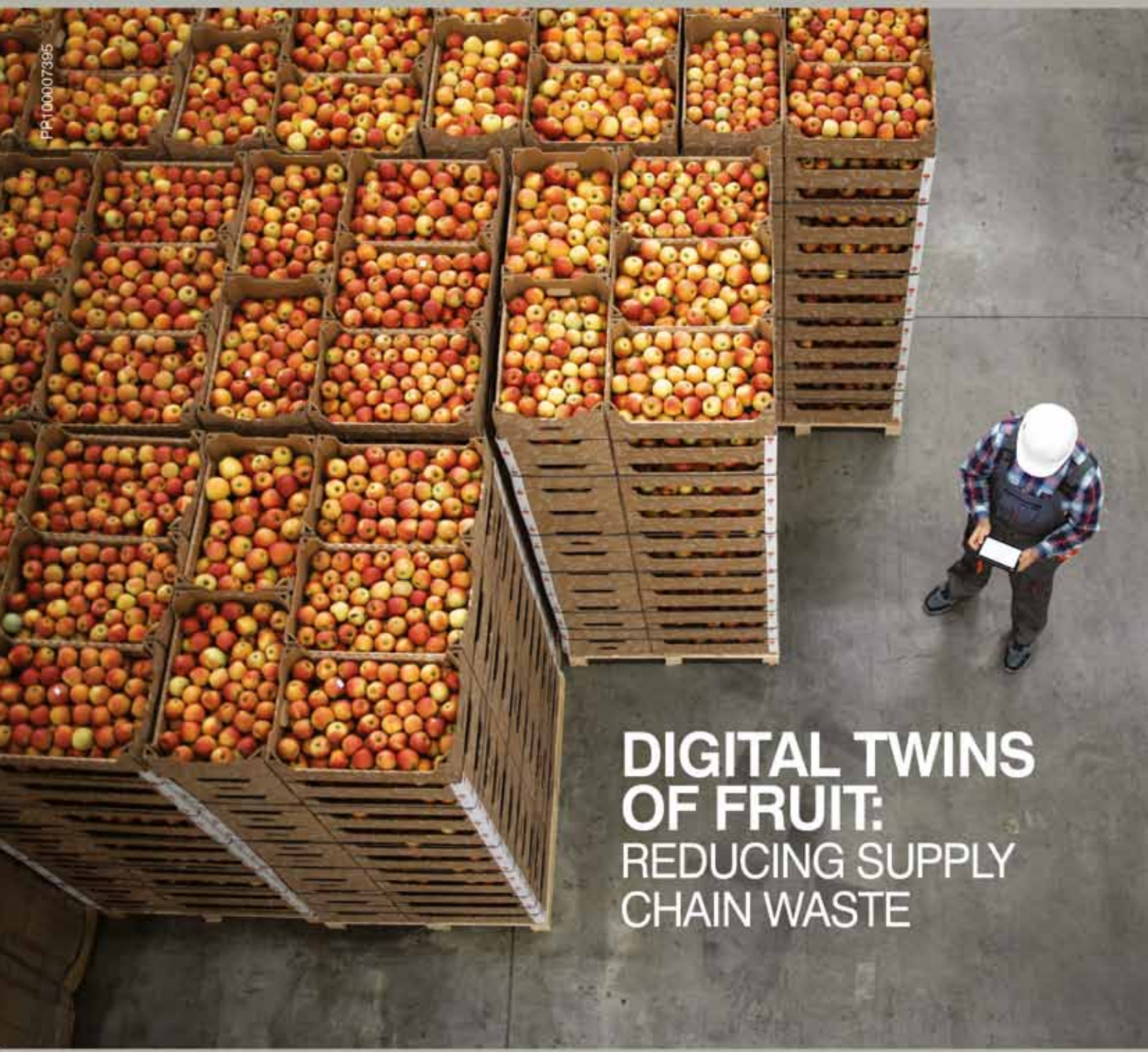
September/October 2022
Vol.30 No.3

what's new in FOOD technology & manufacturing



DIGITAL TWINS OF FRUIT: REDUCING SUPPLY CHAIN WASTE

Authenticating cherries | More beer in less time | 5G for meat processing

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Food brand rankings

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Nestlé is again the world's most valuable food brand, according to the 2022 edition of the Brand Finance Food 100 ranking.

This annual report, compiled by brand valuation consultancy firm Brand Finance, ranks 5000 major brands from around the world according to their value.

Nestlé is the largest food brand, valued at $28 billion, which is roughly twice the value of the second-place holder, the Chinese dairy brand Yili, valued at $14.2 billion. Lay's comes in third place with a value of $11.5 billion. Each of these three brands has increased their value by around $1 billion each in the last year.

Nestlé credits its decentralised structure as the reason behind its ongoing profits and ability to successfully brave the COVID-19 pandemic and supply chain pressures of the past couple of years. The company said its ability to test and launch new products in an agile fashion has led to its continued growth.

Yili products in the cheese, powdered milk and bottled water categories have all had strong growth, with the company saying that consumers in China see these foods as offering health and nutritional benefits, hence their market strength.

Savio D'Souza, Brand Finance Valuation Director, said: "People are returning to the brands they love — they are hungry for Nestlé, Yili and Lay's! Food brand values are back above pre-pandemic levels."

Brand Finance also looks at the relative strength of a brand in terms of marketing, reputation, awareness of consumers and various other factors that are fed into an algorithm to produce a score — the Brand Strength Index (BSI) — that reflects a brand's power. Hershey's was found to be the world's strongest food brand, with a BSI of 89.8 and an AAA+ brand rating.

Brand Finance compiles reports regarding the value of many other food and beverage categories. For instance, Yili is unsurprisingly the most valuable dairy company, followed by Danone (worth $10.5 billion).

The most valuable non-alcoholic drinks company, Coca-Cola, manages to dwarf its competitors, with its total value clocking in at an impressive $47.7 billion. Pepsi takes the second place in this category with $27.9 billion.

"As pandemic restrictions recede in the rear-view mirror, many non-alcoholic brand values are surging," said D'Souza. "People are once again able to easily get together for a Coke, a Pepsi, a coffee or cup of tea. This is good for consumers, and good for brand values in this sector of the economy."

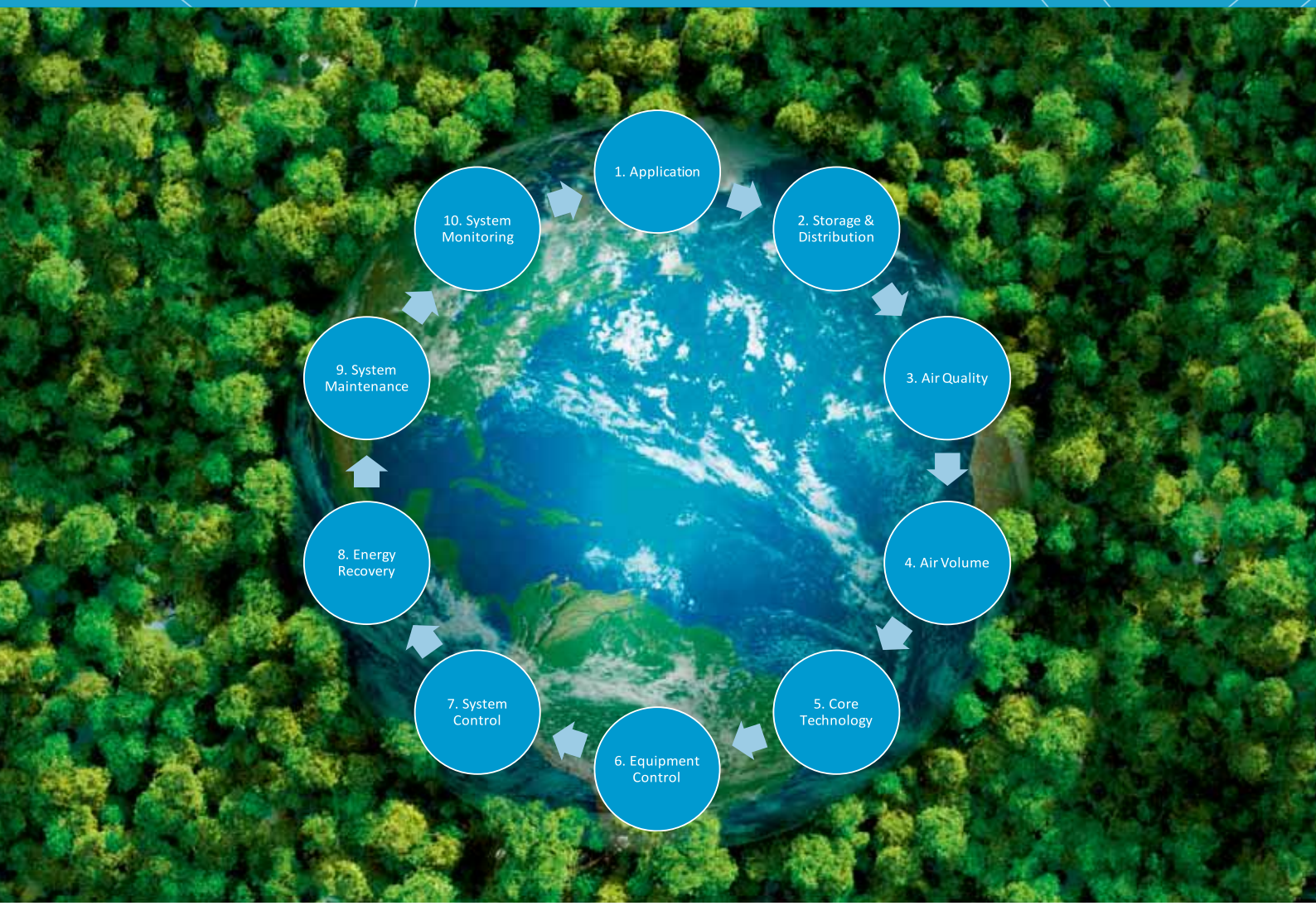
Coca-Cola is the company with the highest brand strength, with a BSI of 93.3 out of 100 and an AAA+ brand rating.

On the alcoholic front, the most valuable beer brand was Corona ($9.4 billion), the most valuable wine was Moët & Chandon ($1.9 billion) and the most valuable spirit was Moutai ($57.8 billion).

The rankings are available from the Brandirectory site: brandirectory.com/rankings

Brand Finance
https://brandfinance.com/

Your 10-step guide to a greener and more efficient compressed air system



Compressed air production consumes a large amount of energy, which impacts a company's bottom line as well as the environment.

However, there are some things businesses can do to immediately and sustainably make compressed air generation less expensive and more environment-friendly.

This 10-step guide will help companies lower their energy consumption and carbon footprint, which will translate into direct savings. In some cases, these savings will be substantial.

Best of all, while all of the 10 steps will save money in the long run, some of them cost very little to implement.

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Food FOR thought

Partnership formed to increase ARL usage in NZ

New Zealand consumers can expect to see a lot more of the Australasian Recycling Label (ARL) thanks to a partnership that has been signed between the Food & Grocery Council (FGC) and the Australian Packaging Covenant Organisation (APCO).

The ARL was developed by APCO, Planet Ark and PREP, and while many companies are adopting it in Australia, and it enjoys strong support from Australian consumers, it is less commonly seen in Kiwi stores.

As part of the new partnership between them, APCO and FGC will design a roadmap to increase awareness of the ARL in New Zealand so that both consumers and businesses are highly aware of it. Use of the PREP system will also be encouraged.

Food & Grocery Chief Executive Katherine Rich said: "69% of New Zealanders say they check the label on packaging before recycling, so the instructions need to be clear and, most importantly, reflect the collection and recycling system here in New Zealand.

"More than 95% of scannable barcodes on packaging are common across both New Zealand and Australia, so our members need one labelling system. We are excited to continue this great work by championing the adoption of the ARL, not just by the food and grocery sector but for all packaging."

Dairy processors and producers unite in WA

The WA Government has welcomed a strategic five-year plan developed to grow and build confidence in the Western Australian dairy industry.

The WA Dairy Five-Year Industry Development Plan, which emerged as a key priority from a ministerial round table with industry last year, will play a major role in supporting future growth and sustainability of the state's dairy industry.

WA Agriculture and Food Minister Alannah MacTiernan officially launched the plan at the WAFarmers Dairy Conference in Busselton on 21 July 2022.

"It is greatly encouraging to see producers and processors come together to develop a plan for Western Australia's dairy industry," MacTiernan said.

The plan aims to increase profitability throughout the supply chain, by better understanding emerging consumer trends and responding to local and international market opportunities.

It will promote the industry with one unified voice, to attract new investment and talent into dairy farming, as well as optimising opportunities to de-carbonise the supply chain.

App puts food waste under the microscope

A research team based in Flinders University has developed a smartphone system to detect spoilage and ripeness of fresh food.

Using the GoMicro Spotcheck app and a phone-attachable magnifier, users can assess the level of ripeness or spoilage of fresh foods. The CEO and founder of GoMicro, Dr Sivam Krish, suggested that the system could help to save money for agricultural industries and solve the $1 trillion food waste problem.

"We can assess the ripeness or spoilage of fruits and vegetables with 86–99% accuracy, measured in days," Krish said.

"It's a very topical issue for the food industry to address, with an estimated 30% of our food being spoiled. We can see that there are some very strong commercial opportunities for a cheap and portable device to have the power to make accurate food spoilage assessments."

The software uses an AI system that was trained with 100 images of different vegetables. The company's patent-pending technology creates lab-quality imaging conditions that can increase the accuracy of detection, reducing the number of images needed for training purposes, resulting in accurate AI detection for this level of magnification.

GoMicro's aim of re-inventing the microscope and instilling it with artificial intelligence is designed to make the highest quality technology accessible to the public and not just scientists.

The system is initially being directed at agriculture to help farmers and agronomists detect pests and leaf disease, and assess food quality.

Foodtech Packtech delayed until 2023

Foodtech Packtech and the Materials Handling & Logistics Expo have been delayed until 19–21 September 2023.

Originally scheduled to be run from 20–22 September this year, the event is being postponed due to a recent dispute in New Zealand's High Court concerning the Auckland Showgrounds, the event's intended location. The managing trust of the showgrounds had planned to lease the location to a film studio; however, a case was brought about by Brent Spillane, Managing Director of XPO (the company that runs Foodtech Packtech and other events), which argued that the showgrounds are required to be used for exhibitions, trade shows, etc.

Although the court ruling is expected to be favourable for the events industry, the event organisers are unable to confirm exact timeframes for upcoming shows. Unfortunately, no alternative venue in Auckland is suitable to house the food manufacturing, packaging and processing technology trade show. As such, Foodtech Packtech and the Materials Handling & Logistics Expo are now scheduled to run from 19–21 September 2023.

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Fonterra to close Brightwater milk powder plant

Fonterra has announced it will be closing the milk powder plant at its Brightwater site. The plant, located near Nelson on the edge of New Zealand's South Island, will cease operations in April 2023, though milk collection and its associated activities will continue at the facility.

Brightwater currently processes around 0.25% of Fonterra's total milk supply into whole milk powder. Post-closure, the company's Darfield site, near Christchurch, will be used for these operations instead.

"We know milk supply is declining over time, flat at best, so we need to make sure we're getting the most out of every drop of milk and optimising our plants to match both consumer demand and available milk supply," said Fonterra CEO Fraser Whineray.

"Part of our long-term strategy is to direct more milk into our Foodservice and Consumer business, less into Ingredients, and in some cases to divert product away from the Global Dairy Trade auctions. This, along with forecast capital and maintenance costs, means we've made the tough decision to close our milk powder plant at Brightwater.

"We're continually working to ensure our assets across the country are as efficient as they can be, changing product mixes, and moving more milk into value-add products."

Thirty employees will be affected by the plant's shutdown. Fonterra has said it is aiming to support these workers.

"It's no doubt tough news for some of the Brightwater team and we'll be working with them in the coming months on their future options, including redeployment opportunities within the Co-op," said Whineray.

Westland butter factory opens in NZ

Yili Group has opened a new butter plant at Westland Milk Products in Hokitika, West Coast, New Zealand. The inauguration, which took place on 19 July, marks the third anniversary of Westland joining Yili in 2019.

With the plant now open, Westland has doubled its production capacity; it can now make up to 42,000 tonnes of butter per year. This means that it is one of the largest butter-producing facilities in the country.

"Since joining Yili Group, Westland has gained increasing consumer recognition. Westland is dedicated to continuing creating more value for consumers, society and employees in the future," said Pan Gang, Chairman and President of Yili Group, in a recorded message played at the event. New Zealand Trade and Agriculture Minister, the Hon. Damien O'Connor, was also in attendance to commemorate the investment in new facilities.


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Westland CEO Richard Wyeth said: "The original butter plant built in 1973 has now made way for a purpose-built facility that allows us to double our capacity of small-format butter pats with modern, state-of-the-art machinery that still holds true to our traditional churn methods."

Wyeth also expressed appreciation for the company's employees, suppliers and partners, with the initial six months of 2022 representing the strongest first-half-year result in seven years.

The butter plant is a component of the Yili Project Goldrush investment plan that is working to upgrade Westland's production systems and capacities, and to increase awareness of the brand worldwide.

Food FOR thought

No- and low-alcohol drinks slated to increase in popularity

An increased number of Australians are reaching for beverages with no- and low-alcohol (NoLo) content, according to a survey performed by Decibel Research and commissioned by Brick Lane Brewing.

The survey revealed that 45% of consumers say that they regularly or occasionally consume these NoLo beverages and well over half of people say that they will increase the amount of reduced-alcohol drinks they will drink in the future.

The increased amount of NoLo beverages being purchased is said to be related to people becoming more interested in having a healthy lifestyle and the ability to drive after drinking. Despite there being a noted presence of a stigma against these drinks among the respondents, there is an increase in the number of young people drinking them. Interestingly, over a third of people said that the taste of NoLo drinks was a purchasing barrier.

Brick Lane CEO & Co-Founder Paul Bowker said: "It's clear that NoLo alcohol is no longer a curio or peripheral category but one which is being embraced across a broad cross-section of demographic groups. In particular, younger Australians and those who want a healthier lifestyle are embracing NoLo drinks as a way to have the best of both worlds.

"The NoLo category is already growing rapidly, and as younger people grow older and become even more influential as a consumer group, we anticipate growth will continue to be exponential. We see no reason why NoLo cannot soon capture 10% of the Australian market."

The results of this survey, which also outline that people want to see more accessibility to NoLo drinks in pubs and retailers as well as a larger variety of options, gel with previously released information that showed them even outperforming alcoholic beverages and that young people are a driving force behind their adoption.

Oat milk producer to build dedicated facility in NZ

Southland-based oat milk producer New Zealand Functional Foods has received a $6 million investment from the NZ Government's Regional Strategic Partnership Fund to develop a dedicated low-emission plant-based beverage manufacturing facility.

At the announcement of the funding today (11 July 2022), Economic and Regional Development Minister Stuart Nash said Kiwis have almost tripled their consumption of plant-based milk alternatives from 2017–19, spending NZ$144 million in 2019, so there is definite demand for alt-milk products.

"We know that oats grow well in Southland, and being low in water use, land use and emissions, they are an excellent raw ingredient for an environmentally sustainable alternative-milk option. Producing oat milk locally is a lucrative way to diversify our strength as a quality food producer," Nash said.

"As it stands, we just don't have the appropriate processing facilities to domestically produce the volumes of oat milk required to make a splash in this burgeoning market. Our investment will help provide the capital needed by New Zealand Functional Foods to build a specialised, large-scale processing plant at Makarewa, with capacity for producing up to 80 million litres of plant-based milk a year.

"The investment is part of our wider government strategy to develop a low-emissions, highly skilled economy that responds to global demands. I am confident that this new facility will add to the reputation of Southland and New Zealand as a real player in the sustainable food and beverage sector."

Americold expands Australian presence

Americold, a firm that focuses on the ownership, operation and development of temperature-controlled warehouses, has expanded its Australian presence through the purchase of De Bruyn Cold Storage in Tasmania. The site is located in Wivenhoe, at the Port of Bernie.

The acquisition will increase the company's APAC pallet positions to close to 300,000 spread across five states and 11 sites in Australia and seven sites in New Zealand.

The company operates an i3PL system that gives users visibility of their inventory at Americold sites across the different sites, states and globally.

"We are pleased to announce our expansion into Tasmania," said Richard Winnall, Managing Director of APAC/LATAM at Americold.

"The acquisition has already enabled us to win new business from a large, quick-serve restaurant customer. Our growth in Tasmania will be a positive thing for the locals as well, with job opportunities and career advancements through a large global organisation."

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Sustainable protection of everyday needs

German institute analyses reclaimed wastewater risk

The German Federal Institute for Risk Assessment (BfR) has recommended that fresh produce that is grown close to the ground and is intended to be eaten raw should not be irrigated with reclaimed wastewater due to the likelihood of causing illness.

Crops such as lettuce, carrots, strawberries and herbs grown in these conditions are at risk of carrying harmful viruses or parasites to humans, with the chance of causing both mild and severe sickness. The recommendation from the BfR, a scientific organisation that provides risk analysis of food, chemicals and product safety for Germany's federal and state government bodies, comes based on emerging evidence that reclaimed wastewater has a chance of carrying viruses and protozoa if not properly treated.

"Reclaimed wastewater in agriculture poses a new challenge to food safety," said BfR President Professor Dr Dr Andreas Hensel. "In order to reduce pathogens as much as possible, we need very good treatment and detection methods."

The data do not currently support a conclusive risk assessment but the organisation is confident enough to make a strong recommendation against the practice of using the water to farm these particular plants, at least until treatment processes are available for the water. Further research is required.

Pink and white strawberries to hit store shelves

Two varieties of strawberries, Pink and White, will soon be available on store shelves. Announced at the BerryQuest International 2022 conference, the berries are being fast-tracked to market after a tender was put out by Hort Innovation for their commercialisation.

The fruits are claimed to be aromatic with a distinct appearance, and they've been bred specifically for Australia's growing conditions. The strawberries are the first novel variety developed from a partnership between Hort and the Department of Agriculture and Fisheries, Queensland (DAF QLD).

"Pink and White strawberries are like nothing else on Aussie retail shelves," said Hort Innovation Chief Executive Brett Fifield. "They're exceptional, and so they should be. They are the culmination of years of research, field trials, consumer preference testing and industry engagement."

A partner is now being sought by Hort and DAF QLD in order to commercialise the strawberries and market them to consumers.

Sustainable salad bag wins Dow packaging award

Mondi has taken home a gold award from Dow's Packaging Innovation Awards for developing a sustainable packaging option for salads.

Mondi worked with Les Crudettes, producer of ready-to-eat salads, to meet its sustainability goals of reducing the amount of plastic the brand uses.

The salad packaging is able to keep its contents fresh but uses paper instead of plastic films, which results in a recyclable product. The salad bags are functionally similar to those previously used by Les Crudettes, as they use coatings that provide protection against the grease and water vapour typically found in salads.

"This award is a recognition of our ground-breaking innovation; our bags could revolutionise the ready-to-eat salad market. Working together with Mondi has resulted in hugely reducing the amount of plastic needed," said Géraldine Collet, Marketing and Innovation Director, Les Crudettes.

The Packaging Innovation Awards by Dow are given out in recognition of packaging projects that innovate on the fronts of sustainability, technology and enhanced user experiences. Almost 100 entries were assessed by a team of international judges in order to select the winners.

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Cherry picking

Using fingerprint tech to reduce counterfeits

Tasmanian cherry grower Reid Fruits has announced a dramatic decline in product counterfeiting over the past three export seasons to Asia as a result of a Smart Fingerprint solution developed by Laava, in collaboration with digital printing specialist Peacock Bros.

"Counterfeiting is a massive issue for us, as well as for countless other Australian fresh fruit producers," said Tim Reid, Managing Director, Reid Fruits. "The Smart Fingerprint technology offers a level of secure authentication that will make it extremely difficult for counterfeiters to replicate."

Reid Fruits has been applying Laava's patented Smart Fingerprint technology on its cherry boxes for 20 export markets from the 2019–20 picking season. Reid Fruits went from experiencing potentially thousands of counterfeits per season, to having 10 cases automatically stopped by the Laava platform in 2019–20, and only three in 2020–21 — a 60% reduction over the previous year.

"The fact that Reid Fruits has experienced such a dramatic decline in product counterfeiting activity demonstrates the direct benefit of the Smart Fingerprint technology. Not only does this identify instances of fraudulent activity, but counterfeiters soon realise that their actions will not go unnoticed if they try to copy Reid Fruits' packaging to leverage their strong market reputation with a substituted and inferior product," said Gavin Ger, Laava's CEO.

Laava Smart Fingerprints are digitally printed by Peacock Bros using digital label printing and finishing technologies. The fingerprints use images that are uniquely generated to each individual product, and use proprietary optical scanning technology that is claimed to be more secure than a QR code. When a counterfeit cherry box is scanned by the consumer, a 'Suspected Counterfeit' message will be displayed on the consumer's smartphone screen, alerting them to the product not being authentic, along with support information from Reid Fruits.

In the 2021–22 season, Smart Fingerprints were incorporated onto over 400,000 Reid Fruits cherry boxes bound for 20 global markets. A significant number of those boxes were sent to China, one of the company's largest export markets and also the destination where the Australian business has historically encountered significant counterfeit challenges.

"Chinese consumers in particular are aware of issues associated with product counterfeiting and have a very strong appetite for product information and brand narratives that allow them to connect directly with Australian producers," Reid said.

When consumers scan a Smart Fingerprint, they not only get a guarantee of the product's authenticity, the digital platform also provides engaging content Reid Fruits can use to educate buyers on the product they have purchased, as well as the ability to serve up special offers and social media integration.

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CASE STUDY

'Apeeling' flour for cookies

Banana peels are finding their way into more meals as consumers look for ways to reduce waste and optimise their food usage. The skins are used variously as a binder for bakers, a source of fibre, a replacement for bacon and simply as a chewy ingredient of curries and sauces.

Research has already found that banana peels can impart nutritional benefits as the skins are rich in fibre, magnesium, potassium and antioxidant compounds.

Previous studies have evaluated the use of banana peel flour in cakes and breads, finding that there were nutritional advantages to its use. Now scientists from the Aligarh Muslim University and the University of Houston have looked at how banana peel flour (BPF) can benefit cookies. Their research was published in *ACS Food Science & Technology*.

The researchers made the BPF themselves: they blanched, dried and ground the skins, which resulted in a fine powder to be added to a standard sugar cookie recipe. The BPF replaced varying amounts of wheat flour, with the experiment testing how consumers liked the resulting treats.

Changing the percentage of BPF (with a range of 0 to 15%) vastly changed the flavour, colour and hardness of the scientists' cookies. The more of the flour that was used, the harder the cookie was and although the tough cookies were more nutritious, they weren't as enjoyable for a panel of tasters.

In the end the scientists discovered that the best balance was to use 7.5% BPF. With this quantity of the flour, the cookies were still tender and supple, and had an enjoyable colour and flavour while also possessing good nutritional qualities. They also has a longer shelf life at room temperature.

The researchers said the flour could be used by manufacturers to bolster nutrition in a relatively cheap and reliable way without affecting how consumers enjoy baked products.

Salad filler

Ready-to-eat salads are popular, and changing trends in salad means recipes must continually evolve to capture consumer interest in this competitive segment. Fast, flexible systems are needed to process high-quality, salad-based meals 'on demand' and the relatively short shelf life of fresh salad can be a challenge.

Ishida has extensive experience in packing salad products and filling into preformed trays. Its salad solutions for pre-prepared salads provide good quality and high processing speeds — for even the most complex ingredient mixes.

Packing salad into trays can be a challenge because the salad leaf has a free-flowing volume or 'bulk density' which can be up to three times the volume of the tray. This basically means the leaf will not fit naturally into the confines of the tray, which causes it to spill over easily when it's packed.

The Ishida Rotary Salad filler is an automatic, high-speed equipment solution — which uses state-of-the-art technology to overcome this problem — and makes packing salad easier and more cost-effective.

The equipment automatically fills salad into preformed trays at high speeds with virtually no spillage at the fill point. It can process up to 50 trays/min/lane (on all pack formats) and when combined with an Ishida combination weigher, it fills trays cleanly, efficiently and cost-effectively.

Preformed trays can be fed by hand or via an automatic denesting system. The filler fills the tray via the Ishida combination weigher and tamps (settles) the product twice to ensure it is fully in the tray. Trays are then lowered at the exit of the machine to ensure all product remains in the tray. The equipment has been designed for standard market tray sizes from 140–450 g. Trays can be narrow or wide edge leading, and the solution is suitable for tray sealing, ultrasonic sealing or shrink banding.

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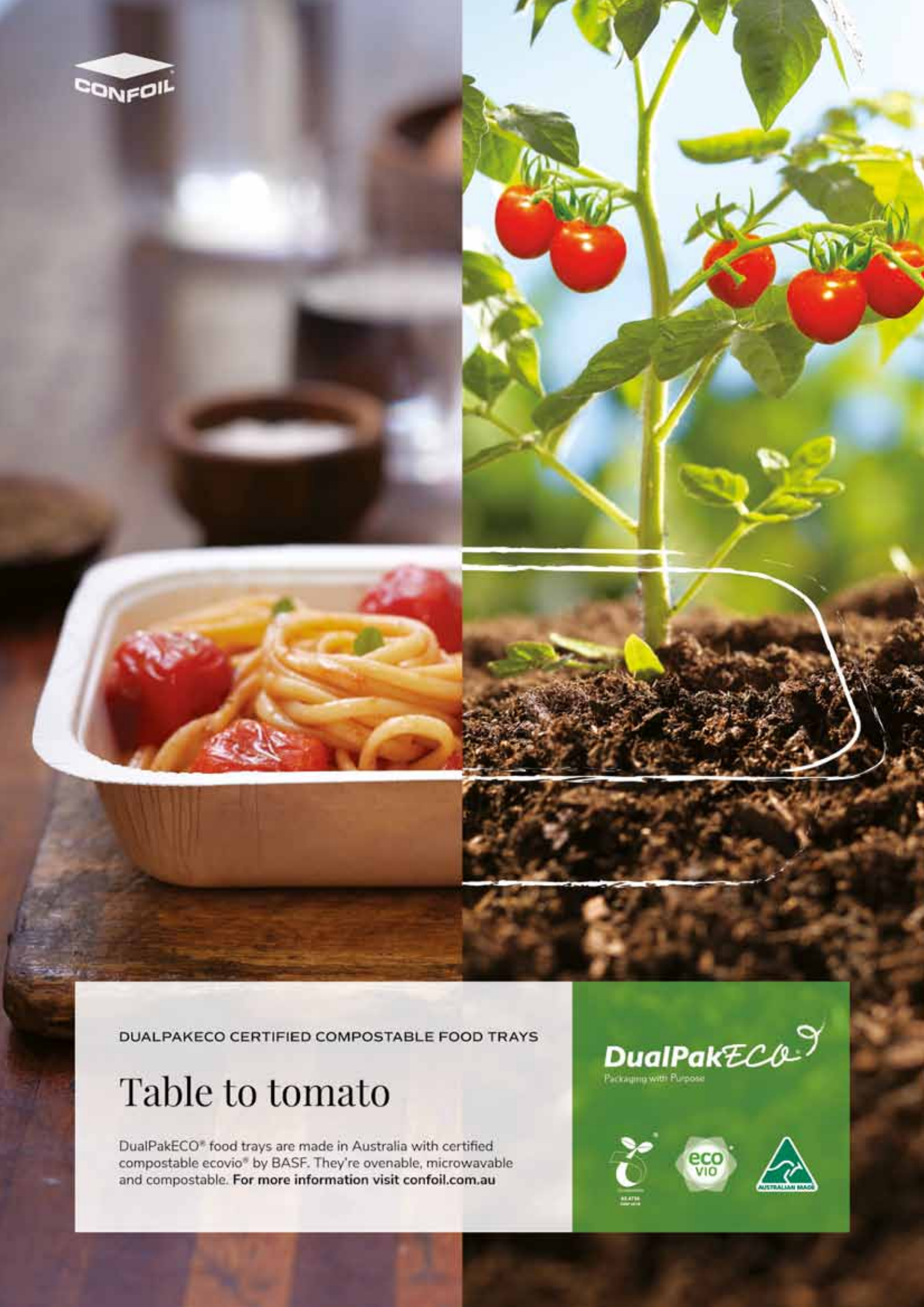
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CASE STUDY

Producing juice from waste

Image: RSCUED

Image: RSCUED

According to a World Wildlife Fund (WWF) study, 42% of all cultivated fruits and vegetables worldwide are thrown away every year — even though they are suitable for further processing. The Swedish company RSCUED wants to change this and has appointed itself a fruit rescuer by turning unwanted fruit into juices, chips and fertilisers.

With the help of a system from GEA, the company can quickly produce high-quality juices from raw materials that would otherwise have fallen victim to waste. It has installed the pre-assembled GEA vaculiq 100 vacuum juicer and the multiCrush milling system on movable skids.

According to Truls Christenson, co-founder of RSCUED: "The advantages of the GEA skid for us were the very short processing time, efficiency, high product quality and flexibility. We need to be able to respond to seasonal supply just as quickly as to fluctuating incoming goods." This is because the company receives the fruit and vegetables sorted out for regular trade via donations from wholesalers, supermarkets, farms and delivery services. Private individuals who have larger quantities from their gardens can also participate in the fruit rescue program.

The juicer with its vacuum spiral filter delivers the desired flexibility. It processes a ton of fruit or vegetables within about 20 minutes and cleaning the system between productions takes just five minutes. Different varieties can thus be turned into juice in quick succession. And it does so with maximum yield: in the first test phase, the company was able to produce twice as much juice compared to its previously used press. With a capacity of up to 1800 L/h, it is now able to easily increase its production in the future thanks to the technology.

With this juicing method, the products do not come into contact with oxygen, and the gentle process can preserve healthy vitamins and secondary plant nutrients.

The dry mash discharged by the vaculiq plant during the production process, together with remaining rejects, is ideally suited as a basis for fertiliser — which can then promote the growth of new fruits and vegetables.

"GEA's overall concept is therefore an innovative and unique solution for us in the field of sustainable, industrial juice production," Christenson concluded.

GEA Group
www.geagroup.com.au

Sustainable packaging trays

Food packaging that delivers optimal barrier performance and high-impact branding while still being sustainable has traditionally proven to be a difficult balancing act. Fibre-based consumer packaging company Graphic Packaging International has introduced a sustainable solution that solves this problem for the food industry with its range of PaperSeal trays.

PaperSeal is a barrier-lined paperboard alternative to MAP and VSP trays, developed in partnership with tray sealing specialist G. Mondini, that has been designed to ensure perishable products stay fresh.

Suitable for packing salads, prepared fruit, cheese, fish, meats, chilled meals and more, the tray is claimed to use up to 90% less plastic than traditional trays.

The liner is easily separated from the board after use, enabling the paperboard portion of the tray to be recycled, contributing to the circular economy.

The trays can be supplied pre-formed or flat, the latter reducing transport costs, emissions and storage space.

The multi-award-winning tray has been adopted by Woolworths for its grass-fed beef packaging, and the retailer won a Special Award in Sustainability at this year's WorldStar Global Packaging Awards.

The solution is available in MAP, VSP and dual-ovenable formats.

Graphic Packaging International Australia Pty Ltd
www.graphicpkg.com

Potato magic

A new potato processing technique has been designed to allow the potato starch to be digested more slowly, which could potentially be of benefit to control the release of dietary glucose. The research findings were presented online at the US event NUTRITION 2022 LIVE ONLINE in June.

For the processing technique, researchers cut potatoes into cubes and blanched them in hot water with a food-grade ingredient for 30 minutes. The ingredient used in the solution has been designated "generally recognized as safe", a standard established by the U.S. Food and Drug Administration for substances considered safe for use in food.

Amy Lin, PhD, the study's principal investigator and lead of the Food Carbohydrate Program of the Singapore Institute of Food and Biotechnology Innovation (SIFBI) at A*STAR, said: "Our team revealed that toggling the accessibility of two digestion enzymes — α-amylase and mucosal α-glucosidase — in the small intestine is a successful strategy to make dietary glucose slowly and continuously release from potatoes."

This process causes a reaction with pectin, a water-soluble fibre in potatoes, creating a gelling structure that acts as a barrier between starch granules and digestive enzymes. This protective layer is porous, and the processing method allows the size of the pores to be controlled to moderate how quickly α-amylase is able to penetrate the potato parenchyma cells and degrade starch to small molecules. Converting starch molecules to glucose relies on mucosal α-glucosidase, which is too big to penetrate those pores. Therefore, the elevation of dietary glucose of processed potatoes depends on the how quickly small starch molecules leach out of parenchyma cells and are digested by mucosal α-glucosidase.

"Without our treatment, enzymes move freely in and out of cells, and starch is quickly degraded by both enzymes and rapidly converted to glucose," Lin said. "The treatment allows the starch to be slowly degraded to prevent a spike in glycemia and then fully converted to glucose to meet our energy and nutritional needs."

The technique is not designed to prevent the potato from being digested, but rather to slow digestion to avoid a rapid increase in blood sugar. Researchers say the modification could also help consumers feel full for a longer period after eating the treated potatoes, helping to avoid overeating.

Researchers report that the method performed well in tests with a simulated digestion process in the laboratory. Treatment increased the fraction of the starch that is considered slowly digestible from 10 to 35% and reduced the ability for the enzyme α-amylase to access starch within the cell walls.

As the process essentially pre-cooks the potatoes, treated potatoes are not shelf-stable but could be frozen and then cooked or further processed for dishes such as roasted potatoes, hash browns, soups or stir-fry, researchers say. Initial taste tests had good results in terms of digestibility and texture.

As a next step, the researchers are preparing to further test impacts on digestibility in a clinical trial. They also plan to study whether a similar approach could be used to improve other staple foods.

Specialty gas product range

The SupaMap Specialty gas product range at Supagas has been developed for use across an array of application areas in food packaging and processing. The colourless and odourless gases are applied to assist with improving food quality, freshness and extension of shelf life.

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Supagas has teams of professional and qualified gas technicians who can design and install a user's MAP gas supply system, including gas regulator supply systems and gas pipelines from the gas to the user's point(s) of use within their facilities.

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Food and beverages manufacturing services guide

Allied Finishes' Food & Beverage Manufacturing Services Guide is a flipbook designed to present its products, services and advice from the floor up for a production area.

With a clear focus on safety and hygiene solutions, all tailored towards the food and beverage manufacturing industry, the guide is designed to help users make an informed choice for complete upgrades and repurposing projects.

The guide covers not only Allied Finishes' project management offerings — from the consulting and auditing stage, through to the management of upgrades — but also how to maximise hygiene and safety efficiency throughout a facility by implementing its hand-picked solutions.

To view the new guide, visit: https://alliedfinishes.com/food-and-beverage-services-guide/.

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www.alliedfinishes.com

Aerator

The EchoStorm, by Gorman-Rupp, is a high-quality range of static venturi aeration devices installed inline on the discharge side of self-priming pumps to introduce dissolved oxygen into the liquid being pumped. The liquid is moved through the internal nozzle creating a Venturi Effect. Air is drawn into the body of the unit, which mixes and oxygenates the liquid.

As these units are mounted on the bank (instead of floating on the water or being submerged in it), access is less complicated and safer, while delivering oxygen transfer outcomes. Unlike other methods of aeration, no rowboats, cranes or tethers are needed by operators to access them for monitoring, maintenance or repair.

EchoStorm units are used to reduce BOD, COD and NH_3, and are also used to control/eliminate algae growth and to strip substances with low Henry's Constants such as CO_2 and VOCs.

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Hotmelt adhesives

Henkel's TECHNOMELT Supra Cool Adhesives are the latest offering in energy-efficient, low-temperature, hotmelt adhesives for the packaging industry. They are applied at up to 40% lower temperatures, compared to conventional hotmelts, and have a wide range of applications in a variety of industries.

Typically, hotmelt adhesives are applied at high temperatures (usually 177°C), which can cause health and safety hazards, in addition to high energy consumption. Further, traditional hotmelt products are prone to nozzle clogging due to charred fragments, resulting in increased machinery downtime and operational cost which impacts the efficiency of manufacturing.

As TECHNOMELT Supra Cool Adhesives are applied at lower temperatures, they help to improve production efficiency, increase worker safety, decrease maintenance costs and reduce businesses environmental impact.

The products require less energy to melt and enable manufacturers to reduce their brand's carbon footprint along the lifecycle of the adhesive. At the same time, they are easy to apply and cure quickly. This, combined with the minimised maintenance intervals, results in improved overall performance of the packaging line.

Henkel Australia Pty Ltd

www.henkel-adhesives.com

Static elimination air gun

EXAIR's Intellistat Ion Air Gun is a handheld and lightweight solution to static elimination in clean processes or sensitive assembly work such as scientific and electronic test facilities, laboratories and clean rooms. The Intellistat is designed to consume minimal compressed air while simultaneously delivering precise blow-off and high static decay rates capable of reducing 1000 V to less than 100 V in under 1 s at a distance of up to 600 mm.

The Intellistat is activated with a comfortable, ergonomic short throw trigger that requires minimal effort. The efficient, low-voltage transformer converts 120 V to 24 V to ensure user safety, while also utilising an EXAIR-engineered air nozzle to maximise efficiency and meet OSHA requirements for sound level and dead-end pressure. It is equipped with a red/green LED to signify proper functionality, as well as a hook for easy hanging and storage. The Intellistat's static-dissipative polycarbonate construction assists its usefulness in applications requiring non-conductivity such as circuit board or electronics manufacturing or testing. It produces clean, ionised compressed air essential for removing dust, static or particulate contaminates in sterile environments such as laboratories, clean rooms or scientific testing.

UL listed and CE compliant, the Intellistat is a low-maintenance solution that is an addition to EXAIR's entire Gen4 static eliminator product line including Super Ion Air Knives, Ion Air Cannons, Ion Air Guns, Ionizing Bars and Ionizing Points.

Compressed Air Australia Pty Ltd

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Signal columns

Located on machines or in automated processes, signal towers are important visual aids for controlling complex processes.

APS Industrial has introduced a range of Siemens SIRIUS signalling columns to make human–machine communication more straightforward.

More than just an on/off light, the signalling columns are designed to ensure optimal visibility of plant operations and in turn, increase its availability. The units signal different machine states and offer a variety of signalling levels and functions for more flexibility.

The wide range of signalling variants includes: an individual mode to activate each of the light segments separately; multicolour LEDs, allowing more than 1 million colours to be set; and different light effects: continuous, blinking (3/2/1 Hz), flashing (1x/2x/3x) and rotating light (70 RPM).

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Metal detection, X-ray — or both?

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Both metal detection and x-ray inspection systems play key roles in product inspection for food and pharmaceutical companies. Choosing the right technology requires consideration of many factors — starting with the application.

Deciding whether a metal detector or an x-ray system is the best choice for your product inspection needs is not as straightforward as it might seem. The application is the starting point, but several factors can complicate matters. Consider this scenario, for example: you need to identify metal contaminants, but the product is packaged in aluminium foil. A metal detector will see the foil itself as a detectable contaminant, while an x-ray system sees straight through the aluminium because it is a low-density metal, allowing it to get a better view of any contaminants inside. X-ray will be the better choice, despite the potential contaminants being metal.

Both technologies have their sweet spots, as we will see, and a range of factors must be considered, including, the nature of the product, product size, the fill process, the potential contaminant types, the packaging, constraints on finance and physical space, and the range of additional quality control checks needed.

Metal detection

Modern metal detection systems can identify all metals, including ferrous (such as chrome and steel) and non-ferrous (brass and aluminium, for example), as well as both magnetic and non-magnetic stainless steels. They work through a system of coils, charged with an electrical current, to create a balanced electro-magnetic field. If a product passing through this field contains a metal contaminant, the magnetic field is disturbed, and this disturbance is interpreted by sophisticated electronic circuitry and software algorithms.

In order to perform as required, the detector must be stable and rigid enough to eliminate any movement of the coil system, as even tiny vibrations can cause rejection of perfectly good products. Airborne electrical noise can also be a problem, so it is essential the metal detector can operate reliably in a factory environment.

The product effect

Product effect is a major consideration, which can lead to high false reject rates. Products with a high moisture content, or those that are salty or acidic, are conductive, and as they pass through the metal detector will emit a signal (i.e. the 'product effect') that disturbs the detection field. Other factors that contribute to product effect are product temperature, format, consistency, size and shape and orientation on the production line. Metal detection is especially suited to dry products, where the lack of moisture means the product is non-conductive, and therefore does not generate a significant 'product effect'.

Manufacturers can eliminate the impact of product effect by installing a high-quality metal detection system that uses a combination of multi-simultaneous frequency operation and software algorithms to optimise performance and reduce the possibility of costly false rejections. This technology will also result in the system having the right level of sensitivity to pick up signals from very small metal contaminants irrespective of the application.

In addition to packaged products, other applications where metal detection can be used include loose, unpackaged products, pumped products such as liquids, pastes and slurries, bulk powders or free-flowing solids under gravity-fall conditions. In addition, tall, rigid containers such as bottles, jars and composite containers can also be inspected, although in these applications, inspection would need to take place before a metal cap or closure was applied.

Type of packaging

Metal detectors using multiple frequencies simultaneously or operating at a single low frequency can usually be used with products packed in metallised film packaging, depending on the film thickness. If aluminium foil packaging, such as foil wraps or products trays, is used, then standard balanced coil metal detectors will not be suitable.

X-ray Inspection

X-ray inspection systems have the capability to detect a wider range of contaminants than metal detectors, including metal, glass, stone, calcified bone, high-density plastics and rubber. They can also perform a range of additional in-line quality checks on food and pharmaceutical products, including measuring mass, counting components, identifying missing or broken products, monitoring fill levels, detecting product trapped within the seal and checking for damaged product and packaging.

The technology works by generating an x-ray beam that passes through a product for inspection and onto a detector. Some of the x-ray beam is absorbed by the product and any contaminant present, and because most contaminants are denser than the food and pharmaceutical products that are being inspected, the contaminants usually absorb more of the x-ray energy. This difference in absorption becomes apparent in an image generated by the x-ray system, which is then compared to a pre-determined acceptance standard for acceptance or rejection.

However, while X-ray can easily detect these dense contaminants, with low density contaminants such as aluminium, insects, wood and polyethylene film, detection by x-ray is not possible.

Nevertheless, x-ray systems are able to inspect a wide range of different product types, including pumped products such as slurries, fluids and semi-solids, bulk, loose products, jars, bottles and cans, and packaged products, including those packaged in foil or metallised film.

Which technology?

The process of choosing the right technology for product inspection means going back to the application and carrying out a Hazard Analysis and Critical Control Points (HACCP) or Hazard Analysis and Risk-Based Preventive Controls (HARPC) audit. This will identify what risks of contamination there are with your application, and what types of contamination are likely, as well as providing a greater understanding of the requirements of any customer or compliance related issues.

It is rarely a clear-cut decision, sometimes the right answer might be to deploy both.

Consider these examples:

Aluminium contaminants in non-metal packaging: as a lightweight, low-density metal, aluminium is hard for x-ray to detect as a contaminant; metal detection is generally the better solution.

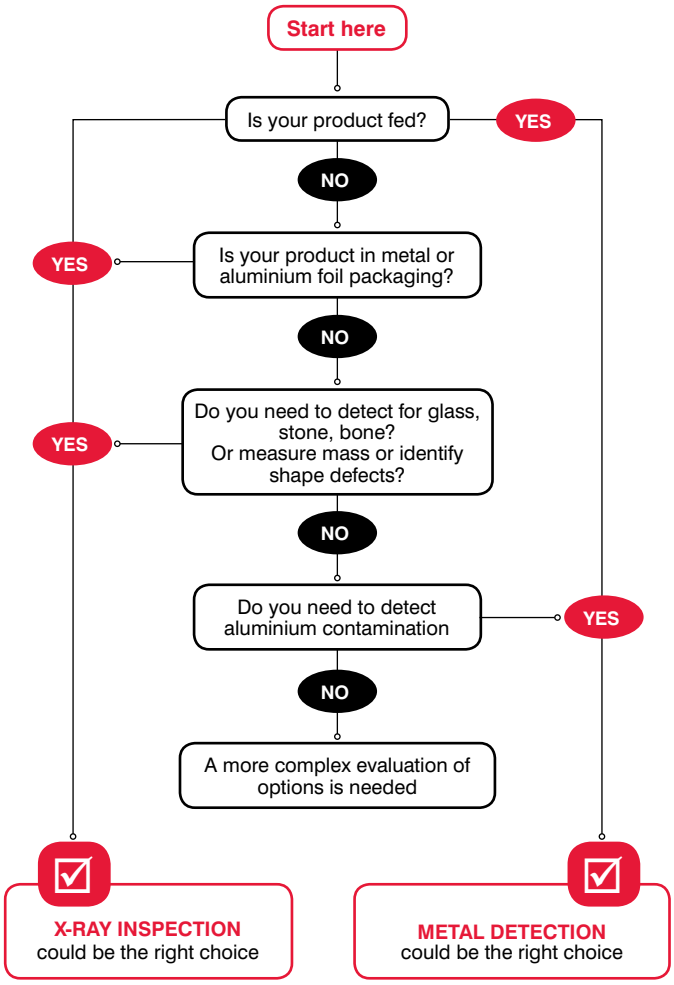
Metal contaminants in aluminium foil packaging: metal detection will be unable to spot the contaminants amidst the foil packaging unless it is a metallised film; x-ray is generally the better solution.

Metal contaminants in gravity-fed products: x-ray does not work well with falling, accelerating objects that do not have a uniform direction of travel; metal detection is the only viable solution.

Metal contaminants in non-metal packaging: this can be complicated. Metal detection systems are more cost-effective but if the product is very large, a bigger detector aperture will be needed, which can reduce the sensitivity of the detector. Multi- and high-frequency technology can help, but a bigger metal detection system will be required. X-ray power can be increased for larger products, but the cost of installation increases as size increases. If there is a need to protect against non-metallic contamination, the choice will swing towards x-ray.

Non-metal contaminants in any packaging; performing additional quality control issues: x-ray inspection is the only solution, and the additional QC checks can justify the additional cost of the technology.

Fast/variable line speeds; situations where there is limited space: metal detection (at 400m/min) is able to inspect at faster speeds than x-ray (120m/min), so may have the advantage if other aspects of the application suit metal detection better. Metal detectors are also less space-hungry than x-ray, so depending upon the application, might be more suitable in factories with limited space.



Making it simple

Metal detection or x-ray? The flow chart above is a good starting point for identifying the right answer. However, there is an area of indecision where the application is not packaged in foil, and metals other than aluminium are potential contaminants. Here, a more complex evaluation of options is needed.

There may also be situations in which more than one type of product inspection system is desirable at different Critical Control Points on the production line. For example, it may be wise to install a metal detector early in the processing line to remove large metal contaminants that could, if left present, cause damage to machinery downstream, or fragment into smaller and less easily detectable pieces. Further down the production line, an x-ray machine could then check for non-metal contaminants, as well as carrying out further quality control checks, while a second, and more sensitive, metal detection system at the end-of-the-line could be used to make a final inspection for smaller metal contaminants.

In closing, while factors such as space limitations, total cost of ownership and productivity targets are important, it is worth reiterating that the first step in choosing a metal detector or an x-ray system for product inspection is to consider the application — this is where the assessment begins.

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The generation and application of clean, food-grade compressed air is a vital part of most manufacturing and handling processes. It is even more critical in the food processing industry where the slightest contamination can be a very expensive and disruptive problem.

Many food manufacturers regard compressed air merely as an energy source in their production processes. As a result, the medium is not given sufficient consideration in the measures for hazard analysis and risk minimisation.

Typical applications for compressed air in the food industry are processes such as cleaning, filling, mixing, spraying, cutting, transporting and packaging. During these different work steps, depending on the application, there is direct and/or indirect contact between the compressed air and the product.

New PMV (Permanent Magnet Variable Frequency) rotary screw air compressors use special FDA-certified, food-grade, synthetic lubricants to eliminate the chance of contamination through the compressed air plant and line to deliver clean, dry air power at the application end.

Developed by Kaishan, these new-age compressors are also suitable for food manufacturers wanting to reduce the cost of compressed air generation with a low-maintenance machine.

Kaishan's range of Permanent Magnet Rotary Screw Compressors is claimed to deliver up to 50% energy cost savings over conventional compressors with equal or greater output.

From 250 to 15 kW, these advanced machines use systematic optimisation of the airends through permanent magnet drive motors and variable speed drive technology to achieve higher efficiency at all operating speeds. This also results in good bearing life and long-term operation.

The combination of advanced PMV 2-stage technology and variable speed control means the system only operates at the level required to generate air for a given application at any time from stop to maximum output. This controlled flexibility is suitable for food processors with variable needs in compressed air power for a variety of manufacturing, processing, packaging and handling operations.

Kaishan Compressors has experience in providing food-grade air compressors and systems for use in processing, conveying, packaging and other operations. Custom-designed and -made compressors include marine-based machines for aquaculture and specialised models for grower quality control lines.

A leading Australian egg brand has recently installed a Kaishan 75 kW PMV compressor to run its processing, grading and packaging facilities ensuring efficient, contaminant-free operation with energy cost savings compared to the fixed speed machine that was replaced.

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With Han F+B, HARTING has created a range of connectors that are specially designed for the requirements of the food industry. Smooth surfaces make it harder for bacteria to accumulate. The hoods, housings and seals are robust and protect the internal contacts against hose water and aggressive cleaning agents, which are certified by Ecolab and have FDA 21 approvals. The water jet from high-pressure cleaners cannot penetrate the hoods/housings when closed.

The connectors offer multiple benefits. They can help to reduce machinery downtime and maintenance; the connectors are faster in plugging compared to wired solutions; one type of hood or housing can be used for different sorts of transmission in the industrial lifelines of data, signals and power; finally, their use enables the modularisation of machines and plants as well as the introduction of future-proof concepts.

The connectors use a design based on standards ISO 14 159 and DIN EN 1672-2. They can be used in machines in the food industry, in bottling plants and for packaging equipment. In food processing zones they can be used in interfaces inside the splash zone and are resistant to chemical cleaning agents even at high cleaning density.

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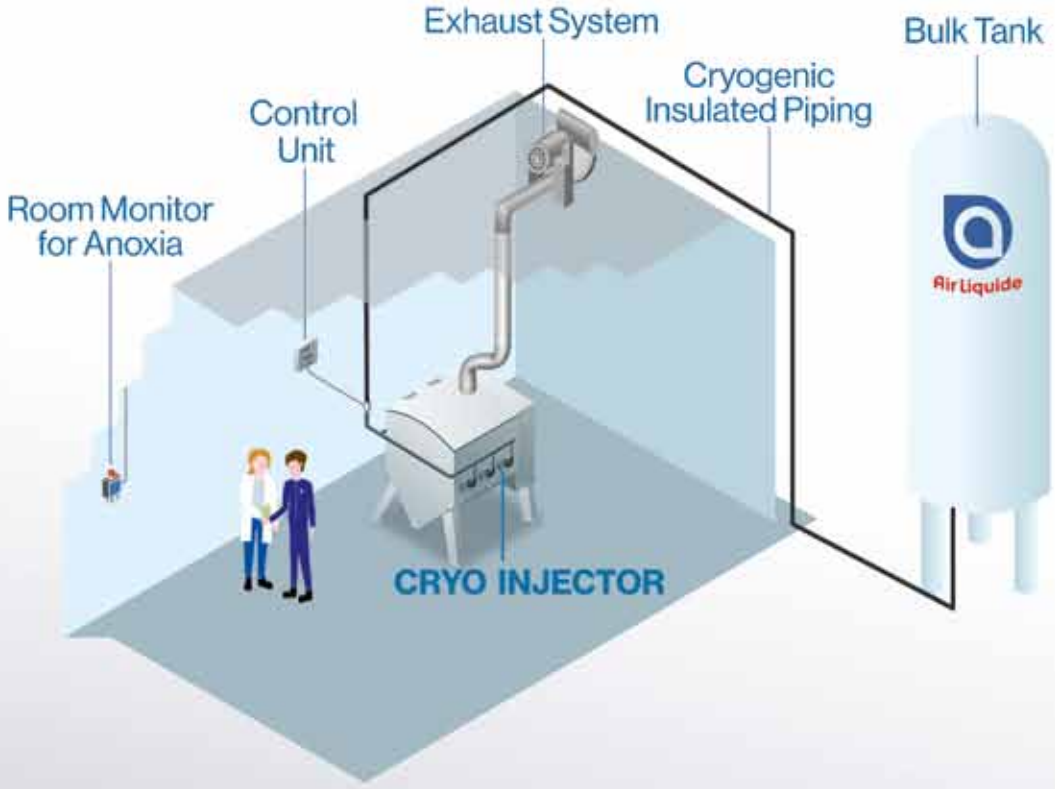

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The importance of evaporation in CBD extraction

Matt Hale, International Sales & Marketing Director, HRS Heat Exchangers

Functional health and medicinal products containing CBD (cannabidiol) are growing in popularity, and the Australian market is now worth more than $58.6 million a year[1]; however, traditional extraction processes do not always capitalise on the latest evaporation technology.

The current growth in the legal cannabis products market is exceeding even industry predictions. It has been estimated that, with suitable policy support, the market could grow by 32.7% a year.

What is CBD?

CBD is a chemical extracted from hemp and marijuana plants, and while it is an active ingredient in the cannabis drug, it does not cause the psychoactive effects associated with THC, which is also found in the plants. Although medical studies are inconclusive, some of the claimed benefits of CBD include reducing inflammation, improving relaxation and focus, and slowing down digestion. As such, it is often used to treat issues such as anxiety and insomnia, as well as some types of seizures and digestive complaints.

How is CBD extracted?

There are several different techniques for extracting the CBD from the hemp plant, although most of these require the use of solvents which are effective at separating the CBD from other chemical compounds found in the plant. Once the CBD has been extracted, the solvent is evaporated off leaving pure CBD oil.

Some methods use supercritical carbon dioxide in a closed-loop extractor to extract the CBD under pressure, resulting in a liquid mixture of CO_2 and CBD, which must then be separated by evaporation, but a step involving alcohol solvents is usually still required. For this reason, the use of liquid solvents based on alcohols (ethanol, or isopropyl alcohol (IPA)) or hydrocarbons (butane or propane) are also sometimes used and are much simpler and more straightforward. However, unless the evaporation step is carried out correctly, some alcohol residues may remain in the CBD oil mixture.

It is important to remember that even where CO_2 extraction is used, a further stage involving alcohol solvents will still be required. Each method has its own benefits and drawbacks and the best method for one manufacturer may not be right for another.

Once the CBD oil has been separated from the solvent, it is usually refined and distilled to produce pure CDB oil which is free from other compounds, such as THC, waxes and lipids. The exact nature of this refining process will impact on the chemical profile of the resulting CBD product and depends on the extraction method used.

Considerations for evaporation

To maintain the characteristics of the CBD oil, low-temperature evaporation techniques must be used, often involving separate vacuum extraction systems to reduce the boiling point of the solvent.

At a small scale, laboratory-based rotary evaporation systems (with or without vacuum extraction) may be suitable — and indeed are one of the most common systems used today. But as the market grows and producers need to scale up production, they are likely to look to the type of low-temperature evaporator used in pharmaceutical or food production. In addition, maximising solvent recovery with such a system requires a high level of vacuum control and so often requires skilled oversight of the process.

Multi-stage falling-film evaporation processes are highly efficient and allow much higher throughputs. As a continuous system it does not need to be disassembled and cleaned between each run and cleaning-in-place (CIP) is used to maintain hygienic condition and prevent contamination. Having different temperature regimes in each evaporation stage improves ethanol removal and the unit is highly efficient as each evaporation stage is held at a lower pressure than the previous one.

HRS provides equipment which meets the highest standards of hygiene and traceability and is well placed to help the rapidly growing CBD industry fulfil its market potential.

1. https://www.grandviewresearch.com/industry-analysis/australia-legal-cannabis-market

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Tackling production challenges with predictive maintenance

Food processing and food packaging are uniquely fast-paced environments, where the margin for error is slim to none. Particularly in the tightly regulated world of food and beverage production, a breakdown in the production line can result in a whole batch of products being discarded.

Manufacturers looking to avoid food waste and costly production disruptions have looked to machinery data and predictive maintenance tools as a way to gain greater insight into what is happening on the factory floor, perform essential maintenance when it is required and anticipate and prevent breakages before it is too late.

"Once you give manufacturers involved in food and beverage manufacturing the ability to visualise data, everything changes," said Jim Wallace, Sales Manager at Balluff Australia and member of Industry 4.0 advocacy group Open IIoT. "It gives them greater control over the production process, and once that data visualisation is paired with predictive maintenance, efficiency and revenue gains are realised."

What is predictive maintenance?

This proactive approach uses innovative diagnostic and sensing technologies to monitor the condition of equipment and predict when maintenance should be performed. Predictive maintenance tools such as infrared thermography (detecting high temperatures), acoustic monitoring (detecting leaks), vibration analysis and oil analysis alert manufacturers of potential failures.

"Essentially, predictive maintenance uses data to estimate when a machine might fail (causing costly disruptions) so that maintenance can be scheduled before the point of failure, to reduce downtime," Wallace said. "Another benefit is that it gives manufacturers the ability to schedule maintenance when it is most cost-effective and does not interfere with production, as well as helping to extend the equipment's lifespan."

As food and beverage manufacturing is a tightly regulated industry, the strictest hygiene and sanitation standards must be upheld. The need for heightened cleanliness can create a wet environment, which can easily damage important equipment. "Add on the fact that machines deployed in the food processing

industry are highly complex and challenging to maintain due to the connected system of conveyors, electronic and electrical equipment, and the heightened risk of machinery breakdown becomes abundantly clear," Wallace said.

Impact of breakages in food and food packaging production

Poor maintenance results in unexpected breakages, and even worse — if a machine has missed multiple maintenance cycles due to a lack of monitoring, it may be broken beyond the point of repair. The *Wall Street Journal* estimates that unexpected downtime costs manufacturers an estimated $50 billion annually and reduces plant productivity by between 5 and 20%.

In the food industry, these consequences are magnified. Food processing equipment is working with delicate products which have a variety of time requirements to ensure health and safety standards are met. Any delays in the production process may result in spoiled goods. Broken machines are unsafe and carry the threat of contaminating food and beverages or damaging food packaging. If any contamination or damage occurs, manufacturers will need to dispose of the goods and restart the production process from scratch leading to food waste, missed deadlines and additional costs incurred.

"While predictive maintenance is key to predicting and ultimately avoiding these obstacles, manufacturers in this industry will realise additional benefits when these technologies are combined with data visualisation tools," Wallace said.

Data visualisation key to remaining competitive

Data visualisation refers to presenting data in a visual context such as a chart or graph so that it can be more easily understood. In food and beverage production, this is made possible by adding sensors to machinery to monitor what is going on on the factory floor. By using IoT connectivity, this information is shared as data that manufacturers can access in real time and use to make decisions.

"Using sensors to transmit real-time data can alert employees when equipment malfunctions so that they can make the necessary adjustments to avoid goods from becoming contaminated or destroyed. Data insights allow employees to adjust equipment in real time to get it back to normal functionality, reducing the need to shut down production completely," said Richard Roberts, Industry 4.0 Operations Manager at ZI-Argus and fellow member of Open IIoT.

In the food and beverage industry, where contamination is always a risk, data-driven insights have further advantages. If there are reports of consumers getting sick from products, manufacturers can check machinery data to trace back the food production line and determine the source of the contaminants. This gives them the facts necessary to decide whether or not a product should be recalled.

Combining predictive maintenance with data visualisation helps to boost equipment reliability, quality standards and production.

What's holding manufacturers back?

With all of these benefits, why is predictive maintenance not more widely adopted by food and beverage manufacturers?

"Compared to other manufacturing industries, the food and beverage sector has historically been a late adopter of digital trends. This is often because of the complex manufacturing processes needed to comply with the strict safety and hygiene standards of this industry, which may result in manufacturers being more hesitant to adopt new solutions," Roberts said.

The initial cost of implementing predictive maintenance and related Industry 4.0 technologies on the factory floor is a factor, but Roberts reassures manufacturers that these tools have not only become much more affordable in recent years, but that they will soon pay for themselves in gains realised. "Predictive maintenance is a cost-effective strategy as it reduces downtime and helps prevent food waste.

"Smart connected systems give food and beverage manufacturers a competitive advantage, boost product quality and safety, increase efficiencies and increase productivity — there is very little to lose by implementing them," Roberts said.

Open IIoT
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Bega signs deal with SXiQ for tech upgrade

Bega Cheese has partnered with SXiQ to deliver a technology migration as part of its acquisition of Lion's Dairy & Drinks business back in late 2020. The acquisition has seen well-known brands such as Big M, Dare, Pura, Dairy Farmers, Farmers Union, Masters, Yoplait, Juice Brothers and Daily Juice come under the Australian dairy and food company's wings.

As part of this deal, which cost Bega Cheese around $560 million, the technology was required to be transitioned within 12 months. Bega Cheese required the acquired Lion Dairy and Drinks applications, data and processes to be transitioned into its existing or expanded infrastructure. Furthermore, the acquisition principles were based on an application and data separation, with core infrastructure remaining with the seller.

For the Chief Information Officer of Bega Cheese, Zack Chisholm, this project presented both challenge and opportunity — given the integration was to occur whilst both Bega Cheese and the LD&D business were fully operational and required minimal business disruption. Complexities included replacing remote site hosting infrastructure, transition of core business processes and systems, deploying new cloud infrastructure and the migration of previously Lion hosted desktop and cloud-based applications to the Bega Cheese network. On the other hand, a number of opportunities presented, and the LD&D business was able to modernise a number of core-platforms.

SXiQ, which is owned by IBM, was approached as a key partner to support the migration and integration work for core applications. In addition, this partnership led to the successful infrastructure migration and transition of 31 physical sites performing production, distribution and administration duties, ensuring minimal disruption to the business operations of both the LD&D and the Bega Cheese businesses, within the required completion time of 12 months.

SXiQ, together with the Bega Cheese IT team, developed a plan which was underpinned by some core principles to ensure the migrated and integrated systems performed equal to or better than the state they were in prior to the acquisition.

SXiQ partnered with Bega Cheese on end-state design, migration planning and ultimately execution for significant parts of the program, with the scope encompassing:

Migration of mission-critical applications, databases and their associated backups

- Modernisation of numerous applications, delivering improved system performance and security compliance.
- Implementation of a prod and non-prod AWS accounts and Landing Zone to house all LD&D workloads, which also included the implementation of a continuous integration and continuous deployment toolset and workflow built on Cloud Formation, Ansible, Jenkins and GitHub.
- The migration of remote site systems from 31 physical sites across almost every state and territory in Australia, which included 13 production sites.
- Integration of mission-critical applications and users into Bega Cheese's core security and identity platforms.
- Cloud cost optimisation strategies to ensure intelligent and efficient consumption of cloud resources to support the newly acquired business.
- Uplifting the cloud ops team to ensure Bega Cheese IT incorporates true DevSecOps into its core capability supporting this new platform.

A project of this scale, complexity and duration required strong governance so both Bega Cheese and SXiQ immediately mobilised a joint Integration Management Office (IMO) with both leadership, architecture and project teams. The IMO and project teams ensured transparent, efficient and closely integrated delivery of the program, amid the fast-moving BAU landscapes. In parallel, delivering timely, coordinated organisational change and communication ensured the successful wave-by-wave activation of systems. This also meant employees were well supported in an emerging One Bega culture, so team members were aware, prepared and assisted through the changes, resulting in positive experiences.

Fast forward 12 months with the entire scope delivered, SXiQ said the project is delivering improvements to application performance and systems availability.

SXiQ CEO John Hanna said, "Our experts executed deep analysis, strategic thinking and detailed planning to ensure the successful migration of Lion to Bega Cheese's existing infrastructure.

"By uplifting infrastructure, cloud management tooling and practices, SXiQ has enhanced management of Bega Cheese's cloud assets, improving consistency, security and reducing time to deploy cloud infrastructure in the future."

SXiQ
sxiq.com.au

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All about your flow™

Compostable paperboard packaging

Australian food packaging manufacturer Confoil and BASF have developed a certified compostable, dual ovenable paper tray for packaging of ready-to-eat meals.

The DualPakECO trays are made of lightweight paperboard and coated with BASF's biopolymer ecovio PS 1606, a partly bio-based and certified compostable biopolymer developed for coating food packaging made of paper or board. Performance regarding processing, sealing, printability and strength is claimed to be on same level as conventional PET food trays.

The trays are certified according to the Australian standard AS4736-2006 and food contact approved according to international requirements. They can be used for ready-to-eat meals like lasagne, curries and stir-fries available as cold or frozen in supermarkets as well as for catering and take-away from restaurants.

The trays are designed to extend the end-of-life options for paper-based packaging by being organically recyclable: they can be commercially composted with the organic waste collected in organic waste bins. Thus the new packaging solution supports organics recycling of food residues and food-soiled packaging, which increases the diversion of food waste from landfill and incineration.

This certified compostable solution provides an alternative to conventional PET packaging for ready-to-eat meals: the trays can be heated in conventional ovens and microwaves, can be chilled or frozen. They show good barrier properties against fats, liquids and odours, helping to preserve freshness and flavours.

Composting trials have shown that the trays break down into water, carbon dioxide and nutrient-rich compost within four to six weeks under commercial composting conditions.

The paperboard can easily be formed and allows for printability. It is lightweight yet rigid enough for in-line production facilities. It also offers secure sealing across a variety of film substrates and machinery. The paper tray is coated with ecovio PS 1606 in a mono-layer extrusion process. Due to its good migration barrier properties the BASF biopolymer also enables the use of recycled paper in food applications.

The packaging solution is suitable for organics recycling such as the Australian FOGO (Food Organics and Garden Organics).

Confoil Pty Ltd

www.confoil.com.au

High-temperature IEPE sensors

The Dytran Instruments 3055D and 3056D high-temperature IEPE (integrated electronics piezo-electric) sensor model series feature true base isolation.

The 3055D7-D10, D13, D14, and 3056D9-D14 models feature an extended operating temperature range of 163°C for use in higher temperature testing environments.

The models include the standard performance features found in the original series. The 3055D and 3056D families are characterised by low noise, high resonant frequencies (>25 kHz), a tight sensitivity specification of ±5%, and a frequency response of 1 Hz to 10 kHz. The welded titanium housing yields a durable, yet lightweight product suitable for modal response and shaker control.

Both sensor series feature a wider hex design for ease of installation.

The 3055D series features a side 10–32 radial connector, while the 3056D Series features a top 10–32 axial connector.

Suitable for many general-purpose applications, both series have optional TEDS capabilities available.

Metromatics Pty Ltd

www.metromatics.com.au

Electromagnetic drives for production lines

Enmin's new generation drives are designed to energise production lines.

Manufactured in Australia, the electromagnetic drives offer a unique handling method for controlling the flow of food products, ingredients and bulk material. Products can be screened, sized or metered to ensure a smooth, uniform and fully variable flow.

With minimal moving parts, next to no ongoing maintenance and low energy consumption, the drives can provide a low-cost method of product handling. They are designed and constructed to meet the rigorous requirements of the food and pharmaceutical industries such as maximum hygiene, ease of cleaning and continuous 24/7 operation.

The cyclic operation is controlled from a range of electronic controllers that will vary the feeding rate in a manner to suit the specific application enabling high-speed filling. The controllers are available in different enclosures or as standalone for incorporation into central panels.

With reduced energy consumption, Enmin's new generation drives are designed to ensure a higher conveying speed can be achieved to match the performance of other production line components.

Installation is relatively easy and straightforward, with a wide range of drives available to suit most requirements and applications. The drives are available with either an epoxy or a recently introduced Teflon coating. The Teflon coating provides greater cathodic protection thereby eliminating surface rust, making it a suitable surface finish for a food environment.

The Teflon is fully FDA approved; its 40-micron surface coating means that it doesn't suffer from chipping that can occur on painted models. This makes it suitable for use on mobile equipment that is susceptible to knocks and bangs as it is moved.

In addition to the food industry, the electromagnetic drives are suitable for any industry that handles dry bulk material, processed products or parts.

Enmin Pty Ltd

www.enmin.com.au

Inline vacuum filler

JBT Corporation's PLF International has launched its all-new PLF Virtus Inline Vacuum Filler. The new range of linear vacuum filling machines is designed specifically to handle a wide range of milk-based nutritional powders including infant formula and specialised medical nutrition.

Developed by PLF's team in the UK, the solution delivers up to three times higher throughput per head than previous machines with its new patent-pending nozzle design.

The design — offered at 1, 2, 3 and 6 head models with speeds of up to 180 cans/min — results in reduced changeover and cleaning times, maximised yield and reduced operational costs for the users.

Compared to auger filling systems, PLF's vacuum filling system has no moving parts in contact with the product, which eliminates any risk of product contamination, as well as the possibility of powder breakdown during filling.

JBT

www.jbtc.com

Ingredient cutting machine

GEA's CutMaster Generation 3 bowl cutter is suitable for cutting, mixing and emulsifying. It can be used for preparing different kinds of sausage, a wide range of poultry, fish, plant-based, vegan and vegetarian products as well as processed cheese. With a small footprint, it comes with integrated AC drive technology to increase the machine's flexibility.

A reinforced machine frame and knife shaft bearing arm is designed to reduce vibration. The product's hydraulic unit ensures more convenient adjustment and simpler maintenance.

On the hygiene front, improvements span a reduction in hidden voids, new door and cover seals as well as an additional access flap — all of which contribute to a cleaner environment and easier washdown. The machine meets 3-A sanitary standards and optional hygiene packages are available to meet customers' requirements.

The unit is equipped with an upgraded control system, including a new standardised user interface employed on all other GEA equipment, such as mixers and grinders. The software has features such as heating and cooling options as well as an optional offline recipe editor which lets customers export recipes to a PC for adjusting before returning them to the system.

The optional PerformancePlus maintenance system uses condition monitoring to measure machine performance. With this information, users can plan maintenance schedules, improve machine uptime and increase productivity.

The machinery is available with or without a vacuum. Using a vacuum helps create a finer product with a more satisfying taste and colour as well as fewer air bubbles and jelly deposits, contributing to a longer shelf life. The product comes in four sizes — 200, 325, 500 and 750 L — and different performance levels, to be used in varying functions.

GEA Group

www.geagroup.com.au

Discharge station

The Syntegon Distribution Continuous Slide (DCS) is a flexible discharge station for round cookies, crackers and biscuits. The modular discharge system consists of one or more stations arranged one behind the other. These are equipped with belt slides for gentle handling, minimising mechanical stress and thus reducing product breakage and loss. Providing pack-style flexibility, the unit distributes cookies onto belt legs for packing them flat or on their edge into pile, slug or tray packs. Furthermore, the system's guard-free design provides operators with unrestricted process visibility, safe accessibility and easy cleaning.

Cookies, biscuits and crackers are taken from the cooling conveyor and are continuously distributed to the leg belts. They are neither pushed nor dropped but slide over the belts and are thereby protected from any mechanical stress. This reduces product loss and leads to efficiency gains, especially when handling sensitive products.

The higher the speed of the belt slide, the more cookies are transferred to downstream leg belts by the DCS. On the individual legs, a further belt slide arranges the straight product stream into an S-shape. This arrangement ensures the cookies and crackers are evenly distributed across the entire width of the belt, preventing them from wedging or overlapping. A homogeneous product stream is created, providing a constant feed to the packaging machine.

Other features include flexibility for varying formats and changing production output, and easy cleaning thanks to the vibration-free design.

Syntegon Technology Singapore Pte. Ltd
www.syntegon.com

SIRIUS industrial control — control, command & monitor

With growing pressure on industry to reduce time-to-market and implement more flexible and efficient production processes capable of delivering at least the same quality levels, quality and reliable product has never been more important. As well as speeding up development operations, businesses also must become more cost-effective to keep pace with competitors. What is more, stricter standards and guidelines are making such challenges even tougher.

With the SIRIUS range of Industrial Controls, APS Industrial and Siemens offer you a unique and comprehensive portfolio that helps you overcome all of these challenges whilst being suitable for every industrial control application.

The range includes everything you will require to control and protect, optimally start motors, command signal and protect, as well as monitor and respond. Below are two featured products within the signalling portfolio.

SIRIUS 8WD46 signal columns

On machines or in automated processes, signal towers are important visual aids for controlling complex processes. Now, so much more than just an on/off light, APS Industrial are proud to bring to market a new range of Siemens SIRIUS signalling columns that revolutionise human-machine communication.

Thanks to their professional signalling technology, the new compact 8WD46 signal column ensures optimal visibility of plant operations and in turn, increase its availability. The new-to-market units reliably signal different states and offer a variety of signalling levels and functions for never-before-seen flexibility.

They can be flexibly designed with continuous, flashing, strobe and all-round light as well as acoustic elements. Whether in modular or compact design — they are easy to install and extremely resistant to shock and vibration.

The wide range of signalling variants include:

- The individual mode allows to activate each of the segments separately
- Multicolour LEDs allow to set more than 1 M colours
- Different light effects: Continuous, Blinking (3/2/1 Hz), Flashing (1x/2x/3x), Rotating light (70 RPM)

SIRIUS ACT Push Buttons

Powerful machines and plants need powerful push buttons, switches and indicators: SIRIUS ACT offers you a unique portfolio of elegantly designed push buttons, indicator lights and switches that are the perfect embodiment of style, intelligence, and physical toughness.

Constructed with genuine metal and high-grade plastics, and engineered with smart functions and communication capabilities, these new push buttons, indicator lights and switches have been tested for the most extreme environments to ensure reliability for your most critical operations.

SIRIUS ACT is a modular system of push buttons and indicator lights for front plate mounting and rear-mounted electrical modules. It can be flexibly configured to specific customer requirements and features extensive accessories. For common applications, complete devices are offered.

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- Rugged Reliability
- Flexible Communication
- Modern Design Lines

APS Industrial
www.apsindustrial.com.au

SIRIUS Industry Controls

With Siemens SIRIUS from APS Industrial, you have exclusive access to a unique and comprehensive portfolio for every industrial control application. Thanks to their modular design and simple integration capability, these products can be designed and built into a control cabinet in a very simple way.

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apsindustrial.com.au

CASE STUDY

Wonky bread wrapped in compostable bags

Earth & Wheat was looking for a home-compostable bag for its 'wonky' bread box and found a solution from KM Packaging.

Earth & Wheat is an e-commerce operation that directly connects UK bakeries with customers looking to reduce food waste. It delivers perfectly tasty fresh bread that would otherwise have gone to waste due to appearance standards or overproduction while also aiming to reduce plastic waste and carbon emissions as much as possible.

The company was using plastic bags, which were considered incompatible with the brand's values.

The home-compostable bags from KM Packaging not only meet the eco-friendly and sustainable attributes but also other requirements from the company. These included being able to print on the bag for branding purposes and for the bags to be compatible with the company's automated bagging machines.

The C-Bag from KM Packaging's C-Range has been developed in partnership with Treetop Biopak. The bio-plastic packaging has similar properties and look and feel to conventional plastic and includes shrink wrap, stretch wrap, cling film, adhesive tape and nets.

Earth & Wheat founder James Eid said: "Our mission is to reduce food waste in the UK, and we're always looking at innovative ways to become even more sustainable. By using home-compostable bags in our bread boxes, we have found a great alternative to using plastic."

The new bag protects, presents and preserves the wonky bread from Earth & Wheat. It will disintegrate in a compost heap and then biodegrade into carbon dioxide (CO_2), water and biomass, leaving no harmful residue behind.

The bio-based bag is made from renewable resources using versatile materials supplied in various grades and meets the Soil Association Standard for packaging materials. It has TÜV certification, which was developed to guarantee complete biodegradability in garden compost heaps and other slower-paced processes. It also has good impact, puncture resistance and material perforation, and can be used as bin liners for organic waste collection.

KM Packaging Services Ltd
www.kmpackaging.com

CASE STUDY

Boosting recyclability in the freezer section

Image credit: Parkside Flexibles

Parkside Flexibles has produced a paper recyclable frozen food packaging option for UK supermarket Iceland, which is using the packets for its Northcoast range of frozen seafood.

The supermarket chain had previously used an LDPE-plastic bag that could not be properly recycled. The new version uses a specially developed paper pouch that is grease and oil resistant and is designed to be suitable for freezer temperatures.

Typically, a laminate of paper with a thin plastic layer is used for this kind of frozen food where oil is inherent to the product. This offers protection against leaks but a major downside is that it complicates the recyclability of the packs.

The heat-sealable paper solution was designed to withstand the rigours of frost and moisture in a freezer environment, for prolonged periods of time. This has been achieved by creating excellent heat sealability, and by using a range of water-based coatings with high barrier performance, which are designed to break down when re-pulped in the paper recycling process.

Mark Armstrong, Packaging Specialist at Iceland, said: "As everyone knows, we are loud and proud about our forward-thinking ideas and commitment to plastic-free packaging across our products. We previously worked with Parkside in a successful bid to reduce food waste via a lidding film solution in 2017.

"But we know we can do more. As consumer sentiment continues to grow for circular solutions, it is the perfect time to collaborate once again in a bid to reduce unnecessary plastic in our packaging.

"Bag sealing was a challenge, as was ensuring the material had the necessary barrier properties. We also wanted the print to match the existing LDPE bag and therefore a lot of time was spent in artwork and repro to give us the best possible result."

Parkside
www.parksideflex.com

Designing a unique can of beer

Digital printing specialist Peacock Bros. has worked with Little Bang Brewery to help expand the beermaker's sales volumes from 5000 to 400,000 L annually. This achievement was helped by the use of bold artwork on the range of cans produced by the beermaker, including one that features unique designs for each can.

In its early day, the brewery operated on a limited marketing budget so relied on the eye-catching visuals on its cans to draw shopper interest online and instore.

"I wanted to turn every beer can into a little sales representative on the shelf," said Ryan Davidson, Co-founder of Little Bang Brewery. "We knew that our business couldn't afford a sales team all over the country pushing our product so that meant the product itself had to be out there doing the selling for us."

The company would design its own labels, which were then printed and applied to the beer cans manually by staff members. This was a labour-intensive process that proved impossible to scale as the business grew so it turned to Peacock Bros. for help.

In addition to being able to produce labels with less manual work than previously, Peacock Bros. used features on its HP Indigo digital colour label presses, such as the Mosaic variable data software functionalities, that allowed the brewery to sustain creativity while increasing productivity. This resulted in labels that were not just graphically interesting but also unique.

"Peacock Bros. is proud to act as the label producer and printing partner for Little Bang Brewery," said Ryan McGrath, Group Managing Director at Peacock Bros. "The digitally printed labels we produced deliver Little Bang Brewery high levels of creativity and colour variation in the artwork, with the flexibility to print different labels for every SKU."

Little Bang Brewery worked with Peacock Bros. to develop an algorithm that gave every single beer can a different name and printed these uniquely. The initiative was developed for the Little Bang Hazy IPA beer can and has produced over 75,000 different names to date, meaning 75,000 different labels printed in runs of one.

"Peacock Bros. have been a true partner for Little Bang Brewery. They helped us develop a flexible digital printing solution that accelerated our creativity and amplified our brand personality that was scalable as our business grew. Standing out on a crowded retail shelf is difficult as a challenger brand and the Peacock Bros. solution helped us to do just that," Davidson said.

Peacock Bros Pty Ltd
www.peacocks.com.au

CASE STUDY

Cutting carbon emissions in food colouring bottles

McCormick has teamed up with Berry Global to produce a 100% recycled PET (rPET) food colour bottle. McCormick, a manufacturer of various food ingredients, had been looking to increase the circularity of its packaging and had set packaging goals that would see it reduce its net emissions to zero by 2050.

Made using post-consumer recycled (PCR) plastic, the bottles could help the company reduce carbon emissions by an estimated 59% compared to the same bottle made from virgin material.

"By collaborating with key suppliers like Berry, we gain access to valuable recycled content. This 100% PCR bottle furthers our journey towards our emission reduction goal through packaging," said Michael Okoroafor, Chief Sustainability Officer for McCormick.

Berry Global
www.berryglobal.com/en

100% recyclable pouches

Perfect Automation has partnered with Thanh Phu, which produces fully accredited recyclable pouches. The pouch has undergone strict testing criteria to get the tick, including real-life sample validation reporting to ensure that recycling streams can indeed capture these pouches for complete recycling.

This has been made possible with Vexoflex and the structure of the pouch. Moving away from multi-laminated films, the mono-PE polyethylene-based film allows for the entire package to be recyclable and doesn't impact barrier protection for dried, chilled and frozen foods.

Along with the pouch style, the packaging solution is also available as a zipper closure, side gusset, flat-bottom and stand-up to suit the user's requirements.

Thanh Phu is a member of Australian Packaging Covenant (APCO), Australia's national regulatory entity that sets the standards for responsible packaging.

Perfect Automation will be running the 100% recyclable pouches on its Leepack Pouch Machine.

Perfect Automation
www.perfectautomation.com.au

On-demand colour label printer

The Epson Colorworks CW-4010 is designed for on-demand colour label printing for a variety of applications and environments. It has been designed as a colour upgrade to black-and-white thermal transfer printers and can print labels at a resolution of up to 1200 dpi. The printer is compatible with SAP, is optionally Wi-Fi connected, offers speeds up to 100 mm/s and features a colour LCD screen with automatic nozzle verification technology to make it easy to operate. It is also dust- and water-resistant for high-duty-cycle environments.

The product produces varying droplet sizes that can accurately produce a wide gamut of colours, smooth gradations and fine image details.

Its ESC/Label and ZPL II Interface Languages ZPL II capabilities allow customers to use the company's inkjet technology without reprogramming existing systems and command extensions can be added by users. The printer can be used for colour-coded fields, product pictures, logos and marketing messages.

Remote management tools make it possible to manage a number of printers on a network. These allow IT support teams to do mass configuration of printer settings, generate automatic alerts for items needing attention, deploy automatic firmware updates and generate reports on usage of devices and consumables.

The printer uses pigment-based inks with gloss or matte versions available for varying labelling applications. The gloss black ink can print on a wider variety of substrates whereas the matte black ink offers a darker, sharper black text and images on matte media. Both have been BS5609 certified.

Label Power Pty Ltd
www.labelpower.com.au

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CASE STUDY

Meeting the bottling needs of water company

With bottled water being one of the most popular beverages in the United Arab Emirates, Mai Dubai wanted to increase its market share in the region and turned to Sidel to upgrade its equipment. A new packaging line was installed that is able to fill 86,000 bottles per hour in three different formats (200, 330 and 500 mL).

"Our key considerations were the optimal use of space, high consistent quality and efficiency with flexibility. Sidel's digital capability was very attractive, too, with its Efficiency Improvement Tool enabling us to track the performance of every part of the line," said Mai Dubai CEO Alexander van 't Riet.

"Sidel also added extra value by using its design expertise to help us to strengthen our 500 mL bottle without compromising its iconic design. Finally, Mai Dubai is a leader in sustainability and Sidel's solution supported our low energy requirements."

The line includes an all-in-one Super Combi solution for blowing, labelling and filling. It has a ground-level preform infeed system, EasyFEED, and an ergonomic cap feeder, Gebo OptiFeed, which detects caps' quality and colour.

UV lamps are designed to ensure clean and hygienic conditions, as do a dedusting system integrated into the blower and a deionising system in the cap chute. There are also three labelling stations with auto-splicing systems. The filler has particulate-absorbing filters that feature a reduced enclosure kept in overpressure with high-efficiency particulate-absorbing (HEPA) filters. This results in a protected environment around the filling valves, and an easier-to-clean area using fewer sterilising agents and less time.

The line also features an EvoFilm shrink-wrapping component and a PalLinear palletiser.

"We were very impressed with Sidel's adaptability and understanding of our requirements," said Mai Dubai's Mohamad Usman.

"They delivered a line that was faster than our original specification. Sidel also met our additional request for bottle strength improvement. Within 15 days they had done a failure mode and effects analysis (FMEA) and come up with a solution. With Emirates Airlines as a flagship client, premium, distinctive and reliable packaging is important to Mai Dubai."

Sidel Oceania Pty Ltd
www.sidel.com

Leak detection range for cheese packaging

Accurate leak detection of packaging is a critical part of the production process that ensures the consumer receives a quality product which is safe to consume. Any micro leak can have a major impact on a product's quality, shelf life and safety; and irregularities must be detected in time to avoid leaks.

Leak detection specialist Oxipack understands the vital role of leak detection to ensure the quality of dairy snack foods and their shelf life. It has developed several solutions for the cheese industry that are designed to quickly and accurately determine if packaging is leaking. All tests are 100% non-destructive and no added gas is required.

Testing for leaks is generally conducted as a manual process, using a water bath, with random sample testing. By taking a number of samples at each test, statistical analysis is applied to determine if there is a line issue with the packaging process. These products cannot be returned to the line — even if they've passed the leak test — which is wasteful, and costs the business money.

The Oxipack range of non-destructive leak detection solutions uses a new method. Through the use of two rubber membranes (or a deep chamber depending on the product's packaging) a vacuum is created in the equipment's test chamber, which is then monitored over a time period. If a pressure increase is detected during this period, it can determine if a leak is present, as well as the size of the leak.

The method provides detection of large, small and micro leaks, without damaging packaging.

Cheese processors can use the Oxipack Stationary Leak Tester (SLT) to detect leaks in all types of cheese packaging.

Oxipack has solutions that are suitable for all sizes of packages, up to 25 kg, and for detecting leaks down to 25 μm. The equipment can even be calibrated to a known minimum hole size, should that be acceptable.

Heat and Control Pty Ltd
www.heatandcontrol.com

SPONSORED CONTENT

Food packaging leading the way

There are numerous forces at play in the ready-made and take-away food industry that are demanding change. With the pandemic, the growth of meal delivery services and significant changes and innovations in the ready-made meal market, not to mention an increased expectation around sustainability — food packaging looks set for a shake-up.

The National Packaging Targets include the target of 100% reusable, recyclable or compostable packaging by 2025. This is less than two and a half years away, so action is needed now.

Packaging producer Confoil® is on the front foot and has embarked on a partnership and new product development journey with BASF to produce certified compostable DualPakECO® trays. The trays are made in Australia using compostable ecovio® biopolymer coating by BASF. The coating is food contact safe and has barrier qualities against liquids and oils to protect the paperboard tray from losing its shape or rigidity. The trays can be frozen or refrigerated and are ovenable for 40 minutes, up to 180 degrees as well as being microwave safe.

DualPakECO trays are certified compostable to Australian Standard AS4736-2006 so can be commercially composted in organic waste bins, where allowed, together with contained food scraps. The trays carry the 'looped seedling' compostable logo to educate consumers of their compostable quality.

As more communities introduce source separation systems for diverting food waste from landfill, having certified compostable products will give consumers and organics recyclers (commercial composting facilities), the assurance that the products will completely compost.

Alison Buxton, CEO of Confoil explains, "We wanted to create a paper-based food tray that meets all the food industries' requirements but with the added benefit that it is certified compostable. Our joint development with BASF represents a shift to paper-based and certified compostable material in order to support the Australian 2025 National Plastics Plan which aims at reducing the impact of packaging on the environment."

While food producers are sourcing local, in-season ingredients and lessening their impact on the environment, Confoil are looking to close the gap in the circular economy. Ingredients go from the paddock to the plate and DualPakECO trays go from the table to the composting facility and back to the farm to help provide nutrients for the next crop.

Finding a market for any recycled material is critical to the success of a circular economy, ensuring resources retain value through the process. Composting is the ultimate in recycling as the result can be so beneficial to agriculture and viticulture, as well as the environment.

In Australia, according to the Australian Organics Recycling Association (AORA), the composting industry's environmental contribution is significant. Greenhouse gas savings from organics recycling tops 3.8 million tonnes of CO_2 annually, which is equivalent to planting 5.7 million trees or taking 876,663 cars off the road.

Compost and mulch can improve soil quality and assist with water retention and drought mitigation. All organic materials contain both carbon and nitrogen — green materials like garden waste and food scraps are richer in nitrogen and brown materials such as straw, sawdust and paperboard are richer in carbon. The perfect recipe for optimum biological activity and efficient compost production, requires a balance of carbon and nitrogen in the material being composted.

Packaging like DualPakECO trays can become an essential part of the composting process, reducing waste to landfill, creating a valuable resource, balancing production and helping to nourish the plants that put food on your table.

CONFOIL®

Confoil Pty Ltd
www.confoil.com.au

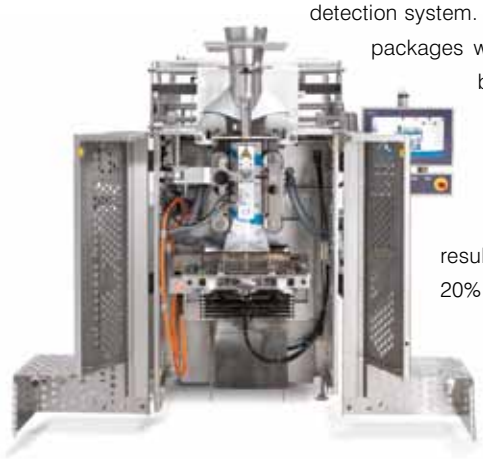
Sealing system for vertical food packaging machines

GEA has introduced its Smart Sealing System for use with its vertical food packaging machines for the frozen food market. The system uses special metal tapes in the sealing area that are designed to eliminate the need to replace the traditionally used Teflon tape on the heated sealing jaws after just a few hours.

The system is designed for pillow and gusset bags packed with frozen vegetables, fruits, potato products, meat, meat alternatives, fish and seafood. Though initially developed for use with PE mono materials, it can also be used with all widely used laminates, including recyclable material structures such as BOPE, MDOPE, PP-based laminates and paper laminates.

Instead of the Teflon-tape method, the sealing system uses metallic strips with a non-stick, PFAS-free (polyfluoroalkyl substances) coating. It is designed to seal up to one million bags without changing the sealing strips. Without having to change Teflon strips, the packer can run almost continuously, reducing downtime.

The product provides sealing of the bag with the incorporated product in seal detection system. This reduces the possibility of open packages while also preventing sealing of the bag when food is detected in the seal area.



The system uses an increased pressure for each seal and a reduced cooling time for each cycle, which results in a faster running speed and a 20% increase in machine output.

GEA Group

www.geagroup.com.au

Coding inkjet printer

The Hitachi UX2 is a continuous inkjet printer that has several new features to enhance the coding process.

Features include enhanced code quality at higher speeds — the improved dot control algorithms create more legible codes, and even at increased speeds, code quality does not degrade. There is also added convenience and safety — with a sealed Safe-Clean Station, multiple cleaning modes, and self-guided troubleshooting videos available, the UX2 puts control in the hands of the operator.

Other features include: quick line changeovers to allow the printers to move production lines using preconfigured I/O connectors, which reduces time-consuming mistakes; and a redesigned print head that catches inkjet build-up so that the printer can run up to three times longer by reducing print quality issues and electronic faults.

Visy Technology Systems

www.visytech.com

Tray sealing machine

Capable of sealing up to 120 atmospheric packs per minute, the Proseal GT2e incorporates several features that help to provide good seals at high speeds. Incorporating the company's electric sealing technology, which is claimed to be able to increase seal force by up to 600% while achieving up to a 92% reduction in energy usage, the GT2e has a good seal to meet the strict requirements of the food sector.

In addition, speeds are increased through features such as servo-controlled pack transfer, which creates a smooth movement for trays through the sealing process, with self-centring pack guides that accurately position trays during sealing. Automatic film snap and film end detection also help with consistent operation.

The machine uses QR conveyors which, as well as providing a consistent infeed and outfeed of trays, incorporate quick-release belts that allow fast and straightforward disassembly and reassembly for convenient cleaning. This helps to meet the fast changeover and maximum hygiene requirements of food packaging environments.

Proseal Australia

www.prosealaustralia.com

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NEWS

Electric milk tanker on the road in NZ

Claimed to be New Zealand's first electric milk tanker, Milk-E has been officially launched by the Minister for Energy and Resources, Hon. Dr Megan Woods, in Morrinsville. The tanker was named by Fonterra farmer Stephen Todd from Murchison and is part of the Co-op's fleet decarbonisation work.

"Right across the Co-op, our teams are constantly looking at how we can decrease our emissions — from on farm, to at our sites and throughout our transport network," said the Chief Operating Officer at Fonterra, Fraser Whineray.

"The team here at our Morrinsville Workshop have done a fantastic job of pulling this tanker together. Being a New Zealand first, there's been a lot of creative thinking and Kiwi ingenuity to bring Milk-E to life."

The electric tanker is the same size as Fonterra's regular tanker with the capacity to carry 28,000 L; however, because the 'truck' part of the tanker is a bit heavier with the battery it will carry around 2300 L of milk less so it can operate within permitted weight.

A battery swap system is being installed at the Waitoa site where Milk-E will be based to trial how this could work within a fleet to minimise downtime from battery charging.

"It's been great to see the team turn challenges into opportunities so in addition to trialling Milk-E's on-road ability, we're also trialling a new electric pump, hose configuration and cabinetry," Whineray said.

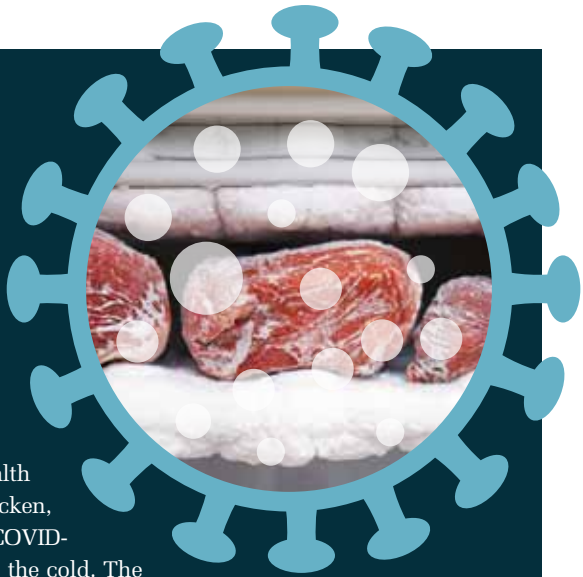
Fonterra received co-funding from the Government's Low Emissions Transport Fund (LEFT), which is administered by EECA (the Energy Efficiency and Conservation Authority).

EECA Group Manager Investment and Engagement Nicki Sutherland said, "We're pleased to see this project come to life. New Zealand has ambitious targets to rapidly reduce carbon emissions, and transport is key, but heavy freight has proven hard to decarbonise. If successful, this project could be replicated across a number of New Zealand businesses."

The electric milk tanker will operate out of Fonterra's Waitoa site, which Whineray says is very fitting given it was the site of New Zealand's largest fleet of electric milk trucks 100 years ago.

NEWS

COVID-like viruses can survive in freezer



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Scientists in American have discovered that viruses that are similar to SARS-CoV-2, the cause of the ongoing COVID-19 pandemic, have the ability to survive on meat products in the freezer. The findings may have implication for routes of transmission.

A trio of researchers from Campbell University, the Texas Tech University Health Sciences Center and the University of North Carolina at Chapel Hill infected chicken, beef, pork and salmon and with surrogate viruses that have similar spikes to the COVID-causing virus in order to assess how COVID-19's viral particles may behave in the cold. The meat samples were stored in refrigeration (4°C) and freezer (-20°C) temperatures. It was not viable for real SARS-CoV-2 viruses to be used, with used 1 RNA virus with a lipid envelop, and 2 animal coronaviruses, murine hepatitis virus, and transmissible gastroenteritis virus used as surrogates.

After being refrigerated or frozen for 30 days, the researchers found that the viruses on this meat could still be cultured, meaning that they were effectively alive — or as alive as a virus could ever be technically. While the viruses survived to varying degrees depending on the kinds of meat they were frozen on, no samples were left free of the virus after spending a month in the cold.

The scientists noted that research may suggest the possibility of people becoming sick by coming into contact with COVID-infected surfaces and there have been accounts of other coronaviruses making people sick after being transmitted on fresh produce. As such, the frozen meat could provide a way for people to become sick with COVID-19 if they were to touch infected meat and then their face, and it may even be possible to become sick by eating the meat, though it was noted that this is still up for debate as of now. More research will be pursued in the future to gain a better understanding of how SARS-CoV-2 could survive on foods.

The study was published in the *Applied and Environmental Microbiology* journal.

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Digital twins of fruit:

could reduce supply chain waste

Most fruits are literally cruising for a bruising, say researchers who have created what they call "digital twins" of fruits and vegetables being shipped internationally. These models have allowed the researchers to understand that cooling conditions involved in shipping are leading to damaged fruits ending up on shelves only to be thrown away.

Each year about a third of all food is shovelled into the bin instead of our mouths — this is a costly and wasteful prospect and the ways that foods are shipped play into this problem. The researchers, from Empa, the University of Bern and Stellenbosch University, worked to develop digital models of citrus fruit as a way of understanding how shipping foods in less than ideal circumstances could lead to substantial food waste.

The digital twins of fruits are models developed using the temperature sensors that all modern shipping containers are equipped with. These sensors let the researchers keep track of the temperature levels of 47 shipping containers of citrus fruits across their entire transport route. They then took data from these trips and ran them through computer models to determine the quality of the fruits — these are the digital twins. Specifically, negative factors such as decay, moisture loss, cold damage and mould were analysed, along with positive changes like the mortality of fruit fly larvae.

The analysis showed that around half of the shipments were operating outside of ideal temperatures, meaning that the negative factors were likely to occur in the fruits. This would result in goods that were decayed, spoiled or damaged being put on store shelves and then quickly discarded; at the end of the fruits' journey, some only had a shelf life of a few days before they were thrown away.

The solution to this problem is not merely to increase refrigeration but to change its parameters, as different foods have different requirements. For the citrus fruit, there is a balance between cooling products to a point where the desirable factors (such as keeping decay or fruit flies at bay) but preventing damage to the fruit caused by low temperatures. Other foods have their own needs and they all need to be carefully adhered to to keep the quality of the shipped produced high.

In addition to creating these digital models of fruits and vegetables, physical ones were created too. Fruit models were equipped with sensors that can measure temperature and moisture content as though on real fruits. The researchers suggest that these fruit 'spies' could be sneakily put into batches of shipped products to report precise data in order to optimise shipping conditions of food.

Combined, the researchers suggest that if physical and digital models of fruits and vegetables were used in the shipping industry to better understand the conditions that these foods are exposed to then waste could be reduced, with more people fed and money saved.

NEWS

New wholesale distribution centre announced for Victoria

Metcash, owner of IGA and other retailers, has announced that it has entered into an agreement with Goodman Group for the development and lease of a new wholesale distribution centre (DC) in the Melbourne suburb of Truganina.

The DC will have an area of roughly 115,000 m^2 and will replace Metcash's Laverton-based distribution centre. The company said that it expects the larger space to increase the competitiveness of its independent retailers in the region by making its operations more efficient and providing access to a wider range of products. Local suppliers are expected to benefit from having access to the Metcash distribution network, providing them with an efficient means of bringing their products to market.

The centre will have products for Metcash's food and liquor retailers and will be equipped with semi-automated goods-to-person and layer-picking technologies.

"We are delighted to be able to announce this significant long-term investment for our independent retailers in Victoria, which is a reflection of our continued focus on championing their success," said Metcash Group CEO Doug Jones.

"Supporting our decision to proceed was the success of our new DC at Gepps Cross in South Australia, which has been operational since December 2020, as well as strong growth in both our Food and Liquor pillars in Victoria and the recent renewal of a long-term agreement to supply FoodWorks stores."

The distribution centre will be built with sustainability in mind and is aiming to adhere to the 5-Star Green Star sustainability rating from the Green Building Council of Australia.

Construction is scheduled to begin in the first half of financial year 2023 and it is expected that it will be completed in the middle of 2024.

Plug-and-play conveyor platform

Designed as a plug-and-play modular system, Interroll's Light Conveyor Platform (LCP) allows system integrators to implement scalable belt conveyor sections easily in order to quickly meet customer-specific automation requirements for material flow.

Belt conveyors can be easily assembled from factory-preassembled and predefined modules without any engineering effort, and can be put into operation quickly and safely via an autonomous machine control system, optionally without an additional programmable logic controller (PLC). Depending on user requirements and application, connection to an external PLC with user-specific programming is also possible.

The platform is designed to transport smaller conveyed goods, as well as boxes or polybags weighing up to 50 kg. The conveyors, which can also handle inclines or declines, are driven by compact and energy-efficient drum motors that have an efficiency of over 85%. The fully modular system can be planned and assembled easily and conveniently on a PC using Interroll's Layouter tool.

The product also features an integrated emergency shutdown at the push of a button, complies with all relevant safety regulations and has a quiet noise level during operation.

Interroll Australia
www.interroll.com

Tim Symons
Packaging Manager, Tooheys

Supply Chain of the Future

Dematic AGVs help keep the beer flowing at Tooheys Brewery.

When Lion Beer Australia started thinking about what its supply chain of the future might look like, they knew they needed to improve productivity to keep up with demand, and adopt processes and technologies that would deliver optimum services for Lion's people, brands, production facilities and suppliers.

The fleet of Dematic AGVs at Tooheys are helping achieve just that — giving Lion dependable seamless performance for its end-of-line process, keeping product moving accurately and safely to the end consumer.

See the video and read the full story at Dematic.com/lionbeer

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DEMATIC

CASE STUDY

Using blockchain technology to keep track of palm oil

Unilever is using a blockchain technology, GreenToken, to keep track of its palm oil crops and ensure that only verifiably sustainable palm oil is being used in its products.

Developed by SAP, GreenToken allows Unilever to monitor its supply chain through end-to-end tracking, which means that palm oil from unsustainable sources cannot be accidentally mixed in.


iStockphoto.com/Wirachai

The technology was first trialled by Unilever in Indonesia but with the success of this trial its use is being expanded. The proof-of-concept trial sourced almost 190,000 tonnes of palm oil fruit. It enabled Golden Agri-Resources and other suppliers from whom Unilever sources to create tokens that mirror the material flow of the palm oil throughout the supply chain and capture the unique attributes linked to the oil's origin.

"Unilever is committed to achieving a deforestation-free supply chain by 2023, and blockchain technology has the potential to help companies, like ours, track their supply chains to ensure the commodities we source respect people and the planet," said Dave Ingram, Chief Procurement Officer, Unilever.

"We are encouraged by the promising results of our pilot with GreenToken by SAP, the latest building block in our tech-enabled approach to ensure a more traceable and transparent supply chain."

Since GreenToken uses the blockchain as a way of handshaking at each step of the supply chain, it offers near real-time tracing to keep track of where a product has originated or where it is on its journey. Tokens are created in the system that collect and share this information, with the tokens reporting into the system as though the palm oil was checking in with a QR code as it makes its way along the supply chain. This means that only palm oil that has checked in would be recognised.

"With GreenToken, we want to bring the same traceability and supply chain transparency to bulk raw materials that you get from scanning a bar or QR code on any consumer product," said Nitin Jain, Co-founder and General Manager of the GreenToken by SAP solution, SAP.

"Our solution allows companies to tell what percentage of palm oil products they purchased from a sustainable origin and track it to the end consumer product."

Unilever Food Solutions
www.unileverfoodsolutions.com.au

NEWS

Coles trials electric delivery truck

Coles is using an electric truck for stock delivery in New South Wales as part of a trial being untaken with transport partner Linfox Logistics. The Fuso eCanter truck is powered entirely by renewable electricity and is operating out of Coles' Eastern Creek Distribution Centre. Its use is predicted to help avoid the emission of over 60 tonnes of carbon dioxide a year.

David Clark, Head of Transport Safety & Sustainability – Supply Chain at Coles, said that the electric truck represented a forward step for the supermarket in boosting its sustainability.

"Coles' first electric truck is a big step to introducing alternate fuel technologies to our supply chain, and we are excited about the opportunity to see more electric vehicles delivering groceries to our distribution centres and supermarkets in the future," Clark said.

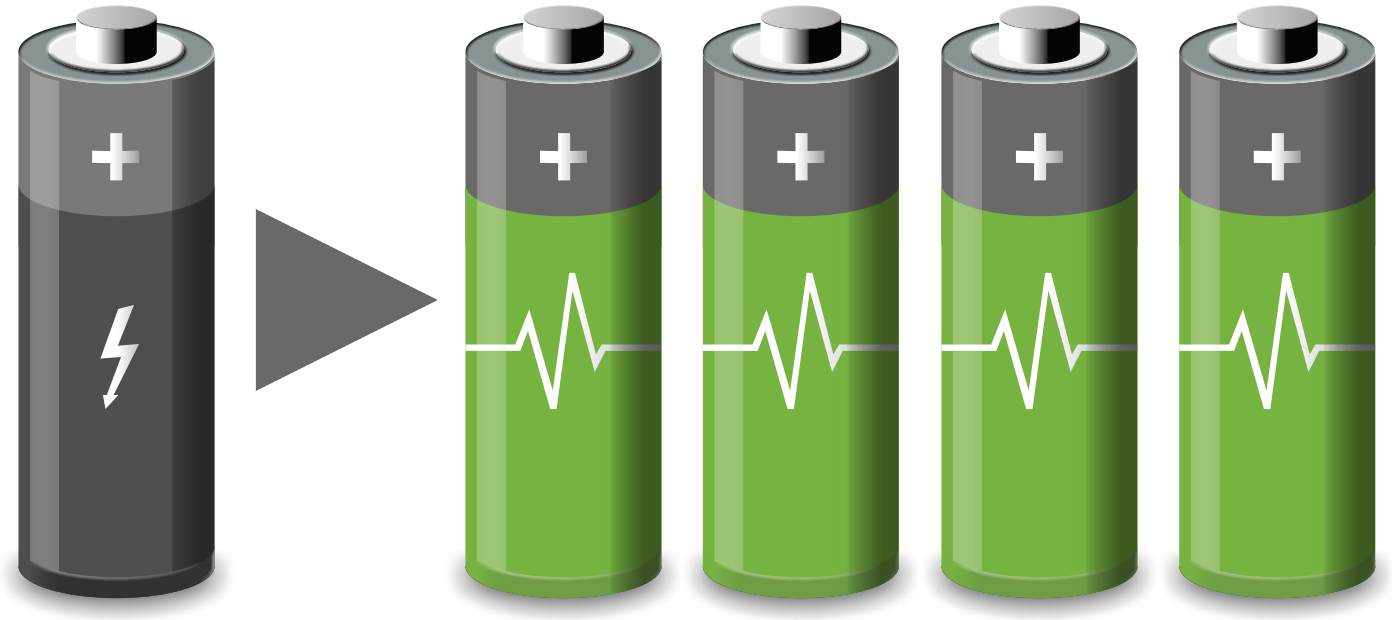
"By working with Linfox, we have considered the sustainability of the truck, from its carbon footprint when operating to the end-of-lifecycle impacts on the environment.

"We are proud to be working with Linfox Logistics to deliver Coles' first electric truck. We are excited to see how electric truck technology evolves and are eager to continue working with Linfox to discover ways to reduce emissions in our supply chain through alternate fuel technologies.

"We will continue to work tirelessly toward our Together to Zero sustainability ambitions, with hopes to one day introduce electric vehicles to support home delivery as customers look to live and shop sustainably."

Coles has committed to achieving zero emissions by 2050 as part of its Together to Zero strategy and will use 100% renewable energy by the end of 2025.

ENERGISE YOUR PRODUCTION LINE WITH NEW ENMIN DRIVES.



Replacing dated and inefficient drives with new generation Enmin units ensures a higher conveying speed can be achieved to match the performance of other components. Enmin drives also offer reduced energy consumption and of course less likelihood of stoppages due to breakdowns.

Designed specifically for the food industry, Enmin's electromagnetic drives are designed to provide years of trouble-free operation with minimal moving parts, next to no on-going maintenance and low energy consumption.

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Developing smarter warehouse robots

Researchers from the Rochester Institute of Technology (RIT) are working to develop smarter industrial robots that are designed to be aware of whether or not they have the right of way in busy aisles and can intelligently avoid obstacles, people and other robots. The system integrates smart technologies like LiDAR sensors, and uses artificial intelligence and neural networks to achieve a clearer view of personal space so that robots can behave safely in a decentralised way.

With supply chain challenges brought on by the pandemic and increased demands for e-commerce, technology can provide the support businesses need to improve productivity, efficiency and safety in a warehouse setting.

"This is one area where robotics and autonomous material handling can help," said Michael Kuhl, professor of industrial and systems engineering in RIT's Kate Gleason College of Engineering. "Robots can work longer periods of time — not necessarily to replace jobs, but on some of the manual, non-value-added tasks. It means a change of focus of jobs, with people needed to design and maintain fleets of vehicles and robots."

Kuhl and the project team received a grant for "Effective and efficient driving for material handling", a one-year, $300,000 project sponsored by The Raymond Corp. It advances earlier work with the company that established task selection and path planning of individual autonomous mobile robots (AMRs).

New work focuses on advanced avoidance and communication strategies for multiple robots and humans in the warehouse environment.

In warehousing operations, there is often a mix of autonomous and human-operated equipment. Avoidance strategies need to be integrated with task options, path planning and recognition of multiple robots able to communicate with one another in real time, and to recognise humans who also will be interacting in the warehouse space.

"We have information about localisation, the different types of sensors that we use within the warehouse to try to identify where the robots are located and the actual movement of the robot," Kuhl said. "Can they plan to get from the current location to destination safely and efficiently? They can have a short path, but they still need to avoid other robots and people."

Using deep neural network strategies (types of machine learning techniques), the system components are trained to make specific, sequenced decisions based on common tasks, but also infrequent or unusual actions that might occur in the warehouse environment.

The team is also studying the communication networks within the warehouse — Wi-Fi and cellular network technology functions — as viable solutions. New standards for cellular technologies permit increased individual cellular communication between individual devices, Kuhl explained.

"In terms of people and vehicles interacting, could we take advantage of the sensors of multiple vehicles moving around the warehouse?" he said. "If a vehicle is coming down one path and it sees a person or another vehicle coming out of an aisle, can they communicate and make a decision about what to do next? Who has the right of way?"

The team has found that robots will be able to react in field experiments at Simcona Electronics Corp.

"We needed the real setting to be able to do this work and to move it forward. They provide an extremely valuable resource for us," Kuhl said.

Rochester Institute of Technology
www.rit.edu

CASE STUDY

Reducing inefficiency by tracking pallets

German researchers have developed software that can track and visualise the paths for load carriers such as pallets, crates, racks, containers or tanks. This provides the logistics sector with a way of improving efficiency and reducing downtime.

Developed in the Center for Applied Research on Supply Chain Services at the Fraunhofer Institute for Integrated Circuits IIS, the Logistikbude (German for "logistics convenience store") software is a web-based offering that helps keep track of load carriers that might otherwise be ignored or left unattended.

The software generates labels for each load carrier and creates a digital file. Returnable load carriers are also equipped with barcodes or sensors. A smartphone app can then be used to record each load carrier with its label before being transported and when they arrive at their destination, with optional updates about their status along the journey possible as well. All this data is synchronised with a server, which can keep track of the locations and statuses of these load carriers as well as their quantities.

Users are then able to access the data and understand when they have been unloaded and are ready to be returned to their home or used for transporting other goods. Any load carriers that have been emptied but not returned will result in an email being sent to the user. Sensors can also be used to record exact location, temperature and humidity to give users more information about their pallets. This means that instead of carriers sitting around unused, they can quickly be reintegrated into the supply chain.

"Until now, many companies have often not even known where their own load carriers are at a given moment, for example. Now they can see where they are at any time and when they will get them back. It makes planning easier. The accelerated circulation ultimately ensures that fewer load carriers have to be purchased overall. This, in turn, contributes to increasing sustainability in the sector," said Philipp Wrycza, co-founder and CEO of the Fraunhofer spin-off Logistikbude.

"We are pleased not only because Logistikbude has been created at our institute, but also because it represents a valuable tool for making even better use of efficiency potential in the field of transport and logistics," said Prof. Michael ten Hompel, institute director of Fraunhofer IML.

"With this, Fraunhofer researchers are once again demonstrating their ability to develop practical and helpful solutions for industry."

Blue nitrile gloves

Designed for use in the food processing industry, Restock's Blue Protectaware nitrile gloves provide a close fit for increased tactile sensitivity, grip and precision.

With good puncture and chemical resistance, the gloves have a textured finish for good wet and dry grip.

The glove's synthetic formulation is designed to reduce hand fatigue, which can help to improve workers' efficiency for longer.

The nitrile gloves are free from latex, making them suitable for those with skin sensitivities. They also have a roll beaded cuff for easy pull on and off.

The blue gloves are both HACCP certified and ARTG listed.

The company also has a range of alternative coloured nitrile gloves including green, orange, purple, black and clear.

Restock Pty Ltd
www.restock.com.au

Nut processing feeder line

Eriez vibratory feeding equipment efficiently moves and meters a variety of virgin and processed nuts of any size or shape.

The vibratory feeders are suitable for several applications in the nut industry, particularly when it comes to metering nuts at controlled rates into the next process in the production line.

The feeders specified for nut processing are designed to comply with strict guidelines set forth by Safe Quality Foods (SQF), Good Manufacturing Practices (GMP) and sanitation requirements.

They are commonly used to meter nuts into downstream processing equipment. The vibratory feeder acts as the bulk metering device to provide the nuts at a controllable, easily adjusted rate. Feeders are also used to sprinkle salt, sugar or other seasonings during nut processing. Eriez electromagnetic feeders are offered in various models and designs to meet specific application requirements.

Eriez HD (High Deflection) Vibratory Feeders combine the higher tray deflection, lower frequency advantages of mechanical feeders with the trouble-free service and adjustability of electromagnetic feeders. When screening is required to remove undersize material such as excess salt or oversize materials such as agglomerated coated nuts, the higher tray deflection of HD models is suitable. HD Feeders are commonly used in nut processing applications when gentle feeding is critical. Softer nuts, such as walnuts, can be handled by this model.

Eriez HS (High Speed) Vibratory Feeders are specifically designed for fast feed rates and offer fast start-up and shutdown, making this model suitable for nut packaging applications. They are suitable for use in conjunction with weigh scale and packaging machines. The compact and functional units can be installed easily in small spaces.

Eriez Model C Feeders feed and control material flows ranging from a kg per minute to many tons per hour. These units have no rotating parts to wear out and feature AC-operated, electromagnetic drives which consume up to 60% less energy than competitive DC drives.

One of the primary benefits of vibratory feeders in the nut processing industry is the simple and clean construction of the feeder tray. The trays are designed to be easily and quickly wiped down or washed out for product changeover or sanitation protocols.

Eriez Magnetics Pty Ltd
www.eriez.com.au

CASE STUDY

Optimising a returnable Coca-Cola bottle system

A Coca-Cola plant in Mannheim, Germany, has installed a returnable glass bottle line from KHS to boost its recycling abilities. The automated line takes bottles, cleans and rinses them, and then sorts them out to be reused. The system fills six bottle formats: four in 200 mL and two in 330 mL sizes, with different use cases for the different sizes.

"The smaller sizes are primarily destined for the hospitality trade, where the packaging has to be a bit more impressive than for retail," said the plant manager, Christopher Bee. "This is why the Coca-Cola, Fanta, Sprite and mezzo mix brands on this line have their own respective bottle designs. We process two formats for the bigger containers that are also sold in the retail trade: what's known as the contour bottle for products in the Coca-Cola family and our green multibottle for Fanta, Sprite and mezzo mix."

The sorting and washing are all done automatically and there is no need for the cleaned bottles to be sent to a warehouse before being refilled. Instead they are sent right off to the filling line.

The system has only one manual element: prior to being sorted, crates of empty bottles are scanned by the sorting system and it is here where any obstacles like paper cups or film must be removed by hand. Otherwise the system operates in a wholly autonomous manner.

"The smaller bottles are set down on a different conveyor where they're separated and guided to different lanes with the help of camera systems and pushers," Bee said. "Here, we aim to manipulate the containers as little as possible: in other words, to ensure that they have very little contact with the machine. In this way, we can keep the risk of something falling over at such high speed to a minimum."

The line's bottle washer saves around 40% on energy and water usage compared to previous generation systems. Energy is saved elsewhere too, with its carriers having a reduced weight and more carefully placed openings to make rinsing bottles easier and more efficient. Finally, the spraying system uses less pressure during downtime and thus reduces electricity consumption by up to 80%.

The plant is now operational and processes 60,000 bottles an hour.

KHS Pacific Pty Ltd
www.khs.com

iStockphoto.com/Antagain

A step closer towards a 'zero-waste' poultry industry

NTU Singapore and poultry manufacturing firm Leong Hup Singapore have collaborated to create what is claimed to be Singapore's first 'zero waste' poultry processing facility. The teams have jointly developed two innovations for repurposing waste material from poultry processing.

One of the key innovations includes using the keratin from chicken feathers as a material for packaging meat trays, creating a sustainable replacement for synthetic polymers made from petroleum oil.

The collaboration also resulted in another innovation — the conversion of biological waste from poultry farming, such as blood and bones, into an alternative culture medium that could be used to cultivate cell-based meat.

Professor William Chen, Director of NTU's Food Science and Technology Programme, co-lead of the industry collaboration, said: "The project has clearly demonstrated that feathers can no longer be viewed as a waste product. Instead, they should be seen as a source of valuable raw materials and an essential component to the circular economy, in which raw materials, components and products lose their value as little as possible. The utilisation of chicken feather fibres in composite materials is a new source of materials that can be economic, eco-friendly and recyclable. Meanwhile, the repurposing of poultry blood to cultivate cell-based chicken meat could be a step towards cutting down the carbon footprint of the food industry."

Lau Joo Hwa, Chief Executive Officer of Leong Hup Singapore, said: "Being one of Singapore and Malaysia's main poultry suppliers, it's important to futureproof the company's practices, while also raising our sustainability profile. By tapping on NTU's rich research expertise, especially with the scientists from the university's Food Science and Technology Programme, it has great potential to also impact the poultry industry in Southeast Asia and beyond."

Chicken feathers were thoroughly washed with distilled water and detergent to remove different sorts of contaminants such as bloodstains, oil and grease from the surface. These feather fibres were dried at room temperature (27°C) for four days and cut by a crushing machine. The chicken feather fibres and unsaturated polyester resin were mixed and placed inside glass moulds and kept in a fume hood for one day.

In laboratory tests, the material that used keratin from chicken feathers could withstand nearly two times of force exerted on it, compared to conventional plastic trays used to contain chicken meat.

Poultry blood and the by-products of processing animal and food products are dense in organic matter, and have high concentrations of growth factors and other nutrients. As the organic waste from poultry processing includes blood, gristle, skin and bone, it contains amino acids, vitamins, glucose, inorganic salts and growth factors, which are suitable for cell culture mediums to cultivate cell-based meats.

The NTU scientists have also managed to effectively extract those nutrients and develop a solution that has the potential to grow animal cells for lab-grown meat. In recent tests, they also showed that the serum derived from poultry blood and biological matter has the potential to replace foetal bovine serum as a medium to cultivate cell-based meat, as it has similar concentrations of growth factors and other nutrients.

Chen added: "The cultivation of lab-grown meat has the potential to reduce and even one day end the slaughter of farm animals and the impact rearing farm animals has on the environment. But it is expensive, partly due to the high cost of the medium that is used to grow the meat. Our collaboration with Leong Hup Singapore sees us applying innovations developed by NTU's Food Science and Technology Programme to address that problem, bringing down the price for the medium, while repurposing materials that would otherwise have been discarded."

Lau said that Leong Hup is currently testing the innovations in its Singapore plant, and expects to implement the products it has developed with NTU in its overseas plants in Malaysia and Southeast Asia, by 2023.

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CONTACT

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CASE STUDY

Making more beer in less time

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Australian manufacturing performance software company OFS and US 'grain-to-glass' brewery data management company The 5th Ingredient have signed a craft brewing partnership to help the companies expand in each other's home markets.

The software duo have integrated their technology to help brewers of all sizes make more beer in less time, with less waste. OFS's software uses sensors to draw real-time data from the packing line to identify and reduce inefficiencies and waste, while The 5th Ingredient's Beer30 brewery software assesses data from the moment raw ingredients are purchased to when the can, bottle or keg is sold.

OFS CEO James Magee said craft brewers typically spend over half their time *not* making beer, which is a data problem the partnership can solve.

The software integration between Beer30 and OFS provides visibility into yield, covering losses from every step of the brewing and packing process in real time. For example, OFS could capture a series of downtimes on the filler correlating to a CO_2 quality issue captured by Beer30, which has affected a portion of the product. If the overall problem is related to raw ingredients, it could also identify the relevant batch and which products were affected, preventing a larger-than-needed product recall.

OFS's software is used by around half of Australia's craft breweries, including Stomping Ground and Tribe Breweries.

The 5th Ingredient has already deployed its software in more than 10% of the Australian industry, while OFS, having recently launched in the US, has already signed its first three US breweries, including Pelican Brewing Company. The brewing software specialists now aim to expand their footprint across both countries.

The solutions can be used for brewers of all sizes and, depending on the size, even 10 minutes of downtime solved could equal thousands or hundreds of thousands of dollars in gained production.

The 5th Ingredient CEO Pulkit Agrawal said:"Many decisions in breweries are made based off anecdotal evidence that emerges on day six or seven of production. Together with OFS, we can highlight the issue on day one or even zero, before production begins. This helps craft brewers change from being reactive to predictive and proactive."

The software combination can also be used in non-alcoholic beer production.

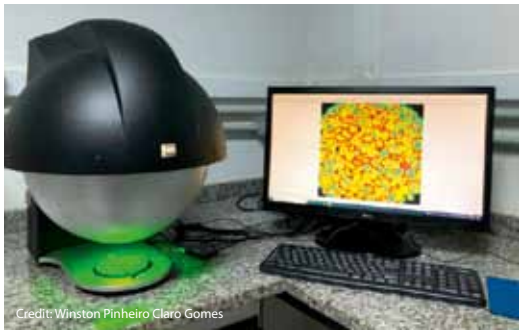
OFS
www.ofsystems.com

iStock.com/gerenme

Coffee beans sorted

Researchers in Brazil have developed a real-time selection method performed directly with coffee beans. The method doesn't require roasting, doesn't destroy the samples and can be included as a step in the production process.

The process of selecting specialty coffee beans currently entails three kinds of inspection. Two are physical and involve samples of raw and roast coffee; and the third is sensory, involving tasting the drink. In accordance with Specialty Coffee Association of America (SCAA) guidelines, coffee quality is measured on a decimal scale from zero to 100. A specialty coffee must score 80 or more.



Multispectral images based on reflectance and autofluorescence are processed using mathematical models.

Brazilian scientists at the University of São Paulo's Center for Nuclear Energy in Agriculture (CENA-USP), collaborating with colleagues at Luiz de Queiroz College of Agriculture (ESALQ-USP) and the Computer Center at the Federal University of Pernambuco (UFPE), have now developed a coffee bean selection method based on multispectral imaging and machine learning. Although it relies on expensive equipment, the method doesn't require roasting and can be performed in real time during the production process. An article about the new method has recently been published in *Computers and Electronics in Agriculture*.

"Specialty coffees are often selectively harvested, meaning only the ripe red cherries are picked. They're harvested individually by hand. If a specialty coffee grower harvests green beans, or at any time uses strip picking, manual and/or mechanised, this procedure can result in a standard commercial crop," said Winston Pinheiro Claro Gomes, first author of the article. Gomes is a PhD candidate in chemistry at CENA-USP, with Wanessa Melchert Mattos and Clíssia Barboza da Silva as thesis advisors.

To discriminate between 'special' and 'traditional' classes of green coffee beans, an advanced multispectral imaging technique based on reflectance and autofluorescence data was employed in combination with four machine learning algorithms (SVM, RF, XGBoost and CatBoost). Of the four algorithms, SVM showed superior accuracy (0.96) for the test dataset.

Using the images, the machine learning model can classify beans. Specialty beans were seen to be more uniform in shape in the visible spectrum (RGB) images, while standard beans were more intense in the autofluorescence images.

"The model we chose was the one that performed best in distinguishing between specialty and standard coffee beans. In this model, the most important information for the purpose of constructing separation boundaries came from the green fluorescence. We therefore decided to analyse the individual compounds that naturally display green fluorescence and tried to associate some fluorescent compounds that might influence the coffee grading separation process," Gomes said.

Green fluorescence, a biological marker represented by green light in the visible spectrum, was analysed for 10 phenolic compounds, and the data showed that catechin, caffeine and certain acids (4-hydroxybenzoic acid, sinapic acid and chlorogenic acid) responded intensely after being excited with blue light at 405 nanometres (nm), emitting energy at 500 nm. This autofluorescence data (excitation/emission at 405/500 nm) contributed most to distinguishing green specialty beans from green standard beans.

Next steps, according to Gomes, will entail obtaining samples from each of the SCAA-defined score levels for specialty coffees (no easy task) and classifying the beans according to their scores. "In Brazil, coffees are rated at most 90–92. It's hard to find any higher than that. Only imported coffee, from Ethiopia, for example, scores 100. In my PhD research, I'm attempting to classify beans on the basis of X-ray images, and I've decided to increase the number of samples and the breadth of the analysis by including imported beans," he said.

CASE STUDY

Harnessing the sun for water at winery

Andrew Peace Wines is one of Australia's largest family-owned wineries. It is committed to producing the highest quality products while improving operational sustainability.

The vineyard and winery operations use a considerable amount of water, which is typically pumped from the Murray River. Electricity supply for the pumping stations is often at the end of long supply feeders.

Andrew Peace Wines had an opportunity to source water from an artesian source on its land, which would reduce its offtake from the Murray River. This project involved building a water treatment plant that required a reliable power supply and the company also wanted to make it renewable.

The solution

Acacia Energy, with expert support from its Engineering Procurement and Construction partner, AEES Group, completed a detailed analysis of Andrew Peace Wines' situation and developed a bespoke solution comprising:

- 1 MW of ground mount solar PV, and
- 3500 kVA bio-diesel generators.

The impact

The 1 MW solar system displaces electricity for daytime operations all year round and significantly reduces the amount of electricity drawn from the network.

The 3500 kVA bio-diesel generators provide power when supply from the electricity network is not available, ensuring that water is always available for operations.

This solution decreased the water-treatment plant's energy consumption with 42% of the electricity used yearly replaced by the energy produced by the Acacia Energy renewable solution.

Combining the impact for both the water treatment plant and the winery renewable energy solutions has provided significant savings on their electricity bill.

The project has reduced Andrew Peace Wines' reliance on water from the river system and delivered water for operations at a lower cost.

Acacia Energy
www.acaciaenergy.com.au

Air cleaning system for powder

Worldwide, about 80% of the cleaning of powder mixers is done by manual dry cleaning. In the case of paddle mixers, this is a difficult and time-consuming job that can take about 90 min for one operator. Tetra Pak now has a new cleaning method using Air Jet technology that takes only 30 min each time.

The Tetra Pak Air Jet Cleaning system for Powder uses a patented technology in powder handling. Jets of compressed air are used to break the interaction between particles and stainless steel surfaces and between the particles themselves. The air jets suspend powder particles so they can be extracted from the mixer using a vacuum system.

The technology is not just intended for full cleaning, but it can also be used for flushing for a few seconds to avoid powder fouling on surfaces. For example, layers of powder can build up on the ceiling inside the mixer when running one batch after another without cleaning in between. If these residues drop down, they can affect the homogeneity of the product. In the case of infant milk formulas, it is not the base powder that sticks to the ceiling, but micro-ingredients.

Normally operators need to manually remove the layers of powder that build up. As an alternative, flushing dislodges powder stuck on surfaces and avoids the build-up of layers. As a result, the powder goes into the product instead of being lost. Flushing can be done without needing to open the mixer and without impacting the production schedule, which is an advantage.

The Air Jet technology is designed to reduce not just the time for manual cleaning but also the frequency of cleaning due to the timely use of flushing. As the technology can reduce the amount of direct intervention by operators in the mixer, it can also increase food safety.

The technology cleans fast and with minimal residual powder so users can switch hygienically from one recipe to another as quickly as possible.

The technology is a form of dry CIP (cleaning in place) that can in some cases replace wet CIP using liquids. Users can reduce the environmental impact and cleaning costs because no water, no chemicals and no detergents are needed.

Tetra Pak Air Jet Cleaning system for Powder is an option that can be fitted not just onto the Tetra Pak Powder Mixer B range of paddle mixers but onto other brands of mixers or other types of powder handling equipment.

Tetra Pak Marketing Pty Ltd

www.tetrapak.com/au

Double wall modular magnet filter for chocolate

The range of magnetic filters that Goudsmit Magnetics from Waalre has been manufacturing has recently been expanded with a modular, double-wall chocolate filter.

The hygienic magnet filter is composed of neodymium magnets that can remove pieces of iron as small as 30 μm, weakly magnetic particles and even iron dust from sticky substances such as chocolate.

The housing is made from one piece of type-316 stainless steel. The new design prevents heated liquid such as water from entering the product channel. The water flows through the outer wall of the filter and keeps the chocolate liquid. With its fully modular design, a standard filter vessel of choice can be an ISO or a DIN pipe.

This makes the filter simple to integrate into existing installations and also suitable for many couplings. The system meets the stringent requirements within the food industry such as HACCP and EHEDG.

The modular design allows adaptation to different options. A powerful magnetic core can increase the magnetic value to 11,000 G. Cleaning can take place semi-automatically with the help of a tool.

The optional 'Lock out, Tag out' or 'LoTo' safety system is designed to ensure that the magnet will only return to production if the magnet is properly replaced after cleaning.

The magnetic filter is used in tubes and/or pipelines in the food industry, where it performs deferrisation of products conveyed under pressure. Even small iron particles can be filtered out of sticky substances.

Goudsmit Magnetics

www.goudsmitmagnets.com/en

Data cable range

Thanks to their chemical resistance, as well as being highly ozone-, UV- and weather-resistant in compliance with EN 50396 and HD 605 S2, the ÖLFLEX and UNITRONIC robust cables from Treotham are certified to be suitable for wet cleaning in the food and beverage industry in accordance with ECOLAB, European and North American standards.

When in contact with hot steam, the cables have a service life 10 times greater than normal rubber or polyurethane sheathed cable. This makes the series suitable for indoor and outdoor use in machine tool building, food & beverage, the chemical industry, medical engineering, laundries, car wash systems, composting and sewage plants and agricultural machinery.

The ÖLFLEX robust range are flexible down to -40°C with a low-capacitance design. They are also suitable for use in fresh water down to 10 m depth at max. and water temperature of +40°C according to EN 50565-2 and have a core insulation made of modified PP. An option for EMC-sensitive environments is also available.

The UNITRONIC robust range are for use in data processing, measurement and control engineering, safety-related systems and as electronics cable. They have a core insulation made of special halogen-free compound and low smoke density according to IEC 61034-2.

Treotham Automation Pty Ltd

www.treotham.com.au

Mass flow meter and controller

The FLEXI-FLOW mass flow meter and controller from Bronkhorst combines the advantages of a through-chip-sensor with bypass technology. The company says the compact thermal mass flow meters and controllers are 35% smaller than traditional instruments, and offer flow ranges up to 20 ln/min.

Due to the sensing technique, the instruments feature stable but fast flow control, with settling times smaller than 150 ms.

FLEXI-FLOW instruments have integrated temperature and pressure sensors and an onboard gas database for high accuracy, even in varying process conditions. With this technology, the instruments are adaptable to many applications through their wide dynamic flow ranges (up to 1:1000). The temperature and pressure signals may provide the user with information about the actual process conditions.

For easy set-up and monitoring of the instruments and the process, Bronkhorst has introduced a USB-C port, optional Bluetooth communication and NAMUR status indication by means of coloured LEDs and digital output parameters. FLEXI-FLOW is available in two preconfigured models, as a built-to-order version or as a customised, multi-channel solution, each including software tools for configuration, diagnostics and predictive maintenance.

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

Media preparation system for food testing

Merck's Life Science business sector has launched the ReadyStream system — a system that is designed to easily prepare and instantly dispense culture media for use in microbiological food testing.

With traditional microbiological food testing methods, quality control lab technicians prepare the culture media themselves or use voluminous bags of ready-to-use media. This makes culture media and sample preparation a time-consuming, multi-step process.

The ReadyStream system has been designed to eliminate five time-consuming steps in the testing process, supporting food & beverage testing labs with a simplified workflow that can save time and resources.

Up to 100 L of ISO 11133-compliant culture media can be prepared at the touch of a button right in the lab, at the point of use. Concentrated media is diluted with sterile water to dispense up to 100 L pre-heated culture media from a 10 L bag (shipped dry and reconstituted with the system). Autoclaving, powder handling, washing and dealing with bottles are eliminated from the process. The system also removes the need to handle or move heavy bags of ready-to-use culture media.

Merck Pty Ltd
www.sigmaaldrich.com/AU/en

Getting it sorted:
more product from one fish

Scientists from the Chalmers University of Technology in Sweden have developed a new fish sorting technology designed to take as much food product from the fish during processing, similar to how it's done in the meat processing industry.

Currently fish processing will see fillets removed and the rest of the fish being used as animal food or even discarded as waste, with only half the fish used for food. The new technique has been developed to split the fish up into five components instead of just the fillets.

"With our new sorting method, the whole fish is treated with the same care as the fillet. The focus is on preserving quality throughout the entire value chain. Instead of putting the various side-streams into a single bin to become by-products, they are handled separately, just like in the meat industry," said the project's research leader Ingrid Undeland, Professor of Food Science at the Department of Biology and Biological Engineering at Chalmers.

The method involves filleting the fish and then dipping the remaining parts of the carcass into a special solution to allow for further processing. This solution contains ingredients that extend the shelf life of the product. These parts of the fish — the head, backbone, viscera and belly flap, and tailfin — can be then used in other applications such as fish mince, nuggets, oil and even collagen products.

As the belly flap and intestines are rich in marine omega-3, they can be used for oil production. The tail fin has a lot of skin, bones and connective tissue and is therefore well suited to such things as producing marine collagen. In addition to food, marine collagen is also used in cosmetics and 'nutraceuticals'.

The research was performed as part of the WaSeaBi project, an initiative that is trying to better utilise the by-products of the seafood industry.

"Our study shows that this type of sorting technology is important, particularly as it means we can avoid highly perishable side-stream cuts being mixed in with the more stable cuts. This new method brings fresh opportunities to produce high-quality food," said Chalmers researcher Haizhou Wu, first author of the scientific article.

A Swedish fish processing company, Sweden Pelagic, is already using parts of the technique in its production and has seen good results.

"The sorting technology gives us many more opportunities to develop healthy, new and tasty foods and to expand our product range," said Martin Kuhlin, CEO of Sweden Pelagic.

"This year, we estimate we'll produce around 200–300 tonnes of mince from one of the new cuts and we aim to increase that figure year on year. The interest is there, in the food industry and public meal production segments like school catering."

The study was published in *Food Chemistry*.

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CASE STUDY

Beating back salmonella with oil and acid

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Research published in the journal *Applied and Environmental Microbiology* has suggested that oils may be the key to preventing the spread of salmonella in food manufacturing.

Recent outbreaks of foodborne salmonella have been associated with chocolate and peanut butter. Despite the bacteria struggling to grow on these foods due to their low water content, cells can survive and become resistant to heat-based treatments, which can lead to outbreaks of the disease.

The solution, the researchers say, is to use an oil-based formulation in combination with food-grade organic acids that can kill dried salmonella on stainless steel surfaces.

"Cleaning and sanitation of manufacturing environments are critical for a safe food supply," said lead author Lynne McLandsborough, PhD, a professor of food science at University of Massachusetts Amherst.

"Also, as anyone who has baked peanut butter cookies can tell you, peanut butter and water do not mix, and clean-up with water is challenging."

Water-based solutions are rarely used to clean environments used in peanut butter processing as it can encourage bacterial growth. Instead the equipment is cleaned with heated oil and then left to cool overnight, after which a flammable alcohol-based sanitiser is applied.

However, for this study the scientists tried a different method using an acidic component. They dried salmonella on stainless steel surfaces in a controlled humidity environment and then covered the bacteria with oils and acids with various properties.

They found that after using peanut oil that was mixed with a low concentration of acetic acid, which is found in vinegar, and then applying heat, "killing was much greater than expected, indicating a synergistic effect," McLandsborough said. "Our results show that acidified oils could be used as an effective means of sanitation in low-moisture food processing facilities, where water-based cleaning can be challenging.

"To our knowledge, using oils as a carrier of organic acids is a novel approach to delivering antimicrobial compounds against food-borne pathogens."

The research may thus lead to adaptation of oil-based systems for industrial cleaning, for example, of machinery for processing chocolate and peanut butter, McLandsborough said.

"That would enable more frequent cleaning, boosting the safety of these products."

Refrigerant dryers

The BOGE DT refrigerant dryer series have been designed for sustainability. Models in the range keep a constant dewpoint of 3°C at a free air delivery of between 0.4 and 14 m³/min and the products come with an 'all-in-one' aluminium heat exchanger operated in a reverse flow process and containing an air/air heat exchanger, evaporator and condensate drain. The R-513A refrigerant used means the models are compliant with Regulation EU 517/2014 on fluorinated greenhouse gases. The range's refrigerant circuits are hermetically sealed.

As hot air is injected below a specific temperature, there is no chance of ice forming in the evaporator. The refrigerant dryer's condensers are amply dimensioned, delivering good operation even for compressed air at an inlet temperature of 70°C. The large fan is mounted directly on the condenser for high cooling air flow.

The CCD 10 condensate drain has electronic level adjustment, so condensate that might form can be drained without pressure losses once a defined level has been reached. If the dewpoint is reached in partial-load operation, the control unit automatically switches off the compressor. The condensate in the heat exchanger then cools the compressed air until the dewpoint once again reaches the target value, allowing the cooling compressor to come back on.

The refrigerant dryer's control system enables continuous monitoring of the pressure and temperature. The pressure dewpoint can be checked with the help of the LED status light. The models come with a Modbus RTU/RS 485 interface, allowing users to detect alarm thresholds and display other parameters and these data can be forwarded to an interlocking control device or master display for further use.

Boge Compressors Ltd

www.boge.net.au

CASE STUDY

Modernising an abattoir's pump technology

A Queensland abattoir was looking for a solution for its DAF tank sludge and scum transfer. It had previously used submersible pumps and double diaphragm pumps, but with limited success. A Hydro Innovations pump specialist recommended the use of a Ragazzini peristaltic (hose) pump for the application.

Ragazzini hose pumps are positive displacement pumps using a set of rollers to compress an elastomeric tube that pushes the fluid contained within it. This means that no mechanical moving parts are in contact with the fluid being pumped, and there are no valves or seals to ever replace. And because the pumps use rollers and not 'shoes', the casing does not need to be filled with an expensive lubricating fluid.

Solution

The abattoir needed to transfer up to 10 m^3/h of the sludge, so Hydro Innovations recommended the Ragazzini MS3 peristaltic pump with fully cast casing, cast iron rotor and cast iron rollers.

The pump only needed to run at the slow speed of 26 rpm to meet the duty, so the pump is expected to have a long service life. It is also fitted as standard with a leak detector that instantly detects a damaged hose. The leak detector stops the pump and sends a warning signal. Pumps are mounted on stainless steel base frames and are supplied with 316SS ports.

The pump was duly ordered and installed. An operator at the plant commented: "It was easy to install and works very well, with little maintenance. A great feature is not having to fill the roller section with glycol, and the quiet operation of the pump."

The operators at the abattoir are very pleased with the solution and have since rolled out the new technology to its other branches around the country.

Ragazzini pumps are available in sizes ranging from 10 mm ports up to 150 mm, with flows from 0.2 L/h up to 180 m^3/h, and with pressures to 15 bar. Various pump hose materials allow pumps to move abrasive fluids, corrosive fluids, fats, oils, along with FDA-approved hoses for foods and pharmaceutical products.

Hydro Innovations
www.hydroinnovations.com.au

Greenfield facility:

plant will use fungi fermentation to produce meat alternatives

Mycorena greenfield production facility

Tetra Pak is teaming up with Mycorena to build a greenfield facility for the production of new meat alternatives. Located in Falkenberg, Sweden, the plant will use fungi fermentation to produce products with lower GHG emissions, land and water use compared to the production of traditional protein sources.

The factory's first phase will include mince-based products that will serve as ingredients for making alternative meat products. Mycorena also has plans to expand its production capacity and extend its geographical reach by opening new factories across Europe and Asia in the near future.

Charles Brand, Executive Vice President for Processing Solutions & Equipment, Tetra Pak, commented: "We are very excited to be working with Mycorena on this project for the innovation and advancement of the food supply chain that aligns with all three areas of our purpose — protecting food, people and the planet. The process of fungi fermentation utilises microorganisms that are bioprocessing powerhouses which can create high-quality, nutritious proteins. They may be small, but they have the potential to make a big impact on building a more robust and diverse food system, cementing a better future for all."

Charles Brand, EVP at Tetra Pak and Dr Ramkumar Nair, Founder and CEO, Mycorena.

Dr Ramkumar Nair, Founder and CEO, Mycorena, added: "Fungi fermentation is the future of the food industry and we are proud to be revolutionising this space. This new fermentation facility is a state-of-the-art production plant, which provides us with a technology blueprint that will be further expanded in Sweden and replicated globally. For such an ambitious journey, Tetra Pak is the ideal partner for us, not only because of their cutting-edge expertise in processing, but we also have a shared ambition to develop a more sustainable food supply chain."

Fungi fermentation is one aspect of food fermentation, which takes natural, age-old processes and uses microbiology to turn microorganisms into tiny production centres that make protein-rich products including alternatives to meat, seafood and dairy. The process also serves to improve texture and taste of traditional plant-based food products.

Tetra Pak Marketing Pty Ltd
www.tetrapak.com/au

Beverage packaging machinery system

Graphic Packaging International is set to unveil its ClipCombo packaging machinery system at drinktec 2022, being held in Munich, Germany, from 12–16 September.

The flexible system combines multiple packaging solutions over a modular machinery system, suitable for beverage manufacturers using fibre-based packaging solutions. It provides users with the ability to run multiple fibre-based multipack styles across the same machine.

Machine options are available for either cans or PET bottles, offering multiple combinations, including: KeelClip plus EnviroClip fibre-based clips for can multipacks; GripClip plus EnviroClip fibre-based clips for can multipacks; and Cap-It plus EnviroClip fibre-based clips for PET bottle multipacks.

Benefits include high speeds of up to 400 packs/min (dependent on application) and rapid changeovers.

The new approach to machine system development will allow Graphic Packaging to add to its clip-style packaging range and further help users eliminate plastic rings and shrink wrap across their product range.

Graphic Packaging International Australia Pty Ltd
www.graphicpkg.com

Aseptic packaging system

The Sidel Aseptic Predis X4 is an integrated blow-fill-cap solution that incorporates consolidated Predis dry preform sterilisation, making it suitable for sensitive beverages in PET bottles. The flexible, easy-to-use system builds on Sidel's aseptic technology and introduces further innovation in design and digitalisation.

An evolution of its existing range, the Aseptic Predis X4 is developed by Sidel to help users meet the growing market for healthy and nutritious drinks with a long shelf life, such as juice, nectar, soft drinks, isotonics, teas (JNSDIT) and liquid dairy products (LDP).

The solution will be introduced at drinktec 2022 from 12–16 September 2022 in Munich, and will then go through a progressive deployment plan across applications and regions.

Sidel Oceania Pty Ltd
www.sidel.com

Compact tray sealing machine

The Proseal GT4s compact tray sealing machine is designed to maximise the use of pack room space while delivering fast speeds of up to 140 atmospheric packs/min with a seven-impression tool.

The GT4 features the company's Pro-Motion technology to increase throughput with following motion and intelligent buffering technology that enables trays to feed continuously into the sealer without stopping. This is claimed to improve speeds by up to 30%. The GT4s also can be customised to include free flow gas flush modified atmosphere packaging (MAP) to further extend the shelf life of perishable products.

Furthermore, the machines are capable of handling modern pack formats such as the Alexir Stackpack, a craft-board punnet that provides an inline, off-the-shelf, fully printed card punnet, and the CKF Earthcycle Punnet that offers a plastic-free equivalent to a plastic punnet.

Proseal Australia
www.prosealaustralia.com

Image credit: QUT

Research centre opens to boost indoor air quality

An Australian Research Council (ARC) training centre that concentrates on improving indoor air quality and reducing spread of airborne infections has been announced.

The ARC Training Centre for Advanced Building Systems Against Airborne Infection Transmission is aiming to develop standards that would improve air in new builds.

The project, which will be hosted at QUT's Gardens Point campus, aims to reduce transmission of diseases indoors through principles, technologies and systems that can be used in building control and management. The centre will be cooperating with the Advanced Manufacturing Growth Centre (AMGC) to translate research into useful practical solutions.

"I firmly believe the centre will be a catalyst for revolution and bring us closer to clean indoor air becoming the norm," said QUT Distinguished Professor Lidia Morawska, who is leading the centre.

"Our work will see Australian building system manufacturing companies working alongside international companies, as forerunners in establishing the new norm."

Last year Morawska called for the development of new standards of air quality to help deal with COVID-19, saying that food processing plants would do well to prioritise the improvement of air quality in order to reduce illness amongst workers. Meat packers were notably impacted by COVID-19 throughout the pandemic so far, with close proximity, low temperatures and poor air filtration blamed, and some adopted new technology to counteract these problems.

Infection by airborne diseases has an impact on the workplace due to time that workers have to take off, leading to millions of dollars in lost productivity each year. Using new standards and products to fight this will be a big undertaking but will reduce illness.

"Respiratory infectious diseases spread mainly by airborne transmission, which is the inhalation from the air of virus or bacteria-laden particles generated during breathing, speaking and all other human respiratory activities. Protecting building occupants from airborne infection in all shared interior spaces must be strategically controlled," Morawska said.

"This has never previously been envisioned outside specialised sections of healthcare facilities."

Ultrasonic flow meter

Bronkhorst has released a new model of the ES-FLOW family: the ES-1x2C. This flow meter will cover the flow range just below the existing ES-1x3I or ES-1x3C.

The market for low liquid flow range of ≤1000 kg/h or L/h measurement and control is an important section to Bronkhorst, due to its size and the expected future growth.

The ES-FLOW product series offers a good performance of ≤0.8% Rd at an economic price level. Mini CORI-FLOW offers a higher performance, but this high-performance level at ≤0.2% Rd is not always required. Both flow meter series always include the same Bronkhorst features such as onboard PID-controller, totaliser and alarm functions, and many communication buses.

The ultrasonic flow meters ES-1x2C and ES-1x3C are compact, versatile (eg, liquid independent), provided with a straight sensor tube, eg, low internal volume, easy to clean, low-pressure drop in relation to sensor diameter and equipped with advanced signal processing (eg, dosing functionality).

AMS Instrumentation & Calibration Pty Ltd
www.ams-ic.com.au

Central vacuum system

The Leybold NDi central vacuum system is for food and packaging applications requiring a hygienic central vacuum supply.

Easy to operate and compact, the system is based on the dry-running NOVADRY screw pump and the integrated VAControl CAB controller for smart control.

By equipping the standardised NDi pump systems with the VAControl CAB, the Leybold system helps ensure control of all processes. Continuous data recording helps achieve maximum production quality, with the encrypted pump data available regardless of location. Individual users can access the server at any time — users can choose between local, remote or cloud connectivity.

Direct control of the system is possible via various interfaces and end devices.

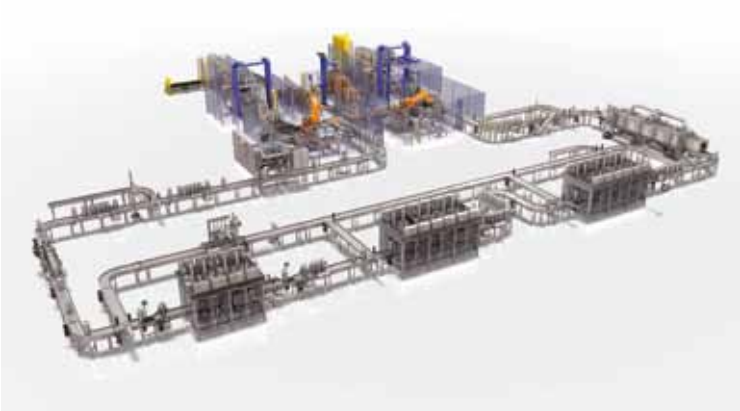
The intelligent software functions that Leybold has stored in the control system are user-friendly and serve the entire process planning: for example, they can be used to control the starts and stops of several pumps, the pressure control and the cloud communication via GENIUS. The maintenance and service recommendations of the vacuum system are generated by the computer depending on the operating times.

The standardised NDi vacuum systems are available fully assembled in different pumping speeds: as ND 400i with 400 m^3/h pumping speed and as ND 600i version with 600 m^3/h pumping speed. Other features include a strong vacuum performance up to a working pressure of 5 mbar, intelligent pressure adjustment and control of the target pressure.

Applications include: food and packaging processes (ie, packaging of red meat with modified atmosphere (MAP)); research and development; pick and place; and production of electronic components.

Atlas Copco Group
www.atlascopcogroup.com

Automatic kegging line



The Innokeg AF-C Transversal from KHS is an automatic kegging line that can wash and rack up to 500 kegs per hour.

The line does not use separate belts for infeed and discharge upstream and downstream of the actual machine. Instead it uses a centralised conveyor system that reduces the footprint of the line by transporting the keg through the middle of the paired opposite processing stations on a single conveyor belt.

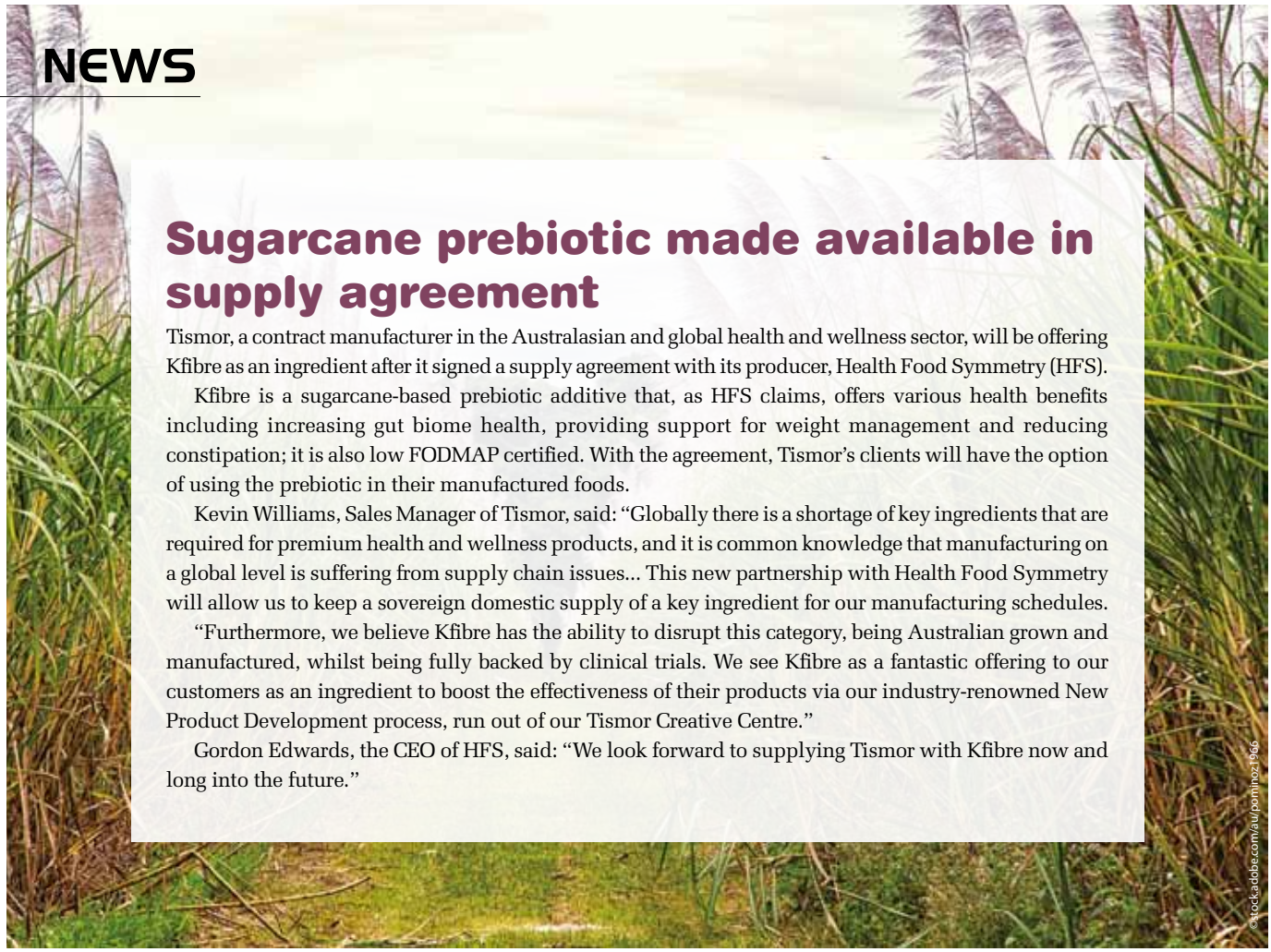
The system is modular for flexible expansion. Two modules with two respective processing stations can be combined in a single block frame and the block fits into a standard overseas container. A machine can be flexibly configured with up to four blocks with two modules each. This is equivalent to 16 treatment heads that can function as a pre-, main or combined washer or filler respectively.

In configuring the overall line 12 washing stations can be combined with eight racking stations, for instance, to balance the different cycle times. Individual modules in the block can initially be left empty and simply fitted with further processing stations at a later date should the necessity arise.

The line is suitable for most market-standard returnable and non-returnable kegs and optional modules allow for the automatic adjustment to different keg heights and diameters.

It features an Innopal RK palletiser to move the kegs, as well as an on-demand turner, fitting position detector and decapper. Kegs are cleaned and soaked. The Direct Flow Control filling system helps with the filling. An inkjet is used for labelling.

KHS Pacific Pty Ltd
www.khs.com



Sugarcane prebiotic made available in supply agreement

Tismor, a contract manufacturer in the Australasian and global health and wellness sector, will be offering Kfibre as an ingredient after it signed a supply agreement with its producer, Health Food Symmetry (HFS).

Kfibre is a sugarcane-based prebiotic additive that, as HFS claims, offers various health benefits including increasing gut biome health, providing support for weight management and reducing constipation; it is also low FODMAP certified. With the agreement, Tismor's clients will have the option of using the prebiotic in their manufactured foods.

Kevin Williams, Sales Manager of Tismor, said: "Globally there is a shortage of key ingredients that are required for premium health and wellness products, and it is common knowledge that manufacturing on a global level is suffering from supply chain issues... This new partnership with Health Food Symmetry will allow us to keep a sovereign domestic supply of a key ingredient for our manufacturing schedules.

"Furthermore, we believe Kfibre has the ability to disrupt this category, being Australian grown and manufactured, whilst being fully backed by clinical trials. We see Kfibre as a fantastic offering to our customers as an ingredient to boost the effectiveness of their products via our industry-renowned New Product Development process, run out of our Tismor Creative Centre."

Gordon Edwards, the CEO of HFS, said: "We look forward to supplying Tismor with Kfibre now and long into the future."

Aseptic cleaning system

SPX FLOW has released a new design of its APV Aseptic Rapid Recovery System that is suitable for high-value and sensitive products. Featuring steam barriers and pressurisation, the technology is designed to provide dairy, personal care and plant-based processors with a higher level of hygiene and food safety.

The market for ambient yoghurt and dessert — which use aseptic systems — is on the rise. Ambient yoghurts are heat-treated after fermentation, providing similar benefits to cold yoghurt but with a longer shelf life. These products demand an aseptic set-up for downstream process. SPX FLOW's recovery system is suitable for this application, saving more high-value product through a quicker cleaning process. It can also be used for other high-viscosity products, including creams, cosmetics and nutraceuticals.

The system is designed to clear product from process pipes in a more sustainable way — using approximately 60 to 70% less water compared to other cleaning systems. It can be easily retrofitted into existing plants, and parts are traceable. The system is optimised for aftermarket parts, including valves, actuators and gaskets.

SPX FLOW TECHNOLOGY PTY LTD
www.spxflow.com/au

Sifter for alternative foods

The GEA Scan-Vibro Sifter type SRW helps to meet the growing demand for vegan and alternative foods. It is designed specifically for dewatering ingredients such as spent grain or yeast from breweries, tea leaves or coffee grains from beverage plants and even insect larvae, a source of valuable proteins, fats and carbohydrates for conventional as well as novel food applications. The sifter can be placed at the start of a line to remove contamination and provide a consistent feed, centrally to remove unwanted material or to recycle product or immediately before packing for a high-quality product.

It has a V-shaped seal between the sifter mesh and the sifter body has been integrated into the sifter to prevent product losses and contamination. The sifter's inlet has been redesigned for better distribution of product across the whole surface of the mesh. This improves the separation process to enhance product recovery and further reduce the moisture content at the solid's outlet.

The product is available with the company's ViwateQ treatment on all surfaces, making it difficult for bacteria to adhere, so hygiene is improved and cleaning is simpler and faster. A cleaning-in-place system is included. A pneumatic screen tensioner improves screen service life and allows screens to be changed without tools.

The sifter can handle a wide range of products, is efficient with low power consumption, is capable of 24/7 operation with long service intervals and can comply with USDA 3-A, EHEDG and ATEX guidelines.

GEA Group

www.geagroup.com.au

CASE STUDY

Test plant for sugar reduction in juices

GEA is working with Israeli start-up Better Juice to help manufacturers reduce the sugar content of their beverages. It is doing so by installing new equipment — the GEA Better Juice Sugar Converter Skid — at its Ahaus Test Center that will conduct product tests. The two companies inked a partnership deal in 2021.

The equipment uses an enzymatic process that can help to remove up to 80% of fruit juices, concentrates and mixtures. In a bioreactor, the sugars in these products are converted to prebiotic, non-digestible molecules that help intestinal flora.

"We can now collaborate with our customers at the Test Center to strike the ideal balance between a sweet note and reduced sugar content," said Gali Yarom, co-founder and joint CEO of Better Juice.

Companies will be able to receive support and guidance from GEA's specialist engineers and Better Juice's microbiologists, and the facility will provide analytical lab services.

"It's often necessary to initially demystify innovative solutions like the Better Juice process. That's why it's all the more important to make the case for the technology with manufacturers in person," said Sascha Wesely, who leads the Non-Alcoholic Beverages business at GEA.

Image credit: GEA

"The Ahaus trials help us optimise process efficiency right from the outset. By running scalable tests under real-life conditions, we significantly cut the time to market."

GEA Group
www.geagroup.com.au

CASE STUDY

Bringing a can-do attitude to brewery

CCU Argentina, the Argentinian branch of the Chilean company Compañía Cervecerías Unidas, has increased its market share by using aluminium cans as a method of serving its beers, with the filling machinery for this process being upgraded by KHS.

When the relationship between the two companies began in 2016, glass bottles were the normal way of consuming beer, but CCU Argentina wanted to move to aluminium cans as its method of providing beer thanks to the logistical advantages of such a change. It equipped its brewery, based in the city of Luján, with new filling and packaging machinery and quickly introduced a trio of cans that proved popular in the local market.

A filler machine was installed in three months, which allowed CCU to fill aluminium cans starting in the 355 mL size and progressing to the larger 473 mL size in 2017 and then the a large 710 mL can in 2018. The latter size proved so popular that it went from being produced two days a month to four days a week.

In 2020 CCU again wanted to expand its production capacity by using machinery from KHS. A similar set-up to that of the prior expansion was utilised: KHS installed an Innofill Can DVD filler with a Ferrum seamer and an Innopas SX tunnel pasteuriser to keep product safety high, with Innopack Kister SP and PSP shrink packers for the packing process.

The new line has a capacity of 72,000 cans an hour and now, after its installation, CCU Argentina is processing around 200,000 cans of beer hourly. This has resulted in the brewery increasing its market share to 33%.

"The teamwork between our two companies was like nothing else I've ever experienced in any other project. Before the pandemic our KHS colleagues were a fixed feature of our soccer matches every Wednesday evening and were of course invited to the barbecue afterwards. This was real camaraderie," said CCU Argentina's Héctor Mungo.

KHS Pacific Pty Ltd
www.khs.com

5G technology trial for the Australian meat processing industry

BAI Communications Australia (BAI) has announced its participation in a 5G funded trial with the Australian Meat Processor Corporation (AMPC) and developer of augmented intelligence technologies Bondi Labs.

BAI will design, supply and install a 5G communications network at two regional red meat processing facilities that will deliver the high-speed connectivity required to enable smart verification technologies such as high-fidelity video streaming that can be used for remote auditing and compliance monitoring through computer vision technology.

BAI's knowledge and experience of private 5G networks will be instrumental in Bondi Labs' development and rigorous testing of two use cases: SmartInspect and SmartPack. Both innovations are designed to increase productivity and efficiency in the highly regulated red meat processing industry.

SmartInspect allows meat processing employees, wearing live-video streaming glasses, to participate in remote audits and inspections, and undertake remote equipment maintenance and remote training, delivering savings in time and travel. SmartPack leverages the power of AI to identify different types of meat products and verify that carton contents exactly match carton labels. This technology reduces the potential for human error by being able to correctly identify a wide range of symbols, including languages that use special characters, such as Mandarin and Japanese.

Nick Gurney, Director of Telecommunications, BAI Communications Australia, said, "The trial is an opportunity to showcase ever-advancing Industry 4.0 digital technologies that leverage artificial intelligence (AI) capabilities to better support the industry through advanced interconnectivity, automation and machine learning. BAI's private 5G network solution is a viable, futureproof technology that will deliver the connectivity regional meat processors and other industries need to realise the significant benefits and savings enabled by 5G use cases and Bondi Labs' innovations.

"Meat manufacturing is one of this country's largest manufacturing and agricultural export industries, vital to the Australian economy. Leveraging the benefits of automated intelligence will bolster the industry's already excellent international reputation and provide increased employment security for thousands of meat processing workers across regional towns and centres."

The project is part of the Australian Government's 5G Innovation Initiative which provides businesses with opportunities to trial and test 5G applications that demonstrate 5G's capability and benefits across a range of industry sectors and locations.

Bondi Labs' Research and Engagement Manager, Dr Stuart Smith, said, "The trial is important in assessing the use of 5G technology within a processing plant, as well as from a processing plant to an external party. Work being progressed by Bondi Labs to match carton labels with products in the box requires a stable and high-bandwidth internet connection which is enabled by BAI Communications' solution."

BAI's private 5G network solution enables the trial to be quickly set up onsite, with no disruption to processing operations. The two-month trial will demonstrate the benefits of in-building coverage using low-power 5G access points and moving computing traffic and services closer to processing plant operators by using multi-access edge computing, all within a private 5G network. The company has devised a test plan that, in addition to negating the connectivity problems of being in a regional location, also allows for the extreme temperatures and enormous number of mechanical obstructions typically part of a meat processing plant set-up. Equally important is that this solution can meet the high level of security required at each plant and by the industry at large.

Peter Lambourne, Chief Executive Officer, BAI Communications Australia, said, "We are pleased to be involved in a trial that has the potential to reduce processors' compliance costs, substantially improve operational efficiency and place a leading Australian industry at the forefront of best practices worldwide."

It is hoped that a successful collaboration between BAI and Bondi Labs will be the start of big changes for Australia's red meat processing industry.

BAI Communications
www.baicommunications.com

CASE STUDY

Boosting profits with powdered carrots

UK root vegetable processor Huntapac has used HRS Heat Exchangers equipment to help it produce carrot powder.

The company grows its own root veggies and wanted to find a way of producing a useful product from the 5% of its carrots that were otherwise not suitable for packing customers. The business decided to make carrot powder and it turned to HRS to supply the necessary tools to achieve its production.

"Five per cent may not sound like a lot, but when you are washing up to 400 tonnes of carrots a day, it soon adds up," commented Huntapac's Commercial Director Steven Kay. "We researched a few methods because there are lots of different drying techniques available, and we felt that the process that was right for use was to puree the carrots, put them over a drying drum and then mill the flake that results into a powder."

The process begins when the carrots are diced and then pureed, after which they are fed into the heat exchanger. This consists of two HRS R Series rotary scraped surface heat exchangers placed in series, which raise the temperature of the carrot puree from 10 to 60°C. As well as the heat exchangers themselves, HRS supplied two feed hoppers and an HRS BP Series positive displacement pump to feed the puree into the heat exchanger. The heat for the process is supplied from a dedicated steam boiler and the line has a capacity of 500 kg of puree per hour. The warmed puree is then passed over a drying drum where it is dried to create a flaked product that is milled down into the finished powder.

"Preheating the puree before the drier performs two main functions," explained HRS UK Sales Manager Andy Ensor. "Warming the puree makes it easier to move through the line as it has less resistance, but the biggest benefit is that it reduces the amount of energy needed to dry the puree making the overall process more efficient."

The company now produces 60 kg of carrot powder an hour and it is sold as an ingredient in animal feed.

"With the tight margins involved in fresh produce, it is important to maximise the value of the crop which has cost you money to grow, and this line allows us to utilise the entire crop," said Huntapac's Commercial Director, Steven Kay.

"The line has been designed to be able to handle other crops, but we have initially chosen to focus on carrots, and although we have had to make tweaks as you do with any new process, we are now very happy with the quality and of the product that we are producing."

HRS Heat Exchangers Pty Ltd
www.hrs-heatexchangers.com/anz

Optimising the identification of key odourants in food

The isolation of the volatile fraction from food and beverages is a big challenge, particularly for flavour chemists. In the past 20 years, solvent extraction followed by solvent-assisted flavour evaporation (SAFE) has become the standard approach, particularly prior to GC–olfactometry. However, the manual valve of the SAFE equipment can lead to suboptimal yields and the risk of a contamination of the volatile isolate with non-volatiles.

A research team from the Leibniz Institute for Food Systems Biology at the Technical University of Munich (LSB) has now automated this established method for the gentle, artifact-avoiding isolation of volatile food ingredients by replacing the manual valve with an electronically controlled pneumatic valve. The team's study has shown automated solvent-assisted flavour evaporation (aSAFE) can offer advantages over the manual process by achieving higher yields on average and reducing the risk of contamination by nonvolatile substances.

The optimised method is particularly important for odourant analysis

Odourants contribute significantly to the sensory profile of food and have a major influence on eating pleasure. Knowing the key odourants that shape the aroma of a food is therefore of interest both for analytical quality control and for targeted product development in the food industry.

The manual SAFE technique developed in 1999 made it possible for the first time to easily isolate even thermally labile odourants from food without artifact formation. "This is an important prerequisite for using further analytical methods to identify the key odourants," said Philipp Schlumpberger, who contributed equally to the study with Christine Stübner.

The manual SAFE is established as a standard procedure in aroma research. Nevertheless, the research team saw a need for its optimisation.

"As we discovered, the problems are mainly associated with the manual operation of the valve on the dropping funnel. Therefore, we replaced it with an electronically controlled pneumatic valve. To fully automate the SAFE apparatus, we optionally extended it with an automatic liquid nitrogen refill system as well as an endpoint detection and shutdown system," explained Martin Steinhaus, principal investigator, and section and working group leader at LSB.

The installation of the automatic valve increased yields, particularly for lipid-rich food extracts and for odourants with comparatively high boiling points. In addition, operator errors, which can lead to contamination of isolates with non-volatile substances in the manual version, can be eliminated with the aSAFE.

"In the meantime, automated SAFE has replaced the manual variant in our laboratories. Other academic and industrial research groups are already following our example," Steinhaus said.

1. Philipp Schlumpberger, Christine A. Stübner, Martin Steinhaus. Development and evaluation of an automated solvent-assisted flavour evaporation (aSAFE). European Food Research and Technology, 2022; DOI: 10.1007/s00217-022-04072-1

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NEWS


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Start-up develops marbled cell-cultivated pork loin

While there has been steady and impressive technical progression in the development of cultivated — or lab-grown — meats, they are not able to perfectly imitate conventional cuts. Now an American start-up company has developed pork loin that more closely resembles animal-based meat thanks to the marbling effect of fat rippled throughout.

Novel Farms Inc, funded by investment company Big Ideas Ventures (BIV), has worked to produce a cell cultured cut of meat that is accessible and that has similar properties to regular animal meat.

The company produced an edible scaffolding using a microbial fermentation method. It also produced a tissue development platform that lets the company produce meat from a wide range of different animals.

The new 'cut' of pork has a marbled effect with fat mixed throughout the meat, which is designed to make the cell-cultured product tastier with a good texture.

"Our goal is to accelerate the widespread adoption of cultivated meat and its benefits by producing 'hard-to-resist' whole muscle cuts," said Novel Farms co-founder Nieves Martinez Marshall.

"Therefore, we need to be able to fulfil consumer demand by delivering cultivated meat with the same fibrous texture and mouthfeel as conventional cuts from an animal."

BIV invested in the start-up early, helping it raise $1.4 in a pre-seed funding round.

"We have worked with Novel Farms from their earliest days and are excited about what they have accomplished in the cultivated meat category," said Andrew D Ive, Managing General Partner for Big Idea Ventures.

"They have always tackled the scale-up challenges with fresh and novel approaches and Big Idea Ventures is glad to support them throughout their journey as true innovation leaders. Novel Farms are ones to watch, support and partner with as they bring sustainable protein to the world market."

BIV's investment is part of its larger involvement in the cultivated meats industry.

Organic food colour powders

GNT has expanded its selection of EXBERRY Organics Coloring Foods with a range of powder products for dry applications.

Based on the concept of colouring food with food, the colours are created from edible fruit, vegetables and plants using traditional physical processing methods. They are certified organic in accordance with EU regulations and qualify for clean and clear label declarations.

The powders include yellow, red, pink, purple and blue shades and have been specifically developed for dry applications such as instant beverages, seasonings and cake mixes. They complement the company's liquid range of colours that include yellow, orange, red, pink, purple, blue and green options, which can be used in beverages, confectionery and dairy products.

The powders are clean-label colour concentrates that enable brands to create products that are both organic and visually appealing.

EXBERRY

www.exberry.com

Cultures for dairy-free cream cheese

To help producers meet consumer demands for plant-based products delivering on taste, nutrition and sustainability, Chr. Hansen has developed a range of VEGA Boost cultures, its newest addition to the VEGA Culture Kit.

Chr. Hansen has extended its range of cultures for plant-based dairy alternatives and used them to create a dairy-free fava bean cream cheese that provides good taste, nutrition and sustainability in a formulation which can be allergen-free.

Development of the cream cheese was performed using expertise and ingredients from Ingredion, AAK and Givaudan, who have been working together with Chr. Hansen on new plant-based dairy-alternative concepts at MISTA, a California-based future-food innovation ecosystem. Fava beans proved to have the right sensory, affordability and physical properties to create a product with the functional and nutritional properties needed in a spreadable vegan cream cheese.

The fermented fava bean cream cheese alternative can easily be tweaked by using flavours or spices that meet regional preferences for taste, texture and appearance.

Chr. Hansen

www.chr-hansen.com

Researchers discover biocatalysis-boosting polymers

Researchers from the University of Birmingham have used synthetic polymers to increase the efficiency of biocatalysis, which could have implications for food industries that make use of this process.

Biocatalysis is the use of living systems — such as enzymes, cells or microbes — to induce and speed up chemical reactions; through this method, manufacturers are able to produce ingredients that otherwise wouldn't be possible to make. Production of cheese, bread and wine can all benefit from or directly make use of biocatalysis.

One challenging part of using this technique for the manufacture of foods is that the required microbes, such as probiotics and non-pathogenic strains of *Escherichia coli* (*E. coli*), are generally not good at forming biofilms. These are little communities of cells stuck together and protected by a matrix of extracellular materials. Typically in food processing biofilms are a problem, since they shield nasty bacteria that can cause illness, but when they are used for biocatalysis biofilms can increase efficiency and productivity and can thus be quite helpful.

Solving this issue is usually done through the use of genetic engineering, but such a method is expensive and time-consuming. Now the Birmingham scientists have discovered a way to boost the ability for bacteria to produce biofilms through the use of synthetic polymers. They tested two types of *E. coli*: MC4100 and PHL644; the former is bad at forming biofilms and the latter is good. The bacteria were grown on different materials to compare how they would impact the quality and quantity of biofilm formation.

Hydrophobic, cationic, aromatic and aliphatic polymers all had different effects on the growth of the films but in the end the researchers discovered that through their general use the MC4100 strain of *E. coli*, usually bad at forming biofilms, could actually perform better than PHL644.

Further study found that the polymers were able to act as coagulants and stimulate a process called flocculation that triggers the formation of biofilms by bacteria, potentially explaining the mechanics of how the synthetic polymers were helping. The researchers believe that this method could be used as a way of improving the production of food in a cheap and effective manner.

One of the researchers, Dr Francisco Fernandez-Trillo, said: "We explored a broad chemical space and identified the best performing chemistries and polymers that increase the biocatalytic activity of *E. coli*, a workhorse in biotechnology. This has resulted in a small library of synthetic polymers that increase biofilm formation when used as simple additives to microbial culture. To the best of our knowledge, currently there are no methods that provide this simplicity and versatility when promoting biofilms for beneficial bacteria.

"These synthetic polymers may bypass the need to introduce the traits for biofilm formation through gene editing, which is costly, time-consuming, non-reversible and requires a skilled person in microbiology to implement it. We believe this approach has an impact beyond biofilms for biocatalysis. A similar strategy could be employed to identify candidate polymers for other microorganisms such as probiotics or yeasts, and develop new applications in food science, agriculture, bioremediation or health."

The full paper can be read in *Materials Horizons*.

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3D printing

the sustainable food of the future

Researchers in Singapore are developing methodologies for futuristic new foods manufactured with 3D printers and alternative proteins.

Insects are becoming a more attractive protein thanks to their low carbon, environmental and geographical footprint. However, a plate of crickets may have slightly too many legs for some people, which is why the research team is working to change how this protein is served up, without reducing its nutritional and environmental advantages.

"The appearance and taste of such alternative proteins can be disconcerting for many," said Professor Chua Chee Kai, from the Singapore University of Technology and Design (SUTD).

"This is where the versatility of 3D food printing (3DFP) rises to the challenge as it can transform the way in which food is presented and overcome the inertia of consumer inhibitions."

For instance, commonly known foods like carrots can be mixed with alternative proteins such as crickets to produce a more familiar taste to consumers. This mixture of carrots and crickets can then be extruded by a 3D food printer to create a visually appealing dish that would appeal to the senses.

However, the combining of different food inks and optimising it for 3D food printing is known to be a laborious task as it is usually done on a trial and error-based approach. Therefore, the researchers worked to develop a systematic engineering method that could incorporate proteins into food inks.

The team from SUTD, with collaborators from Khoo Teck Puat Hospital (KTPH) and University of Electronic Science and Technology of China (UESTC), were able to reduce the effort of making this 3D-printed food using a method called response surface methodology. The details of the method are published in *Food Hydrocolloids*.

Professor Yi Zhang, the principal investigator from UESTC, said: "Alternative proteins may become our main source of protein intake in the future. This study proposes a systematic engineering approach of optimising food inks, thereby enabling easy creations and customisations of visually pleasing, flavourful and nutritionally adequate food enhanced with alternative proteins. We hope our work would encourage consumers to eat more of these unfamiliar, but sustainable food items."

The team looked at using three ingredients for their food inks: carrot powder, proteins and xanthan gum. The carrot acts both as a binder and as a way of increasing taste, nutrients and colour, effectively making the 3D printed food less of an insect sludge and more of an enjoyable treat.

A variety of alternative proteins were experimented with, including soy, spirulina and cricket.

Aakanksha Pant, corresponding author of the paper and Research Associate from SUTD, said: "This research study can also be generalised for other food ingredients, and response of the food inks like texture, printability, water seepage may be included for optimisation.

"The response surface method approach may lead researchers to adopt similar method for optimising 3DFP food inks constituting complex multicomponent food ingredients."

The chemical allure of vanilla

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Vanilla is a popular flavour but can be one of the most labour-intensive spices to produce, which can lead to shortcuts in the process resulting in a less tasty product.

Now, scientists have reported a profile of 20 key chemicals found in vanilla bean extracts, including several previously unknown ones, that together create vanilla's complex and enjoyable flavour. The work could help manufacturers and farmers develop better-tasting vanilla and improve quick-curing methods.

The research findings were presented at the fall meeting of the American Chemical Society (ACS).

"Vanilla is the second-most expensive spice in the world," said Diana Paola Forero-Arcila, PhD, who presented the work at the meeting. "One of the reasons it's so expensive is because its flavour is developed during a curing process that takes up to nine months."

Two shortcuts are currently used to get around this long, drawn-out curing process. One is to speed it up with quick-curing methods that attempt to recreate the natural vanilla flavour in a fraction of the time. Another is to make artificial vanilla as an alternative to the real thing.

These alternatives can fall flat in terms of flavour because they both focus on vanillin, Forero-Arcila explained. Quick curing attempts to maximise the amount of vanillin in the cured bean, whereas artificial vanilla contains only one flavouring agent — lab-made vanillin.

Although vanillin is an important part of a vanilla bean's flavour, the alternative products can be missing the complexity of flavour. To capture that complexity, Forero-Arcila, who is a postdoc at The Ohio State University, used an approach called untargeted flavouromics to pinpoint which chemicals in vanilla bean extracts are the most important for the overall aroma and taste.

The researchers first made extracts from 15 beans they sourced from various countries and that were cured differently. They then constructed a chemical profile of each type of bean and identified which compounds were present. To find out how people reacted to the extracts, the team asked more than 100 individuals to taste the samples and rate whether they liked or disliked the flavours.

By connecting the dots between the chemical profiles and the taste ratings, the researchers identified 20 compounds that are the main drivers behind whether a person likes the flavour of a vanilla extract. Of these compounds, some, like vanillin, were expected. However, several compounds important for the flavour were completely unknown, said Devin Peterson, PhD, the project's principal investigator.

The researchers are still analysing these novel vanilla compounds to determine the final structures, but they have observed that the compounds have phenolic and aglycone parts. They also identified some compounds present in the extracts that made people dislike the flavour. One example is anisaldehyde, which has a floral aroma. Forero-Arcila found that anisaldehyde is produced during the curing process from a previously unknown precursor.

CASE STUDY

Researchers find low-cal sweetener that boosts gut health

A team of international researchers has discovered a low-calorie sweetener that is as sweet as table sugar and seems to be able to feed 'good' gut bacteria.

While sugar replacements are commonly used as a way to avoid calories, there are some downsides. For instance eating non-sugar sweeteners may actually increase appetite, and the body seems to be able to distinguish artificial sweeteners from real sugar on a molecular level, making the person feel less satisfied when eating it.

Other considerations are that sweeteners like galactooligosaccharides are not sweet enough to serve as sugar replacements despite their low-calorie nature, whereas others like mogrosides (found in monkfruit) are far sweeter than sugar but can give food an odd flavour.

The researchers, working from the Spanish National Research Council, the University of Reading and research centres in Argentina and England, looked for a compromise between these problems, searching for a low-energy substance that imparted appropriate levels of sweetness.

To do so, they started with lactose and mogroside V, and added β-galactosidase enzymes, resulting in a mixture that contained mostly galactooligosaccharides and a small amount of modified mogrosides.

A panel of sensory experts tasted this substance and found that it was about as sweet as table sugar; lab experiments discovered that it also increased beneficial gut bacteria such as *Bifidobacterium* and *Lactobacillus*. The researchers noted a potential prebiotic effect, with an increase in acetate, propionate and butyrate, all of which drive a healthy growth environment in the gut.

Ongoing studies are planned to understand the impact of this sweetener on human gut health. The researchers think that it may be able to serve as a 1:1 replacement for sugar that actually could make the eater healthier.

What's new

Genuine wasabi, brilliantly coloured apples and AI-designed milk are some of the products that have been hitting the store shelves recently.

Plant-based protein meals

Greens & Goodness's range of plant-based frozen meals are designed to provide healthy convenience. The protein-rich meals include options such as Golden Crumbed Garlic & Herb Schnitzel, Golden Tempura Nuggets, Saucy Garlic & Parsley Kiev and Spicy Bombay Tenders. The range uses pea-based protein so the meals have a pleasant texture, are high in fibre and protein and low in fat. Available at Woolworths. **greensandgoodness.com.au**

Authentic wasabi

Shima Wasabi is offering traditional wasabi root products. Grown in Tasmania, the product range includes wasabi stems, stalks and leaves, as well as powders and pastes, all of which feature a spicy, crisp and clean flavour. Available online. **shimawasabi.com.au**

Award-winning salmon

Huon Aquaculture's range of salmon is suitable for use in salads, pastas, appetisers or straight from the packet, and is rich in omega 3. The salmon is grown sustainably and is recognised in the RSPCA's Approved Farming Scheme. It has also seen recognition in the 2022 Royal Tasmanian Fine Foods Awards. Available from select NSW and WA Coles stores. **huonaqua.com.au**

Sustainably packaged breakfast

We* the many's range of porridge and granola is now packaged in a monomaterial bag that is recyclable to reduce the use of virgin plastics in the supply chain. The products in the new packaging are the brand's Prebiotic Granola, Antioxidant Granola, Turmeric Granola and Antioxidant Porridge. Available from Woolworths. **wethemany.com.au**

AI-designed plant milk

NotCo's NotMilk has been designed by an AI, which picked out the plant-based proteins that are similar to those found in animal milk. This means that the milk, which uses ingredients from cabbage and pineapple for flavour and smell, peas for protein and sunflower oil for sweetness, has similar properties to regular dairy milk. Available from Woolworths. **notco.com**

Sun-soaked apples

Yello apples have a warm yellow skin over a cream-coloured flesh. Developed in Japan, they can be a sweet and crunchy snack or contrasted against the savoury flavours of a cheese platter. Available from select Woolworths and independent grocers. **montague.com.au**

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Printed and bound by Bluestar Print
Print Post Approved PP100007395
ISSN No. 1039-8414

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