

March/April 2022  
Vol.29 No.6

what's new in  
**Food**  
technology & manufacturing



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# The science of delicious food



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**F**ood texture has a crucial influence on the enjoyment of eating and acceptance of new food. It can make the difference between passing on a plate and love at first bite.

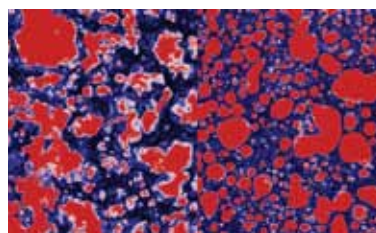
To date, most studies on food texture centre on relating a food's overall composition to its mechanical properties. However, an understanding of how microscopic structure and changes in the shape of food affect food texture remains underdeveloped.

Researchers from Denmark and Germany conducted a series of experiments relating to food microstructure and rheology. The study published in *Physics of Fluids* by AIP Publishing looked at two dishes — foie gras and pâté — and showed how soft solids and some liquids deform to create texture. They used coherent anti-Stokes Raman scattering (CARS) microscopy to relate the molecular makeup of the fat in foods with the rheological and mechanical properties of the food.

“Using soft matter physics tools and models, we connected structural information in the food across length scales,” said author Thomas Vilgis. “We joined microscopy and rheology to understand the mouthfeel of food from a gastrophysical standpoint.”

Both deriving from duck livers, the two dishes are similar enough in overall structure, and their differing fat distribution provided a window into how fat affects texture.

“There are further different interesting aspects that can be targeted to create new products with the same features as these products,” said author Mathias P Clausen.



*Microscopic structure of fat (red) explains texture differences between foie gras (left) and pâté (right).*

Image credit: Matias A. Via and Mathias P. Clausen

The researchers wanted to determine if they could create foie gras-like textures using other ingredients, such as non-animal based, and also whether or not they could create melting and creamy texture from different fat sources.

They used CARS microscopy to vibrate chemical bonds in foods to tun-

able frequencies and cause them to emit light. The technique has been used for decades in other fields but, so far, has received relatively little use in food science.

The fat in foie gras had arranged into an irregularly shaped, weakly linked fat network embedded in a protein matrix, which made its mouthfeel harder, more brittle and more elastic than pâté's.

The greater number of rounder and smoother fat particles and lack of an interconnected network were responsible for the pâté's softer texture.

Clausen hopes their research stokes further interest in investigating which microscopic features of foods can be tweaked. The group looks to study other components of foods with advanced microscopy, such as protein arrangement, and see if they can use their findings to create foods that mimic the texture of foie gras.

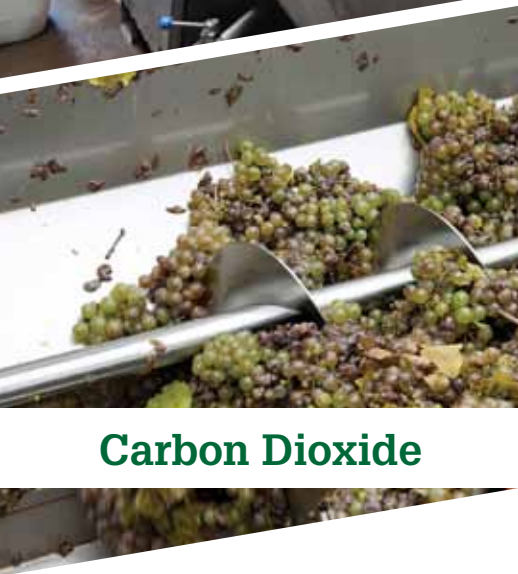
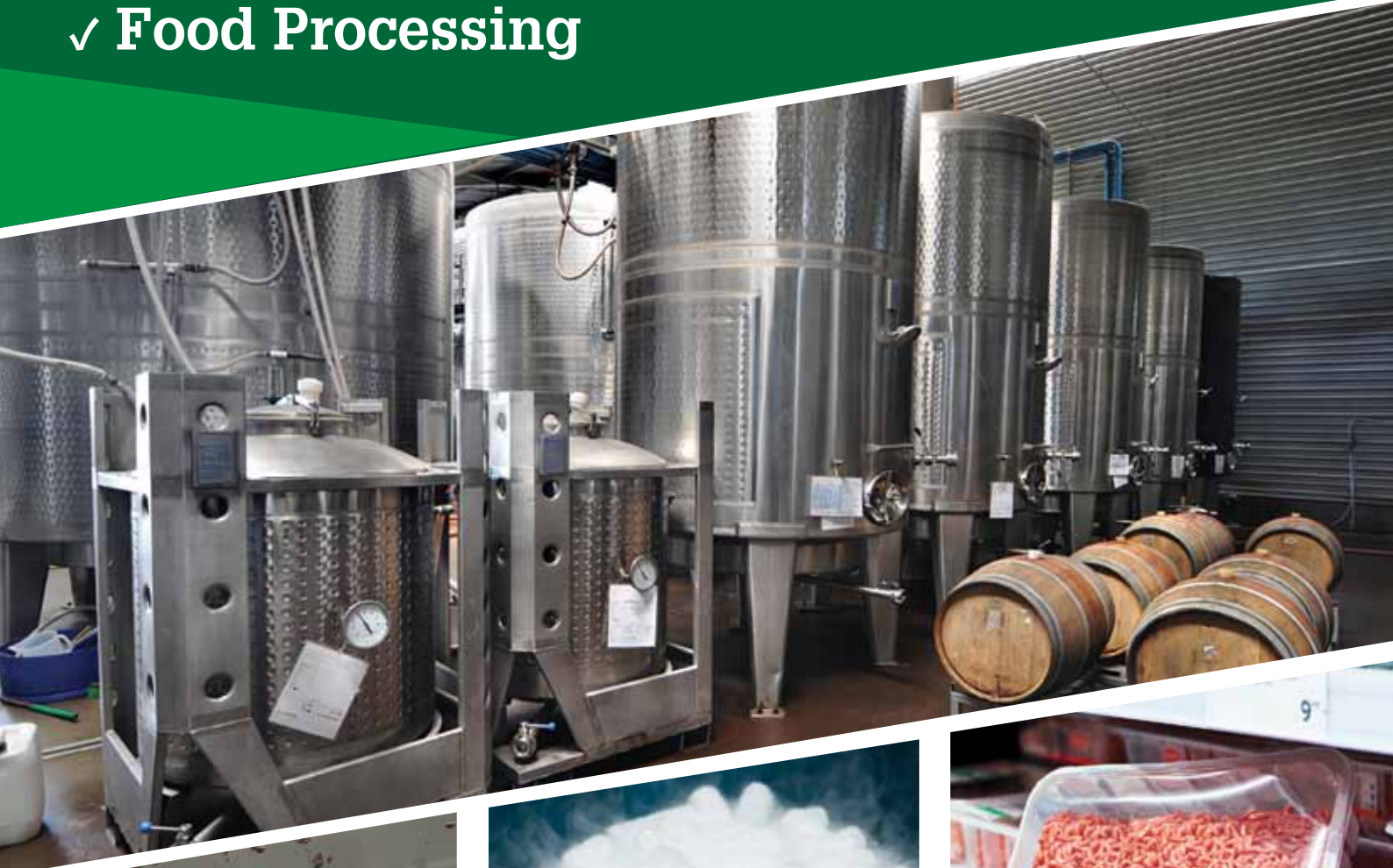


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# Food

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## FSANZ releases sugar labelling review

Food Standards Australia New Zealand (FSANZ) is beginning work on amending the Australia New Zealand Food Standards Code (the Food Standards Code) regarding the labelling of added sugars on nutritional information panels.

This follows the release of findings last year in its Review of nutrition labelling for added sugars. The review was undertaken at the request of food ministers with the aim of ensuring food labels provide adequate contextual information about sugars to enable consumers to make informed choices in support of dietary guidelines.

Quantifying added sugars in the nutrition information panel (NIP) was the option preferred by ministers. The review argued that while the process of labelling foods based on their added sugars would be complex, there were no technical reasons to not include these sugars on the NIP.



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## SPC completes growth capital round of funding

SPC has announced that it has completed the growth capital round of funding, which has resulted in the injection of \$111 million ready for the next phase of growth.

The capital comes from investments from the Australian Meat Industry Superannuation Trust (AMIST); the family office of Mr Khalil (Charlie) Shahin AO, Managing Director of Peregrine Corporation; and through the sale and leaseback of the flagship SPC property in Shepparton to Charter Hall.

As part of the investments, Murray Rutherford and Charlie Shahin of AMIST and Peregrine Corporation respectively become members of the SPC board.

“We are delighted with the new partnerships and look forward to working with our new Board, and welcome the knowledge and experience they bring,” said Robert Giles, CEO of SPC.

“SPC is committed to reinvesting in Australian products. In line with our vision for continued growth, we are doing all we can to highlight Australian food and beverages internationally. Local partnerships like these make our mission possible.

“SPC has an aggressive expansion plan that includes launching new products in existing and new categories, as well as acquisition plans in Australia and overseas. We are already in talks with a few parties, and expect to complete a key acquisition during 2022.”

## Yili Group building ice-cream factory in Indonesia

Yili Group has launched the first phase of its Yili Indonesia Dairy Production Base, which will form a dual operation centre for Indonesia and Thailand.

Upon completion of the second phase, the company's first self-built factory is set to become the country's largest ice-cream factory with a daily production capacity of four million ice-cream products.

The facility has adopted cutting-edge technology and equipment, including the Internet of Things and big data analytics, to build an innovative and smart factory. The production base integrates advanced digital technologies throughout its entire production chain. Robotics solutions are introduced to provide automated packing, palletising and warehousing.

The construction of infrastructure and buildings has been undertaken strictly in line with Yili Group's global quality management standards. To date, the factory has already passed the ISO22000, HALAL and BPOM certifications and been rated A grade by the LPPOM MUI food and drug certification agency in Indonesia.

As part of its efforts to build a sustainable and environmentally friendly production facility, Yili Indonesia Dairy has built a wastewater treatment system with a daily treatment capacity of 2800 tons. Reclaimed water is then used for the irrigation of plants in the factory.



Image credit: Yili Group



# Air Compressors: the high cost of not going green in your food and beverage production.



Atlas Copco

**“You snooze, you lose.” Failing to seize an opportunity will result in disadvantages later and this applies nowhere more than in business. Going green is no exception.**

One-hundred years ago, if you were still relying on horses and carts to move goods while your competitors used trucks, your company probably wasn't going to last.

Twenty years ago, if you felt that the internet was a fad that would pass, then your market share probably ended up plummeting.

Today, that opportunity is **Green technology** and missing out on it will mean getting left behind.

While it is true that the initial investment for some eco-friendly equipment may be higher, a reduction in production costs in the long run and other benefits will quickly recover that difference and more.

That is why the real question companies should be asking, is not “What is it costing my company to go green?” but rather “What is it costing my company *not* going green?”

The answer is “a lot.”

There is something admirable about trying to squeeze every bit of performance out of an ageing machine. That in itself is a form of sustainability and resource preservation.

However, in the case of air compressors, this is often neither efficient nor environmentally-friendly. With Atlas Copco's cutting edge variable speed drive technology that reduces energy use and energy costs by up to 60 percent, not upgrading to a new compressor is often much more wasteful than sticking with an old model.



Wouldn't it be great if there was a way to make compressed air systems more efficient while saving money and the environment at the same time?

The bad news is that there isn't one way to do that. The great news is that there are 10 ways!

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If you want to know how, check out our new **“10-step guide to a greener, better, and more efficient production.”** Scan the QR code now!

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# Food

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## Registration to AUSPACK 2022 now open!

The AUSPACK 2022 processing and packaging trade event, which is part of Packaging and Processing Week, is being held at the Melbourne Convention and Exhibition Centre on 17–20 May 2022.

Mark Dingley, Chairman of the Australian Packaging & Processing Machinery Association (APPM), which owns AUSPACK, said: “AUSPACK 2022 will showcase a host of global mega trends in the food, beverage and pharmaceutical processing and packaging industries.”

This year, more than 250 suppliers representing hundreds of global brands will be on the show floor, offering visitors solutions that address a range of industry trends and themes. The event will allow attendees to see, firsthand, products that offer enhanced safety, security, automation and cost-saving benefits.

The AUSPACK Leaders Forum, from 18–19 May, will offer business owners the opportunity to benchmark as an organisation of the future, gain knowledge and inspiration, and network with like-minded, forward-thinking leaders. Key themes include:

- Future supply chain
- Adapting and diversifying for commercial success
- Future technology
- Sustainability and the circular economy
- Investment and collaboration
- Future workforce



The expanded Solutions Theatres will give visitors in-depth overviews of technology, solutions and strategies, with sessions covering:

- supply chain and procurement
- education
- preventive maintenance
- materials and packaging design
- network security
- the circular economy
- the future of manufacturing and warehousing
- ... and more.

The exhibition floor will also feature an array of new zones: IT & Services, Processing Equipment, Packaging and Packaging Materials, and Packaging Machinery, making navigation easier.

Behind-the-scenes enhancements to the exhibitors' directory will allow visitors to search for very specific areas, while the highly searchable Leaders Forum will allow visitors to find topics that suit their interests.

- AUSPACK 2022 will be held at the Melbourne Convention and Exhibition Centre, 17–20 May 2022.
- Tickets to the exhibition are free and are now available on the website.
- For more information, visit [www.auspack.com.au](http://www.auspack.com.au).



## Kellogg ANZ appoints new MD

Kellogg ANZ has announced the appointment of experienced Kellogg Executive and FMCG industry leader Anthony Holme as its Managing Director.

Holme has worked at Kellogg since 2017 and will be relocating from South Africa (where he has served as Kellogg South Africa General Manager since 2019) to Sydney for his new role.

Prior to Kellogg, he has previously held senior leadership roles across sales and business development with Woolworths, PepsiCo, Diageo and SABMiller in both South Africa and the United Kingdom.

Shumit Kapoor, President Kellogg AMEA, said, “We are pleased to appoint Anthony Holme to lead the Kellogg ANZ business. We believe that his experience will help build on our sustainable growth momentum in ANZ, develop our talent and bring more food innovation to our consumers.”

Holme said, “I feel very privileged to have the opportunity to lead Kellogg's ANZ business with its portfolio of iconic brands and an extremely talented team. I look forward to continuing to deliver great tasting foods that nourish Aussie and New Zealand consumers, whilst also finding new and innovative ways to reduce our impact on the environment and help protect our planet.”







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# Co-investment funds awarded for F&B manufacturing projects

**T**he latest round of co-invested projects announced via the Advanced Manufacturing Growth Centre's (AMGC) Commercialisation Fund will see Australia's manufacturing industry contribute over \$32.4 million in funding alongside the federal government's \$9.03 million to drive commercialisation of Australian-made products. As per previous rounds, the funding has been allocated to projects across the six National Manufacturing Priorities: recycling and clean energy; medical; food and beverages; resource technology and critical mineral processing; defence; and space.

Of the 24 latest projects to receive funding, two were from the F&B sector. TPS, a Queensland-based measuring instruments supplier, is looking to commercialise advanced digital sensors for the testing of water quality parameters in the F&B sector. Total project commitment is \$1.31 million, with \$444,875 from the Commercialisation Fund.

ICEE, a Victorian packaging company, is meanwhile seeking to commercialise 'Bouncee' — a reusable and collapsible insulated crate and coolant system for short-transit perishable logistics, such as click and collect, and home delivery. Total project commitment is again \$1.31 million, with \$444,875 from the Commercialisation Fund.

There are also several projects in recycling and clean energy that are relevant to the F&B sector, including:

- **Plantabl (Vic)** — Commercialisation and manufacture of Great Wrap's biopolymer resin (cling wrap) derived from organic waste, to produce a compostable stretch wrap that can replace plastic cling, silage and pallet wraps.



- **Sustinent (NSW)** — Commercialisation of a scalable process using sugarcane waste to make value-add products such as mushroom grow bags.
  - **Venlo (Qld)** — Manufacture of a 100% recycled, repairable pallet that is tracked/traced and serviced within a global network.
  - **TomKat Global (Qld)** — Manufacture of a fully traceable and recyclable thermal container, the KoolPak, for the transportation of temperature-sensitive and perishable produce.
- "This latest tranche of co-investment demonstrates the broad capability of Australian manufacturing and its ability to drive jobs growth across the entire spectrum of manufacturing roles," said AMGC Managing Director Dr Jens Goennemann.

"The demand for targeted, well-managed and appropriately sized co-investment has seen the Commercialisation Fund near exhaustion after just 10 months. This demonstrates the appetite for co-capital investment and the manufacturing industry's willingness to match or better federal investment to commercialise Australian ideas for domestic and international markets."

Since its launch 10 months ago, \$29 million of the \$30 million Commercialisation Fund has been allocated to 55 projects. For more information or to apply to the fund, visit <https://www.amgc.org.au/projects/>.





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# No- and low-alcohol beverages on trend

Once just a sliver of the global beverage alcohol market, no- and low-alcohol beer/cider, wine, spirits and ready-to-drink (RTD) products grew by more than +6% in volume in 10 key global focus markets in 2021 and now command a 3.5% volume share of the industry, according to a new study published by IWSR Drinks Market Analysis.

Among the 10 focus markets examined in the 2022 IWSR 'No- and Low-Alcohol Strategic Study' (Australia, Brazil, Canada, France, Germany, Japan, South Africa, Spain, the United Kingdom, and the United States), the market value of no-/low-alcohol in 2021 was just under US\$10 billion, up from \$7.8 billion in 2018.

The IWSR forecasts that no- and low-alcohol volume will grow by +8% compound annual growth rate (CAGR) between 2021 and 2025, compared to regular alcohol volume growth of +0.7% CAGR during that same period.

"While January has become a popular month for people to cut back or abstain from alcohol, interest in no- and low-alcohol drinks has increasingly become a year-round trend among consumers across the world," said Emily Neill, COO of IWSR Drinks Market Analysis. "To meet that demand, beverage alcohol companies have invested heavily to introduce a number of innovative new products, and many established mainstream brands have recently crossed over to develop no-/low-alcohol versions of their popular beer, wines and spirits."

## Other key statistics from the study

- Beer/cider is the largest no/low category (at 75% volume share), with no-alcohol beer projected to drive growth at more than +11% CAGR over the study's 2021–2025 forecast period.

- No-alcohol RTDs and no-alcohol spirits are both expected to post about +14% CAGR volume growth.
- The wine category is the exception, as the taste of low-alcohol wine is perceived by many consumers to be superior to that of no-alcohol wine.
- Low-alcohol wine is expected to grow almost +20% CAGR 2021–2025 vs no-alcohol wine projected at +9% CAGR.
- By volume, Germany dominates no-/low-alcohol, and is more than three times that of the next-largest market, Spain, followed by the US, Japan and the UK. However, the UK and the US are two of the most dynamic ones, and are growing at a faster rate.

## Who is the consumer?

According to the new IWSR research, 43% of adults across the focus markets who have purchased no- and low-alcohol beverages say they are substituting those products in place of full-strength alcohol for certain occasions, rather than abstaining from alcohol overall. The majority of no/low drinkers also enjoy standard strength alcohol too — only 17% of people report they are drinking no/low to avoid alcohol completely.

The country with the largest proportion of alcohol abstainers is the US, with 23% of no/low drinkers avoiding alcohol completely.

"The no-/low-alcohol market is still very much in its early growth stage in many categories and geographies, as the sector continues to define itself," Neill added. "Brands that will ultimately dominate in the no/low space are those that are successful in navigating the barriers of taste, price, pack format, availability and overall consumer education."





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# Exploring the growth of plant-based milk

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

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

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

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

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

While dairy milk has long been seen as a drink or a meal accompaniment, for example being used as an ingredient or with cereal, there are increasing signs that plant-based drinks,

particularly those with a thicker more yoghurt-like texture or those sold in individual portions, are being seen as a healthy snack. Research by the Brisan Group suggests that up to a third of these products are viewed as a snack, and 61% are viewed as 'a treat'.

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

## Production of plant-based milk

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

These days there is a wide range of plant-based milks made from nuts, grains and legumes, as well as other seeds (such as sunflower and hemp) or coconut.

There are two main methods for processing plant-based milk: wet or dry. The wet process involves soaking and grinding the raw material in large volumes of water for up to 12 hours. In some cases, enzymes are added to hydrolyse starches (for example in oat milk production). The dry process involves milling the raw material into a flour or powder which is then processed to separate the starch, protein and fibre as desired, before being





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However, as well as being free of lactose, they are lower in saturated fat and cholesterol than non-skimmed milk.

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

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

### Maintaining quality and demand

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

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

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

Whatever plant-based milk product you are producing, it is important to remember that plant-based milks have the same requirements for pasteurisation, sterilisation, cooking or cooling as other beverages which contain specific ingredients. It is therefore crucial to invest in the most effective and efficient processing technology for all stages of production.

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

*The new HRS DSI Series uses direct steam injection to increase the speed of sterilising products such as oat milk.*

hydrated. As a result, dry production processes can result in a higher protein content in the finished product.

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

### Disadvantages of plant milk

Plant-based milks cannot match the natural nutrition profile of dairy milk in terms of protein levels and essential amino acids.

## Chobani moves into new milk segment



Chobani is moving into the refrigerated milk aisle with the launch of its ultra-filtered milk and half-and-half products. The company's entrance into this new milk segment follows the 2019 launch of its plant-based Oatmilk product.

The ultra-filtered milk segment, up 17.5% in total Nielsen reported sales, is driving growth in the US\$1.7 billion easy-to-digest milk segment, which consists of both ultra-filtered and lactose-free dairy milk.<sup>1</sup>

The Chobani Ultra-Filtered Milk range is a selection of filtered milk products that comes in reduced-fat, fat-free and whole-fat options and is made with locally sourced milk. It uses a filtration process to reduce the amount of sugar and totally



excise lactose. The milks can be used in cooking, baking and blending, with the high levels of protein offering a healthy boost. A chocolate milk version is also available.

"With our lactose-free, reduced sugar and protein-packed Chobani Ultra-Filtered Milk, we're making dairy accessible to more people and giving consumers a great option to trade up to a more advanced, functional and delicious product," said Peter McGuinness, Chobani President & Chief Operating Officer.

Also being launched is the company's half-and-half product category, with both plain and lactose-free coffee creamer products, made from an equal parts combination of fresh milk and cream. The company is targeting the half-and-half segment, which is currently estimated to be worth US\$1 billion value<sup>1</sup>, and is hoping to draw in coffee drinkers who have already been interested in the company's coffee creamer products.

The new product lines are being packaged in recyclable, paper-based packaging.

1. Source: Nielsen Scan, Total US Food xAOC, Latest 52 weeks through 1.15.22

## CASE STUDY

### Nestlé Nescafé improves efficiency at its largest coffee plant

Food manufacturer Nestlé is using Schneider Electric's EcoStruxure Asset Advisor software to boost efficiency and reduce downtime at its largest coffee production plant. The Nestlé Nescafé Toluca Complex in Mexico City produces over a million jars a day and the company wanted to ensure that it was able to avoid unnecessary and costly downtime.

By moving to the EcoStruxure software, Nestlé has gone from using a reactive system of maintenance to a predictive one. With this reactive method problems were being fixed as they arose, with eight unplanned outages in one year, one of which led to a 14-hour shutdown at a cost of almost \$600,000.

With the new software, however, Nestlé has real-time insights into its electrical equipment, which means that engineers can remotely monitor the company's assets and data analytics can be used to inform service intervals. This means that the company has greater visibility into its operations and thus higher flexibility, resilience and efficiency.



"With a plant as large as Nestlé Nescafé, ensuring reliability of all the electrical systems is a particularly involved task," said Luis Gilberto López Páez, electricity specialist in Nestlé Toluca Cafés.

"Across our operational network, we have been deploying flexible and scalable digital solutions to enhance our responsiveness, and the move to partner Schneider Electric was a natural one — having already collaborated in our production facilities in France and Switzerland.

"Since deployment, EcoStruxure Asset Advisor has allowed us to identify hot spots and attack them before they become a problem — saving us costly downtime, greatly enhancing our ability to respond quickly to changes in demand and ultimately better service our customers and reduce our operational carbon footprint."

Schneider Electric  
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# Beamex MC6-T

## New revolutionary temperature calibrator



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The Beamex MC6-T is an extremely versatile portable automated temperature calibration system. It combines a state-of-the-art temperature dry-block with Beamex MC6 multifunction process calibrator and communicator technology.

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It offers versatility, that no other temperature calibrator can match.

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## Natural alternative for red beverages

Oterra has launched a natural alternative to Red40/Allura Red for beverages, which is called Hansen Sweet Potato FruitMax Red 116 WS.

In 2019, Oterra (at that time known as Chr. Hansen Natural Colors) launched its Hansen Sweet Potato range as a natural red alternative. The result of nearly a decade of research and development, the range scooped up prizes in three continents: Europe, North America and South America.

Oterra's scientists went back to work after launching the original range to develop the next solution for the beverage market. The result, FruitMax Red 116 WS, is designed specifically for beverage manufacturers. It addresses the complexity this industry faces when using anthocyanins, including fortification, high water-activity, carbonisation, off-flavour, and colour stability.

The product is designed to provide manufacturers with a clean label, minimally processed, and GMO-free fire-engine red shade for beverage. It is recommended for alcoholic beverages, carbonated soft drinks, cordials, energy drinks, juice-based drinks and near waters.



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## CASE STUDY

### Pasteuriser increases capacity for drink manufacturer

An HRS Aseptic Block pasteuriser and filler has allowed a contract manufacturer of soft drinks in the UK to increase its capacity to fulfil extra orders from its client.

The customer is a supplier of contract manufacturing, packing and distribution services for the food and drink industry in the UK. One of its products is a branded fruit juice drink produced under contract for a major brand. When they needed to increase production capacity within a limited existing footprint, they approached HRS for a solution, which also needed to preserve the fresh taste and premium quality characteristics of the product.

The customer had an existing plate heat exchanger for pasteurising drink products, but this lacked sufficient capacity to

meet the increased demand for the product, and due to its design could only cope with a limited range of product types. Using a tubular pasteuriser based on an HRS multitube heat exchanger not only increased production capacity in a relatively small unit, but it also provided new capacity to handle thicker and more viscous products if required.

After consultation it was decided that an HRS Aseptic Block unit — incorporating a pasteuriser (based on the HRS MI Series of multitube heat exchangers), pumps and AF Series aseptic filler to fill bulk bag-in-box products — would be the best solution to meet the technical requirements in the space available. Because the customer wanted a turnkey solution, HRS also took care of

the ancillaries such as a boiler for the heating water for the pasteuriser, the chiller and all the necessary pipework, pumps, gauges, etc. The Aseptic Block also included a buffer tank, integrated cleaning-in-place system, and controls.

Capable of handling 3 tonnes of product per hour, the pasteuriser raises the temperature of the product from 15 to 95°C, with a holding time of 30 seconds, before the product is cooled to 18°C ready for aseptic filling. Since installation the HRS Aseptic Block has performed to specification, fully meeting the needs of both its customer and their client.

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Can Seaming

# Upcycling residual materials from the brewing process



For most breweries, brewer's grains are just what's left over after brewing and often merely used as animal feed. In some cases breweries even have to pay for their disposal, but much more is hiding in these residual materials from the brewing process.

A project team pursued jointly by Steinecker and the two development specialists Prof Waldemar Reule and Dr Rainer Gottschalk is now demonstrating how these materials can be managed.

One of the latest BROWNOMIC modules is a solution for material upcycling of residual materials from the brewing process and using them for energy recovery. The solution is being examined and optimised in a pilot installation as part of a Steinecker development project.

Whereas the BROWNOMIC has so far focused only on using residual materials for energy recovery, the project team has now developed a process for material recovery. This process consists of three steps:

1. First, proteins are extracted from the residual materials. This is done in a three-vessel system, similar to the concept of the CombiCube brewhouse. Following dispersion and hydrolysis, protein is separated by means of membrane filtration.
2. In the second step, the remaining biomass is acidified. After that mineral fertiliser is obtained by means of an ion exchanger.
3. This is followed by energy recovery in the form of biogas production. The brewery's wastewater is also added and purified here.

Thanks to the trends towards a sustainable, healthful and vegan lifestyle, demand for plant-based protein sources is rising in the manufacturing industry. Potential buyers of this



highly sought-after raw material include not only dairies and food-processing plants, but also producers of food supplements and the cosmetics industry. Moreover, selling the mineral fertiliser and the savings achieved by feeding in biogas also pay off for the brewery. So the sum of annual revenues results in a return on investment (ROI) of just a few years, which is substantially shorter than that of a classical biogas plant where the spent grains are used only for energy recovery.

The Ustersbacher Brauerei in Bavaria will be the first to use the concept developed for spent-grains upcycling in shopfloor reality.

"Over the past 10 years, we've already implemented a number of measures. With each of these, we've taken one step at a time towards achieving our goal: to become an energy-self-sufficient brewery using the BROWNOMIC concept. So it is only logical that our aim now is to also make maximally sustainable use of the residual materials from the brewing process," explained brewery owner and manager Stephanie Schmid.

Krones (Thailand) Co Ltd  
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## NEWS

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### Better Juice is going commercial with sugar-reduced juices

FoodTech startup Better Juice has sealed its first commercial deal to bring reduced-sugar juices one step closer to the supermarket beverage aisles. The company inked an agreement with a US fruit juice manufacturer for commercial instalment of its sugar-reduction technology.

This is Better Juice's first official commercial venture in its long-term collaboration with GEA Group, AG, Germany. The two companies joined forces in a strategic move to scale up and promote the sugar-reduction technology throughout the global beverage market.

Better-Juice's patented enzymatic technology uses all-natural ingredients to convert fructose, glucose and sucrose sugars into prebiotic and other non-digestible fibres. The juice passes through a continuous flow bio-reactor housing non-GMO microorganisms that transform the unwanted sugars into beneficial, non-digestible molecules. It boasts capabilities to reduce sugar loads by up to 80%, while preserving the full complement of vitamins and other nutrients inherent in the fruit. The process is claimed to moderate the sweetness of the juice, while intensifying the fruit flavour.

Under the new venture, GEA will design, manufacture and install the bioreactor that reduces sugars, and offer follow-up technical support. Better Juice will produce the microorganisms for the enzymatic process. According to the first commercial order, the fruit drinks manufacturer will produce natural juices with a minimum sugar reduction of 30%, and anticipates the product will arrive in supermarkets in the US early in 2022.



*Erin Blachinsky, PhD, co-founder and co-CEO of Better Juice, and Gali Yarom, co-founder and co-CEO of Better Juice, with the sugar reduction system.*



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# Canning experts

discuss hygienic machine design

An increasing number of beverages are being filled into cans worldwide, with the diversity of products seeing a similar increase. This is the reason why canners make particularly high demands on flexibility and the hygienic design of machinery.

Thanks to many years of partnership, KHS and Ferrum technical systems are attuned to one another enabling beverage producers to make hygienically designed products.



The compact Innofill Can C from KHS, for example, features flexible, taste-neutral filling, among others. This is supplemented by matching seamer systems FC06 and FC08 from Ferrum which have an open design making them easy to clean. Combined, both machines make for an efficient filling process.

The world demand for trend beverages such as hard seltzer, energy drinks and craft beer continues unabated. Here, the can is often the container of choice, said Manfred Härtel, filling technology product manager at KHS. "It's light, easy to recycle and keeps products fresh for longer with its excellent barrier properties." This type of container is increasingly being favoured for established beverages such as soft drinks, water and mixed beer beverages.

According to Härtel, this is prompting a good number of beverage filling operations to increase their range in the can segment and fill more and more different products on the same line. "This means higher demands are made of the machine's flexibility and hygiene," the KHS filling expert explained. "For the greater the product variety on a line, the greater the risk of contamination and flavour carryover."

KHS provides two fillers for the can segment: the Innofill Can DVD for the high-performance range and the Innofill Can C designed for small to medium filling quantities. Thanks to a new addition to the series that boosts capacity to up to 60,000 cans per hour, the Innofill Can DVD's little brother can now be integrated into lines with higher outputs even more effectively. It is also extremely flexible, enabling several different products and formats to be processed on a single line. "The Innofill Can C is distinguished by its fast format changeovers and set-up times. This in turn increases the availability and economy of the system," is how Härtel described the benefits of this particular filler.

In view of the increasing number of beverage variants being processed, during development special attention was paid to the hygienic machine design and providing protection against flavour carryover. In the product area the filling valves on the KHS can fillers are thus equipped with PTFE expansion joints (Teflon) in place of conventional seals. The sliding seals in the bell guides have also been replaced by Teflon expansion joints to create gapless, hygienic seals. These effectively protect the product from contamination and are easier to clean. Moreover, the electropneumatic lifting and positioning of the bells when sealing cans further contributes to a safe filling process. "Also doing away with water lubrication in the filler carousel area shortens exterior cleaning intervals by up to 20%," Härtel said.

As an option, the Innofill Can C can also be fitted with a HEPA filter that removes potential bacteria from the air in the machine's interior. Another option available on request



*Ferrum seamer (pictured left) and Innofill Can C (pictured above)*

is warm filling. This prevents condensation and thus microbiological contamination such as mould from being formed.

### Hygienic design for seamers

The greatest importance is attached to the hygienic design of all components in both the ferruBasic and FC series with seamers FC06 (15,000 to 45,000 cans per hour) and FC08 (19,000 to 60,000 cans an hour). "When developing our seamers, we consciously went for an open design without cladding. This makes the components easy to clean and the machine readily accessible to operators," explained Jörn Winkelmann, process engineer and hygiene expert at Ferrum.

In the FC series — compatible with the KHS Innofill Can C — the use of several different angled levels allows condensation and other unwanted liquids to easily run off and not enter the open beverage cans. For the same reason the conveyor segment features regularly spaced openings and the components have an extremely high surface quality to prevent microbiological deposits. Another item of note is the design of the seals that are easy to sanitise as they are installed on the exterior of the machine. The seamer section is made entirely of stainless steel and provides maximum durability even when aggressive cleaning media are used.

For can seamers F12 (35,000 to 105,000 cans per hour) and F18 (51,000 to 150,000 cans an hour) in the ferruBasic series, the Swiss company provides optional hygiene packages whose components are largely installed in the FC series as standard. These include, among other things, installation of an inclined base plate (on the F12 only) and various adaptations to tools that have a positive impact on machine hygiene. Furthermore, since very recently the welded cladding around the upper parts in the standard version has consisted entirely of stainless steel. Ferrum systems F12 and F18, designed for the high-performance range, are therefore a useful addition to the KHS Innofill Can DVD can filler.

In the future, KHS and Ferrum plan to further intensify their cooperation.

KHS Pacific Pty Ltd  
www.khs.com

## CASE STUDY



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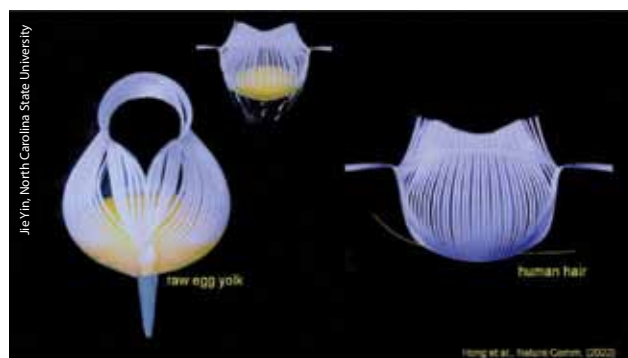
### Robotic gripper with a delicate touch

Engineering researchers from North Carolina State University have demonstrated flexible, robotic grippers that are able to lift delicate egg yolks without breaking them, and that are precise enough to lift a human hair. The work, published in *Nature Communications*, has applications for both soft robotics and biomedical technologies.

The grippers draw on the art of kirigami, which involves both cutting and folding two-dimensional (2D) sheets of material to form three-dimensional (3D) shapes. Specifically, the researchers have developed a new technique that involves using kirigami to convert 2D sheets into curved 3D structures by cutting parallel slits across much of the material. The final shape of the 3D structure is determined in large part by the outer boundary of the material. For example, a 2D material that has a circular boundary would form a spherical 3D shape.

“We have defined and demonstrated a model that allows users to work backwards,” said Yaoye Hong, first author of a paper on the work and a PhD student at NC State. “If users know what sort of curved, 3D structure they need, they can use our approach to determine the boundary shape and pattern of slits they need to use in the 2D material. And additional control of the final structure is made possible by controlling the direction in which the material is pushed or pulled.”

“Our technique is quite a bit simpler than previous techniques for converting 2D materials into curved 3D structures, and it allows designers to create a wide variety of customised structures from 2D materials,” said Jie Yin, corresponding author of the paper and an associate professor of mechanical and aerospace engineering at NC State.



Jie Yin, North Carolina State University

The researchers demonstrated the utility of their technique by creating grippers capable of grasping and lifting objects ranging from egg yolks to a human hair.

“We’ve shown that our technique can be used to create tools capable of grasping and moving even extremely fragile objects,” Yin said.

“Conventional grippers grasp an object firmly — they grab things by putting pressure on them,” Yin said. “That can pose problems when attempting to grip fragile objects, such as egg yolks. But our grippers essentially surround an object and then lift it — similar to the way we cup our hands around an object. This allows us to ‘grip’ and move even delicate objects, without sacrificing precision.”

There are a number of other potential applications, such as biomedical technologies that conform to the shape of a joint such as the human knee, which the researchers are now exploring.



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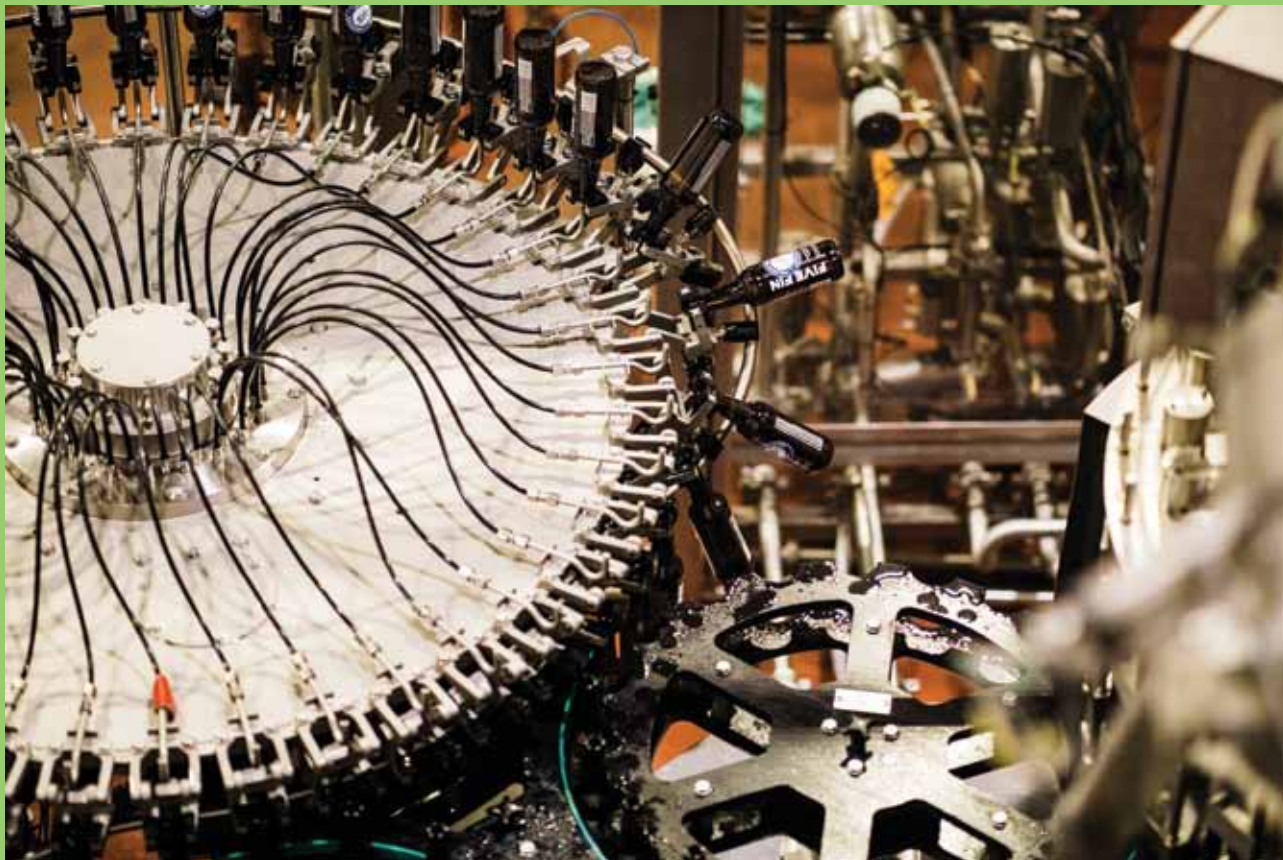
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## OFS moves into US market with Pelican Brewing deal



Australian manufacturing performance software company OFS has debuted in the United States via a partnership with Oregon-based craft brewery Pelican Brewing Company.

The brewing company has locations around Portland's coast, produces 50,000 barrels of beer each year and sells its products in four states. Additionally, it is known for its beer-on-demand service for retail and consumer customers. With expansion potentially on the horizon, the brewer wanted more insights into its operations and hoped to reduce waste and improve efficiency.

OFS's software solution was ideally suited for such a requirement. It is able provide manufacturers with accurate production line data using sensors and monitoring software. It has been used by other brewers in Australia along with a selection of other companies such as AstraZeneca.

"We had used other software before, but it never had the right levels of automation or any real-time data," said Martin Bills, Director of Brewing Operations, Pelican Brewing Company.

"My ears are well trained — I can tell if there's an issue on the line, and in time I can figure out the cause. But OFS gives me and my team that information in real time so we can resolve it and get back to making beer."

Real-time data from sensors in the production environment allowed for previously unknown problems to be identified. For instance, inefficiencies in the boxes in the bottling line were causing unplanned downtime. Implementing the OFS software helped solve this, just as it highlighted hundreds of small pauses elsewhere that added up to substantial lost time. Using the software has assisted in boosting the brewery's operations and will help further as the company grows in the future.

The partnership between OFS and Pelican Brewing Company is the beginning of the software company's move into the US. It is currently running proof-of-concept trials for its software in other parts of the country as it plans to further expand into the brewing industry there and to become the industry standard software.





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
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 **DEMATIC**

# Developments in cobot technology improve workplace safety

*John Young, APAC Sales Director*

Around 3000 B.C., the Egyptians created mechanical devices to ease repetitive manual tasks. However, the earliest modern robots weren't introduced into industrial settings until the late 1950s. For millennia, workers have turned to technology to avoid the most physically demanding or monotonous tasks. But, in the search for better technology to use in manufacturing, has worker safety remained the primary concern?

Traditional industrial robots operate behind a cage, physically separated from human workers. If this safety measure fails for any reason and a worker walks into the path of an industrial robot, it will hit them at full force without ever detecting the worker at all. While these kinds of accidents are rare, they do happen, and can be fatal.

## Collaborative robots

Since the first collaborative robot (or, cobot) was installed in 2008, they have steadily grown in popularity around the world due to their flexibility and because they are designed to work in close proximity to human workers. Due to the lack of physical separation between cobots and workers, they are designed and programmed with safety in mind.

In 2016 the International Organisation for Standardisation (ISO) released guidelines regarding collaborative robots and human safety, which were last reviewed in 2019. These regulations detail how manufacturers can use the wide range of safety equipment available to ensure the safety of their workers, including using emergency stop buttons, safety light curtains and force and speed limits.

The flexibility and adaptability of cobots means that it is impossible for their original manufacturer to test all possible

applications. It is therefore down to the end user to ensure safety and a comprehensive risk assessment is essential.

The risk assessment must identify any reasonably foreseeable contact between the robot and an operator and must crucially be specific to the end-effector, as each one will have very different safety implications. For example, a cobot fitted with a welding tool will require much stricter safety procedures than one fitted with a simple probe. Risk assessments must also be regularly updated, to reflect any reprogramming.

## Recent developments

With safety being such a key component of cobots, other capabilities such as speed are often compromised with traditional collaborative robots. But some recent developments are allowing collaborative robots to increase their productivity while keeping workers safe.

Certain newer cobots can determine the best way around an obstacle without having to pause. This advance in technology means cobots can spend much less time stopping to avoid collisions and more time being productive. It also means several cobots will be able to work together independently, as well as in the immediate vicinity of humans.

In addition to seeking technology that will free up workers from dull or physically demanding work, manufacturers must keep worker safety in mind. The latest developments in collaborative robots will bring improvements in both productivity and safety, and being aware of these developments in the field will help manufacturing managers both meet and prepare for future safety standards.

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## CASE STUDY

### Sorting out berries

Founded in 2019, FRESHBERRY is a Russian startup producer of wild-growing berries. The enterprise is engaged in collecting, procurement, processing and selling wild-grown blueberries, cranberries, cowberries and cloudberries.

The company aims to produce first-grade berries for export to the EU market, as well as to China and the US. This means they must ensure there is less than 1% of foreign matter in the final product volume.

In March 2020, the company implemented an automated production line for cleaning blueberries, cranberries and cowberries. To ensure high quality of the final product, it purchased two TOMRA Food optical sorters that were integrated into the line: Helius and Blizzard.

The berry production line includes a number of stages. The feedstock passes the feed hopper and enters the vibrating screen through the crusher, where the bulk of leaves are removed. Then the feedstock is sent by the screw conveyor to the air separator, which removes sticks and branches, before entering the berry freezer. At the next stage, the product is stemmed and then moves to another air separator and the polisher, which removes the leaves adhered by freezing. Downstream of the polisher there are two TOMRA optical sorters: Helius and Blizzard respectively. The final stage includes filling and packing.

“The main task of the TOMRA sorters is to ensure the stable high quality of the berries,” said Vladimir Romanchuk, General



Director of FRESHBERRY. “Optimal performance for our enterprise is no less than 2–2.5 tons of berries per hour: the slower run of the feedstock along the line causes steep escalation of the production costs. Considering the relatively large volume of foreign matters in the feedstock, our TOMRA sorting machines face a really challenging task. Profitability of the entire enterprise strongly depends on their proper work. And they certainly meet the requirements.”

Due to individual laser signal transmitters, TOMRA Helius free-fall optical sorters are able to identify any deviations in colour and structure in the stream of the quality product. Its powerful pneumatic guns separate the defective product — immature berries and the residual foreign matters after the previous feedstock processing stages — from the quality product with high accuracy.

The Blizzard free-fall sorting unit scans the feedstock stream with pulse LED cameras operating together with multispectral sensors and identifies deviations in colour, shape and structure.



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Pneumatic ejectors expel the foreign matter in milliseconds and pass the quality product on for further processing. Within the FRESHBERRY production line, the Blizzard sorter performs final sorting, removing residual immature berries, berry stems and other types of berry.

FRESHBERRY has now ordered another Blizzard sorting unit. Thus, three optical sorters will be subsequently integrated into the enterprise production line.

“All too often, we have to work with berries having the volume of foreign matter up to 5–7% of the entire feedstock volume. Two sorters can ensure the output of first-grade products only upon the secondary sorting. However, in order to achieve this, berries have to be finally frozen in the freezer, which results in the dramatic growth of the energy costs and, therefore, significant escalation of the production costs. Our calculations show that the necessary quality level for us and our customers will require the integration of another TOMRA Blizzards machine into the line.”

In conclusion, Romanchuk said: “Perhaps the main advantage of TOMRA Food sorting solutions is that they allow not only for increase of the final product quality but also for stable maintenance of the target quality level. This is important as this enables us to build long-term relations with our customers, as well as to develop our business systematically and thoughtfully.”

*TOMRA Sorting Solutions Pty Ltd*  
[www.tomra.com](http://www.tomra.com)

## NEWS

### Woolworths' refrigerated electric truck hits the road



As part of a trial to reduce its carbon impact, Primary Connect, Woolworths Group's supply chain arm, has partnered with Linfox to introduce an electric truck in Melbourne. Woolworths Group is working to reduce its carbon emissions by a substantial amount before 2030 and to become net carbon positive by 2050. In introducing more electric vehicles it will be able to reduce the carbon footprint of its fleet.

The refrigerated truck, one of only two Volvo FL Electrics in Australia, will be seen rolling through Melbourne's streets as it transports perishable goods in a carbon friendly way. It is Primary Connect's third electric vehicle.

The vehicle will be dressed in the expected Woolworths-green livery and will travel between Primary Connect's Fresh Distribution Centre and supermarkets around the metro area to deliver food.

It can carry up to eight pallets of produce, which results in around four tonnes of goods being transported each trip. It has a range of 200 kilometres on a single charge and its regenerative charging means that it can recharge when travelling downhill or when it brakes.

Woolworths has expressed confidence in the new truck and says that it is monitoring the ways in which electric vehicles can be used in the supply chain to assist in shifting to a lower carbon future.

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**Engineering the Future**

## Tracking oysters with blockchain



The food-grade marker can be applied to a live oyster and is able to be read through plastic liner packaging. The marking system is not affected by refrigerated environments, logistics and transport conditions and procedures that are typical to the industry and sustained through the shelf life of the oysters.

The benefits of this system are twofold: firstly, the provenance of the oyster can be easily kept track of, as it moves between producers and sellers. This means that theft and fraud of the oysters can ideally be minimised, with buyers knowing where the products are coming from and if the seller is acting legally.

The second benefit of the system is that it allows buyers to understand the source of the oysters and check on their sustainability practices.

Blockchain is being used to keep track of organic oysters, protecting them and their buyers from fraud and theft. Developed by Security Matters (SMX), the tracking technique involves connecting the physical and digital worlds in order to allow for a form of provenance and digital genealogy to be established.

The method is fairly simple: the organic oysters are marked with an invisible, food-grade marker during the cleaning and processing stage that identifies their geographical origin. The marking is then linked to the blockchain, which allows the physical oyster to be tracked. Since the blockchain is hosted externally and has been developed to minimise fraud, the service makes it possible to have a long-term digital receipt of where an oyster was bought or sold and by whom.

“SMX is excited to have successfully developed a food-grade marker system for oysters,” said Security Matters founder and CEO Haggai Alon.

“This is the first of several large superfood markets where our technology can be applied to provide all value chain players with the ability to meet the consumers and stakeholders’ expectations on the origination of their products and sustainability, whilst also increasing the marketability of products, which has the potential to increase sales.”

The technology was tested in a laboratory environment and Security Matters is currently negotiating with commercial suppliers to adopt the technology, with the launch of the oyster-blockchain service expected by the end of Q1 2022.

## Hygienic robots

KUKA has announced a Hygienic Oil (HO) range and Hygienic Machine (HM) variants that are designed for use in applications that prioritise hygiene. The robot arms use food-compatible lubricants in all axes and feature a smooth surface for easy cleaning. This design ensures a high hygienic standard and makes these robots attractive for use in other industries such as pharmaceuticals and cosmetics.

Equipped with certified NSF H1 lubricants in all axes, the robots meet the hygiene requirements of Machinery Directive 2006/42/EC and DIN ISO 14159. According to the company, maintenance intervals are identical to those of its standard robots.

The modern lighter grey design of this robotics range is also intended to make it particularly easy to detect contamination on the machine. With these measures, KUKA meets the increased safety standards in the secondary sector. HO robots also offer application potential beyond food industry processing and packaging, for processing of solid or dry products such as chocolate or baked goods.

KUKA hygienic robotic technology with H1 lubricants covers payloads from 6 to 240 kg and reaches from 900 to 3200 mm, and is suitable for use along the entire process chain. This encompasses all robot families: from the KR AGILUS to the KR QUANTEC PA — with even faster cycle times. The main axes carry a protection of rating IP 65 against dust and water, the wrist axes to IP 67.

**KUKA Robotics Australia Pty Ltd**

[www.kuka.com.au](http://www.kuka.com.au)

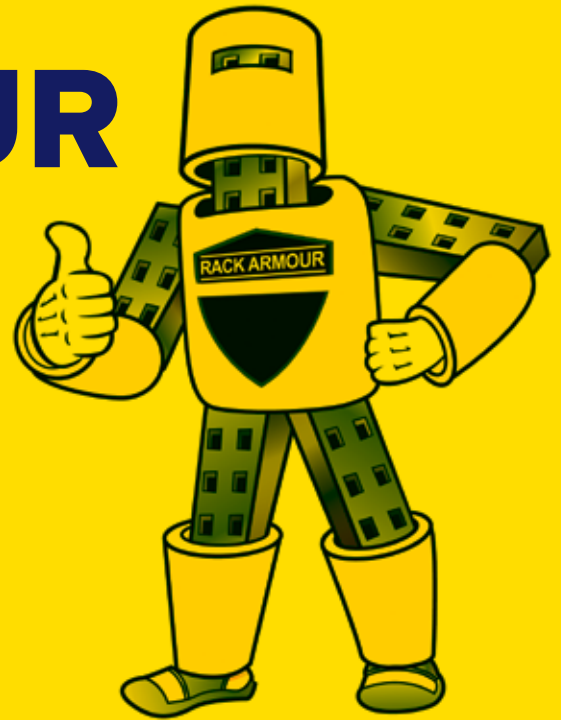






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## Bulk bag discharger with integral conditioner and bag dump station

Flexicon's BULK-OUT BFC Bulk Bag Discharging System promotes the flow of bulk solid materials that have solidified during storage and shipment, automatically discharges the material and allows manual additions of ingredients from sacks, drums and other containers.

A cantilevered I-beam with electric hoist and trolley lowers a bag lifting frame to floor level for rapid attachment of the bag to patented Z-CLIP bag strap holders, and then hoists and rolls the bag into the safety frame, eliminating the need for a forklift.

The integral conditioner consists of two hydraulically actuated rams with specially contoured conditioning plates that

press opposing sides of the bulk bag. A human-machine-interface (HMI) housed in a NEMA 4 (IP 56) enclosure controls the stroke and number of ram actuations. The electric hoist can be used to raise and lower the bag for conditioning at varying heights.

For bulk bag discharging, the bag outlet spout is pulled through an iris valve mounted atop a dust hood over the hopper. Once the bag outlet is secured and the iris valve is closed, the bag spout drawstrings can be untied, the dust-tight, snap-action access door closed, and the valve released slowly, reducing uncontrolled bursts of material into the hopper and dust into the plant environment.

For manual dumping in conjunction with or independent of bulk bag discharging, the operator raises the hinged door and adds the material from smaller capacity containers through a coarse screen into the hopper. A fold-down support tray serves as a bag rest.

The hopper can be configured to connect to pneumatic or mechanical conveyors, or directly to downstream process equipment.

The discharger can also be configured for weigh batch discharging with the addition of load cells and a programmable controller.

Models are available in carbon steel with durable industrial coating and stainless steel material contact points, or in all stainless steel finished to industrial, food, dairy or pharmaceutical standards.

**Flexicon Corporation (Aust) Pty Ltd**

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## NEWS

### Organic winery toasting sustainable packaging success

As a leading family farm and vineyard producing artisan fig, olive and wine products, Rosnay Organic Wines has set a high benchmark in creating premium organic products for Australian and overseas customers.

For more than 25 years, Rosnay Organic Wines has been meticulous in producing organic products celebrating the Canowindra region in New South Wales.

Positioned front and centre for Rosnay Organic Wines is the celebration of its organic community and their unwavering commitment in organic science investment and creation.

The care taken to create its product range also translates to the other products they use in packing, shipping and delivering them Australia-wide.

Rosnay Organic Wines connected with an Australian supplier of landfill-biodegradable plastics, Biogone, using its pallet wrap to securely ship out product to hundreds of outlets nationwide and globally.

According to Sam Statham, General Manager, Rosnay Organic Wines, using standard plastic wrap to protect and secure its products on the pallets was not a path the family business wanted to continue with.



"We were simply sick of all the plastic that was being used, and for us, we were struggling to find a sustainable solution, but then we discovered Biogone," Statham said.

"As a small and successful business like ours, Biogone shares the same ethos of wanting to leave our planet in as good or better condition than when we came here."

Statham has three simple pieces of advice for other companies to embrace sound and doable sustainable practices.

"Firstly, what you do is more important than what you say. Secondly, be transparent and welcoming to your customers and thirdly, work with people who share your values."

*Biogone*  
[www.biogone.com.au](http://www.biogone.com.au)

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## CASE STUDY

### German brewery opts for high-performance filler

There are repeated bursts of noise from outside the office window when trucks piled high with full crates of beer trundle off on their journey to their customers. OeTTINGER Brewery still delivers most of its products — from beer through mixed beer beverages to soft drinks — directly to supermarkets without using any intermediaries. The fleet now numbers about 120 vehicles. “Our motto is ‘consistently simple’. At OeTTINGER, it’s all about beer,” said a smiling Jürgen Brunacker, technical plant manager for OeTTINGER at the brewery site in Mönchengladbach.

KHS has been a partner to the company for several decades, helping it to implement its strategy and playing a big part in its success. The KHS Innofill Glass DRS ECO machine is now in operation at OeTTINGER and has demonstrated savings on CO<sub>2</sub>, water, energy and space, while also benefiting the brewer with improved quality in the filling process.

Mike Herrmann, the KHS sales representative responsible for OeTTINGER said: “The technology is extraordinary.”

For a total oxygen pickup of 20 ppb<sup>1</sup> the machine only uses 160 g of carbon dioxide per hectolitre of beverage. For a value of 40 ppb 110 g of CO<sub>2</sub> per hectolitre are needed, which is claimed to be up to 60% less than in direct market comparison.

The filler can be tailored to cater for the individual criteria of different beer styles. “We adjust the filling process to suit our customers’ products. Because of the shorter processing time, we’re not getting any bigger with our bottle filling machine,” Herrmann stated.

Lots of breweries have to buy in their carbon dioxide and due to rising prices, this is a growing cost factor. “The lower the consumption for the filled bottle, the more efficient the production process,” Brunacker said. “And the lower the oxygen pickup, the better the product quality. The concordance between these two points on this filler is phenomenal.”

The high-pressure injection unit acts as a support here, monitored by camera technology directly upstream of the container closure system. It causes foaming that displaces even the tiniest amounts of air from the bottle neck and under the domed crown cork. Too much oxygen pickup during filling damages the beer. It starts to oxidise and the taste changes.

“The new KHS filler has such low oxygen filling that product spoiling caused by the machine is practically eradicated. There



hasn’t been anything quite like this in bottle filling before,” Herrmann said.

Thanks to the frequency-controlled vacuum pump and ECO process the brewery also saves up to 20% in energy and water. The vacuum pump cooling water passes through a heat exchanger and is then used for the bottle spray. To date these were separate processes that each needed their own respective media.

Besides profiting from the quality of the filling, OeTTINGER enjoys benefits in other areas too, such as the machine’s compact design; and automated and digitalised processes.

The DIAS diagnostic assistance system, for instance, monitors the entire filling sequence. Summaries of the operating data and consumption values can be easily generated. Operators can quickly intervene and make any corrections that might be necessary. In addition, individual alarm thresholds can be configured in advance.

“We can set up the machine so that it always produces the same values. This gives us a number of advantages with regard to quality management and product safety,” Brunacker said.

The system also consistently recognises bottle breakages in good time, thus further contributing to product safety. With improved broken glass protection and a bottle burst monitoring system, splinters of glass can be perfectly isolated, unlike on the old system.

The camera-controlled high-pressure injection control system known as OPTICAM enables the head of foam to be automatically monitored and regulated without the need for a machine operator. According to Herrmann, the deviation in filling accuracy is less than one millimetre. Here, automatic fill level probes enable infinitely variable adjustment of the fill levels for the different bottle shapes and sizes. This not only cuts down on beer loss but also reduces the amount of effort required for cleaning.

Product changeovers are also faster. The automatic CIP caps no longer have to be attached or removed by hand and automatically drain themselves. Switching from beer to a mixed beer beverage or one of the over 40 other beverages in the OeTTINGER range is quick and easy.

<sup>1</sup> ppb = parts per billion. 1 ppb is the equivalent of 1 µg per kilogram, for example.

KHS Pacific Pty Ltd  
www.khs.com



Mike Herrmann and Jürgen Brunacker



## Electric forklifts range

The Mitsubishi 4-wheel battery electric counterbalance forklifts range is now available with lithium battery power.

The latest addition to the range is the FBCB series, which offers a choice of 12 models with an updated, modern looking design and capacities ranging from 1000 to 5000 kg.

With a combination of a wide variety of optional features and a waterproof rating of IPX4, the range can work across all platforms of light- and heavy-duty work cycles with consistent operation. A range of battery and charger options including lithium power is available within the product range, where solutions can be tailored to suit the user application.

The range is designed to be comfortable for drivers with a spacious and highly ergonomic driver compartment. With a narrow dashboard, high-visibility mast, small steering wheel and optimised lever placement, all-around vision has been maximised for safety without compromising on control.

With a low centre of gravity, electric hydraulic power steering and curve control, the range is designed to provide increased operator confidence when travelling, cornering and lifting with intuitive speed control. The trucks are designed to keep travel consistent on inclines, responding as if it were driving on a flat surface.

Featuring customised control with a choice of operation modes, modes can be adjusted to meet the driver requirements associated with the operator's skill level, workplace conditions and operator's preferences.

An additional ECO mode can be selected to make energy consumption more efficient, extending working hours per charge (up to 11.5 h) while also reducing running costs. If the truck is left idling with no operation for 15 min, auto power-off comes into effect further conserving energy.

While the base model is highly suited to many different working situations, a wide choice of options and attachments is available, allowing the truck to be specified to meet the needs of a business. PIN code entry can be enabled at an administrator level to allow tight control over who can operate the fleet and adjust the operational characteristics.

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# Top 10 considerations when moving to heat pumps

*Dr Alemu Tiruneh Alemu\**

Transitioning from burning fossil fuels to electricity requires new technologies, and in particular heat pumps. Heat pumps can replace boilers of all kinds in buildings for heating but also in industrial processes. This is a challenge for many commercial and industrial heat users because heat pumps are “unfamiliar territory”. So what are the “Top 10” considerations when moving to heat pumps?

## 1. Get to a solution

“Analysis paralysis” afflicts the heat pump transition like many other business decisions. Heat pumps that have been common in the HVAC and refrigeration sectors are new and different for the industrial sector. Steam, hot water boilers, gas, diesel and coal burning are the norm.

Heat loads are characterised by demand (the heating rate), load (the amount of heat),

and Delta-T — the difference between input and output temperatures. Heat sources need to be assessed — the ambient conditions across the year, the waste heat opportunities, and other sources (eg, water, etc). All of these have load profiles — the load over time. Without load profiles we only see peak requirements, and the peak demand is often quite transient.

By evaluating all your loads, you can work to a solution that optimises the input energy (recovered heat and eventually electrical power) required.

## 2. Take off the “boiler blinkers”

Our natural inclination is to think in terms of what we know — our current heat architecture. We think the problem is, “We need to replace the boiler with a heat pump”. In fact the problem, usually is, “Decarbonise by

2030!”. This requires a different perspective — a change of paradigm. Instead of “How do we replace the current equipment?”, begin with “What do I use heat for?”, and “What is my heat demand?”. Begin by understanding the application and from there work to a solution that aligns with the capabilities of heat pumps. Looking at heat pumps through “boiler blinkers” will only rarely bring you to a workable solution.

## 3. Modulate the load

Installed boiler capacity is often a multiple of the actual demand, and boilers are rarely operated at capacity.

It is not unusual to see heat capacity confused with the actual heat demand. Thermodynamics is usually straightforward. The expected heat demand of industrial processes is amenable to analysis and



prediction, even without expensive monitoring equipment. This analysis can highlight how to improve efficiency and eliminate losses. In the past, capital investment decisions were based on, for instance, the marginal cost of using more heat from a boiler. We thought of hot water and steam from boilers as a “free” commodity. Even today with rising gas and fossil fuel prices this no longer holds, yet the thinking often remains.

Usually, we can modulate the load and thus reduce the actual demand required from a heat pump solution.

Begin with the analysis and modulate the load.

#### 4. Use the free cooling

Many industrial processes requiring heat also need cooling and refrigeration. This is common in food and beverage where product is heated for cleaning or cooking, and then chilled or frozen for packaging, storage and distribution. Pharmaceuticals and other industrial applications similarly use both chilled water and heating in their industrial process.

Heat pumps use the refrigeration cycle to produce heat. They can be configured to support the refrigeration demands nearby. Today that demand is currently met by chillers supporting chilled water or glycol loops configured as “secondary refrigerants”. By using the “free cooling” from heat pumps the cooling demand can be offset. This reduces the need to run the chillers, hence reducing the energy cost and extending the chiller life. All of these improve the efficiency of the heat pump solution and improve the business case for heat pumps.

#### 5. Go higher! (temperatures)

Glaciem CO<sub>2</sub> heat pumps can produce hot water as high as 95°C at marginal additional cost. Further, they can produce sensible heating of air, many oils and other materials up to 120°C. They can be configured to serve all of these from one heat pump using a range of heat transfer technologies including heat exchangers and coils at the same time as cooling down to -50°C. Some heat pumps can only produce lower temperatures and being constrained by a technology choice like this limits system efficiency. Many industrial production processes have been designed around technologies that have a high cost for higher temperatures. The availability

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*We think the problem is,  
“We need to replace the  
boiler with a heat pump”. In  
fact the problem, usually is,  
“Decarbonise by 2030!”.*

---

of heat pump technologies that produce higher temperatures at similar cost and higher efficiency leads to best practice that reconfigures the heat demand to accept the highest reasonable temperatures.

#### 6. Go for scale!

In the past every heat or cooling demand had its own system. Each system was over-sized. Today, by incorporating all your available heating and cooling demands into one heat pump solution you can optimise for “diversity” (the reality that not all demands peak at the same time). One system with different operating modes provides all of your differing demand profiles.

The result is larger heat pumps with lower heating unit cost. Glaciem CO<sub>2</sub> heat pumps are multi-megawatt systems that are deployed into a range of flexible configurations depending on plant room and space constraints.

#### 7. Level the load with Stratified Thermal Storage

Stratified hot water storage tanks allow heat pumps to be sized for a consistent capacity that “levelises” the energy requirement from the heat pump whilst providing for the peak demand of the application. Further stratified hot water storage allows for return temperatures and off-takes to vary without affecting heat pump efficiency.

#### 8. Maximise use of renewables with Thermal Energy Storage

Behind the meter renewables like solar PV naturally produce low or marginal cost electricity when the sun is shining. Using such power when it is available to run your heat pump means that you need to be able to utilise the heating and cooling even when it does not match your load profile. Thermal energy storage with phase change materials like that

of Glaciem enables dense storage of cooling to offset cooling demand at a different time. Similarly, stratified hot water storage can be used to store heat for when it is required.

#### 9. Kill the parasites

Heating and cooling architectures traditionally have been designed around processes that made assumptions about how heat was best delivered for technologies related to boilers. When analysed there are usually huge parasitic loads like pumping power and fan power that are not assessed when people are evaluating the cost of energy for heating demands.

Producing higher temperatures and higher Delta-T reduces the power required for pumping without affecting “off-coil” air temperatures thus reducing the fan power needed to heat air to the required temperature.

Avoiding secondary refrigerants where possible (eg, using the heat pump’s CO<sub>2</sub> refrigerant directly as the heating or cooling fluid) can eliminate pumping power and dramatically reduce the fan power required.

#### 10. Engage heat pump experience

Companies like Glaciem Cooling Technologies have a wealth of experience in designing and configuring heat pumps for commercial and industrial applications. There is also a growing network of energy and mechanical services consultants who understand heat pump capabilities and are experienced in their application. Reach out to them for help.

CO<sub>2</sub> heat pumps are industrial refrigeration systems with the same general architecture, maintenance requirements and integration requirements as systems that have been deployed into many refrigeration applications in various industries. These contractors and skills are readily available to support the installation, commissioning, service, and maintenance of heat pumps in industrial settings.

*\*Dr. Alemu Alemu is a Senior Applications Engineer at Glaciem Cooling Technologies, the 2021 Winner of the AIRAH Awards for Excellence in Innovation and Refrigeration.*



Glaciem Cooling Technologies  
glaciemcooling.com

## NEWS

## NEWS

## New framework for steviol glycosides

The recently adopted International Stevia Association (ISC) Codex Framework for Steviol Glycosides encompasses four different technologies for the production of stevia. This change is designed to enable greater access to the full range of stevia ingredients to meet demand for new products.

The beverage category continues to be the leading category for new product launches with stevia, while sports nutrition, supplements, dairy, snacks and confectionery are also seeing significant growth. New emerging categories include desserts, ice cream, bakery products and cereals.

The four steviol glycoside production technologies approved by Codex Alimentarius (Codex), the international food standard safety authority, now include stevia leaf extract, steviol glycosides from bioconversion, steviol glycosides from fermentation and glucosylated steviol glycosides.

Over the last five years there have been many advancements in the stevia ingredient space leading to the development of the next generation of steviol glycosides with a reduced bitterness and licorice aftertaste and an increased clean taste similar to the taste of sugar. For example, Reb M and Reb D are found in smaller amounts in the stevia leaf and are claimed to have a better taste.

"ISC was instrumental in getting this new framework approved, which benefits the entire stevia industry," said Maria Teresa Scardigli, ISC executive director.

"The Framework approach ensures that business operators can put steviol glycosides produced through their various technologies on the market without submitting new dossiers, provided they fulfil the defined criteria and specifications per technology. This is based on the authorities' review of the production technology, ensuring the highest level of safety, purity and quality is achieved for the final steviol glycoside ingredient put on the market."

Consumer demand for stevia continues to grow. Data from Innova shows that global product launches with stevia have increased by 21.9% CAGR over the past 10 years (2011–2021).

There has also been an increase of more than 35% of new product launches with stevia in regions such as Eastern Europe, Australasia, Africa and the Middle East in this same time period.

The adoption by Codex should help open more markets for the use of stevia.

## Nestlé develops healthy grain ratio concept

Nestlé has developed a nutritional concept that helps consumers understand the levels of carbohydrates, fibre and sugars in its products.

The 'GRAINSMART balance' concept was developed by scientists from Nutrition Research Australia, National University of Singapore and Tufts University in Boston. It is a ratio of carbohydrates, fibres and sugars and is meant to help define how healthy a product is and does so by limiting the amount of sugar and increasing the amount of fibre in foods. The specific ratio is 10:1:2; that is, for every 10 grams of carbohydrates, there should be one of fibre and no more than two of sugars.

"This new nutritional concept aims at facilitating a choice of higher quality carbohydrate products, helping consumers to increase their consumption of fibre-rich grain such as whole grains, while at the same time reducing their intake of added sugars," said Kim-Anne Lê Bur, nutrition expert from Nestlé Research.

Any product whose ingredients meet this ratio can display a special logo on its packaging, indicating to the consumer that it is healthy. By limiting the amount of unhealthy ingredients it is hoped that consumers will be able to easily buy healthy foods with good carbohydrates that slowly release their sugars into the blood.

"We are very proud to pioneer this unique nutritional concept that supports products with higher nutritional quality," said Mayank Trivedi, Head of Nestlé Strategic Business Unit Dairy. "We want to make sure consumers can trust products bearing the GRAINSMART balance logo as healthy options for themselves and their family because of their composition, which has been co-developed and validated by internationally recognised nutrition experts."

The first products using the concept and its logo have already made their way to shelves in Europe. More should arrive this year, with the concept being applied by Nestlé for product development across its cereal portfolio. There is currently no word on whether or not it will be adopted by Nestlé in Australia.







Inspiring  
**discovery**



## Critical pH monitoring for cultures

**D**SM Food Specialties (DFS) provides specialty cultures, probiotics, bio-preservation, sugar reduction and savoury taste solutions to the food and beverage industry globally.

The company's ingredients and solutions enable its customers to make healthier and more sustainable consumer products. It is a global leader in the manufacturing of products used in the dairy industry, with nearly 150 years' expertise in microbiology and fermentation technologies. These include the production of cultures and bio-preservation solutions for use in applications such as cheese ripening, yoghurt production, beverage brewing and lactose-free milk production.

Due to the nature of the products manufactured, there is a strong emphasis on system cleanliness — unwanted microbes can seriously compromise or destroy the finished product. Both CIP and SIP processes are utilised, in addition to inline process equipment having zero dead legs, maintaining a sterile manufacturing process.

### Fermentation is the core process

Fermentation is the nucleus of the production process and is performed under a controlled environment. The void between

the product interface and the internal top of vessel surface is gas blanketed with either carbon dioxide or nitrogen, depending upon the characteristics of the culture or enzyme.

The most critical process parameters during fermentation are pH and temperature, with typical pH ranges for all products being between 5.6 and 6.4. Whatever the target pH, the value must be maintained with minimal deviation. For example, some cultures may only have a pH tolerance of  $\pm 0.1$ .

Fluctuations in pH can cause a number of undesirable results, such as reduced growth rate or reduced product effectiveness and variations in quality. Where the culture consists of multiple strains, changes in pH can promote the growth of one strain over another, resulting in an out-of-specification product.

In the worst case, product can be destroyed, so the accurate monitoring and control of pH is fundamental to the success of the production process.

### Enter the Bürkert 8201 solution

The pH monitoring technology previously used by DSM had a number of drawbacks, which prompted the company to look for a more up-to-date and effective solution.

With the previous system, pH probes needed to be replaced every three months, and they were not tolerant to clean-in-place (CIP) and sterilisation-in-place (SIP) processes, so cleaning required removal of the probes from the lines.

If the system was not operating for a time — for example over a weekend — then the probes needed to be removed from the line and immersed in distilled water to prevent measurement drift on start-up of the system when re-installed.

DSM Food Specialties had an existing relationship with Bürkert, and chose to replace its pH probes with Bürkert's Type 8201 hygienic pH measuring system, which provided an effective solution to the drawbacks of the previous system.

The Type 8201 glass-free probe offers a robust and unbreakable construction, and



*CIP and SIP process*





iStockphoto.com/au/jenifera

a long service life with long calibration intervals. The smooth enamel surface of the probe inhibits the medium from sticking and is easy to clean in-line. Due to its robust design and high temperature and chemical tolerance, the electrode can stay in the process even during a CIP or SIP purification. This meant that DSM could dispense with expensive retractable fittings and would no longer need to remove the probe over the weekend or maintain a special probe storage environment.

External components of the Type 8201 system also offer an IP68 ingress protection rating, making them resistant to washdown processes.

### Fewer intrusions and greater accuracy

With the Type 8201, temperature sensing is also included in the same probe. A PT100 output is provided, removing the need for a separate temperature sensor and thereby reducing the number of intrusions into the process. Fewer intrusions into the piping reduces the risk of either ingress of contaminants into the process or of egress of process fluids.

As well as integral temperature measurement, greater accuracy is also maintained via a constant supply of potassium chloride electrolyte. Electrolyte level monitoring in the system's pressure container prevents operation without an electrolyte, and when a minimum level has been reached, the electrolyte supply bottle in the pressure container is simply changed.

### Solving a problem with a future-proofed solution

Combined with Bürkert's Type 8619 multifunction controller, full support of the Modbus TCP, PROFINET or EtherNet/IP protocols means that unlike the previous system, DSM will be able to integrate the new pH measuring system into an industrial Ethernet infrastructure in the future.

"Accuracy and stability of pH measurement is critical for optimisation of both product quality and yield," said a representative of DSM. "Previously the reliability of pH measurement was a constant issue, but now the Bürkert solution provides the reliability we seek."

Bürkert Fluid Control Systems  
www.burkert.com.au



## Natural caramel food colouring

Oterra has launched its extended caramel range.

The range of caramel food colourings offers a variety of brown colours and shades for a large number of product needs. Its colours are naturally sourced and can be used in an assortment of goods, including beverages, baked goods, confectionery and cereals, among others.

The colour range covers caramelised sugars and all four classes of caramel colour. It is offered in powdered and liquid forms, which can be used for a variety of applications with different requirements. Multiple concentrations are available.

All products are fully certified and accredited, including Non-GMO, Halal and Kosher, as well as Low 4-MEI options.

**Oterra Australia Pty Ltd**

oterra.com



## Soluble fibre range

Tate & Lyle has added two new products to its Promitor Soluble Fiber portfolio — Promitor Soluble Fiber W and Promitor Soluble Fiber 90L.

The products have been developed to make adding fibre to applications including confectionery, beverages and bars, easier and more cost effective.

Promitor Soluble Fiber W, which contains a minimum of 85% fibre and less than 2% sugars, has a lower viscosity than comparable fibre ingredients and performs well in confectionery products such as gummies. It can therefore be used for sugar reduction in mainstream confectionery or for fibre fortification in nutritional confectionery products.

Promitor Soluble Fiber 90L is a liquid version of Tate & Lyle's existing 90% fibre powder ingredient, which, depending on the end-product and manufacturing set-up, can provide production efficiencies by avoiding the need to dissolve or handle powders. The ingredient has lower viscosity and is easier to handle and use than comparative products on the market.

**Tate & Lyle**

www.tateandlyle.com



## Net zero mass spectrometer

The Thermo Scientific Delta Q Isotope Ratio Mass Spectrometer (IRMS) is a next-generation gas IRMS designed to enable detailed analysis with precision. Combining high performance with Thermo Scientific Qtegra Intelligent Scientific Data Solution (ISDS) software to improve ease of use and laboratory productivity, the product is designed to be connected with a wide range of peripherals.

The Delta Q IRMS is the first product to be released as part of the IsoFootprint campaign, an initiative to permanently remove CO<sub>2</sub> emissions associated with the manufacture and supply chain of all inorganic IRMS products. This means the system's carbon footprint will be neutralised, allowing scientists working across geoscience, food and beverage, environmental science and forensics to carry out their work while minimising their environmental impact. The Inorganic MS (IOMS) team at Thermo Fisher has committed to removing all embodied carbon in its instrumentation, using technologies, like direct air capture and bio-oil sequestration, that lock away carbon from the atmosphere permanently.

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## NEWS



## Food manufacturers sign UK fibre pledge

More than 20 companies in the United Kingdom have pledged their support to increase the amount of fibre in consumers' diets, as they back the Action on Fibre initiative. Launched by the Food and Drink Federation, which represents food manufacturers in the UK, the program aims to boost the fibre in consumers' diets in line with dietary requirements laid out by the government.

In 2015 the UK altered its dietary standards, changing the recommended daily intake of fibre from 25 to 30 g, a value that the substantial majority of people do not meet. In fact, most people are unaware of the change in the first place. The Action on Fibre initiative seeks to alter this by supporting material policy changes that see consumers eating a more fibre-rich diet each day. Signatories for the initiative include Kellogg's, Nestlé and Unilever-owned Graze.

As part of the program companies make individual pledges, as they promise to introduce new fibre-rich products, prominently label fibre content and implement programs that educate people on fibre. The pledged organisations also contribute to annual reporting and case studies on the program's successes.

Australians also struggle to meet their recommended fibre intake, which differs slightly from the UK's insofar as men and women have different fibre recommendations. Diets high in fibre are claimed to be associated with lower levels of chronic diseases and a reduced chance of bowel cancer.

Currently there is no sector-wide, manufacturer-driven project to increase fibre in Australian diets but individual organisations have pushed to boost it in their own foods. The Australian Health Star Rating System prominently features the fibre value in a food and displays whether it is a high a low value.





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# What if you could reduce organics-related product loss issues?



*The Hach BioTector B7000i is a management tool that allows plants to instantaneously view and quantify the product in process streams and wastewater. Source: Hach®*

How innovative TOC analyzer technology can play a critical role in helping plants optimize process control, minimize product loss and reduce energy and wastewater treatment costs.

Water is an important topic in the food and dairy industry. Companies need to pay high attention to wastewater management to meet stricter regulations, protect their social reputations, and reduce energy consumption to respect ecological footprint. Reducing product loss and keeping the profitability high is another important factor.

Historically, many processing plants viewed production and wastewater treatment as two entirely separate functions. This is changing as raw material costs increase and margins tighten. Therefore, cost management is more important than ever.

Process wastewater is infamous for carrying valuable product away from the plant, and away from the bottom line. The International Dairy Industry estimates a “standard” product loss figure for dairy plants at 2–3% annually. This might not seem like much at initial glance, but the financial implications of this loss level are quite significant. For example, experiencing an average 2.5% product loss level costs a “typical dairy plant” more than \$5 million per year in lost product value (and nearly \$900,000 in extra wastewater treatment costs).

Monitoring organics in water and drain lines helps production facilities quickly and

accurately measure the carbon content in their water streams so they can maximize production yield by quickly detecting product loss events to take corrective actions and improve production management processes to prevent future product loss.

A critical element to the effectiveness of a product loss reduction program today is a plant’s ability to best utilize online instrumentation. The continuous measurement of Total Organic Carbon (TOC) through field proven online instrumentation can greatly help dairies identify when and where losses are occurring. TOC is a measure of the carbon content of dissolved and undissolved organic matter in a sample. TOC measurement is widely considered the most cost-effective, continuous, accurate and timely test to identify the quantity of milk products in wastewater streams, because there is a direct relationship between gallons of milk lost by a dairy plant and the quantity of TOC in dairy wastewater at that point in time.

But industrial applications are demanding, especially when it comes to measuring TOC in real-time. High salts, oils, greases, particles, and a host of other materials pose challenging conditions.

For these challenging conditions in food and dairy processing, Hach uses its patented two stage advanced oxidation (TSAO) technology and larger internal diameter tubing (with self-cleaning), giving its Online TOC Analyser B7000i the ability to measure organics

reliably in food processing conditions with 99.86% uptime and required preventative maintenance only twice per year.

The Hach BioTector B7000i Dairy TOC analyzer was developed specifically for the Dairy Industry. Typically, lost product levels can be reduced by a conservative 15% using reliable TOC monitoring. There is a direct correlation between levels of lost product and wastewater loading. Clients regularly report greater than 15% reduction to wastewater loading as a result of using reliable TOC monitoring, with some clients achieving as much as a 40% reduction.

There are many opportunities for the food processing and dairy industry, and many new challenges in terms of sustainability, process efficiencies, and wastewater treatment capacity — challenges that Hach will continually work with the industry to address with reliable and cost-effective solutions.

*To learn more about how Hach can help you with your water needs, you can contact the friendly team at [sales@hachpacific.com](mailto:sales@hachpacific.com), 1300 887 735 (AU) / 0800 50 55 66 (NZ), or read more at <https://au.hach.com/industries/food> / <https://nz.hach.com/industries/food>*



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# E-tongue is sweet

Nearly everyone enjoys sweet treats such as lollies, biscuits and soft drinks, but what one person thinks tastes too sugary, another might think is just right. This variability makes it challenging to develop new foods and beverages, so companies have sought a more objective method. Now, researchers reporting in *ACS Applied Materials & Interfaces* have developed an ultrasensitive bioelectronic tongue that measures sweetness by mimicking human taste buds.

Although human sensory panels are the most common way to analyse a substance's taste, there can be a lot of differences in how people perceive flavours. To get more objective data, researchers have made bioelectronic tongues in the lab, but they can be complicated to manufacture or can't fully replicate the way the human tongue works.

Human tongues have sweet taste receptors with two large, complex structures that bind to compounds such as sugars. The outermost portion of one of these structures is called the Venus flytrap domain because its hinged, two-lobed molecular structure resembles the leaves of the insectivorous plant that close around its prey. This domain interacts with most of the sweet substances a person consumes.

In a previous study, Tai Hyun Park, Seunghun Hong and colleagues made an umami sensor with human-like perfor-

mance by using just the protein at the end of the umami taste receptor. So, these researchers wanted to apply the same concept to make a sweet-sensing bioelectronic tongue, using the Venus flytrap domain as electronic taste buds.

The researchers attached copies of the Venus flytrap domain that were made by bacteria in a thin layer on a gold electrode. They then connected multiple gold electrodes together with carbon nanotubes, making a field-effect transistor device.

When solutions of naturally sweet sucrose or of the artificial sweetener saccharin were applied to the device, the current decreased.

The sensor responded to these solutions down to the 0.1 femtomolar level, which is 10 million times more sensitive than previous bioelectronic sweet sensors, the researchers say. The device could also consistently measure the sweetness of real drinks, such as apple juice and sucrose-sweetened chamomile tea, but it did not show a response when cellobiose (a tasteless sugar) or monosodium glutamate (a salt known as MSG) were introduced.

Because the bioelectronic tongue was both sensitive and selective for sweet-tasting compounds, the researchers say this could be a powerful tool for the healthcare, pharmaceutical, and food and drink industries.





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## CASE STUDY

### Water bottler boosts production using PET bottling line



Apemin Tusnad has invested in Sidel's complete PET line. Changing market demands and the company's sustainability goals were driving factors in the investment. The investment should see 5% less plastic used for each bottle while maintaining a high standard of hygiene, thanks to the use of Sidel's Combi SF300 solution.

Apemin Tusnad, founded in 1999, is one of Romania's primary mineral water bottlers and has invested widely in technology and production capacity. It uses mineral water from Romanian volcanic mountains as its source for its three product brands, Tusnad, Artesia and Izvorul Ascuns.

As Apemin Tusnad places emphasis on the environmental health of its water sources, it sees Sidel as a viable partner thanks to its technology offering useful advances in sustainability and hygiene. The bottling process — forming, filling and closing the bottles — is fully automated in a controlled system, thereby reducing human contact and sources of contamination.

Fewer components and functions will also reduce the carbon footprint of the operation while shorter neck finishes and lightweight preforms lead to reduced plastic usage.

The new line, running at a rate of 18,000 bottles per hour, is designed to boost Apemin Tusnad's production by 40%.

*Sidel Oceania Pty Ltd*  
[www.sidel.com](http://www.sidel.com)

### Single-pair Ethernet cable

Single-pair Ethernet (SPE) is a key technology on the way to the smart factory and Industry 4.0. It enables consistent and efficient industrial Ethernet networks and only needs one pair of cores to transmit data. This saving enables smart components to be integrated into the network, which were previously not networked via industrial Ethernet.

The ETHERLINE T1 Y Flex 1x2x22/7 AWG from LAPP is a UL-certified, two-core data cable for high-speed information exchange that maintains the same high data rates while reducing the set-up required. Due to its small bending radius and small outer diameter, it is lightweight and easy to install.

The Power-over-Data-Line compatible cable complies with IEEE 802.3bu and has been specially designed for transmitting digital signals in the frequency range up to 600 MHz over distances of up to 40 m. It enables a simultaneous power and data supply to SPE terminals with low energy consumption (up to 50 W). With an aluminium-laminated foil and copper braid screening with a high degree of coverage (SF/UTP), it is double shielded. In addition, the PVC outer sheath is resistant to acids and alkalis and is partially oil resistant. As a UL/CSA-certified Power Limited Tray Cable (PLTC), the single-pair Ethernet cable can also be installed openly on cable trays.

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## Hygienic servo actuator

Microbiologically safe, residue-free cleaning, resistant to corrosion, a hygienic system design that is suitable for integration into open machine architecture — all of these attributes are united in the hygienic servo actuators in WITTENSTEIN alpha's axenia value series available from Treotham.

Developed for use in the sterile and wet areas of production and packaging machines, these motor/gearbox systems can be incorporated into open units without any additional protective measures.

axenia value servo actuators in single-cable technology complement the Treotham range of Hygienic Design and EHEDG-compliant Wittenstein planetary gearboxes (HDV and HDP). Treotham also offers the compact servo actuators in the cyber dynamic line for output ratings up to 335 W

as mechatronic drive solutions for sterile applications where germs, bacteria, microorganisms and dirt pockets must be ruled out and machine components have to be cleaned fast, reliably and without residue.

Using the system toolkit provided for this purpose, the hygienic servo actuators in the axenia value series can be configured in three motor sizes with a maximum acceleration torque of 32, 80 or 200 Nm and gear ratios from  $i=10$  to  $i=25$ , depending on the desired task and the performance requirements. A holding brake, temperature sensors and analog and digital encoder systems for position and speed can be built in as options. Regarding the controller, these servo actuators in hygienic design are specified for more than 20 possible types from different manufacturers to assist with optimal connectivity.

The exterior housing surfaces and the cable glands are made from 1.4404/AISI 316L stainless steel. The rolled steel surfaces are smooth with roughness of less than  $Ra\ 0.8\ \mu m$ . This minimises the risk of product adhesion and allows cleaning materials and disinfectants to be rinsed or drained off without leaving any residue. The housing has IP69K protection to prevent the ingress of moisture during CIP or SIP cleaning or when using a high-pressure cleaner. The sealing materials conform to EHEDG and FDA requirements for hygienic design.

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# Printing fake meat in 3D using cocoa butter

In a study reported in *ACS Food Science & Technology*, one team has developed a new combination of plant-based ingredients tailored for 3D printing meat alternatives. Their most successful recipes required the odd-sounding addition of cocoa butter, derived from cocoa beans used in chocolate.

Many current meat alternatives rely on plant-based proteins, most often from soy and wheat, which can readily mimic the texture and nutritional value of the real thing. While 3D printing has already been tested for meat alternatives, none of the current formulations include proteins from these particular plants. So, Songbai Liu and Shanshan Wang wanted to figure out an approach to making a 'meat dough' with soy and wheat protein that could be produced effectively with a 3D printer.

*Meat alternative created with a 3D printer and plant-based ingredients, including cocoa butter.*

Image credit: Adapted from ACS Food Science & Technology 2021, DOI: 10.1021/acsfodscitech.1c00311.



The research experiments revealed the importance of several additional ingredients, including the emulsifier Tween-80 and sodium alginate to control the texture. Heat-sensitive cocoa butter turned out to be a particularly important ingredient, making the dough more fluid at warm temperatures for printing, but then hardening afterward at room temperature, allowing the dough to retain its printed shape.

One drawback, however, is that people who cannot eat wheat gluten or soy because of allergies or celiac disease would not be able to partake of the new alternatives.

To address this issue, the researchers attempted to replace the soy protein with that from peas, but the resulting dough was too soft for printing. Even so, these experiments have identified a new strategy for formulating meat alternatives using this versatile technology, according to the researchers.

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## CASE STUDY

### v2food implements sustainable wastewater treatment



When plant-based meat company v2food needed a wastewater treatment system that ensured a small environmental footprint, it turned to Australian company Aerofloat for its sustainable wastewater treatment products that are designed to ensure compliant effluent.

With v2food rapidly expanding and diversifying, its wastewater treatment system needed to be both efficient and robust to keep up with growth. The HSE Manager at v2food, Scott Harbridge, said Aerofloat was the preferred wastewater treatment choice, thanks to its clear design and installation process.

“Aerofloat brought a robust solution to the table. We could clearly envision the end product thanks to the 3D CAD designs they offered prior to installation,” Harbridge said.

“Any site challenges were addressed at the design stage and there were no surprises with the system at the time of installation,” he added.



Aerofloat’s engineers designed and installed inline manual screens, wastewater flow balancing tanks totalling 100 m<sup>3</sup> capacity, as well as pH correction and controlled discharge to sewer. The aerated and mixed balance tanks blended and hydraulically balanced the incoming wastewater for v2food.

“Aerofloat’s system is simple to operate — we’ve also had Aerofloat’s engineers down to service the system every few months with excellent results. Having that ongoing relationship is also a great way for our operators to upskill and to also understand the mechanics of the system,” Harbridge said.

Aerofloat installed an intelligent HMI and remote monitoring system to allow the v2food team operators access even

when not onsite. It also allows Aerofloat’s engineers in Sydney to identify issues and manage the system remotely if required.

“Being in Wodonga, it’s nice to know we can call on Aerofloat’s expertise in Sydney via remote login if needed,” Harbridge added.

v2food is using the latest science from CSIRO to make plant-based food that looks and tastes like meat. The company recently signed with Woolworths and Coles to distribute its Australian-made plant-based mince, burger patties and sausages. It also provides the plant-based meat for Hungry Jack’s Rebel Whopper burger, and collaborates with a number of food delivery giants including Marley Spoon.

According to v2food’s CEO and Founder, Nick Hazell: “Population growth is set to reach 10 billion people by the year 2050. Planet Earth’s resources would need to double to feed the population with animal meat alone.”

Aerofloat has a number of sustainable projects under its belt; working with v2food made sense.

“We really commend the work v2food is doing for the environment. Creating an alternative to meat-based food fits our innovative thinking and aspirations to improve the environment globally,” said Michael Anderson, Aerofloat’s Operations Manager.

“We have enjoyed working with v2food, as like us, they push the status quo. v2food’s vision to create a sustainable food source for our planet fits our own vision for sustainable wastewater solutions,” Anderson said.

“Our engineers have been onsite in January this year supporting the team there with our After Care program. The system is operating well and recent testing results have been well in spec — great news for v2food,” Anderson added.

Aerofloat will showcase its custom-designed and standardised wastewater treatment systems at AUSPACK 2022, including its patented technology. Aerofloat offers products to address a range of wastewater treatment requirements for both large and small food and beverage companies, including processed and packaged food as well as restaurants and shopping malls.

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## Track & trace systems and software

Mettler-Toledo T51 and T61 Integrated Mark & Verify systems and software strengthen its Track & Trace portfolio, enabling instant code verification to boost accuracy and reduce waste in pharmaceutical, food and other markets.

Mettler-Toledo PCE has launched the Integrated Mark & Verify systems and software to help pharmaceutical manufacturers to fulfil increasing product safety and compliance requirements by making it easier to integrate code marking and verification capabilities into their production lines. These capabilities will also assist manufacturers in other industries such as food & beverage.

Mark & Verify systems enable the printing and verification of 1D and 2D codes and alphanumeric text such as those used for accurate identification of individual products (serialisation) and those aggregated into containers such as cases or pallets (aggregation). In addition to these reference checks, integrated smart cameras allow for both presence and quality checks — verifying the presence of required labels and information, and checking that printing and labelling quality is high, with no damaged labels or smeared ink.

Market requirements across a large range of industries require manufacturers to be able to track individual products throughout the production and supply chain, facilitating simpler and more targeted product recalls where necessary, and improving levels of product safety. The new Mark & Verify systems enable manufacturers to integrate these capabilities seamlessly into existing production lines with the minimum of disruption for installation. The new systems are:

**T51 Integrated Mark & Verify:** Systems are suitable for the inspection of codes on oriented products such as cartons, labels, cases and

pallets. They can be easily integrated into production lines or packaging equipment and can be linked with existing printers. In addition, multiple sensors such as smart cameras, barcode scanners and machine readers provide support for presence, quality and reference checks. Systems are capable of throughputs of up to 300 ppm, supporting Good Manufacturing Practice (GMP) requirements, and are easily upgradeable to a serialisation system.

**T61 Integrated 360 Mark & Verify:** These systems are suitable for the inspection of round products such as bottles and vials up to a maximum product height of 230 mm and width from 6 to 110 mm. Systems use six image sensors to capture a full 360° view of the product. The inspection head can be installed over conveyors, into new equipment or on a standalone frame with minimal space requirements. Moreover, they can be easily integrated with existing printers to deliver presence, quality and reference checks. Capable of throughputs up to 500 ppm, these solutions also meet GMP requirements and are upgradeable to a serialisation system.

**PCE Line Manager — Mark & Verify:** This pre-installed software package provides comprehensive quality control management when used with Mettler-Toledo Mark & Verify systems. The solution manages presence, quality and reference checks, with the capability for multiple inspection options (for example, code, label, blister and text inspections). For a future-proof solution, it can be upgraded to PLM Serialization or PLM Aggregation when required, giving users a familiar intuitive software interface capable of performing track and trace requirements.

In addition to the Mark & Verify systems, a new manual multi-aggregation system is now available, enabling the aggregation of serialised packages to cases and pallets.

**T16 Manual Multi-Aggregation:** These systems include an automatically focusing high-resolution camera and advanced software algorithms that capture and verify product codes on serialised cartons and add them to the aggregation hierarchy with a single click. With a high-resolution camera, the T16 offers a wide field of view (600x400 mm) and detailed imaging capabilities to help capture each package code. The camera can also inspect label artwork for additional quality control.

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There are many boxes to tick when it comes to flooring, drainage, coving, hobs and ancillary products in the food and beverage manufacturing industry. Compliance to food safety is vital, but no more so than employee safety.

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## CONTACT

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## Making future foods tastier

Imagine beaming your favourite treat with X-rays to map out exactly what makes it so delicious. Then, picture being able to transfer some of those magnificent qualities and tastes to healthier, more sustainable products.

Such a fantasy could become reality if the University of Copenhagen's Small Angle X-ray Scattering (SAXS) method is used. The method could be used to optimise foodstuffs and help us produce ever-tastier and more sustainable food in the future.

By using X-rays, SAXS makes it possible to study food at the nanolevel, where a nanometre equals one millionth of a millimetre.

SAXS has yet to be widely deployed for food research, but the University of Copenhagen's Department of Food Science is working on the method and has acquired a Nano-inXider instrument that uses X-ray radiation to examine foodstuffs, among other things.

The method has great potential in relation to the foods of the future, said Jacob Kirkensgaard, an associate professor at the University of Copenhagen's Department of Food Science, as well as at the Niels Bohr Institute. Kirkensgaard uses SAXS equipment in his research, where he collaborates with the Department of Pharmacy and Lund University.

"SAXS can be used to optimise the development of foodstuffs in relation to their taste, texture and nutritional content. For example, when we look at the structure and function of foods at the nano level, we could improve their design so that they break down in such a way that as many nutrients as possible are absorbed. In this way, we can help prevent obesity and improve health," he said.

### Plant-based foods of the future

SAXS can also be used to make our foods more sustainable, said Professor Lilia Arhné of the University of Copenhagen's Department of Food Science.

Together with Jacob Kirkensgaard, she used the SAXS method to study how milk proteins behave in various sustainable processing methods.

"Our knowledge of how milk components give a special taste, mouthfeel and texture can be used for research into plant-based proteins. Because, if we can map out exactly what it is that makes milk nourish us, feel soft in the mouth and taste sweet and salty, we could copy those properties into new plant-based products that are easier on our climate, which would help get more people to consume them," she explained.

The two researchers have already met with great interest from Danish industry in relation to how the SAXS method can make it easier to produce tasty plant proteins.

"Recently, we met with a range of large Danish food producers and ingredient suppliers. They are particularly curious about how they can make delicious plant-based foods, without compromising taste and structure," Kirkensgaard said.

He underscores that the development of new sustainable and innovative foodstuffs depends on our being able to understand and analyse the structure of individual products.

"As such, the University of Copenhagen's commitment to the SAXS method is interesting. We certainly hope that industry embraces it," Kirkensgaard concluded.



## How the SAXS method works

SAXS stands for 'small angle X-ray scattering'. The method uses X-rays to examine materials on a nanometre scale (ie, 1–1000 nm).

The method works by emitting lightwaves into, for example, a protein-based food, where they interact with electrons in the sample. Some of these lightwaves are absorbed, others shine through and still others affect the molecules. The lightwaves are scattered in new directions and the pattern they form is then analysed by researchers. This provides insight into the structural properties of a given food.

The method differs from microscopy in that samples need not be fixed while examining them. Proteins, for example, can be examined while being heated. This is an advantage as most foods require processing, where the structural organisation of their constituents continuously changes throughout processing.

*The Nano-inXider machine that resides in Department of Food Science at University of Copenhagen. Photo: Jacob Kirkensgaard*



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### Ultrasonic flowmeter

The KATflow 230 is easily portable but incorporates an advanced specification for situations which require comprehensive measurement features coupled with easy operation. The flowmeter has two measurement channels, which allow it to monitor two pipes simultaneously or to improve accuracy in non-ideal conditions. The unit can also be supplied with a variety of options to meet the most diverse application requirements.

With a choice of 4–20 mA, relay and open-collector outputs available, the KATflow 230 can be used as a temporary replacement for existing inline flowmeters when calibration is due. Moreover, the inclusion of PT100 temperature inputs enables the instrument to provide either temperature-compensated flow data or full energy measurement. This functionality can be further enhanced by using the expansion capability which permits the flowmeter to perform dual-channel heat quantity measurements or to integrate alternative output options such as Modbus.

The unit has up to 100,000 measurements in the data logger and software for sampling and data transfer.

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## Sugar application library

ABB has released ABB Ability System 800xA Sugar Library, the newest version of its sugar application library, with new functionalities to act as a control engineering inventory for sugar manufacturing.

This release has a range of new templates for sugar process applications in the cane sugar and sugar beet industries. The library fulfils process area requirements such as raw material handling, purification, crystallisation and sugar handling. Also introduced in this version is the ability to fulfil evaporation and filtration needs.

The library is built on knowledge gained through collaboration between equipment suppliers and sugar manufacturers, which means it operates in an up-to-date and advanced manner.

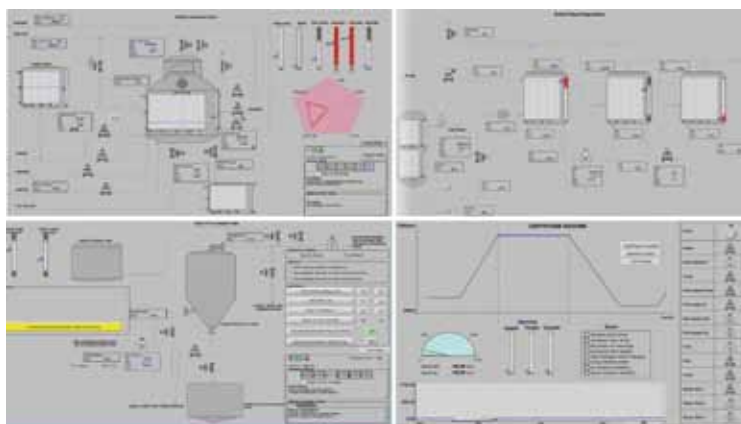
A human-machine interface has been designed to allow for the fast detection and resolution of process disturbances. This means that maintenance teams can quickly obtain the information needed due to the visual display of process tracking and trends.

The library features a steam economy mode to ensure that only the necessary amount of steam is generated during the evaporation phase. This steam is subsequently collected and then reused for the crystallisation phase, thereby reducing energy and production costs.

Sugar manufacturers can make use of premade templates for control schemes that cover vacuum pans and Brix control as well as other critical process areas such as purification, evaporation and raw material handling. Efficient boil up curves with customisable algorithms are also included. The result is that producers are able to gain improved control for steam economy, with better shape and homogeneity of their sugar crystals.

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## CASE STUDY

### Plant to process plant-based beverages

GEA is building a new production plant for producing oat, rice and soy bases for beverages for Laiterie de Saint-Denis-de-l'Hôtel (LSDH), a French manufacturer of liquid food and vegetable products. GEA will also supply a pilot plant for product development.

All process steps, from the raw material intake of grains and flour to inline standardisation, will be incorporated into the plant, which is scheduled for completion mid-2022.

The new plant, which is being built at the company's headquarters in Saint-Denis-de-l'Hôtel, is part of a EUR300 million (AUD470 million) investment program to modernise LSDH's production infrastructure.

For the first time, LSDH will be able to extract the oat, rice and soy concentrates on its own production line.

The turnkey plant for continuous extraction entails combining processing technologies, such as soaking, milling, separation through decanting, enzyme deactivation, starch hydrolysis, blending, homogenisation and pasteurisation, with the engineering expertise required to plan, automate and operate the plant.



Images supplied by GEA.

Heinz-Jürgen Kroner, who is responsible for liquid and filling technologies at GEA, commented on the order's significance.

"GEA regards plant-based applications as a strategic growth area, thanks not only to rising global demand for these products, but also to our technology portfolio and comprehensive project experience. As a result, we can support our clients throughout the entire process, right up to providing services once production gets underway."

With the new plant, LSDH will be able to produce 14 tons of soy and cereal concentrate per hour.

#### Economic stimulus program in France

The project is associated with a European protein research centre and subsidised under a national economic stimulus program.

In response to the modern health- and sustainability-conscious food culture, strictly plant-based products made from soy and cereals in the form of beverages, cottage cheese, spreads and other convenience foods are making inroads into French kitchens. The country's sales of products in this category increased by 12% to 32 million L in 2020. This demand is fuelling France's efforts to promote the production of vegetable proteins found in cereals, pulses and soybeans at a national level. To address consumer criticism directed at soy production conditions and reduce reliance on foreign soy imports, the French government has launched an investment program for the regional cultivation of this crop. As part of this initiative, LSDH is working to establish the shortest possible supply chains for high-quality regional products. With the new extraction facility as well as the pilot plant for processing other cereal-, nut- and legume-based beverages, GEA is supporting LSDH in this endeavour.

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### Compact USB thermal imager

The MicroEpsilon TIM160S is a miniature-sized industrial thermal imaging camera with good thermal sensitivity of 0.08K. It can measure the temperature ranging from 100 to 1500°C with a frame rate of 120 Hz. This compact thermal imaging camera also comes with interchangeable lenses designed to allow for accurate measurement at every measurement distance.

Due to its lightweight design and robust construction with IP67 enclosure, this thermal imaging camera can be suitable for quality assurance and product testing in the food manufacturing environment. It can be easily installed in the production line and powered simply by USB connection. Data transfer is also done via this USB interface and visualised in a TIM Connect software with software development kit.

Users can view the real-time thermal image in the software in either video or snapshot mode. The control and set-up of the experiment is done through the software in the PC. This TIM Connect software is also loaded with functions and modes to allow for detailed analysis of the transient thermodynamic process. The sensor offers signal output and alarm output via the external process interface which can be integrated into the PLC.

**Bestech Australia Pty Ltd**  
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### Compressed air filters

Kaeser Compressors has launched its latest generation of compressed air filters that provide efficient filtration for flow rates from 0.6 to 32.0 m³/min. The filters are also designed to create reductions in costs and CO<sub>2</sub> emissions.

The product is claimed to deliver a 50% lower pressure loss in comparison to other filters on the market — and this is a value that remains constant throughout the entire service life of the filter element.

The units use filter elements with flow-optimised element heads. The filter inlet is offset towards the air inlet. This increases the flow cross-section at the air discharge side and contributes to good filter efficiency with minimal pressure loss. Generously dimensioned connection flanges furthermore help to keep pressure losses to a minimum.

High filtering efficiency with minimal pressure loss is also achieved thanks to the element head of the filter units which is optimised for best possible air flow. Its tapered internal structure channels the compressed air towards the centre of the element interior for an even charging of the filter media.

Kaeser activated carbon filters with high-efficiency carbon matting are designed to prevent channelling whilst also ensuring reduced differential pressure.

The filters are available in four different filter grades and twelve housing sizes.

**Kaeser Compressors Australia**  
[au.kaeser.com](http://au.kaeser.com)



### Vertical X-ray inspection system

Mettler-Toledo Product Inspection has introduced the X34C vertical X-ray system, which has been designed to detect contaminants in small, individual packaged products at high speeds. Snack and confectionery producers specifically will be able to benefit from the sensitivity that the system offers.

It has a length of 700 mm including the integrated reject so it is compact enough to be installed in tight production lines where space is a premium. Its high-speed capabilities mean that it can operate at 120 m/min, allowing the X-ray process to keep pace with other operations such as wrapping and packing.

The focal distance of the 0.4 mm diode detector and the 100 W Optimum Power Generator combine to result in a high probability of detecting small contaminants all while keeping the false positive rate low. The components are automatically optimised for different applications and thus do not always have to run at full power, reducing power use.

The system also offers operating software designed for ease of use as well as an automated set-up process to reduce the need for operator training. These features can boost production uptime and product safety. Convenient maintenance access is provided via the front.

The product has been designed to work in a range of operating conditions and is by default rated at IP55, with IP65 an optional configuration. It can be actively cooled with either an air-conditioning function or using fans when in cooler environments.

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## CASE STUDY

### Food manufacturer seeks solution for cleaning batch freezing tanks



A food manufacturer who works with batch freezing tanks was looking for an easier and more efficient cleaning system. With two areas to clean — the tank itself and the filling point at the bottom of the tank — the manufacturer was looking for a way to simultaneously clean both areas. As a food manufacturer, any new cleaning solution needed to achieve 3-A certification.

An innovative, custom-designed solution was found using two PNR Italia washing heads and lance with a single water supply.

The cleaning process now occurs in two stages. Stage one uses a combination of water and detergent while stage two is a rinsing cycle using water only.

#### How it works

The two washing heads have been mounted onto a lance to create a single-feed washing device. One washing head is fixed and designed to clean the body of the tank. The second washing head rotates, releasing jets of water at the tank's filling point for an aggressive clean.

The rotating washing head is manufactured from stainless steel and mounted on two rows of ball-bearings. This makes operation possible in any position.

In addition, the entire cleaning lance and two washing heads have been carefully machined, deburred, cleaned and polished



Image credit: PNR Italy

to a precisely defined smoothness to avoid contamination from bacterial growth.

Now the food manufacturer has a robust and portable solution for cleaning all of its freezing tanks to the required food manufacturing standards.

This is just one of many examples where the team at Tecpro Australia has assisted users with tailored solutions designed to streamline their operations.

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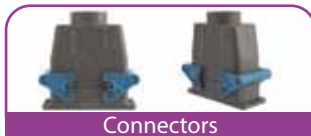
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## Automated bin washer

Suitable for the food process industry, the Walter Euro Bin Washer is designed for space-saving, keeping production lines flowing and reducing congestion on the work floor.

200 L Euro Bins weigh around 43 kg, so, unless an automated cleaning solution is in use, they require back-bending labour and time to wash them thoroughly inside and out.

Walter manufactures high-quality cleaning systems that are designed to be economical and environmentally friendly. Taking just five minutes on a cleaning cycle for a 200 L Euro Bin wash, the push button controls can automate bin-cleaning.

The system's pivot arm raises each 43 kg stainless steel bin in front of the pressure cleaner head for a comprehensive clean. The lift mechanism can prevent dents and damage to bins on raising and lowering.

Users have the option to use a cleaning sanitiser in the pressure wash for an optimum cleanse and rinse. The unit connects directly to wastewater and has a removable filter insert.

With a two-minute bin rinse cycle and a five-minute cleaning cycle, users of the system can clean up to thirty 200 L Euro Bins an hour. This makes it suitable for high-production facilities.

While the 200 L Euro Bin is automatically raised, tipped and pressure washed on the inside, users can clean the exterior, underside and wheels quickly using the high pressure spray nozzle.

The system is designed to optimise the cleaning process by using bin-cleaning in rotation, so there's less need to have idle bins occupying valuable floor space.

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### Electric spiral oven

JBT has launched an electric version of its Stein TwinDrum Spiral Oven, which is designed for easier maintenance and the use of renewable energy sources.

The oven features a two-zone spiral system that can provide a uniform temperature and good roasting capabilities.

The hot air in the oven is uniformly distributed across all tiers

so that products are roasted evenly, and the oven's design is claimed to allow for greater processing yield compared to existing ovens.

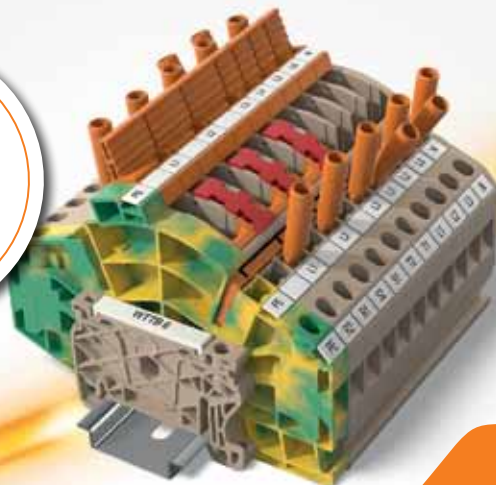
Until now, the TwinDrum was heated by an oil-based thermal fluid system that made use of either natural gas or electricity to heat air inside the oven. The electric TwinDrum only requires a single heat transformation and therefore doesn't require a separate boiler and piping. The electric heater is fixed in the machine, so it can be easily accessed for cleaning and maintenance. It also gives users the ability to utilise renewable sources of energy.

Additional features include proportional control for the heating elements to achieve more accurate temperature control, and built-in connectivity with JBT's (Internet of Things) platform iOPS, which enables the monitoring of temperature fluctuations and energy consumption across systems, meaning areas where energy savings can be made can be easily identified.

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## Flexible hose assembly

AFLEX FaBLINE flexible hose assemblies offer a versatile hose solution that can be used throughout many different production

processes. The hoses can carry up to twice the flow of similarly sized convoluted delivery hoses meaning that they can provide a faster, more efficient processing option.

The product's low-friction, smooth bore construction means that it can dispense viscous fluids to precise levels, whereas rubber hoses may become blocked or even burst when tasked with this same application. The high flow rates offered also mean that the load and unload times will be shorter, reducing the cost of processing.

The product is offered in either EPDM or platinum cured silicone rubber and can have a range of end fittings attached to it. The hoses' conductive liners mean that static build-up can be prevented during the steam or air-drying processes. The PTFE liner tubes are chemically resistant to CIP, SIP and autoclave conditions to allow for efficient and complete sterilisation.

The product has a long service life, which means operating time can be maximised and waste is minimised.

**Watson-Marlow Fluid Technology Group**

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## Detector technologies for poultry processors



New detector technologies from Eagle Product Inspection enable poultry processors to find bone fragments as small as 0.6 mm.

In the poultry industry, minute bone fragments pose constant challenges and risks for recalls and even consumer injuries. Such tiny pieces of calcified bone can be easily overlooked in chicken products bound for human consumption.

To help processors prevent such issues

and protect their products and brands, Eagle Product Inspection has developed a next-generation detector technology, Performance X-ray Technology (PXT), that captures detailed data about a product.

PXT can identify bone fragments down to 1 mm in size in fresh, frozen and refrigerated poultry products as well as in bulk flow and retail poultry portions.

When paired with the RMI 400 X-ray machine, the technology has been shown to detect bones as small as 0.6 mm.

High-resolution product images are processed instantly through the use of Eagle's latest SimulTask PRO image analysis software.

In addition to helping solve problems in the poultry industry, Eagle's PXT detector technologies are now available in several Eagle X-ray machines for general food applications.

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## Refrigerant dryers

The refrigerant dryers from BOGE's DS-2 series are designed to be more environmentally friendly than their predecessors. They come with refrigerant R 513 A as standard, which has lower global warming potential than the refrigerants previously used.

The series is also designed to provide economic advantages as the smart control adjusts to the actual demand and reduces power consumption at a constant pressure dewpoint.

For example, the smart control automatically switches off the cooling compressor at partial load as soon as the required dewpoint has been reached. The cooling temperature is stored in the heat exchanger. This cold reserve cools the incoming compressed air until the dewpoint rises again. The cooling compressor only starts up again to maintain the required temperature level, and thus only begins consuming energy at this point. This principle allows energy savings of up to 79% compared to a dryer in continuous operation. The new frequency-controlled fan is designed to ensure a stable condensation pressure and reduce energy consumption by up to 25%. Furthermore, the patented design of the heat exchanger, combined with low differential pressures and a low refrigerant requirement, results in lower power consumption. The high-efficiency components reduce pressure losses to a minimum, which prevents over-compression.

With a GWP (global warming potential) of 573, the new devices exceed the requirements of F-Gas Regulation EU 517/2014 which stipulate a significant reduction in emissions of fluorinated greenhouse gases (F-gases) by 2030 to protect the environment. Furthermore, the models of the DS series require a small amount of refrigerant to begin with.

Thanks to the hermetically sealed refrigerant circuit and a CO<sub>2</sub>-equivalent less than 10 t, the entire series is exempt from the leak tightness test stipulated in the F-Gas Regulation. So users can save the costs of testing by certified refrigeration technicians.

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## Reconfigurable work platform

The LOBO System is a reconfigurable work platform that combines the flexibility and strength of traditional scaffolding with the simplicity and mobility of tower systems. This combination provides a versatile access system that is suitable for the food industry.

The system uses a patented clamp, which can be reconfigured and adjusted, without the need for tools. The components are modular so it is simple and easy to use. Its electroplated steel legs and components can be flat packed when not in use and transported and stored easily.

Installed safely around, under or above machinery or conveyors, handrails can be fitted in seconds at any point in the system.

It is designed to be scalable, adaptable and adjustable to meet ongoing and changing requirements.

The LOBO Towerstore also provides a secure way to store the LOBO components.

**Lobo Systems Ltd**

[www.lobosystems.com](http://www.lobosystems.com)





## Non-contacting radar level transmitter

To meet the need for highly accurate level measurement in hygienic applications, Emerson has developed the Rosemount 1408H Level Transmitter, which the company says is the world's first non-contacting radar device designed specifically for the food and beverage industry.

Non-contacting radar is a suitable level measurement technology for applications that require stringent hygienic facilities and equipment. It has a top-down installation that reduces the risk of product loss through leakage, and it is unaffected by process conditions such as density, viscosity, temperature and pH. The compact form of the Rosemount 1408H makes it a suitable solution for the small tanks and space-constrained skids commonly used in food and beverage production. The hygienic antenna is flush with the process connection in order to facilitate the removal of process residue during clean-in-place and sterilise-in-place processes.



The Rosemount 1408H uses 80 GHz frequency modulated continuous wave technology on a single electronic chip with embedded smart algorithms. This enables stronger radar beam focusing, so that internal tank obstructions such as agitators can be avoided and greater measurement accuracy achieved. Fast sweep technology also means collecting up to 40 times more information, increasing accuracy. The technology also enables measurements all the way to the top of the tank by eliminating radar dead zones.

The Rosemount 1408H is also said to be the first non-contacting radar transmitter with connectivity via the IO-Link communication protocol, making it easy to integrate with any automation system. The transmitter provides conventional analog 4–20 mA, switch outputs and digital high-speed communication.

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## Multistage centrifugal pump range

GEA's Hilge CONTRA III multistage centrifugal pump is designed according to hygienic design guidelines, has electropolished surfaces and high-quality sealing materials, and is suitable for use in dairy, beverage and food industries, in addition to pharmaceutical ones. Its increased drive power, over the smaller models, means its maximum flow rate is 100 m<sup>3</sup>/h.

The product's components are forged, deep-drawn and milled from 316L grade stainless steel and are designed to be hygienic and easy to maintain. Clean-in-place and sanitising cycle times can be reduced, leading to savings in water, cleaning agents and energy. Sterilisation-in-place pumps are also featured. The pump is able to remain in the pipeline for a motor change. Pipes are easy to clean, with a cavitation-free design, with a surface roughness from Ra ≤0.8 µm to Ra ≤0.4 µm.

A large number of configurations are viable, with both horizontal and vertical installations possible. High efficiency is achieved due to the precise operating point design and the number of impeller geometries available. For corrosive atmospheres, the product is available in the Adapta variant, which has EC conformity approval according to ATEX Directive 2014/34/E.

For plants that run on weekends or under partial loads, the speed control feature means water can be kept continuously in motion regardless of the operating phase, thus reducing the chance of contamination. The product's frequency converters have a lower heat effect on the pumped media; less cooling is required therefore reducing energy and protecting the media.

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## CASE STUDY

### Sweet success for sugar mill's high-powered centrifuge



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A sugar producer has increased the performance of a high-powered centrifugal machine after changing the variable frequency drive (VFD) used to control the motor.

PTPN XI PG Kedawung is a major producer of sugar in Indonesia, and owns many plantations and sugar factories in the country. Recently, one of its centrifugal machines was underperforming and had become unreliable. This resulted in downtime and maintenance costs, as well as affecting the quantity and quality of the sugar product. Sumitomo Cyclo Drive Asia Pacific Pte Ltd was brought in to provide a solution.

One of seven stages in the sugar production process is the separation of the sugar crystals in the massecuite from surrounding molasses. It does this by spinning the product in the centrifuge at speeds of up to 1200 rpm using a high-powered motor.

"The problems with the existing drive were impacting on production at the sugar mill. We considered the power requirements of the motor and the intense production schedules and quickly identified the Optidrive P2 VFD as a good replacement," said Deddy Christian, Area Sales Manager at SHI Cyclo Drive Asia Pacific.

"The drive had to be robust and powerful enough for the application, while ensuring its size was compact to fit into the existing cabinet without any problems."

The drive was compact to fit into the existing cabinet without any problems. There were also energy efficiencies created as a result of installing the new drive due to the motor control produced by the VFD.

A 160 kW, 380 V, 3 PH in, 3 PH out P2 drive frame size 7 was used. Its IP55 enclosure rating meant it could more than cope in the conditions.

The Optidrive P2 high-powered drive is available in IP20, IP55 and IP66/NEMA 4X enclosures; single- and three-phase input of between 200 to 600 V, 0.75 to 250 kW and 1 to 350 HP. It supports all motor types, including IM, PM, BLDC and SynRM.

The Invertek Drives Optidrive range is designed to meet with recognised international design standards for CE (Europe), UL (USA) and CTick (Australia).

**Invertek Drives**

[www.invertek.com.au](http://www.invertek.com.au)



## Servo motor for drive system

Siemens is adding new servo motors to its Sinamics S210 single-cable servo drive system, thereby expanding its range of applications. Specifically, for use in the pharmaceutical and food industries, the company is launching the Simotics S-1FS2, a motor version with a stainless steel housing, the highest degree of protection IP67/IP69 and high-resolution 22-bit absolute multturn encoders. The servo motor

thus meets all hygienic conditions and can be used for mixing and stirring, air conditioning and ventilating, dosing and filling, as well as conveying, packaging and storing a wide variety of end products in the food and beverage sector and in the pharmaceutical industry.

The Simotics S-1FK2 servo planetary gearmotors also complement the Sinamics S210 drive system. They are used when high cycle rates need to be achieved with a lightweight and low-inertia gear design, or when inertia matching is required to move heavy loads precisely. The motors are ready mounted and as a unit available in a wide range of gear ratios and sizes, allowing them to be optimally adapted to different applications.

The Sinamics S210 servo drive system consists of a servo converter and servo motor. All motors of the servo system are connected via a single cable that combines power wires, encoder signal and brake in one line. The range of applications includes highly dynamic servo solutions such as those found in handling systems, packaging machines and machine building applications.

**Siemens Ltd**

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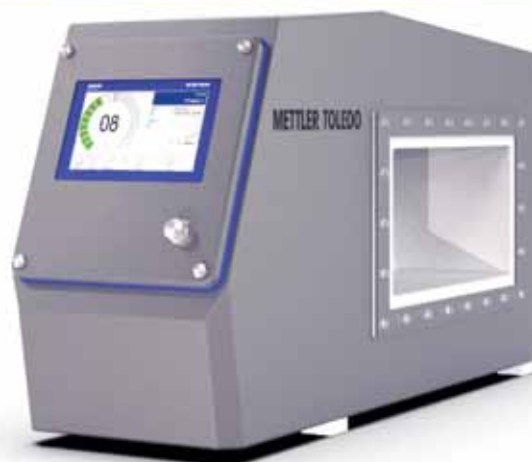
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Smart, digital inspection designed specifically for small and medium-size manufacturers

Food processors, FMCG manufacturers and co-packers have long thought that to acquire advanced metal detection capabilities they would have to spend a lot of money on a high-end system, but with the new M30 R-Series Metal Detection solutions, that is no longer the case.

The new M30 R-Series Metal Detection solutions from METTLER TOLEDO provide affordable, reliable and accurate metal detection to help you meet your compliance needs.

To find out more about the M30 R-Series Metal Detection solutions and other product inspection solutions available from METTLER TOLEDO Email [info.mtaus@mt.com](mailto:info.mtaus@mt.com), call **1300 659 761** or visit [www.mt.com/PI](http://www.mt.com/PI) for more information.



**PLUS... Learn how to choose the correct metal detection solution for your organisation, with our free guide 'Practical tips for metal detection selection'**



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**METTLER TOLEDO**

## CASE STUDY



## Bakery solutions

A bakery was using a v-belt drive system in its air handlers above their ovens, which was contributing to high energy and maintenance costs. The belt slipping resulting in decreased energy efficiency through torque loss and the v-belt required constant re-tensioning and replacement, resulting in high maintenance costs.

With the help of Gates technical experts, it was determined that the bakery could save on energy and maintenance costs by switching the v-belt drive system to a synchronous belt system. Due to the air handlers' location above the ovens, a belt with high temperature tolerance was necessary, making the PowerGrip GT4 the suitable solution.

The PowerGrip GT4 can withstand temperatures of up to 184°C (intermittently). Synchronous belt drive systems operate with positive tooth/groove engagement, which negates many of the



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## Vacuum controller

Atlas Copco has developed the HEX@ vacuum controller for industrial processes 4.0. It serves as an enhanced control centre for vacuum pumps and systems. It is designed to ensure higher vacuum performance and functionality as well as increased user empowerment across a large range of applications.

Featuring increased connectivity and system integration, it has a clean and intuitive user interface. Users access key data directly on the home screen and can access further settings and controls easily using the on-display menu. Relevant pump data is displayed quickly and the controller can be individually configured by users so that only selected values, such as discharge temperature, power consumption or inlet pressure, are displayed.

The communication options for HEX@ enabled pumps are also diverse. Users can access the unit remotely using smartphones, tablets, laptops or PC; alternatively, access can be via the onboard HMI interface or a local device connected to the machine using wired or Wi-Fi-based connections.

Users can choose to connect fully to their local network and the cloud. The device will also support other communication protocols such as Ethernet/IP, EtherCat, Profinet, Modbus TCP, Profibus and OPC UA.

The HEX@ controller is continuously collecting and processing a wide range of pump data, which can be used to evaluate performance and trends.

**Atlas Copco Compressors Australia**  
[www.atlascopco.com.au](http://www.atlascopco.com.au)





issues causing energy loss such as drive belt slip, torque loss, bending loss and friction, and this ultimately saves on energy costs. Additionally, the GT4 doesn't stretch nor does it require re-tensioning, which can save the bakery in maintenance and replacement costs.

Benefits include: increased productivity, lowered cost of ownership, reduced electrical costs, reduced day-to-day maintenance costs, sustainability and reduced carbon footprint.

### Case study 2: Bakery increases production, safety and cleanliness

In another example, a bakery that was using roller chain drives on its conveyor was not running smoothly, resulting in buns falling off the conveyor in numerous locations; this caused production safety and cleanliness concerns for the bakery.

Gates technical experts found the jumping teeth on the roller chain was to blame. The roller chain was replaced with the PowerGrip GT4, which prevented the belt from skipping.

This resulted in increased production at the bakery, as well as safety and cleanliness due to the buns no longer falling off the conveyor.

Gates Australia Pty Ltd  
www.gatesaustralia.com.au



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### Compressed air on demand

The Sigma Air Utility operator model from Kaeser Compressors provides compressed air on demand in the same way one would buy gas, electricity or water. It requires no capital investment costs and no ongoing maintenance costs.

Kaeser first analyses the end user's compressed air needs and then draws up an individual concept based on what is required. This allows Kaeser to set a price for the duration of the contract, which covers system and operating costs along with consumption of a mutually agreed base volume of compressed air.

The contract also includes an agreed surplus air charge that would be applied if consumption were to exceed that amount. Precise measurements ensure users are only charged for the volume of compressed air actually drawn from the system.

Each Sigma Air Utility compressed air system comes complete with a Sigma Air Manager 4.0 compressed air management master system. Using adaptive 3-D<sup>advanced</sup> Control, the inclusion of a Sigma Air Manager 4.0 makes air generation and treatment even more intelligent and efficient. This is designed to ensure maximum efficiency and compressed air availability while enhancing production reliability.

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## Researchers develop antimicrobial food packaging

Researchers from Nanyang Technological University (NTU) and Harvard's T.H. Chan School of Public Health have developed a form of food packaging that is claimed to be able to kill harmful microbes. It is biodegradable and could also extend the shelf life of fresh fruit by up to three days.

The packaging is made from zein, which is a protein sourced from corn. Other constituent parts are naturally sourced starches and biopolymers. When the packaging is exposed to increases in humidity or the enzymes that harmful microbes

create, its fibres release antimicrobial compounds that can keep food safe. The compounds are able to kill common bacteria such as *E. coli* and *Listeria*. The packaging is able produce the compounds over multiple exposures to bacteria.

The researchers suggest that the packaging material could be used for ready-to-eat foods, fruits and vegetables, and raw meats. As part of experiments into the properties of the material, it was used to cover strawberries, which stayed fresh for days longer than when packaged through the usual methods.

"Food safety and waste have become a major societal challenge of our times with immense public health and economic impact which compromises food security. One of the most efficient ways to enhance food safety and reduce spoilage and waste is to develop efficient biodegradable non-toxic food packaging materials," said Professor Philip Demokritou, Adjunct Professor of Environmental Health at Harvard T.H. Chan School. Dr Demokritou is also Director at the Center for Nanotechnology and Nanotoxicology at the Harvard School of Public Health, and Co-director of the NTU-Harvard Initiative on Sustainable Nanotechnology.

The paper outlining the packaging was published in *ACS Applied Materials & Interfaces* and is available here. The packaging was developed as part of NTU's push to produce sustainable forms of food technology.

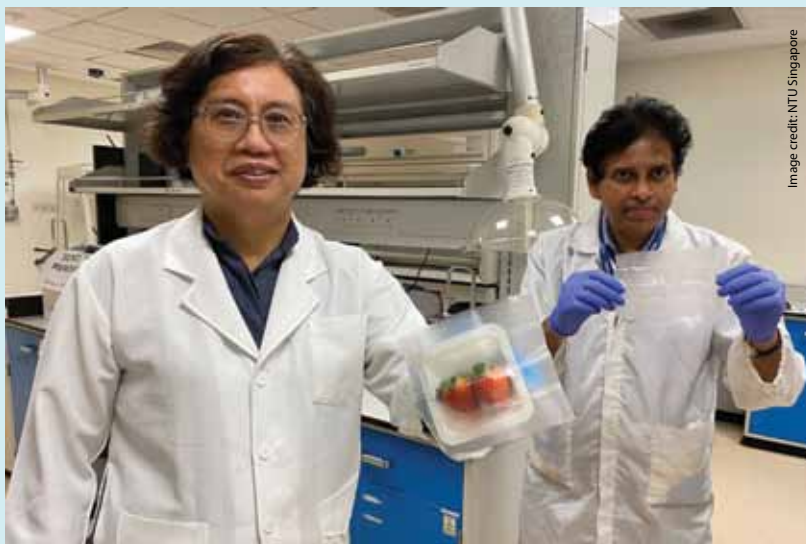


Image credit: NTU Singapore



## Hot-melt adhesive for packaging

The Technomelt Supra 90 hot melt adhesive is suitable for packaging products in the food and beverage (F&B) industry. The adhesive's high molecular weight is designed to reduce the chances of contamination and enhance food safety. The hot melt solution also offers benefits such as high bond strength, ease of application and quick set time.

It uses metallocene technology that is designed as a better alternative than ethylene-vinyl acetate (EVA). Solutions that use EVAs tend to have limited thermal stability and are prone to char build-up, which creates a need to replace parts of the application system. In contrast, Technomelt Supra 90 avoids char build-up, which is claimed to result in better performance and less downtime.

For the F&B sector in Australia and New Zealand, the product is used for carton closing and sealing. It has a low ability to migrate between layers of packaging due to its high molecular weight, thus reducing the chances of contamination entering the packaged product. Any

tampering with the carton packaging is also immediately visible, thereby discouraging unauthorised openings and improving food safety.

**Henkel Australia Pty Ltd**  
[www.loctite.com.au](http://www.loctite.com.au)



# PhageGuard Listex — Innovative Listeria Treatment

## Listeria Detection

So what is it about listeria that causes so many problems compared to other food poisoning bacteria? The worrying fact is that listeria is a hardy cold-loving microorganism that can multiply rapidly at refrigerated temperatures in most foods.

With a growing market for ready-to-eat (RTE) foods and the relentless push to extend shelf life, any relaxation in hygiene control can increase the risk. In other words, a single listeria cell can easily multiply and reach the infective dose levels to cause listeriosis when ingesting food contaminated with listeria. This can occur within a few days.

For a food manufacturer, if the food product has a detection and is on hold and destroyed before it's released it's a minor loss. If not, it becomes a major problem and there is a possibility of a recall. That's what you don't want.

So how can the risk of listeria cross contamination be prevented?

The most effective way to prevent listeria contamination is to control it, by providing all employees with proper training on contamination prevention, cleaning, and sanitizing procedures.

Listeria often thrives on dirty floors, drains, cleaning and washing areas, food contact equipment, walls, ceilings, compressed air and HVAC systems, permeable surfaces, open seams, cracks, crevices, and hard-to-reach or hard-to-clean parts of equipment. Even with the best cleaning and sanitation program in place — listeria can still survive. That's why you also need a robust and regular environmental listeria monitoring program to identify potential hotspots. This targeting allows extra controls to be added and make sure listeria does not cross contaminate other cleaned areas.



Is there another way; a safer solution that you can just add to the product that targets and destroys listeria?

## Phageguard Listex

FMCG Industry Solution have partnered with Microcos, a Dutch-based company in the field of targeted antibacterial technology to offer PhageGuard Listex. It is a culture of bacteriophages (or phages for short) that effectively eliminates *Listeria monocytogenes*.

Found naturally in the environment, phages offers its own best solutions, as exemplified by the ability of phages to eliminate many pathogenic bacteria. PhageGuard Listex goes further as it targets and destroys *Listeria monocytogenes*.

Current food safety solutions that are being used include chemically based preservatives, which are added to the product to inhibit listeria. According to Dirk de Meester, Director of Business Development at Microcos: "Better than suppressing the bacteria, phages targets and kills listeria cells."

PhageGuard is different in that it can be applied in the environment and even food

products, without affecting taste, odour or texture. It's also safe and has been approved by Food Standards Australia New Zealand (FSANZ) as a processing aid.

## Why use PhageGuard Listex?

Even with the best manufacturing practices in place, gaps in hygiene control can still occur as listeria is commonly found in the environment — especially drains.

There is a likely risk listeria may cross contaminate and end up in the products, particularly for RTE foods.

PhageGuard Listex offers that extra insurance; that peace of mind knowing that even with the best hygiene controls and practices in place, low-level listeria cross contaminations are eliminated during and after the food is packed. Imagine a vaccine-like treatment for your food product against listeria!

It can also eliminate listeria in the environment such as direct food contact surfaces and even floors and drains.

## How is it applied?

PhageGuard Listex is applied onto the food via spraying, misting or in a bath solution such as brine which can be easily incorporated into the food producer's production process.

For the environment it can be sprayed directly onto food contact surfaces or in the processing environment. It's that simple.

For more information, visit <https://www.fmcgis.com.au/product-category/hygiene-control/phageguard/>. Alternatively, contact us on (02) 9540 2288 or [info@fmcgis.com.au](mailto:info@fmcgis.com.au).



FMCG Industry Solutions Pty Ltd  
[www.fmcgis.com.au](http://www.fmcgis.com.au)

## CASE STUDY

### Finding the right sustainable box for Ferrero Rocher

Ferrero has collaborated with Milliken & Company to find the right material for the iconic Ferrero Rocher transparent boxes.

Milliken custom-designed more than 20 formulations to find the right box made from polypropylene (PP) — a clear, lightweight and highly recyclable material.

During the course of the project, Milliken was able to demonstrate measurable performance improvement including lower resource consumption and reduced greenhouse gas emissions.

“This project with Ferrero is a great example of how close collaboration can help to deliver value-added solutions,” said Ruben Subira, Regional Market Manager Plastic Additives.



Photo ©2021 Ferrero

## CASE STUDY

### Microwave packaging concept with added spice

Danish Kildespring has launched a new Nature's Kitchen potato range in microwavable bags with added value.

Designed to be prepared in only eight minutes, the potatoes are packed in the latest SchurStar Zip-Pop Bag, which allows the potatoes and spiced butter to be placed in two separate compartments. During preparation, the steam from the potatoes opens the compartments and the butter in the top melts down over the potatoes.

When potatoes are prepared traditionally, valuable minerals and vitamins are lost with the boiling water, but this method is designed to retain the nutrients in the bag.

Kildespring is a team of enthusiastic people whose focus is on offering Danish consumers honest products. Each product is produced with the shortest possible distance between field and stove — without added preservatives, e-numbers, or any other irrelevant elements.

“We were in the process of replacing the glass jars for our ready meals by a lighter solution, when we were introduced to the SchurStar Concept,” said Peer Slynge, Managing Director of Kildespring.



“On top of that, we faced issues in the packing process for our ready-to-serve sauces, again and again. But Schur's presentation of their packaging machine made the decision easy. The packaging concept fits our production set-up perfectly. And as we need to pack a wide range of ready meals and convenience food, the versatility of the machine will be a great plus for us.”

Kildespring is packing root vegetables, ready meals and sauces on its SchurStar machine — manually, semi- or fully automatically. Switching between filling methods, bag formats and product types takes place within a few minutes. The packaging machine can be combined with diverse weighing, filling and process equipment, as well as equipment for labelling and marking.

Kildespring now has two new varieties in the pipeline, one with a root vegetable mix and another with sweet potatoes.

The microwavable Zip-Pop bag is now available in Australia.



Schur Star Systems  
[www.schur.com](http://www.schur.com)



## Powder packaging for food, dairy and pet food producers

GEA has launched the SmartFil M1 system, which has been designed to deal with an assortment of powdered materials. With over 100 possible variants, the system can package a range of products, from dry and fine powders to coarse, granular material.

These powdered materials can be packed into open-mouth bags, boxes and drums of varying sizes and the closure types include heat sealing with glue reactivation, sewn-closures and impulse sealing. The system is capable of filling 120 bags/h or 3 t/h for products of a 25 kg size.

The system has been designed to encapsulate a range of possible products to package. For instance, it can consistently package foodstuffs into 25 kg packages thanks to the controlled auger metering system. It can fill packages with coffee and other freeze-dried products that are inherently fragile by using a vibratory feeding solution, which prevents product breakdown. The system can also be used by small-scale dairy plants to hygienically package goods.

Finally, the system has been certified for its hygiene standards and has been designed for easy cleaning, with components that have been optimally located for convenient maintenance.

**GEA Group**

[www.geagroup.com.au](http://www.geagroup.com.au)



## Recyclable retort pouch

Mondri has launched the RetortPouch Recyclable — a mono-material retort pouch that is fully recyclable and suitable for food and wet pet food packaging solutions.

Moist or semi-moist foods that are heat-treated in steam or hot water retort vessels to achieve commercial sterilisation for shelf-stable foods require retort packaging. The aluminium typically used in most solutions has been substituted with a high-barrier film that keeps temperatures high and maintains short processing times during the retort process.

In addition to being fully recyclable, the packaging also provides good shelf life for a mono-material solution and is designed to reduce potential food waste.

**Mondri Group**

[www.mondigroup.com/en/home/](http://www.mondigroup.com/en/home/)

## Listeria Detected in 25g

To minimise this risk FMCG Industry Solutions is now offering a new unique anti-listeria product called **PhageGuard Listex**.

Contact us now for more information how this amazing product can stop the spread of listeria in the environment and Ready to Eat (RTE) Foods.



**PhageGuard Listex**  
Improved formula,  
facilitating ease of production

**PhageGuard**  
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## Life cycle assessment (LCA) can guide sustainable packaging design

*Life Cycle Assessment, Sustainable Packaging Design, Nerida Kelton, Australian Institute of Packaging*

To optimise circular and sustainable design, packaging technologists need to look at the potential environmental impacts of the product across its lifetime.

Environmental impact categories can include carbon/greenhouse gas emissions, water depletion, mineral consumption, land transformation, eutrophication, toxicity and many more, and can be undertaken through a life cycle assessment (LCA).

This assessment can look holistically at environmental impacts of products, and associated packaging, from raw materials, to production, through to household, and then at end-of-life.

Now more than ever science-driven information, which is derived from an LCA, is such an important step in ensuring that your product and packaging have the lowest environmental impact wherever possible across the entire value chain.

When used in the packaging industry LCA can provide accurate data that can guide a business in the choice of materials, pack shapes and sizes, but also when looking to move to a 'more sustainable' material or pack. The recyclability of the packaging, the ability to re-use and refill the packaging and meeting global and regional packaging targets must also be considered and can be checked as a design choice with LCA.

Using LCA within this decision-making process ensures that the business has all available datasets in front of them to make informed choices. LCA can eliminate second-guessing and assumptions about sustainable packaging choices and can provide concrete information that crosses all areas of the supply chain.

### Start with a life cycle map

Before you undertake an LCA establish a cross-departmental and cross-supply chain team to create a life cycle map of your product and packaging.



The life cycle map needs to provide a clear and concise representation of the steps required to source and produce the product-packaging system, the distribution system, as well as its use, disposal and recovery. Determining inputs and outputs to life cycle stages on the map, such as energy, materials and emissions, should then start to reveal blind spots and impact categories or priority areas to focus on. The map will also help to identify areas of improvement, challenges and unexpected consequences of possible product or packaging choices.

### Streamlined LCA or full LCA

Once you have established your life cycle map the next step is to decide whether you would like to undertake a streamlined LCA or a full LCA on the product. To do this you need to define the goal and scope of the LCA. You need to determine the purpose of the study ie, internal improvement or public claims, the system boundaries to be set, the inventory to be collected, the impact assessment to be applied and the interpretation method that will enable the business to arrive at conclusions and recommendations.

Streamlined LCA is ideally suited when a business is looking to better understand the blind spots and any major areas



of focus within the life cycle of a product, or to make internal decisions about something to change in the life cycle. Streamlined LCAs can produce results quickly, are ideal for SMEs and can invaluablely assist to meet global and regional packaging targets. They are also a great way to determine if a full LCA is required thereafter.

Full life cycle assessments are comprehensive reports that meet international ISO 14040/14044 standards for life cycle assessment. The data is permitted to be used for internal assessment purposes and within the public domain when undertaking either a standalone assessment or when comparing more than one product or packaging system. If publicly disseminating a study, the ISO standards suggest peer review, which is often conducted for companies going down this road by an external panel or party. An example of a full LCA is a comparative study called 'Beverage and Food Packaging in Australia and New Zealand' that was recently commissioned by Tetra Pak Oceania.

### Benefits of life cycle assessment

There are so many benefits of embedding LCAs into all areas of the business including lowering environmental impacts, optimising packaging material choices, improving the sustainability of a product and its whole-of-life and improving your triple bottom line. Life cycle assessment can also contribute to making more informed decisions when it comes to sustainability and carbon footprinting. These decisions are made easier when a packaging technologist embeds life cycle assessment into packaging design.

When embarking on the use of an LCA it is important to note that the process is not a silver bullet. An LCA should be seen as an investigative and comparative process that can identify areas of improvement within the whole-of-life of your product and packaging. An LCA is quite simply an additional tool in the tool belt to ensure that decisions are well-informed, and science-driven.

As Dr Karli Verghese FAIP said in her book *Packaging for Sustainability*, "Life Cycle Assessment (LCA) can produce convincing evidence that intuition is no longer enough."

Australian Institute of Packaging  
www.aipack.com.au

## CASE STUDY

### Building a better box for Oatly



Oatly, which produces oat-based drinks, has worked with packaging company BillerudKorsnäs to increase its sustainability. With Oatly opening its first South-East Asian production facility in Singapore, it wanted a secondary packaging option that was both able to withstand the climate of the region but also to guarantee the high sustainability of its products. Thus, the two companies worked together to optimise and maximise the efficiency of Oatly's packaging.

South-East Asia's humid climate requires hardier packaging, so they needed to use primary, not recycled, fibres for the box. These boxes are sturdier and thus better able to withstand the heat and high humidity of the region, whereas recycled material, while more sustainable, would not be strong enough to operate as effectively. In order to compensate for this, the primary fibres are able to be sourced from responsibly managed forests in order to boost sustainability and the boxes are fully recyclable too so the material in their construction is reused subsequently.

The packaging was made more efficient too, through the cutting out of unnecessary material and optimisation of packaging design. Reducing the material in a box might usually also see a reduction in its practicality but as the primary fibres in the packaging are stronger, ultimately 35% less material was used compared to conventional offerings. Careful use of water was considered too, as paper and cardboard typically use a fair amount. With the process implemented by BillerudKorsnäs water use was reduced from 24,000 m<sup>3</sup> a year to 10,000 m<sup>3</sup>.

"We always look to find solutions to make our production chain more sustainable, transparent and resource-efficient. Therefore it's great that we are able to work with BillerudKorsnäs to find this solution to lower the climate impact and optimise the design of our Asian packaging," said Jenny Belsö Trojer, Global Cat Manager Packaging Material at Oatly.

BillerudKorsnäs  
www.billerudkorsnas.com

## CASE STUDY

### The importance of wine closure selection



Jet Technologies works closely with global wine solution leader Vinventions, whose research shows the selection of wine closures can have an impact on a wine's oxygen transmission rate — which can impact its taste, quality, and shelf-life. The research shows that different wines are suited to different wine closures, and also that the intended shelf-life of a wine affects the most appropriate choice of wine closure.

"There's no doubt that Australian and New Zealand wines are some of the most renowned in the world, which is why local wine producers need to keep on top of current trends to ensure the region's reputation is upheld," said Daniel Malki, General Manager of Jet Technologies. "Accurate wine management today has become more complex than ever before, and with this new insight into how oxygen, and wine closures, can affect a wine's composition, choosing the right wine closure during the bottling process is critical to its long-term quality."

"Oxygen is generally understood to be detrimental to wine quality, from the end of fermentation and through to wine storage and bottling — with closures crucial to keeping oxygen out of wine. In fact, different types of closures can retain different amounts of oxygen within wine. For example, oxygen storage in a wine bottle can differ between cork and screwcap closures, with screwcaps making up a higher percentage of oxygen retained within the bottle," added Daniel.

Jet Technologies produces wine closures with a range of defined and reproducible oxygen ingress. Wine producers can then select the closure with an oxygen ingress level that is suitable to their wine's profile, and to the aromatic evolution they desire. As to what closure to choose, the choice must be considered according to the initial wine profile and its sensitivity to reduction and oxidation.

The Jet Technology wine closure range includes:

- ROPP aluminium wine closures with multiple liner options to manage the oxygen transfer rate that each wine may require.
- Wine cork closure solutions.
- Standard and recyclable sparkling wine hoods made from biocompatible material, patented polymer, multi-layered and self-supporting material with 100% vegetable origin.

Jet Technologies  
[www.jet-ap.com](http://www.jet-ap.com)

## CASE STUDY

### Capping off French cream

Tetra Pak's new caps integrating attributed recycled polymers have been chosen by French cream brand Elle & Vire, part of Elvir's portfolio.

The HeliCap 23 cap solution was chosen to complement the company's cream products, which are distributed in Tetra Brik Aseptic 1 L Slim carton packages. This one-step resealable screwcap is manufactured at Tetra Pak's Châteaubriant plant in France.

Designed to provide easy opening, the caps feature a clearly visible tamper evidence ring.

They are manufactured under the RSB chain of custody attribution method, which means that the plastics are made of a mix of recycled and non-recycled materials, with the corresponding mass of recycled materials tracked throughout the Tetra Pak supply chain. This is verified by a third-party auditor according to the RSB Chain of Custody Procedure, which forms part of the RSB Advanced Products certification.

This move marks a key step in both companies' progress towards circularity and minimising their dependency on virgin, fossil-based resources.



"Deploying cartons integrating attributed recycled polymers represents a key step in our journey towards the ultimate sustainable food package, one that is fully made of responsibly sourced renewable or recycled materials, fully recyclable and carbon neutral," said Chakib Kara, Managing Director France & Benelux at Tetra Pak.

Tetra Pak Marketing Pty Ltd  
[www.tetrapak.com/au](http://www.tetrapak.com/au)





# AUSPACK 2022 offers high value for food and beverage businesses

AUSPACK 2022 promises to offer high value for the food and beverage sectors when the doors open on 17 May at the Melbourne Convention and Exhibition Centre (MCEC).

Registration to the four-day event is now open, with tickets available on the AUSPACK website.

Mark Dingley, Chairman of the Australian Packaging and Processing Machinery Association (APPMMA), which owns AUSPACK, said AUSPACK 2022 retains the 36-year-old exhibition's strong points, with features added to suit industry's current needs. These include the AUSPACK Leaders Forum; expanded Solutions Theatres to give visitors in-depth overviews of technology, solutions, and strategies; an array of new zones; and expanded awards categories in the APPMA Awards of Excellence.

He said in the past 10 years in particular, the event has grown to be the largest of its type in the southern hemisphere. Recognised globally, the long-running biennial destination showcases mega trends across the packaging and processing industry, specialising in all sectors of the food and beverage industries, including retail and distribution.

"We're anticipating more than 250 exhibitors for AUSPACK 2022, who will represent hundreds of global brands. Despite the difficulties of the last two years, we're seeing strong interest from those involved in the food and beverage industries to get back in front of their target markets. Testament to that, by the end of last year [note: 2021], 70% of the exhibition floor space had already been sold, with many

exhibitors from the postponed 2021 show rolling over into this year."

Mr Dingley said there were four new zones on the 2022 show floor: IT & Services, Processing Equipment, Packaging and Packaging Materials, and Packaging Machinery.

"These categories reflect key areas of interest for businesses."

## AUSPACK Leaders Forum

Mr Dingley said sessions chosen for the AUSPACK Leaders Forum — which will take place from 18–19 May, being the middle two days of AUSPACK 2022 — also reflected key areas of interest for businesses.

"With Australian businesses, and indeed the overall economy, at a critical recovery stage after two years of pandemic-related restrictions, many business owners have considered what their businesses will look like in three, five and even 10 years' time.

"There are many factors and challenges driving unparalleled organisational changes in processing and packaging for food and beverage businesses. These include supply chain disruption, sustainability demands, and technology and automation leaps; then combine these with quick changes in how consumers have purchased throughout the pandemic, plus environmental regulation and governance, and it's a lot of change for individual businesses."

Mr Dingley said the AUSPACK Leaders Forum would allow business owners and leaders to benchmark progress as "an organisation of the future", as well as gain

knowledge and inspiration, and network with other forward-thinking leaders.

The six themes across the two-day forum are: Future Technology, Future Workforce, Future Supply Chain, Sustainability and The Circular Economy, Investment and Collaboration, and Adapting and Diversifying for Commercial Success.

Mr Dingley said, "Many of these sessions will be of interest to food and beverage business leaders and owners, and we'll be announcing more speakers in the coming weeks."

Tickets for the AUSPACK Leaders Forum are on sale now.

## Exhibitor list growing

Mr Dingley said some of the major exhibitors at AUSPACK 2022 included Aerofloat, Australis Engineering, Foodmach, Heat and Control Pty Ltd, Insignia, KHS Pacific, Matthews, Metalprint Australia – Auspouch, Pressco Technology Inc., Recopak Machinery, SMC Corporation, Technomik Pty Ltd, Tronics, and WRD Wells.

"There are still some stands left, so I encourage any food and beverage-related businesses who are keen to put themselves in front of good strong leads to take up the opportunity to exhibit at AUSPACK 2022."

*AUSPACK 2022 will be held at the Melbourne Convention and Exhibition Centre, 17–20 May 2022. Please visit [www.auspack.com.au](http://www.auspack.com.au) for more information.*

Exhibitions & Trade Fairs Pty Ltd  
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# Top 5 food and beverage investment trends for 2022

A report has been published that outlines the food and beverage trends that are likely to represent strong returns in 2022. Published by Grant Thornton, the Bite Size Dealtracker 2021 report examines trends for mergers and acquisitions, and IPO activity, for food and beverages for the year and makes some suggestions on what is looking ripe for investment in 2022. Here is a summary of its top five predictions:

## 1. Craft beer

Craft beer will continue to hold Australian interest and as consumption of it and craft cider continues to grow, the field will represent a potential point of investment. The number of transactions in the Australian brewery sector currently represents 4% of Australian deals and that number is expected to grow in the next year.

## 2. Pre-packaged meals

This year has seen an increase in the pre-packaged food trend. It's the return of the TV dinner, but not as we know it — gone are the fish fingers and soggy frozen vegetables, and instead Australians are enjoying fresh vegetables, tender meats, healthy sides, and a variety of sauces from a range of cuisines in a pre-packed and convenient serve. Pre-packaged meals make up a component of the packaged foods and meats subsector which continued to account for the majority of all deals, and is expected to maintain its lead in FY22.

## 3. New technology and innovation

Food and beverage producers are enthusiastically embracing new technologies within the production and operational process and this is helping them to stay on top of their game. While the size of the agricultural products sector has not increased in the last year, it has stayed consistent and is expected to do so for the next year too. Additionally, carbon capture technology is due to have a stronger presence for buyers in the future.

## 4. Plant-based 'meats'

Plant-based 'meats' are increasingly popular thanks to both their health and environmental benefits and consumers are drawn to them when they want to try something new without straying too far from their comfort zone.

## 5. Distillers and Vintners

Finally, distilleries and winemakers accounted for over a fifth of acquisitions in 2021 and their clever responses to dealing with the pandemic have meant they've done well during this last year. The trend looks set to continue in 2022, with a predicted rise in mergers and acquisitions.

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CELEBRATING  
YEARS

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