March/April 2023
Vol.30 No.6

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2023 food trends: flavours that tell a story

Sour cream sweet potato hummus

Kerry has predicted that food and beverage innovation in 2023 will be inspired by heirloom recipes across generations of tradition globally. In-depth analysis of flavours, ingredients and nutrition trends shaping innovation are contained in the company's annual Taste and Nutrition Charts.

In the coming year, food and beverage choices will continue to be driven by taste. Meeting nutrition goals, simplicity and sustainability will be a motivating factor in food choices. There may be a rise in unconventional flavour pairings such as Sriracha Ginger Citrusade, where the spiciness of ginger and heat of chili will add dimensions to the flavour. Across Asia–Pacific, Middle East and Africa there is a strong interest in provenance, functional ingredients and flavours that tell a story.

Top insights for flavour innovation in 2023

- Old cooking practices and heirloom recipes will re-emerge as tradition and provenance becomes more important. Ingredients such as nutmeg, ashwagandha, Indian gooseberry and ancient grains are becoming more popular in food and beverage applications.
- Mashups of familiar foods and drinks with emerging flavour tonalities will become popular, augmented by the influence of social media channels such as TikTok and Instagram.
- There will be demand for unconventional combinations of traditional ingredients and emerging taste profiles from other regions, such as black sesame crusted meats, sriracha-spiced cocktails, green tahini, saffron and curry aioli. There will also be demand for healthier beverages with functional ingredients such as ashwagandha.
- Product value will be an important factor due to the impact of inflation; however, there will be demand for products that allow permissible indulgence with simple flavours such as cheddar cheese, caramel and fudge across nostalgic favourites like cookies and salty snacks.

Harsch Koshti, regional Taste expert for Kerry Asia Pacific, Middle East & Africa, said demand is rising for foods that offer functionality and simplicity. This includes flavours that convey health with functional ingredients added. Health is an important factor as seen in the rise of healthier snacking options.

Commenting on these taste trends, Soumya Nair, Global Consumer Research and Insights Director at Kerry, said that time-honoured traditions and heirloom recipes are resurging as comfort remains an important factor in food choices. Familiar flavours such as peppermint, hazelnut, chocolate, cheese, and chilli still dominate food choices.

"Through our in-depth research and insights from our teams across the globe, we are seeing how trends are travelling the world — with Asian flavours, such as Cardamom, Japanese Miso, Gooseberry and Hawthorn, reaching Europe and North America, while popular dishes in Europe such as Moroccan Tahini and Italian Bolognaise inspiring innovation in Asia–Pacific. Consumers are travelling the world through taste and we expect that interest and desire in authenticity to continue," Nair said.

Kerry Taste & Nutrition (APMEA)
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Food for thought

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NZ backs out of Manuka honey naming rights case

New Zealand's Manuka Honey Appellation Society (MHAS) discontinued its High Court appeal in the UK at the end of 2022, which means the UK Intellectual Property Office's previous rejection of MHAS's application to trademark the words "Manuka honey" would stand. Weeks earlier, the New Zealand producers also withdrew their application for the 'Manuka Honey' certification mark in the European Union.

The Australian Manuka Honey Association (AMHA) said the withdrawal of proceedings had enormous significance for the thousands of Australians working in the honey industry.

AMHA chairman Paul Callander said: "For five years, the AMHA has been battling the New Zealand MHAS in multiple jurisdictions over their attempts to trademark the term Manuka as exclusively their own. The MHAS backdown means the UK IPO ruling of December 2021 in Australian beekeepers' favour stands, and there is no restraint or trademark on Manuka naming rights."

"Manuka is an Australian native plant and the term Manuka honey has long been used in Australia to describe this unique honey. Australian growers have every right to use the word to describe their produce, as upheld by the UK Courts," Callander said.

The AMHA is still awaiting the outcome of a New Zealand trademark application by MHAS that was heard by the NZ IPO in 2021. The Australian producers mounted a similar defence in New Zealand to their position in the UK and EU hearings.

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JBS Australia to reopen Cobram processing facility

JBS Australia has announced it will reopen its processing facility in Cobram, Victoria, to service the growing demand for lamb, goat and mutton proteins, both in Australia and overseas.

The facility was last operational in 2017 and has been in care and maintenance mode since, consistent with the company's objective to reopen it once market conditions supported its sustainable operation.

The company is now investing around $20 million in the latest processing and safety technologies to restart the facility, which will have the capacity to process up to 4000 head of livestock per day.

As part of the Great Southern and JBS Australia businesses, the Cobram facility will focus on delivering against a range of sustainability targets including CO_2 reduction, water and energy conservation and people safety.

"JBS Australia is proud to reopen its Cobram facility to support jobs and economic growth in the local community," said Sam McConnell, Chief Operating Officer of JBS Southern. "Today's changed market conditions and increasing demand for lamb products has allowed us to invest in this fit-for-purpose facility which will partner with local businesses and livestock producers to deliver Australian lamb, mutton and goat to domestic and international consumers."

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Prime Minister dines with food & beverage manufacturing industry

Speaking at a food and beverage manufacturing dinner on Saturday, 11 February 2023, the Prime Minister said he'd been a lifelong supporter of the Australian food and beverage manufacturing industry and pledged his support to deliver a new generation of success.

The Hon Anthony Albanese reminisced about growing up in Camperdown where he visited the Weston's biscuit factory nearby to get imperfect Wagon Wheels, which were free. Although he's not had one in decades due to his over-indulgence as a kid, he said he "was comforted by the fact that all these years later, Wagon Wheels are still made in Australia".

"Your industry is at the heart of our ambition for Australia to be a nation that makes things here again," he said.

"This is why we have made our National Reconstruction Fund a priority for the first sitting of parliament this year."

The government's $15 billion National Reconstruction Fund will provide loans, guarantees and equity to support projects that create secure well-paid jobs, drive regional development and invest in our national sovereign capability, broadening and diversifying Australia's economy.

Albanese said $500 million of the fund will be available to invest in unlocking potential in agriculture, forestry, fisheries, food and fibre. There will also be a further $1 billion available for advanced manufacturing.

Introducing ULTRA foodgrade compressor oil from Atlas Copco

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Food FOR thought

A rundown of the Future Proteins conference

Over 240 visitors from around the world recently convened at MULTIVAC headquarters to participate in the Future Proteins conference. What united them was their interest in food products from alternative protein sources, such as camembert made from cashew milk, shrimp made from soya and cutlets made from chickpeas. These food products are often delicate and have to be processed and packaged very gently.

A full program, supported by the Industry Association of Alternative Protein Sources (BALPro) was offered to visitors by the organisers, MULTIVAC and Handtmann. The program included presentations by speakers from science, research and industry, followed by podium discussions on subjects such as product trends, opportunities for market positioning and ways of reducing the CO_2 footprint of packaging over the entire life cycle.

Harald Suchanka, CEO of Handtmann, said the visitors appreciated the opportunities for networking and the solutions presented at the event. The Meet the Experts format, where more than 60 experts were available for half an hour of individual discussion with the conference participants, was also popular.

The conference had a practical aspect in its deep dive sessions, which gave visitors the opportunity to observe machines and lines at work. The demonstrations ranged from semiautomatic individual machines right up to fully automatic industrial-scale line solutions from MULTIVAC and Handtmann, all of which featured the processing and packaging of sliced, minced and formed products, as well as other items such as convenience foods and spreads.

"We have now completed more than 100 projects in the alternative proteins sector," said Klaus Deniffel, Project Manager for Alternative Proteins at MULTIVAC. "Each individual solution is configured independently, so that every manufacturer is supported during the challenges in their transformation of proteins."

Image credit: UQ

Dr Heather Shewan said the spray contains a protein that allows it to remain active on surfaces.

Anti-COVID cleaning surface spray with commercial potential

A team led by Dr Heather Shewan from the University of Queensland's School of Chemical Engineering set out to create a spray for use on various surfaces to kill COVID-19 and bacteria such as *E. coli* and *staphylococcus aureus*.

The spray contains a protein that allows it to stick to surfaces and remain effective for 24 hours and is being assessed by the Therapeutic Goods Administration for commercial cleaning use.

"We used hydrolysed gelatine which essentially helps create a thin film that allows the spray to stick on surfaces and can stay there for at least a day and potentially longer," Shewan said.

"This durability means it is effective over a longer period than a standard cleaner and has the potential to be used in high-use areas such as in public transport, kitchens, hotels, retail outlets, hospitals and public areas."

The research has been undertaken in partnership with Australian cleaning product manufacturer OzKleen, with the protein supplied by Beaudesert company GELITA Australia.

Shewan enlisted the help of virologist Dr Kirsty Short and microbiologist Dr Deirdre Mikkelsen to provide the multidisciplinary expertise required.

The team used several methods to test the spray, which is claimed to be cost-effective to manufacture and not harmful to the environment.

"In one test we sprayed glass surfaces with the cleaner and let it dry on the surface, and after 24 hours we added the COVID virus and further testing showed it did not survive," Short said.

"We also conducted other tests that showed even after rinsing surfaces with water, the spray significantly reduced the amount of virus that was able to survive on stainless steel."

OzKleen CEO Mark Quinn said the spray would be manufactured and produced in Queensland and potentially exported across the world.

Queensland Innovation Minister Stirling Hinchliffe said the research was made possible through an Advance Queensland Industry Fellowship grant of $90,000 and the product is gaining international attention.

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Beer set to be brewed with Queensland sunshine

XXXX brewery is set to be powered by 100% renewable electricity following an agreement to use electricity from the Woolooga Solar Farm. Through its owner, Lion, the brewery signed a power purchase agreement (PPA) to procure electricity from the Lightsource bp solar farm in Woolooga.

Steven Miles, Deputy Premier, said the Queensland Energy and Jobs Plan encourages businesses to invest in decarbonisation, with an increasing number wanting to decarbonise operations and offer low-emission products.

"With the PPA in place, Lion has reached their target of 100% purchased renewable electricity by 2025 in Australia, two years ahead of schedule. And they're Australia's first large-scale, carbon-neutral brewer," Miles said.

Lion Sustainability Director Justin Merrell said, "All of our beer produced here — up to 250 million litres annually — is now made using 100% renewable electricity. This agreement will stop around 138,000 tonnes of carbon emissions from entering the atmosphere. That's the equivalent of taking 45,000 cars off the road."

According to Merrell, Lion became Australia's first certified large-scale carbon neutral brewer in 2020.

Wine initiative is sharing the drop across Japan and Korea

The Australian Government is partnering with the viticulture industry to promote Australian wine in key export markets — Japan and Korea.

The Wine Country Manager initiative is designed to help Australian wine exporters diversify their markets. The initiative will bring together exporters, importers, wine experts and buyers to increase sales of Australian wine in supermarkets, restaurants and homes across Korea and Japan.

Under the Wine Country Managers initiative, industry bodies Wine Australia and Australian Grape & Wine will partner with the Australian Trade and Investment Commission (Austrade) and Australian embassies to run education seminars and marketing activities in Japan and Korea.

Australia's Minister for Trade and Tourism Senator the Hon Don Farrell has announced Rosemary Macdonald and Suzie Chung as Wine Country Managers for Wine Australia for Japan and Korea, respectively.

Wine Australia Chief Executive Officer Dr Martin Cole welcomed MacDonald and Chung to the new roles that will be based with Wine Australia.

"Ms MacDonald and Ms Chung will be a vital conduit between Australian wineries and the local wine trade in Japan and South Korea," Cole said.

From left to right: Australian Trade Minister Don Farrell, Country Wine Manager for Japan, Rosemary Macdonald and Chairman of the Japan Wines and Spirits Importers Association, Taiichiro Isono.

Independent brewer launches non-alcoholic craft beer

CbCo Brewing has launched CBCo Zero, a 0.0% ABV beer. The first in the CBCo Zero range is Tropical Sour, available exclusively at CBCo Brewing's Port Melbourne brewery from 14 February.

The range has been developed for occasions where 0.0% alcohol is a better fit, such as for those wanting to regulate alcohol consumption or avoid the effects of drinking.

Lawrence Dowd, CBCo Brewing Managing Director, said the launch is a significant milestone for the independent craft brewer.

"We have deliberately taken our time to perfect the process and master the technology to ensure there is no compromise to the quality or flavour of our beer during the dealcoholisation process," Dowd said.

Image: Supplied

CBCo Head Brewer Ashley Hazell toasts launch of CBCo Zero.

Ashley Hazell, the Head Brewer, has been leading the dealcoholisation process to ensure the taste and quality of the beer remains consistent.

"The process works by passing finished beer through a vacuum chamber full of low-temperature steam, to evaporate the alcohol with minimal impact on beer flavour. It's real beer, but with the alcohol removed," Hazell said. "The team and I have been continually brewing small batch beers with dealcoholisation in mind, and look forward to releasing a range of 0.0% ABV beers on tap and in pack throughout 2023."

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Analysis of the NoLo market

According to a study published by IWSR Drinks Market Analysis, no- and low-alcohol beer, cider, wine, spirits and ready-to-drink (RTD) products grew by more than 7% in volume across 10 key global markets in 2022.

The pace of growth in the no/low alcohol category is expected to surpass that of the last four years, with forecast volume compound annual growth rate (CAGR) of 7% in 2022–26, compared to 5% in 2018–22. This will be spearheaded by growth in the no-alcohol category, expected to account for over 90% of the forecast total category volume growth.

The 'IWSR No- and Low- Alcohol Strategic Study' examined 10 focus markets: Australia, Brazil, Canada, France, Germany, Japan, South Africa, Spain, the United Kingdom and the United States. It found that in these markets, the value of no/low alcohol products in 2022 surpassed $11 billion, up from $8 billion in 2018.

"The dynamic no/low-alcohol category presents opportunities for incremental sales growth as consumers are recruited from drinks categories such as soft drinks and water. Brand owners have an opportunity to recruit non-drinkers of alcohol," said Susie Goldspink, Head of No- and Low-Alcohol, IWSR Drinks Market Analysis. "As more people opt to avoid alcohol on certain occasions — or abstain from it altogether — no-alcohol is steadily increasing its share of the no/low category."

No-alcohol drinks dominate

In 2022, no-alcohol volumes grew 9%, increasing its share of the overall no/low-alcohol space in the analysed markets to 70%, up from 65% in 2018.

"No-alcohol is growing faster than low-alcohol in most markets," Goldspink said. "The countries where this does not apply, such as Japan and Brazil, are early-stage low-alcohol markets with a small volume base."

No-alcohol's dominance over low-alcohol in many markets is being driven by improved taste, production techniques and a diversification of consumption occasions. IWSR expects no-alcohol volumes to grow at a CAGR of 9% between 2022 and 2026.

Largest market and expected growth

The most valuable no/low-alcohol markets in the world are Germany, Japan, Spain, the US and UK, with growth in the no/low-alcohol category varying in each market depending on market maturity.

Germany is the world's largest and most mature no/low-alcohol market, but growth is expected to be relatively slow in

> *The dynamic no/low-alcohol category presents opportunities for incremental sales growth as consumers are recruited from drinks categories such as soft drinks and water.*

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this market. In contrast, markets including Australia, Canada and the US are forecasted to see double-digit volume CAGR in 2022–26.

Nearly 70% of the overall no/low-alcohol growth between 2022 and 2026 is expected to be in the no-alcohol beer/cider category. The majority of this will come from the US and Japan, whereas no-alcohol wine growth is expected to be more fragmented, but positive, across markets. No-alcohol spirits will also see some dynamic growth.

Low-alcohol is expected to grow at a 2% volume CAGR in 2022–26, driven by the low-alcohol beer and wine categories. The dominant driver of low-alcohol wine is the US.

Consumer base

Millennials are consuming the most no/low alcohol beverages.

It is common for consumers to switch between alcohol and no/low, with 78% of no/low consumers saying they also drink full-strength alcohol; of which 41% are classified as 'substituters' who choose no/low products when avoiding alcohol on certain occasions.

The 'abstainers' group, who refrain from alcohol altogether, account for 18% of no/low consumers. This number is rising in nine out of 10 markets, with younger legal drinking age consumers at the fore.

Newer recruits to no/low are increasing their frequency of consumption as the products permeate a wider variety of occasions, such as low-key social settings, no-alcohol alone or unwinding with a partner at home.

With people motivated to drink no/low by lifestyle, rather than necessity, growth is now being driven both by recruitment of new consumers and by greater participation. Daytime consumption of both no- and low-alcohol has increased, signalling potential for the category to expand beyond alcohol-replacement occasions.

"This pattern of avoiding alcohol on certain occasions or altogether is driving no- over low-alcohol growth," Goldspink said. "Pair this with the rise of functional beverages — often containing 'mood-enhancing' adaptogens or nootropics — and the result is a strong outlook for no-alcohol."

Key challenges

The biggest challenge in the no/low category is one of availability. No/low products lack visibility in mainstream trade and there is often confusion about where they should be displayed among retailers, whether it be with soft drinks or on their own. In both channels, the choice of products is often limited.

Cost has become less of a barrier for the category, dropping from 14% in 2021 to 7% in 2022. Despite the cost-of-living crisis, cost as a barrier to purchase currently remains unchanged among those who do consume no/low drinks. Where no/low is established, prices are similar to equivalent full-strength alcohol categories.

Product innovation

While many approaches so far involve modification of alcohol by volume, some no/low producers are focusing on innovation in packaging, functional benefits and flavour to allow brands to keep consumers within their portfolios.

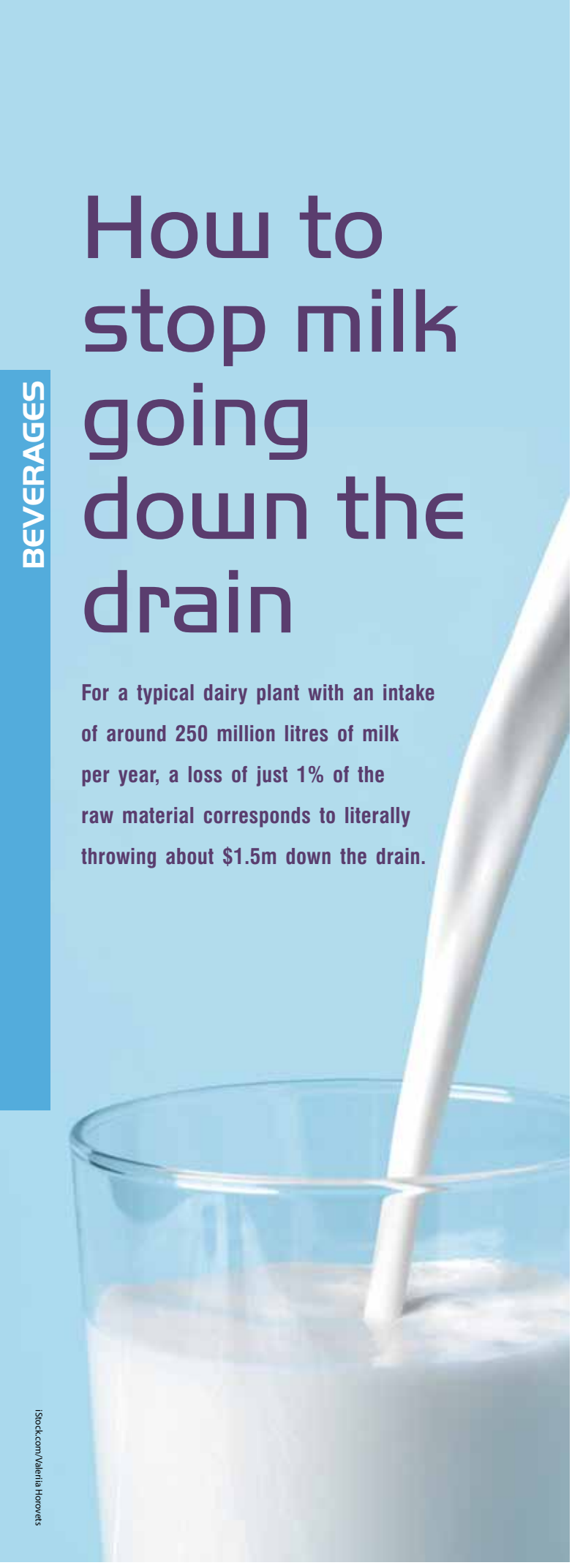
Examples of these include sliding ABV scales and multipacks, the use of botanicals to create more intense flavour and the introduction of spirit alternatives across a wider range of categories, such as aperitifs, dark spirits and agave.

Some product messaging has shifted from the absence of alcohol to flavour and other functional benefits such as added nootropics, vitamins and adaptogens. Some mixer brands are also broadening their range to offer products that can be enjoyed without a spirit or spirit alternative.

IWSR
www.theiwsr.com

How to stop milk going down the drain

For a typical dairy plant with an intake of around 250 million litres of milk per year, a loss of just 1% of the raw material corresponds to literally throwing about $1.5m down the drain.



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With rising inflation and environmental focus, product loss management is more important than ever in dairy plants and other fluid processing plants.

In order to minimise wasting valuable milk products, it is essential to know where in the process the leak happens. If flow rate timings or other sensors and process parameters are not set correctly, valuable liquid product could be washed out with the wastewater.

Finnish company ColloidTek (Collo) has now developed a liquid fingerprint technology that can help address this problem by detecting any type of liquid in the pipes in real time. The technology supervises all draining points in real time, monitoring all liquids in the pipes to show exactly where leakages originated.

Mikko Tielinen, Head of Sales at ColloidTek, said there are several types of traditional sensors needed to detect different types of liquids, such as whey, cream and cleaning chemicals, so optimisation systems have become complicated and expensive to manage.

"Our solution, on the other hand, offers an easy and very accurate way to detect where exactly in the process the leakage is," Tielinen said.

"It measures the exact real-time liquid fingerprint at any desired point in the process with a single EMF-sensor. Combined with machine learning, our solution ensures that the process stays optimised and easily monitored through our cloud solution."

Usually, product losses in the process are noticed when there is an excess of organic material in the effluent. This can also be a sign of problems in the production; however, measuring just the effluent does not tell why, and from where too much milk product is getting flushed out with the wastewater.

> *In order to minimise wasting valuable milk products, it is essential to know where in the process the leak happens.*

"As our technology can supervise all the draining points in real time, it can keep track of the liquids in the pipes and show exactly where the leakage is," Tielinen said. "This makes it possible to address the problem at the point of origin, saving huge amounts of milk and money."

In addition to directly improving the profitability of a dairy plant, reducing the milk waste also lowers the cost of wastewater treatment and helps dairies to achieve their environmental goals.

"Most of the carbon dioxide generated in a dairy production originates from the stages before the milk even arrives at the dairy," Tielinen said. "That is why it is essential to not waste valuable milk in the dairy's processing operations. If milk-based products are lost in a dairy, a replacement amount of milk will have to be produced and transported to the dairy, which will produce even more carbon dioxide emissions."

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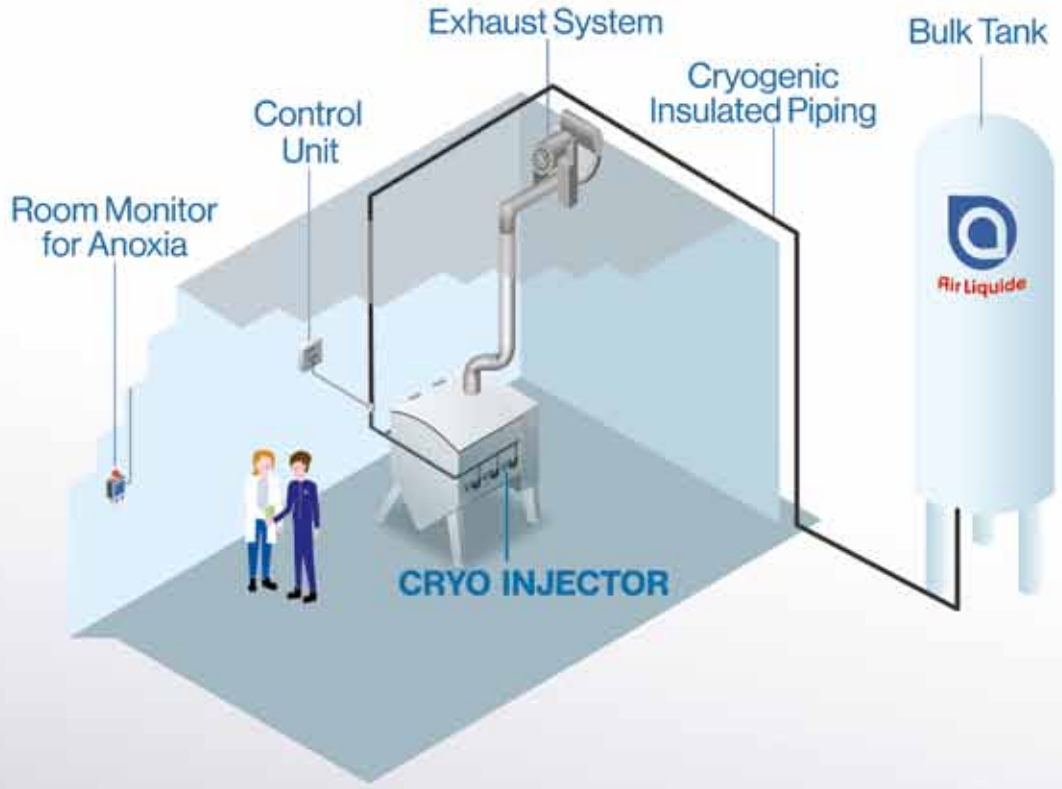

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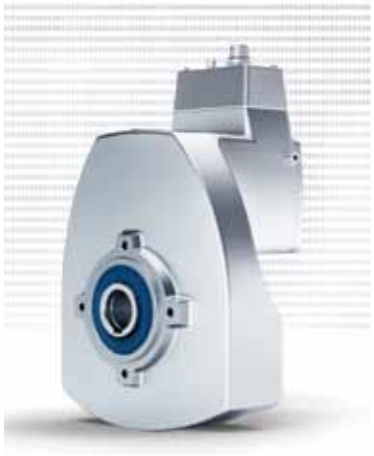

Automatic bottling and conveyer systems in beverage and liquid food production set high requirements for energy efficiency, operational reliability, washdown capability and corrosion protection. NORD Drivesystems can provide suitable hygienic solutions for bottling and conveyor technology in beverage lines.

Drive systems used in automatic bottling systems for the beverage industry must reconcile various requirements. The DuoDrive geared motor integrates an IE5+ synchronous motor into the housing of a single-stage helical gear unit, with a system efficiency of up to 92%. The constant motor torque over a wide speed range allows for consistent version reduction and reduction of operating costs. Together with the plug-and-play commissioning, this is designed to reduce total cost of ownership. It contains an unventilated, washdown design with smooth surfaces to meet hygiene requirements and ensure cleaning.

Beverage bottling is an area where the demand for decentralised drive technology is on the rise. NORDAC ON/ON+ covers power ranges up to 2.2 kW and is characterised by an integrated Ethernet interface (Profinet, EtherNET IP and EtherCAT can be set per parameter), full plug-in capability and a compact design. Decentralised inverters are ideally suited for integration into bottling and conveyor systems and can save space as well as the extensive motor cable wiring required for centralised frequency inverters.

The nsd tupH surface treatment provides a good anti-corrosion treatment for drive components in washdown-optimised cast aluminium housings for the beverage industry. The surface treatment is available for DuoDrive, NORDAC ON/ON+ and most NORD modular drive systems made from aluminium. Using a special method, the surface is made corrosion-resistant and harder, and is claimed to make aluminium behave like stainless steel with regard to corrosion protection. It is not a coating, but a surface treatment which creates a protective layer that bonds to the substrate material. The drives are made to be easy to clean and largely resistant to acids and alkalis. It is possible to use high-pressure cleaners or apply aggressive media.

NORD Drivesystems (Aust) Pty Ltd
www.nord.com

Packaging coatings

AkzoNobel Packaging Coatings has revealed its next-generation product portfolio to distinguish its new BPA-Ni and NexGen coatings from its legacy products.

The move will support the transition away from coatings based on legacy technologies like epoxy and vinyl, towards technologies that comply with incoming regulations by the European Food Safety Authority (EFSA), FDA and other regulatory bodies.

Beverage coatings will become Accelshield and Accelstyle for internal and external coatings respectively. Both will feature products that remove various materials such as BPA and other bisphenols, phenolics, PFAS, formaldehyde and Styrene. Similarly, food packaging coatings will become Securshield and Securstyle for internal and external coatings respectively.

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Foam physics:

calculating the perfect pour for beer


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From creating drinks with distinctive looks to providing aromas for connoisseurs, beer foam is big business. The complex interplay between the components of a beer, the vessel from which it's poured and the glass it's poured into has garnered plenty of attention from researchers, brewers and drinkers. Now a new study looks to provide predictions about how a beer will foam.

Researchers analysed brewing with numerical simulations to determine foam patterns, heights, stability, beer/foam ratio and foam volume fractions. The findings have been published in *Physics of Fluids*, by AIP Publishing.

The frothy foam on top of beer is an important characteristic for beer drinkers across the globe. It's basically produced by bubbles of gas, predominantly carbon dioxide, rising to the surface. The chemical components that produce the head are wort protein, yeast and hop residue.

To achieve an accurate prediction of beer foam formation and collapse is challenging because complex numerical models are required to account for all its nonlinear beer foam effects, such as lacing (glass adhesion or cling), whiteness, creaminess and strength.

The computational approach used in the study is called a multiphase solver to tackle beer heads.

"Simulation of a bottom-up pouring process using a multiphase solver is a complex task that involves modelling the physical and chemical interactions that occur during the process, such as fluid dynamics, heat and mass transfer, and chemical reactions," said author Wenjing Lyu. "By using a multiphase solver, it is possible to accurately predict the behaviour of the system and optimise the design of the nozzle outlets and the cup geometry to ensure the fastest possible bottom-up pouring under various conditions such as pressure, temperature and carbonation."

To tackle this task, the group partnered with Einstein 1, a startup developing a new bottom-up tapping system in which the nozzle pushes up a movable magnet on the bottom of a glass to create a temporary inlet. As the glass fills, the magnet moves back into place and the beverage is ready to drink. After repeatability studies to establish stable pouring conditions, they assembled a model that was then validated with experiments.

The group found that foam from Einstein 1's tapping system is generated only in the first moments of pouring. Higher temperatures and pressures yielded more foam.

After that, beer's liquid phase kicked in. Determined in large part by bubble size, the beer's foam phase slowly decayed, taking approximately 25 times longer to fully fizzle out than it took the foam to form.

Alongside further optimising their computational approaches, the group next looks to study the effects of nozzle shapes.

"This will help in controlling foam formation, reducing consumption and pouring time, and improving the overall efficiency of the pouring process," Lyu said. "By accurately simulating the foaming process, our model can help to improve the quality of the final product, reduce costs and increase productivity in industries such as food and beverage, chemical and others."

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Sugar tax: the non-alcoholic beverage industry responds

The non-alcoholic beverage industry has responded to calls for a proposed sugar tax on beverages. The proposal, if approved, will see a tax of 40 cents per 100 grams of sugar, increasing the price of individual beverage cans by about 16 cents. This is predicted to reduce sugar consumption from soft drinks by 12–18% and raise annual government revenue of up to $814 million.

The sugar tax is strongly advocated for and supported by the Australian Medical Association (AMA). According to AMA research, sugar-sweetened beverages contain 33–50 g of sugar in an average 375 mL can of soft drink. This category of beverage includes carbonated and non-carbonated fruit, dairy/milk, sport, energy and cordial drinks containing free sugars.

The AMA estimates that Australians consume over 2.4 billion litres of sugar-sweetened beverages annually — the equivalent of 960 Olympic sized pools. Research found that 36% of adults and 41% of children consumer sugar-sweetened beverages at least weekly, with 9% and 7% respectively consuming them daily.

A range of health problems have been linked with the frequent consumption of sugary drinks, such as poor dental health and obesity, which is a risk factor for chronic illnesses such as type 2 diabetes, heart disease, stroke and cancer. These conditions, which may be preventable, have a significant impact on Australia's healthcare system and broader economy.

To address this, the AMA has called for a tax on a subset of these beverages — all non-alcoholic drinks containing free sugars, excluding 100% fruit juice, milk-based and cordial drinks. The focus is drinks that provide limited nutritional benefit.

The Australian Beverages Council (ABCL), representing the non-alcoholic drinks industry, has responded to this call in opposition of the proposed tax. Geoff Parker, CEO of ABCL, spoke out on behalf of the industry.

He said that in 2018, the nation's largest non-alcoholic drinks companies committed to Australia's first Sugar Reduction Pledge, which aims to reduce sugar across the companies' portfolios by 25% from 2015–2025. By the end of 2021, pledgees had cut sugar content by more than 16%.

The ABCL argued that demand for low- and no-sugar varieties has increased over a 20-year consumer trend for more options in grocery and convenience stores. A range of initiatives were created in response to this, including reformulation, smaller pack sizes, and investing in a greater variety of low- and no-sugar products to meet growing consumer demand.

In 2022, the Sugar Reduction Pledge report found that low-sugar options accounted for half of all sales, up from 47% on the previous year. Additionally, Australians now drink almost five times more bottled water than they did two decades ago and full-sugar soft drink consumption accounts for less than 15% of free sugar intake.

Parker said that change in consumer behaviour is more lasting when individuals are able to make informed choices through healthier drink options.

"All the evidence demonstrates that each year people are already drinking less sugar-sweetened beverages. This is happening without a sugar tax which risks increasing the cost of the weekly shop and placing more pressure on households grappling with the soaring cost of living," he said.

The ABCL further argued that the United Kingdom and other countries who have imposed a beverage tax found no change in obesity levels, with it only making a difference of three calories per person per day in the UK. A University of Cambridge-led study found that consumers will seek out cheaper, non-taxed beverages, and a tax would make no difference in the amount of weekly household purchases of sugar sweetened beverages. The study also found that the sugar content in taxed drinks is reduced by 10%, a figure already exceeded by ABCL's Sugar Reduction Pledge.

"In 2023 we need innovative, real-world evidence-based solutions to address lifestyle health challenges rather than slapping another tax on the weekly shop of Australians. The drinks industry urges other categories in the shopping trolley to make their own commitments and play their part in helping people choose healthier options," Parker said.

Australian Beverages Council
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Global packaging trends for 2023

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Mintel's Global Packaging Trends for 2023 features a PESTEL analysis* that explores the macro-environmental factors impacting the packaging industry in 2023 and beyond.

"The decision to use a PESTEL analysis was based on the fact that currently there are so many extraordinary outside influences on package innovation and the packaging supply chain," said David Luttenberger, CPPL, Global Packaging Director at Mintel.

"Pressures from the environmental perspective, the conflict in Ukraine, global inflation, social issues, legal challenges, extended producer responsibility, and other forces mean packaging must navigate new and more challenging routes to market. The PESTEL format enables us to succinctly identify the opportunities and present clear recommendations to retailers, brand owners and package manufacturers."

Economic factors impacting packaging

"Economic uncertainty and the associated rising cost of goods have forced consumers to rethink budgets and discretionary spending. Across categories, brands are tapping messaging, technology and retail strategies to show consumers how packaging can stretch a budget.

"Consumers will look to brands to help them overcome economic-induced stresses with products and packaging that mesh with purchasing abilities and reflect value without compromise. Offering packaging that represents financial value propositions, while not compromising quality, convenience, freshness, safety and environmental responsibility, will be a differentiator in 2023 and beyond."

Social factors impacting packaging

"From food shortages and ethical sourcing to responsible water and land use, consumers want to know more about the products they buy and the brands that produce them. In addition to achievements, brands and package manufacturers must be transparent about their weaknesses. Consumers are pursuing transparency through clearer labelling and what those claims mean for the greater good.

"In the future, packaging will paint a picture of a brand's equity, which increasingly includes social and environmental capital. Consumers want to hear what companies have to say on controversial topics related to diversity, inclusion, and equity."

Legal factors impacting packaging

"A myriad of laws have been enacted to protect consumers from deceptive or fraudulent business practices. New rules around the use of plastics and pollution-causing materials, as well as protecting human and planetary health, will greatly affect consumers. To get ahead and stay competitive, companies must get a firm grip on current and future legislation around plastics, PFAS and EPR.

"Consumers will rally behind legislation that benefits the environment. Their support will spur additional bans which will put significant cost pressures on manufacturers in their quest to meet mandates and find suitable, though more costly, alternatives."

Mintel's 2023 Global Packaging Trends also discusses the packaging industry implications of the 2023 Global Food and Drink, Beauty and Personal Care, and Household Care Trends, including the future of packaging within these industries.

Food and drink packaging trends

"Although costs of living are rising globally, consumers will not be motivated solely by low prices in 2023. They will find value in affordable food and drink that promises clarity, nutrition, and versatility. Package manufacturers must enable clear communication of added-value nutritional content and provide efficient portioning and product preparation. Clean packaging designs that highlight natural ingredients and health benefits will stand out to shoppers. In the future, brands seeking to be trusted partners in the kitchen need to take energy consumption into account and deliver packaging that enables energy-efficient cooking."

*A PESTEL analysis is a framework used to analyse and monitor the macro-environmental factors that have an impact on an organisation, company or industry examining the Political, Economic, Social, Technological, Environmental and Legal factors impacting global packaging evaluations, planning and decision-making.

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NEWS

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Edible packaging: alternative film for frozen fish

The SeaFilm project is developing a food packaging that aims to create a substitute for single-use plastic film used for frozen fish. The film is based on bioactive seaweed extracts and edible algae, which is claimed to help to conserve frozen seafood for longer while maintaining the quality.

Developed by researchers from the Polytechnic University of Leiria in Portugal, the concept of edible biofilm for frozen fish came about as a solution that was in line with the European Union's commitment to ban the use of single-use plastics.

After the frozen fish is defrosted, the biodegradable film can either be disposed of or eaten along with the fish. The film could even include seasonings for the fish.

The new material could be used as an alternative to plastic and help to differentiate seafood products, reduce food waste and cut the amount of single-use plastics used in the production process.

The film has been validated for shelf life extension in frozen salmon, significantly reducing freezer burn. Recent results also indicated that it might extend the shelf life of seafood after defrosting by delaying microbial growth.

For most species tested, the researchers found that the development of microorganisms was delayed after thawing. The combination of the alginate-based biofilm and the seaweed extract can help to conserve seafood while maintaining the quality.

Following the results with salmon, the industry has asked the team to produce biofilms for other species such as cod and hake.

The solution was supported by the European Maritime and Fisheries Fund.

Sustainable dunnage solution wins WorldStar award

WORLDSTAR WINNER 2023

Opal and JBS Australia have won a 2023 WorldStar global packaging award in the transit category for their corrugated cardboard dunnage solution. The dunnage was previously awarded Gold in the Sustainable Packaging Design of the Year Industrial sub-category and Outside of the Box Design of the Year at the Australasian Packaging Innovation & Design Awards (PIDA) 2022.

Opal developed the solution in collaboration with JBS to limit product movement during transportation. It provides an alternative to traditional dunnage, usually constructed from expanded polystyrene (EPS) that can't be easily recycled and ends up in landfill. Opal's dunnage is a column-like corrugated structure that also provides enhanced transportation and distribution efficiency as it accommodates 1800 boxes per pallet, compared to the 200 boxes enabled by EPS dunnage. The sustainable dunnage complies with Australia's 2025 National Packaging Targets and aligns with JBS Australia's sustainability commitment to reduce its footprint.

"This innovative product has resulted in tangible cost savings and operational efficiencies. By reducing our packaging footprint we are meeting our sustainability objectives for the benefit of our business and customers, and providing positive environmental outcomes," Sam Churchill, Group Manager Sustainability for JBS Australia, said.

Brad Hinds, Group General Manager Opal Fibre Packaging, said that Opal is committed to providing sustainable, innovative solutions.

"We are delighted to be recognised on a global scale through the WorldStar global packaging award in the transit category. By collaborating with our customers, we are able to design and produce products that can deliver on functionality, supply chain efficiency and sustainability," Hinds said.

CASE STUDY

High-flow wrapping for delicate products

A manufacturer needed to expand its operations to achieve a speed of 300 ppm for its frozen dried yoghurt product. Previously operating on a 140 ppm manually fed Omori Flow Wrapper, the manufacturer called on Perfect Automation for a faster solution for its lightweight, heat-sensitive product.

High-speed performance can be tricky to navigate, with many variables impacting final speeds. Omori's Complete Aligning and Fully Automatic S-56000X-BXS High-Speed Box Motion Flow Wrapper system delivering a hermetic seal at 300 ppm was installed for packaging the delicate product.

Having undergone strict and strenuous testing criteria for light and difficult products, the packaging of frozen dried yoghurt weighing only 1 g with a crumbly exterior was a challenge.

Achieving minimal seal testing criteria of 80 kPa for three minutes in a finished leakproof pack was no easy feat. With the high-density barrier film made up of 12 µm PET, 7 µm aluminium and 45 µm LDPE for product protection, Omori box motion technology allowed for optimal sealing of products averse to moisture and oxygen with no impact to the 300 ppm rate required.

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CASE STUDY

Paper-based packaging for charcuterie business

Mondi has partnered with Noel Alimentaria to find the most suitable paper-based packaging solution for its range of food products.

Supplying both plant-based and meat foods, Noel Alimentaria chose Mondi's PerFORMing paper-based tray to pack its range of sliced plant-based food and vegetarian burgers, 'Verday'. This range is used by Marks and Spencer in the UK and supplied to Nordic markets for ham and charcuterie products.

The trays can be moulded and adapted to suit a range of different-sized food products, with high symmetrical stretch for uniform formability. They offer barrier protection against moisture and oxygen to keep food fresh throughout the storage and distribution process. The trays are made up of 80% paper and designed for recycling. They have passed the recyclability tests by German institute PTS.

Falk Paulsen, Sales & Business Development Director, Mondi, said, "By working very closely with Noel Alimentaria from the outset, we were able to ensure we delivered the best possible option for the entire range of meat and meat-free products, using a tray made from renewable and responsibly sourced material that still provides maximum protection for the goods."

Maria Sánchez, Corporate Marketing Director, Noel Alimentaria, said maintaining the freshness of products is essential while they are distributed across Europe, and the added sustainability of Mondi's solution was a welcome bonus.

"We were able to run the new paper-based trays on our existing machinery and will now be using the same solution for our further ranges of ham and other meat products," Sánchez said.

Mondi Group

www.mondigroup.com/en/home

Food product inspection equipment

Mettler-Toledo plans to showcase its latest product inspection equipment for the food manufacturing industry at the Interpack trade fair being held in Germany in May 2023.

The solutions to be shown for the first time include the X2 X-ray inspection platform and an entry-level X12 X-ray system, alongside its portfolio of inspection technologies integrated with ProdX data management software.

All solutions are positioned to help food manufacturers tackle the increasing need for digitalisation in the marketplace, as well as helping combat rising manufacturing costs.

The Mettler-Toledo booth, A60 in Hall 11 at the Messe Düsseldorf, Germany, will comprise several different themed 'islands'. These will include areas dedicated to checkweighing, metal detection, X-ray inspection, vision inspection, track & trace and combination product inspection systems, in which more than one product inspection technology is integrated within a single frame. Visitors will be able to see a practical demonstration of how connectivity delivers a range of digital productivity and security benefits.

A new vision inspection system — the V13 Flat Pack Label Inspection System — will be launched globally at Interpack. This system performs inspection from the bottom up with a unique line scan camera, to inspect labels on the underside of flat packs at speeds of up to 300 packs per minute. This system completes the portfolio of Label Inspection solutions from Mettler-Toledo that carry out 100% label inspections from all directions, for all package shapes and for all label quality and data defects. The systems are modular and can be configured to match the customer application and are available as kits, standalone or combination systems.

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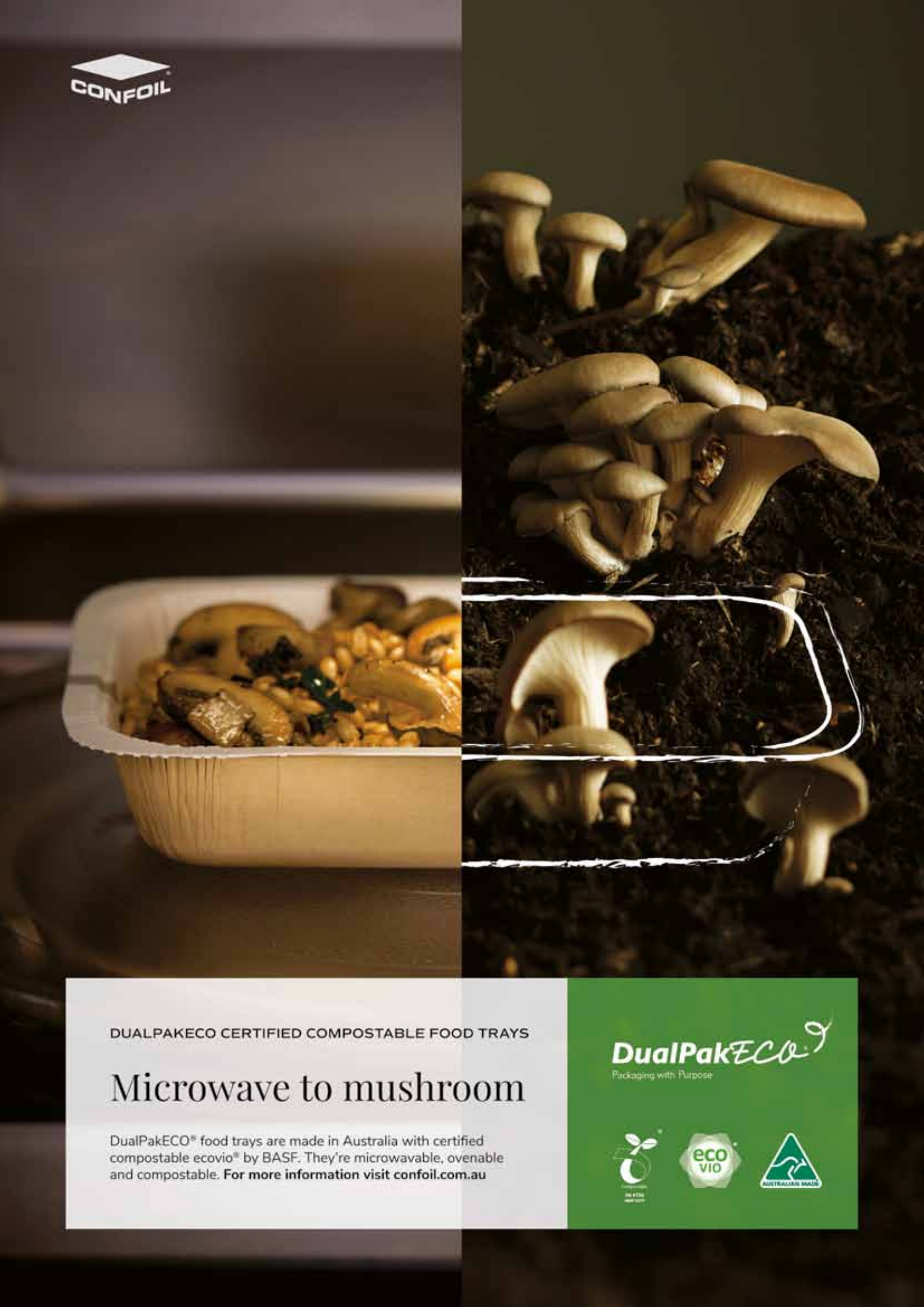

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AUSTRALIAN MADE

Incorporating renewable materials in packaging

Nerida Kelton MAIP, Executive Director, AIP and Vice President – Sustainability & Save Food, WPO

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Incorporating renewable materials is just one of the 10 principles within the Sustainable Packaging Design Guidelines that help companies and packaging technologists to design sustainable packaging that will meet the 2025 National Packaging Targets.

So what are renewable materials? Well, they are materials made of natural resources, composed of a biomass from a living source that can be sustainably grown and replenished continuously. There are a number of renewable materials available for packaging including sugar cane, bagasse, corn starch, wood fibres, bamboo, cotton, straw or biopolymers from a sustainable source.

Renewable materials, if sustainably grown and certified in the country in which the packaging is sold, can potentially offer lower environmental impacts than non-renewable alternatives. Undertaking a lifecycle assessment before you shift your packaging to renewable materials is paramount to ensure that the choice of material is an appropriate alternative. Another important factor in selecting renewable materials is the end of use (EoU) of the packaging; ie, will the packaging be able to be reused, recycled or composted?

Current renewable and recyclable fibres (cellulose, straw, grass) should be recyclable through existing paper kerbside recycling programs, although it would be important to have this verified.

Renewable and recyclable plastic are currently derived by converting sugar cane to ethanol to produce bio-polyethylene (Bio-PE), bio-polypropylene (Bio-PP) and bio-poly(ethylene terephthalate) (Bio-PET). These plastics being identical to fossil fuel plastics can be recycled through existing plastic kerbside recycling programs.

Renewable sourced bioplastics that are biodegradable come from sources like starch, cellulose, proteins, lignin and chitosan. Examples of these bioplastics are polylactic acid (PLA), polyhydroxyalkanoates (PHAs) and also polyhydroxybutyrates (PHBs) and polyhydroxyvalerate (PHV). These bioplastics are currently not recyclable in kerbside collections and need to be certified for commercial composting (AS4736) to be accepted in some of the kerbside food organic collection programs.

In addition, it is recommended that all renewable material packaging is verified to local and international certifications such as Forest Stewardship Council (FSC); the Program for the Endorsement of Forest Certification (PEFC) for timber/cellulose-based materials. Other renewable fibre and bio-based materials will need to be certified either home compostable AS5810-2010 or commercially compostable AS4736-2006. It is also important that renewable fibre-based packaging is certified to have 'no added PFAS', as this treatment is commonly used for water and grease proofing. Packaging that is certified to these standards will confirm to consumers that there are no forever chemicals or potential toxins in the material and that the pack can be reused, recycled and/or composted in the correct environmental conditions.

Some of the recent winners of the Australasian Packaging Innovation & Design (PIDA) Awards are using renewable materials in the packaging including sustainable milk cartons (Brownes Dairy), FSC rectangle paper containers (BioPak) and SMARTIES Paperisation range (Nestlé Australia).

Not only are we seeing an increase in entries in the PIDA awards that incorporate renewable materials in their packaging, but more companies are ensuring that the material is certificated to the appropriate standards and the Australasian Recycling Label (ARL) is included on-pack. All of these changes are positive steps to meet the 2025 National Packaging Targets and to design packaging that can assist the circular economy. >

Here are some examples of the recent winners of the Australasian Packaging Innovation & Design (PIDA) Awards.

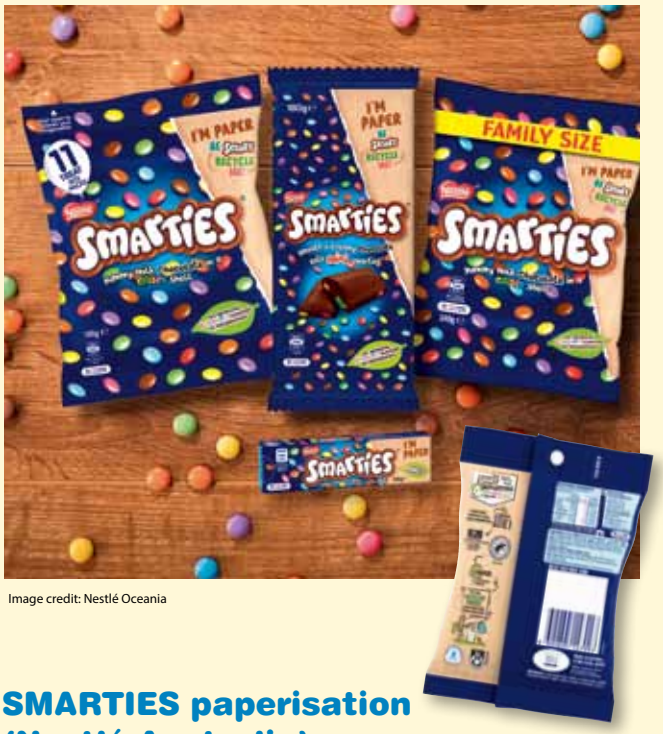

Image credit: Nestlé Oceania

SMARTIES paperisation (Nestlé Australia)

Smarties global confectionery brand has switched from plastic bag and blocks formats to paper packaging and recyclable paper packaging. The materials were selected based on their acceptability in the Australian recycling infrastructure. The use of a water-dispersible coating allows for separation of non-fibre materials with the fibre backing, allowing recycling in the paper recycling centres.

The paper material selection takes into consideration product shelf life and manufacturing/supply chain efficiency, with the aim of matching that of existing plastic packaging.

The Smarties products, which are considered as sensitive, have been packed in paper packaging coated with a high moisture barrier, while still maintaining water-dispersible qualities. The maximum reduction in packaging weight has been achieved by reducing headspace where possible.

Claims on front of pack illustrate to the consumers that the pack has now transitioned to paper packaging. Using a clever graphic to indicate that the packaging underneath is produced using paper material, the claim "I'M PAPER" speaks to the consumer.

The front of pack also has a call to action to the consumers to "RECYCLE ME", indicating that the paper material is recyclable. The call-out to "Be Smart" is a play on words on the Smarties brand which is an effective method to further engage consumers on the sustainability message. The Australasian Recycling Label (ARL) is included on all packs to raise consumer awareness and ensure Smarties fans know how to recycle the packs.

The transition out of plastic packaging removes 20 tonnes of virgin plastic use annually in Oceania. Globally, this change has resulted in removal of approximately 250 million plastic packs sold globally every year.

Sustainable milk cartons (Brownes Dairy)

With consumers becoming ever more conscious about their impact of the environment, the Brownes Dairy 1 L milk in Tetra Rex Plant-Based Craft cartons stands like a beacon of hope in the middle of the white milk supermarket shelf. The eye-catching packaging is a natural brown colour, fully renewable and made with renewable energy. The recent move to Tetra Rex Craft Plant Based drove a further weight reduction of just under 4%, taking further packaging out of the supply chain. Less packaging material is required to protect the same amount of milk, further enhancing the sustainability credentials of the carton.

To help, Browns Dairy has incorporated the Australasian Recycling Label (ARL) into the pack design. The on-pack artwork provides clear information about its renewable source to aid consumer understanding and awareness of these unique cartons.

FSC rectangle paper containers (BioPak)

Plastic takeaway containers that are contaminated with food (think greasy curry, pasta and other oily foods) cannot be recycled and putting them in your recycling bin can jeopardise the entire bin of recycling.

The FSC certified rectangular paper containers have been created to replace the humble plastic container. They are renewable material PLA bioplastic lined, allowing them to carry hot, greasy foods without spoiling/breaking. The PLA bioplastic lining is made from rapidly renewable materials. The footprint of these renewable materials is smaller than that of traditional plastics derived from fossil resources — Ingeo bioplastic, for instance, has a footprint up to 80% lower.

Until now, using bioboard they have only been able to manufacture round paper bowls; however with new machinery and tooling, BioPak has been able to achieve the rectangular shape with the performance of a round paper bowl.

Industrially compostable to Australian AS4736 standards, they are independently tested and verified to completely biodegrade within 120 days in a commercial compost facility. The end product is a non-toxic, nutrient-rich compost.

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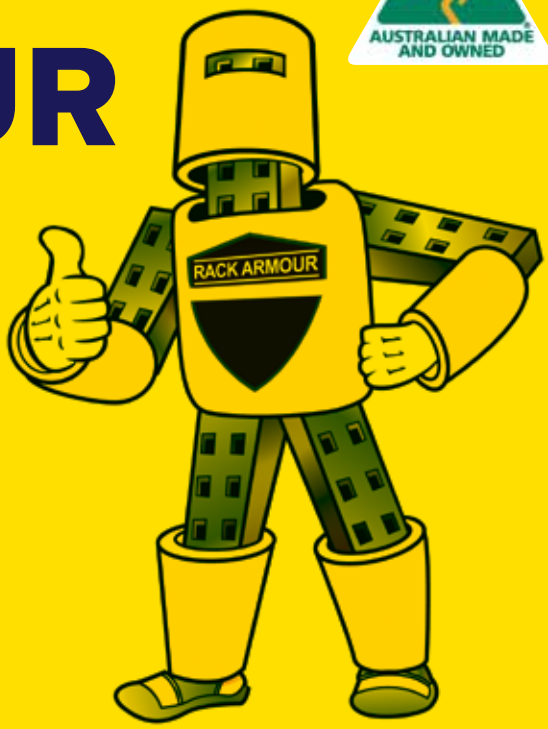

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CASE STUDY

Making packaging from vegetable waste

With an Australian Government target for all packaging to be reusable, recyclable or compostable by 2025, Victoria University researchers have been looking at how agricultural waste from vegetables such as zucchini, broccoli, celery and lettuce could be used to create affordable and easily compostable packaging.

Polymer expert Dr Marlene Cran and her team have been working in the research labs at VU's Werribee Campus with the unusable produce provided by a nearby Werribee South market-farm. Leaves, stems and rejected produce is normally used as animal feed, composted or can be sent to landfill where it decomposes and produces methane gas. Instead, the team has created a range of food packaging products using the waste vegetables.

VU researchers found celery's high cellulose content is good for making food trays, whereas zucchini, broccoli and lettuce can be processed into thick films that could be suitable as a tray insert or produce separator. Mycelium — the root structure of mushrooms — can be grown on the partially dried waste materials to make a replacement for Styrofoam boxes.

Victoria University researchers Ghowsalya Mahendrarajah and Ghofran al-Nasiri with sustainable packaging products made from vegetable waste

The team's goal is to use minimal interventions such as intensive drying or the use of excessive additives so that the processes are as natural and inexpensive as possible, and easier to scale up in the future.

Away from the farm, the team is using starch waste material left over from the extraction of proteins from yellow peas to create a flexible film that could become the new plastic in a true circular economy.

"In future there could be protein powders or dried peas sold in a bag made from the leftover starch sourced from the vegetables… inside the bag," Cran said. "That's the dream."

Despite the lack of industry-grade testing facilities and the expense to test alternative packaging — meaning a possible long road ahead — Cran said it just makes sense to replace throw-away packaging with sustainable natural products.

"Designing something that can compete on price and effectiveness with plastic and foam is the work of decades. But the investment needs to start now."

Victoria University

www.vu.edu.au

Recyclable packaging trays for fresh food

Mondi has launched two tray packaging products — PerFORMing Monoloop and Mono Formable PP — to provide recyclable options for fresh food manufacturers.

Both the recyclable packaging products come with high barrier food protection, one is a paper-based tray and the other is a semi-rigid plastic tray.

The trays are designed to protect fresh food contents at every stage of the manufacturing and logistics process, ensuring they last longer and the potential to apply MAP (modified atmosphere packaging) to extend the shelf life. The packaging inhibits exposure to elements such as moisture, gases and grease, and actively encourages correct consumer use, through resealable functions. This aids convenience and ease of portion control while also reducing food waste.

PerFORMing Monoloop is a formable and recyclable paper-based solution for sliced food such as cheese or meat. The paper tray with a barrier layer is combined with a plastic top web solution, allowing good product protection while reducing plastic use. The barrier layer can be easily separated from the paper tray so that all elements can be disposed of in the correct waste streams separately. It is certified recyclable by Institute cyclos-HTP and is suitable for a range of depths and forms on existing lines.

Mono Formable PP is a recyclable high barrier MAP solution, created from mono-material polypropylene (PP). Featuring a printed top web and a complementary thermoformable semi rigid bottom web, the fully recyclable packaging weighs around 30% less than a comparable polyester (PET) tray at the same thickness while offering the same high level of product protection. The solution can provide a substitute for the industry standard of multi-material non-recyclable PET trays and is available with a range of features like easy-peel for convenient opening and/or reclosure.

Mondi Group

www.mondigroup.com/en/home

iStock.com/KoKimk

Static vs rotating tank cleaning nozzles

No matter what is being produced at scale, from foodstuffs to beverages, manufacturers must thoroughly clean their tanks to avoid contamination and meet health and safety standards.

A clean-in-place method that uses different types of spray nozzle technology is most commonly employed to avoid dismantling and rebuilding equipment that needs cleaning. It also prevents operators having to enter tanks or other confined spaces to clean manually.

Tank cleaning nozzles are industrial quality equipment, specifically designed for washing and sanitising tanks, cans, scrubbers and containers of all sizes. They can, for the most part, be divided into two types: static or rotating. The rotating type can then be divided into free-spinning, controlled rotation or gear controlled.

This article will outline the differences between static and rotating tank cleaning nozzles to help determine which solution is better fitted for financial and environmental targets.

Static spray nozzles (spray balls)

Used across many industries for its reliability, this is the most basic of tank washing devices. Liquid from the static spray nozzle hits the tank interior in a pre-defined cleaning pattern which is fixed as a result of holes being drilled into the nozzle. This freefalling film then cleans the tank walls; however, it takes a relatively long time and can result in excess water/chemical usage. Its low-impact and high-volume fluid requirement limits its use to small tanks and processes where easily cleaned liquids and non-sticking products have to be rinsed.

Free spinning (rotating) spray nozzles

The free-spinning rotating spray nozzle offers a rotating spray pattern. The liquid itself drives the movement, which cascades and wets the internal surfaces of the tank walls. The fan pattern creates a vibration off the tank's internal surfaces, agitating the residue and making it easier to remove. This rotating spray nozzle can reduce water and chemical usage by up to 30% compared to static spray nozzles, while also cleaning the tank faster and consequently reducing downtime.

It is worth noting, though, that the operating pressure has a direct influence on the rotation speed. It must be limited to prevent the liquid jets from breaking into minute droplets, losing part of their impact value on the wall. While these rotating spray nozzles are suitable for larger tanks with a wetting radius of up to 6 m, they may not be effective for harder-to-clean residues, but they do offer a 360° guaranteed repeatable cleaning coverage.

Controlled rotation nozzles

Controlled and gear-controlled rotation nozzles are kept in motion by a friction motor and generate high-impact water jets that clean the inside of the tank in a repeatable predefined pattern to remove even the most stubborn of residues and effectively clean the entire tank surface with high mechanical impact. This nozzle technology can provide additional efficiencies such as reducing water and chemical usage, while reducing cleaning cycle times.

So, which is best?

Each application may require a different approach. When choosing the right cleaning head for your application there are a few questions to consider:

- Is the product water soluble and easy to clean?
- What size is the tank?
- Are there any obstacles in your tank that might shadow areas from direct cleaning fluid impact?
- Is reducing water and chemical usage a company focus?

As a rule of thumb, when carrying out simple cleaning tasks in smaller tanks or vessels that require a simple rinse, the fixed or static spray nozzles continue to provide excellent cleaning. So, if the product is water soluble and has only light residue to remove, this may be a good option.

If you have high flow rates, fixed spray balls may also be a good solution; however, for larger or more complex tanks, rotational spray nozzles use less water, have faster cleaning cycles and use fewer chemicals. Their flat fan or jet spray patterns can penetrate a larger surface area inside the tank with greater impact. Moreover, droplets created by controlled rotation spray nozzles are larger and strike at higher speeds, enabling them to remove tough, heavy soiling.

Tecpro Australia
www.tecpro.com.au

Optimising food manufacturing through artificial intelligence

Jarrod Kinchington, Infor ANZ Vice-President and Managing Director

The value of the market for artificial intelligence (AI) in the food and beverage sector is expected to exceed AU$45 billion by 2026, with Asia–Pacific slated as the fastest growing region.

Already in use by pioneering businesses across the industry, it's clear that AI is making its presence felt in more ways than one, impacting all aspects of the food supply chain, driving smarter, faster decisions and underpinning that all-important competitive advantage.

Whilst many in the industry have heard of AI, there is still widespread uncertainty as to how AI technologies can be applied and just what benefits can be reaped. Put simply, AI has the potential to optimise all areas of food manufacturing, facilitating smart, industry-specific applications to improve every aspect of the supply chain, from farm to fork, building agile supply chains and driving revenue growth.

Many regard AI as the machinery and technologies used to carry out complex tasks that previously required human thought to complete, but it goes even further than that, enabling new approaches to data analysis that simply are not possible to do manually. This is where AI comes into its own, with the ability to consider an inordinate number of data values, parameters, what-if scenarios and other contributing factors to produce accurate and timely recommendations for almost every aspect of the food supply chain. Ultimately, this provides a competitive advantage that would be impossible to replicate without the application of AI technologies.

AI in the food industry comprises a number of technologies, from robotics to machine learning, so where are we seeing AI in action across the industry and what impact is it having?

Precision farming

AI technologies are being used to bring new depths of precision to farming. So, this might be an analysis of past harvests in terms of both quantity and quality, in combination with weather forecasts to inform which fields need watering and when, or when to use fertiliser perhaps. In the aquaculture sector, there is a business that is using AI technology to ensure accurate doses of feed are administered in shrimp farming, avoiding over- and under-feeding. This serves to lower the feed conversion ratio and shortens the shrimp production cycle, doubling production without huge intensification.

Pricing strategy

Again, taking into account numerous factors, the application of AI technologies can inform a more effective pricing strategy. AI applications can quickly and effectively analyse all contributing variables, such as seasonality, competitor pricing, promotions, customer demand, etc, building up a clear picture of pricing history and trends, to inform recommendations regarding which products should be sold at which price to maximise revenues. There is already a leading European bakery ingredients business doing just this, implementing the right technology to achieve optimal pricing recommendations for its wide range of products.

Mitigate against unpredictability

Over the past two years in particular, the unpredictability of food supply chains has had a massive impact on food and beverage manufacturing. This is another area where AI can hold the key to unlocking new, better ways of working. For example, the right AI tools can predict sea vessel arrival times, helping manufacturers to more accurately forecast when their raw ingredients will be arriving. It is the level of detail that AI brings that makes all the difference. Not only can manufacturers secure a more accurate picture of when ingredients will arrive, but the technology can also factor in considerations such as how long deliveries will take to unload at the factory, instilling an even greater level of accuracy when it comes to scheduling production to optimise operations and maximise productivity.

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> *Many regard AI as the machinery and technologies used to carry out complex tasks that previously required human thought to complete, but it goes even further than that, enabling new approaches to data analysis that simply are not possible to do manually.*

This granularity of information is what makes AI the cornerstone of more accurate, agile, predictable supply chains, helping businesses to plan for all eventualities and delivering the actionable insight needed to stay one step ahead of the competition.

Sustainability

The issue of sustainability is another area where AI is having a positive impact on food and beverage manufacturing. Businesses are able to use the insight generated by AI applications to minimise energy and water usage, ensuring the most energy-efficient production, alongside waste reduction at all potential touch points in the manufacturing process. In a similar vein, machine learning-based specification matching and stock allocation enables manufacturers to ask if they can optimise the use of existing stock and still meet customer specifications.

As well, innovative businesses are taking quality information, in combination with ingredient shelf-life data, using AI to determine dynamic best before dates. AI answers the question of 'can we extend the shelf life safely considering the quality at hand?', which ultimately prolongs the sellable life of a product, reducing waste and increasing revenue. At the same time, AI technologies can facilitate smart shelves in supermarkets, where prices are adjusted based on remaining shelf life and point of sales history, reducing waste and increasing profitability further still.

Maximise yield

The ability to maximise yield is yet another area where AI can make a world of difference. Internet of Things (IoT) devices in combination with machine learning are optimising machine settings to maximise yield. For example, manufacturers can ask how to maximise yield considering the quality of ingredients and the process conditions. Taking into account an almost inordinate number of process parameters, it is possible for manufacturers to use AI to maximise the output of processes at every step of the way.

AI is all about connecting the dots, making the most of the huge amounts of data generated by the food and beverage sector, and using AI technologies to analyse this data and gain a better understanding of the many and complex variables at play within the industry. As more businesses invest in AI technologies, suppliers can create more out-of-the box AI solutions. The learnings and experiences of food and beverage manufacturers inform AI templates that can then be applied to similar businesses, delivering the insight needed to maximise efficiencies and boost revenue.

To work, AI needs data. As long as there is data, it is possible to use AI technologies to recognise data trends and patterns, applying this learning and insight back to the business. It is this application of insight that is helping to create better, faster, more profitable operations at every stage of the supply chain, building a responsive and resilient food and beverage industry right across the world.

Jarrod Kinchington,
Infor ANZ vice-president and managing director

Infor
www.infor.com.au

Bulk material tipper

A new High-Volume Open-Chute Tipper from Flexicon allows discharging of non-dusty, free-flowing and/or agglomerated bulk materials from multiple drums or boxes simultaneously, as well as from Gaylords, totes or bins individually.

The bed of the unit's hydraulically tipped housing can accommodate containers from 940 to 1115 mm in height, having an individual or combined footprint of up to 1825 x 2435 mm. Typical applications for multiple containers include simultaneous dumping of four 210 L drums, or four boxes, each having a footprint of 915 to 1220 mm.

Pallets weighing up to 2265 kg are forklift-loaded into the three-sided unit and secured, after which a grate is lowered onto the container(s) to prevent shifting. The lifting assembly is raised to a height of 1955 mm and tipped hydraulically, causing material to slide through a smooth, three-sided chute into receiving vessels.

Twin hydraulic cylinders pivot the platform-chute assembly to discharge angles of 45 or 60° beyond horizontal, including a motion-dampening feature at the termination of container rotation.

Impact-resistant side panels and custom guard panels with a light curtain help ensure safe operation.

The tipper is available in heavy-duty, all-stainless construction to sanitary standards or in carbon steel with durable industrial coatings and stainless steel material contact surfaces.

It is also available with optional receiving hoppers configured with Flexicon mechanical or pneumatic conveyors to transport discharged material to any plant location.

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

Automated technologies for palletising

MHM Automation has released the MHM Automated Mobile Robots (AMRs) and the H&C Gantry Palletiser and De-Palletiser.

The AMR is an automated vehicle which moves product on pallets or in crates, without the need for conveyors. Integrated navigation and vision technology enables the AMR to navigate and move safely around people and objects, making it suitable for congested production environments where automation would previously not have been possible. AMRs' ability to work together as a fleet mean they are a scalable solution that can be used for operations large and small.

The H&C Gantry Palletiser and De-Palletiser (SimPal50) is capable of palletising or de-palletising up to eight boxes or bags per minute, an alternative to a robotic palletiser. The SimPal50 features MHM's proprietary vision system, which enables it to identify and de-palletise boxes in a randomly stacked pattern. It reduces labour, allowing staff to be redeployed to higher value work and helps reduce the risk of injury through manual handling.

MHM Automation
mhmautomation.com

High-speed insulated door

High-trafficked doorways to food processing areas, coolrooms and freezers require a specialised door that will not only operate quickly and efficiently, but provide a high level of insulation. Sydney-based company DMF International has supplied rapid roll doors with flexible PVC type panels for over 30 years and now has a more efficient solution for these applications — the RL3000-Coldsaver high-speed insulated door.

The flexible high-speed door can withstand the harsh conditions of bulk commercial coolrooms and freezers, and the door blade is constructed using a 15 mm-thick door panel using polyskin 900 gsm outer layer and pocketing high-density insulated cores.

Based on a similar design to its Series RL3000 door, the Coldsaver door can provide a greater level of insulation to temperature and noise. It is suitable for opening sizes up to about 20 m^2 and the doors are custom made to size and specification at its Sydney factory.

With operating speeds of over 1 m/s, and multiple safety sensors that prevent the door closing onto an object, the door is designed for hundreds of cycles a day.

DMF International Pty Ltd
www.dmf.com.au

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 case study at Dematic.com

Scan to watch the video!

Dematic.com
02 9486 5555
info.anz@dematic.com

DEMATIC

CASE STUDY

Robots employed to improve bottling operations

Australian contract bottler Vinpac International has selected Dematic automated guided vehicles (AGVs) to help boost productivity and efficiency at its South Australian facility.

Founded in 1975, Vinpac provides contract bottling services to the Australian wine industry and beyond, bottling over 10 million 9 L cases annually for over 500 customers. It operates out of the Barossa and McLaren Vale wine regions in South Australia.

Andrew Holdback, Group Operations Manager at Vinpac International, said, "We are absolutely thrilled to be making an investment in three AGVs for the future growth of our Angaston facility. The safety of our team is paramount, so the deployment of these AGVs will help to enhance the working environment for our valued team members and will deliver the best level of service possible to our customers."

The self-charging Dematic Counterbalance (CB) AGVs are designed to increase efficiency productivity and safety in manufacturing and distribution centres (DCs) with laser guidance and safety scanner technology.

AGVs are capable of working 24/7 every day of the year, which can increase the efficiency of operations. They also help to minimise workplace accidents, improving occupational health and safety standards.

"We are very excited to be working with Vinpac on this project. The Vinpac AGV system will transfer finished goods from production lines to conveyors and manage the empty pallet stacks to/from the palletisers and de-stackers," explained Tony Raggio, General Manager for AGVs at Dematic.

The AGVs can lift loads of up to 1500 kg to a height of four metres. They are self-charging and can drive themselves onto charging floor plates at hours of inactivity to top up their high amp hour, maintenance-free batteries.

The AGVs can function in the typically challenging environment of a warehouse while providing a 360° safety field of protection. They have three obstruction sensors for personnel and other material handling equipment, designed to identify any unexpected object within the scanner's horizontal sensing plane. The sensor has a protection field and warning field. When an object is detected in the warning field, which is longer and wider than the protection field, the AGV will slow to below normal walking pace. When it detects an object in the protection field, it will trigger an emergency stop and remain stopped until the obstruction is cleared.

Each corner of the AGV has an emergency-stop button. Once pushed, the vehicle will not move until the emergency stop is released manually and the reset button is pushed.

The AGVs are designed, engineered, programmed and manufactured in Sydney, Australia.

Dematic Pty Ltd

www.dematic.com.au

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Five automation predictions for 2023

The past few years have seen many organisations implement tech-driven changes at a rapid pace. As society embraces and adopts digital technology, the effective management of new processes becomes key to the success of almost every business.

The rapid workplace transformation evident across industries, whether that's moving to hybrid working or adopting new technologies, prompts us to ask: what can we expect from 2023? Anders Beck, Vice President of Strategy and Innovation at Universal Robots, discusses five predictions for the coming year.

1. Turnkey solutions

In recent years, we have witnessed the development of many different types of sophisticated technologies. Advances in robotics, machine learning and other technologies have increased the pace of this change tenfold. While these promise to revolutionise the business world, all technology companies face the same challenge — they can't be good at everything.

In the world of robotics, this is no different. Creating a robotic system requires hardware development, software development, application development, sensors and interfaces — to name a few. That's why 2023 will be the year of turnkey solutions. Original equipment manufacturers (OEMs) — companies creating new applications and products around existing technologies — will lie at the heart of this. They can drive innovation by combining technologies to deliver complete solutions for the most common applications, such as welding and palletising.

The result? Automation will become more sophisticated yet easier to use than ever before. Enabled Robotics, an OEM based in Denmark, is a great example of how this works. Since 2016 the company has been working to combine two types of cutting-edge technology by mounting cobots onto autonomous mobile robots (AMRs). This hybrid technology is now operating in industry, warehouse management and production and bringing robotics to service applications and hospital intralogistics.

Ultimately, these out-of-the-box solutions make it easier for companies to integrate crucial technologies and there is no limit to the imaginative ways companies will bring robots alongside humans in the world of work.

2. Modular production

Traditional industrial robots remain important in some parts of manufacturing, but we are seeing a trend towards the deployment of more flexible models of production. This is largely due to the fact that traditional industrial robots are typically large and fixed and entail complex deployment.

In contrast, cobots can perform a similar range of activities to traditional industrial robots but are smaller, lighter and much

easier to deploy. They are designed to work alongside humans so pose less risk to safety and are better suited to environments that require flexibility and adaptability. In addition, they present a cost-effective solution for businesses looking to deploy automation — a key consideration as we move into 2023.

The cobot industry is projected to grow to US$2.2 billion by 2026 ('The Collaborative Robot Market 2022' report, Interact Analysis). Cobots will continue to change the way work is done in applications such as packing, palletising, welding and assembly, and this year we will see even larger companies turning to lightweight cobots to increase modularity in their production. Robot weight and versatility will be key specifications for those seeking out new automation solutions and we will see more reconfigurable robotic work cells than ever before.

3. Higher payload and longer reach cobots

While more companies will move towards cobot automation, many will require bots that can handle heavy payloads. The good news is that we have recently seen the introduction of several higher payload, longer reach cobots. In 2023 these will continue to transform parts of the manufacturing industry, improving the working lives of many employees.

Last year, Universal Robots presented a new cobot, UR20, which is built for higher payloads and faster speeds and delivers good motion control — all within a lightweight, small footprint system. The 20 kg payload capacity can transform industries by enhancing activities such as palletising. Manufacturers looking for extra flexibility will find the robot light enough to be unbolted and relocated or attached to a heavy base with wheels. This will create new possibilities for various applications and will drive innovation across the board. The UR20 will be available in 2023.

4. Increase in industrial robot installations despite global uncertainties

The recent IFR World Robotics Report showed that industrial robot installation reached an all-time high in 2021, increasing by 31% over the previous year. Overall, worldwide annual robot installations between 2015 and 2021 have more than doubled. Although growth in 2022 seems to be slower across the sector, this is largely due to global uncertainties triggered by the COVID-19 pandemic and the scarcity of electronic components.

We expect the upward trend of cobot automation to resume in 2023. Why? Because businesses across the world are facing labour and skills shortages and, despite the day-to-day challenges facing industry right now, we are in the midst of a transition towards Industry 5.0. Here, working alongside robots will create more human-centric, sustainable and resilient businesses.

5. Customers at the heart of product development

Although we talk extensively about robot collaboration in the workplace, human collaboration is what drives innovation.

Customers understand their own needs better than anyone else and, as the automation market has matured, they are better placed than ever before to offer valuable input on their requirements. This means robotics companies will involve end-customers much more in product development. It is why Universal Robots has reorganised its product creation teams and is focusing heavily on understanding the challenges customers are facing, before designing solutions.

Co-development projects, where robotics companies and customers work together in developing specific solutions, are also bound to increase in 2023 and beyond. Ultimately these allow customers to directly influence the product they are buying, while at the same time delivering valuable feedback for the robotic companies — meaning they will be able to launch a product to the benefit of the whole market.

The future of cobots

Businesses need to innovate continuously and remain adaptable to survive and expand. As we head into 2023, they will rely ever more on technology and innovation to break new ground, with turnkey solutions at the heart of it. This makes for an exciting time for automation.

Anders Beck, Vice President of Strategy and Innovation at Universal Robots

Universal Robots
www.universal-robots.com

Using lubrication science to design low-fat chocolate

iStock.com/apomares

Remember the old proverb: "A moment on the lips, a lifetime on the hips"? Indulgent food such as chocolate can be irresistible for most of us but many are concerned about the impacts of the fat contained within them.

Now, new research could lead to the development of a new generation of luxury chocolate that has the same mouthfeel and texture but could be healthier on the hips.

The research team at the University of Leeds analysed each step of the physical process that takes place in the mouth when a piece of chocolate is eaten as it changes from a solid into a smooth emulsion.

During the moments it is in the mouth, the chocolate sensation arises from the way the chocolate is lubricated, either from ingredients in the chocolate itself or from saliva or a combination of the two.

Fat plays a key function almost immediately when a piece of chocolate is in contact with the tongue. After that, solid cocoa particles are released and they become important in terms of the tactile sensation, so fat deeper inside the chocolate plays a rather limited role and could be reduced without having an impact on the feel or sensation of chocolate.

Anwesha Sarkar, Professor of Colloids and Surfaces in the School of Food Science and Nutrition at Leeds, said: "Lubrication science gives mechanistic insights into how food actually feels in the mouth. You can use that knowledge to design food with better taste, texture or health benefits.

"If a chocolate has 5% fat or 50% fat, it will still form droplets in the mouth and that gives you the chocolate sensation. However, it is the location of the fat in the make-up of the chocolate which matters in each stage of lubrication, and that has been rarely researched.

"We are showing that the fat layer needs to be on the outer layer of the chocolate — this matters the most — followed by effective coating of the cocoa particles by fat — these help to make chocolate feel so good."

The study — published in the scientific journal *ACS Applied Materials and Interface* — did not investigate the question of how chocolate tastes. Instead, the investigation focused on its feel and texture.

Tests were conducted using a luxury brand of dark chocolate on an artificial 3D tongue-like surface that was designed at the University of Leeds. The researchers used analytical techniques from a field of engineering called tribology to conduct the study, which included in-situ imaging.

Tribology is about how surfaces and fluids interact, the levels of friction between them and the role of lubrication: in this case, saliva or liquids from the chocolate. Those mechanisms are all happening in the mouth when chocolate is eaten.

When chocolate is in contact with the tongue, it releases a fatty film that coats the tongue and other surfaces in the mouth. It is this fatty film that makes the chocolate feel smooth throughout the entire time it is in the mouth.

Dr Siavash Soltanahmadi, from the School of Food Science and Nutrition at Leeds and the lead researcher in the study, said: "With the understanding of the physical mechanisms that happen as people eat chocolate, we believe that a next generation of chocolate can be developed that offers the feel and sensation of high-fat chocolate yet is a healthier choice.

"Our research opens the possibility that manufacturers can intelligently design dark chocolate to reduce the overall fat content.

"We believe dark chocolate can be produced in a gradient-layered architecture with fat covering the surface of chocolates and particles to offer the sought after self-indulging experience without adding too much fat inside the body of the chocolate."

The researchers believe the physical techniques used in the study could be applied to the investigation of other foodstuffs that undergo a phase change, where a substance is transformed from a solid to a liquid, such as ice cream, margarine or cheese.

SAWING
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CUT TO WEIGHT

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PORTIONING
SHAVING

DICING
STRIP CUTTING
SHREDDING

MASSAGING
MARINATING

MINCING
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WALTER eurobin trolley cleaning systems

CONTACT
CBS Foodtech
2/7 Jubilee Avenue
Warriewood, NSW 2102
info@cbsfoodtech.com.au
tel: 02 9979 6722
cbsfoodtech.com.au

CBS Foodtech

Reactor for material synthesis and R&D

Bestech Australia offers the complete range of kilolab reactors from PIGNAT ranging from 5 up to 50 L. The reactor range is designed for research laboratories or R&D centres as a scale-up tool in their development process.

The design of the reactor is flexible to meet the needs of users. Therefore, it can be tailored to suit different processes and mimic the real industrial environment as per requirement. The reactor can be easily installed in the laboratory and is robust, easy to run and easy to maintain.

Generally, the reactor can be used for the synthesis and hetero-azeotropic distillations. These reactors facilitate process development by their specific design and the different technology that is integrated in them. These are adaptable units designed to include glassware set-ups for batch reactions, distillation set-ups and chemical synthesis in kilo laboratories and pilot plant systems. Its glass construction allows it to display various physical phenomena. Furthermore, the mobile tanks facilitate portability and safe handling during the feeding and draining operations.

With its partner PIGNAT, Bestech Australia designed the unit to give as much flexibility to manage a dynamic process portfolio while fulfilling environmental, health and safety, product quality and business goals.

Bestech Australia Pty Ltd
www.bestech.com.au

Trolley cleaning system

The KWR 200 L Eurobin trolley cleaning system from Walter Geratebau is designed to optimise the cleaning process of the Eurobin trolleys. The system features a standard push button operation and can rinse up to 30 trolleys per hour.

Benefits include: 30% reduction of the 200 L Eurobin trolleys in the production cycle; eliminating damage to the Eurobin and surrounds during manual cleaning; 2 min rinse cycle, 5 min cleaning cycle; frees up Eurobin storage space; and reduced risk of injury from manually turning over the Eurobins to wash.

Currently there are two versions of the cleaning system. Version A features a 90 s wash-only cycle. Version B features a 90 s wash and 340 s wash cycle.

CBS Foodtech
www.cbsfoodtech.com.au

Non-cyclic refrigerated air dryers

ELGi Equipments has expanded its range of non-cyclic refrigerated air dryers with the inclusion of three-phase options on five of its medium-sized models which produce flow rates from 210 to 590 cfm (5.95 to 16.71 m^3/min).

The product includes a controller which automatically reduces the fan speed or stops the fan depending on the condensing pressure and dryer temperature.

A rotary compressor is designed to ensure specific power consumption while the inclusion of a heat exchanger minimises the pressure drop and maximises thermal efficiency. The three-stage heat exchange system with cold storage allows the unit to cycle on and off as necessary. The heat exchanger is also able to operate in high ambient temperatures, suitable for Australian conditions.

The inclusion of a zero loss drain means that only condensate is drained with no air loss, which helps save energy.

The dryers include a fixed speed, hermetically sealed and energy-efficient rotary compressor. They feature a suction separator muffler, an internal protector, a reverse-phase protector in the three-phase variants and a run capacitor which contribute to the overall high reliability of these compressors.

Additional design details include a hot gas bypass valve, which prevents the freezing phenomenon in the heat exchanger, the use of high quality copper capillary tube, level sensing drain, insulation of each and every pipe, a number of protection devices and failure prevention features on the controller.

Meeting F-Gas regulations, the EGRD series use either the ozone-friendly R-134a or R-407c gas, both of which have zero ozone depletion potential (ODP).

The models contain removable access panels providing immediate access to all parts of the system for easy maintenance. All service alerts are also clearly displayed on the controller.

Elgi Equipments Ltd

www.elgi.com.au

Digital winery for Treasury Wine Estates

Treasury Wine Estates (TWE) is one of the world's largest wine companies, selling its wines in more than 70 countries and employing more than 2600 people across nine locations around the world. The company operates wineries not only in South Australia, but also in New Zealand, the USA, France and Italy.

In 2022, TWE unveiled its new winemaking facility in the Barossa Valley, which has the capacity to produce more than 100 million litres of wine and package up to 216 million bottles per year.

When TWE was beginning to design its winery expansion back in 2019, it was seeking an automation system that would improve on the cumbersome maintenance and inflexibility of the traditional hard-wired valves and sensors that had been used on previous sites. As a completely new greenfield installation, this was an opportunity to embrace new technology across the whole winemaking operation, improving efficiency and safety for workers.

Bürkert presented TWE with an opportunity to digitally transform its network for the new tank farm and bring its infrastructure in line with Industry 4.0 and modern digitalisation trends using IO-Link capabilities. Bürkert Type 8801 - ELEMENT On/Off Valve Systems were chosen for fermentation, glycol and must delivery (heating and cooling) applications across a tank farm of over 400 tanks. The fully integrated valve and automation system has an IP65/67/NEMA 4X protection class and good chemical resistance, suitable for the environmental demands of an outside tank farm.

Today, digitalisation is the fastest moving automation requirement for food and beverage producers across the world. Ensuring simplicity in installation and management, reducing maintenance and improving environmental footprint are also part of this modern automation infrastructure. By using smart valves and sensors and the right fieldbus technology, wineries can embrace automation for now and into the future while saving on implementation costs.

"Working closely within this industry and hand in hand with Australian winemakers, we are ensuring that Australian produces are at the forefront of this movement," said Bürkert Australia's General Manager, Chris Hoey. "In the implementation of digitalisation across a winery, we can begin assessing and improving wastage, blending errors, burdensome maintenance, long wait times for upgrades and installations, whilst improving energy efficiency, hitting sustainability targets and reducing bottom line expenditure."

The automation infrastructure proposed by Bürkert offered the opportunity of moving to best practice with smart equipment and connectivity that could improve overall control and management of the winery. Bürkert offered valve systems with IO-Link capability, due to IO-Link's seamless integration capabilities as well as its standardisation as an independent fieldbus network.

Over the next two years, the project got underway and collaboration between partners, including Chris Hoey and National Engineering Manager Nelson Chymiak, ensured the tank farm was up and ready to go in no time.

"The most noticeable positive impact of this solution was the diagnostic information provided from the network connected field devices," said Harry Robinson, Project Engineer for Treasury Wine Estates.

He also received positive feedback from the electrical contractor that the single cable installation for each device was a welcome change from legacy systems.

Not only do the new valves supplied by Bürkert enable efficient error-free activation of valves on wine tanks through QR-coded operation, they also improve safety in a number of ways.

Firstly, they can automatically prevent tank collapse by the automated activation of tank vent valves and remove the need for costly catwalks and access stairways to the tops of tanks. There is also a reduced safety risk associated with working at heights.

With traceability and transparency direct from the valves themselves, management and maintenance of the entire site can be controlled from one central point. Smart valve actions and alerts ensure reduced risk of wastage and faster reaction times if things go wrong, and having that peace of mind has made an incredible difference to the team and how the winery undergoes managing the winemaking process.

Although the site itself is still evolving and growing with further installation and upgrades, the bulk of the work is done and the foundations for a futureproof winery are in place. With IO-Link capabilities, flexibility of connectivity across the site means that the sensor and actuator network could be customised to TWE's requirements.

Burkert Fluid Control Systems
www.burkert.com.au

"Bürkert presented TWE with an opportunity to digitally transform its network for the new tank farm and bring its infrastructure in line with Industry 4.0 and modern digitalisation trends using IO-Link capabilities."

CASE STUDY

Smallgoods manufacturer improves return on solar

Shun King Li Sealane MD, with Peilin Li and Jamie Li

Victorian-based processed meat supplier Lago Smallgoods and Sealane Food Group joined South Street Energy's Distributed Generation Network, which provides a way for owners of small-scale renewable energy systems to get more returns from the national electricity market.

Lago Smallgoods supplies processed meats including ham, bacon, salami, European sausages and pizza toppings to food distributors across Australia.

Lago Smallgoods General Manager Rhett Davis said the company is committed to environmental sustainability and energy efficiency is important for running its ovens, slicers, refrigeration and freezers. It pays up to $20,000/month in electricity and its gas bill is expected to increase by 350% in January.

Eight years ago, the installation of a 420 kW solar PV system halved its electricity bill. The 1120 panels cover the whole roof of its Broadmeadows factory, generating more than 500 MWh and preventing 770 kg of CO_2 from entering the atmosphere daily.

In recent years, however, Lago wasn't getting much return from its solar energy.

"We were down to getting between $80 and $200/month for any solar-generated electricity we supplied to the grid. South Street Energy came and installed a smart meter and quadrupled the income we could get to $900 or more per month," Davis said.

Sealane solar array

South Street Energy Managing Director Marco Bogaers said, "South Street Energy has found a way for owners of small-scale renewable energy systems to participate in the electricity market and realise the true value of the renewable electricity they contribute.

"When businesses like Lago Smallgoods join our Distributed Generation Network, we install a meter so we can accurately measure the amount of electricity that is generated. Then we sell the renewable electricity they produce in either the retail or the wholesale market, whichever offers the greater return, and take a share of the increased value we create."

Another company to benefit from the distributed generation network is Sealane Food Group, a family business that distributes wholesale and retail food and beverage products and operates from a purpose-built facility in Heidelberg, Victoria.

Co-owner Jamie Li said the company is constantly looking at ways to reduce its environmental impact, including with sustainable packaging of food products, recycling onsite materials by reducing waste going to landfill and implementing sustainable energy solutions.

"We're very proud of having our own 300 kW roof top solar generation system, and we took into consideration the design and build of our facility to support physical expansion of renewable energy infrastructure beyond 2030, such as capacity for onsite battery storage, water retention, efficient building design principles to combat sun exposure and room for solar panel expansion when required.

"Working with South Street Energy has provided support we're not getting elsewhere to get more return on our solar energy system."

In the first nine months of 2022, Sealane's solar system generated 256 MWh. South Street Energy sold 35% of Sealane's renewable electricity to the wholesale electricity market for $18,400 and its electricity bills reduced by $12,000. South Street Energy increased the value of the company's renewable electricity from $19,200 to $30,400 — or from 7.5 cents to 11.9 cents per kWh.

"Getting this significant return allows us to offset high energy costs in this current economic environment and potentially re-invest back into our internal sustainability program for future planned renewable projects that we are currently exploring with industry partners and experts," Li said.

South Street Energy was recently recognised at the 2022 National and Victorian iAwards, in the Sustainability and Environmental Solution of the Year category, for its Distributed Generation Network.

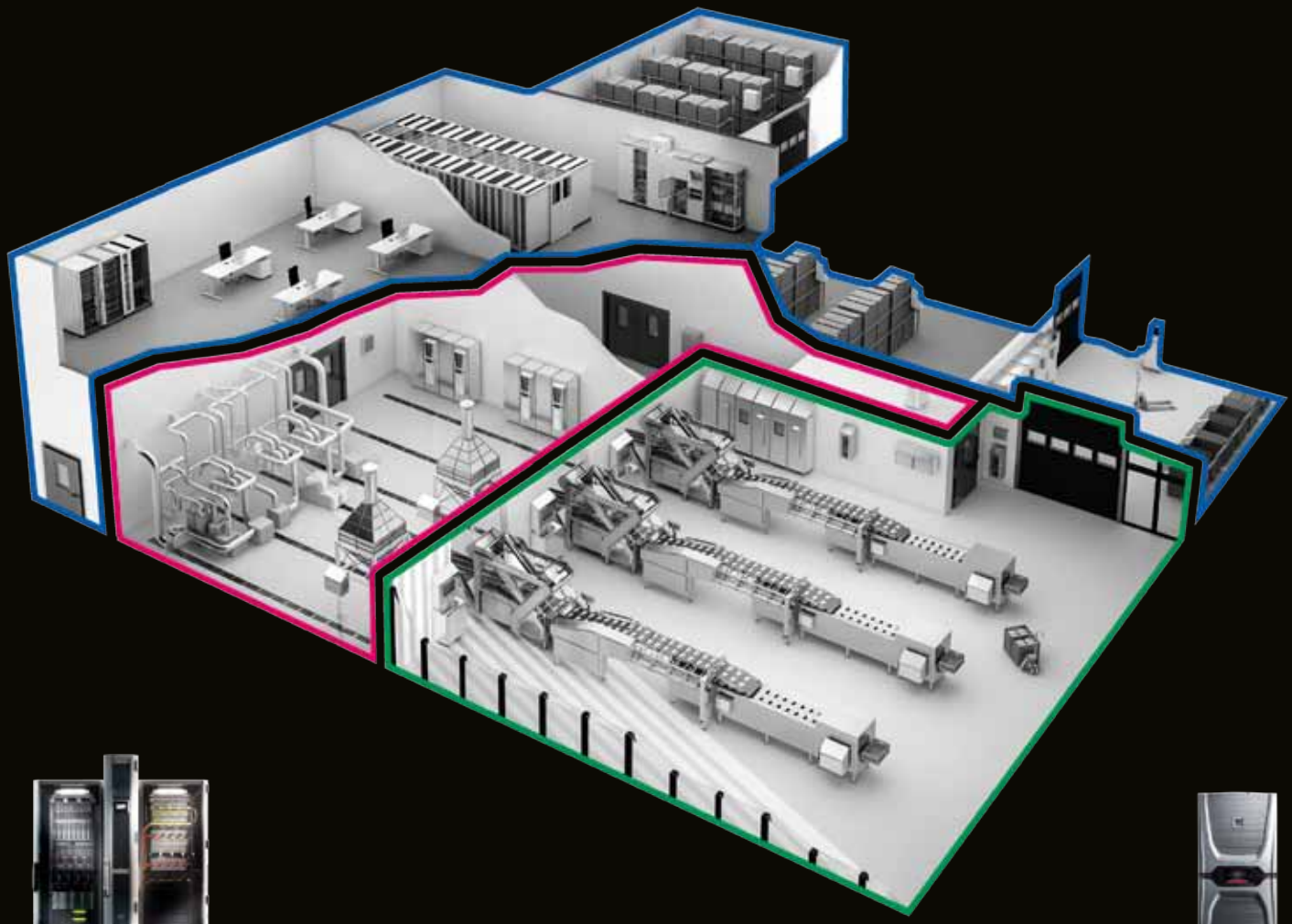
According to Bogaers, the system can benefit everyone. "It helps the owners of individual systems by providing a new and additional form of revenue, it helps the community by providing further financial incentives for the take-up of renewables and it helps the National Electricity Market (NEM) by providing a demonstrable mechanism for participation by small-scale, renewable generators."

South Street Energy

www.southstreetenergy.com

Lago Smallgoods' hams hanging

Clean, sustainable, efficient: Our three areas of expertise



More data

Digitalisation has really taken off in the food Industry and Rittal supports Industry 4.0 concepts with pioneering IT infrastructures and smart services.

Cleaner

Rittal's HD range sets the standard for hygienic production, high productivity and food safety.

More efficient

Innovative low-carbon cooling technology and efficient power distribution solutions.

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RITTAL

Bacteria-based whipped cream:

could this pave the way for future food?

Whipped cream can be delicious on top of a dessert but the dairy delight is composed of 38% saturated fat, making it not so fluffy on the calories. Therefore, a group of researchers at the University of Copenhagen's Department of Food Science set out to develop a low-fat alternative.

The fat-free prototype is built using bacteria instead of milk fat — in both velvety and stiffer varieties. The concept opens up the possibility of producing alternative whipped creams using beer brewing residues and plants, which can also increase sustainability of the product.

"The most difficult aspect of developing an alternative food is getting the texture right. Whipped cream undergoes a unique transformation that occurs in a complex system where a high saturated fat content makes it possible to whip the cream stiff. So, how do we create an alternative where we avoid the high fat content, while still achieving the right consistency? This is where we need to think innovatively," explained Associate Professor Jens Risbo of the Department of Food Science.

New role for bacteria

For a number of years, Risbo and a group of researchers have been working on using lactic acid bacteria as tiny building blocks for creating food. They have now succeeded in illustrating their knowledge by creating a whipped cream in both fluffy and stiff versions.

"We usually associate bacteria with something to keep away from food. But here, we base a beloved food product on good bacteria found in nature. This has never been seen before. This is advantageous, both because it is a renewable resource grown in a tank, and because it creates a healthier, less energy-dense, fat-free product," stated Jens Risbo, who is the lead author of the study, now published in the journal *Food Hydrocolloids*.

Lactic acid bacteria are ubiquitous. Some live on plants, while others are found naturally on human and animal mucous membranes, as well as in their digestive tracts. In the food industry, these bacteria are used to culture yoghurt and as a preservative for cold cuts. Here, they are put to work in an entirely new way — to serve as the building blocks of a food product, where they play the leading role.

How whipped cream is made

Dairy-based whipped cream is formed as the fat globules in cream clump up during whipping, until the airy foam stabilises and provides the strength necessary to stand and not let liquid drain out. This requires a lot of fat globules, which is why heavy whipping cream has a fat content of 38%.

While there are a number of non-dairy artificial whipped creams on the market, they are made from other saturated sources of fat, such as coconut or palm fat, which are imported from the tropics. Furthermore, they contain at least 25% fat. Finally, their production is usually complicated to manage and involves a long list of E-number food additives.

"Here we only use four ingredients — water, bacteria, a bit of milk protein and a single thickener. With these few ingredients, we've managed to make a fat-free product that can be whipped, peaks up and retains the liquid," Risbo explained.

The UCPH researchers used two different lactic acid bacteria — *Lactobacillus delbrueckii* subs. *lactis* (LBD) and *Lactobacillus crispatus* (LBC) — for the two versions of the bacteria-based foam, both of which are roughly the same size as the fat globules in dairy-based whipped cream. The differing surface properties of each bacteria provide the foams with different structures. One bacterial species, whose surface likes water, forms a weak network that produces a softer foam. The second bacterial species, which is more similar to fat, forms stronger networks and thus a stiffer foam that can stand in taller, pretty peaks.

Risbo points out that the bacteria-based foam is a proof of concept, which should not be seen as a standalone product, but considered as new knowledge that provides insight into how to create a similar food structure using non-dairy sources.

"We've shown that bacteria can be used to create the right structure. Now that we understand the context and have learned which surface properties are important, it opens up the possibility of using many other things from nature. This could be yeast residue from brewing, or perhaps small building blocks that we extract from plants. This would make the product very sustainable," Risbo concluded.

Fanless panel PCs

Interworld Electronics has introduced the PhanTAM series of fanless, rugged, waterproof stainless steel panel PCs from APLEX Technology. The PhanTAM series has an updated Intel 11th Gen. Core i3 (Dual Core)/i5 (Quad Core) processor, ultra slim front frame design, special hygienic bolts, landscape or portrait mode and waterproof antenna covers which lower the risk of bending/breaking antennas.

The PhanTAM series offers a protective panel solution by achieving IP66 and IP69K-certified protection with M12 connectors. The 304 (or optional 316) fully enclosed stainless steel chassis of the PhanTAM series makes it a suitable option for the food and beverage manufacturing industry due to its slim design, high corrosion resistance and germ resistance, helping to prevent any bacterial contamination. Stainless steel also makes the chassis easy to clean (capable of withstanding high-pressure cleaning), increases the life cycle of the chassis due to its rugged nature and helps to lower the cost of maintenance.

The PhanTAM series is available in two sizes, 15.6″ and 21.5″, and includes two USB, one serial and one LAN port, as well as the ability to add additional ports, Wi-Fi and RFID. The addition of waterproof antenna covers allows companies to make use of a range of antenna options (4G LTE, 5G, BT and Wi-Fi).

The PCAP touch screen with 7H anti-scratch surface and optional high brightness helps to improve usability and makes it adaptable to a range of environments.

Interworld Electronics and Computer Industries
www.ieci.com.au

Flow meter series

Following the release of the ES-FLOW ES-1x3C in 2021, Bronkhorst has now released the ES-1x2C flow meter which will cover the flow range just below the existing ES-1x3I or ES-1x3C.

The ES-FLOW product series provides a good performance of ≤0.8% Rd. Mini CORI-FLOW offers a higher performance of ≤0.2% Rd but this high level is not always required. Both flow meter series include an onboard PID-controller, totaliser and alarm functions and many communication buses, followed up by the Bronkhorst sales and service network.

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

Online TOC analyser technology

TOC analyser technology plays a role in helping plants optimise process control, minimise product loss and reduce energy and wastewater treatment costs.

The Hach BioTector B7000i Online TOC Analyser is a TOC analyser, designed to detect product loss, decrease and conserve water usage and improve production processes.

The product measures organics in food processing conditions with 99.86% uptime and requires preventive maintenance only twice per year.

The analyser comes with a built-in self-cleaning sample line and reactor. This enables the B7000i to deliver results even if water contains high levels of fats, oils, greases, sludge and particulates or has pH swings. Installing the analyser decreases chemical dosing, reduces waste and reduces samples processes. Industry studies show that lost product can be reduced by over 15% by using accurate and continuous TOC measurement. Further savings of up to 40% can be made in the operating cost of the treatment plant by reducing energy and water consumption.

Hach Pacific Pty Ltd
www.au.hach.com

Ion air nozzle

Like the Intellistat Ion Air Gun the EXAIR Intellistat Ion Air Nozzle provides a lightweight solution rated Class 5 for clean rooms and controlled environments per ISO 14644-1. It may reduce 1000 V to less than 100 in 0.6 s and up to 24″ (610 mm) away. It is a solution for neutralising static in sensitive processes like scientific and electronic testing, cleaning medical or pharmaceutical products and packaging, or removing debris from sensitive electronics.

Including a compact stainless steel adjustable mounting bracket, the Intellistat nozzle can be mounted to benchtops and machine frames to provide hands-free operation when needing both hands to package, test or assemble parts and products. The nozzle is equipped with an LED indicator to assure proper functionality and employs an EXAIR-engineered air nozzle to maximise efficiency and meet OSHA requirements for sound level and dead-end pressure. Its static dissipative polycarbonate housing and non-marring nozzle makes it suitable in applications such as PCB or electronics manufacturing and in sterile environments such as pharmaceutical and medical laboratories.

Compressed Air Australia Pty Ltd
www.caasafety.com.au

CASE STUDY

Arnott's factory to transition to 100% renewable

iStock.com/Yoyochow23

The Arnott's Group has signed an agreement with CleanPeak Energy to transition its Huntingwood manufacturing facility to 100% renewable electricity by 2029. The project, based in Sydney's western suburbs, is expected to be one of Australia's largest integrated behind-the-meter solar and battery installations.

The 44,000 m² manufacturing facility employs over 400 people and operates 24 hours a day, seven days a week. It runs five different automated manufacturing lines and produces 53% of Arnott's total biscuit volume, equalling around 56 million kg of biscuits annually, including Tim Tam, Shapes and Jatz.

CleanPeak will install a 4.1 MW rooftop solar system which will operate alongside a 15 MWh battery energy storage system, generating more than 5.25 GWh of renewable electricity. It will then source an additional 17.3 GWh of mixed renewable and non-renewable electricity required for the site, progressively moving to renewable electricity from 2023 and reaching 100% by 2029.

Around 10,000 panels will be housed on the rooftop of the facility, all connected to inverters and a battery energy storage system. The integrated solar and battery assets will operate to smooth the solar output each day to match the energy usage of the site.

Supported by consultant World Kinect Energy Services, Arnott's embarked on the journey to transition to renewable electricity across its operations over 12 months ago. CleanPeak was selected as its partner to deliver an onsite solution and complement this with a multi-year in-front-of-meter energy offer that will allow the site to transition to 100% renewable electricity operations in a cost-effective manner. The plan is designed to provide Arnott's with certainty over the site's electricity costs for seven years.

The installation is due to be fully operational by the end of 2023, and will be built without interrupting the production facility's operating schedule, connecting to the site's HV switchboards.

Simon Lowden, Chief Transformation Officer at Arnott's Group, said, "This agreement allows us to make significant progress towards achieving our group net-zero targets that we've set ourselves. It offers greater certainty over our electricity prices, is affordable and efficient, and is just one of the tools we're investing in to get to meet our net-zero commitment. We are also investing in large-scale energy monitoring trials and working with our suppliers to better understand their emission profiles."

CleanPeak will become the energy retailer for the Huntingwood manufacturing site from 1 January 2023. It will then commence installation of the onsite solar system as part of Stage 1 of the project. Stage 2 will involve the battery storage asset, which will be operational in the second half of 2023.

It will also build a 1.3 MW rooftop solar asset at the Arnott's Virginia site in Queensland.

CleanPeak CEO Philip Graham said, "It's terrific to see Tier 1 industrial companies who have large rooftops in metropolitan areas showing the leadership needed to achieve the renewable energy transition. These deals are very complex in a manufacturing environment as it's imperative to deliver the system without impacting production, and we congratulate The Arnott's Group's focus and commitment to achieving what really is commercial sustainability in action."

The Huntingwood rooftop

Low-profile touchless switches

IDEC Corporation has introduced a line of CW low-profile touchless switches suitable for many hygienic industrial and public automation applications. The product is designed to address cleanliness concerns for protection against COVID-19 and other contamination.

With a 2 mm rise low-profile surface silhouette, the switches are built for an industry-standard 22 mm mounting hole and require only a shallow 35 mm space behind the panel face, plus room for the wiring connector. The typical installation pitch is 30 mm width and 50 mm height. Operating temperatures range from -25 to +55°C.

A rubber washer and locking ring ensure IP65/67 and NEMA Type 4X ratings are maintained. The CW1H housing and bezel is black plastic resin and the CW4H is silver aluminium alloy metal. Although the switches are rated for outdoor use, made from weather-resistant materials and highly resistant to visible light, excessive exposure to ultraviolet rays from direct sunlight can cause material degradation, colour fading and false signals. Additionally, dirt and water droplets can impact operation. Therefore, designers should check product performance before use and consider degrees of physical protection.

The switch front face contains a central emitter and receiver sensing lens and an LED indicator ring. Infrared LED diffuse reflection technology is used to detect objects. The detection distance is adjustable, typically ranging from 70 to 270 mm depending on the colour, material and surface condition of the object to be detected. When two switches are installed close together, their emitting frequencies are automatically adjusted for mutual interference prevention, ensuring the switches do not trigger each other.

Switch output is a non-contact photoMOS relay, available without a timer or with a 0.5 s on-delay and a 2.0 s off-delay. Reverse connection protection is included, and the switch operates at a nominal 12 to 24 VDC with 100 mA max load current. The two-colour LED ring, which can be externally controlled to illuminate in red or green, provides status feedback for users.

IDEC Australia Pty Ltd
www.idec.com/australia

Would you like a 3D-printed low-fat chocolate?

iStock.com/Olga Chetvergova

A Rutgers University scientist has developed a low-fat chocolate formulation that can be printed on a 3D printer in pretty much any desired shape. The researcher hopes this will be the first in a new line of 'functional foods' that are specifically designed with health benefits.

"Everybody likes to eat chocolate, but we are also concerned with our health," said Qingrong Huang, a professor in the Department of Food Science at the Rutgers School of Environmental and Biological Sciences. "To address this, we have created a chocolate that is not only low-fat, but that can also be printed with a 3D printer. It's our first 'functional' chocolate."

The study findings from the Rutgers-led team of scientists have been published in the scientific journal *Food Hydrocolloids.*

For the study, the scientific team experimented with different ratios of the ingredients for a standard chocolate recipe to find the best balance between liquid and solid for 3D printing.

Chocolate is generally made with cocoa butter, cocoa powder and powdered sugar and combined with any one of a variety of different emulsifiers.

Seeking to lower the level of fat in the mixture, researchers created a water-in-cocoa butter emulsion held together by gum arabic, an extract from the acacia tree that is commonly used in the food industry, to replace the cocoa butter. The researchers mixed the emulsion with golden syrup to enhance the flavour and added that combination to the other ingredients.

Employing advanced techniques examining the molecular structure and physical properties of chocolate, researchers investigated the printed chocolate's physical characteristics. They were seeking the proper level of viscosity for printing and looking for the optimal texture and smoothness "for a good mouthfeel", Huang said. Experimenting with many different water–oil ratios, they varied the percentages of all the main ingredients before settling on one mixture.

Huong said he is already working on manipulating sugar content in the new chocolate formulation for low-sugar and sugar-free varieties. Ultimately, he said he plans to design functional foods containing healthy added ingredients — substances he has spent more than two decades studying, such as extracts from orange peel, tea, red pepper, onion, rosemary, turmeric, blueberry and ginger — that consumers can print and eat.

"3D food printing technology enables the development of customised edible products with tailored taste, shape and texture as well as optimal nutrition based on consumer needs," Huang said.

Other researchers involved on the study with Huang include Siqi You and Xuanxuan Lu of the Department of Food Science and Engineering at Jinan University in Guangzhou, China.

CASE STUDY

Filtering rice paste for baby cereal

iStock.com/SeventyFour

Rice cereal is a common first food for babies once they reach six months as it contains B vitamins, minerals and some of the nutritional value required by the infant at this time. Compared to other grains, rice cereal is also a favourable choice as it's less likely to trigger an allergic reaction.

A food factory in China that specialises in the production of rice cereal recently sought help from Russell Finex to ensure its product met stringent food health and safety regulations.

Since the factory opened, demand for its products — including milk powders, cereals and infant formula — has increased, which has required the food manufacturer to optimise its production line.

Having never used a filtration machine in its production line, the food manufacturer trialled both the Self-Cleaning Russell Eco Filter (SCF) and Russell Filter Management System in its processing line.

The SCF has a stainless steel, reusable filter element instead of a filter bag, which is designed to eliminate the replacement and disposal costs of filter bags. The enclosed design of the SCF also protects the rice paste from airborne contamination in the environment.

To streamline production, the Russell Filter Management System was used to monitor the filtration process, minimising operator involvement. Automating this task also meant operators could focus on other tasks while eliminating the potential risk of hazardous exposure.

After a successful trial, the filter was used to filter out oversize and contamination from the rice paste before being heat treated. The filtration equipment is processing six tonnes/h, which has resulted in a significant boost in production.

Russell Finex

www.russellfinex.co

Mechanical skewering machine

The MyBroch Production by French manufacturer SYSTEM B is a simple and ergonomic skewering machine suitable for butchers, food trucks, caterers, manufacturers of prepared foods and supermarkets. It is designed to be safer, faster and more precise than skewering by hand.

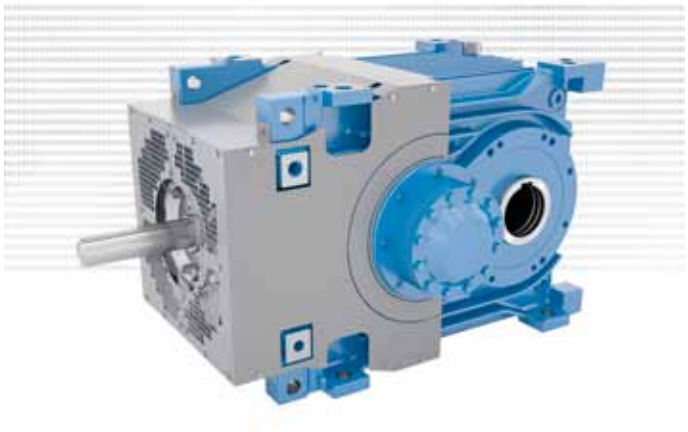
It is intuitive to use so no extensive training is required to operate the machine. It also involves no electrics or pneumatics, thus reducing possible downtime.

The versatile and modular machine has interchangeable moulds for fish, meat and vegetables, and various possibilities of lengths, widths and styles included in the one machine.

It is compact and fits on a benchtop, and it folds away when not in use. All parts are easily disassembled for cleaning and the machine frame can be sprayed with a water jet.

The machine is designed to improve the experience of workers involved in a labour-intensive process, reduce the possibility of injury and increase efficiency.

Barnco Pty Ltd
www.barnco.com.au



Durable drives for belt conveyor systems

The MAXXDRIVE XT industrial gear unit from Nord Drivesystems provides output torques of 15 to 75 kNm with speed ratios from 6.3 to 22.4 and is offered in seven sizes for powers from 22 to 2100 kW.

The power and speed ranges of the two-stage right-angle gear unit have been specially designed for industries in which low speed ranges are required in combination with high powers, such as the bulk goods and mineral industries. Its robust design makes the MAXXDRIVE XT resistant to dirt and is suitable for use in rough operating conditions. A special sealing concept reduces maintenance, while large roller bearings and centre distances can increase the load capacity and service life of the components.

As standard, the industrial gear unit is equipped with a heavily ribbed UNICASE housing and an integrated axial fan. Due to the increased surface and the airflow covers, the cooling airflow is optimised and a high thermal limiting power is achieved. In many cases, additional cooling is not required.

NORD Drivesystems (Aust) Pty Ltd
www.nord.com

Improving health credentials using cellular flour ingredient

Researchers from King's College London School of Life Course and Population Sciences (SLCPS) and the Quadram Institute have looked into replacing regular wheat flour with 'cellular chickpea flour' to find out the effects on feelings of fullness, fullness-regulating hormones, insulin and blood sugar levels. The research has been published by the *American Journal of Clinical Nutrition*.

The study is based on the design of a pulse ingredient known as PulseON by PulseON Foods, which is being commercialised for use in the food industry.

By developing new methods in food technology, the scientists have been able to make whole cell flours that preserve the dietary fibre structure of the pulses, keeping their nutritional qualities intact in flour-based food.

By adding whole cell chickpea flour to bread, the scientists found a significant increase in the satiety signals released from the gut to the brain, leaving people feeling fuller.

Use of cellular flour also led to a slower breakdown of starch during digestion, with the scientists finding that bread containing 30% cellular chickpea flour reduced blood glucose levels by as much as 40% compared to regular white wheat flour bread.

Results showed that switching to a cellular chickpea blend in commercial bread recipes may improve feelings of fullness, helping to avoid overeating. It may also contribute to a lower risk of obesity and type 2 diabetes.

Further research is needed to show the effects of regularly eating these foods in the management of healthy body weight or diabetes. The researchers are now aiming to set up a larger scale trial.

King's College London
www.kcl.ac.u

Level measurement device

Emerson has released the Rosemount 3408 Level Transmitter, a non-contacting radar device suitable for use in a wide range of industries and applications, such as chemical storage, mixing tanks and open air applications.

The device provides a range of functions that reduce radar level measurement complexity throughout its lifecycle, including an intuitive interface, Bluetooth wireless technology remote capabilities, predictive alerts, in-situ verification, data historian and an upgradeable design.

The user interface provides pictorial instructions, allowing operators to be guided through installation, commissioning, proof-testing, operation and maintenance. This increased ease-of-use gives process and manufacturing organisations the confidence to replace manual procedures, helping to increase safety and maximise productivity.

The device is based on frequency modulated continuous wave (FMCW) technology, which enables accurate measurement, even in challenging process environments. It is also suitable for use in critical safety applications such as overfill prevention, as it is Safety Integrity Level (SIL) 2-certified and designed according to the International Electrotechnical Commission's IEC 61508 standard relating to functional safety.

Emerson's Smart Meter Verification software provides a means of verifying the health of the device, without interrupting the process. Official records of device verification are generated, simplifying compliance with regulatory requirements. In addition, an advanced diagnostics suite continuously monitors key device health and process parameters. This provides actionable information and predictive alerts that support preventative maintenance strategies, streamline troubleshooting and help increase process availability.

Emerson Automation Solutions

www.emerson.com/au/automation

Endload cartoners to automate processes

Kliklok's upgraded endload cartoner BEC will be launched at interpack 2023. The machine includes an optimised drive system, a Human Machine Interface (HMI) 4.0 for simpler Digital Service connectivity, a redesigned frame and new controls. The cartoner is designed to be suitable for mid-sized businesses that seek to automate their cartoning processes.

The entry-level machine's recent upgrade includes servo motors instead of mechanical drive technology.

The machine's frame has been redesigned, reducing its footprint while offering an accessible, operator-friendly layout. Beckhoff controls in discrete CPU boxes allow for simple cabling without electrical cabinets, leading to a compact overall layout. The reduced footprint makes it suitable for operating the cartoner on limited floor space.

In combination with its hygienic stainless steel execution (IP54), the endload cartoner can provide a robust and hygienic cartoning solution.

With its HMI 4.0, it supports line integration while providing access to Syntegon's Digital Service Solutions. A full range of connectivity options and controls enables users to connect the machine not only to a company's higher level system, but to integrate it with existing upstream and downstream equipment.

Syntegon Technology Singapore Pte. Ltd
www.syntegon.com

Identifies codes like no other, meet the new SICK Lector85x

Highest reading performance for ultimate sort rates, less manual post-detection and higher throughput

Cost efficiency meets space efficiency: for reading portals such as those used in automated sorting processes for multi-sided reading of objects, the increase in code reading performance that the Lector85x makes possible means both a lower number of reading devices overall as well as a small footprint for the entire code reading tunnel.

New identification software platform: reliably read 1D and 2D codes

With the Lector85x, SICK is not just presenting a new image-based code reader, but also an innovative identification software platform with significantly improved decoding algorithms and a web-based operating concept. Thanks to the latest 12.4 megapixel imager technology, optimized illumination intensity, optional use of polarizing filters and capture of multiple object codes, the Lector85x delivers optimal images regardless of object size and object surface, and regardless of whether the object is a tire, a parcel, or a flat. Decoding algorithms improved by artificial intelligence ensure that codes can be detected on the object faster and more reliably and that even low-contrast or incompletely detected markings can be decoded reliably. The new web-based software enables easy commissioning without prior software installation on the PC.

Reliably master high throughputs and assign each code to the right parcel

Reliable code reading, correct assignment of codes to objects — the Lector85x eliminates probably the most common causes of errors in sorting processes, thus improving their throughput performance. Significantly improved processor and computing power, as well as the high-speed Gbit/s image channel, enable faster conveyor speeds of up to 3.5 m/s. The steeper mounting angle

of the Lector85x reduces shadowing effects, allowing for smaller object gaps. If multiple objects are captured simultaneously, the integrated real-time tracking function ensures 3D tracking of the code within the field of view, thereby correctly assigning codes to the correct objects in each case.

In addition to code reading and object assignment, the best possible plant availability is a guarantee for maximum object throughput. This is why essential interfaces in the Lector85x as well as the system controller, the cabling or the data and voltage supply are designed redundantly, thus guaranteeing maximum sorter system productivity.

Sorting flight luggage: the Lector85x provides support in remote video coding

Thanks to its high-speed image and data transmission and good image quality, the Lector85x fulfills all the requirements for transmitting images for optical character recognition (OCR) and remote video coding (VCS) in addition to code reading. Secondary identification is possible with the image data provided — for example, the flight date, flight number, destination, registration number and IATA code can be identified at a later point. This significantly reduces the rejection rate of unidentifiable bags at airports as well as the time and effort required for manual processing and recoding.

Smart diagnosis tools enable error analysis

With selective image transfer and archiving, the process of analyzing no reads is made much simpler. Integrated into the efficient Package Analytics 4.0 analysis software, causes of read problems can be quickly and specifically identified and eliminated. In this way, the Lector85x, together with Package Analytics, also improves the availability and productivity of sorting processes.

Intuitive commissioning

The new web-based GUI does not require separate installation of software on the PC; all it needs is a browser. The installation and parameterisation interface guides the user intuitively through the setup menu, meaning expert knowledge is not required to get the Lector85x ready for operation in the shortest possible time. The reduced number of cameras required per reading portal results in significantly reduced cabling and parameterization work, saving a huge amount of time during commissioning.

Also available as a complete solution

SICK can also create individualised all-in-one complete solutions with the new Lector85x. System designs are tailored exactly to customer requirements and customer protocols are developed as needed. In addition to code reading, weight and volume data can be recorded and output. SICK supplies turnkey, customised solutions and provides support with installation and commissioning on request. This minimizes risks for the customer and ensures maximum performance and availability.

SICK
Sensor Intelligence.

SICK Pty Ltd
www.sick.com.au

Cleanroom-compatible energy chain

Cleanroom-compatible energy chains from the igus e-skin flat series are designed to qualify for the highest cleanroom class even after 1.5 years of continuous use and 60 million double strokes. The results have been confirmed by a test in a cleanroom laboratory set up by motion plastics specialist igus in cooperation with the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA).

The flat cable guidance system is made of abrasion-optimised high-performance plastic that can ensure particle-free guidance of power and data cables in moving production systems and is thus suitable for ISO Class 1.

Suitable for robots and other automation systems, the system features not only extreme abrasion resistance but also a modular design. Modules can be replaced, if needed, and the module connection also allows individual profiles to be interlinked.

In combination with the chainflex CFCLEAN stranded structure, the complete system has a globally recognised certification from the US Underwriters Laboratories (UL) organisation.

The cable guidance system is claimed to be 9 dB(A) quieter and cost 20% less than standard ribbon cables.

Treotham Automation Pty Ltd
www.treotham.com.au

Stainless steel panel PC with CPU processor

Backplane Systems Technology presents Aplex's ViTAM-9B, which is a series of stainless steel panel PCs with a new generation of previous product lines and an overall upgraded performance.

The unit is equipped with an 8th Gen. Intel Core i3/i5 processor (codename: Whiskey Lake), which provides high computing performance.

The panel PC features a fanless design but can also support a wide range of temperature variations and wide-range power input DC 9~36 V.

Available in six LCD sizes from 15 to 23.8″, it supports system memory size up to 64 GB DDR4 and the storage has advanced to a new interface, M.2. The unit has I/O connectors that all come with M12 connectors, which can prevent water ingress and dust accumulation. Furthermore, it supports an optional RFID module and internal expansion slots for full-size mSATA/mPCIe.

Suitable for use in high hygiene-standard factories, it is constructed with 100% recyclable and environmentally friendly stainless steel.

With a total IP66/IP69K certification, it is easy to clean and maintain.

Backplane Systems Technology Pty Ltd
www.backplane.com.au

CASE STUDY

Making the move into salad processing

iStock.com/indigolotos

Given the growing demand for cut, ready-to-eat salads in Mexican supermarkets, a salad wholesaler recently decided to join the fresh-cut sector. The decision turned out to be a fruitful one with a new processing line now implemented and plans for further expansion underway.

Based in the Queretaro region, the wholesaler's original processing activities only involved packaging entire heads of lettuce to be sold in supermarkets. As the demand for ready-to-eat, cut and washed salads continued to grow over the past few years, the company decided to establish its own processing department.

With the help of KRONEN's local representatives, it has now implemented a processing line capable of processing up to 700 kg of lettuce leaves per hour.

The salad processing line covers all stages of processing, from preparation at the trimming table to cutting into strips and squares using the GS 10-2 belt cutting machine; gentle yet thorough washing in a GEWA 3800 V ECO washing machine; right through to spinning the lettuce in two KS-100 PLUS spin-dryers; as well as finally packaging the salads with the UP 350 packaging machine from the KRONEN partner GKS.

As a result of the support received by KRONEN, the company was able to begin its production activities and fulfil the multitude of orders already received before the start of production.

A further spin-dryer has already been added to the line to add spinach to the company's product range, and the company now has plans for an expansion of its production capacities.

KRONEN

www.kronen.eu

iStock.com/Margarita Medvedeva

Fairy bread's key ingredient goes global

Founded in 1947, Dollar Sweets is a family-owned Australian business that makes cake decorating and baking products, confectionery as well as ingredients for the industrial food sector. While it had been exporting for years, exports only accounted for 10% of total revenue so it started working with Austrade to help double this figure by 2025.

Over the past 12 months, Austrade has helped the food manufacturer win over $1 million in new business by taking its beloved 'fairy bread' ingredient, 100s & 1000s, as well as its sprinkles and other confectionery to global markets in the US and across Asia.

"We wouldn't be where we are today without Austrade," said Philip Holm, Dollar Sweets' Sales and Marketing Director. "Their teams in Australia and offshore have a wealth of practical experience and advice. Austrade motivates us to keep moving forward with our export plans."

The company's export success over the past 12 months has been achieved through Austrade's help with:

- online business matching meetings and attendance at major trade shows
- introductions to new retail customers and importers
- reconnecting with existing distributors
- seeking new opportunities with multinational customers.

"Austrade did a market selection survey to help us determine which markets held the most potential for our products," Holm said. "Once we decided on the markets, Austrade shared some key tasks we needed to do for each market. In the US, for instance, it was getting our products certified by the US FDA. Austrade's in-market teams shared insights and advice, helped us workshop plans and introduced us to distributors.

"Importantly, Austrade acts as a checkpoint for our business," Holm said. "At our monthly meetings, we follow up on the previous month's actions and set tasks for the next month."

Dream entry into the US market

In May 2022, Dollar Sweets took part in a virtual business matching program organised by Austrade. Over three days, it met with 15 US retailers and distributors, including discount retailer 99 Only.

"99 Only placed a $300,000 order for our range of seasonal baking ingredients and products," Holm said. "We also signed non-disclosure agreements with three large retail chains. We are in ongoing discussions with 10 companies for private-label business. It was a dream entry into the market."

Buoyed by its success, Dollar Sweets attended PMLA's Private Label Trade Show in November 2022. The company was one of 11 Australian companies at the Australia Pavilion, hosted by Austrade.

"It was an incredibly successful experience," Holm said. "We had face-to-face meetings with the buyers we met at the virtual business matching program. We met new potential customers at the event and networked with other Australian suppliers. Austrade also organised trade visits for us."

Dollar Sweets is in ongoing negotiations with six US retailers it met at the trade show. "If successful, we are looking at total sales worth over $2 million," Holm said.

Super market in Singapore

Dollar Sweets also launched in Singapore in 2022 after Austrade introduced a Singaporean consolidator to the company's products at a supermarket promotion. The consolidator, Bemco, then presented Dollar Sweets' range to NTUC FairPrice, Singapore's largest supermarket chain.

FairPrice placed an initial order of $200,000 for Dollar Sweets' bakery range. Dollar Sweets expects ongoing orders will be worth up to $400,000 annually.

"Our products are now in 50 supermarkets," Holm said. "FairPrice backed the launch with lightboxes, highlighting our brand as an exclusive hero product. That support is invaluable for a first-time exporter like us."

Reconnecting with distributors and multinational partners

Holm said Austrade has provided commonsense advice that has delivered strong results. One piece of advice has been reconnecting with existing distributors.

"Austrade helped us reinvigorate our business in New Zealand," Holm said. "After we spoke to our distributor, we launched 10 new lines into the country. This business was worth $500,000."

Similarly, after speaking with its distributor in Malaysia, Dollar Sweets is now sending six new products to the country. The new business is worth $50,000 annually. Dollar Sweets' Halal-certified products mean there is strong potential to grow sales in Malaysia. The company developed its Halal-certified products about a decade ago.

Dollar Sweets' multinational industrial customers provided another entry point to new business in new markets.

"Austrade advised us to reach out to our food manufacturing customers to see if they could connect us with subsidiaries in other countries," Holm said. "We picked up new business worth $100,000 with the Thai subsidiary of a major manufacturer after speaking to our contact in Asia."

With Austrade's help, Dollar Sweets has developed relationships worldwide with a leading snack food manufacturer. After reaching out to the Indonesian subsidiary, the company is exporting ingredients to the country with an estimated annual value of $250,000.

Future plans

Dollar Sweets will focus on building its business in the US in 2023. The company is exploring opportunities in the UAE, where its Halal-certified products can be readily exported. It also wants to grow sales in New Zealand.

CASE STUDY

iStock.com/barbaragibbons

Getting value out of industrial food waste

About 2% of the 36 billion kilograms of food discarded annually in the US is attributable to food manufacturing and processing — with food waste solids sent to landfill or composted, and liquids poured into sewers. However, according to new research, there's money to be made by finding a second life for the potato peels, fried dough particles, cheese whey and other industrial food-processing waste products that routinely end up in landfill.

Scientists have taken the first step at estimating the best large-scale uses for food processing waste, first analysing its contents and, based on those findings, proposing production opportunities ranging from sustainable fuels, biogas and electricity to useful chemicals and organic fertiliser.

Katrina Cornish, senior author of the study and professor of horticulture and crop science and food, agricultural and biological engineering at The Ohio State University, said this work is known as valorisation, or determining the potential value of something that is otherwise valueless or even a drain on resources for a company — ie, when you have to spend money to get rid of it.

"The bioeconomy is becoming much more prevalent as a topic of conversation. In this case, don't get rid of food waste — make some money from it," said Cornish, who is also an Ohio Research Scholar of Bio-Emergent Materials. "Here, we're putting the base model in place for food manufacturers who are wondering, 'What can I do with this stuff?' Our flow chart guides them in a specific direction and prevents them from wasting time trying something we know won't work."

The study was published online recently in the journal *Science of the Total Environment.*

For the study, researchers collected a total of 46 waste samples, including 14 from large Ohio food processing companies, and divided them into four broad categories: vegetable, fat-rich, industrial sludge and starchy. They then characterised the sample contents' physical and chemical properties and tested some starchy wastes they determined were good candidates for fermentation into the platform chemical acetone.

In the big picture, a waste type's energy density — based on calorific value — and carbon-to-nitrogen ratio were major determinants for its repurposing potential. For example, fatty waste and mineral-based waste can be digested anaerobically to generate biogas, and soybean waste has enough energy density to be used for biodiesel production.

Low-calorific vegetable wastes aren't great for energy production, but they are plentiful organic sources of flavonoids, antioxidants and pigments that could be extracted and used in health-promoting compounds.

Based on the analysis of fibrous and mineral-rich wastes, Cornish has practiced what she's preaching: her lab developed a method for turning eggshells and tomato peels sourced from Ohio food producers into fillers in rubber products, partially replacing petroleum-based carbon black in tires, for example.

"We aligned this work with the Environmental Protection Agency goal to reduce 50% of food loss and waste by 2030," said first author Beenish Saba, a postdoctoral researcher in food, agricultural and biological engineering at Ohio State. "So, how can you reduce this waste? Valorisation is one method.

"In Ohio, corn is being grown to convert into biofuel, acetone and butanol, and here we've identified other sources already available as wastes that you can also convert into those products."

The proposed conversion technologies require energy to operate and also yield some secondary waste, but the valorisation modelling lays groundwork for further 'cradle to grave' analyses that would help quantify the environmental benefits of large-scale food — and other industry — waste reduction, Saba said.

While this study is a starting point, it ideally will offer incentive for food producers to consider the possibilities of making something out of waste products that are currently treated as trash, the researchers said.

"What we hope will happen is that food producers will actually look at their costs and their footprint, and see which of these approaches for their particular wastes will work best — which will be the least financially negative, and preferably profitable, and also minimise any carbon footprint," Cornish said. "In terms of global warming, any waste that can be valorised has a direct impact on global warming because it has a direct impact on emissions and on the ecosystem."

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Air monitor for virus detection

Designed to detect the presence of viruses in air, Orium International's Trio-Bas Airbio.One Rapid-Virus works in combination with rapid methods such as PCR, genetic sequencing, immunoassay, microarrays and mass spectrometry (MS).

The instrument is designed for total pathogen air monitoring of virus, bacteria, yeasts and moulds.

Two applications include: for collecting viruses in a liquid sample for subsequent rapid analytical identification (by PCR) or for traditional impact on agar culture media plate to count colonies (CFU) to detect bacteria, yeasts and moulds.

The instrument is the result of the European NATO project EUCLID CEPA 13 ("protection of personnel against pathogenic micro-organisms via air sampling and rapid detection and identification").

Cell Biosciences Pty Ltd
www.cellbiosciences.com.au

Grain analyser on combine

The CropScan 3300H On Combine Grain Analyser provides protein, moisture, oil, starch and fibre data for wheat, barley, canola, corn, soybeans and other grains and oil seeds directly from the combine. Up to 240 samples may be scanned for every tank or bin load as the grains or oil seeds are harvested. By combining protein and yield data, a set of field data layers are available to help farmers develop variable rate nitrogen fertilisation applications.

The John Deere X9 Series combine is larger than the previous models and has several changes to the clean grain elevator. It contains an installation kit with a mounting bracket to bridge across the seam which is now part of its grain elevator. A fibre optic cable connects the CropScan 3300H Sample Head which is mounted on the outside of the clean grain elevator and the CropScan 3300H NIR Spectrometer mounted inside the combine's cab.

The product has established an API connection between the John Deere Operations Centre and the CropScanAg Cloud. This enables files to be automatically uploaded into the CropScan 3300H Touch Screen PC mounted inside the cab. Yield from the John Deere Operations Centre will be uploaded directly into the CropScanAg Cloud, allowing farmers to have one location to capture all farm field data collected during harvest.

Also included are the CropScanAg N-GAUGE Harvest Manager app and Nutrient Manager app, which allow farmers to manage harvest data from their smart devices. The harvest manager app provides a virtual storage system in the cloud where the quality data for each tank or bin load are recorded and tracked. Farmers and agronomists can view the field maps for protein, moisture, oil, yield and elevation directly on their smart devices.

The nutrient manager app uses algorithms to compute and display the performance data for each field on a smart device. These performance maps include protein/yield correlation, nitrogen, potassium, phosphorous and sulfur removal, nitrogen use efficiency and water use efficiency. Variable rate fertilisation prescriptions can be generated directly from the app and posted to the John Deere Operations Centre for downloading to sprayers, spreaders or seeders.

CropScanAg
cropscanag.com

Extracting antioxidants from corn waste

iStock.com/RHJ

Of the more than 120 million metric tons of corn starch produced each year, nearly 15% is discarded or fed to chickens and other animals. Now researchers at the KTH Royal Institute of Technology have developed a method to generate nutritional value from what is described as "a huge sidestream".

Corn bran is rich in the potent antioxidant ferulic acid but until now it was trapped in an insoluble material matrix that humans can't digest.

The researchers developed a way to unlock soluble ferulic acid-rich dietary fibres from this matrix, developing a hydrogel that could be digested as a prebiotic for gut health.

The method is called subcritical water extraction to isolate the soluble fibre part of the bran that contains ferulic acid.

Francisco Vilaplana, Associate Professor in the Division of Glycoscience at KTH Royal Institute of Technology, said crosslinking the soluble fibre using natural enzymes (laccase and peroxidase) is the next step to creating a hydrogel, which could also be used as a potential wound treatment.

"We showed that we can upgrade a food side stream into a valuable material for both food and biomedical applications that could mitigate inflammatory processes," Vilaplana said.

The method was published in the scientific journal, *Green Chemistry*.

KTH Royal Institute of Technology
www.kth.se/en

Fanless box PC

Backplane Systems Technology has released Sintrones' ABOX-5211(P) Series, which allows users to develop carrier or service-type AMRs that can perform actions across factories, such as delivery, picking, disinfecting and more.

The ABOX-5211 features a 10th generation Intel Core i9 processor, Q470E Intel chipset and built-in Intel UHD Graphics 630 and 610 cards for suitable AI performance, graphics and display. With a single-side I/O panel design, the ABOX-5211 provides eight RJ45 GbE and eight optional PoE (Power-over-Ethernet) connectors for ethernet networking. Additional support is provided via the seven Intel i210-AT and one i219LM, with support for iAMT ethernet controllers. The controllers provide onboard support for PXE and WOL for power on and booting. Wireless network transmitting is an essential feature for automated facilities, which is why the ABOX-5211 also includes dual SIM card slots with support for 5G and LTE communication.

The fanless box PC for edge AI GPU computing is ideal for factory automation, service robots, smart retail, AIoT and cellular V2X applications, as well as critical industrial IoT deployments with an operating temperature of -40~+70°C.

Key features include 8 x DI, 4 x DO and 4 x RS-232/422/485; 3 x M.2 2280 M key support NVMe SSD storage; dual hot-swappable SATA storage RAID 0,1,5; 9–60 VDC input; and 8 x GbE RJ45 (Optional 8 x PoE).

Backplane Systems Technology Pty Ltd
www.backplane.com.au

Upgraded air cleaner

Key Technology, a member of Duravant, has released its #16 Air Cleaner. Suitable for both wet and dry products, such as peas, green beans, corn, berries and nuts, the air cleaner is designed to remove extraneous vegetable matter (EVM), dirt and other lightweight materials and debris to improve product quality and line efficiency.

Features includes an upgraded fan, motor, screen and chamber configuration designed to enhance sanitation and reduce maintenance while increasing air flow capacity and spreading air velocity more evenly across the product screen.

Typically installed at receiving, the system separates EVM and debris, such as leaves, steams, husks, dirt and more, early on the production line. It uses positive air flow, which moves through the product as it falls above a diagonal screen, to push light debris up and into a collection hood.

While the previous model provided an air flow capacity of up to 453 m^3/min, the upgraded one provides up to 538 m^3/min depending on the application. It can achieve more even distribution of air velocity — produced by a smaller fan that operates with 20 hp — across the product screen to remove more debris. For minimal wear, the system has been designed with only one moving part, the motor.

To improve sanitation, large access doors and sloped surfaces have been removed from the product design. A hinge design with a single lamination replaces piano hinges, while a screen design with perforations integrated into the side panels replaces spot-welded screens. The fixed twist lock cam latches replace the previous model's rubber draw latches and wing nuts.

Each air cleaner can be mounted with either a dewatering shaker for wet products or a transfer shaker for dry products.

Key Technology Australia Pty Ltd
www.key.net

CASE STUDY

Renewable energy solution reduced cost for food and beverage maker

The production operations of nutritional food and beverage manufacturer Noumi were being challenged by fluctuations in the quality of power from the network. Small and very short duration (sub one second) disturbances in voltage can disrupt critical processes resulting in high-cost wastage and lost production. Noumi was seeking a solution to isolate its critical production operations from these supply fluctuations.

The challenge was compounded by the fact that the low-voltage electrical system was at capacity, so any solution needed to operate on the high-voltage supply. Noumi was also looking to surpass the requirements set out in its internal sustainability plan to reduce the environmental impact associated with its business activities.

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

- 2 MWh of Tesla battery storage
- Voltage optimisation
- 8 MW of solar PV

The battery storage system and voltage optimisation equipment work together to protect Noumi's critical production operations from supply fluctuations. This complex high-voltage installation sits behind the meter but in front of the user's transformer, identifying and remediating power fluctuations before they enter the low-voltage system.

Acacia Energy's analysis also identified that a 3.8 MW solar system was ideally suited to Noumi's facility. This solar system provides charge for the Tesla battery storage as well as displacing expensive grid-sourced energy, delivering significant operating cost reductions. The solar system also provides a substantial contribution to Noumi's CO_2 reduction targets. At the time of installation, 3.8 MW of solar PV was claimed to be the largest behind the meter rooftop solar PV installation in the country.

Acacia Energy

www.acaciaenergy.com.au

Trudy and Ben Nankervis, co-owners of GD Wholesale

Image: Supplied

Fruit & vegetable supplier embraces sustainable packaging

For more than 60 years, family-owned business GD Wholesale Fruit and Vegetable Supplies (GD) has supported local South Australian growers by supplying fruit and vegetables in its Hawthorndene store and wholesaling to the hospitality industry.

In 2018, Trudy and Ben Nankervis, co-owners of GD, began researching alternatives to the plastic they used in their business. It wasn't easy; in fact, it proved to be a labyrinth of twists and turns on researching alternatives, extensive product testing, storage factors and cost restraints. They discovered that not all compostable or biodegradable plastics are the same and they have varying roles, costs and shelf-life considerations.

Compared to conventional fruit and vegetable stores that unpack and repack the whole shop into cool rooms each day/night, GD's retail store packs produce into prepacked and costed bags that are displayed in its temperature-controlled refrigeration units.

The method maintains good quality produce and shelf life due to minimal handling, and the savings in labour costs are considerable. Another advantage of this system is the reduction of food waste due to minimal handling and spoilage, thus saving vast amounts of otherwise wasted energy.

Previously the business was using conventional plastic bags and plastic wrap to display its produce. However, some of its customers were concerned about plastic use, which triggered GD to look for a solution.

After much research, GD joined forces with Biogone, to replace its traditional plastic produce bags and plastic wrap with Biogone's landfill-biodegradable plastic alternatives.

Two customised products were created for GD — the 1 and 2 kg fruit and vegetable bag. They are made from clear material, have holes in the bag so produce can breathe, and are printed with "landfill biodegradable".

Biogone's biodegradable plastic is designed to be safe for food packaging film, and is made with an organic additive that is USFDA-compliant for food contact applications.

The organic additive accelerates the rate at which the plastics will biodegrade when in a landfill, allowing naturally occurring microbes in that environment to consume the plastic, resulting in biogas and humus (natural fertiliser).

As it is a biodegradation process, the plastics also don't fragment into microplastics. The Biogone plastics can also be recycled with other soft plastics (when available).

Biogone

www.biogone.com.au

iStock.com/RusN

Does packaging influence the flavour of milk?

To date the dairy industry has largely focused on packaging milk in light-blocking containers to preserve freshness but there has been little research on how the packaging itself influences the flavour of milk. Now a study published in the *Journal of Dairy Science* by Elsevier confirms that packaging does affect taste — and paperboard cartons do not preserve milk freshness as well as glass and plastic containers.

To quantify the flavour impacts of packaging, the researchers examined pasteurised whole and skim milk stored in 236 mL containers: paperboard cartons, three plastic jugs (made from different plastics), a plastic bag, and glass as a control. The milk was stored in total darkness to control for light oxidation and kept cold at 4°C.

The samples were tested on the day of first processing, then again at five, 10 and 15 days after. A trained panel examined the sensory properties of each sample, and the research team conducted a volatile compound analysis to understand how the packaging was intermingling with the milk. Finally, the samples underwent a blind consumer taste test on day 10 to see whether tasters could tell any difference between milk stored in the paperboard carton or the plastic jug compared with milk packaged in glass.

The results showed that package type does influence milk flavour, and skim milk is more susceptible to flavour impacts than whole milk. Of the different packaging types, paperboard cartons and the plastic bag preserved milk freshness the least due to the paperboard's absorption of milk flavour and the transfer of paperboard flavour into the milk. Milk packaged in paperboard cartons, in fact, showed distinct off-flavours as well as the presence of compounds from the paperboard. The final results show that, while glass remains an ideal container for preserving milk flavour, plastic containers provide additional benefits while also maintaining freshness in the absence of light exposure.

CASE STUDY

High-protein pasta for the gluten intolerant

iStock.com/HiGri8

A faculty member of Chulalongkorn University's Faculty of Science in Thailand has researched and developed high-protein, gluten-free pasta noodles for people who are gluten intolerant.

Although there are plenty of gluten-free pastas now available for consumers who are intolerant to gluten, many such products are made from rice flour, which causes the pasta to lose its desired chewiness and some also have lower protein content than wheat pasta.

Many attempts have been made to heighten the quality of rice flour pasta by adding ingredients. To increase the protein, animal-based proteins like egg white and whey proteins or plant-based proteins like soybeans have been added. Different types of hydrocolloids have also been used to improve the texture and cooking quality, but such ingredients may need to be imported or are expensive.

Associate Professor Dr Kanitha Tananuwong, a lecturer at the Department of Food Technology, the Faculty of Science, Chulalongkorn University, head of the research team, has now investigated the use of mung beans to improve the protein levels and texture of gluten-free pasta products.

"Mung beans are an alternative ingredient which has the appropriate qualities. The best part is they can increase protein to pasta and help with the texture and cooking quality, not to mention that they're easy to find here in Thailand," said Kanitha.

The research team came up with recipes for developing gluten-free pasta using the scientific and statistical methods. With three main ingredients — rice flour, mung bean flour and concentrated mung bean protein, they developed four basic pasta recipes with 17–24% of protein, which is higher than wheat pasta, which contains only 14% of protein.

"After mixing the pasta dough, we ran it through a pasta extruder to make spaghetti using the extrusion process under high temperatures, pressure and mechanical shear. Then, the cut pasta is dehydrated until the moisture is no more than 12%," Kanitha said.

The finished pasta must be inspected for significant characteristics, such as an evaluation of cooking quality and of cooked pasta texture under a texture analyser. More importantly, consumers' acceptance was tested through a tasting of cooked pasta.

Kanitha said for the appearance, taste and texture when mixed with a sauce and overall preference, the gluten-free pasta with 20% protein, which is the best recipe developed, received similar scores to wheat pasta, but with higher protein content.

The research project was funded by Thai Wah (Public Company Limited) and the ingredients used in developing the pasta are domestically grown in Thailand.

"A benefit of collaborating with the private sector is our research has a chance to hit the shelves in the market," Kanitha said.

The research team is now working on refining the production of concentrated plant-based proteins for possible used in alternative protein drinks.

Optical sorter for whole potatoes

Key Technology has released its Herbert OCULUS optical sorter for whole potatoes. Suitable for fresh market potatoes or whole potatoes prior to processing, the enhanced system is designed to find and remove potatoes with defects. Its sorting capabilities help ensure product quality while reducing labour requirements and achieving consistent line capacity despite fluctuations in incoming raw product quality.

Features include new cameras that have twice the resolution of the previous generation to identify smaller, harder-to-detect defects. A more advanced 64-bit operating system replaces the previous 32-bit system to achieve a better analysis of each tuber. Longer-lasting air cylinders with better seals run at a lower pressure to minimise energy usage, reduce maintenance and lessen operating noise while maintaining high performance. Lighter reject fingers move faster to improve reject accuracy.

The sorter conveys the potatoes over a series of rollers to present a complete 360-degree view of each tuber to the digital infrared colour cameras. Compared to traditional cascade sorters, this method of sorting can provide gentler handling and 20% more surface inspection to maximise defect removal.

Available in multiple sizes for a range of capacities up to 40 metric tonnes of product per hour, the sorter recognises size, shape, colour and texture. Its detection capabilities enable it to remove a wide range of colour defects, diseases and surface abnormalities including skin discolouration, green and dark colours, bruising, mechanical damage, blackleg and silver scurf.

Key Technology Australia Pty Ltd

www.key.net

An inside look into London's second-largest brewery

Logan Plant's love of beer was sparked by his famous father, Robert Plant, lead singer of British rock band Led Zeppelin. Logan was only 18 when his father began taking him to the pubs of the British West Midlands, and by the time he was 20, he wanted to open his own brewery. Instead, he set off traveling the world with his band, only discovering local craft beer while on tour in the USA. It rekindled his idea of starting a brewery and Logan subsequently opened a pub in the London suburb of Haggerston, where he sold his own home brew. The project took off and evolved into the Beavertown company, which recently constructed a large brewery with the help of Dortmund-based KHS technology.

Logan Plant's first brewing experiments were performed in his kitchen less than 10 years ago, using a rice pan and tea urn to make beer that was initially sold in his own pub. According to Beavertown Brewery, it is now the second-largest out of over 100 breweries in London. It operates several other facilities, including a microbrewery in the local stadium belonging to Tottenham Hotspur Football Club. Its most recent addition was a production site in the North London borough of Enfield.

Nikola Marjanovic, Beavertown Brewery Operations Director, labels this as one of the most ambitious projects to emerge on the British Brewery scene for years. With the aim to build a modern and unique brewery, the cost of investment was around £40m (AU$72m).

The brewery chose KHS to support its project in its early days and has been in contact with Andy Carter, Managing Director of KHS in Great Britain and Ireland, and his team since then.

To meet the demand for its own craft beer brands such as Neck Oil Session IPA or Heavy Gravity Hazy IPA, the decision to build a production plant was made.

Heineken was approached for support in the project, and after initially holding 49% of shares, now owns 100%. However, Marjanovic said Beavertown still operates independently and has ambitious growth targets.

The percentage increase in the amount of beer produced has run into double figures in recent years, and the brewery aims to boost this by a further 30% in 2023.

KHS provided the brewery with the filling and packing technology to suit its requirements, which Marjanovic labelled an "advantage" as it meant all turnkey lines were sourced from a single supplier.

The premises were designed to centre on the keg and beverage can container segments with the aim of boosting performance capacity and configuring production for further growth.

"Our systems are flexibly adapted to cater for future requirements," Carter said. "Thanks to their modular design, KHS machines can be easily retrofitted to meet a new increase in capacity or enable any adjustments that may need to be made to the secondary packaging, for example. A high standard of hygiene and low use of resources round off the list of requirements."

The brewery invested in a turnkey canning line from KHS. Its integrated Innofill Can DVD filler that includes a Ferrum seamer is designed to process up to 33,000 330-mL containers an hour and available with an output of up to 135,000 cans per hour. A CO_2 purging process ensures low oxygen pickup and consumption.

The line is supplemented by the Innoket Neo labelling unit and a fully automatic KHS Innopack Kisters WP Advanced wraparound packaging machine. The labelling station has reduced the beer's time to market and allowed smaller

batches to be produced as no large quantities of printed cans are kept in stock. The packaging and palletising section is rounded off by the Innopal PB N palletiser and Innopal LD Z depalletiser.

In addition to beverage canning, the brewery also invests in KHS technology to process its kegs. It uses the Innokeg Transomat 6/1 Duo, a keg washing and racking system with two docked linear machines. This manages up to 160 kegs per hour holding between 30 and 50 L and includes options that can expand capacity to up to 240 kegs an hour.

The machinery uses pulsed sprays to ensure microbiological safety and product purity and uses counterflow cleaning in the pre-washer.

The conveyor belt in the modular Innokeg Transversal pre-washer segment runs through the middle of the processing machine, a function that can be deactivated if operators process one-way kegs. The kegs are then conveyed to the next machine without being processed.

The system may also contribute to reaching sustainability targets, with the Direct Flow Control (DFC) filling system designed to save on CO_2 usage. Sustainability is at the centre of Beavertown Brewery and it also aims to invest in a new water treatment plant and solar technology.

KHS Pacific Pty Ltd

www.khs.com

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3D ink for cultured meat

In a recent study published in *Advanced Materials*, researchers have developed edible plant-based ink that is derived from food waste such as cereal husks. The new ink can be fully absorbed into the meat product and is claimed to be economical to produce, so it could reduce the cost of large-scale cultured meat production.

To produce cultured meat, animal muscle stem cells are grown on a scaffold, which improves the environment for the cells by enabling the transport of nutrients and allows the generation of texture and structure. Without it, the meat is more likely to resemble lumpy mashed potatoes.

Unique scaffolds can be created using an emerging 3D-printing technology, electrohydrodynamic (EHD) printing. As the scaffolds become part of the meat product, they need to be edible, so are generally made from animal products such as gelatine and collagen, or synthetic materials, but are expensive to produce. Finding cost-effective edible inks for printing is one of the main challenges in producing cultured meat.

Professor Jie Sun from Xi'an Jiaotong-Liverpool University, China, and an author of the study, said: "We have optimised our plant-based ink for 3D-printing technology so that we can print scaffolds and place muscle stem cells on them. The cells can then grow with the structure of the scaffold and we use beets to colour the grown meat to give it the look of conventional meat."

Professor Sun and researchers from the National University of Singapore Suzhou Research Institute, China, and the National University of Singapore, Singapore, mixed cereal proteins extracted from barley or rye with corn protein — zein — to produce pure cereal protein-based inks for the first time.

"This is a novel and disruptive idea to mass-produce cultured meat. Using nutrients from food waste to print scaffolds not only uses and increases the value of the food waste but also alleviates the pressure on the environment from animal agriculture," Sun said.

Finding new ink

Sun explained why the requirements for creating scaffolds for culturing meat differ from those used for growing other types of cells.

"When culturing cancer cells for drug research, we want them to gather into clusters to mimic how they grow in the human body. Thus, we have high requirements for the strength of the scaffold, which has to be strong enough to support the cell clusters.

"However, when cultivating meat, we want the meat to grow evenly so it can have a better texture for eating," she continued. "Therefore, we do not need a scaffold with high tensile strength. Instead, we want it to be edible and absorbed by muscle cells.

"These are some of the biggest challenges in finding an edible ink suitable for EHD printing of the scaffolds. We tested various materials and finally decided to use plant protein to make scaffolds," Sun said.

Sun hopes that, in the future, plant extracts will also be used to create the nutrient-rich substance the meat cells grow in.

"Currently, one of the major reasons for the high cost of cultured meat is the nutrient medium for muscle cells, which is still from animal proteins. In the future, if suitable plant extracts can be found to supply nutrients, that will further reduce the cost of cultured meat, making it more affordable," Sun concluded.

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Novel food colouring company closes $6.4 million seed round

Ingredient biotech startup Michroma has raised US$6.4 million in seed financing, which will help with the commercialisation of its sustainable, natural fungal food colourants.

The billion-dollar food colourants market is trending towards natural ingredients, with many food manufacturers transitioning away from artificial colours to meet health-conscious consumers' demand for natural ingredient alternatives.

"We are poised to meet consumer demand for healthier and more sustainable food without petroleum-based ingredients," said Michroma's CEO and Co-founder, Ricky Cassini.

Michroma's approach centres on creating fungal biofactories to produce small molecules, such as colours, more efficiently.

"We are leveraging the power and versatility of filamentous fungi with our synbio platform. By combining a unique fungal chassis strain with precision fermentation, we are capable of producing high-value complex molecules with high yields previously unseen in the biotech industry," said Michroma's CSO and Co-Founder, Dr Mauricio Braia.

Founded in 2019, Michroma started out by developing a red colourant called Red+, which is temperature-resistant and stable across the food pH system. Such characteristics allow the colours to survive processes like pasteurisation, cooking and extrusion, which are among the most intensive processes for natural dyes.

Following prototyping with food companies, Michroma is negotiating agreements for Red+ with ingredients suppliers for global distribution. It is also planning to submit colour additive petitions to the FDA and EFSA as it continues to scale up.

The financing round was led by Supply Change Capital, a food tech VC backed by 301 INC, the corporate venture capital arm of General Mills. Investors include Be8, backed by Dr. Oetker and CJ CheilJedang, a $23 billion Korean conglomerate that supplies fermentation-based bio-products.

Nutritious salt alternative using Indigenous food

Image credit: © Megan Pope

A group of plants used by First Nations Australians as food, animal fodder and medicine could have potential as a nutritious alternative to salt, according to University of Queensland research.

According to PhD candidate Sukirtha Srivarathan from the Queensland Alliance for Agriculture and Food Innovation (QAAFI), Australian edible halophytes, such as samphire, seablite, saltbush and sea purslane, have been used for more than 65,000 years and have both nutritional benefits and bioactive properties.

"They're a good source of protein and most of them are a good source of fibre, minerals and trace elements, especially calcium, iron, potassium and zinc, while some also have considerable amounts of folate (vitamin B9) and vitamin C," she said.

"Now we're looking at how we can use these plants in food production."

QAAFI Senior Research Fellow Dr Michael Netzel said the salt-tolerant halophytes are a sustainable food source.

"Halophytes have a lot of bioactive compounds, so it's a more sustainable and healthy choice to eat as a salad or side dish," Netzel said.

"For example, instead of table salt you can use halophytes as a freeze-dried powder condiment."

The research was conducted through the ARC Industrial Transformation Training Centre for Uniquely Australian Foods at the request of a Western Australian First Nation community led by Bruno Dann and Marion Manson.

Uncle Bruno said halophytes have long been a staple food for Nyul Nyul people in the Kimberley region, healthy mai (bushfood) collected seasonally by his mimies (grandmothers) and gullords (grandfathers).

Srivarathan said she consulted extensively with the community during her research because there was not much western literature on the subject.

When her PhD is completed, Srivarathan will continue to work with the community to get a product into market and plans to co-design a dehydrated halophyte substance.

NEWS

Fermented fava beans: the next plant-based alternative

iStock.com/Mehmet Hilmi Barcin

Finland-based food company Foodiq has developed an ingredient for plant-based food alternatives. Named Fabea+, the ingredient comprises fermented fava beans, providing an alternative to mainstream ingredients used in the plant-based market, such as soy, pea or oats.

Fava beans are often only used as isolates and concentrates, but the fermented powder form is one that may offer a base for the production of plant-based ingredients. It is designed to be as tasteless as possible, something that the fermentation process assists with.

Pasi Raito, Chief Business Officer, Foodiq, said the ingredient is vegan, gluten-free, non-GMO and suitable for a FODMAP diet.

Fabea+ was presented to the industry at FI Europe food convention in December, where it was shortlisted in the innovation prize category.

Features of the ingredient include:

- Includes high levels of protein and fibre.
- Can be used to create alternatives to baked goods, dairy, pastas and other applications.
- Made from fava beans, a crop that is sustainable and can be grown almost anywhere.
- Can be rapidly scaled and incorporated into production lifecycles.
- Available as a powder and as a block.

Plant-based antimicrobial preservative

Prinova Europe has launched its PlantGuard AM plant-based antimicrobial that is designed to inhibit the growth of yeasts, moulds and bacteria.

Using a blend of natural extracts from plants, the product is designed to extend freshness and shelf life, delaying the onset of rancidity, hindering microbial growth and conserving flavour and colour.

The heat-stable, neutral-tasting preservative is claimed to perform well against synthetic alternatives in a range of foods and beverages.

It can be used in applications including dairy, fish, meat, fruit, vegetables, cereals and juices.

Because it can be used in such a broad range of applications, the company said it can be used to replace artificial preservatives across a number of product lines.

Prinova Europe Limited
www.prinovaeurope.com

What's new

Raw, unfiltered honey, summer-flavoured milk and Vegemite pizza are some of the products hitting the shelves.

Raw, unfiltered honey

Wild Nectar Honey is a raw, unpasteurised and unfiltered honey from the hive straight to the jar, complete with the flavours of the Aussie bush.

wildnectarhoney.com.au

Nutrient-rich pasta

San Remo has launched a pasta range enriched with vitamins B1, B6 and folic acid.

sanremo.com.au

Summer-flavoured milk

Oak has partnered with Streets to launch OAK Splice Pine Lime flavoured milk, a summery combination of vanilla and fruit flavours.

lactalis.com.au/oak

Plant-based snacks

McCain Foods has launched V'DGZ, a range of vegetable appetisers. These include Cauli W'ngz, Bruss'lz and Corn R'bz.

www.mccain.com.au

Vegemite pizza

McCain and Vegemite have partnered to create Cheesy Vegemite Lil' Pizzas and Cheese Vegemite Pizza Pockets.

www.mccain.com.au

Dog-friendly peanut butter

Mayver's Rover's Rewards Peanut Butter contains no Xylitol, added oils, sugars and chemicals, making it safe for pets. It is made with a base that has added turmeric and collagen peptides for an extra boost.

mayvers.com.au

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Head Office
Unit 7, 6-8 Byfield Street, North Ryde
Locked Bag 2226, North Ryde BC NSW 1670
Ph: +61 2 9168 2500

Editor: Carolyn Jackson
wnift@wfmedia.com.au

Editorial Assistant: Vanessa Boumelhem

Publishing Director/MD: Geoff Hird

Art Director/Production Manager: Julie Wright

Art/Production: Linda Klobusiak, Marija Tutkovska

Circulation: Dianna Alberry
circulation@wfmedia.com.au

Copy Control: Mitchie Mullins
copy@wfmedia.com.au

Advertising Sales Manager
Kerrie Robinson
Ph: 0400 886 311
krobinson@wfmedia.com.au

Nikki Edwards
Ph: 0431 107 407
nedwards@wfmedia.com.au

If you have any queries regarding our privacy policy please email privacy@wfmedia.com.au

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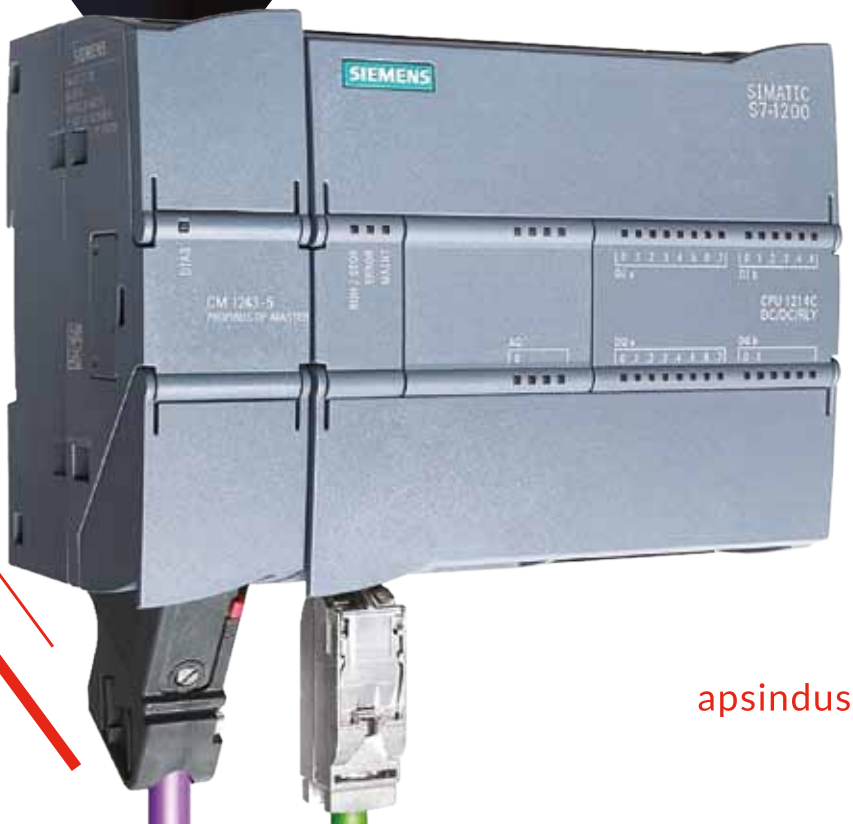

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