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# What's in a name?

**The Morrison government is seeking the views of Australian producers and businesses as it continues to work towards securing a free trade agreement with the European Union (EU).**

**A**s part the negotiations, the EU has proposed a list of 400 protected terms known as 'Geographical Indications' or GIs. The terms include, for example, Kalamata, Bratwürste, Prosciutto, Scotch Whiskey as well as many cheeses including, Feta, Gruyere, Camembert, Brie, Mozzarella, Edam and even Blue Stilton. Australian producers would be required to re-name their products that use these terms, and the packaging of some products could also be in jeopardy as the EU document stipulates that packaging must be changed if it is liable to convey a false impression of the product's origin.

The European Commission tried to register Prosecco as a GI in Australia in 2013, but it failed after the Winemakers' Federation of Australia (now Australian Grape and Wine Inc) argued successfully that it was the name of a grape variety. But the battle was lost for Champagne and Rhine Riesling, which are now known by terms such as Sparking Wine or Clare Valley Riesling. According to Birmingham, in the end it has been a good thing for the Australian wine industry. By developing our own brands, he said there could be opportunities for Australian food producers.

However, some in the food and beverage industry may not agree, so the government wants to hear the views and


objections from Australian industries, farmers and businesses directly. A public consultation process on GIs is open for comments until 13 November 2019. Given wine GIs are already protected under Australia's existing wine agreement with the EU, this public objections process excludes any wine terms.

"Australians can be confident that we will drive a very hard bargain — as we always do — to achieve an overall agreement that delivers more opportunity for Australian farmers and businesses. Ultimately, we will only do this deal if overall it is in Australia's interests to do so," Birmingham said.

Birmingham said that compared to New Zealand's deal with the EU, Australia's current Act is really limited so the upside of the negotiation could be positive for our agricultural industry as well as the services sector.

As a bloc, the EU is Australia's second-largest trading partner, third-largest export destination and second-largest services export market. Australia and the EU have a close trading relationship, with \$109 billion in two-way goods and services trade last year.

For more information about the EU's list of proposed GIs, visit: <https://dfat.gov.au/aeufta/gis>.

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# Food FOR thought



## Soft drink waste could tackle global warming

The by-products of some soft drinks remove carbon dioxide from gas streams and could therefore help reduce global warming, according to new research.

Published in *Microporous and Mesoporous Materials*, researchers from Cornell College and Oak Ridge National Laboratory in Tennessee show how a simple procedure can convert waste soft drinks to porous carbon, which is capable of absorbing carbon dioxide. As well as addressing global warming, this will also help limit the high volume of waste caused by expired soft drinks and the production process.

"In this research, we are looking at turning one waste material into something of value," said Craig Teague, Professor of Chemistry at Cornell College. "We looked at waste soft drinks — asking could we possibly find a way to make that waste useful by doing a simple process in the lab and taking the carbon out? That carbon, by the way we synthesised it, has tiny pores, which are able to capture carbon dioxide."

The researchers reduced Coca-Cola, Push Orange, Diet Mountain Dew and Diet Pepsi to carbon powder using a simple, hydrothermal synthesis process. The remaining carbon powder has micropores or tiny spaces that capture the carbon dioxide.

Although this method of carbon dioxide separation is not ready for industrial use, Teague suggested the research brings chemists closer to finding a cost-efficient waste product.

## Clean and clear labelling now the norm



Clean and clear labels are key concerns for the food and beverage industry, featuring in all Innova Market Insights' Top Trends forecasts in recent years.

Almost 28% of global food and beverage launches used one or more clean label claims (natural, organic, no additives/preservatives and GMO-free) in 2018, according to Innova Market Insights.

Consumers are also increasingly drawn to clean label areas such as vegan-friendly, raw and paleo diets and minimal processing, with emphasis on cold-pressing and high-pressure treatment. No additives/preservatives labels are most prevalent, used in 15% of global launches in 2018, and over 20% in the USA. This is running alongside increasing ethical concerns, including fair trade and sustainability, packaging, the environment and animal welfare.

GMO-free labelling is the second-highest clean label claim in the USA, well ahead of both organic at over 13% and natural at 8%. GMO-free labelling featured on 17.8% of launches in the US, compared with under 6% globally.

## How to make milk seem sweeter

Adding vanilla to sweetened milk tricks the brain into thinking the beverage is sweeter, which could help reduce the added sugar content, new research has found.

Researchers from Penn State conducted a blind taste test which found participants — who did not know vanilla had been added to the milk — consistently indicated that samples with vanilla were significantly sweeter than their added sugar concentrations.

Participants did not rate individual attributes of the milk such as sweetness, intensity of vanilla odour or milk taste, but instead selected the best match for the vanilla milk from four differently sweetened milk choices.

"We are utilising a learned association between an odour and a taste that will allow us to reduce the added sugar content," said Helene Hopfer, Assistant Professor of Food Science. "Reducing added sugar in products, just like reducing fat and salt, is the Holy Grail of food science."

With vanilla, the added sugar content in flavoured milk could potentially be reduced by 20–50%, suggested Gloria Wang, who conducted the research as part of her master's degree thesis in food science.

"We maintain the sweetness perception by having this congruent odour — this learned, associated odour — basically trick the brain into thinking that there is still enough sweetness there," she said. "Based on our results, taste-aroma interaction is a robust effect."

Wang believes the findings offer manufacturers a workable option to reduce added sugar in their products and retain the sweetness consumers demand.

Hopfer's lab will use the concept to develop a reduced-sugar chocolate milk for the National School Lunch Program funded by the National Dairy Council.



## Industry and government take action on packaging

The Collective Action Group (CAG), a team of 12 representatives from across the supply chain and government, recently held its first meeting in Melbourne. The group — which includes Coles, Nestle, Coca Cola Amatil, Planet Ark, Pact Group and the Department of Environment and Science (Qld) — has been tasked with overseeing the progress of Australia's 2025 National Packaging Targets.

Launched in 2018, the 2025 targets provide a clear mandate to deliver a new sustainable pathway for packaging in Australia.

"The Collective Action Group is putting the targets into action and finding practical solutions to tackle packaging waste," said Assistant Minister for Waste Reduction and Environmental Management Trevor Evans, who officially opened CAG's first meeting.

In 2019, the primary task for the CAG is to develop a white paper setting out the roadmap for all stakeholders and identifying the critical interventions required to successfully transition Australia to a circular economy for packaging.

Brooke Donnelly, CEO of the Australian Packaging Covenant Organisation (APCO), said: "The formation of the CAG is an exciting milestone in our work towards delivering the targets and it's fantastic to bring together such a prestigious group of leaders for the task.

"The 2025 National Packaging Targets are some of the most ambitious and decisive environmental targets to be supported in Australia and their delivery requires collaboration from across industry. We applaud all CAG participants and their leading organisations for stepping up as key players in the global movement to create sustainable packaging solutions that drive accountability, transparency and shared value for consumers, industry and government."

Over the next 12 months, APCO will be delivering an extensive program of projects to drive the delivery of the 2025 National Packaging Targets. These will be facilitated by a team of APCO working groups, comprising nearly 100 participants from industry and government across Australia, which will in turn provide analysis and resources to the overarching CAG.

The projects include comprehensive infrastructure mapping of the current waste and recycling system and a series of models for alternatives; a range of research and trials to better understand compostability; remote and regional waste collection partnerships; phasing out of single-use plastics; and consumer education initiatives to ensure a consistent approach to resource recovery in the packaging streams.



## Proactive approach for Salmonella detection

The world's food supply will become safer as the food industry shifts to high-resolution, whole-genome sequencing — which examines the full DNA of a given organism all at once. This move to make sequencing ubiquitous will lead to the consistently reliable detection of *Salmonella*.

A paper published in the journal *Frontiers in Microbiology* — co-authored by researchers from Cornell University and the Mars Global Food Safety Center (GFSC), Beijing — illuminates breakthroughs.

"*Salmonella* is the foodborne pathogen with the biggest public health and economic impact globally. It's one of the major causes of diarrhoea all around the world," said Martin Wiedmann, food safety professor and Cornell Institute for Food Systems faculty fellow.

"*Salmonella* can be mild or it can cause death, as its severity depends on *Salmonella*'s serotypes [distinct variations] — and that's what we're trying to find out."

The paper describes how the food industry around the world should use molecular methods more often for subtyping and characterising *Salmonella*. The paper compared older subtyping practices — some practices going back to the 1930s — to the newer whole-genome sequencing, a method that can analyse a wider, more complete swath of the genome.

With this technique, scientists can more precisely identify a particular strain of *Salmonella* and determine the origin and the path of the disease's outbreak, Wiedmann said.

For example, in early July the U.S. Food and Drug Administration and the federal Centers for Disease Control and Prevention (CDC) used the technique, as they began investigating a suspected *Salmonella* link between pig-ear dog treats and humans — due to people handling the treats. At the time, there were 45 cases of *Salmonella* in 13 states, with 12 people hospitalised, according to the CDC.

"Whole-genome sequencing is rapidly becoming the method of choice for *Salmonella* subtyping," said microbiologist Silin Tang, the paper's lead author and senior research scientist at the Mars Global Food Safety Center.



## Beef boning set to transform red meat processing

Australia's red meat industry is set to benefit from the establishment of what is claimed to be the world's first beef boning automation research and development room, as the industry looks to reduce processing costs and increase boning room yield efficiency.

MLA Donor Company (MDC) will invest up to \$32.4 million over five years to enable Meat & Livestock Australia (MLA) in collaboration with beef processor Teyes Australia, and solution providers, to develop beef boning automation technology.

Leveraging on MLA's lamb boning automation, known as LEAP, the move towards beef boning automation will see the R&D room developed.

The beef boning automation will be known as Leap4Beef and will be enabled by CT and DEXA (dual-energy X-ray absorptiometry) objective carcase measurement technology. The beef boning automation R&D room will be established at Teyes Australia's facility in Rockhampton, Queensland.

MLA Managing Director Jason Strong said with Australia reportedly having one of the world's most expensive processing sectors, automating beef boning would reduce per head operating costs for the benefit of the entire Australian industry.

"Maximising the value of carcasses through accurate cutting along with the increase in productivity through continuous flow in the boning room is vital to the sustainability of the Australian red meat industry," Strong said.

"Beyond movement in livestock prices, the single biggest impact on processing efficiency is the accurate segmentation and deboning of carcasses into the highest primal value possible.

"Beef boning automation has been estimated to deliver at least a \$30 per head benefit, with an estimated 40% of this benefit to return to producers.

"We are seeing the benefits of lamb boning automation in Australian processing plants, with carcase values increasing by more than \$6/head."



## More Aussies snacking on seaweed

Seaweed, particularly in snack form, is becoming more popular in Australia, according to a study from the University of the Sunshine Coast. Although some adventurous Australian consumers would try seaweed-based main meals, snacks such as crackers and sushi are more widely consumed.

A national survey of 521 Australian consumers revealed about 75% of respondents had eaten seaweed, but few (37%) reported consuming it regularly over the past 12 months.

"Seaweed has been touted as a whole food source, high in dietary fibre and omega-3 fatty acids," said Nicholas Paul, USC aquaculture biologist Associate Professor and co-author of the study.

The researchers found these health benefits were one of the key drivers of consuming seaweed, as well as taste, natural, safe and fresh. The barriers, on the other hand, were lack of knowledge and familiarity, and the perception that seaweed is expensive. Well-educated, health-conscious females under 35 years old were the most likely to consume seaweed products.

Lead author and Associate Professor Dawn Birch said Australia remained an emerging market in the seaweed section of the global snack industry, which is expected to be worth \$635 billion in 2020. However, it has the potential to be an enormous industry in Australia, according to Paul.

"We have a long way to go and we are not even in the same ballpark as Asia," Birch said. "But the sushi trend is having a significant impact and it's more likely that consumers will eat seaweed in a snack format before they move on to maybe eating a seaweed salad, smoothie or soup.

"Developing convenient and sophisticated seaweed products with tailored branding that appeals to this demographic will be critical to the emerging Australian seaweed industry and potentially that of other Western societies," she said.

The study provided an insight into consumers' attitudes towards seaweed, and will allow the emerging seaweed industry in Australia to adopt a demand-driven approach to developing relevant product offerings and targeted branding strategies.

The study was published in the *Journal of International Food and Agribusiness Marketing*.





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# ‘Free-from’ food category estimated at \$7.7 billion in Australia

A study on free-from foods by global research company The NPD Group has found that consumers who want to make healthier life choices are driving the growth in the free-from food category. The free-from food category, comprised of meals associated with health, lifestyle and ethical attributes (eg, gluten-free, no added hormones and free-range), is estimated to be worth \$7.7 billion in Australia, generating 23% of foot traffic within the foodservice industry.

Almost a quarter of Australians said that they consume meals that are free-from (23%) to improve health (13%), because they are perceived to be better for you (13%), to support animal welfare (4%) and allergy related (only 3%).

Initially, free-from foods were manufactured to meet the requirements of those with dietary intolerances. Nowadays, demand for these products is more about consuming foods that are better for you.

Within the free-from food sector, four in 10 respondents (36%) indicated that their meals were vegetarian/vegan or allergy/intolerance related. Of these, 4% of respondents claimed to have had a gluten-free meal, which is 11% higher than a year ago. Research shows that people are restricting unhealthy food groups as a lifestyle choice, as they no longer need a medical reason to opt out of certain foods.

“What’s interesting is that it appears people believe eliminating food groups is better for them, but they don’t always understand why. There is an opportunity here for manufac-

turers of free-from foods to educate their customers on why their products are healthier both on pack and through their communications. We also know that consumers are willing to pay more for the health benefits associated with free-from foods,” said Gimantha Jayasinghe, Deputy Managing Director APAC at The NPD Group.

Millennials are driving the demand of free-from meals, with almost half (47%) of those purchasing falling within the millennial age bracket. Consumers are also seeking more vegan, plant-based and vegetarian options, with over half (57%) of those searching for these options falling into the older millennial age bracket (25 to 34 years of age).

Quick service retail (QSR) brands are resonating with the free-from consumer type. Meals with better for you and provenance attributes experienced marked growth in 2018, despite the price-sensitive landscape; consumers are willing to pay more for the health benefits associated with free-from foods. The average bill is \$10.88, which is two times greater than the industry average.

Having tired of the products that don’t cater to their preferred diet, millennials are opting to consume products that taste good and offer nutritional value. “The food industry is evolving for the better,” Jayasinghe said. Continued innovation and availability of the free-from food sector will ensure its popularity with the millennial market.

For more information, visit [www.thenpdgroup.com.au](http://www.thenpdgroup.com.au).





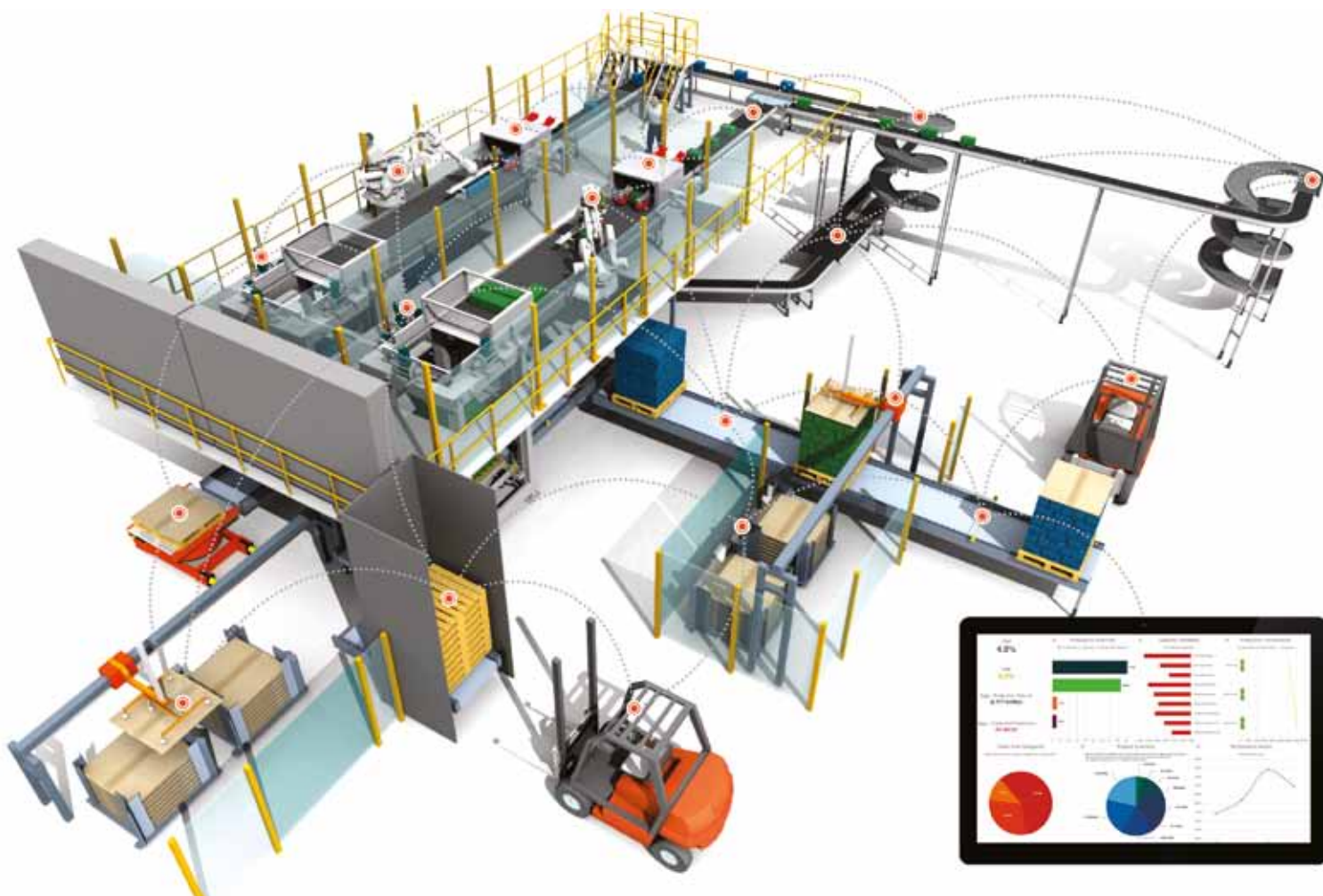
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## Packaging with built-in preservatives

**As consumers demand a reduction in food additives, research is underway to improve the commercial viability of a new food packaging material that actively reduces the need for preservatives while decreasing food waste.**

**T**his project is one of the two Cornell University food science research projects awarded \$1.8 million by the US Department of Agriculture's National Institute of Food and Agriculture. The other project is working on improving juice and beverage production to keep the fresh taste in concentrates.

Ever-increasing food waste represents an emerging threat to the economic and environmental sustainability of the US food system, said Julie M Goddard, associate professor of food science. Preservatives are added to foods to retain quality with a longer shelf life, but consumers are demanding a reduction in additives.

However, this consumer movement leads to unintended results: food that spoils more quickly, which could cause a surge in food waste.

"We've shown that you can introduce preservative functionality into packaging materials, so that we can reduce the additives in foods and beverages without losing product quality," Goddard said. These 'active packaging' materials are a promising new technology, but technological hurdles and consumer mindsets have so far prevented their successful commercial translation, she added.

Removing the preservatives in food products — such as sauces, mayonnaise or salad dressing — would severely diminish shelf life, even with refrigeration. But by adding chelating agents — compounds that can sequester metal ions — to the jar or bottle itself, the food can last much longer without the additives seeping into the food.

"There is a lot of benefit in having fewer additives but gaining the preservative quality built in to the package so they don't migrate to the food," she said.

During the research phase, the researchers will work directly with consumers and producers to ensure that the packaging material meets food-production, supply chain needs and that consumers are more likely to accept this new technology.


### Juice concentrate project

For the other project, Carmen Moraru and Olga Padilla-Zakour, both professors of food science, will lead research on using reverse and forward osmosis filtration and other cold processes to create nutritious, high-quality and tasty juices and beverages in an energy-efficient way.

Currently, juice processors use heat to create juice concentrate, but heat changes the product's nutritional and sensory profiles.

"Our combination nonthermal process maintains product quality and makes the juice concentrate taste like it is fresh," Moraru said.

Also, juice concentration consumes energy. "With this cold process technology, we can save energy and conduct the concentration at a fraction of the thermal evaporation cost," she said.

The researchers will examine different filtration conditions for specific juices and other beverages. 



*Graduate student Josh Herskovitz conducts research on active packaging in the laboratory of food science professor Julie Goddard.*

## CASE STUDY

### Sustainable packaging for meal kits

Meal kit company HelloFresh is reducing its environmental footprint by using sustainable packaging from Tetra Pak for products in three European markets.

HelloFresh has used the Tetra Recart carton package in the US since 2017, and this has now expanded to its branded tomatoes, beans, chickpeas and lentils in the UK, Germany and the Netherlands.

Tetra Recart offers 80% lower carbon footprint and weight and space savings compared to tin cans and glass jars.

"Introducing the Tetra Recart carton to our sustainable packaging portfolio is a strategic move for HelloFresh, helping us reduce our carbon footprint through improved logistics efficiencies," said Jakob Schmidt, Senior Global Procurement Manager at HelloFresh Global. "Tetra Pak's innovative packaging enables HelloFresh to consistently deliver a quality product and a great opening experience for our customers."

Peter Arvidsson, MD, Tetra Recart at Tetra Pak said: "We see a huge growth in the meal kit category as consumers demand easier shopping experiences and services offering less planning [and] shorter cooking time, all while maintaining the quality of the ingredients. We are pleased to be able to help food producers capture this opportunity with a sustainable package that keeps food fresh and tasty."

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### Five-colour, toner-based tabletop printer

AstroNova has launched the QuickLabel QL-300, a five-colour, toner-based tabletop printer designed for production label printing.

The product goes beyond the traditional four-colour (cyan, magenta, yellow and black) printing process by adding white toner, giving users the ability to print white and CMYK in 1200 dpi high resolution in a single pass. The benefit of toner EP (electrophotographic) technology includes label print that is durable, water fast and UV resistant.

It also includes transparent/clear, black, Kraft paper, metallic silver and gold label materials.

It is a full-production label printer in a compact tabletop footprint that easily adapts into the print workflow of businesses. The product prints label widths ranging from 2.54 to 12.7 cm and features roll-to-cut or roll-to-roll operation. The built-in automatic cutter allows for single-pass printing and reduces label waste.

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# A targeted shift towards sustainable packaging

*Nerida Kelton, MAIP, Executive Director – Australian Institute of Packaging (AIP); ANZ Board Member – World Packaging Organisation (WPO)*

In September 2018, Australia's 2025 National Packaging Targets were announced at a milestone industry event convened by the Australian Packaging Covenant Organisation (APCO). These targets build on commitments made on 27 April 2018 by Commonwealth, state and territory environment ministers and the President of the Australian Local Government Association to set a sustainable path for Australia's recyclable waste.

The 2025 National Packaging Targets are:

- 100% of all Australia's packaging will be re-usable, recyclable or compostable by 2025 or earlier.
- 70% of Australia's plastic packaging will be recycled or composted by 2025.
- 30% average recycled content will be included across all packaging by 2025.
- Problematic and unnecessary single-use plastic packaging will be phased out through design, innovation or introduction of alternatives.

With 2025 only six years away, now is the time for your business to stop and re-evaluate current packaging designs and formats and develop a structured plan to ensure that all of your packaging adheres to the sustainable targets.

The Australian Institute of Packaging (AIP) is often asked to simply provide a list of the exact substrates and materials that should be selected for every product on the market to meet the sustainable packaging targets. Unfortunately, the answer is never that simple.

We often remind packaging technologists and designers that the true role of packaging is its functionality. First and foremost, packaging is designed to ensure that a product is protected all the way across the supply chain until it is purchased by the consumer. Packaging has a vital role to play in ensuring the health and safety of the products and consumers. Waste must be kept to a minimum and the packaging must be designed to withstand the rigours of transport.





*The 2019 AIP PIDA gold winner in the beverage category was PACT Group for the New Zealand brand Lewis Road Creamery post-consumer sourced PCR 100% recycled rPET milk bottle range.*

The functionality of the packaging cannot be ignored when redesigning your packaging to meet the sustainability targets. 'Sustainable Packaging' in the simplest of terms is packaging that performs the primary role of functionality but is also designed with the lowest possible environmental impact when compared to an existing or conventional pack. Finding the balance between functionality, commercial reality, consumer demands and environmental criteria is the real challenge.

### Existing packaging

For existing packaging, ask yourself what is the true purpose of the packaging you are currently using and then stop and re-evaluate whether the packaging can be improved and altered to either be reduced, re-used or recycled. Challenge your design process and start incorporating the 2025 targets in all of your packaging. Redesign your on-pack communication to demonstrate the changes and to enable customers to



better understand what your business has done to adhere to the 2025 targets.

### New product development

For all new product development (NPD), incorporating sustainable packaging design from the beginning will be a much easier process and this should ultimately become a fundamental part of your packaging design. NPD is the perfect time to focus on the number one waste management hierarchy item of REDUCE. Ask the questions: What can you do to reduce your packaging before it is even designed and manufactured? Is your business doing everything in its power to reduce as much packaging as possible from your primary, secondary and tertiary products?

### Lifecycle assessment tools and lifecycle thinking

Incorporating lifecycle assessment (LCA) tools into your NPD process should be a consideration as LCA quantifies the environmental burdens associated with a product, process or activity over its entire lifecycle, from production of the raw material to disposal at end of life (as defined by INCPEN). Using LCA tools provides insight and better understanding of how to include lifecycle thinking into your packaging design processes and will help achieve the 2025 targets. Lifecycle thinking also enables the team to determine whether the changes will have a greater or lesser environmental impact on other parts of your supply chain, eg, within transport, storage or disposal.

### Understanding recycling facility capabilities

We would also recommend that you look at the end of life (EoL) of your product, or the expected disposal option for your packaging when the customer/consumer has removed the product. APCO has developed the Packaging Recyclability Evaluation Portal (PREP), which provides information to ensure that you are selecting the most appropriate packaging substrates that will actually be able to be re-used, recycled or repurposed. The PREP tool is the starting point for the application of the new Australasian Recycle Label (ARL), which provides helpful and consistent on-pack information to the consumer on correctly disposing of the packaging items.

All manufacturers and their packaging teams have a responsibility to better understand the current recycling facilities and capabilities in this country, and those into which you may export your products, and ensure that your packaging is able to be sorted and processed through these systems.

A useful exercise is to take your designers, marketers and agencies down to the local materials recycling facility (MRF) to see what happens to the packaging collected at kerbside. 25 National Packaging Targets: PREP & ARL'.

Ultimately the goal is to achieve optimal outcomes for packaging functionality and to collectively meet the new 2025 National Packaging Targets.



Australian Institute of Packaging  
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A fully recycled carbonated soft drink bottle has been produced by Coca-Cola Amatil, and the company has indicated plans to switch its single-serve plastic bottles in Australia to the fully recycled materials by the end of 2019.

Group Managing Director Alison Watkins said while 100% recycled plastic had previously been used in still beverages, it had never successfully been used for carbonated drinks.

Designing a 100% recycled bottle for carbonated beverages presented its challenges. Depending on a range of factors, including temperature, the pressure inside a soft drink bottle can be up to three times the pressure in a car tyre. Therefore, the bottle design needed to be much stronger than that used for still beverages.

Coca-Cola Australia and Coca-Cola Amatil have previously announced that seven out of 10 of their plastic bottles would be made from recycled plastic by 2020. This could reduce Amatil's use of virgin plastic by around 10,000 tonnes a year.

Watkins credited the production of the recycled bottle to Australian innovation. The company's recycled plastic bottle range supports its goal for a "world without waste", an ambition to help collect and recycle one bottle or can for each one it produces.

Coca-Cola Australia and Coca-Cola Amatil has committed to using recycled plastic, with the company's Mount Franklin Still range switched to 100% recycled plastic bottles in 2018.

## Compostable flexible packaging

Grounded offers a range of compostable flexible packaging options made from bio-based materials. It has a complete suite of compostable, flexible packaging solutions suitable for use across numerous industries and applications, including food production and processing, fresh produce, snack foods, apparel, retail and consumer goods.

All the packaging is bio-based and certified to European or OK Compost compostability standards for both home and industrial composting, with its look, feel and functional properties designed to mirror that of their non-compostable counterparts.

The range is fully customisable and includes popular and widely functional items such as stand-up pouches, snack wrappers and produce bags in various finishes, which are all fully compostable and branded to customer specifications.

The company will also launch a range of 100% compostable stand-up pouches that will be available in smaller quantities.

### Grounded

<https://groundedpackaging.co/>



## 100% recyclable sparkling wine hoods

The Jet Technologies recyclable sparkling wine hood is made from 100% biocompatible material.

The polymer material used in the wine hoods is completely recyclable due to it being of vegetable origin and free of glues.

The hood is also certified for contact with foodstuffs.

The product is recyclable, once crushed into a ball, because it uses an ultra-thick alloy material, and the remaining 80% of the polymer consists of plant-based carbons. It is also soft and pliant while at the same time resistant, making it suitable for sparkling wine hoods.

The premium wine hood product can be printed in a combination of up to three print processes per hood — offset, embossed, screen, gravure, hot foil, etc — to create the right look and feel for a variety of wine producers.

The wine hoods are certified for contact with foodstuffs in compliance with all European and non-European regulation. Migration tests on the poly laminate verify the absence of harmful or hazardous substances such as Bisphenol A, heavy metals and aromatic substances (Ministerial Decree 21/3/73 and Regulation (EU) 10/2011).

**Jet Technologies**

[www.jet-technologies.com.au](http://www.jet-technologies.com.au)





## Colour label printers

The 4-colour and 4-colour plus white LED Toner OKI PRO series colour label printers are available from Label Power.

The colour label printers will print onto most low-cost uncoated label and tag stocks in vibrant colour. Gloss, matt and even slightly textured stocks can be printed on. This means users can produce wine labels, beer labels and food, beverage and chemical warning labels and tags.

The printers can print on pre diecut stocks or onto continuous roll media to allow digital cutting and laminating after the printing process into any shape or size with a label finisher that is also available from Label Power.

The OKI PRO1040 and OKI PRO1050 label printers feature a rotary cutter and can cut after every print job or after each label or tag. The PRO1050 model also includes white toner so users can print onto clear label stocks, eco-friendly brown FSC Kraft label stocks and dense black label materials.

The toner is scratch resistant, waterproof and lightfast, meaning users' products will remain looking great on the shelves for months or years.

Having this capability in house means users have control over their label production with no minimum orders or lengthy lead times from an external label printer.

**Label Power Pty Ltd**  
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### Cube package to save space

Tetra Pak has launched the Tetra Classic Aseptic 65mL Cube package, offering an efficient packaging solution for dairy, juice and liquid food.

The dimensions of the package have been designed to allow every six packages to form a cube, optimising the use of space in distribution and storage. This has brought improvements in efficiency and environmental footprint.

Compared to the traditional Tetra Classic Aseptic 65 mL packages, the package requires less secondary packaging and needs approximately 40% less space to transport the same quantity of products. This means food can be delivered safely over longer distances at lower cost.

The package is available with hand packing for secondary boxes.

**Tetra Pak Marketing Pty Ltd**

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## CASE STUDY

### Keeping ready meal manufacturing going



Ready meal manufacturer Rowan Foods has replaced some of its older equipment with machines from tray sealing specialist Proseal to maintain reliable production.

From the installation of three Proseal PR30 machines in the late 1990s, which are still in operation to this day, Wrexham-based Rowan Foods now has an additional 23 Proseal tray sealers, comprising GT1, GT0 and GTR models, to support the company's production of ready meals.

The company recently turned to Proseal when the servos failed in seven older machines from a different supplier, which were no longer being supported and therefore were unable to function. It also incorporated some of the latest improvements into its older pre-owned models.

"We knew that Proseal's machines were of the highest quality from the fact that some of our PR30 machines are still in operation in our factory after 20 years and if maintained and serviced annually will be for some time yet. They just keep on working with great reliability," said Rowan Foods' Engineering Department.

"So, when our other supplier's tray sealers became obsolete, causing a huge problem for us, we knew we could turn to Proseal for a trusted solution. We've not been disappointed. Our Proseal machines are providing us with outstanding quality as well as a really impressive range of new features."

According to Proseal, technical advances in its tray sealers include the E-seal technology which ensures seal reliability to meet the stringent quality requirements of the food sector, and ProMotion, a continuous motion tray infeed system which can increase the speed of a tray sealer by up to 30%.

At Rowan Foods, some of the tray sealers are in operation 22 hours a day, seven days a week, producing up to around 60 packs per minute depending on tray size and type.

"We were delighted to have been able to help Rowan Foods out of a tricky situation, getting the best possible sealing machines installed in a very short space of time to replace the company's original equipment," said Proseal Project Engineer Carl Cryer.

**Proseal Australia**  
[www.prosealaustralia.com](http://www.prosealaustralia.com)



# Fresh packaging innovation delivers fresher products, longer

By nature, cats are fussy creatures; therefore, it's no surprise that one of Australia's leading brands of cat food is named 'Fussy Cat'.

Fussy Cat was launched 15 years ago and has built up a loyal following of discerning cat owners who are aware of the health benefits from feeding premium food to their feline friends. The brand's premium cat food prides itself on being a 'complete' food, offering all the vitamins and minerals for a cat's daily diet.

Owner of the Fussy Cat brand, Real Pet Food Company, has just added an additional product to the range of fresh chilled grain-free food with the recent launch of single serve chilled pots, to complement the existing larger serving sizes.

The beauty of the single-serve pot is not only the convenience of the less-mess approach to feeding (where the full product serving goes straight into the cat food dish), it also delivers cutting-edge packaging innovation in the form of high oxygen barrier properties.

How does that help the fussy cat? The packaging keeps the food fresh for longer — turning a fussy cat into a contented cat! The high-barrier container helps to preserve the fresh product and extends the shelf life... welcome news for retailers.



Collaborating with Real Pet Food Company on this pioneering project was Australasian packaging company Bonson-Savpac Pty Ltd. The companies worked together to custom design a polypropylene injection-moulded container that considered both the functional and aesthetic requirements of the fresh cat food. The packaging serves the needs of the premium market by delivering high-quality branding graphics through the use of full-body-wrap, in-mould-label (IML) decoration. The IML incorporates transparent windows to allow the consumer to see the freshness of the product. This eye-catching labelling helps the Fussy Cat range stand out on-shelf as a premium-quality offer.

The Real Pet Food Company's Fussy Cat Portfolio Lead, Jarrod Edgecombe is delighted with the results of partnering with such an innovative packaging manufacturer. "Working with Bonson has been an absolute pleasure — they have been proactive and very responsive to our needs," comments Jarrod.

So, what do Bonson have in store for their next packaging innovation? Watch this space... To quote their ANZ Business Manager, Glenn Drake, "Every approach from leading food manufacturers who are looking for a food-grade packaging company to partner with, leads Bonson to push beyond the expected solutions and service boundaries to create unique advantages for every client. We believe that honouring our customers' greatest potential is what ultimately serves our own."



Bonson-SavPac  
[www.bonson-savpac.co.nz](http://www.bonson-savpac.co.nz)  
[glenn.drake@bonson-savpac.com](mailto:glenn.drake@bonson-savpac.com)

## Solvent print cartridge

The HP 2590 solvent print cartridge utilises HP 45si print cartridge technology with HP 2590 solvent ink, designed to meet the user's coding and marking production needs.

The ink provides industry-standard durability on untreated BOPP, and good durability on treated BOPP and a variety of other substrates, including PE, PET, UV, aluminium foil and PVC. Users can get print definition and optical density from the combination of HP TIJ 2.5 technology and HP 2590 solvent ink.

Printing with the solvent print cartridge is easy in intermittent and fast printing production environments. The long decap time of the ink allows operators to leave the cartridge uncapped for up to 1 h with immediate recovery after restarting printing.

The ink is suitable for printing in food applications as it will soon be equipped with GMP compliance Statement of Compliance.

**Hewlett Packard Enterprise**

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



## Washdown VFFS machine

The ADM-W400 vertical fill, form and seal (VFFS) machine has been designed as a full-featured, high-specification machine suitable for wet and dusty environments.

The machine can tackle common issues such as tracking and belt slip. Its vacuum pull-down belts provide tracking and grip on the film, while the edge tracking feature provides control to form the bag. Able to change film and former size without extraneous tools, the machine has a vertical seal and back support, commonly missed with former changeover leading to damage to the former.

This VFFS machine has a maximum speed of 80 bags/min and is suitable for cheese, poultry, frozen foods, salads and wet fill. The machine uses an Allen Bradley control system including PLC, 10" HMI and Servos. The machine uses an EtherNet/IP system for quick troubleshooting, useful in rural installation. ADM can also install a modem for remote access for fast program updates.

The fully enclosed stainless steel engine room and control cabinet prevents foreign objects from entering the control system. The machine also protects against condensation occurring inside the control cabinet in cold or humid environments.

Optional end sealing units include impulse sealing for polyethylene film and ultrasonic sealing for products such as cheese and salads. The machine features safety guarding to AS4024 and uses SICK safety sensors, providing a CAT3 safety rating. It uses components from suppliers such as, Allen Bradley, SICK, SEW, Omron and SMC.

Other optional features include gas flush for MAP, gusset system, liquid fill squeeze roller, antistatic device, zip applicator, hole punch, 5" thermal transfer printer and mechanical spreaders.

**ADM Packaging Automation**

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



## Take your brand beyond the box with Zip360®

The wide-mouth opening of the Zip360® resealable pouch, created by a 360-degree perimeter zipper around the package, provides easy access to contents. Zip360® allows for neat in store shelf presence and convenient home storage – it's a package as innovative as the product.

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## Counterfeit whiskies scotched by artificial tongue

Scottish engineers have built a tiny 'tongue', able to differentiate between drams of whisky, in a step towards halting the trade of counterfeit alcohol. A paper published by the Royal Society of Chemistry described how the tiny taster was built, and how it exploits the optical properties of gold and aluminium to test each whisky.

Sub-microscopic slices of the two metals arranged in a checkerboard pattern function as the 'tastebuds', approximately 500 times smaller than human tastebuds. Researchers pour samples of whisky over the tastebuds, measuring how they absorb light while submerged. The subtle differences in how the metals absorb light — called plasmonic resonance by scientists — allows scientists to identify different types of whiskies.

The tongue was used to test a number of whiskies from Glenfiddich, Glen Marnoch and Laphroaig, with approximately 99% accuracy, capable of determining subtle differences between the same whiskies aged in different barrels. The taster could also tell the difference between the same whisky aged for 12, 15 and 18 years.

The tongue can't identify individual chemicals that make coffee taste different to apple juice, but it can differentiate between complex chemical mixtures. The tongue could also be used to 'taste' any liquid, making it useful for a variety of applications, including food safety testing, quality control and security.

Dr Alasdair Clark from the University of Glasgow's School of Engineering is the paper's lead author.

"We're not the first researchers to make an artificial tongue, but we're the first to make a single artificial tongue that uses two different types of nanoscale metal tastebuds, which provides more information about the taste of each sample and allows a faster and more accurate response," he said.

The paper, titled 'Whisky tasting using a bimetallic nanoplasmonic tongue', is published in the Royal Society of Chemistry's journal *Nanoscale*.



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## Serial dilution system

Serial dilution of samples is standard practice in microbiology. Purchasing pre-filled diluent tubes can be expensive, while preparing them in-house can be laborious and time-consuming. In either case, performing the actual dilutions do not get any easier.

The Inlabtec Serial Dilution System (SDS) replaces tubed media with single-use sterile bags. The sample is pipetted into the bag, and the sample is homogenised by the SDS. According to the company, in laboratory trials the SDS was faster and more accurate than manual methods.

The SDS can save on both storage space and the amount of waste produced compared to disposable plastic tubes, which minimises environmental impact.

Serial Diluter UA has an integrated Stomacher-like bag mixer, therefore all known pipette tip types can be used without any effect on dilution speed. The working process is 100% identical to the standard method and complies with EN ISO 6887-1: 2017.

**Australasian Medical & Scientific Ltd**

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



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## Gas analyser with memory card

The WITT-Gasetechnik OXYBABY 6.0 gas analyser now includes a Micro SD card for data export and memory expansion.

Used for checking protective gas packaging in the food industry, the analyser already comes with an internal memory. Once a Micro SD card is inserted into the instrument, each measurement is written to the card in parallel to the internal memory. A separate file is automatically created in the common csv format containing all measurements of the day.

The memory of the analyser can be expanded as required. For example, an SD card with 1 GB memory provides space for approx. 2.5 million measurements. The SD card can also be retrofitted to older OXYBABY models after a software update.

The card can be used for data exporting and the user can easily edit the data in a spreadsheet program or archive it directly.

Available on request, an SD card reader/adaptor option makes it compatible with hardware such as a PC, notebook, tablet or smartphone.

The OBCC software option is also available to offer the option of editing master data such as products and users on the computer, and then importing that master data into the gas analyser.

**Niche Gas Products**  
[www.nichegas.com.au](http://www.nichegas.com.au)



## Sensitive analyser for food, flavour and beverage testing

The FlavourSpec comprises advantages of a gas chromatograph (GC) with regard to selectivity and sensitivity of an ion-mobility spectrometer (IMS) enabling the analysis of volatiles in the headspace of liquids and solid samples without any sample pre-treatment.

It operates isotherm in a range of 40–80°C and can be set to >100°C for baking out (cleaning). To better separate compounds, the instrument uses a firmware steered ramping by its integrated electronic pneumatic controller.

FlavourSpec consists of an automatic headspace injector that does all sample conditioning. The operator enters the measurement parameters (number of samples, conditioning and run time) via the easy-to-operate menu on the sampler.

It provides an automatic data acquisition on the device and when connected to a PC 3-D data visualisation and analysis by G.A.S. Laboratory Analytical Viewer (LAV) software.

Besides the possibility of quantifying single marker compounds, additional software plug-ins help to easily detect the appearance of new compounds or the differences of their concentrations to a reference sample to further match peak pattern with sensory wise defined flavours. The result classifies differences from a selected reference (golden standard) to quickly characterise for example, the quality of a sample.

This concept follows the approach of the electronic nose, but using a specific and reliable physical separation/detection of the volatile compounds by GC plus IMS instead.

Applications include control of raw material quality and storage conditions, flavour stability and off-flavour detection, process control, product quality test and authentication.

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## Multi-probe wireless temperature sensor

Monnit has released a multi-probe industrial wireless temperature sensor, featuring four independent sensor probes to accurately measure and track multiple temperatures on one device.

The ALTA Industrial Wireless Quad Temperature sensor can monitor temperature-critical applications such as food coolers, HVAC systems and data centre monitoring.

For example, one quad temperature sensor can provide a preventive maintenance system for HVAC applications by monitoring the input and output temperatures of air handling systems. It also confirms proper operation and sends notifications via text or email if maintenance is required.

Sensor data is stored in the iMonnit Online Sensor Monitoring and Notification System, and can be reviewed and exported as needed from tablets or smartphones. Notifications and alerts can be configured through user customisation to inform users of temperatures above or below an optimal range.

The sensors have a probe temperature range of  $-40$  to  $+125^{\circ}\text{C}$ , and over-the-air updates for new fixes or features. They are housed in an IP65 NEMA 4X, CE rated, sealed and weatherproof enclosure, with a single, replaceable 3.6 V battery.

**Metromatics Pty Ltd**

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



## Food and feed testing system

A validated analytical workflow is designed to provide a sensitive and reliable solution for screening for testing food and animal feeds.

A dioxin analyser workflow, which incorporates the Thermo Scientific Triple Quadrupole TSQ 9000 GC-MS/MS system, enables detection of dioxins and 'dioxin-like' polychlorinated biphenyls at lower levels now required by European Union regulations.

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# Quantitative, non-destructive leak testing solutions

**The Sealtick non-destructive leak testing device delivers exceptional performance in industrial and manufacturing environments and offers quantitative results, stored internally, which can be retrieved for quality traceability. The devices are also available in different versions for testing a wide range of package sizes and shapes.**

The Sealtick leak testing device from Bestech Australia offers easy and simple solutions for testing the integrity of food and pharmaceutical packaging. Requiring only air and power, the device utilizes vacuum decay testing principle to inspect whether leaks are present in the packaging. Test can be completed typically in 5–20 seconds and the packages can be returned to the production line in good condition upon testing. As the leak rate is quantifiable, this device provides the highest level of reliability to the manufacturer and ensures that the products are safe to consume for customers.

## Leak classifications

When the packages fail the standard leak test, classifying the degree of leakage is essential for engineers and operators to identify the root cause of issues. This is where the Sealtick device stands out as it not only guarantees measurement accuracy and long-term reliability in production environments but also features an internal storage for quantitative results, which can be retrieved for quality traceability. This justifies a higher price level as compared to conventional underwater leak testing devices.

The test can be initiated by placing the package in the test chamber. The chamber is then evacuated to a pre-set vacuum

level. At this stage, any large leaks from the package provide extra air for evacuation which increases the time required to reach the pre-set vacuum level. Coarse leaks or large leaks are identified when the rise time required to reach the set vacuum level is longer than the maximum allowable time.

If the rise time is within the allowable limit, the package is said to pass the coarse leak test. The package is then isolated from the vacuum source, allowing a measurement of vacuum decay towards atmospheric pressure. This rate of decay is used to identify small or fine leaks in the package by comparing it to allowed leak rate limit. A lower maximum allowable leak rate can be specified if packages need to be tested against smaller leak sizes.

## Benefits for food industry

All types of contaminations, whether physical or chemical, will compromise the food products, making them unsafe for the consumers. Even leakage of air into the package accelerates the decomposition which reduces their shelf life and they potentially arrive at the customer's shelf in a bad condition. This would reflect badly on the company brands and results in massive product recalls.

The Sealtick leak testing device offers a simple and easy approach to test the integrity of food packaging. It is reliable and provides

accurate results in the long-term as leak justification is not operator reliant. Instead, the device determines whether the package passes or fails the leak test based on the pre-set leak and decay parameter. The packages can be returned to the production line upon testing, minimizing waste and production loss. It also ensures the manufacturer that product contamination is unlikely during transportation and the products retain their maximum shelf life.

## When it wouldn't work

In general, this testing system is suitable for testing any type of packaging, provided the packages contain headspace. Such examples include snacks or dried food, coffee beans, pet food, etc. This system is not suitable for testing vacuum-sealed packaging that is commonly used for products such as cheese blocks and meat products.

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# bulk handling storage & logistics



# Solving dust issues

Dust capture is an important part of maintaining a clean production environment to ensure 100% operational efficiency in any food and beverage manufacturing plant. We chat to Vince Marcucci from SMC about his company's recently released cost-effective and simple solution to this pesky problem.

**D**ust may seem harmless enough, but it can pose a major risk in food plants, with almost a quarter of all reported industrial dust explosions occurring in the food and beverage industry. Furthermore, if dust is not captured when processing products such as sugar, starches and milk powders, valuable product can be wasted and there is also the potential risk of food cross-contamination and workplace health and safety. The cross-contamination is particularly important for manufacturers of gluten-free and allergen-free products.

The dust removal process can also involve significant energy costs — particularly when a bag house could have six or more valves, with hundreds of valves at any one facility.

According to Marcucci, SMC Corporation has now developed a valve technology — the JSXFA — that is designed to provide users with many advantages in the dust removal process, including improved energy efficiency, longer life cycle and better clean functionality for resource recovery.

Developed in Japan and recently released in Australia, the dust valve includes a fast closure and response that can flow large volumes of air at a higher pressure for a short period of time. This is sufficient to create a shock wave that cleans the bag — while reducing costs. “By having a faster close, energy savings of around 35–45% in compressed air can be achieved,” Marcucci said.

SMC's JSXFA valves are rated to at least 10 million cycles but according to Marcucci they could last even longer.


“The elastomer material used in the SMC design is robust and has been tested up to 12 million cycles with no issue,” he explained.

“Traditional valve technology uses a thin rubber diaphragm and because it's quite thin it's susceptible to premature failure — it only lasts around 1 million cycles.”

Another issue with traditional valve technology is that the flow path is quite aggressive, said Marcucci, whereas the SMC valve's flow path has been designed to be smoother. “Dropping the seat height provides easy flow of air, which is claimed to increase peak pressure by 15% and this provides a better cleaning of the bag. Then, should a bag house be operating in ‘on demand’ cleaning control, this also represents fewer cleaning cycles, further reducing compressed air consumption.”

Key improvements to highlight include:

- 15% increase in peak pressure
- 35% reduction in air consumption
- 45% reduction in OFF response time
- 40% increase in flow rates

The JSXFA valve also comes with two different types of fitting suitable for different installations. One is direct mount with threaded connections and the other a compression fitting also known as a dresser nut. 

SMC Australia | New Zealand  
www.smcanz.com



## Lithium-ion powered forklifts

Mitsubishi forklifts are designed to be smooth, safe and easy to operate, making them suitable for safe, clean and productive lithium-ion (Li-ion) batteries. Benefits of Li-ion forklifts include rapid recharging, zero maintenance, no dangerous acid spills or gas emissions, and long runtime.

Li-ion batteries naturally take charge faster than lead-acid batteries and can be 'opportunity charged' to less than full capacity. Lead-acid batteries, on the other hand, can succumb to negative sulfation effects if they are not charged fully or left in storage too long. Full charge for a lead-acid battery takes around 8 h, whereas a Li-ion battery will charge in 1–2 h, with no cooldown period required, and work for up to 20 h.

Lead-acid batteries also produce hydrogen gas when charging, meaning users have to be careful where they charge them. Li-ion batteries can be charged anywhere, as there is no gas emitted from the battery. This eliminates the need for a ventilated battery charging space and is especially advantageous for those working in the food and pharmaceutical industries, or anywhere a clean environment is of import.

Just one Li-ion battery is required per machine and it never needs to be removed, eliminating the risk of injury when changing batteries. Li-ion batteries don't contain acid, which eliminates the risk of acid spills and the need for associated safety measures. They also don't require water, making them maintenance-free.

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# CLEAN HYGIENIC SMART

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## CASE STUDY

### Efficient process-controlled access guarding without muting sensors



Based in Germany, WITRON specialises in the planning and realisation of warehouse and order picking systems in the field of intralogistics. The company is constantly striving to develop better, more cost-efficient and safe logistics solutions for its customers. In the area of automation and further optimisation of warehouse logistics, the selection of suitable partners also plays a decisive role.

When man and machine meet in a mechanised environment, it must be possible to stop machine and system parts within a fraction of a second. "The safety of all persons who work in one of the many logistics centres of our customers around the world — whether in industry, retail or service — is the asset most worthy of protection," explained Stephan Schmid, Project Engineer in the area of development and control technology at WITRON. This means that appropriate areas are equipped with safety devices or fencing that meets the applicable standards and norms so as to eliminate accident risk before it can even occur.

But because it is not possible to completely fence in all areas in which man and machine meet in a networked, mechanised system, WITRON is working on systems such as conveyor lines with safety light curtains that must reliably distinguish between people and merchandise.

Especially in intralogistics and in the automotive and packaging industries, affected areas must be safeguarded by optical safety sensors.

To unambiguously recognise transported goods as they approach a protective field and to bridge this for passage of the goods at the proper time, muting processes with signal-emitting muting sensors have been used across the industry in the past. These sensors were installed in addition to the safety light curtains and enabled pallets and transported goods to move in and out without interruption. In front of and behind

the safety light curtain, however, quarters are usually a bit tight. The additional use of bridging sensors often required more space, leading to a less compact system design. The installation and service effort for the additional set-up, alignment and realignment of these sensors also resulted in additional work. "This led WITRON to search for a solution that combines process reliability, system availability and easier operation with one another," Schmid explained.

At that time, Leuze electronic did not yet have a practical answer to this requirement, but did already have a project idea. The idea, known as 'Smart Process Gating' is based on its MLC safety light curtains. Leuze electronic

presented this to WITRON in a very early development phase. WITRON was quickly convinced of this idea and assisted Leuze's development in numerous practical tests. Smart Process Gating (SPG) was then put through its paces by WITRON on its test tracks in its company headquarters, where it was further optimised.

"The result is impressive: a clever solution was created that combines the requirements for safety at work with high process reliability and system availability," explained Josef Apfelbeck, Key Account Manager and Specialist for Intralogistics at Leuze electronic. With SPG a new process was created that enables muting processes to be executed more easily, more compactly and more stably. With the SPG principle developed on the basis of Leuze's MLC safety light curtains, it is possible to completely forego the previously necessary muting sensors. Conveyor systems can thus be made more compact. During the operating phase, the risk of misalignment or damage to the sensors is also eliminated as are the costs for their maintenance and servicing. The availability of the entire safety device is thereby increased and other practically oriented risks reduced.

With SPG, the first muting signal comes from the process control (PLC), while the second muting signal is generated by the protective field itself. SPG requires a controlled material flow so that the necessary PLC control signals are made available in the expected time window. The MLC 530 safety light curtain variant with SPG is TÜV certified for safety.

In combination with a standard control, a performance level PL d can be achieved, which is sufficient for many applications in intralogistics. With a safety control, performance level PL e is also achievable.

Leuze electronic Pty Ltd  
[www.leuze.com.au](http://www.leuze.com.au)





### Magnetic separator and metal detector

The RE7 Xtreme magnetic circuit from Eriez alongside the Xtreme Metal Detector (XMD) is designed to provide a solution for food industry applications requiring a high level of protection against metal contamination.

The improved Xtreme RE7 magnets are proven to be 13–40% stronger than other magnets on the market today, as confirmed in head-to-head pull tests, according to the company. The Xtreme RE7 is available in all Eriez magnetic tubes, grates and liquid line traps.

The Xtreme Metal Detector is specifically designed for food processing applications. Using advanced technology to minimise false trips, the unit is designed to detect small metal contaminants in challenging production applications.

The 'double team' concept, combining the Xtreme Metal Detector with the Xtreme RE7 magnetic separator, results in a solution that maximises protection while maintaining high product yields. Together, the RE7 and XMD help protect against dangerous, contaminant metals in finished products or process flows.

The products comply with HACCP International Food Standards.

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## IP69K safety light curtains

The Schmersal SLC/SLG440 range of IP69K safety light curtains and light grids is suitable for hygiene-sensitive sectors including food, pharmaceuticals, meat and milk processing. The range is resistant to daily cleaning processes prevalent in such industries.

Its detailed design protects against ingress of water during close-range high-pressure and high-temperature spray. The seals can withstand frequent cleaning with water, alkali solutions, foam, hot steam or high-pressure jets.

The locking caps are manufactured in stainless steel (V4A) as are the cable inlet and the fastening parts. Transparent protective tubes are resistant to cleaning agents and strong mechanical loads.

As with the standard SLC440 safety light curtains, the SLC440 69K are available in lengths from 170 to 1920 mm and two resolutions of 14 and 30 mm. The safety light grids SLG440 69K are available in 2, 3, 4 light beam grids. The SLC/SLG440 IP69K are both suitable for use in safety circuits up to PLe (EN 13849) or SIL3 (IEC 61508).

**Control Logic Pty Ltd**

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

## Segmented transfer plates

Flexco has introduced a Segmented Transfer Plate with options from 3.8 to 7.6 cm gaps between conveyor belts. Segmented Transfer Plates are designed to prevent product and foreign object debris from jamming in the transfer, minimising product and belt damage, improving efficiency and eliminating downtime.

The device can be installed into narrow gaps and is designed to release under extreme pressure, such as when a product lodges between the belt and the segment.

A single segment releases to dislodge the product, leaving remaining segment pieces intact, thereby protecting operational efficiency.



**Flexco (Aust) Pty Ltd**

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

## Refrigerant gas detector range

Bacharach has announced the addition of 22 halogen refrigerants for its MGS-400 gas detectors for commercial and industrial gas leak monitoring applications.

The range of halogen refrigerants includes: R1234yf, R1234ze, R134a, R22, R32, R404a, R407a, R407C, R407f, R410a, R422, R422D, R427A, R434A, R448A, R449A, R450A, R452A, R454A, R454C, R507a and R513A.

The MGS-400 series products use three different sensor types, depending on measurement range, temperature and gas type, to detect hazardous refrigerant leaks. The sensors offer flexibility with refrigerant leak detection, helping users achieve compliance with safety standards such as ASHRAE 15, CSA-B52 and EN 378 inside of machinery rooms, mechanical equipment rooms, chiller plants, cold storage facilities and walk-in freezers.

A mobile app interface simplifies commissioning and maintenance without special tools. Calibration certificates can be generated from the mobile app, making calibration documentation easy to create and send by email or store in the cloud. A Modbus RTU interface and analog and relay outputs enable easy safety alarming and automation control. Plug-and-play precalibrated sensor modules facilitate quick, simple sensor replacement.

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## Touch panel PC

Extending its line of panel PCs, Winmate is adding a 23.8" model to the selection. Designed to be rugged, the line of stainless steel panel PCs are fully sealed to meet IP69K standards of protection against intrusion from dust and water.

The projected-capacitive (PCAP) touch screens support rain/glove modes for use in a range of different environments including harsh, wet and dusty conditions. Additionally, this allows the screens to be cleaned and sterilised with ease. Made of corrosion-resistant stainless steel and featuring an edge-to-edge flat screen design, the PCs are resistant to chemicals and reagents, can withstand cleaning with water temperatures up to 80°C and pressures of up to 30 bar.

The PCAP screens featured by these PCs are resistant to scratches by way of their glass-cover lens, and their touch features support 4-point multi-touch, easily controlled by fingertips to make every command simple and convenient. With the new 23.8", 1920 x 1080 design, users can clearly see every aspect of their work.

Other sizes in the range include 10.4", 15", 19" and 21.5" screens.

Key features include: 23.8", 1920 x 1080, PCAP touch screen; Intel Celeron Bay Trail-M N2930, 1.83 GHz; SUS304 stainless steel for food and chemical industries; full IP69K waterproof enclosure with good corrosion resistance; flat, easy-to-clean front surface with edge-to-edge design; USB 2.0, RS232 and RJ45-10/100/1000 LAN; waterproof ports with adapter cables for external connectivity; support for VESA mount; and support for glove/rain mode (optional).

**Backplane Systems Technology Pty Ltd**

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

## USING INDUSTRIAL ULTRASONIC CLEANERS IN YOUR FACILITY

Ultrasonic cleaners are extremely worthwhile when a component or part is very complex, needs to be super clean, or the manufacturer wants to save on labor and even energy costs.

Industrial ultrasonic cleaners provide manufacturers with a range of tangible bottom-line-boosting benefits, including:

### Speed

An average ultrasonic cleaning cycle lasts between two to 10 minutes, with cleaning times varying widely based on the size, composition, and number of components to be cleaned.

### Safety and Environment

Implementing ultrasonic cleaning technology removes manual cleaning, safety hazards and creates a safer, more environmentally friendly work environment.

### Increased Cleanliness

Ultrasonic technology has the capacity to reach into components on a microscopic level, cleaning even small or complex applications where a cleaning brush might not reach.

### Protection and Longevity

A properly calibrated ultrasonic cleaner uses touch-free cleaning on a microscopic level that can protect the surface of even the most delicate components.

### Savings

Ultrasonic cleaning utilizes affordable water-based soaps and enzyme solutions instead of spray solvents and toxic cleaning products, saving manufacturers 70 percent or more in solvent costs.



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## Rotary lobe pumps

Alfa Laval OptiLobe rotary lobe pumps are designed to provide gentle product treatment and easy serviceability. The Alfa Laval OptiLobe 10 and OptiLobe 50 add four new pump sizes to the range. The new pumps also provide the possibility of having heating/cooling front covers for processes where products tend to harden at low temperatures.

The pumps' high-precision rotors and low-shear operation provide gentle handling of delicate products.

Seal faces in the pump have direct contact with high-velocity product media, providing a fast and secure cleaning-in-place (CIP) process, reducing cleaning time and contamination risk.

Engineered for use within the food, dairy, beverage and home-personal care industries, the positive displacement pumps conform to CE directives and EHEDG, 3-A and FDA hygienic standards.

Other features include: an advanced rotor shape design and rotor case that incorporates cusps; design that reduces pulsation and noise emissions; internal product recirculation; factory-set shimming that simplifies maintenance; and full interchangeability of spare parts.

**Alfa Laval Pty Ltd**

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



## Cobot palletiser

simPAL Mini is a cobot palletiser combining smart software and smart hardware to create a highly flexible palletising solution. The simPAL Mini cobot palletiser features the TM12 collaborative robot by Techman Robots. Small but powerful, the TM12 collaborative robot has a payload capacity of 12 kg and 1300 mm reach, allowing simPAL Mini to effortlessly palletise onto a standard 1165 mm Australian pallet and operate up to eight cycles/min.

simPAL Mini requires minimal floor space, just 270 mm wider than a pallet, making it suitable for small spaces. simPAL Mini also has the option of single or double pallet positions.

The TM12 resonates with 'smart thinking' and includes a fully integrated vision system utilising a 5 MP camera. Gone are the days of needing hardwired scanners to detect product types. Combined with TM-Flow software, the cobot's vision system can read text, barcodes or QR codes and distinguish shapes and colours, all of which offer flexibility and futureproofing of the palletising system.

simPAL Mini can read the text or barcode on a carton and correctly palletise that product accordingly. This innovation allows easier, more flexible product integration or the addition of new product or packaging types.

More than just a cobot, simPAL Software utilises over a decade of palletising experience. simPAL Software allows new products to be introduced without requiring costly reprogramming and helps owners easily generate new pallet patterns and save new recipes. It features an Automatic Pallet Generator that creates an optimised pattern. Custom patterns can also be created directly on the touch screen. Coupled with the lead to teach capabilities of a Techman Robot, programming a simple pick and place can be achieved in around 5 min.

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# Helping robots come to grips with motive and context

**A** new study by the National Centre for Nuclear Robotics in the University of Birmingham states that robots need a conceptual understanding of motive, similar to that of humans, so they don't perform tasks blindly, without context. This will determine if robots are able to safely work alongside humans in future.


The paper, published in *Nature Machine Intelligence*, explores the issue of robots using objects, with the act of 'grasping' by robots representing the cutting edge of robotics research. This shift in thinking is crucial as economies, factories and homes embrace automation, connectivity and digitisation, and levels of human-robot interaction.

Most factory-based machines blindly pick up familiar objects that appear in predetermined places at just the right moment. Getting a machine to pick up unfamiliar objects, randomly presented, requires the seamless interaction of multiple, complex technologies. These include vision systems and advanced AI so the machine can see the target and determine its properties (for example, is it rigid or flexible?). Sensors in the gripper could also be required so the robot does not crush an object it has been told to pick up. Despite all this, researchers in the National Centre for Nuclear Robotics revealed that robots

still do not understand the goal of grasping an object, or why it is instructed to carry out certain activities.

*Nature Machine Intelligence* provides an example of a robot in a factory picking up an object for delivery to a customer. The robot holds the package securely without causing damage, but the robot's gripper obscures a crucial barcode, which means the object can't be tracked and the firm has no idea if the item has been picked up or not; the whole delivery system breaks down because the robot does not know the consequences of holding a box the wrong way.

"What is obvious to humans has to be programmed into a machine and this requires a profoundly different approach. The traditional metrics used by researchers over the past 20 years to assess robotic manipulation are not sufficient. In the most practical sense, robots need a new philosophy to get a grip," said Dr Valerio Ortenzi, at the University of Birmingham.

The research is the result of a collaboration between the Centre of Excellence for Robotic Vision at Queensland University of Technology in Australia, Scuola Superiore Sant'Anna in Italy, the German Aerospace Centre (DLR) in Germany and the University of Pisa in Italy. 

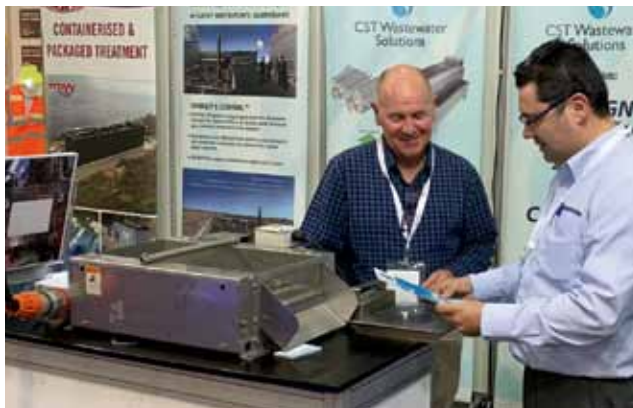
## CASE STUDY

### How can food manufacturers halve waste?

The CST Wastewater Solutions KDS separator system was displayed at the recent FoodTech Qld exhibition. It is designed to remove 50% of the water from wastewater sludge, creating a more compact output ready for transport to a treatment centre.

“Food and beverage companies are highly aware of the need to dispose of waste responsibly. But small-to-medium operations can’t afford to install expensive processing, compacting and drying plants at their own facilities, so they need to have it carried to a dedicated treatment centre — usually by road. That’s where the costs can start to add up with sodden or wetter wastewaters,” said Michael Bambridge, Managing Director, CST Wastewater Solutions.

“Compacting the wastewater onsite prior to transportation can lead to significant savings, particularly when you consider that it can cost upwards of \$150 a ton to move by specialised transport.”



The smallest separator system available is approximately 250 mm wide with throughputs of one cubic metre or one tonne every hour, depending on the application. The clog-free automatic technology is suitable for compact dewatering applications including: food processing waste, seafood processing and abattoir, feedlots and dairy farm wastewater and sludge.

“The machine can be placed into existing facilities without the need for a major upgrade of the overall space,” Bambridge said.

Used for thickening of dissolved air flotation sludge, the KDS liquid-to-solid separator is claimed to achieve solids capture of 97% thickened sludge at a dryness of 17%. Waste activated sludge dryness levels are typically 15–25%.

CST Wastewater Solutions  
[www.cstwastewater.com](http://www.cstwastewater.com)

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what's new in

# Food

technology & manufacturing

Processing



## Skim milk powder spray could replace emulsifiers in food

Penn State researchers have discovered a new method of processing, by using high-pressure jets to spray milk and then quickly drying the spray, to produce skim milk powders with enhanced properties and functionality.

As concerns about 'clean labels' increase amongst consumers, providing recognisable ingredients on products has become a priority for food and drink manufacturers. This novel processing strategy could remove synthetic ingredients from food labels, in keeping with rising consumer demand for 'clean' labels.

"On the label, it would just say 'milk proteins' — that is something all consumers can recognise, nothing is synthetic," said Federico Harte, Professor of Food Science at Penn State.

This method of processing could replace food emulsifying and foaming agents like carrageenan, agar, albumin, polysorbate, saccharides and lecithin, allowing consumers to recognise the ingredients in their products. Milk proteins could be used as emulsifiers or as foaming agents in food products in which a clean label is important, like ice-cream.

Creating skim milk powder through this method revealed notable increases in foam expansion and foam-volume stability, indicating that the skim milk powder could be a strong candidate for use in lattes. This process could be able to develop vending machine powders from just milk and coffee that can create long-lasting foam, to be used in bottled cold cappuccino coffee.

Harte published his research on high-pressure jet processing of food in the *Journal of Food Processing*. The study focused on a device that pressurised pasteurised, skim milk using an intensifier pump and then sprayed the milk through a diamond or sapphire nozzle.

Liquid is expelled from the nozzle as a jet of fine droplets that form an aerosol. The spray is then dried to obtain skim milk powders. Unlike liquids, powders have a wide range of applications due to their shelf-life stability and lower cost of transportation and storage.

Scaling up the process for industry is challenging, as the flow-through of the pumps is relatively low.

"We need to achieve a throughput that is attractive to industry. We are talking about a few litres per minute now, and industry needs hundreds of litres per minute. We are discussing with the manufacturers of the pumps ways to scale this up," Harte said.

Harte has applied for a patent on foaming properties from milk protein, which is currently under revision and should be finalised by the end of the year.



Credit: Federico Harte, Penn State.

*Researchers were able to generate a powder that can be used as a natural foaming agent. The picture shows two cappuccino coffees; the one on the left made with standard skim-milk powder and the other using powder obtained with high-pressure jet spraying and drying.*



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## How a Swedish food plant recovers 98% of compressor energy

PROCESSING

**A**s a result of installing a new oil-free compressed air plant, with 98% energy recovery, Swedish food company Dafgård Foods has been able to make big energy savings as well as reduce costs and carbon dioxide emissions. The short payback period and increased capacity made the choice for Atlas Copco an easy one.

### Oil-free compressors for increased air quality

During 2010, Dafgård Foods expanded its production by building a new bakery, where the company's famous sourdough bread is baked.

Dafgård Foods Technical Manager Anders Dafgård explained, "With the expansion of our production, our demand for compressed air increased. Our compressed air system at that time was not up to the task. For that reason, we contacted Atlas Copco to review the potential for a new and larger plant," he said.

It became apparent that potential energy savings and increased compressed air quality could be made by switching from oil-injected to oil-free compressed air.

"Atlas Copco performed an air-energy audit," said Dafgård, "and we began to discuss the oil-free air alternative, dew points, energy recovery, a new compressor room, life cycle cost calculations, control systems for multiple compressors..."

"The compressed air quality of the oil-free compressor with internal MD dryer, together with the short payback period, became the deciding factors for the choice of the new oil-free air compressor," said Klas Johansson, Sales Engineer at Atlas Copco.

Dafgård commented that "When upgrading our production, we always strive to improve our energy use, which means that we always choose the most energy-efficient alternative. That was a major factor in the choice of the new air compressor."

### Cost savings

Dafgård Foods installed a ZR 160 VSD FF oil-free air compressor with variable speed drive, internal MD dryer and an ES8 control system for multiple compressors.


"We have decreased our energy costs by approximately \$140,000 per year and lowered our carbon dioxide emissions by 117 metric tons per year," said Dafgård.

### Energy savings

Atlas Copco's system for energy recovery enables surplus energy to be used for heating. Dafgård Foods recovers approximately 98% of the compressor input energy, which is used for preheating diluted water for the production's boilers.

"We have many processes in our production where we use direct-acting steam. In order to use the energy recovered from the compressor, we have installed a heat exchanger, which transfers the heat to the diluted water."

Dafgård Foods Processing Compressed Air Manager Jan-Ake Karlsson said that the plant saves approximately 1100 MWh/year.

"In addition to all this we have also gained drier compressed air with higher quality," he said. 

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

# Canola oil processing

## heats up with biomass



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**O**ilseed crushing, refining and packaging company MSM Milling is now using a biomass boiler to power its manufacturing plant located in Manildra, 300 km west of Sydney. This makes the company one of Australia's first large-scale food manufacturers to use biomass for thermal energy.

Founded by two brothers in 1991, the company's canola oil is used in popular biscuits, cereals, snack bars and even Australian KFC stores.

Historically, the company trucked in LPG for the boilers as it wasn't connected to the gas grid, but faced with rising transport costs and variable gas prices it began exploring alternative fuel sources.

In order to determine whether biomass could be a viable source of energy for a facility of this type, ARENA announced \$2 million in funding towards the \$5.4 million project in June 2018.

After an 18-month transition, the facility has now officially moved from gas-fired boilers to a biomass system fuelled by timber waste from forestry operations in surrounding areas.

Danish specialist Justsen supplied the biomass system and sent three staff to the regional site to manage the installation.

MSM Milling Director Bob Mac Smith said the biomass system has reduced their thermal energy costs by about 70%.

He added that the amount of work required to connect the new boiler to the existing plant may have been underestimated, but given the scale of the project it has come together smoothly.

"Technically the boiler and fuel handling system has been wonderful. I couldn't speak highly enough of the suppliers — the installation and the quality of their work and the equipment itself has been fantastic," he said.

As a source of steam to power the oilseed processing plant, Mac Smith said the biomass system is behaving much like the gas system it replaced.

"It's really just a fuel source. What we've done is replace three independent smaller gas-fired boilers with one large biomass fired boiler. Our guys do say that the new system provides more stability with more torque or grunt than the system it replaced. It's smoother, it's like having a V8 engine out there doing its thing compared to three two-stroke motors."

Functionally, the operation of the plant is largely unchanged. The boiler runs around the clock and requires the same inspections every 12 hours as the old gas-powered system.

"There's more logistics involved in getting fuel here, having said that, now it's been running for some months that's pretty seamless. It's not a massive imposition — rather than getting one truckload of gas every week, we get four truckloads of biomass.

"If there was an additional impost, that would be about it. It's just a logistic exercise... we move six or seven thousand tonnes of product every week both coming in and going out, so it's not a big deal in the scheme of things," he said.

He added that the boiler is producing about 500–700 kg of ash for every 100 tonnes of biomass processed, which is being used in road base and combined with chicken manure to fertilise the family farms.

The emergence of an Australian biomass-powered operation has not gone unnoticed. Mac Smith said he is regularly approached by businesses interested in embracing bioenergy, or even to supply waste products that could fuel the boiler.

Australian Renewable Energy Agency (ARENA)  
[www.arena.gov.au](http://www.arena.gov.au)





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# Craft beer company

## rocks with new can filler



Image source: Magic Rock/Sam Needham

**D**ue to increasing demand for craft beer, Magic Rock in the UK extended its production facilities to include a KHS Innofill Can C can filler. The unit has 21 filling and three seaming stations, enabling the brewery to quadruple its previous output.

The Innofill Can C is designed for low to medium outputs depending on can size, enabling between 10,000 and 40,000 cans to be filled per hour. In addition to quick commissioning and thorough hygiene the system features low oxygen pickup and fast format changeovers. The can filler also features a computer-controlled, volumetric filling system for accurate and uniform fill levels when processing 330 and 500 millilitre cans.

Brewers like Magic Rock produce unpasteurised beers, ensuring oxygen pickup during production is low, while

maintaining high demands of hygiene and product quality. This process is simplified with the Innofill Can C, as the need for external water lubrication is replaced with bells, sealed by PTFE expansion joints, on the filling valves. The can filler system is also easy to clean and maintain, providing flavourful beers months after canning.

With a sizeable yield exported to 25 countries, Magic Rock commissioned the Innofill Can C system and integrated it into their existing line without elaborate installation measures. The can filler system allows flexible format set-ups and quick product changeovers, suitable for the brewery's varied production of IPA, pale ale and Surreal Stout.

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# Automated wastewater systems a technological leap

Important technological advances in recent years have meant the Australian food industry can farewell the days of high-maintenance wastewater treatment systems. Automated system instrumentation allows technicians to better track the operations of their wastewater treatment plant and be alerted to any potential issues before they arise — meaning potential cost savings, while keeping the authorities happy.

Even old wastewater treatment plants can benefit from an automated system.

“Any manually controlled plant can be integrated with a complete automatic operation system,” said Aerofloat General Manager of Engineering Michael Anderson.

“It’s important for companies to keep up with the latest technology in order to remain current and to ensure local council expectations are met.

“Companies are now encouraged to prepare detailed reports for local council authorities. Automated system controls ensure that data is continually being collected, which means reports can be quickly generated for council. In turn, this also reduces the frequency of independent testing, saving the industry valuable time and money,” Anderson added.

With wastewater treatment plants often located at the back of a production site or set in limited access areas, automated system instrumentation coupled with remote monitoring capabilities can have enormous benefits. Remote monitoring means technicians can keep on top of wastewater levels and adjust the system without physically being on site. This can have a huge impact on the bottom line, freeing up staff to concentrate on quality control on the production line instead.

Aerofloat’s remote monitoring capabilities allow technicians at Micropellets in Braeside,

Victoria, to log onto the system from anywhere in the world to check the operations, monitor the waste and adjust the system as required.

According to Steve Cook at Micropellets: “Any unusual activity is picked up quickly and our operators can respond before an incident eventuates.”

Management have the option of viewing information on a range of devices including a mobile, smartphone, tablet or desktop. Notifications can be sent directly to the nominated device via an easy-to-operate app and can also be remotely viewed by Aerofloat technicians if further advice is required. Operators can log onto the system to adjust parameters, monitor trends, optimise settings and prevent incidents.

“I can check operations quickly and effectively via the app on my phone, no matter where I am each day,” Cook said.

The peace of mind that comes with knowing that wastewater system automation is continuing to work even after staff have clocked off for the day cannot be underestimated.

“One of the great outcomes of Aerofloat’s automated system instrumentation is the ability to predict and prepare for incidents,” said Anderson.

Gone are the days of arriving at 7 am on a Monday to find an issue has gone unchecked. An automated system means

that the wastewater treatment plant is under constant surveillance.

“The pumps, water levels, temperature, pH and other components are being monitored and logged, and trends recorded 24 hours a day,” Anderson said.

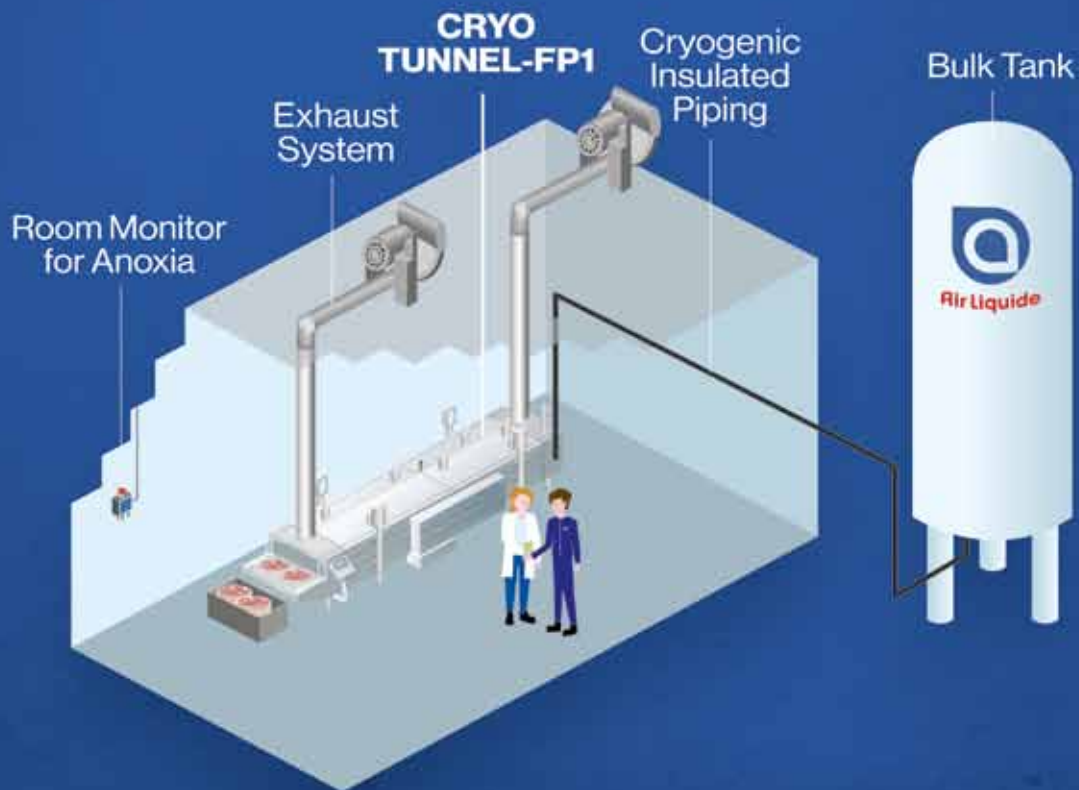
As a family-run, Australian-owned company, Aerofloat offers the food industry a full range of wastewater treatment expertise, including software programming and electrical support for all its automated wastewater system instrumentation. Aerofloat electricians can install systems directly, saving on unnecessary contractor fees.

Automated system instrumentation ensures controls are always within reach, even when offsite; and with council demands for detailed wastewater reports becoming more frequent, automated monitoring and ongoing data collection is fast becoming a necessity for the industry.

  
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# Tracking down aroma

## — science meets senses

**Aroma analysis is a valuable addition to the quality assurance of products.**

*Dominique Weiss, CEO, Tentamus Helvetia and Dr Monika Christlbauer, CEO, aromaLAB*

**T**he different questions that can be answered by aroma analysis are as varied as the range of aroma compounds themselves. Does a product have an untypical unknown smell? Does the product still possess the typical aroma at the end of its shelf life? How can internal sensory panels be reliably trained for product-specific off-flavours? But, the term 'aroma' should be defined first.

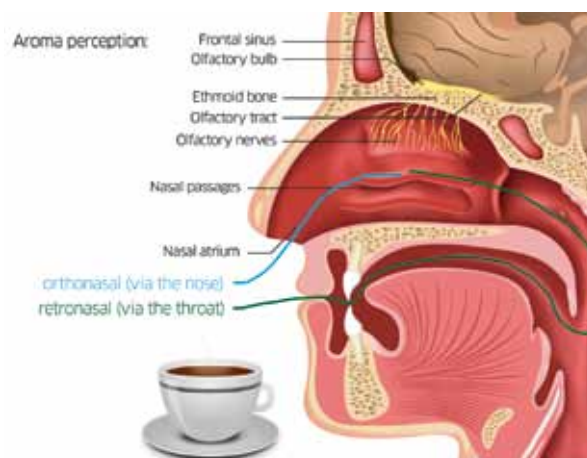
### What is aroma?

The technical term 'aroma' solely describes volatile compounds which can be perceived olfactively, by the human sense of smell. Commonly known aroma impressions such as smoke, vanilla and coffee generally consist of a multitude of individual aroma compounds. Aroma perception is a part of the organoleptic perception, which is formed by the aroma, taste and trigeminal impressions.

In contrast to the aroma, the taste of a product is perceived gustatory via the human taste organ and the trigeminal impressions via the fifth cranial nerve (trigeminal nerve). This interaction gives the overall organoleptic impression, known as flavour.

### How is aroma perceived and detected?

The volatile compounds of the aroma are perceived at the olfactory receptors of the nose. The volatile compounds can



*Organoleptic perception is formed by the perception of aroma, taste and trigeminal impressions.*

be received via the nose itself or via the throat. Only a small number of volatile compounds are aroma-active compounds — only about 5% in food.

In addition, these aromatic substances are usually only found in very low concentrations, which are nonetheless sufficient to stimulate the olfactory receptors of the human nose.



*The aroma expert determines the different aroma within a product by using the sniffing-port, whereas the gas chromatograph separates them.*

(Source: aromaLAB)

Abnormal aroma	Odour	Most common causes	Matrix
Geosmin	mouldy, beetroot	microorganisms (Streptomyces)	cocoa mass
2,4,6-Trichloroanisole	cork taint	microbial modification of chlorinated substances in the bark of the cork oak	wine
5 3-Methyl-2-buten-1-thiol	skunky	sunlight	beer
Various unsaturated aldehydes eg, (Z)-non-2-enal, (Z)-dec-2-enal, (E,Z)-nona-2,4-dienal, (E,E)-deca-2,4-dienal and trans-4,5-epoxy-(E)-2-decenal	fatty, metallic	sunlight	PET bottles mineral water
4-Vinyl-2-methoxyphenol	clove	degradation of 4-hydroxy-3-methoxycinnamic acid	orange juice
p-Cresol	like a cowshed	malfermentation	white pepper

Table 1: Overview of the most common off-flavours by matrix.

(Sources: aromaLAB; Pixabay)

The sensitivity of the instrumental detectors of the analytical equipment often fails to keep up with the human nose. The determination of the individual components of an aroma is therefore carried out using the combined measurement principle of gas chromatographic separation and the subsequent detection via the human nose at the sniffing-port, a technique known as gas chromatography olfactometry (GC-O). The results determined in total give a product's spectrum of aroma compounds.

### Why analyse the spectra of aroma?

The following practical examples provide an overview of the most common questions:

- There is a shortage of raw material and/or raw material prices rise significantly and there is a need to determine the level to which a specific raw material can be reduced within the recipe, while still maintaining the quality of the product's aroma.
- The supplier is no longer able to deliver a certain raw material at the usual quality and there is a need to determine the extent to which the new quality of the raw material influences the quality of the product's aroma.

- The use of added aroma is to be reduced within the context of providing 'clean labelling' and there is the need to determine the reduced level at which the quality of the product's aroma can still be maintained.
- During a new product development, a storage test is used to determine up to which point in time the product's aroma will retain the desired quality.
- Prior to changing the production process/technology, there is a need to determine to what extent the change in conditions will influence the quality of the product's aroma.
- A particular recipe of unknown composition is to be examined to determine the main components of its aroma.

In general, the consumer will have a negative perception of the aroma if:

1. the typical aroma of the product is missing or the perception is too low;
2. there is an inappropriate mixture of aroma compounds (recipe);
3. there are perceivable off-flavours.

Off-flavours generally occur during the transport of raw materials, in the event of changes in recipes, changes in production parameters, followed by the introduction of new packaging, changes in storage conditions and during the transport of the goods to the customer.

### What are the benefits of aroma analysis?

The analytical data form the basis for further clarifications and the deducing of internal measures. Targeted conclusions can only be drawn about the cause of the off-flavours once the characteristics of the aroma fingerprint are known. The most frequent causes are of a microbiological or chemical nature (Table 1).

The downstream possibility to synthesise the off-flavour is particularly helpful in the daily work. The standardised off-flavour can be used for training purposes and for the early detection of deviations in odour.

Off-flavours often occur in isolated cases and the recognition and evaluation of the situation is usually difficult in everyday work life. With the aid of off-flavour standards, processes within the framework of deviation management can be standardised.

As a result, trained personnel are able to directly recognise off-flavours upon the receipt of the goods, during the production process or the quality assurance routine and can act in accordance with predefined measures. The assignment of odour-related deviations during the process facilitates rapid intervention and avoids and/or reduces production errors and costly product recalls.



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# How safe is the food supply chain?

## 7 risks compromising customer safety

A white paper from food safety certification and training organisation SAI Global has highlighted that safety failures at certain points in the food supply chain, including contaminated foods, adulterated ingredients and the presence of unlabelled allergens, can have serious, potentially life-threatening consequences. The organisation says that more needs to be done to ensure customer safety by assessing and addressing risks across the entire supply chain.

SAI Global has audited thousands of food manufacturers to ensure they meet legislative requirements in the country of sale and manufacture, and comply with global food safety standards. The auditing process has revealed common mistakes that businesses are making when purchasing ingredients, and when storing, processing, packaging, distributing and handling food.

Despite the food industry's focus on customer awareness and developments in food processing and technology, food scandals continue to occur. In 2017, SAI Global found that 47% of consumers were less trusting of a business involved in a major food incident.

Kimberly Carey Coffin, Global Head of Food, Retail and Hospitality at SAI Global, said, "The ever-increasing complexity of the food supply chain translates to ever-increasing levels of risk, challenging an organisation's ability to satisfy its customers in terms of quality, safety, integrity and continuity. As an industry, we are particularly vulnerable when it comes to risks that can occur deep within those chains — like intentional and inadvertent adulteration, substitution, product mislabelling and cross-contamination with both naturally occurring and foreign materials."

Coffin is urging food businesses to thoroughly investigate their food supply chain to identify and mitigate any known risks. "Many of the faults that occur in the food supply chain are often the result of an organisation lacking adequate resources to mitigate risks, not understanding the importance of formally monitoring suppliers or having poor supplier relationships, to name a few," she said.

"Ever-changing consumer demands are also putting pressure on the need to demonstrate integrity of products, as well as on



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the continuity of supply. Now, more than ever, food businesses must impose strict assessment practices in food production, manufacturing and other stages of supply chain management to ensure customer safety is a primary focus.”

### Seven risks in the supply chain

SAI Global has identified seven risks that could compromise the integrity of the food industry supply chain, and hence customer safety:

#### 1. Fierce competition placing downward pressure on supply costs

Due to continual downward pressure on supply costs, food businesses are often forced to source from further afield, often opting to go global.

As a result, the chance of risk events occurring deeper in the supply chain increases, putting pressure on manufacturers to rethink their controls.

#### 2. Most companies are only monitoring their first- and second-tier suppliers

A recent study by SAI Global revealed that many food businesses are only looking at their first-, and perhaps second-, tier suppliers — rather than digging deeper into their supply chains. This is a significant source of risk.

#### 3. Most companies manage their suppliers through contractual arrangements, rather than more formal monitoring

A reliance on contractual arrangements places the onus on suppliers to manage their own supply chain. As a result, any risks or liabilities lie with the supplier; however, this does not eliminate the risk to the ultimate food manufacturer. As suppliers may not be as closely aligned with the customer, more formal monitoring of subcontractors or second- and third-tier suppliers is required to assess risks to product integrity.

“ Food businesses must impose strict assessment practices in food production, manufacturing and other stages of supply chain management to ensure customer safety is a primary focus.

”

#### 4. Many companies source raw materials through brokers and agents, resulting in loss of supplier relationships

Any food business that sources raw materials through brokers and agents — who can source from anywhere — risks losing control of supplier relationships. Therefore, companies need to get to know their indirect suppliers. Although this involves investing time and money, it enables more effective targeting and increases knowledge of a product’s source of origin.

#### 5. Ever-changing consumer demands placing pressure on continuity of supply

Consumers are no longer just looking for a source of ‘fuel’ in the food they eat. They are much better informed about the impact of diet, with food choices often guided by specific dietary requirements or the latest food trend. Given the need to cater to more diverse consumer preferences, there is added pressure on businesses to provide more information to consumers such as ingredient origin, nutritional information and allergens.

#### 6. Food brands have inadequate resources for mitigating risks

To mitigate risks, food businesses need to make supplier diversity management a primary focus. For instance, they need to move from the ‘preferred supplier’ model to a ‘multi-supplier’ relationship model. Although this takes the organisation to unfamiliar areas of the globe, it increases focus on building holistic supplier relationships of trust and transparency.

#### 7. The growth of private labels

There is an obvious financial incentive for retailers to sell private label products, as this allows them to maintain an identity in a price-competitive market. However, most retailers do not have manufacturing infrastructure and rely on suppliers to assess, interpret and manage risk. Again, this ties a food retailer’s brand equity to its suppliers, emphasising the need to manage downstream risk.



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# Disinfecting beer caps

## using UV LED technology

To ensure clean water for high-quality beer, brewing companies often install ultraviolet (UV) systems upstream of their brewing equipment, with the purpose of keeping the drinking water free of germs. Fraunhofer researchers are investigating a greener and more efficient alternative, which uses UV LEDs to destroy bacterial DNA. The technology is also suitable for disinfecting brewing water and for disinfecting the caps for bottled beer, soft drinks and mineral water during the filling process.

UV light is used to keep drinking water clean as it is very effective in killing bacteria, viruses and germs — their genetic material (DNA) is destroyed by the UV rays. The brewing water is disinfected by pumping it through stainless steel tubes in which UV lamps have been fitted. UV light with a wavelength of 265 nanometres is especially suitable for this task.

Until now, this UV light has been generated using mercury-vapour lamps, which emit light at 254 nanometres; but as this lies below the optimal wavelength of 265 nanometres, the disinfection performance is not optimal. A further disadvantage of this type of lamp is that mercury is a heavy metal that can damage the environment. Other disadvantages include long warm-up phases, short service lives and lack of flexibility due to their bulky design.

Researchers at the Advanced System Technology (AST) branch of the Fraunhofer Institute for Optronics, System Technologies and Image Exploitation IOSB, in collaboration with project industry partner PURION GmbH, have been investigating a solution to replace the conventional lamps containing mercury with ultraviolet light-emitting diodes (UV LEDs).

"We prefer UV LEDs, which emit at a maximum wavelength of 265 nanometres," said Thomas Westerhoff, scientist at Fraunhofer IOSB-AST. "Of particular interest are UV-C LEDs, because their radiation destroys the DNA of the pathogens much more

effectively. The UV rays generate resonances in the nucleic acids of the DNA and break the bonds of the molecules open. This changes the cell nuclei of the microorganisms in a way that renders cell division impossible. Consequently, the pathogens can no longer multiply."

The UV LEDs do not require any warm-up phase — they reach full power instantly. In addition, they offer high mechanical stability, are not toxic and can be operated at low voltage. Another advantage is that LEDs are spotlights, and by virtue of their radiation pattern, they offer a wide range of design possibilities.

Following numerous practical tests, the researchers are now able to operate the UV LEDs directly in water without the need for a tube to encase them. Thus they eliminate reflections to further increase the performance yield of the radiation sources.

For the industry partner, the experts have developed a special module that can disinfect the insides of beer caps during the production process before the bottles are filled with beer. This ensures that no germs get into the bottles during the production process. "We're able to irradiate the inner surface of the caps with a UV power of four watts. Doing that with mercury-vapour lamps on such a small surface is almost impossible," said the engineer.

The new technology also has applications in medical devices.





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EXAIR's Atomizing Spray Nozzles atomise fluids in a range of spray patterns for a variety of uses, including washing, rinsing, coating, cooling, quenching, wetting (moistening), humidification and dust control. They combine liquid and compressed air to create a mist of atomised liquid that can be easily adjusted to meet the needs of the user's application.

All models are stainless steel construction for durability and corrosion resistance and are available in 1/8", 1/4" and 1/2" sizes in 3 basic families:

Internal Mix Atomizing Nozzles mix the liquid and air inside the air cap and produce the finest atomisation. They can be

used on liquids with a viscosity up to 300 cP. Both air and liquid sides are pressure fed.

External Mix Atomizing Nozzles have high flow rates and allow the air and liquid flows to be adjusted independently. These nozzles are best where precise liquid flow is needed. They can be used on liquids with a viscosity above 300 cP. Both air and liquid sides are pressure fed.

Siphon Fed Atomizing Nozzles require no liquid pressure and can be used with gravity fed liquids or liquids from a siphon height as much as 91 cm. The nozzles can be used on liquids with a viscosity up to 200 cP.

The maximum temperature rating is 204°C for EXAIR's atomising spray nozzles and all models are CE compliant.

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## Water hardness analyser

The Endress+Hauser Liquiline System CA80HA hardness analyser provides online analyses of water hardness in drinking water and process water. It aids control of water softening processes such as ion exchange or reverse osmosis, determines the quality of products influenced by water hardness and analyses feedwater used in boilers.

The CA80HA colorimetric analyser uses the phthalein purple method, providing direct comparability to lab results. It measures calcium carbonate ( $\text{CaCO}_3$ ) over a range of 0 to 80 mg/L with accuracy of  $\pm 0.5$  mg/L. The analyser has up to two measuring channels and up to four digital inputs for optional Memosens sensors such as pH, ORP, conductivity, oxygen, chlorine and turbidity.

The optional sensors can measure and calculate pH from two conductivity values according to the CGB Standard 405 for boiler feedwater. The sensors can also measure the difference between two assigned values from different sources to monitor membranes and calculate differential conductivity to monitor the efficiency of ion exchangers.

Outputs from the CA80HA can be used to directly control water processes as the process variables in a control loop, be assigned as a measured variable to a limit contactor, trigger cleaning, be sent to a control system for further analysis and be displayed on the local graphic readout. The local graphic display has 240 x 160-pixel resolution, a red display background for alarms and user-definable measuring menus.

The CA80HA meets the requirements of harmonised European standards and Canada and USA standards: CAN/CSAC22.2 No. 61010-1-12 UL Std. No. 61010-1 (3rd Edition).

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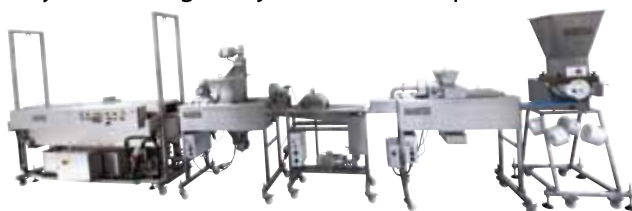
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# Pumps reduce the risk of dairy contamination



A dairy-based ingredients manufacturer has eliminated the risk of contamination by installing 10 MasoSine Certa 250 pumps from Watson-Marlow Fluid Technology Group (WMFTG).

The pumps all perform the transfer of soft cultured products like yoghurt, butter, cream and soft cheese. This follows the company's engineering team highlighting potential food contamination issues with positive displacement (PD) pumps two years ago.

"Our customer had a number of PD pumps on site and, although they performed well and were food-grade rated, there was always the worry of potential contamination from the wear parts of the pump," explained WMFTG Food Sector Specialist Eddy Smeaton. "As a result, they started looking for a pump that could do the same job, but which could take away the risk."

Unlike traditional pumps with rotors that cut through the fluid, Certa's sinusoidal rotor gently carries product through the pump to dramatically reduce shear, an important factor when handling dairy-based products. Further advantages delivered by sinusoidal technology include energy efficiency,

virtually no pulsation, simplicity, reliability, interchangeable parts, low cost of ownership, and separation between the wet end and dry end which ensures no potential for contamination.

Offering EHEDG (Type EL Class I and EL Aseptic Class I) and 3A certification, MasoSine Certa is easy to clean for minimal maintenance and downtime. A range of seven Certa pumps is available for flow rates to 99,000 L/h and pressures to 15 bar.

"We were invited to visit and give a demonstration of Certa; the customer could see immediately its simple design and lack of wear parts," said Smeaton. "With a single shaft and single seal, the drive unit is extremely advantageous to their operation."

After WMFTG provided the company with a trial pump so it could assess its suitability for transferring soft cultured products, a Certa 250 was installed approximately 18 months ago. The customer has since expanded one of its facilities with the introduction of a new filling machine, for which a Certa 250 was specified, bringing the total number of units in use to 10 Certa 250 pumps.

Each is used for transferring different soft cultured products, either from IBCs to plant or from tanks to plant, or for pushing through pasteurisers. The pumps are also used for blending ingredients in various viscosities. In terms of transfer distance, the farthest is 20 m with a 4 m head. Flow rate tends to be dictated by other parts of the process.

"Previous PD pumps had always given our customer concern about wear parts, but with the MasoSine Certa this problem is essentially eliminated," said Smeaton. "The customer reports that reliability is excellent and issues such as contamination or leaks are a thing of the past. In addition, issues with suction have been eradicated, while efficiency is improved."

**Watson-Marlow Fluid Technology Group**  
[www.wmftg.com.au](http://www.wmftg.com.au)

## Hygienic low-shear mixer

The Alfa Laval LeviMag mixer provides low-shear mixing, gentle product treatment and is easy to clean. With a broad range of speeds, the magnetic mixers feature a four-wing impeller that delivers high-pumping efficiency. The mixers have the capability to run dry and provide a homogeneous product down to the last drop.

These features are designed to safeguard product integrity and ensure efficient mixing and easy draining. The open mixer design enables full coverage during cleaning in place, making the removal of product residues efficient.

Easy and convenient to service, the mixer's levitating bearings and low-wear female bearings are designed to enhance product safety and increase uptime. High-strength, stress-tolerant male bearings minimise the generation of wear particles that can contaminate the product.

The Alfa Laval LeviMag UltraPure model complies with the requirements for operation in demanding sterile applications. The mixer comes with the Alfa Laval Q-doc, a comprehensive documentation package. To assist in validation, qualification and change control, it provides transparency of sourcing, production and supply chains — from raw material to delivered equipment. Q-doc also ensures traceability of all product contact parts.

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## Oil-free vacuum pumps

Atlas Copco has had its vacuum pumps checked for traces of oil by TÜV Rheinland in accordance with the ISO 8573-1 standard.

Three different types of oil-free vacuum pumps were measured and certified: the oil-free claw vacuum pump DZS, the oil-free screw vacuum pump DHS VSD+ and the new Atlas Copco innovation of oil-free liquid ring pumps LRP VSD+. As a result, all three pump types meet the strictest quality requirements and have been classified by TÜV as completely oil-free in the best "Class 0".

The measurements were carried out without an oil removal device at the outlet between the pumps and measurement membrane. The three pump types were certified by TÜV Rheinland that no traces of aerosol oil (concentration below 0.01 mg/m<sup>3</sup>) could be detected in the exhaust air flow. The vacuum pumps were certified by the testers to be completely harmless to the quality of the ambient air during the process, because oil-induced damage to sensitive applications and products cannot occur.

Completely oil-free vacuum pumps from Atlas Copco are used in a variety of sensitive areas — in food processing and packaging processes, in the production of semiconductors or medicines, and in the paper industry.

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## Industrial ultrasonic cleaners

The CleanSonic industrial ultrasonic cleaners provide manufacturers with a range of benefits, including speed, safety and environment, cleanliness, protection and longevity.

Available in a variety of sizes from large tanks to small tabletop washers, an average ultrasonic cleaning cycle lasts between two and 10 minutes. Cleaning times vary based on the size, composition and number of components to be cleaned.

The ultrasonic cleaning technology is designed to remove safety hazards and eliminate the need for manual cleaning, thus creating a safer, more environmentally friendly work environment.

With the capacity to reach into components on a microscopic level, the cleaner is capable of cleaning even small or complex applications where a cleaning brush might not reach. A properly calibrated ultrasonic cleaner uses touch-free cleaning on a microscopic level that can protect the surface of even delicate components.

The cleaners use water-based soaps and enzyme solutions instead of spray solvents and toxic cleaning products, which are claimed to save manufacturers 70% or more in solvent costs.

**CleenSonic**

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## 2019 fresh food safety guidelines released

The Fresh Produce Safety Centre Australia & New Zealand (FPSC A-NZ) has released an updated version of the Guidelines for Fresh Produce Food Safety. Launched at the industry conference and trade show Hort Connections, the guidelines are designed to assist all entities involved in the fresh produce supply chain to identify and assess potential food safety hazards.

Melbourne Market Authority Chair Peter Tuohey said, "The Guidelines for Fresh Produce Food Safety 2019 ensure Australian produce has the highest safety standards of any produce anywhere in the world."

Acknowledging that Australian horticulture had seen some damage in recent years via contamination and tampering that impacted producers, retailers and exporters, Tuohey commented that the industry continues to evolve and change the standards within the guidelines to meet consumer expectations.

"These guidelines set out the procedures and steps to prevent or deal with contaminations, and covers a comprehensive list of practices and potential hazards to assist growers, packers, transporters, wholesalers and retailers along the supply chain," Tuohey said.



The needles in strawberries scare of 2018 was an example of an incident that caused damage to the strawberry industry, resulting in supermarkets pulling strawberries off shelves and tonnes of fruit being thrown away at the peak of the growing season. Investigations by the Food Standards Australia New Zealand (FSANZ) identified potential weaknesses in the supply chain, resulting in several recommendations to government and industry outlined in the strawberry tampering incident report.

With so many links in the chain, it can be difficult to identify where a particular hazard originated, hence the need for a comprehensive set of guidelines applicable to the entire network of supply chain businesses.

The Guidelines for Fresh Produce Food Safety were developed through the expertise and knowledge of the FPSC A-NZ's technical committee and can be viewed here.

FPSC A-NZ's Jessica Purbrick commented, "As custodians of the guidelines, the FPSC A-NZ ensures that with each updated version we are enhancing Australia and New Zealand's fresh produce reputation."

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### Food-grade cleaning tools

The Vikan Ultra Safe Technology (UST) food-grade brushware is designed to exceed global food safety standards. The product doesn't use any non EU Food Contact approved resins that might be found in other resin set brushware.

Through the design of its Filament Security Units, the brushware is effectively a one-piece moulded brush (handle and filaments), which ensures secure filament retention. The spacing of the bristles/filament security units makes the product easy to clean, sanitise and inspect. All products have been validation tested and have good cleaning efficacy.

The British Food Safety peak body, the Society of Food Hygiene and Technology (SOFHT), recently awarded Vikan UST brushware as the winner of the annual Best New Product or Service award in Europe.

A full range of Vikan UST colour-coded cleaning tools is available in Australia and NZ.

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## Rotational viscometer

Developed for a wide range of applications, ViscoQC 300 is designed to ensure the quality of substances — from almost any fluid to semi-solid samples — by delivering fully traceable viscosity results.

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Features include: automatic spindle/guard detection and digital instrument alignment check; simple one-handed spindle attachment/exchange by built-in magnetic coupling; V-Curve adds graph/analysis/programmability features to the standalone instrument; data processing is improved via LIMS Bridge and/or the optional sample barcode scanner; and prolonged spindle lifetime thanks to food-grade stainless steel AISI 316L.

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### Surface-mounted wastewater pumps

The Gorman-Rupp T and V series pumps from Hydro Innovations are mounted on the surface instead of in

the wastewater pit. This allows operators to access the equipment for monitoring or maintenance without opening wet well safety covers, eliminating the risk of personnel falling into the pit.

A surface-mounted pump does not need a crane to access pumps, minimising the associated costs of crane operation/use. Only one operator is needed to safely access and maintain a self-priming surface-mounted pump and adjust pump clearances on a Gorman-Rupp self-priming pump, keeping the pump operating efficiently. This provides energy savings for the life of the asset.

The pump series also comes with a range of built-in safety features to protect operators and the pump, designed to enable reliable, dependable and safer pumping of wastewater. The pumps are suitable for applications in animal process plants around the country.

**Hydro Innovations**

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

### Spherical pneumatic transfer magnet

The RE80 Spherical Pneumatic Transfer Magnet is aerodynamic and is designed to extract foreign metal fragments from high-velocity pneumatic transfers.

Foreign metal fragments such as tramp metal, work-hardened stainless steel and stone, and fine dust-like metal shavings can have devastating effects if they contaminate the final product. Food recalls, brand reputation damage, consumer health risks and financial loss are common consequences of metal contamination.

The Spherical Pneumatic Transfer Magnet enables food processors to help minimise these risks using RE80 +11,000 gauss magnet elements to attract and retain magnetic fragments. The company claims the magnet is superior to original probe, bar and blow-line grid installations inserted transverse to the product flow. This is achieved by providing a large surface area for retention of weak magnetic fragments on the back of the magnetic sphere, outside of the product zone as the powder/product exits the chamber. The aerodynamic design of the magnet prevents blockage of product and also minimises product particle breakdown.

The Spherical Magnet is suitable for starch, powders, flours and ingredients. It is popular in large flour mills and bakeries to magnetically clean product conveyed to bagging operations, bulk out loading or direct filling of flour trucks. It is suitable for high-velocity and large-volume vertical installations in blow, vacuum, gravity and pneumatic transfer lines.

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## 15.6" IP66/IP69K stainless steel panel PC

The ViTAM-916A 15.6" Stainless Steel HMI Panel PC is a fully sealed IP66/IP69K all-in-one computer. To comply with IP66/IP69K standards the PC uses M12 sealed connectors for all I/O connections. The result is a panel PC that can withstand high-pressure hose down cleaning.

The PC is based on Sixth Generation Intel Core i3-6100U 2.3 GHz or i5-6300U 2.4 GHz Processors with up to 16 GB of DDR4 memory to provide a high-performance industrial control solution. Standard I/O connections provided include USB2.0, LAN, RS232/422/485 and 9~36 VDC power. Two optional I/O connections can also be installed. An internal 2.5" HDD/SSD drive bay and SD slot are provided for storage. A Mini-PCle slot is provided for Wi-Fi/BT cards and an RFID module is also available. The 15.6" 1366x768 flat panel LCD screen touch panel options include resistive touch, projected capacitive touch or a no-touch glass front bezel.

Housed in a Grade 304 or optional Grade 316 stainless steel enclosure, the ViTAM-916A will not corrode and is easy to clean. To assist the cleaning of the display, the PC includes a touch on/off button that allows the touch screen to be temporarily disabled during the cleaning process. This allows the display to be hygienically wiped down without having to shut down any process control applications.

Standard 300 nits and optional sunlight-readable 1000 nits display brightness is available. The PC supports operating temperatures from -0 to 50°C.



VESA 75 mm mounting holes allow the displays to be arm or wall mounted. Optional ergonomic yoke mounting is also available.

**Interworld Electronics and Computer Industries**  
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## Workshop calibration test bench

Beamex has introduced a workshop calibration test bench called Beamex CENTRICAL. It is designed to combine ease of use, versatility and ergonomics for performing calibrations in a workshop, which can, in some situations, be more effective and convenient than calibrating instruments in the field.

For example, during a commissioning phase, it is easier and faster to calibrate the process instruments in a workshop before installing them into the process. It is also more efficient to calibrate spare devices and rotational spares in a workshop. Accuracy can be achieved when the calibration is performed in controlled conditions using dedicated workshop calibration equipment. In the event of harsh or even dangerous field conditions, calibration in a well-designed workshop with equipment ready for use is ergonomic and practical. Workshop calibration can also complement field calibration.

The product is easy to configure to suit individual requirements, while the standard electrostatic discharge (ESD) protection offers electrical safety measures. Each unit is supplied with accredited calibration certificates to ensure quality and traceability. It is available with ergonomics via motorised height control or as a fixed-height bench. A straight bench as well as corner modules are available to meet user needs. A trolley-based design is also available for mobile solutions.

Combining the Beamex CENTRICAL together with software, hardware and calibration expertise forms an automated and paperless digital calibration solution.

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# AWRE tackles the topic of food waste

The Australasian Waste & Recycling Expo (AWRE) is where the waste, recycling and resource recovery sectors come together to find solutions for a cleaner, more sustainable future. This year's event will be held in October at ICC Sydney.

The need for new and better waste solutions has never been more crucial, with Australians looking to the waste and recycling industry to drive positive change.

With over 120 brands represented, attendees can expect to connect with solution providers and industry associations, such as Wastemaster Pacific, Clean & Green Organics, Cardia Bioplastics, ORG Organics Recycling Group and Australian Institute of Packaging (AIP), to discover solutions which convert food and organic waste into re-usable resources including the latest aerobic digesters, composters, collection containers and sustainable food packaging.

Waste and recycling communities use this event as a platform to learn and collaborate, with the AWRE Speaker Series tackling the industry's most challenging and compelling issues. Presented over two dedicated stages in 2019, Industry Forum (presented in partnership with NSW EPA) attendees will

discover the latest trends and insights affecting the wider industry.

The 'Food Waste Stage' will debut this year, facilitating discussion and focus on the national issue of food waste. Featured speakers will include food waste pioneers Katy Barfield, Founder and CEO of Yume Food Australia, and Ronni Kahn, CEO and Founder of OzHarvest. Session topics will address 'Australia's Best Practice Food Services Guidelines' and 'The Role of Packaging in Minimising Food Waste', plus much more. 



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**What** Australasian Waste & Recycling Expo

**When** 30–31 October 2019

**Where** ICC Sydney

**Web** [www.awre.com.au](http://www.awre.com.au)



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## Modular conveyor system

Enmin has launched a modular conveyor system called mi-con (Modular Incline Conveyor System), which is claimed to be the first hygienically designed full wash-down system to offer multiple standardised components.

With its flexible modular design coupled with a range of standard parts and components, the system provides user-specific flexibility making it suitable for multiple applications.

The system is delivered flat packed in a box, which allows for fast and cost-effective delivery and simple installation by the user's maintenance team. It can also be delivered partially complete or fully complete for quicker installation and commissioning.

Fully Australian made, the mi-con system is constructed of 304 stainless steel and all components and running gear used are FDA approved and suitable for a full washdown environment.

A range of accessories is available that allows the user to semi-customise the conveyor to suit the type of product they are handling or the site's operational requirements. All items have been hygienically designed to meet OH&S standards while maintaining flexibility and quality.

The modular intermediate section can be used to extend the available in-feed and out-feed sections and also increase the overall discharge height of the conveyor. With two standard belt widths of 500 and 700 mm and incline angle options of 60 and 75 degrees, the system is designed to suit a wide variety of applications and space constraints.

The system can use either a PU flat, scooped cleated wave wall or a plastic modular design, depending on the application.

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# Squeezing the myths on OJ pasteurisation

Despite recent declines in demand, the Australian orange juice market was forecast to be worth almost \$724.2 million last year, with 5 million people drinking their way through 4.6 glasses a week. In fact, orange juice still accounts for around two-thirds of the total juice market.

**W**hile sales of UHT orange juice have fallen among older consumers, younger people are actually buying more with sales from juice bars and of premium products rising. With chilled products in particular attracting premium customers, the most effective technique to help satisfy discerning consumers is 'flash pasteurisation'.

With or without pulp, the challenge for manufacturers of fresh orange juice is the speed at which the flavour and quality alters and deteriorates after the orange is squeezed. Like any fruit, oranges are perishable commodities and need to be pasteurised to stop the product spoiling. If there is to be an acceptable shelf life, the juice has to be pasteurised to destroy microorganisms and stop enzymatic activity.

There are various ways to delay these chemical changes. At HRS Heat Exchangers, thermal treatment, also known as 'flash pasteurisation', is the preferred technique for making premium quality juice. "Oranges are complex fruits,"

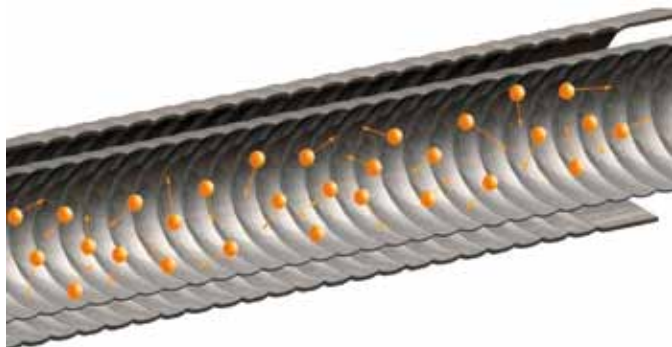
explained Matt Hale, International Sales and Marketing Director at HRS. "The flavour and quality is determined by hundreds of compounds, among them limonene, pectin methylesterase (PME), hydroxymethylfurfural (HMF) and ascorbic acid (vitamin C). What's more, the exact composition varies according to the type of orange, climatic conditions and ripeness when picked."

Chemical changes begin to occur as soon as juice is squeezed. Some compounds react with oxygen in the air; others are affected by enzymes that are released during squeezing. With oranges containing natural yeasts, squeezing triggers fermentation, which results in the multiplication of any bacteria present.

Critics of pasteurisation argue that the process destroys the flavour of juice and alters the nutritional value. However, by minimising the thermal treatment time, HRS is assisting juice production plants to optimise juice quality and taste.

The HRS series of MI/MR Pasteurisers uses a food-grade corrugated multi-tube heat exchanger to speed up the heat transfer in pasteurisation systems. These corrugated tubes create extra turbulence in the fluid as it flows through the heat exchanger.

Hale explained further: "The result of this extra turbulence means that the orange juice can be heated up to pasteurisation temperature much faster — typically by up to 30%. Critically, the rate of heat transfer should be carefully considered because the longer it takes the greater the effect on the product and quality will deteriorate. The temperature of the heating media can affect quality too — the hotter the heating media, the more damage the hot tubes inside the pasteuriser will have on product quality."







*With or without pulp, the challenge for manufacturers of fresh orange juice is the speed at which the flavour and quality alters and deteriorates after the orange is squeezed.*



Because of the high heat transfer rates of the corrugated tube technology, HRS's pasteurisation systems use water at a lower temperature to reduce the risk of product damage. Another benefit of higher heat transfer rates is that system footprint can be reduced using shorter heat exchanger modules. The shorter length of the heat exchanger also results in a reduction in pressure drop, which saves pumping power and further reduces energy costs — often by 40%.

System lifespan is also claimed to be greater using the HRS technology. The corrugated design/profile of the inner tube helps reduce product fouling — it disrupts the fluid boundary layer and creates higher velocity and turbulence. As the juice travels around the system, it's less likely to stick to the tube wall causing corrosion and lack of performance (leading to increased downtime and maintenance costs, expensive replacement parts and reduced system lifespan).

In the system, water carrying the recycled heat energy travels in the space between the inner and outer tubes and flows in the opposite direction to the juice. The fact that the two liquids are travelling in opposite directions boosts the maximum amount of heat transfer due to a mechanism called counter-current exchange as Hale explained: "Counter-current creates a declining difference in temperature (helping heat transfer), whereas in concurrent (where heated and heating elements are side by side, as in a tank and jacket system) the initial difference is higher but quickly levels off. The HRS system pumps the juice and heating and cooling water around the exchanger, which further boosts the maximum heat transfer achievable."

HRS Heat Exchangers Australia New Zealand  
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BRANCHES AND DISTRIBUTORS IN ALL STATES AND NEW ZEALAND

Purdue University-affiliated start-up Induction Food Systems (IFS) has finished the first round of testing on a technology system to provide on-demand heating options for food and beverage manufacturers.

"We were tired of seeing the old-school processes for heating food and beverages during manufacturing," said entrepreneur Francesco Aimone from Columbia University, who co-founded IFS with George Sadler, an alumnus of Purdue's College of Agriculture. "Those legacy systems like steam are slow, energy-consuming and can take away some of the food's natural flavours and textures."


IFS plans to launch in the next few months its first commercial line, which involves a fluid heating system for use in the manufacturing of beer, water products and juices.

Aimone said their technology is designed to increase the speed and efficiency for producing beverages and foods, and helps manufacturers grow. He said the IFS on-demand heating system uses plug-and-play heating components involving electromagnetic energy and induction, which has been shown to be about six times more precise in controlling temperature than conventional methods.

IFS's technology uses a coil and core design in its heating systems. It uses solid-state electronics to generate electromagnetic energy instead of the traditional combustion that creates steam in boilers.

"We know that manufacturers need and want more nimble, responsive and sustainable heating options," Aimone said. "We are prepared to meet those needs with our technology."

Aimone said the next focus for the start-up is to address the problem of fouling — which is sticky substances left behind after processing — for manufacturers.

"It's similar to when you are making eggs and you have the gunk stuck to your pan when you're preparing them," Aimone said. "Our preliminary testing shows we can reduce fouling in some applications by up to 30%." 



## Modular convection oven

The TruBake HiCirc convection oven by Baker Perkins brings higher rates of convection, higher heat flux and a broader range of product capability than its predecessors.

The stable and predictable baking environment is suitable for a wide variety of products, from brownies, cookies and bars, up to crackers and pet treats.

The design of the modular oven body allows it to be seamlessly assembled with TruBake DGF (Direct Gas Fired) modules to form a hybrid oven, combining the advantages of both heating methods.

TruBake HiCirc uses direct convection. With no heat exchanger, there are savings in fuel and maintenance, plus a faster temperature response time than indirect convection ovens. Features include a 40:1 turndown range for flexibility; large doors for cleaning and maintenance; blowers and burners placed above the oven to create extra floor space; full VFD control of all blowers; and directional damper control.

The easy-to-use touchscreen controls feature a simple graphical interface, recipe-driven settings, clear alarm management and historical trending.

Modules are arranged on-site to form an oven with a number of separate baking zones. Each zone is specified to achieve the necessary baking profile, with independent temperature, extraction and airflow control.

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# The importance of power quality in the food industry

Fixing power quality, from the grid, can reduce food waste in an increasingly autonomous and continuous production cycle, explains Darcy Simonis, Vice President of ABB's Food and Beverage segment.

**F**ood is delicate, so even slight power disruptions can lead to food wastage. Disruption of machines in food production and refrigeration can lead to food being burnt, spoiled or contaminated. Due to stringent health and safety regulations, this food must then be discarded. This can escalate fast in a continuous production system because if even one piece of equipment goes out of sync, and is not caught quickly, large quantities of products will go to waste.

Low power quality is when power supplies are disrupted and no longer power machinery properly, such as voltage drops. These are sudden increases in current that cause voltage to drop over the impedance of a supply network, causing the voltage to vary. Disruptions from low power quality can cause machinery to shut down in an unsafe manner.

For example, if a conveyor was to break down while feeding bread through an oven, it could lead to the loaves igniting, which would not only cause severe damage to the conveyor belt and oven, but the fire could then spread putting the whole plant at risk. Improper shutdowns for smart machines can also damage internal systems, scrambling the data and leading to faults and loss of precision.

The effects of power disruptions are also financial. The Pan-European Power Quality Survey reports that annual losses from power quality issues may amount to 4% of business turnover. This is set to grow as more processes become automated leading to power disruptions having larger effects on operations.

Food manufacturers understand that reducing food waste is a key method for creating a strong operation. The main way to reduce food waste is to have good control over processes. However, modern methods of increasing control through software and improved monitoring cannot have the desired effect if they are damaged through grid disruptions. As such, plant power

quality should be closely monitored to prevent any unexpected interruptions.

## Protecting systems

Research shows that over 90% of power quality issues that lead to industrial equipment malfunctions are voltage sags. These happen when the RMS voltage decreases between 10 and 90% of nominal voltage for up to one minute. Voltage sags are generally caused by weather events such as high winds, heavy rain or snow build-up, but can also be triggered by traffic accidents and construction works. These sags can cause short circuits and overloads.

Businesses, sadly, cannot influence the weather or external works and must rely on other methods to protect equipment. Active voltage conditioners, such as ABB's PCS100 AVC range, can sense power disruptions, such as voltage sags, and perform corrective measures returning the voltage to nominal levels. This will allow for uninterrupted production reducing unwanted downtime and eradicating food wastage caused by system faults.

If an unprotected bottling plant for soft drinks was hit by power disruptions this could cause large losses through, for example, misalignment of injector and bottles. Formulas for soft drinks are also very delicate and loss of precision could mean that ingredient amounts could become skewed altering the taste of the product. By installing active voltage conditioners plant managers can ensure the delicate processes are protected.

As food and beverage production becomes a 24-hour process, manufacturers need to take greater precautions to ensure both their equipment and staff remain safe while reducing food waste.

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## Change management software

MDT AutoSave is a change management software package to safeguard industrial programmable equipment from loss of configuration for fast disaster recovery and configuration version archiving.

It can be configured to automatically inspect or analyse programs found in automation devices and provide detailed information of changes made between a master copy, prior version or a current version in the processor. With a complete history of changes and who made them all in one place, revisions can immediately be reviewed and audited to quickly resolve faulty or damaged programmable equipment in the production line.

The software acts as a universal industrial change platform or centralised system to co-ordinate all security, program versions and change-related activities to easily program logic for control programs and devices such as PLCs, CNCs, HMIs, PC control systems, robots, drives and general automation programs. This reduces time spent manually tracking changes, rewriting and commissioning programs.

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### Safety air gun

EXAIR's Soft Grip Back Blow Safety Air Gun uses a small back blow nozzle to deliver a blast of air to effectively blow debris and liquids from inside small pipe or hose diameters, channels, bores, holes, internal threads and other internal part features. The ergonomic design of the air gun keeps the operator's hand in a comfortable position so it can be employed for hours of continuous use without fatigue.

An array of holes on the Model 1004SS M4 Back Blow Air Nozzle provides a forceful back-facing 360° airflow to clear out coolant, chips and light oils from machining processes. The nozzle prevents chips from being blown further

into a part, tube or pipe and eliminates any safety hazard created by blowing debris out the far end of a pipe or tube.

Air consumption is 4.5 SCFM at 80 PSIG with a low sound level of 75 dBA. The nozzle is manufactured to clean inside openings as small as 6 mm and up to 25 mm. It is constructed of type 316 stainless steel to provide durability and resistance to corrosion. The air gun with nozzle is OSHA and CE compliant.

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what's new in

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# Product development & ingredients



# Producing ready-to-eat salads at higher capacity

A processing line for the production of ready-to-eat salads was recently put into operation at South American salad producer Verdeagua. Wanting to adapt its production to higher capacities, the salad producer installed machines supplied by KRONEN on its processing line.

Verdeagua started out with the cultivation of small quantities of salad in hydroponics back in 2000. Today, its products include the delicate Salanova lettuce, baby leaf salad, spinach, rocket, as well as watercress and basil. All products are packed as ready-to-eat vegetables and are delivered to customers in retail and the foodservice industry with high-quality requirements.

The Salanova lettuce is characterised by small leaves with thin, short mid ribs which do not need to be removed before consumption — resulting in less waste and more edible product.

Sustainability is an important aspect at Verdeagua with its processing as well. Furthermore, food safety plays a key role as the aim of the company is to provide safe and healthy ready-to-eat products.

The company is well aware of its responsibility towards consumers and pays attention to hygienic processing of its

products, during which products are cleaned thoroughly but damaged as little as possible. The new processing line installed enables a gentle but thorough washing and dewatering of the different products.


The new washing and dewatering line at Verdeagua consists of a trimming table, a conveyor belt, a washing machine as well as a salad spin-dryer of the latest generation.

The washing machine, a GEWA 3800V ECO, enables a thorough and at the same time gentle washing of different products due to the adjustable water spiral and the changeable vibration screens with different hole sizes, which allow for an adaptation to various product features. It can process up to, for example, 350 kg of baby leaf or 200 kg of basil per hour.

Following the washing and a first dewatering by the vibration screen, the salad and vegetable spin-dryer, KS-100 PLUS, dewateres the products gently by automatically changing the spinning direction during a spin cycle.

The spin cycles can be adapted to different products, since individual settings for each product can be stored in the programmable memory locations. The processing capacity of the salad spin-dryer is up to, for example, 190 kg of baby leaf or 130 kg of rocket per hour.

The processing line at Verdeagua processes 100 kg of product per hour.

“We are pleased to have these machines in use in Uruguay for the first time. This will allow us to open the market and serve more customers in the future,” said Sebastián Figuerón, Technical Manager at Verdeagua. 

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*KRONEN conveyor belt  
in the salad processing  
line at Verdeagua.*





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## Plant-based protein nuggets

DuPont Nutrition & Health's six plant protein nuggets from its SUPRO and TRUPRO product range feature more protein or less sodium than previous offerings, in a broader array of formats and textures.

The SUPRO NUGGETS 310 LS are oval-shaped soy protein nuggets with 80% protein (dry basis) and less than 120 mg sodium per 100 g. They are suitable for applications with reduced sodium targets.

The company is expanding its SUPRO Soy Protein Nuggets with the cocoa range. These products deliver 82% protein (dry basis) and are offered in a greater variety of shapes and sizes. In applications like snack bars, these nuggets resemble chocolate cookie bits, flakes or chips.

SUPRO NUGGETS 393 have an irregular, flake-like appearance, SUPRO NUGGETS 385 are offered in a larger barrel shape and SUPRO NUGGETS 398 are offered in the traditional oval shape.

The company's pea protein nuggets, derived from conventionally grown, non-GM yellow peas, have 70% protein (dry basis) and are now offered in a greater variety of shapes. TRUPRO 1670 pea protein nuggets have a firm texture and oval shape, and TRUPRO 1673 pea protein nuggets are offered in an irregular, flake-like shape that blends seamlessly in formulations with high grain, nut or seed content.

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## NEWS

### Making veggies less bitter

Scientists have mapped the crystal structure of a key protein responsible for the bitter taste of Brassicas plants in an effort to tone down the chemical compounds responsible for their pungent flavour.

A genus of plants in the mustard family, the Brassicas of the world (cruciferous plants) share a distinct and bitter taste. The varieties used for food include, for example, broccoli, Brussels sprouts and cabbage, and condiments such as mustard. All Brassicas make sulfur-smelling compounds called glucosinolates, as a natural defence against pests.

Some consider the flavour of cruciferous plants their strongest attribute. But even in India and China, where Brassicas have been cultivated for over 4000 years, scientists have tried to tone down the chemical compounds responsible for their pungent flavour.

Now researchers from three continents — including biologists from Washington University in St. Louis — have mapped the crystal structure of a key protein that makes the metabolites responsible for the bitter taste in Brassicas. Published in the journal *The Plant Cell*, the study traces the evolution of the protein and its diverse by-products in this agriculturally significant group of plants.

Researchers have known about the central role of this protein for decades. But prior to this study, no-one had ever been able to complete the X-ray crystallography necessary to map the central role of this particular protein in detail. The work, co-led by Roshan Kumar, a postdoctoral fellow in the Jez laboratory at Washington University, uses genetics, biochemistry and structural biology to help unravel the molecular basis for the evolution and diversification of glucosinolates.

There are almost 130 different glucosinolates within the Brassicas, with each plant species within the genus making a collection of glucosinolates (its own flavour mix), as secondary metabolites of a particular protein. Decreasing glucosinolates from all over the plant makes it susceptible to pests and pathogens, necessitating the smart engineering of glucosinolates.

"Glucosinolates are derived from amino acids," Kumar said. "Gene elongation is one of the important steps that provides most of the diversity in the glucosinolate profiles across all of the Brassicas. It decides which type of glucosinolates (the plant) is going to form."

The insight gained in the study is an important step towards making a milder mustard or building a bitter-free broccoli.

The results could aid ongoing breeding strategies that manipulate crop plants for nutritional and taste benefits.

The work is a collaboration initiated by Naveen C Bisht, staff scientist at the National Institute of Plant Genome Research, in New Delhi, India, with Joseph Jez, and Jonathan Gershenzon, of the Max Planck Institute for Chemical Ecology, in Jena, Germany.



# Clean produce without using water

Images supplied by company

Clean Works is a Canadian company, but when an unrelated *Listeria* outbreak of caramel apples in parts of the United States impacted the sales in its apple product business, it decided to put preventive action in place. The company developed a process to clean fresh fruits and vegetables without using water.

C o-owner of Clean Works and founder of Moyers Apple Products in Canada, Paul Moyer explains how the Clean Verification sanitising process works.

When following strict operating procedures, the solution is designed to eliminate contaminants, bacteria and pathogens on food. It kills harmful pathogens and mould, helps prevent contaminants from entering the water system and reduces health risks by making fruits and vegetables safer to consume. It is also claimed to increase shelf life by up to 25%.

The process uses a combination of ultraviolet light, vapourised hydrogen peroxide and ozone gas to kill up to 99.9%

of pathogens, compared to water, which is only 50% effective. The ozone treatment is applied to inactivate microbes (including pathogens) on the surface and subsurface of fresh produce. Produce is introduced into the chamber in field containers, while ozone is generated and forced through the chamber with even distribution. Critical variables (ozone, airflow, humidity, time, temperature) are controlled during decontamination.

The company has developed two methods: The Clean Batch Process can decontaminate 4082 kg of produce per hour while the Clean Flow Process can decontaminate up to 22,680 kg of produce per hour, the latter being ideal for larger-volume applications. And the machine used in the process can be customised to work with existing production lines, workflow and capacity for produce including grapes, citrus, strawberries, melons, leafy greens, etc.

Clean Works recently received the Food Safety Innovation Award from the International Association for Food Protection.

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## NEWS

### 'Vegebot' trained to harvest iceberg lettuce

Crops such as potatoes and wheat have been harvested mechanically at scale for decades, but many other crops have to date resisted automation. Iceberg lettuce is one such crop as it grows relatively flat to the ground, presenting a challenge for robotic harvesters.

Now a team at the University of Cambridge have developed the 'Vegebot', a vegetable-picking robot that uses machine learning to identify and harvest lettuce. The prototype is nowhere near as fast or efficient as a human worker, but it demonstrates how the use of robotics in agriculture might be expanded for crops like iceberg lettuce.

The researchers developed and trained a machine learning algorithm on example images of lettuces. Once the Vegebot could recognise healthy lettuces in the lab, it was then trained in the field, in a variety of weather conditions, on thousands of real lettuces. The results are published in *The Journal of Field Robotics*.

"Every field is different, every lettuce is different," said co-author Simon Birrell from Cambridge's Department of Engineering. "But if we can make a robotic harvester work with iceberg lettuce, we could also make it work with many other crops."

"At the moment, harvesting is the only part of the lettuce life cycle that is done manually, and it's very physically demanding," said co-author Julia Cai, who worked on the computer vision components of the Vegebot while she was an undergraduate student in the lab of Dr Fumiya Iida.

The Vegebot first identifies the 'target' crop within its field of vision, then determines whether a particular lettuce is healthy and ready to be harvested, and finally cuts the lettuce from the rest of the plant without crushing it so that it is 'supermarket ready'. "For a human, the entire process takes a couple of seconds, but it's a really challenging problem for a robot," said co-author Josie Hughes.

The Vegebot has two main components: a computer vision system and a cutting system. The overhead camera on the Vegebot takes an image of the lettuce field and first identifies all the lettuces in the image, and then for each lettuce, classifies whether it should be harvested or not. A lettuce might be rejected because it's not yet mature, or

it might have a disease that could spread to other lettuces in the harvest.

At the moment, each field is typically harvested once, and any unripe vegetables or fruits are discarded. However, a robotic harvester could be trained to pick only ripe vegetables.



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### Antioxidant technology

Kemin Food Technologies Asia has released the Powerpacked Molecule antioxidant technology, which is designed to help keep food and beverage products safer and fresher for longer, and enhance the chemical blending process.

In laboratory tests, frying oils that contained Kemin antioxidants crafted with Powerpacked Molecule consistently exhibited improved oxidative stability and reduced total polar compound (TPC) compared to untreated oils or those treated with other antioxidants. Overall, Powerpacked Molecule-crafted antioxidants can help to delay darkening of the oil and extend the frying cycle for food before it needs to be replaced.

**Kemin Industries Inc**

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



### Neutral-flavour starches

Novation Lumina Functional Native Starches have been added to the Ingredient range of clean label texturisers.

Designed for light-coloured applications with subtle flavours, the starches have a neutral colour and flavour profile. This allows formulators to develop creamy, smooth textures without impacting light colours or delicate flavours of finished products.

Labelled as corn starch, the starches are gluten-free, non-GMO and do not require allergen labelling.

The product is designed to provide reliable freeze/thaw and shelf life stability, with gel strength and viscosity comparable to modified starches.

It is suitable for a range of food applications, including: yoghurts, dairy desserts and custards, dairy drinks such as drinkable yoghurts and flavoured milks, white sauces including cooking creams and ready meals, dressings, ready-to-eat soups and fruit preps.

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# Tasty from the first bite

## Designing a better low-fat potato chip

Researchers have developed a method to analyse the physical characteristics of the four stages of eating a potato chip — from the first bite to the final swallow — to help formulate a tastier low-fat snack. The results of the research have been reported in the *Journal of Agricultural and Food Chemistry*.

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**W**hile munching on low-fat potato chips might reduce the guilt compared with full-fat versions, many people don't find the texture as appealing. Cutting fat in potato chips usually involves reducing the vegetable oil content but it's the oil that helps give the product its characteristic crunch, taste and mouthfeel.

Texture perception is conceptualised as an emergent cognitive response to food characteristics that comprise several physical and chemical properties. When food scientists formulate a new low-fat chip, they often rely on trained sensory panellists to tell them how well the new snack simulates the full-fat version. This process can be expensive, time-consuming and often subjective, since perceptions can vary based on factors like a person's saliva flow rate and composition.

While at PepsiCo, Stefan Baier — now at Motif Ingredients — and Professor Jason Stokes' team at the University of Queensland wanted to develop a more objective method to analyse the physical characteristics of a potato chip at four stages of simulated eating:

1. First bite — when the chip is taken from the package and broken by the teeth.

2. Comminution — when the chip particles are broken down further and wet by saliva.
3. Bolus formation — when the small, softened particles begin to clump as enzymes in saliva digest the starches.
4. Swallow — when the clumped mass moves to the rear of the mouth and is finally swallowed.

To develop their method — called *in vitro* oral processing — the researchers used different instruments to measure the physical characteristics of chips with various oil contents at each of the four stages. This enabled them to investigate the material properties that govern each specific oral processing unit operation without being impacted by the biological complexity of the oral environment.

For example, for the first bite stage, they conducted mechanical testing to measure the force required to break the chips, and for bolus formation, they measured the hydration rate of particles in buffer as the fragments became a soft solid.

Rheology, tribology and surface-science were all used in the development process. "Rheology is used to measure how a material responds to flow and deformation, while tribology is the study of friction and lubrication," Professor Stokes explained. >



“We combined these engineering disciplines with surface science to provide new in-depth understanding on the behaviour of foods and drinks in the mouth, including how they respond during chewing and tongue movements, and their interaction with saliva and oral surfaces.

“As we understand the science, we assist in translating the knowledge and the development of suitable tools for the industry to use in new product development,” he said.

In this case, the researchers used the results to design a lower-fat chip coated in a thin layer of seasoning oil, which contained a small amount of a food emulsifier.

The seasoning oil made the low-fat chip more closely resemble the greasiness of a full-fat one in tests with sensory panellists, but it only added 0.5% more oil to the product.


Food scientists could also use the new technique to link physical measurements with sensory perceptions, the researchers said.

This project received funding PepsiCo., Inc. and the Australian Research Council Linkage Program (ARC LP). Professor Stokes said that the ARC LP was used to strengthen the partnership with the PepsiCo team and enabled much more scientific and engineering advances than what would have been possible via directly funded contract research. It also led to the training of PhD students, postdoctorate researchers as well as undergraduate science and engineering students, many of whom have gone on to work in the food industry in Australia, NZ, UK and the USA. “One of our former postdocs, Dr Michael Boehm, is now working in PepsiCo’s research labs in the USA,” Stokes said.

### What’s next?

Professor Stokes’ team has worked with all manner of foods and drinks whether they be considered as solids, powders, soft solids, semi-fluids or liquids, primarily with the aim to improve the efficiency of ingredients in processing and/or improved health benefits.

“A key challenge in the food industry is reducing the amounts of sodium, added sugars and saturated fats without sacrificing the taste, flavour, texture and mouthfeel in foods and drinks,” Stokes said. “In addition, it is desirable to include more processed plant-based ingredients including dietary fibre, proteins, resistant starches and phytonutrients. However, even subtle changes in composition of processed foods and drinks can alter the consumer’s acceptability of a product for reasons that are not well understood, which thus compromises healthy choices.”

Stokes’ team now aims to consider the challenges in emerging areas such as the rise of consumer interest in plant-based foods and proteins. “In addition, we are also about to begin investigating processing challenges associated with certain native foods as part of the ARC Training Centre for Uniquely Australian Foods.” 

## NEWS

### How to make watermelon last longer

Research has found that a small level of ethylene reduces the shelf life of watermelon, despite the fact it was previously thought to not be affected by the gas.

Ethylene is released by many fruit and vegetables as they ripen, and it is in the air in produce trucks, distribution centres, supermarkets and probably in home kitchens.

Through his PhD with the ARC Training Centre for Innovative Horticultural Products, located at the Tasmanian Institute of Agriculture (TIA), Yan Lee has been studying the effects of low concentrations of ethylene on the shelf life of fresh-cut watermelon. He found it can last longer and retain higher quality if ethylene levels are reduced below the usual levels.

“Watermelon doesn’t keep ripening — they are non-climacteric and are harvested at full maturity — but ethylene can speed up spoilage,” he said. “Ethylene isn’t dangerous but keeping ethylene as low as possible helps keep watermelon fresher for longer.”

He said fresh-cut watermelon can be used in fruit salad as long as the other fruits don’t emit much ethylene, such as banana. The journal abstract suggested there is “potential for selecting fruits in fresh-cut fruit-mixes that minimise ethylene production to lower the impacts on fresh-cut watermelon shelf-life”.

Perfection Fresh, CSIRO and University of Newcastle are partners on the research project, and Yan said the next step is to test his findings on watermelons that have just been harvested.

“I’m growing my own watermelon at TIA’s horticulture centre. This means I’ll have watermelons that have not been exposed to any ethylene,” he said. “I want to find out what happens to the shelf life of fresh-cut watermelon if the exposure to ethylene has been controlled since harvest.”

This follows similar research from another PhD candidate of the ARC Training Centre, Michelle Louise Mendoza-Enano, who analysed how to improve the sensory experiences of cubed watermelon.





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## On the shelf: cricket-based pasta

Australian owned and operated food brand Hoppa has released a pasta product made from crickets which are claimed to be packed with more than 60% protein, amino acids, omegas and Vitamin B12.

According to enthusiasts, crickets are the way forward when it comes to sustainability, providing protein food products at a lower environmental cost than traditional livestock farming. And it turns out that their mild, slightly nutty flavour also happens to work well with pasta.

Made from 100% natural cricket flour and durum wheat, the cricket-based pasta from Hoppa is said to contain almost twice as much protein as regular pasta with no artificial ingredients. The product is also dairy- and soy-free.

Founder Channy Sandhu explained: "Our crickets are raised responsibly with complete traceability and fed a high-quality, nutritious diet. By introducing this superfood to a popular staple such as pasta we hope to help people make positive health choices while doing our bit for the environment."

### What were the challenges?

When asked about the challenges the company faced when setting up the manufacturing processes for the product, a Hoppa team spokesperson said it was firstly difficult to find a pasta manufacturer willing to manufacture pasta using cricket flour. "Most manufacturers did not want to introduce insect-based flour in their production lines. We even had some thinking it was some kind of a joke that we wanted to make pasta with insect flour," said the spokesperson.

Getting the recipe development right was a key part of the development. "We wanted to make sure there was no big difference in the taste of the cricket pasta to your regular pasta but had a substantial nutritional benefit as compared to a regular pasta. After several recipe development and tasting sessions, we came up with the right formula for our pastas.

"Our pastas only contain two ingredients — cricket flour and durum wheat — and the core of our business is to ensure sustainability, taste and healthiness in our foods, so getting the recipe right was the key."

Ensuring the packaging achieved the necessary shelf-life and freshness requirements for the products was also a challenge as the business has an emphasis on minimal plastic use. "Hoppa is working towards a zero plastic policy in its business operations," the spokesperson concluded.

The cricket pasta is currently available in penne and fusilli varieties and comes in 250 g packages.



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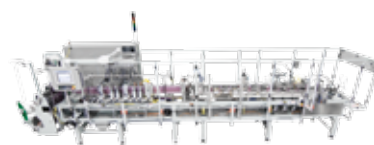
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