant-based milks made from nuts, grains and legumes, as well as other seeds (such as sunflower and hemp) or coconut.
There are two main methods for processing plant-based milk: wet or dry. The wet process involves soaking and grinding the raw material in large volumes of water for up to 12 hours. In some cases, enzymes are added to hydrolyse starches (for example in oat milk production). The dry process involves milling the raw material into a flour or powder which is then processed to separate the starch, protein and fibre as desired, before being hydrated. As a result, dry production processes can result in a higher protein content in the finished product.

The production method means that, if the soaked product is not ground to a sufficiently fine size, the number of particles removed when the mixture is strained creates high levels of waste. It is also important to mix products well, particularly those containing oils or thickening or stabilising agents. Therefore, maintaining product consistency is a key goal for the manufacturing process, and will determine the choice of processing equipment, including pumps, heat exchangers, etc.

Disadvantages of plant milk
Plant-based milks cannot match the natural nutrition profile of dairy milk in terms of protein levels and essential amino acids. However, as well as being free of lactose, they are lower in saturated fat and cholesterol than non-skimmed milk.

Plant-based milks are not immune from criticism, and in some countries and regions, including the European Union, such products cannot be sold or marketed as ‘milk’ or ‘yoghurt’. In addition, supporters of dairy milk say plant-based drinks are highly processed and full of additives, while dairy milk is simply homogenised and pasteurised.

Despite this, such is the interest in the sector that many of the world’s largest dairy companies, including Lactalis, Nestlé and Danone, are investing into dairy alternatives, either through product development or company acquisition. Several market analysts believe the market is ready for rationalisation, with a number of brands falling by the wayside or being acquired by larger food producers.

Maintaining quality and demand
The quality of the product is very important, and monitoring of key parameters includes viscosity, particle size, protein content, digestibility, nutrient content and flavour analysis. Maintaining these important quality characteristics requires the minimal amount of processing — and making sure that processes such as pasteurisation cause as little disruption to the product as possible can help alleviate criticisms about the highly processed nature of plant milks.

Where possible, combining processes such as dilution and sterilisation, for example by using the HRS DSI Series, can provide benefits and reduce overall processing of the product. The benefit of sterilising using direct steam injection is the speed of the process, with sterilisation temperatures of 100 to 145°C being reached in around a second — much quicker than the fastest heat exchanger systems. For products such as plant milks, this rapid heating prevents cooking of the product and formation of caramel-type compounds which can darken the product or produce unwanted flavours.

It is also useful for grain-based products, such as oat milk, which benefit from the additional dilution with water which the food-grade steam provides, but the type and model of heat exchanger chosen will depend on many different factors, such as the nature of the process to be carried out (pasteurisation, sterilisation, dehydration, etc) and the viscosity of the drink being processed. HRS has a complete range of products from simple tube-in-tube designs to rotating or reciprocating scraped-surface designs, all of which combine efficient heat transfer with delicate product handling, ensuring that products remain in emulsion and that the product does not foul the equipment.

Whatever plant-based milk product you are producing, it is important to remember that plant-based milks have the same requirements for pasteurisation, sterilisation, cooking or cooling as other beverages which contain specific ingredients. It is therefore crucial to invest in the most effective and efficient processing technology for all stages of production.
Freezing food, especially meat, can increase shelf life and reduce waste; however, the quality of the food can be affected during freezing and thawing, and this can have potentially harmful consequences to consumers as it can increase the count of many pathogenic microorganisms.

When consumers are standing in the frozen food aisle, it’s nearly impossible for them to know whether a steak has thawed and refrozen. Therefore, a team of researchers reporting in *ACS Sensors* have designed a food-grade device from edible materials, including table salt, red cabbage and beeswax, that can help to detect previous defrosting events in the frozen product. The proof-of-concept sensor provides a colour readout when it’s warmed above a specific temperature, which is tunable from -50 to 0°C.

Keeping food cold while it’s transported and stored is essential to retaining its flavour and quality, reducing the risk of food poisoning and minimising waste. While researchers have developed devices that alert manufacturers when cold items are exposed to unwanted temperatures, they only indicate changes above freezing. To create a sensor for frozen products, one solution could be to use materials with electrical properties that are altered upon melting. It would also be ideal if such changes could produce a signal, such as a visible colour change. In addition, an edible electronic device, which uses only food and consumable components, would be the safest way to monitor food. Therefore, Ivan Ilic, Mario Caironi and colleagues set out to develop a fully edible, self-powered temperature sensor with a visible colour indicator for use with frozen products.

The researchers started by building a device that generated an electrical current as it defrosted, connecting magnesium and gold electrodes through an electrolyte solution held in a plastic container. They tested the device with solutions of frozen edible electrolytes, including table salt and calcium-containing salts, and naturally electrolyte-rich foods, including a grape, melon and apple. As the solutions defrosted, they conducted current between -50 and 0°C, which the researchers say could be fine-tuned, based on the amount and identity of the salt. Next, this device was connected to a colour-changing system, containing tin and gold electrodes and red cabbage juice, that produced an irreversible shift from reddish purple to blue when current was applied.

In the final step, the team put all of the parts together in a block of beeswax that held the temperature-activated and indicator solutions in separate chambers, and demonstrated that the self-powered device could be used for frozen food monitoring.

The researchers say that their proof-of-concept sensor paves the way for edible materials to be used in inexpensive, safe technologies that alert customers to a frozen product’s storage history.

As a sensor, it could be used by the workers in the supply chain, while as a detector, it could be useful for end consumers, ensuring that the food was properly frozen during the whole supply chain.
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The University of Technology Sydney (UTS) and Young Henrys Brewery are pairing brewing technology with brewing knowledge to develop a more sustainable pint.

The UTS Industry 4.0 Brewery, located at UTS Tech Lab, is a 5G-connected microbrewery powered by Nokia’s technology. Using an automated system to continuously monitor the brewing process and the beer, the system analyses data collected throughout the brew to precisely control both the boiling and fermentation processes at the heart of beer production.

“The UTS Industry 4.0 Brewery is pushing the boundaries of what breweries can do,” said Dr Nick Bennett, from the UTS Centre for Advanced Manufacturing.

“Automating the brewing process can reduce waste, save time and energy, and result in a product made entirely from locally sourced ingredients. Making beer production more efficient is key to making the industry more sustainable.”

Industry 4.0 technology is about smart automation and the use of robotic systems equipped with machine learning algorithms. It includes the use of artificial intelligence (AI) to optimise processing conditions and increase the predictability and quality of the final product.

Young Henrys is currently in the research and development phase of a new craft beer and using the UTS Industry 4.0 Brewery as a test facility.

“The nanobrewery helps us refine a digital recipe for the beer in an advanced timeframe due to the sophisticated technology,” said Richard Adamson, Young Henrys’ Co-Founder.

“Young Henrys is committed to working towards a greener future as well as making good beer, and we’re keen to explore ways the brewing industry can move closer to carbon neutrality.”

The collaboration between UTS and Young Henrys ensures the research findings and machine learning techniques are directly transferable to industry.

Resulting research findings will also be highly relevant beyond beer, for example, for smart and sustainable manufacturing processes, and supply chain logistics.

[From left to right] Nick Bennett (UTS Centre for Advanced Manufacturing), Jesse Searls (Head Brewer, Young Henrys), Laryssa Raffa (PhD Student, UTS) and Richard Adamson (Co-Founder, Young Henrys).

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Spherical ball material for food-contact joint system
To make food industry machines and systems even safer, Treotham has introduced the igus iglidur A181 high-performance plastic as a spherical ball material for the igubal Food Contact (FC) joint system. The spherical ball is designed to have three times the wear resistance of its iglidur FC180 predecessor, cost 25% less and is lubrication-free, maintenance-free, hygienic and compliant with FDA and EU 10/2011.

The FC joint system housing is still made of igumid FC — a robust, corrosion-free high-performance plastic that is resistant to moisture, acids, alkalis and UV radiation. Recently, however, the spherical ball inserted into the housing has been switched from FC180 to iglidur A181.

Using the FC joint system with the new A181 spherical ball can improve the hygiene of machinery and equipment in the food industry. Unlike metallic spherical bearings, it requires no external lubricant that dirt and dust can stick to and cause a potential contamination risk. Instead, igus incorporates a solid lubricant into the material that is released automatically over time, ensuring low-friction, hygienic dry operation. Both the housing and the new spherical ball material are thus compliant with FDA and EU 10/2011.

To further improve hygiene, both bearing housing and spherical ball are dyed blue, a colour on which food residue and mould spores can be quickly identified during cleaning checks and that facilitates optical detection in the case of machine damage. Food-compliant, detectable additives are also integrated into the housing material. In an emergency, they allow metal detectors to find even the tiniest fragments — in the range of one tenth of a gram.

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Heavy-duty, food-grade buckets provide for a multitude of uses in food processing facilities. The Vikan range includes three different sizes — 6, 12 and 20 L variants. All buckets come in up to 12 colours, are fully calibrated and are hygienically designed. Bucket lids (also colour coded) are also available in colours to suit each sized bucket.

The bucket range is suitable for carrying, storing and dispensing ingredients and also for allergen control by using different coloured buckets for allergens. Likewise, Vikan hand scoops and shovels are available in 10+ colours to be used in conjunction with the buckets.

Aside from ingredients, the buckets are a suitable for use with chemicals and brushes for cleaning down equipment in food processing facilities. The buckets can be washed at high temperatures and also hygienically stored on the Vikan bucket wall bracket, either upright or also upside down for draining and drying.

Vikan’s range of food-grade buckets is available exclusively from Wells and its authorised distributors.

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X-ray product inspection machine
Mettler-Toledo Product Inspection has launched the X12 inspection solution with high detection sensitivity into the market. It is an entry-level system with contaminant detection with a layer of product safety and quality assurance checks.

The X12 is equipped with ContamPlus X-ray inspection software algorithms which enhance detection capabilities for a wide range of contaminants.

Designed to meet the needs of food manufacturers producing packaged products, the product is designed to be an affordable X-ray solution delivering advances in ease of operation, maintenance and servicing, as well as improved safety features.

The highly sensitive solution is suitable for brand owners requiring cost-effective contaminant detection with the additional benefit of pack and product integrity checks.

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Fluid mixing processes at an industrial scale can be energy consuming and costly if not optimised. Researchers from Japan have now adopted a reinforcement machine-learning-based approach to study and optimise the process of fluid mixing during laminar flow. The research findings show promising potential for application in industrial fluid mixing processes.

Achieving faster mixing using less energy would reduce the associated costs of this process. However, in reality, most mixing processes are not mathematically optimised and instead rely on trial-and-error-based empirical methods. Turbulent mixing, which uses turbulence to mix up fluids, is an option but is problematic as it is either difficult to sustain (such as in micro-mixers) or damages the materials being mixed (such as in bioreactors and food mixers).

In a new study published in *Scientific Reports*, researchers from Japan turned to machine learning to find out if optimised mixing be achieved for laminar flows instead. The team used an approach called ‘reinforcement learning’ (RL), in which intelligent agents take actions in an environment to maximise the cumulative reward (as opposed to an instantaneous reward).

“Since RL maximises the cumulative reward, which is global-in-time, it can be expected to be suitable for tackling the problem of efficient fluid mixing, which is also a global-in-time optimisation problem,” explained Associate Professor Masanobu Inubushi from Tokyo University of Science, the corresponding author of the study. “Personally, I have a conviction that it is important to find the right algorithm for the right problem rather than blindly apply a machine learning algorithm. Luckily, in this study, we managed to connect the two fields (fluid mixing and reinforcement learning) after considering their physical and mathematical characteristics.” The work included contributions from Mikito Konishi, a graduate student, and Prof. Susumu Goto, both from Osaka University.

One major roadblock awaited the team, however. While RL is suitable for global optimisation problems, it is not particularly well suited for systems involving high-dimensional state spaces, ie, systems requiring a large number of variables for their description. Unfortunately, fluid mixing was just such a system.
To address this issue, the team adopted an approach used in the formulation of another optimisation problem, which enabled them to reduce the state space dimension for fluid flow to one. Put simply, the fluid motion could now be described using only a single parameter.

The RL algorithm is usually formulated in terms of a ‘Markov decision process’ (MDP), a mathematical framework for decision-making in situations where the outcomes are part random and part controlled by the decision-maker. Using this approach, the team showed that RL was effective in optimising fluid mixing.

“We tested our RL-based algorithm for the two-dimensional fluid mixing problem and found that the algorithm identified an effective flow control, which culminated in an exponentially fast mixing without any prior knowledge,” Inubushi said. “The mechanism underlying this efficient mixing was explained by looking at the flow around the fixed points from a dynamical system theory perspective.”

Another significant advantage of the RL method was an effective transfer learning (applying the knowledge gained to a different but related problem) of the trained ‘mixer’. In the context of fluid mixing, this implied that a mixer trained at a certain Péclet number (the ratio of the rate of advection to the rate of diffusion in the mixing process) could be used to solve a mixing problem at another Péclet number. This reduced the time and cost of training the RL algorithm.

While these results are encouraging, Inubushi points out that this is still the first step. “There are still many issues to be solved, such as the method’s application to more realistic fluid mixing problems and improvement of RL algorithms and their implementation methods.”

While it is certainly true that two-dimensional fluid mixing is not representative of the actual mixing problems in the real world, this study provides a useful starting point. Moreover, while it focuses on mixing in laminar flows, the method is extendable to turbulent mixing as well. It is, therefore, versatile and has potential for major applications across various industries employing fluid mixing.
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Does processing soy lessen its nutritional benefits?

Scientists from Unilever and Wageningen University and Research have reported that they have discovered processing soy doesn’t decrease its protein nutritional quality. This means that soy can be a valuable source of protein in plant-based foods.

Lately there has been some concern about the nutritional content of plant-based foods so the scientists studied processed soy, which is an ingredient used in Unilever’s Vegetarian Butcher range and ice-cream products.

Soy is a common ingredient in plant-based foods because of its high protein content and quality. But you can’t simply add soybeans in their natural form to a plant-based chicken chunk or an ice cream, for example. Before being used, they must undergo processing, which can take various forms including soaking, heating and dehulling.

To better understand the effect of processing on protein quality, the study assessed the digestibility indispensable amino acid scores (DIAAS) — the UN Food and Agriculture Organization’s standard measure — of various products. The higher the score, the better the protein source fulfils our body’s requirements, with a score of 75 or above considered good.

Analysis of the data showed different protein quality scores between soy product groups, but the DIAAS score for soy protein concentrate — the most commonly used in food such as plant-based meat from The Vegetarian Butcher — was 88, which is slightly higher than the initial soy bean (which scores 85).

This research study found that the soy ingredients that Unilever uses in its plant-based food products are a good source of protein and just as good as the protein quality of soybean.

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In June 2022, the Ministry of Health and Family Welfare/ Food Safety and Standards Authority of India (FSSAI) published new requirements for products labelled as ‘vegan’.

These requirements were published in the Gazette of India as Food Safety and Standards (Vegan Foods) Regulations, 2022, and will come into effect on 26 January 2023.

The standards define ‘vegan food’ as any food or component that contains no animal products. The standard covers all the ingredients used in the product as well as the testing process used in the development of the vegan product. It also sets out specific rules about how vegan food should be labelled, which includes the requirement for a plant-based logo to be used.

The new requirements state: “No vegan food products shall be imported except with a certificate issued by the recognized authorities of the exporting countries in the format as specified by the Authority [FSSAI] is accepted.” Any product imported into the country will need to comply with the new labelling rules.

MPI, as the recognised New Zealand authority for food commodities, said in a statement that it cannot offer official assurances on the requirements set out in this standard. Therefore, after 26 January 2023, the MPI has recommended that manufacturers not use the label ‘vegan’ on any food products being exported to India or do so at full commercial risk.

Nestlé brand moves to paper-based packaging

Quality Street is introducing recyclable FSC-certified paper packaging for its twist-wrapped sweets worldwide.

The move from dual foil and cellulose to recyclable paper wrappers will see the brand remove almost 2.5 billion individual pieces of packaging material from its supply chain globally.

The papers have been developed by packaging experts at Nestlé’s Confectionery Research and Development Centre and Institute of Packaging Sciences, and required extensive development in the engineering of new materials, coating technologies, printing techniques and the adaptation of existing equipment.

The flavours orange crunch and green triangle will remain in their existing foil wrappers as they can already be recycled. The move for the nine remaining twist-wrapped sweets will take a few months to implement, so consumers will see a mix of new and old packaging until the end of 2022.

Louise Barrett, Head of the Nestlé Confectionery Product Technology Centre in York, said: “With nine different sweets to consider, the transition has been a huge undertaking. Each of our existing machines need to be adapted to run paper and then be rigorously tested by our packaging experts to ensure we’re still delivering the same quality consumers expect when they open a box of Quality Street.”

The brand is the company’s second to make the move to paper. It contributes to the company commitment to reach 100% recyclable packaging by 2025.

Cadbury moves to 30% recycled plastic packaging

Cadbury is supporting emerging recycling technology to source soft plastic packaging that contains recycled content. Its Dairy Milk, Caramilk and Old Gold family blocks range will be wrapped in 30% recycled plastic, in place of its traditional single-use material.

The switch will see more than 120 tonnes of packaging waste diverted from landfill. The packaging is more sustainable with the same look and feel, carrying the purple colours and distinctive markers and preserving the chocolate’s taste, texture and shape.

There is a QR code on the pack, providing more information about the packaging innovation and how the company is supporting a circular economy for packaging.

Mondelēz International CEO Dirk Van de Put said Australia was leading the way in finding solutions for a circular economy for packaging waste.

“Until recently, soft plastic packaging has been considered a single-use material,” Van de Put said. “The development of advanced recycling technology and our significant investment in recycled soft plastic means it’s now possible for Cadbury fans to enjoy their favourite treats more sustainably here in Australia.”

The chocolate maker has sourced 120 tonnes of recycled content from overseas but says this announcement sends a signal to market that there is demand for recycled soft plastic packaging to be produced locally in Australia.

This milestone coincides with the anniversary of Cadbury’s 100 years of Australian manufacturing. Its Hobart factory produces 60,000 tonnes — more than 200 million blocks of chocolate for Australia and export markets.
Introducing the new Hitachi UX2 Industrial Inkjet Printer.

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Learn more and contact your nearest distributor at hitachiprinters.au
Beverage closure with freshness indicator

A collaboration between UNITED CAPS and Mimica has developed a closure solution for beverages that can determine food freshness. Called Mimica TOUCHCAP, the closure is designed to create accessible freshness indicators for all types of beverages.

The Mimica freshness indication technology is fully integrated into a beverage cap. Heat generated by deterioration of food product causes the top foil layer of the closure to become bumpy, enabling immediate assessment of freshness and food safety.

UNITED CAPS
www.unitedcaps.com

Detection technology for packaged food

Mettler-Toledo Product Inspection has launched its latest advanced X-ray inspection technology, which has the ability to detect low-density contaminants in packaged food products. The technology is designed to help food manufacturers avoid product recalls, reduce unnecessary product waste costs and enhance product integrity and brand protection.

Mettler-Toledo DXD and DXD+ dual energy detector technology is optimised for identifying foreign bodies such as calcified bone, low-mineral glass, rubber and some plastics. These types of contaminants are traditionally hard to detect within the ‘cluttered’ or ‘noisy’ X-ray images generated by overlapping and multi-textured products such as packs of pasta, chicken breasts, sausages and frozen potato-based goods.

Such applications are suitable for DXD and DXD+ advanced detector technology, in conjunction with intuitive Mettler-Toledo Advanced Material Discrimination software tools. The software helps to separate and remove the prominent material of the food product within the X-ray image, revealing the presence of any lower-density contaminants. Food manufacturers will benefit from reduced false reject rates and product waste.

The performance of the technology has been tested by the company on a range of different foreign bodies hidden in 650 g packs of chicken breasts.

The advanced detector technology is available in two versions. DXD enhanced X-ray performance can operate in the same environments as single energy solutions and can be used with line speeds typically up to 100 m/min. DXD+ premium detector technology is suitable for challenging applications; collects more data about the product being inspected and advanced image analysis software provides clearer images with higher resolution; and it can be used with line speeds typically up to 45 m/min.

Both the dual energy detectors can now be specified with new purchases of Mettler-Toledo X36 X-ray systems. Only a small amount of extra operator training is required due to automatic job set-up and the similarities between the Advanced Material Discrimination software and the ContamPlus software that is familiar to existing Mettler-Toledo X-ray users.

Mettler-Toledo is offering personalised consultations to prospective users of this latest technology either on a 1:1 basis at its Royston facility or virtually. The consultations will include live testing with users’ actual products, as well as the opportunity to engage with experts in the X-ray inspection field.

Mettler-Toledo Ltd
www.mt.com
CASE STUDY

Whey to go into cheese packaging to extend shelf life

Every kilogram of cheese produced yields around 8 kg of whey — a valuable by-product in the dairy industry due to the large volume generated and its nutritional composition.

Many cheesemakers make use of the cheese whey by turning it into whey powder, whey protein concentrates, lactose and beverages such as fermented whey milk. Fermentative processes can also be used to obtain value-added products such as alcohol and vitamins. However, some smaller cheesemakers may not be able to afford these upcycling processes and will send this valuable cheesemaking by-product to waste streams for disposal.

To address this issue, Spanish researchers and cheesemakers are now working together on a project to upcycle the whey by-product of cheese manufacturing into other new value-added products.

Natural antimicrobial coatings will be developed for use in packaging to extend the shelf life of cheese by around 25–50%. New probiotic ingredients will also be added to livestock feeds, which are designed to protect the digestive system and contribute to animal wellbeing.

The GO Orleans Project is being implemented by AIMPLAS, ADM Biópolis, FEDACOVA (Agri-Food Business Federation of the Valencian Community) and the Universitat de València. Two Spanish cheese companies are also participating in the project — Dehesa Dos Hermanas, a sheep cheese factory in Huelva, and Quesos La Cabezuela, a goat cheese company in Madrid.

Project member ADM Biópolis provides its expertise in probiotic design and validation while the Universitat de València contributes its expertise on the study of antimicrobial activity. “We’ll first separate bacteria with biopreservation potential. Then we’ll characterise the compounds in the matrix, which is whey,” said Giuseppe Meca, professor in the Department of Preventive Medicine at the Universitat de València.

“AIMPLAS is working on the formulation of a functional coating containing whey as an active component with antimicrobial properties. Application has therefore been planned on plastic film to obtain active packaging prototypes for cheese,” said Alicia Naderpour, a packaging researcher at AIMPLAS.

FEDACOVA will be responsible for transferring developments to companies in the agri-food industry. “FEDACOVA is participating in this project to transfer research findings to the Valencian agri-food industry, especially companies in the Association of Cheese makers of the Valencian Community and individual members. This will help improve industry competitiveness, which will ultimately benefit society as a whole,” said Sergio Barona, General Secretary of FEDACOVA.

CASE STUDY

Bacon wrapped with ‘wood effect’ packaging film

Designed to look like a wooden chopping board, Mondi has developed a packaging solution to wrap bacon for Austrian food company Handl Tyrol.

The mono-material polypropylene (PP) film used is recyclable in existing recycling streams for mixed polyolefins and is designed to keep the bacon fresh by providing a ‘second skin’ that seals securely with both a high-barrier top and bottom film.

Daniel Maier, Head of Procurement, Handl Tyrol said: “This packaging is certainly eye-catching, while providing excellent product protection. It works within existing recycling guidelines for retailers across Europe and is a great example of more sustainable packaging with no compromises: it still provides the highest level of food protection which of course is always our priority.”

Jan-Mark Wilke, Business Development Manager, Fresh Food for Consumer Flexibles, Mondi said sustainable packaging can reduce the environmental impact of the food industry by preventing food from spoiling before it reaches the table. “With our mono-material PP packaging for Handl Tyrol, we have been able to deliver another fresh food packaging solution that protects the product effectively and can be recycled into existing recycling streams for mixed polyolefins. On top of that, it has an impactful design that incorporates the packaging and reflects the consumer use.”

Mondi Group
www.mondigroup.com/en/home/
Recyclable meat tray

Graphic Packaging International’s PaperSeal range of food trays allows users to replace traditional plastic trays with a more sustainable recyclable solution.

The trays are suitable for modified atmosphere and vacuum sealed packaging applications, as well as for fresh and frozen microwavable or oven-ready meals.

Comprising a recyclable, paper-based tray made from renewable fibre from sustainable sources combined with a removable liner, the range is designed to reduce plastic use in meat and poultry packaging by up to 90%.

In a recent application of the product, Woolworths won a Silver Award in Sustainability at this year’s WPO Worldstar Global Packaging Awards for its PaperSeal meat tray.

Other benefits include: equivalent, or improved, shelf life versus traditional trays, and it can be printed with high-quality graphics on both the internal and external surface for branding purposes.

Graphic Packaging International Australia Pty Ltd
www.graphicpkg.com

Electric hot melt jetting head

Volta is Robatech’s new application head designed for precise dot and bead application at high speeds. With a robust design, the unit can bring stability to the adhesive application and is low maintenance due to its durability.

The hot melt jetting head delivers quality adhesive application over the duration of 1 billion operating cycles. It has hardly any wear parts.

With protection class IP55, the unit is protected against external influences such as cardboard dust or jet water. This makes the electric application head suitable for the harsh environments of the packaging industry as well as for the food or pharmaceutical industry.

Compared to the pneumatic SX Diamond application head, the Volta electric jetting head consumes 60% less energy. It does not require compressed air, which can reduce both operating and maintenance costs. Thanks to the electric drive, the unit is fast — with a switching frequency of 200 Hz, it is suitable for hot melt stitching. This can allow for adhesive savings of up to 40%.

Robatech Australia Pty Ltd
www.robatech.com.au

Paper alternative to plastic shrink wrap

Mondi Hug&Hold is a recyclable, paper-based alternative to plastic shrink wrap for PET bottle bundle packs.

It comprises two elements that provide secure and safe transportation as well as stacking of bundles of bottled drinks. It has a patent-pending sleeve, made of 100% kraft paper, which wraps around the bottles to hold them securely. The sleeve is made from Advantage SpringPack Plus, with high tensile strength, allowing enough weight to be withstood to strap and stabilise the bottles during transportation.

There is a corrugated clip to hold the bottles around the neck, a handle available for carrying and transportation, and functionality to separate single bottles from the pack.

The company worked with Krones to ensure that bottles can be packed in a fully automated process, with the latest Krones machines.

The product is currently available for 0.5–1.5 L PET bottles in bundles of six or four.

Mondi Group
www.mondigroup.com/en/home/
Packaging machine for coffee

Syntegon Technology is expanding its portfolio for coffee packaging machines with the PMX packaging machine for ground coffee and whole beans. The machine can be used for different packaging formats due to fast format changes and full corner sealing.

The machine is composed of individual modules, which make dosing and closing stations as well as the machine design individually configurable. Due to the modular structure, specific user requirements can be realised while also achieving efficient output. It packs up to 65 packages of 500 g of whole coffee beans per minute. To reach an output of up to 100 packages per minute, the machine is also available as a double tube version.

3D format changes on the closing unit can be achieved automatically at the push of a button. If the bag cross-section format is changed, the machine will be ready for use again after just 30 min. It is therefore suitable for small, medium and large packaging formats — various bag variants and closing elements can be combined.

The unit produces coffee bags with package weights between 200 and 1200 g, both with upright and downfolded top parts. The bags are resealable via tin tie, labels or adhesive tape. If required, manufacturers can also use a spout closure. All stations are designed to process recyclable packaging materials and valves made of mono-materials like polypropylene or polyethylene to meet the needs of sustainable value creation.

The ‘neutrafill’ process, in which the coffee is gas-flushed before and during the packaging process, is designed to ensure aroma protection. To keep energy consumption as low as possible, the unit is equipped with condition monitoring. In addition, the consumption of inert gas and packaging material can be digitally monitored and controlled.

Machine data is collected in real time and clearly displayed on dashboards.

Syntegon Technology Singapore Pte. Ltd

www.syntegon.com

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Fruit processor Fructus Meran uses technology to transform sun-ripened fruit from northern Italy into value-added products that meet the strict requirements of its customers. In order to automate its bulk product inspection on its IQF line, the company installed the Key Technology VERYX digital sorter in 2020. It has now purchased a second VERYX sorter for its ‘solid pack’ line.

“Before VERYX, we’d been manually sorting product on our IQF line, but it was becoming very difficult to find reliable people willing to do this kind of work, especially for the night shift,” said Peter Theiner, CEO at Fructus Meran.

“Fluctuations in the quality of incoming product added to the challenge by requiring us to adjust the number of labourers inspecting at any given time. Sometimes, we’d even have to slow the throughput of the line to give those workers the time they needed to adequately inspect the product flow.

“Automating with VERYX solved these problems and more. It’s allowed us to reduce our labour requirements and increase our line capacity at the same time we’re maintaining our high product quality.”

Fructus Meran selected a mid-sized VERYX B140 sorter to inspect fresh peeled and cut apples and pears on its IQF line. For its solid pack line, it chose a high-capacity VERYX B175 sorter to inspect fresh peeled and cut apples and pears that will later be stewed and packed into cans or pouches. Both belt-fed sorters are fully loaded with top- and bottom-mounted off-axis cameras as well as including laser sensors and Key’s unique Pixel Fusion detection module to find and remove FM and the right number of defects to make grade and maximise yield.

Recognising colour, size, shape and structural properties, the sorters are able to find and remove all types of FM including glass, rocks, plastics, insects, extraneous vegetative matter (EVM) and more, as well as a variety of defects such as fruit cores, stems, calyx, seeds and light oxidation. The belt-fed sorter can inspect product entirely in-air with top and bottom sensors, it also achieves all-sided surface inspection with no blind spots to optimise product quality.

To maximise sort performance, each sorter at Fructus Meran is integrated with Key’s Sliver Sizer Remover (SSR) and Iso-Flo shaker. First, the SSR mechanically removes slivers, fines, seeds and juice that are inevitably produced during the peeling, coring and cutting processes. Mechanically removing these process-generated by-products reduces the sorter’s load, which contributes to good sort accuracy. Next, an Iso-Flo shaker gently spreads and stabilises product for presentation to the sorter’s inspection zone, helping the sorter eject more FM and the right number of defects without false rejects.

“Of course, every customer wants us to remove all foreign material and all critical defects. But other specifications, such the acceptable amount of minor defects like tiny brown spots, often differ from one customer to another. We appreciate that VERYX allows us to easily adjust our sort settings to achieve each customer’s specifications,” Theiner noted. “Since we supply products to baby food processors and other quality-driven markets like Japan, it’s important that we can set the sorter to achieve that customer’s quality standards and then not deviate. VERYX is a fantastic tool that helps us keep our customers happy.

“We’re always looking for new ways to improve our operations. Automating inspection with VERYX has helped us on so many levels,” Theiner concluded. “Given how tedious manual sorting is, our workers are happy to be trained for other jobs. And, by trading human subjectivity with a digital sorter’s objectivity, we’re able to improve the consistency of our product quality at the same time we’ve enhanced our yield. Thanks to our VERYX sorters, we’ve significantly reduced our manual labour requirements and increased our throughputs all while — most importantly — protecting our high product quality.”

Key Technology Australia Pty Ltd
www.key.net
Ensuring Australia’s food bowl will not be empty amidst global food shortages

Rob Stummer, Asia Pacific CEO at SYSPRO

High consumer demand post-pandemic, catastrophic flooding and workforce shortages here and internationally have had a significant impact on Australian food supply chains. A key cause of the increasing pressure on the supply is the war in Ukraine, which is impacting inflation and fuel costs as well as the availability of gas, fertiliser and wheat. So how can we ensure that our food supply chains are resilient enough to avoid Australia’s food bowl being empty?

As a nation, we must focus on strategic food production to achieve food self-sufficiency for the essentials such as wheat, dairy, fruit, vegetables, meat and meat alternatives, such as plant-based foods.

The plant-based trend
While consumer tastes guide the growth of meat and protein alternatives, the plant-based market presents many opportunities for associated products and services that will broaden the category’s reach and supplement the food supply by offering more options.

Research is underway to find alternative technologies and production methods that provide food with a lower environmental footprint. At the same time, nutritional and sensory characteristics can be similar to or even better than that of animal products.

Cell-cultured food production for meat, seafood and poultry is being studied owing to its potential to achieve environmental sustainability due to low land and water requirements and reduced greenhouse gas emissions caused by livestock and meat storage and distribution.

Distribution challenges
Major exporting nations for food products like Argentina, India and many others have already introduced ‘export bans’ to increase their national reserves of certain essential foods like wheat, dairy and meat.

There is not only a skills shortage but a lack of shipping containers, ships and shipping workers for exporting grain and other food products. And food distribution costs have also increased due to the rising fuel prices for shipping and the power required for warehousing and storage.

One of the critical causes of the current food shortages is our ability to respond to the rising demand. The steady increase in demand for consumer goods is directly linked to the new normal of working from home, so logistics companies are now under mounting pressure.

It is a no-brainer that improving distribution networks by investing in automated warehousing, driverless vehicles, robotics and drones will help to address the workforce shortages by reducing the over-reliance on labour and enabling distribution centres to operate at full capacity round the clock.
Automation optimising food production and distribution

With a pressing need to optimise food production for future generations, like their distribution partners, food manufacturers will need to become increasingly automated and embrace advanced technologies to optimise production and improve productivity, quality and sustainability.

These advances will help drive efficiencies and deliver healthy and sustainable food to our population whilst reducing food wastage. Critical investments in advanced technologies like artificial intelligence (AI), machine learning, robotics, drones, bio-engineering and 3D printing are essential to getting quality food products from farm to fork in the shortest time possible.

3D printing is currently being introduced to the food industry, allowing the production of on-demand, complex and customised foods. In addition, the technique may be used for a personalised diet to print products that specifically meet an individual’s nutritional needs.

Food delivery has become the largest market for food technology innovation due to a massive uplift in private investment and the emergence of many meal-ordering start-ups. However, challenges such as scalability, the preference for locally produced food and ensuring freshness during distribution are driving the need to optimise the supply chain.

Visibility optimising the supply chain

The key to improving supply chain performance is to have a single view connected to the relevant systems and accurate, up-to-date data, which is accessible to all stakeholders.

Access to data through a supply chain portal gives much-needed visibility and control over supply chain processes, such as procurement, manufacturing, storage and logistics. This can help to reduce food waste and the need for product recalls, which is prevalent in the food and beverage sector due to food safety laws.

A supply chain portal also provides the ability to engage, communicate and connect with colleagues, suppliers and customers while giving manufacturers the control and agility they need to deliver on changing demands, ensuring Australian supermarket shelves are packed and always able to supply their customers with fresh produce.

Developing a digital strategy

A connected supply chain driven by smart manufacturing technologies such as automated warehousing, cargo tracking and remote fleet management is essential.

To build more resilient supply chains going forward, food production companies should consider investing in technologies that involve all stakeholders, including internal teams, suppliers, trading partners and end customers. Whilst implementing an enterprise resource planning (ERP) system is key to ensuring supply chains are more resilient, companies in this sector need a robust digital strategy that underpins their supply chain strategy.

A fully integrated ERP solution with embedded analytics is required by food and beverage producers and distributors to tackle the immense challenges they face by optimising their business operations and satisfying customer demands while increasing factory output.

Rob Stummer, Asia Pacific CEO at SYSPRO.
Automated guided vehicles
Automated guided vehicles (AGVs) are used in a variety of industries to transport and store all kinds of products and materials all without human intervention. Equally at home, in factories, warehouses, distribution centres and shipping areas, AGVs can provide a safe and secure way to increase process efficiency and improve business profitability.

The Dematic Compact Transfer AGV is the smallest in its range and can be used to eliminate the need for extensive use of pallet conveyors. The Compact Transfer AGV provides an open plan automation solution, with flexibility to adjust to users’ ongoing business needs.

The compact AGV is available with a tabletop lift or conveyor and is designed to pick up and drop off pallet loads from conveyors or platforms, connecting production lines to delivery, handling raw materials, for pick & go applications, empty pallet handling, and is suitable for use with robot cells.

Thanks to their accuracy and safety features, AGVs create a safer working environment, with no accidental collisions and zero damage to product loads. AGV systems provide a safe and cost-effective alternative to manually transporting goods, especially sensitive or hazardous products.

The product is manufactured at the Sydney facility in Australia, with service and support provided region-wide. The company analyses a user’s current operation and suggests and supplies solutions for transport, interface, loading, unloading and routing.

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Tasty Fresh, a company specialising in workplace food manufacturing and delivery, has improved its warehouse productivity by 35% using a voice-directed picking system. The system has helped improve its stocktake and supply chain operations.

Tasty Fresh delivers fresh and hot food, snacks and drinks right to workplaces daily in Melbourne, Perth, Sydney, Newcastle and Queensland. Dematic was recently engaged by the organisation to help it move from a manual system to a more automated and centralised solution for managing its supply chain.

The Dematic Voice Solution was selected for the task. It is a real-time logistics voice-on-Android system that works without paper and is hands-free, allowing operators to use a mobile device and voice headset to input information and scan products.

Data ranging from order-picking to replenishment and stocktake is fed into Tasty Fresh’s central supply chain system. The system was implemented at each of the company’s depots, and the two primary voice workflows that were implemented were pick-to-trolley and van loading.

The Tasty Fresh team is advised on which food or drink product SKUs and quantities are to be loaded onto trollies, after which point the vans are loaded. Team members are subsequently instructed, per van ID, which SKUs and associated quantities are to be replenished into each van in SKU sequence.

Product short, overfills and audits are all tracked at the same time. This saves workers time as they don’t have to do these tasks separately. The system thus lets staff check expected stock from point-of-sale deductions versus physical van replenishment.

The technology has allowed the company to improve productivity by 35%, and errors have been reduced in the picking and packing processes. Additionally, counting errors have been reduced as this process is not done manually.

“The voice solution tells us what to load inside the vans and tells the system how many we are loading,” said Aline Parra Sanchez, Brisbane Warehouse Manager at Tasty Fresh Food Co. “This means that when we are loading we are also doing the stocktake. It’s a great system that ensures our stock is right by checking our sales match with the stock being loaded in the vans.”

“Voice has improved productivity across the business,” said Adam Van Bergen, National Operations Manager at Tasty Fresh Food Co. “We’re saving between 5 and 10 minutes a day per van sales manager, and while that may not sound like a big deal, 5 to 10 minutes across 170 employees a day is quite a significant cost savings.”

Dematic Pty Ltd
www.dematic.com.au
Dairy dumping-conveying system

Flexicon’s new manual dumping system with integral conveyor and separate dust collector is suitable for dairy powders, pharmaceutical products and contamination-sensitive bulk foods.

Designed and finished to 3-A sanitary standards, the system comprises a manual dumping station with surge hopper, flexible screw conveyor and support boom on a castor-mounted frame and a separate mobile dust collection system that can be configured alongside or remotely. Ready to plug in and run, the mobile system can serve multiple functions throughout the plant and then be rolled to a washdown station and storage area.

A dust hood with hinged lid is mounted to the floor hopper with quick-release clamps and is equipped with an internal baffle and air vent port for efficient dust collection. A support tray allows operators to stage manual additions from handheld sacks before dumping material through a grate fabricated of powerful rare earth Neodymium-iron-boron magnet material.

The hopper is equipped with a mechanical agitator assembly to promote uninterrupted flow into the charging adapter of a 3 m flexible screw conveyor with a stainless steel screw engineered for the conveyed product. Fully enclosed in a polymer tube inclined at 45°, the flexible screw is the only moving part contacting material and is driven by an electric motor beyond the point of discharge, preventing material contact with the 3-A rated motor shaft seal.

All product contact surfaces are of #316 stainless steel with continuous welds ground and polished to 180 grit or better, including the specially designed screw which is welded instead of fastened to the motor drive shaft. A quick-release end cap allows removal of the flexible screw from the lower end of the crevice-free conveyor tube for rapid sanitising and inspection of both components.

Safety interlocks prevent operation of the conveyor during screw removal or separation of the dust hood from the surge hopper.

The standalone dust collector is equipped with an automatic reverse-pulse filter cleaning system with stainless steel air reservoir rated at 99.99% collection efficiency for materials with particle sizes of 5 microns or greater. Solenoid valves release short blasts of compressed air inside the cartridge filters on an alternating basis at timed intervals, dislodging dust build-up from outer filter surfaces with no loss in efficiency. The raised height of the unit allows gravity discharging of accumulated dust into mobile bins, drums or other vessels for disposal or reintroduction in select non-dairy applications.

NEMA 4 and NEMA 4X enclosures and washdown rated motors allow rapid sanitising using steam, cleaning solutions and high-pressure water.

Flexicon Corporation (Aust) Pty Ltd
www.flexicon.com.au

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Our new 3 in 1 package allows food manufacturers to easily automate their production line and enjoy multiple benefits including significantly improved production efficiencies and reduced labour costs. The package consists of a Storage Screener, Mi-CON Elevating Conveyor and Hopper Feeder. Like all our products, the components are constructed to meet the toughest WH&S standards whilst maintaining the highest quality and reliability that we are known for.

One of the key benefits of this modular package is that it eliminates equipment redundancy. It can be added to, extended and modified in the years ahead as your production needs evolve.
Conducted as part of a Food Agility CRC collaborative project, the CherryPlus traceability project trialled GS1 data standards to create a digital map of properties and the movement of products in the NSW cherry and potato industries.

The pilot project used unique serialised QR codes with a GS1 Digital Link label that were applied to Woolworths-branded bags of brushed potatoes and punnets of organic cherries.

The data was managed via FreshChain’s fully integrated, blockchain-enabled, paddock-to-plate assurance system. This allowed the product to be traced in real time, from property to store, providing information about how the product moved along the supply chain and the time spent at each location.

Project leader and NSW Department of Primary Industries Development Officer Jessica Fearnley said researchers simulated a product recall in track-and-trace trials.

“The project has shown that GS1 data standards can be used to provide instant product identification and recall, something that’s critical during an emergency situation such as biosecurity incursion or food safety breach,” she said.

“The system also supports the electronic flow of information to demonstrate compliance with regulatory requirements and this has the potential to improve market access and reduce compliance costs for the industry.”

Food Agility Chief Scientist Professor David Lamb said the research has provided a proof of concept that can also be developed for other supply chains.

“This type of integrated traceability system offers many potential benefits for growers, exporters, governments and consumers, including providing assurances of food safety, provenance and authenticity of products,” Lamb said. “It also provides the framework for data standards and integration of traceability systems that could be expanded to other agrifood supply chains.”

Importantly, using a new GS1 Digital Link QR code on packaging provided an opportunity for real-time feedback from consumers.

FreshChain Systems’ Greg Calvert said datasets can provide powerful insights to inform decisions to reduce costs, grow profit and build a community of supporters.

“Growers and brand owners can take advantage of the digital age with integrated smart labelling and packaging to share generational farming stories, sustainability initiatives and product attributes that form a growing part of the buying decision criteria at the point of purchase,” he said.
Inspiring discovery

www.imcdgroup.com
The recent Australian Jobs and Skills Summit has brought together industry, unions and other stakeholders to develop initiatives to help build a bigger, better trained and more productive workforce. As the food and beverage manufacturing industry has not been immune from the labour shortages across Australia, this has been welcomed by the sector.

As a result of the summit, the Albanese government has agreed to 36 immediate initiatives including the following:
1. An additional $1 billion in joint federal–state funding for fee-free TAFE in 2023 and accelerated delivery of 465,000 fee-free TAFE places.
2. A one-off income credit so that Age Pensioners who want to work can earn an additional $4000 over this financial year without losing any of their pension.
3. An increase in the permanent Migration Program ceiling to 195,000 in 2022–23 to help ease widespread, critical workforce shortages.
4. Extending visas and relaxing work restrictions on international students to strengthen the pipeline of skilled labour, and providing additional funding to resolve the visa backlog.
5. Improving access to jobs and training pathways for women, First Nations people, regional Australians and culturally and linguistically diverse people, including equity targets for training places, 1000 digital apprenticeships in the Australian Public Service and other measures to reduce barriers to employment.
6. Modernising Australia’s workplace relations laws, including to make bargaining accessible for all workers and businesses.
7. Amending the Fair Work Act to strengthen access to flexible working arrangements, make unpaid parental leave more flexible and strengthen protection for workers against discrimination and harassment.

In further summit outcomes, the government, states and territories have a list of areas for further work, including to:
- examine ways to build scale in local manufacturing;
- continue to work with stakeholders to expedite the development of new remote employment service models;
- consider possible improvements to Modern Awards and the National Employment Standards;
- examine the potential for industry sponsorship of skilled migrants;
- explore options to improve the apprenticeship support system and drive-up completions.

Mars Wrigley Australia is a local manufacturer that employs more than 700 people across three sites in Melbourne, Ballarat and Asquith. According to Andrew Leakey, General Manager, Mars Wrigley Australia, his company (like many others) has been feeling the impact of broader labour shortages, particularly within the manufacturing and technical sector.

“The discussions at this year’s Jobs and Skills Summit are a step in the right direction to addressing skills shortages, boosting productivity and creating more opportunities in more corners of Australia. We know these challenges require a collective effort from government, industry and other parties involved, and need to be addressed with greater urgency. “In the modern manufacturing environment we see strong demand for technical roles across engineering and R&D at our regional factories, and we believe addressing labour shortages in these key areas will create more employment opportunities and boost economic participation.

“We also believe it is critical to invest in people and technology to increase productivity in Australia’s key sectors, including manufacturing, where innovation in technology can drive productivity growth and create demand for workers with high levels of digital and data literacy. Ensuring both businesses and employees are equipped to tackle these new opportunities is imperative as Australia seeks to boost productivity and participation.”

Many other ideas and suggestions raised at the summit will be explored further over the next 12 months as part of the Employment White Paper.
Improving milk digestibility

Natroo, the company responsible for Haelen milk processing technology — which gives fresh milk a 60-day shelf life — has achieved another milk development, this time for digestibility.

Consumer trials and recent Commonwealth Scientific and Industrial Research Organisation (CSIRO) research validation have said that milk processed using the Haelen method results in 100% fresh, natural milk that is twice as digestible as processed cow’s milk. This is due to the treatment of whey proteins, which can often be problematic. The proteins are broken down further allowing for easier and faster digestion, as well as enhanced nutrient absorption.

The CSIRO research followed a 2021 consumer trial which showed that two-thirds of trial participants, who normally experienced an adverse reaction to cow’s milk, found that the alternative eliminated or reduced the reaction.

The CSIRO results confirmed that Haelen processed milk made the milk’s nutrients more bio-accessible, providing the potential for increased absorption by the body.

With 68% of the global population experiencing some form of difficulty in consuming milk, the results mean that more people may be able to enjoy the health benefits of milk without the adverse side effects. It will also provide opportunities for sports nutrition and recovery and health and wellness markets due to the way it naturally hydrolyses milk whey proteins.

The product has been formally approved by Australia’s state regulators for domestic sales, and export registration is due to be formalised in October 2022.

Founder and CEO Jeff Hastings (pictured), said: “This latest digestibility finding is an incredible market breakthrough and has seen us shift our business strategy to allow worldwide Haelen Technology partnerships and licensing agreements, rather than solely focus on processing and exporting fresh milk from our South East Queensland production facility.”

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The primary processing line for Hungarian poultry processor Master Good runs at a speed of 15,000 bph (250 bpm), making it impossible for the human eye to measure efficiency. The company has now installed Marel’s IMPAQT software to help improve the efficiency of its equipment.

Master Good’s Production Controller, Nóra Moldvai-Villányi, said that prior to the software implementation, the company didn’t have a clear view of the performance of its equipment. “The judgments of our technical and production people were sometimes contradictory and subjective,” she said.

“IMPAQT gives us a realistic, real-time overview of the performance of the primary line. But it is more important that it can also help us focus on a certain issue, gather all the necessary data and find the root cause in real time. Having several product detection points in the line, we can instantly see where most product losses occur. We can decide how to prevent this loss. And we can verify the results of our preventive measures.

“However, IMPAQT is not a tool to solve sudden incidents. We use it as a monitoring tool for trends, which alerts us if performance drops in a particular area. This means we can react faster and more efficiently. At the moment, our technical department benefits most from IMPAQT. The Nuova, LineLink DE and EC dashboards are a continuous help for them. They constantly check the screens, spot the issues and react quickly if the performance of any unit drops.”

Moldvai-Villányi suggested that the software has already resulted in a better performance for the company. “Gizzards, hearts and livers are very important for us. We do our utmost to prevent the loss of these products. As this process starts with the Nuova eviscerator, it is crucial that we can closely watch its operation by checking the performance dashboard. This screen not only shows performance — which has considerably improved overall — but also tells straight away which unit is not performing well and needs to be repaired or replaced as soon as possible.

“Especially when we look at maintenance, IMPAQT makes our life easier. Besides the dashboards, the Bad Shackle report is also a ‘must see’ report. Every shackle transfers many birds every day. One defective shackle will cause product loss each time the conveyor goes around. It’s therefore important to recognise broken or damaged shackles. In the so-called Bad Shackle report, our maintenance department can easily identify bad shackles in the line and replace them as soon as possible.”

Marel
www.marel.com
3-in-1 modular package

Enmin is combining three of its most popular modular products into a single automation package. It's an in-house designed combination of a storage screener, Mi-CON elevating conveyor and hopper feeder that is designed to completely automate a production line.

Enmin’s storage screener provides a simple but effective way of storing, screening and sizing products to ensure uniformity. The base of the tray has a fixed or removable section of holes, slots or parallel bars. As the material moves over this section, undersized or oversized products can be removed before they enter the production stream.

The compact, electromagnetic hopper feeder is engineered to suit a variety of food production facility needs. The robust yet compact unit holds bulk dry food products and ingredients and consistently delivers the product at a metered rate.

The hopper feeder can reduce manual handling and food wastage by hygienically storing and delivering product to a secondary process and can be customised to meet a user’s exact requirement. It requires minimal maintenance and is built to withstand the demands of food production and handling.

For maximum flexibility it can be updated as required with a range of options for futureproofing the equipment.

The elevating conveyor is one of Enmin’s most recent product developments. The Mi-CON (Modular Incline Conveyor System) is a hygienically designed full washdown system with multiple standardised components. The running gear and all components are constructed with 304 stainless steel and FDA approved.

As with all Enmin products, the three components are designed and manufactured in Australia. They have been constructed to meet the toughest WHS standards.

For production ease, all three components can be electrically connected so they are ‘talking to each other’, further minimising operator workload. They can also be easily moved to other production lines providing maximum flexibility.

Enmin Pty Ltd
www.enmin.com.au

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The German dairy plant Milchwerk Crailsheim-Dinkelsbühl eG processes around 150,000 tons of raw milk from cooperative suppliers every year, and prepares it to produce Balkan cheese, pasta filata cheese Kashkaval and grill cheese.

In June 2022, GEA commenced modernisation of the dairy’s milk treatment area. Its associated cheese dairies are then supplied with pretreated — purified, heated and mixed — milk. GEA will also further advance the digitalisation of the dairy, with completion planned for early 2023.

The heat treatment of raw milk is immensely important for hygienic cheese production, but at the same time it requires a lot of energy if the technology and process integration are not perfectly designed.

“Energy efficiency is our top priority when we think about the future of our dairy,” said Josef Vögele, Managing Director of Milchwerk Crailsheim.

Key technology and components at the dairy, such as skimmers, valves and plate heat exchangers, are all supplied by GEA. The next step will see GEA work with the dairy to develop a comprehensive energy and heat quantity concept for the entire plant, thereby unlocking CO₂ savings potential.

“In Crailsheim they face similar challenges to many other small and medium-sized dairies: sustainability and digitalisation are taking hold — and they can only be implemented by using efficient high-performance technologies and consistent process planning,” said Steffen Rathmann, Managing Director of GEA TDS. “To tackle these issues, which are so omnipresent in the industry, we develop the process and technology design based on the specific conditions onsite. It makes us proud to have the opportunity to set up the technical backbone for the future success of our customers like Milchwerk Crailsheim.”

In addition to the above technology, the dairy opted to record the plant history via GEA Codex Plant Playback. This automation solution analyses industrial processes batch by batch as a software-based video recorder. It can reveal dependencies, errors and their causes, which can be easily fixed. The software animates SCADA Historian data in real time or time lapse. This is designed to improve both production as well as product and process safety.

In order to connect the cheese dairy to the machine room in Crailsheim, GEA will also technologically modify various tank farms, fundamentally rebuilding all valve blocks and the cheese milk tank farm. To ensure high microbiological quality, the dairy will install a new pasteuriser with surplus cream cooling and two new thermisers. During the project, the existing CIP station will be upgraded. An additional skimming separator is equipped with GEA proplus technology, which is designed to increase protein yield and reduce freshwater consumption through longer emptying intervals for the milk separator. The cheese production technology is complemented by two new calcium chloride stations which increase yield and improve product quality through stabilised rennet gel.

The modernisation of the dairy will take place without stopping production.

GEA Group
www.geagroup.com.au
Tanks and mixers are extensively used during the production processes in most food manufacturing facilities. While the products in the tanks vary, the challenge remains the same: How to clean your tank efficiently?

Spraying Systems are world leaders in tank cleaning technology and our Australian-based team and fabrication facility can custom design and create the best solution for your business. Based on our experience in the industry and feedback from customers, we have separated four main aspects that should be taken into consideration when choosing your ideal tank-cleaning nozzle:

1. Time
The available time for cleaning your tank is crucial for selecting the equipment you need. A long cleaning process has a big impact on productivity, but a short cleaning process might not deliver the required results — and is likely to be less sustainable.

2. Temperature
Hot water is a known solution for removing residues. But beware! Always observe the proper temperature for your equipment. The costs involved in heating the liquid is another important factor to take into account.

3. Chemicals
With some types of residues, it is necessary to resort to chemicals for better cleaning results. Therefore, it is important to pay attention to the material of your equipment and its resistance to corrosive and acid products.

4. Impact
When we talk about tank cleaning, the impact is the aspect that will bring more results and savings to the cleaning. Selecting the ideal spray impact reduces the use of chemicals, provides a shorter cleaning cycle and, consequently, limits water and energy usage.

Selecting the ideal equipment for your operation
At Spraying Systems we have a large range of tank and tote cleaning solutions. Whether your operations require gentle rinsing or the removal of tough residues, we have the right product for any tank measuring up to 30 m in diameter.

When choosing the equipment for your operation’s tanks, you should ideally look for a model that will perform efficient cleaning in the least amount of time, with the least amount of resources, and with a high impact.

The basics sound very simple but unfortunately, we regularly replace inefficient tank cleaning solutions. If you want to make sure that you’re getting the most out of your tank cleaning solution, be sure to contact your local spray specialist. Our experts can help you understand the characteristics of your tank cleaning operation and help you meet your goals.

For more information, email sales@spray.com.au or call 1300 079 998.
Stair tread line

Form-A-Tread Original is a durable epoxy paste designed to prevent slips and falls and improve safety on high-traffic stairs.

The paste consists of 100% solids that, once applied, provides good stair tread footing and visibility for years without reapplication.

Suitable for high-traffic areas such as warehouse and storage facilities, the product can bond to a range of stair tread surfaces, with embedded aggregate to increase traction. It can be used indoors/outdoors and exposed to chemicals, direct sunlight, harsh weather and temperature extremes.

Easy to apply to stair treads, the product’s kit includes a 400 mL cartridge of material that can produce around 7 to 12 metres of 2.5 cm-wide tread depending on the surface type. A special tool is used to dispense and mix the material at the time of application in the correct ratio.

The kit also includes a stencil system to ensure the tread lines remain clean, neat and parallel.

In addition to straight line treads, instructions such as ‘Exit Here’ or a corporate logo can also be applied using the material and a stencil.

Suitable for steps, curbs and walkways, the product can be applied on sloped and irregular surfaces. It adheres to a wide variety of porous and non-porous surfaces without any priming required.

Form-A-Tread
https://form-a-tread.com/

Safe key system and safety switch

Euchner has released its one-fits-all FlexFunction products, including the CTS safety switch and the CKS2 key system.

The Euchner CKS2 safe key system is simple to integrate into the overall control system and suitable for many applications. By selecting the appropriate RFID key during initial setup, the user decides whether the device should be used as a simple means of starting and stopping machines and processes, as an electronic authorisation system for multiple operators or as a trapped key system, for example.

Configuration of the system takes place when the key is ‘taught in’ for the first time using the FlexFunction, and can be reconfigured to perform different functions at any time. The system can be connected to IO-Link using the Gateways. This enables users to implement diagnostic and communication functions, such as determining which key was used to operate the installation. The system is also available as a submodule for the MGB2 Modular safety door protection system, which can open up many other applications.

The CTS safety switch features a good locking force, a compact design and flexible mounting options. Measuring only 135 x 31 x 31 mm, it provides a maximum locking force of 3900 N. For hinged or sliding doors or extremely small door radii, three different switch mounting directions and a universal actuator with floating bearing enable it to be used almost anywhere. An extendable escape release can be added at any time. The transponder-based safety switch with guard locking meets all requirements for category 4/PL e according to the EN ISO 13849-1 and EN ISO 14119 standards.

With its FlexFunction, the CTS combines in a single device multiple functions that are otherwise available only in separate variants. This means users can choose whether the CTS operates with or without guard lock monitoring and evaluates the actuator code using a high or low coding level. Functions are selected via the matching actuator.

Industry 4.0-ready with the CTS: in addition to communicating intelligently when connected in series with other EUCHNER devices, the new switch can also connect to IO-Link.

Treotham Automation Pty Ltd
www.treotham.com.au
Stretch blow moulder

Krones has now released its fourth generation Contiform stretch blow moulders. Its development involved special attention to environmental compatibility and to further improving efficiency and flexibility. The machine can also be equipped with artificial intelligence (AI).

The distance between the heaters has been reduced, making the heating space more compact. They have also been redesigned with parabolic reflectors, which can reduce energy consumption by up to 11% compared to the previous generation.

The Air Wizard Triple air recycling system uses a three-stage compressed-air recycling process that can reduce compressed air consumption by as much as 20%.

The product has increased sustainability, such as through the use of protective panels made of recycled plastic.

The blow moulder uses a newly developed skip-and-run technology, which monitors the mould-hanger locking device and allows a blowing station that is not locked to pass along the main cam, for instance to eject a defective preform without triggering an emergency stop of the entire machine. That reduces the scrap rate and eliminates the need for operator intervention.

User-friendliness has been increased with the use of large-screen interface with touch technology and visualisation software. Assistant systems guide the operating personnel through the settings, even giving them suggestions to make using the machine more intuitive.

The system uses Cantiloop AI, an automatic process control system. This detects small variation in material distribution in the production of PET containers and automatically adjusts key stretch-blow-moulding parameters in real time, keeping bottle quality high. This factor is particularly important when working with recycled PET, which requires uniform quality and composition to be suitable for use.

Krones Pacific Pty Ltd
www.krones.com
SPX FLOW, a provider of process solutions for the nutrition, health and industrial markets, has launched a sustainability initiative that reduces the total amount of clean water a homogeniser uses.

The APV Homogenizer Water Recycling System (HWRS) is designed to recycle up to 97% of the water used by homogenisers. Traditionally, a continual flow of water is supplied to homogenisers to cool the transmission oil and lubricate the plungers. This technology recaptures that water, sanitises and chills it, then returns it to the homogeniser.

The product has met the drinking water regulatory standards set by the Pasteurized Milk Ordinance (PMO). It can be used with both new and existing homogenisers made by any manufacturer. It is compact — 21 x 32” (533.4 x 812.8 mm) — and it has its own control system, including fail-safe features that would default to fresh water without causing downtime, if any problems emerge.

SPX FLOW homogenisers were first introduced in the late 1800s through its APV Rannie and Gaulin brands. The company holds more than 850 patents worldwide and approximately 44% of the patent families are related to sustainability and clean technology.
CASE STUDY

Brewing improved efficiency

An Oregon-based craft brewer, Ninkasi Brewing Company, has boosted its on-time-in-full (OTIF) orders from 40 to 94% by adopting technology from OFS.

The brewery makes around 150,000 barrels of beer a year but expanded its operations recently to contract out its production lines to new brewers and producers of canned cocktails, hard seltzers and other drink lines.

As it reconsidered its approach to data capture and efficiency improvement initiatives, Ninkasi deployed OFS’s line performance software system, OFS-X, on its packaging line.

This meant it was able to utilise accurate, real-time overall equipment effectiveness (OEE) data and detailed insights into length of production, length of changeover, how well lines were performing, and how different shifts and crews were performing.

These data allowed the brewery to adjust its operations to improve their efficiency. The increase in OTIF orders has led to better outcomes for customers and other brewers using its lines.

“Our team on the floor compared all the systems available to us — OFS was the clear, undisputed winner. It was simple to use, made our lives easier, and it supported our drive to grow and diversify while improving our uptime,” said Daniel Sharp, Director of Brewing Process Development.

“Prior to OFS, we often had three or four changes to our production schedule a day, an issue OFS identified was usually caused by a packaging delay. It was wreaking havoc on our entire team and our ability to do what we love — make great beer.

“Now, we’re down to about five schedule changes per week. We’re using data to assign uptime and run rates for different packages on a crew-by-crew basis, leading to new best practices being discovered.”

OFS
www.ofsystems.com
Waste not, want not
How automation can reduce food loss in the food industry

Neil Ballinger, head of EMEA, EU Automation

The UN Food and Agriculture Organization (FAO) reported in 2019 roughly 1.3 billion tonnes of edible food per year were lost or wasted globally. While food waste occurs largely in households and retail, food loss also occurs during post-harvest, transport, storage, distribution, processing and packaging. This means food manufacturers have a role to play in reducing the waste.

The FAO reported some of the direct causes of food loss and waste, such as lack of proper process management and prolonged storage. Automation can help address these issues by limiting human error, improving operations and automating product tracking.

Reducing human error
After studying 47 food manufacturers in Belgium, researchers at Brunel University London and Ghent University found that human error accounted for 10.9% of all food waste. Automation can help reduce human error by digitalising manual work that is less engaging and more likely to cause mistakes. This can be achieved by installing plant management software to help streamline processes by collecting data automatically, eliminating the need for whiteboards and clipboards.

“In many instances, there wasn’t proper training or a standardisation of work being applied in their workplace,” said Dr Manoj Dora of Brunel Business School upon the study’s findings. “As a result, there was a greater tendency toward errors, and therefore, more food waste.”

While proper training is always necessary, automation can help with the standardisation of production. Implementing technology such as IoT sensors can help standardise vital processes like quality control and temperature checks, making them run more efficiently and ensuring every product has the same level of inspection.

Traceability
Estimates by the FAO state that 13.8% of the total food produced globally is lost between the farm and transport to retail. The installation of automated tracking systems can help reduce supply and product loss by automatically tracing and monitoring food from supply to delivery.

Automating the tracking system means there is no need for manual inputs that can be affected by human error, improving supply chain management. Tracking systems also allow supply chain managers to collect data that can help determine inefficiencies and unnecessary expenses in the supply chain.

Maintenance and downtime
Despite the many benefits automation brings to the food industry, manufacturers are still hesitant due to the higher level of maintenance needed and the risk of equipment downtime that could cause more food waste.

According to the U.S. Department of Agriculture (USDA), perishable foods, such as meat and milk, should be discarded if held above 5°C for more than 2 hours. Manufacturers might fear that in case of unplanned downtime caused by equipment failure, the food might be spoiled due to the inability to process and package it in a timely manner. However, predictive maintenance can help avert these issues.

Automation in the food industry can be daunting for many manufacturers, but change is inevitable. Automation technology can progress the industry while reducing food waste. Those in the food industry who have yet to automate their processes should consider starting a trial run to see if digitalisation might help them limit food waste.
Brewing automation solution

Brewery-specific ABB Ability BeerMaker process control solution is designed to improve safety and quality, boost productivity and raise operational efficiency. The solution can also help to reduce impacts on water and energy resources and therefore meet consumer demand for more sustainably crafted drinks.

Based on the ABB Ability System 800xA distributed control system, the process automation solution comprises a control system with batch functionality following the worldwide S88 standard and a digital twin to simulate new recipes. Crafted and tested with brewing knowledge from ABB’s brewmaster, it can be customised using a variety of parameters.

Ready-made and tested templates and objects can bring a high level of automation and intelligence of plant functions into operators’ hands. There is a prepared inventory for queue handling, diagnostics and comprehensive cleaning in place (CIP) support.

Designed to meet the industry’s need for intuitive, visual solutions, the solution can help operators manage their preferred operating procedures and can be used on computers, tablets or mobile devices.

Additional digital solutions based on ABB Ability Manufacturing Operations Management (MOM) have the capabilities to identify energy consumption and beer or extract losses, as well as provide reporting functions and dashboard visualisation. These include the ABB Ability BatchInsight concept, which can use big data analytics to identify process anomalies at the earliest stages.

Other features for breweries include: intuitive controls and high-performance human-machine interfacing, fast detection and resolution of process disturbances, consistent alarm messages, report management and standard operating procedures (SOPs).

ABB Australia Pty Ltd
www.abbaustralia.com.au

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PLUS… Learn how to choose the correct metal detection for your organisation, with our free guide ‘Practical tips for metal detection selection’
Stainless steel washdown scale

Adam Equipment has grown its Aqua family of washdown scales with the addition of the easy-to-clean Aqua Stainless Steel (ABW-S). Washdown scales are particularly useful for applications like food production and foodservice, where scales require frequent, thorough cleaning.

Like the original Aqua range, the Aqua ABW-S has been designed for ease of use and efficiency in demanding environments like industrial factories and food processing plants. After a simple washdown, the scale — which is National Sanitation Foundation (NSF)-certified for food safety — is ready to go again. For additional safety, the product includes blue levelling feet which increase visibility while providing support to keep the scale from sliding on a potentially wet countertop.

With a rating of IP68, the scale offers protection from dust and water, allowing it to be fully submerged in water deeper than 1 m without harm to its components. Strategically placed channels in the housing and a sealed internal design help protect components from water penetration.

The product is available in four models that range in capacity from 4 to 32 kg and readabilities from 0.1 to 2 g. Built to last, the scales feature a grade 304 stainless steel housing and platform, along with a sealed keypad. The generously sized pan (245 x 180 mm on most models and 300 x 210 mm for the ABW 32S model) is removable, making the scale easy to clean and maintain.

For productivity and efficiency, bright front- and rear-facing 20 mm LED displays allow two users to share a single scale. The product can be powered by the included AC adapter or a built-in rechargeable battery that offers up to 55 h of on-the-go weighing. Along with its percentage weighing and parts counting functions (including parts counting optimisation that continually refines piece weight as parts are added), the product is designed to simplify checkweighing with hidden-until-needed indicators that alert the user if a sample is lower, higher or within specified limits.

Adam Equipment (SE ASIA) Pty Ltd
www.adamequipment.com.au
Coca-Cola Europacific Partners (CCEP) has announced that it is collaborating, through its investment wing CCEP Ventures, with the University of California, Berkeley (UCB) to develop scalable methods and technology to convert CO₂ from the air into sugar.

CCEP Ventures’ initial investment with UCB will support the Peidong Yang Research Group on foundational research which will focus on enabling the production of sugar from CO₂ onsite and at an industrial level, with expectation of future investments to drive scale — from lab to pilot phase.

The development of lab-scale prototypes could make the generation of essential raw and packaging materials more sustainable in the long term. It could reduce some of the largest CO₂ contributors in supply chains, while saving material, transportation and logistics costs.

The research and its funding are linked with CCEP’s commitment to reach net zero greenhouse gas emissions by 2040.

With agricultural ingredients, including sugar, amounting to approximately a quarter of CCEP’s overall carbon footprint, this technology could not only reduce emissions associated with sugar manufacturing processes but positively contribute to optimising land usage as less arable land becomes available due to global population growth.

In the longer term, the technology may also make the conversion of CO₂ into PET plastic more efficient by reducing the need for crude oil in the manufacturing process and lowering costs.

Craig Twyford, Head of CCEP Ventures at Coca-Cola Europacific Partners, said: “At CCEP, we want to grow sustainably, producing beverages that people love while helping to build a better future for our business, communities and the planet.

“CCEP Ventures is helping us find solutions to industry challenges and provide funding to make these foundational technologies a reality. We’re excited to be involved in this project that could lead the industry in the development of transformational technology capable of converting CO₂ into more complex, usable goods.”

Prof. Peidong Yang at the University of California, Berkeley said: “Air to sugar conversion could significantly impact our ability to preserve the natural world. This is a bold scientific vision that would bring immediate environmental benefits, fundamentally transforming the production and distribution of goods across the world. We are pleased to be working with CCEP Ventures on research that could make a significant impact on our ability to create a more sustainable future.”

Coca-Cola Europacific Partners
https://www.cocacolaep.com/
Cauliflower ice-cream startup founder wins award

Plant-based ice-cream company Kinda Ice Cream is set to launch in summer 2022 with its product made from cauliflower that’s not pretty enough to be sold in supermarkets.

“We’re creating a delicious product from waste and creating another income stream for farmers,” said Mrinali Kumar, who worked with Jenni Matheson and four others to develop the plant-based ice-cream concept.

“An ice cream made without farming animals, with a lower environmental impact... Kinda sounds good to me,” Kumar said.

She recently won the Momentum Student Entrepreneur award at the KiwiNet Research Commercialisation Awards. The awards celebrate scientific discoveries being successfully commercialised within New Zealand’s universities, Crown Research Institutes and other research organisations, and their impact on Aotearoa and beyond.

Kumar graduated from Massey University in 2021 with a Bachelor of Food Technology (Hons) in Product Development and is currently a postgraduate student at the university.

Through her studies she developed technical expertise and said: “Food Technology is an engineering degree — even though this was frustrating at the start (I really hated physics), in later years and especially now I understand the importance of learning fundamental science. Technical knowledge allows us to solve the problems that we face when trying to commercialise innovative foods, safely.”

The startup is set to commercialise its cauliflower ice cream later this year.

Research chemists with the Agricultural Research Society (ARS) are looking to replace saturated fats found in margarine and spreads with plant-based and natural wax alternatives.

Saturated fats are used as solidifying agents in some of these products to give them their butter-like properties. To create alternatives, sunflower, rice bran, candelilla and beeswax, among other wax alternatives, are melted in hot vegetable oil and left to cool to room temperature, creating a semi-solid substance called an oleogel.

When mixed with water, salt and other ingredients, the substance mimics the role of saturated fat in producing a margarine, spread or shortening that has the desired firmness, mouthfeel, melting point, shelf-life and other properties. It is made of a network of plate-like crystals that immobilise molecules of oil in a gel state and mimic the function of solid saturated fat while minimising the associated health concerns.

Artificial trans fats were previously used for making the products, but were phased out in 2021 over concerns of increased risk of heart disease and stroke. Saturated fats without a trans structure, such as from palm oil and fully hydrogenated vegetable oil, are among the replacements currently used; however, consumers are advised to limit their intake of saturated fats.

Researcher Hong-Sik Hwang from the ARS centre’s Functional Foods Research Unit in Peoria, said: “We think 100% of the saturated fats can be replaced, including saturated fat in palm oil and fully hydrogenated vegetable oil.”

Researchers have so far created formulations from four different natural waxes and 12 different kinds of vegetable oils, including soy and hemp seed oil. Sunflower and rice bran seem to work best, with very little wax needed.

The researchers continue to refine the formulations by blending different waxes with oils to achieve the best combination of properties expected from current spreads. The work is part of a larger research effort at the ARS centre to find value-added uses for both established crops such as corn and soybeans and newer ones such as penny cress and hemp that will benefit producers and consumers alike.
Australia's increasingly diverse food culture is benefitting from the wider recognition of Indigenous bush foods, which University of Queensland Professor Henrietta Marrie AM said must be brought to the mainstream in ways that combine traditional knowledge systems with science.

Marrie is an Aboriginal Australian from the Yidinji tribe and a Member of the Order of Australia for her service to education and as an advocate of Indigenous and cultural heritage and intellectual property rights.

Her work on the development of traditional foods through the Australian Research Council training centre for Uniquely Australian Foods will be the feature of her plenary speech at this year’s TropAg International Conference in Brisbane, titled ‘Future of First Nations food systems and emerging trends’.

While Australia has a growing bushfood industry, Marrie said not enough has been done to centre Indigenous people in this market.

“In Australia, we need to treasure the knowledge system of Indigenous people and work at how to bring their food to the table in a way that exposes the varieties that we have in Australia and how it can be part of everyone’s table,” Marrie said.

“We want to show that Australia does have this food culture, and it includes food that is part of Australia, not just food brought in from the West.”

Traditional Australian foods were projected to be a million-dollar market when they first emerged in the 1980s.

But Marrie said while the market has exceeded projections, primarily non-Indigenous people have benefited, and more Indigenous people must be included in all levels of production of traditional foods.

“We need more collaboration with First Nations people — at a local, national and international level — to see how we can combine the knowledge system of an ancient culture with modern science,” she said.

“Combining traditional systems of knowledge on traditional food and western systems is so very crucial.”

She said the challenges include access to land to grow food, finding ways to commercialise foods in an ever-changing economic climate, and the growing pressures of climate change.

“In the past, the territorial management systems allowed for adjustments to changing migratory patterns and climate variation,” Marrie said.

“The current situation and pressures are now placing Indigenous people in difficult conditions to counteract that.

“So, they see their territories and livelihoods suffering and having a profound impact on their lives both in and out of their communities.”

Marrie said progress in the industry must protect the rights of Indigenous people to their traditional knowledge, which meant helping more Indigenous people gain the expertise to promote and protect their culture in the food industry.

“We need to bring them into universities, hopefully doing degrees that would help them to then take the lead in how they can safely use their products and protect their property rights.”

Marrie said while there are large-scale changes to be made, such as better intellectual property laws for protecting Indigenous knowledge, it is ultimately up to local communities to take charge of safeguarding their knowledge.

She is looking forward to the TropAg conference as a place to bring attention to the potential of traditional foods and to collaborate on innovative solutions.

Running from 31 October to 2 November 2022, the TropAg conference will be held at the Brisbane Convention and Exhibition Centre. It will be hosted by The University of Queensland in partnership with the Queensland Government via the Department of Agriculture and Fisheries.

For more details, visit tropagconference.org/.
Saffron can bring a distinctive colour, aroma and taste to many food industry applications but it is also one of the world’s most expensive spices to produce. Obtained from the stigma of *Crocus sativus* flowers, it takes around 150,000–200,000 flowers to produce one kilogram of saffron. Now, KAUST researchers have found an alternative to saffron’s active ingredient using a common garden plant.

The colour of saffron comes from crocins: water-soluble pigments derived from carotenoids by a process that is catalysed by enzymes known as carotenoid cleavage dioxygenases (CCDs). Crocins are said to have therapeutic potential and they also have an important role as natural food colourants. The researchers have now identified an efficient carotenoid cleavage dioxygenase enzyme from *Gardenia jasminoides* that produces the crocin precursor crocetin dialdehyde. They have also established a system for investigating CCD enzymatic activity in plants and developed a multigene engineering approach for sustainable biotechnological production of crocins in plant tissues.

“The enzyme we have identified and the multigene engineering strategy could be used to establish a sustainable plant cell factory for crocin production in tissue culture of different plant species,” said lead author of the study Xiongie Zheng. “Our biotechnological approach can also be used on crops, such as rice, to develop crocin-rich functional food.” Team leader Salim Al-Babili said the study paves the way for efficient biotechnological production of crocins and other high-value compounds derived from carotenoids (apo-carotenoids) as pharmaceuticals in green tissues as well as other starch-rich plant organs. It also highlights the contribution of functional diversification among CCD genes to the independent evolution of alternative apo-carotenoid biosynthesis routes in different plants.

“Most of our knowledge about CCD enzymatic activity and substrate specificity comes from experiments using *E. coli* engineered to produce different carotenoids,” he said.

“Functional characterisation in plants, for example by using a transgenic approach such as we have here, is important for deducing the role of CCDs in carotenoid metabolism and unravelling their real contribution to the carotenoid/apo-carotenoid pattern.”

The platform technology could be used to produce other important carotenoid-derived compounds, including widely used scents and colourants.

“It could be used to produce safanal and picrocrocin, for example, which give rise to the taste and characteristic aroma of saffron. These could be used as flavour additives and they also have a bioactive potential awaiting exploration,” Zheng added.

The findings have been published in the *Plant Biotechnology Journal*.

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**Food packaging leak tester**

The Seallick TSE6086b has been upgraded with a touch screen HMI for simpler operation. The leak testing system has been developed for testing flexible food and pharmaceutical packaging in many sizes and shapes. It operates on a non-destructive vacuum decay technique that does not damage the packages during testing. Therefore, the products can be returned to the production line after testing if they meet the test standards.

The unit only requires air and power to operate. Once the unit is connected to utilities, it can start the testing procedure by putting the products inside the testing chamber and closing the chamber lid. The results will be reported within a few seconds in the HMI panel, indicating either pass or fail results. The quantitative data are written into the internal memory storage and stored for 30 days. Users can also retrieve the data via Ethernet or USB for quality traceability.

Leak quantifications are defined by setting and controls of test parameters. The test parameters can be configured via the HMI and are password-protected. The system is housed in a robust, stainless steel housing to enable applications in an industrial environment.

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Tasty ‘black diamonds’
truffle into the culinary world

Nicknamed ‘diamonds’ of the culinary world, fungi delicacies known as truffles are prized for their unique flavour and scent. But newer truffle species are now entering the market and fighting to achieve that same gourmet status. Researchers reporting in ACS Omega have studied the aroma of the Appalachian truffle to determine the potential for a new North American ‘black diamond’.

Truffles are subterranean fungi of the Tuber species that require several years under particular conditions to grow. Determining the best way to cultivate the fungi has been difficult, so most forage for them using trained animals, such as pigs or dogs. And because truffles are so rare and challenging to obtain, they are very expensive. For example, a large 1.5 kg behemoth from Italy cost US$330,000 at auction several years ago. Commercial truffles most often originate from Europe, Australia and the western US, but different species exist all over the world.Unlike the fancy white or black truffles grown in Italy or France, however, many unearthed in North America have not been well studied. So, Normand Voyer and colleagues wanted to thoroughly analyse the aromatic profile of one of these North American varieties, known as Tuber canaliculatum, or Appalachian truffle.

To accomplish this, the researchers investigated three T. canaliculatum samples using headspace solid-phase microextraction (HS-SPME) and gas chromatography-mass spectrometry (GC/MS). With these techniques, the team identified the species’ ‘volatile’, or the chemical fingerprint responsible for its aroma. A total of 30 different compounds, including six that had never been reported in other truffle species, were identified. Some, such as 2,4-dithiapentane, are found in many truffle species and give truffle oil its unique smell. The most prevalent compounds were described as having strong odours of garlic, fungus and even a cabbage-like, rotten smell that was found in higher concentrations in older samples. The researchers say that this work could spur future studies of T. canaliculatum, which might one day place it at the same high status as its European cousins.

Optical dissolved oxygen analyser

The ECD Triton DO82 Optical Dissolved Oxygen Analyser provides long-term dissolved oxygen measurements in wastewater aeration basins, aquaculture and all types of environmental water. The sensor uses fluorescence quenching to determine the oxygen concentration in water. This optical method is designed to minimise maintenance and improve the long-term accuracy of the measurement in demanding municipal and industrial wastewater applications.

The product is unaffected by changes in the flow, pH or conductivity of the sample and there is no need to replace or service membranes, electrolytes or anode/cathode assemblies required for other sensors.

The sensor uses stored calibration data and second-generation software algorithms and digital communication.

It uses universal design with a waterproof cable that comes fixed or detachable. It is available with rail-mounted immersion assemblies, flow through cells and automatic spray cleaning systems.

Additionally the analyser interfaces directly with T80 transmitters with a range of 4–20 mA with MODBUS RTU or HART Communication, relays or timers.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au
Chocolate hazelnut hommus
Yumi has developed a sweet, chocolate and hazelnut flavoured hommus dip/spread. yumis.com.au

Nespresso launches range of Australian-designed coffees
Nespresso has launched the ‘Barista Creations for Milk’ range, which includes two new coffee blends inspired by Australia’s unique coffee preferences. www.nespresso.com

Non-dairy chocolate chips
The Ghirardelli chocolate company has launched its plant-based, non-dairy dark chocolate baking chips. They are made with 52% cacao using sustainably sourced cocoa beans and have a dark chocolate flavour. www.ghirardelli.com/

Limited Edition Pineapple Flavour hard seltzer
White Claw hard seltzer has announced the release of a limited-edition pineapple flavour to hit Australian shores this summer, made with sparkling water, triple distilled spirit and a hint of natural pineapple. au.whiteclaw.com

From vegetable waste to artistic ready meal
The ANINA pod is a complete meal made from vegetables that have been rejected for sale due to a less-than-perfect appearance. The ready-to-cook format is a single-size portion that allows for a quick and nutritious meal in just a few minutes. aninafoodtech.com

OAK Golden Gaytime
OAK milk and Golden Gaytime have partnered to deliver OAK Golden Gaytime — a golden toffee, creamy vanilla and biscuit crumb flavoured milk. OAK Facebook/Instagram: @oakmilk

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