

May/June 2021  
Vol.29 No.1

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

## **AUTOMATING** MEAT SKEWER PRODUCTION



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# Minimise overproduction and food waste using AI

Of the millions of tonnes of food that end up in landfill every year, around 30% comes from the food production and processing stage, with around 52% accumulating in domestic households and 18% at the retail level.

In the Resource-efficient Intelligent Foodchain (REIF) project, the Fraunhofer Institute for Casting, Composite and Processing Technology (IGCV) collaborated with 30 partners to look at ways to reduce food waste by implementing AI into the food processing ecosystem.

There are various causes for avoidable waste, ranging from overproduction, to fluctuations in raw materials' quality, to the food failing to fulfil specific aesthetic requirements.

The REIF team focused on dairy, meat and bakery products.

"Two aspects are key to significantly reducing food losses in these sectors — minimising overproduction and avoiding waste," said Patrick Zimmerman, a scientist at Fraunhofer IGCV and member of the consortium.

Zimmerman, fellow researcher Philipp Theumer and five other colleagues began to analyse how a company's internal potentials, such as in plant and machinery or production planning and control, can be optimised to reduce waste using AI methods.

"We apply AI to the entire value chain, especially in the production facilities. To do that, we adapt and select the algorithms that are suitable for the respective application," Zimmerman said.

"We look at the predictability and controllability in all areas — from production on the farm to sale in the supermarket — to optimise their potential."

"Overproduction and waste can be avoided by making targeted forecasts on food requirements, improving the predictability and controllability of the value creation processes and reducing quality-related food loss," Theumer added.

The potentials for the implementation of AI are highly diverse. Zimmermann explains using a meat mixer as an example.

"The temperature and duration of the mixing process influences the expiry date of meat products. If we use AI algorithms

to minimise the amount of energy admitted to the mixing process, we can extend the expiry date, which in turn optimises the selling time in the supermarket and reduces food losses."

At a system level, the highest amount of food waste occurs at power-up. This is because the optimum parameters have to be identified first, and therefore waste is produced in the meantime.

"As an example, we are applying intelligent sensors and self-learning AI algorithms to perfect the foaming process during the production of cake bases at the first attempt," Zimmermann said.

In the long term, the REIF project partners are looking to establish an IT ecosystem and set up a virtual marketplace.

Another aim is to network the data of all companies involved in the project to enhance the added value within the food industry's complex value network.

"One company's expertise can be transferred to another organisation. The more data is made available, the better the AI model can be trained," Zimmermann said.

The online marketplace is where the project partners can swap their data. Ultimately, production companies can better control their manufacturing processes by benefiting from sales figures' sales forecasts. The data collected by supermarkets will be included in the forecasts.

Zimmermann said if the researchers bring together a range of factors like customer behaviour, inventory levels and expiry dates, they could make dynamic price adjustments on specific products in supermarkets.

This locks in maximum profit for the retailer while reducing waste and overproduction. The entire delivery chain benefits from the idea of sharing information, which also includes external data.

The project partners are currently in the concept phase, with the first practical tests set to start soon.



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## Health trend influences confectionery market

Market research firm Innova Market Insights has found the trend towards healthier choices in food and beverages has changed the development of new confectionery products.

Taste quality is essential to confectionery, sweet bakery, ice cream and dessert products, which makes creating healthy sweet treats challenging. The common thread that ties the popularity of these products together is sugar.

Innova found that while there have been winners and losers in reduced sugar treats, there is no sure-fire route to success. Strategies vary and include complete removal of sugar, blending of sugar with sweeteners and advances in sugar science. Sugar reduction has been particularly successful in ice cream, with an emphasis on bolder on-pack calorie counts.

Plant-based ingredients have become an essential ingredient in healthy sweet treats. In sweetening, for example, stevia, erythritol and monk fruit are all gaining ground. Meanwhile, in protein enrichment, pea protein is an increasingly popular ingredient choice, with rice protein an emerging niche.



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## Cadbury achieves 100% sustainable cocoa target

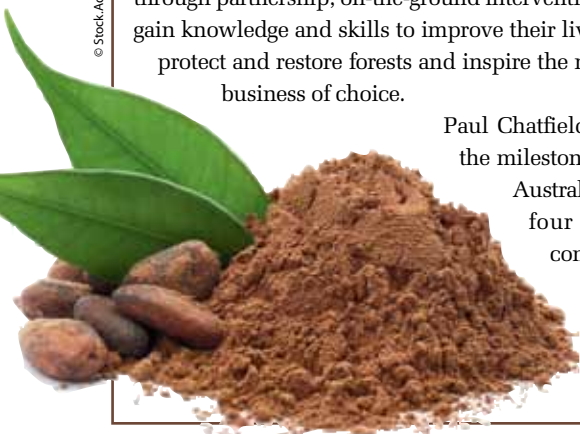
Cadbury has announced that 100% of the cocoa volume sourced for its Australian-made products comes from the Cocoa Life program.

Cocoa Life is Mondelez International's sustainable cocoa sourcing program operating across three continents and focuses on making cocoa right.

A 10-year, \$500 million investment, the program is designed to create a thriving cocoa sector. Its holistic approach tackles the root issues cocoa farming communities face through partnership, on-the-ground intervention and innovation helping cocoa farmers gain knowledge and skills to improve their livelihoods, strengthen their communities, protect and restore forests and inspire the next generation to see cocoa farming as a business of choice.

Paul Chatfield, Marketing Director for Cadbury, said the milestone was a proud achievement for Cadbury Australia, particularly given it had been achieved four years ahead of the company's 2025 commitment.

Cadbury makes over 90% of the products it sells in Australia at factories in Melbourne and Hobart, as well as operating a dairy in Burnie, Tasmania.



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Image supplied by Heineken

## Heineken developing low-carbon glass beer bottles

Heineken has announced it is taking part in a study that aims to better understand methods to decarbonise glass production, as the company looks to reduce emissions in the bottling process.

Partnering with not-for-profit research technology organisation (RTO) Glass Futures and Heineken's supplier Encirc, the venture seeks to create low-carbon glass bottles by developing technology and improving processes across manufacturing and the supply chain.

Within the study, the company has replaced conventional natural gas with biofuel and increased recycled content for its bottles up to 100% to produce low-carbon bottles. It is claimed that for every 10% increase in recycled glass, the company can reduce emissions by 5%.

The trial, which is in its early stages, will see 1.4 million bottles of Heineken low-carbon beer bottles produced, with the intent of hitting the UK market early 2021.

Anca Olteanu, Heineken Strategic Sourcing Director Packaging, said that since 30% of the company's carbon footprint comes from packaging, its ambition is to decrease emissions by embedding circularity of its products.

"Glass is infinitely recyclable with the potential to become truly circular. We will also need help from our consumers to responsibly dispose their glass bottles so they can find their way back into new packaging and close the loop."





## Essential oil to improve storage of fish

A study has found an essential oil may hold the key to preventing fish from going off as quickly in the fridge.

The research article, published by *Functional Foods in Health and Disease*, found the naturally occurring *Eryngium caeruleum* essential oil (EEO) had an antioxidant effect on rainbow trout meat.

The results of the study indicate that the use of EEO in the meat industry could enable the development of novel healthy fish products and improve the meat's chemical stability.

### Lipid oxidation

Fish is often considered a healthy energy source. It contains considerable amounts of vitamins, proteins, major nutrients and omega-3 polyunsaturated fatty acids (PUFAs) that can diminish the risk of heart disease. Unfortunately, it is these PUFAs that are particularly vulnerable to oxidation.

The chemical deterioration of oily fish species, such as the popular rainbow trout, is principally caused by lipid oxidation.

A different study published in 2016 found that the lipid oxidation of PUFA contained in fish is linked to the formation of off-flavour components, loss of nutritional value and even the formation of anti-nutritional molecules.

Antioxidants are compounds that stop the initial onset of the oxidation process. Some food processors incorporate these compounds into foods to stop the food from spoiling as quickly. However, synthetic antioxidants are strictly regulated so researchers are looking for natural alternatives.

### Essential oils

The species *E. caeruleum* is a flowering and herbaceous plant that grows in the northern regions of Iran. The essential oil (EEO) of the plant's leaves contains compounds responsible for its antimicrobial and flavouring properties.

After evaluating the chemical compounds of EEO by chromatography-mass spectrometry and reagent testing, the researchers deemed the oil to have an antioxidant effect.

The study concluded that when applied to the meat, the oil prevented chemical deterioration and subsequently improved its chemical quality.

The essential oil at a concentration of 0.4% showed the best effect in inhibiting lipid oxidation of minced fish.

Therefore, the authors suggest considering *E. caeruleum* essential oil as a natural antioxidant additive in fish meat due to its antioxidant properties.

However, further work is needed to assess the impact of this essential oil on other types of meat products using different packaging techniques for long-term storage.

## Mars Australia flips the switch on renewables

Mars Australia has announced it will transition to using renewable electricity to offset 100% of the power at its six factories and two offices in Australia.

The company behind brands Masterfoods, Pedigree and M&M's made the step in advancing its global 'Sustainable in a Generation' goals to reduce its global greenhouse gas emissions by 27% by 2025 and 67% by 2050.

The announcement is underpinned by the company's US\$1 billion commitment back in 2017 to reduce its environmental impact.

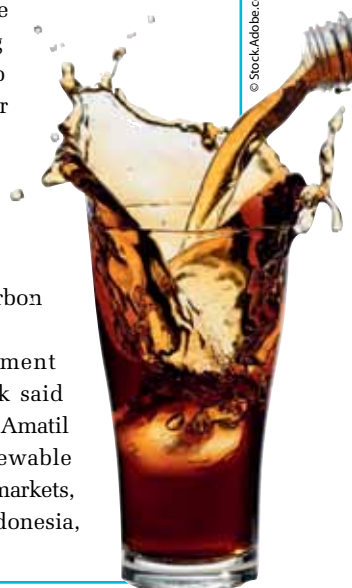
Mars' six manufacturing sites in Asquith, Ballarat, Bathurst, Wacol, Wodonga and Wyong and two sales offices in Melbourne and Sydney will be offset with 100% renewable electricity from the Kiamal Solar Farm.



## Coca-Cola Amatil commits to renewable energy initiative

Coca-Cola Amatil has announced it has joined the global RE100 renewable energy initiative and committed to power its entire operations, spanning six countries, with 100% renewable electricity by 2030. The beverage company plans that its Australia and New Zealand branches will lead the way, reaching the target five years earlier in those economies. RE100, led by the Climate Group in partnership with CDP, brings together more than 290 leading companies around the world that are committed to sourcing 100% renewable electricity. According to Coca-Cola Amatil Group Managing Director Alison Watkins, joining RE100 is an important step in Amatil's strategy to reduce its carbon footprint and follow the recent launch of its 2020–2040 Sustainability Ambitions, which includes the commitment to net-zero direct carbon emissions by 2040.

Coca-Cola Amatil Chief Procurement and Sustainability Officer Sarah Cook said joining RE100 is significant as it means Amatil now has a firm target for 100% renewable electricity use across all of its operating markets, including Australia, New Zealand, Indonesia, PNG, Fiji and Samoa.







# 50 years since the beginnings of the barcode

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**G** S1 is celebrating 50 years since the creation of the GTIN — the number behind the barcode — which transformed the global economy.

The not-for-profit, which develops and maintains global standards for business, is calling for collaboration towards the next generation of barcodes after half a century of digitalisation in commerce.

## Collaborating towards a global standard

Fifty years ago, on 31 March 1971, leaders from the biggest names in commerce came together and transformed the global economy by developing the Global Trade Item Number (known as the 'GTIN'). This numerical code uniquely identifies every single product and is the core of the barcode. Today, the barcode is scanned over six billion times every day and remains one of the most recognisable symbols in the world.

"This is one of the great, untold stories in the history of the modern economy," said Kathy Wengel, Executive Vice President & Chief Global Supply Chain Officer of Johnson & Johnson and Chair of GS1 Management Board.

"Half a century ago, fierce competitors came together, put aside their differences and remade global commerce for the better with the development of the GTIN, which in turn led directly to the creation of the barcode. As we celebrate this remarkable milestone, we call on businesses to collaborate once again to meet the needs of the 21st-century economy by rapidly deploying and implementing new technologies, including data-rich, next-generation barcodes."

The 1971 meeting took place in New York City and included leaders from the biggest names in groceries, retail and consumer goods at the time, including Heinz, General Mills, Kroger and Bristol Meyer. The executives agreed to create a system to uniquely identify every single product, calling it the Global Trade Item Number, or GTIN.

With great foresight, GS1 said, they believed that the GTIN could have a positive impact even beyond the grocery store — from warehouses to board rooms — and would boost speed and efficiency of transactions and processes that could transform everything from supply chains to consumer experiences. And they agreed at the meeting to continue to innovate together to create a system that would benefit businesses and consumers alike. Now, it is considered to be one of the defining inventions of the 20th century.

## Journey to the future

Tom Brady, an engineer who developed and installed the scanner system used at Marsh Supermarket to scan the first barcode with GTIN in 1974, said he is honoured to have been a part of something so beneficial to the world.

"From the visionary meetings of the founders of GS1 to the first scan at Marsh Supermarket, the early 1970s were enormously exciting and challenging," Brady said.

"Now it is time for a new generation of industry leaders to come up with new forms of standards that will have the power to transform business for the next 50 years."

Maria Palazzolo, Executive Director and Chief Executive Officer of GS1 Australia, said she believes that the digitalisation of the GTIN is one of the most significant milestones in the life of the company.

"From the linear EAN/UPC barcode to 2DBarcodes, the need to capture more than just product and pricing information is becoming more urgent and increasingly important. In order to do this successfully we must bring industry together to collaborate and to harmonise. The journey into the future has well and truly begun."

## Next-gen barcodes

GS1 said the developments towards next-gen barcodes (such as QR codes), which can hold vastly more information, should be used to empower consumers with trusted information and reshape global commerce for a new century.

"Their use, for example, can tell consumers if a product contains allergens, if it is organic, and information on its carbon footprint. Ultimately, this provides consumers with a greater level of trust and loyalty relating to the products they buy," the organisation said.

Özgür Tort, CEO of Migros Ticaret A.S. and Co-Chair of Consumer Goods Forum, said the company's ultimate objective is to ensure transparency, satisfaction, safety and trust to its customers, partners and employees.

"Like our predecessors half a century ago, we as business leaders must come together now, to develop standards that deliver even more useful and accurate product information. This type of collaboration and partnership can advance emerging technologies in ways that will benefit both businesses and consumers, all over the world."

**GS1 Australia**  
[www.gs1au.org](http://www.gs1au.org)





# Integrated Manufacturing Operations for Smarter Manufacturing

Digitisation is changing business models and manufacturing approaches across the consumer-packaged goods (CPG) industry.

The pace of innovation in digital technologies along with the ability of these technologies to disrupt traditional processes is becoming a key factor in global competition. These changes may increase pressure on CPG manufacturing professionals, but at the same time they present new business opportunities.

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## Growing meat on spinach skeletons

US researchers have developed an edible platform out of spinach that can be used to grow meat cells.

The team from Boston College found the veiny skeleton of a spinach leaf could be used in the development of cultured, lab-grown meat. A report has been published in the advance online edition of the journal *Food BioScience*.

The circulatory network of a spinach leaf served as an edible substrate upon which the researchers grew bovine animal protein, said Boston College Professor of Engineering Glenn Gaudette, the lead author of the new study.

“Muscle cells are anchorage dependent, meaning they need to grab on to something in order to grow. In the lab, we can use plastic tissue culture plates, but plastic is not edible.”

Earlier advances by Gaudette in this area showed that human heart tissue could be cultivated on a spinach leaf scaffold.

“In our previous work, we demonstrated that spinach leaves could be used to create heart muscle patches,” Gaudette said. “Instead of using spinach to regrow replacement human parts, this latest project demonstrates that we can use spinach to grow meat.”

Gaudette said the team, which included Worcester Polytechnic Institute graduate students Jordan Jones and Alex Rebello, removed the plant cells from the spinach leaf and used the remaining vascular framework to grow isolated cow precursor meat cells. The cells remained viable for up to 14 days and differentiated into muscle mass.

The researchers point out that the successful results will lead to further characterisation of the materials and scientific processes to better understand how to meet consumer demand and gauge how large-scale production could be accomplished in accordance with health and safety guidelines.

“We need to scale this up by growing more cells on the leaves to create a thicker steak,” Gaudette said. “In addition, we are looking at other vegetables and other animal and fish cells.”

## CASE STUDY

### Aussie abattoir invests in Ragazzini pumps

A Queensland abattoir was looking for a dependable solution for its DAF tank sludge and scum transfer. Submersible pumps and double diaphragm pumps had been used in the past, but with limited success. A Hydro Innovations pump specialist recommended the use of a Ragazzini peristaltic [hose] pump for the application.

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

The abattoir needed to transfer up to 10 cubic metres an hour of the sludge, so Hydro Innovations recommended the Ragazzini MS3 peristaltic pump with fully cast casing, cast iron rotor and cast iron rollers.

The pump only needed to run at the slow speed of 26 rpm to meet the duty, so the pump is expected to have prolonged service life. It is also fitted as standard with a leak detector that instantly detects a damaged

hose. The leak detector stops the pump and sends a warning signal. Pumps are mounted on stainless steel base frames and are supplied with 316SS ports.

The pump was duly ordered and installed. An operator at the plant commented that it was easy to install and works very well, with little maintenance.

“A great feature is not having to fill the roller section with glycol, and the quiet operation of the pump,” the operator said.

The operators at the abattoir said they are pleased to have a reliable solution to the previous problematic sludge and scum transfer system. The abattoir was so happy with the installation, it has since rolled this new technology out to other branches around the country.

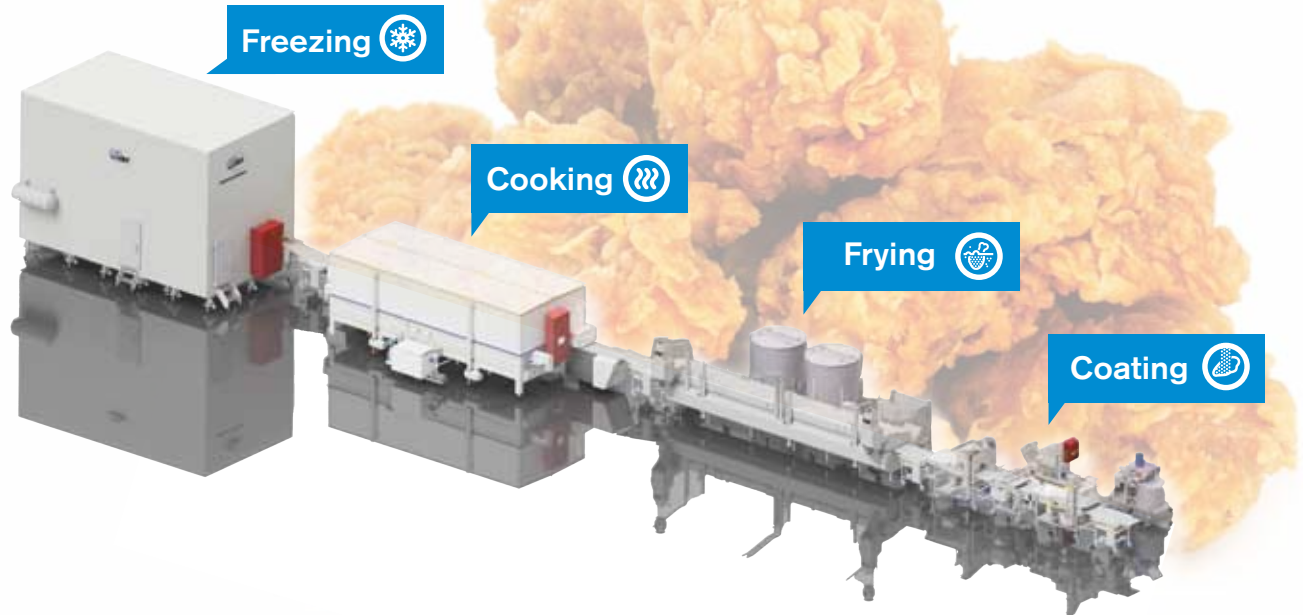
Ragazzini pumps are available in sizes ranging from 10 mm ports up to 150 mm, with flows from 0.2 litres per hour up to 180 cubic metres per hour, with pressures to 15 bar. Various pump hose materials allow pumps to move abrasive fluids, corrosive fluids, fats, oils, along with hoses for foods and pharmaceutical products.

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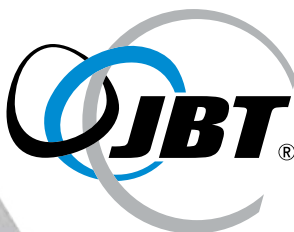
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# How is full automation possible in grill skewer production?

**T**he use of robots in the meat processing industry is expected to increase within the next few years, with more and more manual tasks taken over by computer-controlled robots.

Currently, the cooperation between human and machine is necessary for production of grill skewers. Robotic systems are designed to accelerate and simplify work processes, but how is full automation with maximum performance possible in grill skewer production?

## The challenges

There are many challenges associated with the preparation of the bulk ingredients used

in skewers. Nothing grows squarely, so ingredients such as meat, peppers and onions must be cut to size in one place and then transported to the skewer as quickly and reliably as possible. Other challenges include: the surfaces of ingredients are different: either firm, soft or hard; and using more ingredients in skewers creates more demands for technology. Gripper technology is required to pick up the right ingredient perfectly in the shortest possible time without errors and transport it to the skewering.

Systems such as articulated robots or articulated arm robots are limited by speed and accel-

eration. The working area and thus the necessary distance per cycle depends on the number and type of ingredients. Due to the physical dependence of the speed on distance and time, the cycle time increases — this will reduce the picks per minute. Vibrations caused by acceleration and centrifugal forces can cause positioning errors that have to be absorbed by stiffer frame structures.

Such articulated or gripping arm robots set limits to productivity, when reaching a full-speed production. More power is not possible at the push of a button and they are not scalable at peak

times. Production peaks often mean a multiplication of the manufacturing volume during the same time, which requires a higher number of robots. But when only using them in peak times, downtimes are dead capital which means amortisation only through higher production costs for the grill skewers. Also, the wooden stick is exposed to high forces and bent skewers can increase errors at high processing speeds.

One of the most powerful arguments in favour of robotics is the saving of personnel costs. However, additional investments such as visual



systems, safety devices, protective fences, gripper technology and programming and much more are necessary. In addition, it takes a lot of time and patience to plan, integrate and commission such technologies.

*“The cost of implementing a robot in a production environment is five times greater than the cost of the robot alone” (Quote Dr. Torsten Becker, article vdi-z, 29.10.20)*

### The solution: a hybrid system

A hybrid system from MIVEG, ie, a fusion of conventional technology and robot technology, is designed to help to manage the balancing act required for skewer processing. Using the Skewer Systems 4080 and 720, output can be increased at the push of a button, without any loss of performance. The systems can be rightsized to user requirements to ensure cost effectiveness of the equipment.

Work steps and processes that were previously time-consuming and labour-intensive can largely be replaced or saved in three system steps:

#### 1. Drop-in-place

A process-controlled vibratory conveyor transports bulk goods such as meat, cheese or fish to a skewer automation and then quickly distributes the pieces of meat in the correct position for inclusion in a cassette. A shuttle belt is used for shaped products such as minced meat or meat substitute products. In this production process, employees can optionally equip the cassettes with additional toppings such as peppers and onions. The speed of performance can be maintained and even increased.

#### 2. Patented automated skewer technology

Each skewer is guided through the middle of the ingredients

and components, without putting any strain on the wooden skewer, using a patented high-speed skewer system from MIVEG. The company said the system can achieve an output of over 97%, even at full speed.

The system quickly guides the skewer and the point of application of force is designed to be always at the most efficient position on the skewer. For maximum output in all production conditions,

the grill skewer must be of high quality.

#### 3. Pick and place, gantry robot

A gantry robot removes the finished skewers from the handle and places them either in packaging or on a conveyor belt. With the attachment on the handle, the end of the stick remains clean and attractive. The skewer is not impaired or contaminated with marinade.

With the help of the gantry robot, the orientation of the skewers is maintained. When placed in trays, they stay clean. The number of items and the desired placement orientation of the grill skewers can be selected according to user specifications — for example, lengthways or crossways. The skewers are precisely positioned to a tenth of a millimetre.

**MIVEG**  
www.skewer-machines.com



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## NEWS

### Nestlé launches vegan KitKat

Nestlé announced its latest foray into the plant-based confectionery industry, launching a vegan KitKat — called KitKat V — later this year.

Nestlé Head of Confectionery Alexander von Maillott said the new product, which was developed in York, UK, came after seeing many requests among consumers for a vegan KitKat. “This is a product for everyone who wants a little more plant-based in their life,” he said.

Louise Barrett, Head of the Nestlé Confectionery Product Technology Center in York, said taste was a key factor in developing the plant-based chocolate.

The company has already launched plant-based alternatives to dairy made from rice, oat, soy, coconut, pea and almonds across categories. Examples include non-dairy ice cream, coffee creamers, rice- and oat-based drinks, pea-based beverages, plant-based cappuccinos and lattes, a vegan condensed milk alternative, as well as a range of non-dairy cheese to complement existing plant-based burgers.

Nestlé said surveys have shown that people are interested in exploring more plant-based foods across different categories. Plant-based confectionery is one of the emerging trends this year.

“There is a quiet food revolution underway that is changing how people eat. We want to be at the forefront of that, championing the discovery of plant-based food and beverages,” von Maillott said.

KitKat V is certified vegan and made from 100% sustainable cocoa sourced through the Nestlé Cocoa Plan in conjunction with the Rainforest Alliance.



## Authenticate meat and fish in 15 seconds

**R**esearchers have developed a technology that enables the identification of common types of meat and fish within 15 seconds.

The researchers said the device's ability to authenticate the type and purity of meat samples could be used to combat the global problems of food fraud and mislabelling.

The device, which is called a MasSpec Pen, was previously used to gently extract compounds from a material's surface within seconds and then analyse them on a mass spectrometer.

The research report published in the American Chemical Society's *Journal of Agricultural and Food Chemistry* analysed the handheld device's ability to detect meat and fish fraud rapidly and effectively in pure filets and ground products.

The researchers used the MasSpec Pen to examine the molecular composition of grain-fed and grass-fed beef, chicken, pork, lamb, venison and five common fish species collected from grocery stores.

Once the device's tip was pressed against a sample, a 20 µL droplet of solvent was released, extracting sufficient amounts of molecules within three seconds for accurate analysis by mass spectrometry. The scientists said the whole process took 15 seconds, required no pre-processing and the liquid extraction did not harm the samples' surfaces.

Then the team developed authentication models using the unique patterns of the molecules identified, including carnosine, anserine, succinic acid, xanthine and taurine, to distinguish pure meat types from each other, beef based on feeding habit and among the five fish species. Finally, the researchers applied their models to the analysis of test sets of meats and fish.

For these samples, all models had a 100% accuracy identifying the protein source, which is as good as the current method of polymerase chain reaction (PCR). While being extremely accurate, PCR analysis can take hours to days, and is often performed at off-site labs whereas the MasSpec Pen is approximately 720 times faster.

The researchers said they plan to expand the method to other meat products and integrate the device into a portable mass spectrometer for onsite meat authentication.

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## Where oil-free air is used:

### Automation air

Compressed air is used to control the valves and actuators in automated lines for filling, packaging and bottling. With oil-free compressed air, you prevent your automation components from jamming and keep your end product safe.

### Transportation

Compressed air is used to push powdered milk or cocoa powder along pipes. With oil-free air, you will avoid oil contaminant mixing with the powder and maintain the powder purity.

### Cleaning air

Compressed air for cleaning bottles, packaging and moulding prior to filling. Oil in compressed air will contaminate the food containers and alter

the flavour and odour of the end product, besides being a health hazard.

### Air blowing, aeration

Compressed air is pumped into a liquid to boost its oxygen content. This is used, for example, in fish farming to oxygenate water in lower layers and/or oxidise the sediments. Oil contamination in the air will kill the fish and other fauna.

### Fermentation

Compressed air supplies oxygen to bacteria during fermentation to produce food ingredients such as citric acid, wine and yoghurt. The presence of even small oil traces will affect bacterial activity, create a substandard product and contaminate the end product.

### Food storage

In the air separation process, compressed air is broken up into oxygen and nitrogen. The nitrogen is then used to preserve foods in cans, in larger storage facilities and in

maritime transport. The air must be 100% oil-free as the nitrogen comes directly into contact with the food. Oil will destroy the membranes in plants which are expensive to replace. Oil will also significantly reduce the life of nitrogen generators leading to costly replacement.

### Cooling and spraying

Compressed air is used to cool down baked goods after they emerge from the oven. Contamination of the air spoils the end product leading to rejections and production losses.



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# Shaking up powdered chocolate mix production

*Castor-mounted frame with support boom allows rolling of the unit into position with discharge above the screener, and thereafter to a cleaning area.*



**S**MK Nutra Makers (SMK), a formulator and contract manufacturer of dietary supplements and nutritional products, improved production of a protein shake sports drink by switching from manual dumping of a powdered chocolate mix from an elevated safety cage to dumping of the mix at floor level into mobile flexible screw conveyors.

Previously, operators in a safety cage were raised by a forklift to dump 25 kg bags of the shake powder into either of two screeners positioned above blenders.

To improve the laborious, dusty procedure, the company purchased two mobile, high-capacity flexible screw conveyors, each dedicated to a separate blender. The powder is now dumped at floor level into the hopper of a conveyor, which feeds a screener and, in turn, a blender. SMK owner Avni Patel said: "Manual handling at floor level has increased productivity, eliminated dust and improved worker safety."

Supplied by Flexicon, each of the BEV-CON model conveyors includes a 7.5 m-long bevelled-edge spiral driven by a motor positioned beyond the discharge point, precluding material contact with bearings or seals.

The conveyor's charging adapter consists of a trough at the outlet of a pyramidal hopper that exposes the intake end of the spiral to the powdered mix. A pneumatically actuated vibrator

fitted to the hopper wall promotes the flow of powder into the trough as the rotating spiral moves it at a 45° incline through the enclosed tube, discharging it into the screener.

A 3.6 m-high castor-mounted frame with support boom enables operators to roll the unit into position with the conveyor discharge directly above the screener, and thereafter to a cleaning area. Mobility of the units also provides SMK with the flexibility to satisfy new processes.

Patel said: "We also considered a solid shaft auger conveyor among other options, ultimately deciding on the Flexicon conveyors."

"The conveyors are precisely what we needed," she explained. "We no longer have issues of dust, safety and fatigue when moving the chocolate powder. We're in the process of expanding and will be ordering additional units."

Flexicon also manufactures other configurations of flexible screw conveyors, as well as bulk bag fillers, pneumatic conveying systems, tubular cable conveyors, bulk bag unloaders, bulk bag conditioners, bag dump stations, drum/box/container tippers, weigh batching and blending systems, and engineered plant-wide bulk handling systems with automated controls.

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## Sanitary thermal flow switch

With its stainless steel wetted materials and standard 20Ra finish, available in either mechanical polish or electro-polish finishing, the sanitary FLT93C Thermal Flow Switch supports both skid-mount and stationary clean-in-place (CIP) systems. The primary purpose of these systems is to ensure all process piping and equipment is thoroughly cleaned per ASME BPE standards.

The flow switch monitors the process cleaning solution's minimum liquid flow rate to ensure it is maintained during the entire cleaning process runtime. Operating over a wide liquid flow range of 0.003 to 0.9 mps, it has accuracy of  $\pm 0.5\%$  reading or  $\pm 0.012$  mps.

Designed with unique temperature compensation technology, the flow switch ensures set point accuracy for process temperatures that can vary up to  $\pm 37.8^\circ\text{C}$ . It is easily field-configured or factory preset, providing flexibility, accuracy and stability for all multiple process sensing and switching requirements.

Suitable for 19.05 to 101.6 mm sanitary tubing process lines, it connects with a secure tri-clamp fitting for easy removal for inspection and servicing. The 316 L stainless steel wetted materials are available in both mechanical polish (SF0 to SF3), and electro-polish (SF5 and SF6) surface finishes with 20 Ra maximum ( $\mu\text{in}$ ) finish; 10 Ra maximum ( $\mu\text{in}$ ) electro-polish finish (SF 4) is available on request. The construction complies with ASME BPE requirements.

In addition to CIP systems, other pharmaceutical uses include compendial water systems (WFI, PW and HPW) and solution preparation systems (buffer solution). Special options are available for applications requiring more corrosion-resistant, wetted materials such as Hastelloy C and Class 1, Div 1 and 2 hazardous areas.

The dual-function instrument indicates both flow and temperature and/or level sensing in a single device. Dual 6 A relay outputs are standard and are independently configurable to flow, level or temperature. The sensor technology of the series, combined with FlexSwitch temperature-compensation circuitry, introduces liquid level resolution of  $\pm 2.5$  mm; repeatability of  $\pm 1.3$  mm.

It also features a standard temperature accuracy  $\pm 1^\circ\text{C}$ ; repeatability is  $\pm 0.6^\circ\text{C}$ ; improved temperature accuracy is available with factory calibration.

FCI's FlexSwitch technology can be packaged in integral or remote configurations for installation flexibility.

The unit is available with a choice of sensors, including one that is suitable for process temperatures up to  $176.67^\circ\text{C}$  and one that is suitable for temperatures up to  $260^\circ\text{C}$ . Hazardous approvals include ATEX and EAC/TRCU.

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## Adhesive melter

Robatech's Vision is an energy-efficient adhesive melter for adhesive applications.

The melter gently melts thermoplastic hot-melt adhesives, maintains a constant adhesive viscosity and conveys hotmelt at a consistent pressure to the application head. This increases the reliability in high-precision adhesive applications, which is needed when gluing primary packaging.

The melter can be installed lengthwise or crosswise and is operated remotely or via the optional touch display, which is mounted at the front or side. The 45° FlexPort connection surface allows heated hoses to be connected at different angles to save space. This provides users with the flexibility to position the device at the shortest possible distance from the application heads, keeping the heated hose length short.

**Robatech Australia Pty Ltd**

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



## Twist spray heads

Tecpro Australia's Twister Spray Heads can be used for cleaning large, tough areas.

The European designed and manufactured high-impact spray head can handle 16 bar water pressure at a flow of up to 500 L/min. They are made from AISI 304 stainless steel, impact-resistant POM and chemical-resistant EPDM. They can also handle water temperatures up to 60°C.

The heads come in 3 different sized connections — the largest version is 1" and weighs 800 g. There is also a ¾" and a ½" version weighing 460 and 320 g, respectively.

It only requires a twist of the head to close, open or direct the spray.

**Tecpro Australia**

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

## Industrial Ethernet tester

Fluke Networks' LinkIQ-IE Cable+Network Industrial Ethernet Tester is designed to troubleshoot network cabling, which is claimed to be the leading cause of industrial Ethernet failures.

The technology is based on a single-test approach that automatically provides the appropriate measurements based on what's at the other end of the cable. For an open cable, it shows the length and pairing. If it's terminated with the supplied remote, the test result shows the maximum data rate the cable can support — up to 10 Gbps. If the cable is connected to a switch port, the technology will show the name of the switch plus the port name, speed and duplex. If PoE is advertised, it will display the power and class (up to 90 W or Class 8) and then load the switch to verify the power can be delivered.

The product also features an RJ-45 type connector and includes cabling and adapters, simplifying connection to M12-D, M12-X and M8-D connectors commonly used in industrial applications.

**Fluke Networks**

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

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# At the click of a button

## Connected oil mill 4.0: streamlining F&B operations

*Pierre Kardasz, Asia Pacific Regional Industry Manager, Consumer Packaged Goods and Life Sciences, Rockwell Automation*

Every industrial sector, from life sciences, consumer packaged goods, food and beverage, to mining and chemicals, finds itself undertaking, or on the verge of, massive digital transformation projects to modernise mission-critical elements of their operations. For most, it can be a complex maze of software patches and employee upskilling, a winding journey with no light at the end of the tunnel.

Well, the answer to taking that complexity away lies in automation, which can streamline workflows at the click of a button. This is the new reality afforded by technology that is fundamentally redefining the operation and shape of factories.

The modernisation of technology is not an entirely new concept, but automation demands a rethink of our old approach. A reliance on outdated ways of working or legacy infrastructure and fears of over-expenditure has

seen a rise in siloed businesses that do not communicate and risk disaster on the product line.

In the food industry, the slightest period of downtime quickly results in lost production. This makes traceability throughout the entire supply chain of a business mandatory, with the need for real-time continuous data now essential.

### The case for automation

As we come out of the largest business disruption in modern history, food and beverage companies have been faced with a variety of challenges that caused some to pause investment and others to accelerate digital transformation initiatives.

We know running a plant or manufacturing area with multiple systems that are not natively connected is like running a tap without a handle: you have a huge outpouring of data, with little means to control or measure it.





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It is not enough to just have the technology, and in many instances, legacy infrastructure can ultimately hinder productivity and quality of produce. This critical need to have visibility over autonomous operations means the entire sector is exploring digitisation in some fashion.

Every time a bottle of soda is labelled, butter is digitally churned or a steaming tray of bread rolls emerges from an automated oven, your plant has communicated everything you need to know in the process, from the control room to the board room. Ensuring a process is there to translate it is integral.

By literally connecting the entire enterprise, unifying control systems into one fully integrated system, inter-connecting all applications and devices involved in the manufacturing process to provide meaningful data, analytics and insights that enable real-time decision-making, will ensure manufacturers are better positioned to maintain

business continuity and resilience, while improving operational efficiencies.

We see it in other industries, where this control and visibility of data improves security and allows for finite improvements to overall processes.

### The oil that drives the engine

No sector is held to greater quality standards than food and beverage manufacturing. A mistake or factory error in the production line can have significant ramifications.

Through technology, we have helped food and beverage manufacturers develop a more agile response to changing consumer tastes and industry standards. With the right level of investment, food businesses have harnessed the benefits of smart manufacturing to revolutionise the way they manufacture their products.

An example of the power of information-enabled manufacturing can be found in a producer of a certain gold liquid that makes the creation of other foods possible — olive oil.

The Conde de Benalúa oil mill in Southern Spain comprised non-integrated, isolated systems that were unable to offer any real-time data or predictive maintenance. Worse yet, the mill was ill-equipped to stave off short electric breakdowns in an industry where product quality is measured at the highest standard. The oil mill rolled out an automation system based on control sections, developed with proprietary tools by industry integrators that supply specific solutions to automate oil plants. This extended across the entire oil mill giving the operators a vastly improved pipeline of information and higher machine efficiency.

By eliminating these bottlenecks, Conde de Benalúa was able to ensure a consistency with each bottle. Thus, the connected oil mill 4.0 was born, offering employees leading data visualisation that allowed them to easily monitor every stage in the production process for both idle and operational machines. This generates data that can be instantly checked to improve decision-making in a sector that demands lots of quick and informed decision-making.

In a climate where the difference between making money or facing disaster is measured in milliseconds, food manufacturers need to invest in technology and rethink what it can really do. A well thought out and integrated solution can be the difference in greatly reducing downtime, responding swiftly to outages or unforeseen circumstances, an uplift in performance and making operations more flexible.

Food and beverage industry leaders have found innovative ways to use technology and digital strategies to improve operations, overcome security concerns, manage remote work and meet changing consumer demands. Those manufacturers who have embraced automation are already reaping these benefits. So, if you need a technology upgrade, now is the time to make the switch and modernise mission-critical elements of your operations.

**Rockwell Automation Australia**  
[www.rockwellautomation.com/en-au.html](http://www.rockwellautomation.com/en-au.html)





## Connectors for food and beverage industry

Food industry players who want to shorten set-up times and production stoppages can do so by using connectors. As a result, HARTING developed the Han F+B series. The series' design is intended to provide strong resistance to detergents, functionality across a wide temperature range (-40 to +125°C) and prevent the build-up of dirt.

Smooth surfaces make it harder for bacteria to accumulate. The hoods, housings and seals are robust and protect the internal contacts against hose water and aggressive cleaning agents, which are certified by Ecolab and have FDA 21 approvals. The water jet from high-pressure cleaners cannot penetrate the hoods/housings when closed. Han F+B meets these requirements. Mating and unplugging is designed to be easy, safe and fast.

For secure identification, the connectors are blue. The housings can be used with hybrid contact inserts for data, signals and power. This makes it possible to optimally configure futureproof machine design for processing units, including Ethernet. The maximum power is 16 A/500 V.

**HARTING Pty Ltd**  
[www.harting.com.au](http://www.harting.com.au)



## Bacon slicer

Thurne has introduced a dedicated slicer for belly and turkey bacon.

The Thurne two bacon slicer can deliver production gains for both retail and foodservice bacon processors — maximising on-weight and yield performance in a compact footprint, thanks to high-precision feed tracks and cut face vision technology. The simple flatbed design enables cost-effective, continuous, high-throughput slicing with minimum reload time, and conforms to AMI design guidelines.

The slicer interfaces seamlessly with Thurne and Middleby's Winning Lines, integrated bacon processing systems which include the brands' upstream and downstream equipment, from belly loaders to sheeters and thermoformers. An external trim reject option is available to maintain a clean line for sheeted and carded applications.

**Linco Food Systems**  
[www.linco.com.au](http://www.linco.com.au)

## Ion chromatography system

The easy-to-use Thermo Scientific Dionex Integrion HP Ion Chromatography system is designed to make in-house food testing fast, flexible and precise.

With comprehensive application solutions and flexible detector configurations, it is designed to meet users' analysis needs.

Featuring high-pressure capability, faster analyses and automated eluent generation (EG), the Dionex Integrion system safeguards data quality and delivers better method reproducibility. The system fits in well supporting a range of applications ranging from environmental to food, dairy, beverage and more.

The product can prevent consumable installation errors while tracking system and consumable performance. It is rated for high-pressure operation up to 5000 psi, enabling faster results without compromising data quality.

The system also features an intuitive design with user-friendly component access on a compact platform and simple IC controls.

It also delivers consistent results through its thermally regulated environment, which ensures reproducible and sensitive detection, and its high-performance conductivity or amperometric detection.

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### Flanged vibrators for sieves

The OLI Australia MVE- F Electric Flanged Vibrators for food processing sieves can provide from 200 to 3500 kg of centrifugal force.

The Standard 'S' Series and the Industrial 'I' Series of vibrating motors are suitable for all kinds of vibrating sieves.

S & I Flanged Vibrating Motors are used in vibrating sieves for solid-liquid separation or solid sizing purposes.

Manufactured from quality robust materials, they are built to last in hazardous environments. The 'S' Series is especially designed and optimised for circular sieve applications with the aim to improve the overall performance of application in food production and pre-preparation sectors.

Other features include: vacuum-impregnated windings using Class F insulating materials; long-life bearings; sturdy FMEA-designed casing; European built quality; and ATEX II2D Ex tb IP66 IECEx and ETL Class II Division 2 Certification for hazardous environments.

Other benefits include: corrosion resistant specifically developed for food applications; interchangeable with many brands; smooth shape that improves sanitation of the equipment avoiding product, detergents and micro-organism residues; water- and moisture-proof; and multiple voltages matching electric specifications worldwide and standards.

With the IP66 rating, the units are available with 2-, 4- and 6-pole and all three-phase 220–240/380–415 V 50 Hz/60 Hz.

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## Stainless steel panel PC

The ViTAM-924A 24" Stainless Steel HMI Panel PC is a fully sealed IP66/IP69K all-in-one computer. To comply with IP66/IP69K standards the ViTAM-924A uses M12 sealed connectors for all I/O connections. The result is a panel PC that can withstand high-pressure hose-down cleaning.

The panel is based on Sixth Generation Intel Core i3-6100U or Core i5-6300U processors with up to 16 GB of DDR4 memory to provide a high-performance industrial control solution. Standard I/O connections provided include 2x USB2.0, 1x LAN, 1x 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 is provided for storage. A Mini-PCIe slot is provided for WiFi/BT cards and an RFID front panel module is also available. The 24" 1920x1080 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 panel will not corrode and is easy to clean. To assist the cleaning of the display, the product 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. VESA100x200 mounting holes allow ViTAM Series to be arm or wall mounted. Optional ergonomic yoke mounting is also available.

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## Self-priming centrifugal wastewater pump

The Gorman-Rupp Super T Series self-priming centrifugal wastewater pump has been serving the industry since 1963.

The rugged pump has been designed for economical, trouble-free operation and easy maintenance.

With good solids handling capability, the pump has a large inspection cover that allows easy access to pump internals for service or blockage removal.

Advantages include the ability to mount high and dry above the wet well (not in it); a removable rotating assembly; and a new Eradicator Solids Management System.

Designed with various materials that handle abrasive and corrosive fluids, the pump is designed for easily accessible maintenance to reduce downtime and costs, and has advanced safety features to minimise OH&S issues.

Adjusting clearances is done in minutes by one operator without disconnecting the pump or even opening it, enabling the pump to be kept in peak operational efficiency.

A double lip seal and atmospheric vent arrangement protect the bearings and shaft if a seal fails.

Pusher-bolt capability on the cover-plate and rotating assembly make removing those components easy for one operator, without the need for jemmy bars or excessive force.

A pressure relief valve is designed to protect the pump and operators from excessive pressure if a discharge valve blocks.

### Hydro Innovations

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



## Energy-efficient V-bank filter

Camfil's Opakfil ES energy-efficient V-bank filter includes certain F7, F8 and F9 efficiency models classed with an A+ EuroVent Energy Rating.

Part of Camfil's Energy Saver filter range, the filter is designed for optimal energy-efficient air distribution, which can result in longer filter life and a lower total cost of ownership (TCO).

TCO includes the sum of total product, maintenance and energy costs for a given period, with savings found through high-performance filters requiring less frequent replacement and lower resistance operation resulting in reduced fan horsepower and energy consumption.

Designed to provide high-efficiency filtration to target PM1 particles, Camfil Opakfil ES filters remove airborne contaminants such as smoke, bacteria, fumes, fungi and virus-bearing droplet nuclei; and are suitable for use as a premium-grade secondary filter within the fresh air intakes of food processing and life science facilities.

With effective operation in 100% humidity and temperatures up to 70°C, the filters are suitable for use in humid, tropical areas and coastal areas.

Available in M6, F7, F8 and F9 efficiencies to EN 779, certain models are also offered with ProSafe certification, conforming to BRCGS global standards for food safety.

**Camfil Australia Pty Ltd**

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

## Molecular detection system

The 3M Molecular Detection System helps save time and labour costs with its ready-to-use reagents, a single protocol for all pathogens and same- or next-day results.

Its space-saving design and ability to test for multiple types of pathogens simultaneously increases productivity, allowing for the quick release of products.

The 3M Molecular Detection Instrument is a small device featuring a compact footprint that fits in any lab, a solid design with no moving parts and automatic diagnostics at start-up. It has the capacity to test up to 96 samples per run for high throughput and can run all assays simultaneously for increased productivity.

3M has a growing portfolio that keeps up with the latest technology.

Using isothermal DNA amplification and bioluminescence detection to overcome the limitations of older systems, the 3M Molecular Detection Assays can detect as low as 1 CFU of target pathogen per sample even in the most challenging sample matrices. Assays include: *Salmonella*, *Listeria*, *Listeria monocytogenes*, *E. coli* O157 (including H7), STEC, *Cronobacter* and *Campylobacter*.

The 3M Molecular Detection Software is intuitive and powerful. It gets results quickly and has a user-friendly interface for quick set-up and real-time results for faster decisions.

**3M Safety & Industrial Business Group**

[www.3M.com/au](http://www.3M.com/au)



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## Multipurpose bottle filler

Kosme's Barifill Canto is a multipurpose filler that handles both glass bottles and cans. A key feature of the product is its filling valve.

The valve is equipped with a level probe for filling glass bottles and a volumetric system with an inductive flowmeter for cans. The combination of the two systems in a single filling valve saves time when switching between container types.

The valve can be automatically adjusted to a new fill level or volume when switching between cans and bottles or different container sizes.

As an option, a rinser that likewise accommodates both cans and bottles and various container sizes without any manual adjustments can be integrated directly upstream of the infeed into the filler.

All of the component parts are controlled from a central panel, reducing operator intervention. All parts that come into contact with the product are made of stainless steel, enabling easy cleaning and ensuring their longevity.

The multipurpose filler is suitable for small producers. It does beer, CSDs and sparkling wines in a variety of can types and sizes. It also handles glass bottles — both classic wine bottles and the long-neck bottles used for beer and CSDs. Filling temperatures range from 2 to 16°C for cans and glass. Filling speeds depend on the product and individual configuration and range from 1200 glass bottles or 2500 cans per hour on the smallest layout to 9500 glass bottles or 16,000 cans per hour on the biggest set-up.

**Krones (Thailand) Co Ltd**

[www.krones.co.th](http://www.krones.co.th)

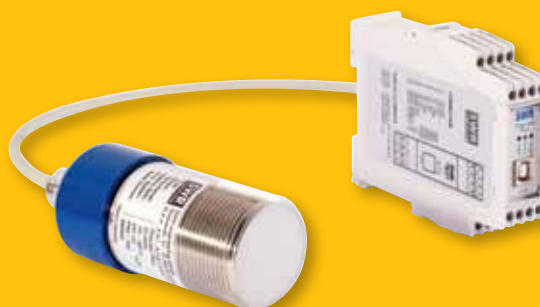


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The HRS R Series of rotating scraped surface heat exchangers is suitable for processing meat products.



The HRS Unicus reciprocating scraped surface heat exchanger is used for meat products with high fouling.

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# The benefits of cooling ingredients for pet food

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

While meat ingredients used for pet food need to achieve the necessary quality and hygiene standards, the fact remains that for many processors, the meat products used in the production of pet food have come from the waste and co-product streams of meat processing for human consumption. It is easy for such pet food ingredients to become treated as waste, or at best a nuisance, until they have left the food processing site. However, doing so wastes the opportunity to increase ingredient quality and value.

There are both quality and regulatory reasons for keeping ingredients cool, including chilling waste and co-products as quickly as possible after processing, and maintaining cold chain conditions during storage and transport. However, due to the highly viscous nature of materials such as meat slurry and mechanically deboned meat (MDM) it is important to choose the right type of heat exchanger. Scraped surface heat exchangers provide several benefits, including better product mixing, less fouling and better heat transfer.

Another benefit of using scraped surface heat exchangers is that they reduce the risk of the product freezing during cooling: the thick, viscous nature of the material combined with low temperature cooling solutions such as glycol means that a phenomenon known as 'slugging' can occur. This is where a channel of warmer product travels down the centre of the heat exchanger while the product at the tube wall does not move. This can create the risk that the product at the tube wall will freeze, while the material in the centre is not cooled sufficiently.

However, there is a balancing act when it comes to handling pet food ingredients. While they need sufficient mixing, meat products and slurries need delicate handling to maintain texture and quality.

## HRS R Series

The HRS R Series of scraped surface heat exchangers uses a patented rotary scraper bar which can reach speeds up to 300 rpm, providing high levels of shear and mixing at the heat transfer surface, which dramatically increases heat transfer rates. This

makes it particularly suitable for challenging heat transfer applications, such as those where the product requires high pressures or has high viscosity.

When creating solutions for highly viscous pet food ingredient processing (and handling other meat products such as sausage meat), the internal scraper configuration of the standard R Series may be adapted to achieve improved thermal performance, while a heavy-duty gearbox is usually specified to withstand the higher torques required to keep the product moving through the heat exchanger.

## HRS Unicus Series

The patented Unicus Series is designed to provide heat transfer of a wide range of difficult meat products which have high fouling potential, but which also need delicate handling to preserve fragile product integrity.

A process of continual improvement means that Unicus heat exchangers are now available with a wide range of scraper designs, providing more choice for applications from cooling to sterilising and everything in between. The hydraulically powered reciprocating movement performs two key functions; firstly, it minimises potential fouling of the product by keeping the tube wall clean, and secondly, it creates turbulence within the material. Both actions help to increase heat transfer rates creating a highly efficient heat transfer process ideal for viscous and high fouling materials.

Another benefit is that the separate hydraulic action enables the speed of the scrapers to be controlled and optimised for the product being processed. This means that materials which may be susceptible to shear stress or pressure damage, such as chunks with jelly and gravy, can be handled gently while still providing high levels of product identity.

Whatever co-product or raw material being used, HRS has a heat exchanger solution that can help to turn a potential waste into a valuable ingredient.

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Suitable for hygienically sensitive applications in the food sector, it can also be used for various applications in process and pharmaceutical industries. Typical applications include conveyor belts, pumps, mixers or agitators, along with water and sewage plants and car wash facilities.

The surface treatment allows for use of high-pressure cleaners and is available for most of the NORD modular drive systems made from aluminium.

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Drinking water is considered the most vital element for life next to air/oxygen. Since there is no alternative to this finite resource, protecting and securing the standard and quality of drinking water is a top priority for engineers, planners and technicians as well as system operators.

The EcoReg fluid regulator is an independent diaphragm pressure regulator that can be installed in all fluid systems. It ensures a constant and precise output pressure independent from the input pressure. The pressure value is factory set and cannot be changed, ensuring that no-one can manipulate the specified pressure.

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## Hygienic powder mixer

Alfa Laval's Hybrid Powder Mixer (HPM) is designed to eliminate lumping when dispersing and dissolving powdered pectin.

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# Ultrasonic washing of leafy greens

Salad and leafy green vegetables may be contaminated with harmful bacteria during growing, harvesting, preparation and retail.

Scientists from the University of Southampton have shown in a recent study, published in the journal *Ultrasound in Medicine and Biology*, that gentle streams of water carrying sound and microscopic air bubbles can clean bacteria from salad leaves more effectively than current washing methods used by suppliers and consumers.

In the study, acoustic water streams were used to clean spinach leaves directly sourced from the field crop; the results were then compared with leaves rinsed in plain water at the same velocity.

Professor Timothy Leighton of the University of Southampton, who invented the technology and led the research, explained: "Our streams of water carry microscopic bubbles and acoustic waves down to the leaf. There the sound field sets up echoes at the surface of the leaves, and within the leaf crevices, that attract the bubbles towards the leaf and into the crevices. The sound field also causes the walls of the bubbles to ripple very quickly,

turning each bubble into a microscopic 'scrubbing' machine. The rippling bubble wall causes strong currents to move in the water around the bubble, and sweep the microbes off the leaf. The bacteria, biofilms and the bubbles themselves are then rinsed off the leaf, leaving it clean and free of residues."

The results showed that the microbial load on samples cleaned with the acoustic streams for two minutes was significantly lower six days after cleaning than on those treated without the added sound and bubbles. The acoustic cleaning also caused no further damage to the leaves and demonstrated the potential to extend food shelf life, which has important economic and sustainability implications.

The research project was a collaboration between Sloan Water Technology, Vitacress and the University of Southampton, a collaboration formed and supported by Global-NAMRIP (the Global Network for Antimicrobial Resistance and Infection Prevention).

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# Reducing salt in aged cheese

**B**efore aged cheeses are fully mature, they're either waxed or placed in brine for weeks to create a natural rind. The high salt content in brined cheeses can deter some consumers; however, researchers reporting in *ACS Food Science & Technology* have now presented a shortened brining time for Parmigiano Reggiano that results in a less salty product, while still potentially maintaining the cheese's distinctive texture and flavour compounds.

Manufactured in select provinces in Italy, Parmigiano Reggiano is a lactose-free, crumbly and hard cheese that requires certain production processes, such as a long ripening period (minimum 12 months). Prior to the maturing process, cheese wheels are placed in a saturated brine solution for weeks. The added salt plays a key role in the ripening process by modulating microbial growth, enzyme activity and the separation of solids from liquids, hardening the final product.

One enzyme-mediated reaction is lipolysis, in which triglyceride fats in milk break down into their key components — free fatty acids and diacylglycerides. Free fatty acids not only contribute to the taste of the cheese but are also precursors to other flavour molecules.

In the study, Silvia Marzocchi and colleagues wanted to test the impact of shortening brining time. The researchers had five Parmigiano Reggiano dairies brine several cheese wheels by immersing them in a saturated salt solution for either 18 days or a shorter 12-day period. Then the wheels were ripened for 15 months under conditions typical for this type of cheese.

Salt content in fully ripened cheese was 9% lower in the samples brined for a shorter time than the group with the longer procedure. Unexpectedly, however, the researchers found no difference in the moisture level, cholesterol and total fat in the two sets of cheeses. The team also observed no major variations in compounds involved in the flavour profile, as most of the 32 free fatty acids had overlapping concentration ranges between the two groups. Yet, in the cheeses with the shorter salting time, overall, the total free fatty acids and the total diacylglycerides concentration ranges were 260% and 100% higher, respectively, than the traditionally brined version, suggesting the lower salt to moisture ratio resulted in more water available to lipolysis reactions and more rapid enzymatic activity breaking down triglycerides.

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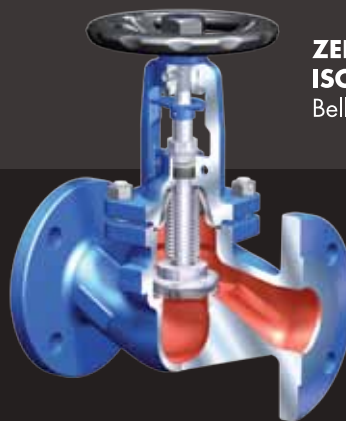
The equipment is made to application-specific performance requirements for mixing volumes up to 19,000 L.

Engineered and built for hygienic environments or general industrial applications, the liquid mixing systems can be designed for open- or closed-tank configurations. Motor specifications include severe-duty and explosion-proof designs, stainless steel construction and horsepower ratings up to 5 hp.

The mixing system projects can be fully integrated to provide total process effectiveness both upstream and downstream.

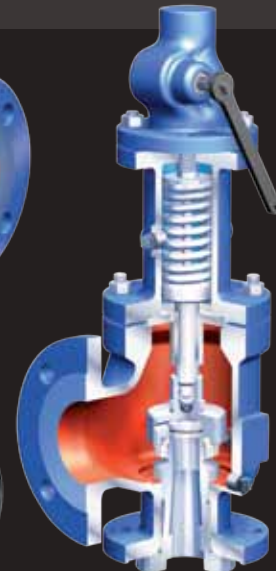
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## CASE STUDY

### Souping up savings

A soup production facility was looking to replace its unreliable surface aerators to save maintenance costs and improve efficiency at its facility. The facility environmental engineer installed the Hydro Innovations Venturi-Aeration solution, which has resulted in improved efficiency and cost savings.

The Venturi Aeration line of wastewater treatment products was introduced in Australia after its successful application by food processors in the US and Europe.

The Venturi Aeration aerators are used in conjunction with Gorman-Rupp pumps and can be mounted on the banks of basins and lagoons instead of being installed within them.

The soup production facility was happy with its results when the facility converted to a Venturi Aerator. The installation is reported to have resulted in annual operating cost savings of more than \$112,000.

According to the company, the system has improved the overall EQ tank performance to produce clearer effluent, controlling odours, settling solids, cooling the water and hydrolysing fats, oils and greases causing them to float for better removal efficiency.

The former system was to add dissolved oxygen to mix and equalise the contents in the EQ tank using submerged aerators. The addition of the dissolved oxygen would cause fats, oils and grease to float so they would not be discharged with the plant's effluent into the publicly owned treatment works.

The submerged aerators were also supposed to provide cooling of the influent process washdown water (at around 40°C).

The aerators had been in operation for several years and were not achieving the desired conditioning objectives. Furthermore, whenever one of the submersible pumps plugged or failed, the company had to rent a crane to remove the pump for repairs and then had to use the crane for removal and repair, and to reinstall the repaired pump at additional costs on each occurrence.

As one or more of the submerged pumps was failing at least once if not twice a year, the company began to look for a more viable aeration, mixing and equalisation solution to keep them in compliance.

The facility environmental engineer decided to replace the existing aerators with a Venturi-Aeration Model VA-1400 aerator



and a T8 Gorman-Rupp pump. The Venturi aerator was designed to handle 82 L/s. This allows the contents of the EQ tank to be recirculated four times during 24 hours, achieving greater oxygen transfer and better mixing and equalisation.

With better circulation and cooling in the EQ tank the fats, oils and grease is floated for separation and treatment and is not being discharged with the effluent to the local treatment works, reducing surcharges.

The plant was able to achieve a \$6000 annual energy cost reduction, an \$89,000 annual reduction in chemical costs, a \$12,000 annual reduction in non-compliance charges and further maintenance cost reductions.

The facility environmental manager now has a system that allows him to achieve his discharge permit parameters and he has less concern over maintenance issues and costs.

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## 24 VDC uninterruptible power supply

Now available at Control Logic, the UB40.241 by PULS is a new addition to its range of 24 VDC uninterruptible power supplies.

The UB40.241 has the highest output current and largest battery size in their range. A maximum continuous output current of 50 A (below 50°C) and up to 60 A for 5s burst and maximum battery size of 200 Ah provides for higher power and longer buffer times. At a constant load of 20 A, the buffer time would be over 10 h, and at a constant 5 A, the buffer time would be nearly 2 days.

The UB40.241 uses the 1-Battery Concept where each 12 V battery is charged and monitored separately, so that matching of batteries is not necessary. A battery size selection switch enables optimising for system battery size, and the temperature-controlled charging extends battery service life. A selectable buffer limit timer can be tuned to specific requirements to disable buffering after the set period to reduce recharge times and further extend battery service life. Diagnostic and monitoring functions and dry contact status outputs can be connected to a PLC or to local indicators for early warning and remedial action. An inhibit input can also be used to prevent system buffering during servicing or other requirements.

Multiple UB40.241s can also be arranged in various architectures to allow for increased voltage, higher current or to create a redundant UPS system. Designed for industrial applications, the UB40.241 is DIN rail mount and has an operating temperature range of -25 to 70°C.

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Compatible with several robot brands, the gripper can handle payloads of 20 kg.

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The gripper provides unlimited cup and airflow customisation and multichannel functionality, allowing it to be deployed on multiple items of different shapes and sizes.

Its built-in intelligence provides precise airflow control functionality. This functionality allows users to vary the type of grip used in different applications, from the soft grip used to handle delicate items to the hard grip required for handling bulky, heavy cardboard boxes with porous surfaces.

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Kosme's Barifill Canto multipurpose filler can handle multiple bottling functions.

The machine can fill beer, CSDs, sparkling water and sparkling wines in a variety of can types and sizes, and also handles PET containers or glass bottles — the latter in both the classic wine bottle format and the long-neck bottle used for beer and CSDs.

This flexibility is made possible by a filling valve, which is equipped with a level probe for filling bottles and a volumetric system with an inductive flow meter for cans.

Depending on the product and configuration, it can fill from 1200 bottles or 2500 cans/h on the smallest layout to 9500 bottles or 16,000 cans/h on the biggest set-up.

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## Wireless condition monitor

The Alfa Laval CM monitors the operating condition of rotating equipment, such as pumps, mixers and agitators, used in hygienic process environments. Compact and easy to use and install, it tracks equipment vibration, temperature and total run time to detect and diagnose equipment faults. This should enable manufacturers in the dairy, food and beverage industries to protect critical assets, ensure process uptime, improve worker safety, reduce maintenance costs and gain competitive advantage.

Powering the monitors are equipment sensors that transmit data to a connected compatible mobile device for predictive maintenance analysis, thereby supporting decision-making with diagnostics such as trend monitoring. Maintenance staff can check equipment vibration and temperature — either by visible notification on an LED indicator on the monitor or through an intuitive mobile app on a connected iOS or Android device within a 20 m range during a periodic walk around.

Trend analysis and FFT (fast Fourier transform) vibration data assist in diagnosing faults. These also enable operators to use the monitors to make informed decisions on scheduling maintenance and process shutdown based on actionable information in addition to actual run time and time to next service.

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## Stainless steel panel PC

The Apex ViTAM Series stainless steel panel PC is suitable for industries with hygiene considerations as a top priority, such as food, beverage and laboratories. It features a fanless PC, all-around IP66/IP69K certification and stainless steel construction, designed to resist germs and humidity.

The series is equipped with M12 connectors and supports IP66/IP69K waterproof rating to provide all-round protection.

The IP69K can resist a high temperature of 80°C and high pressure of up to 100 bars of water during washing down.

Featuring stainless steel housing that is easy to clean, the PC also has a wide operating temperature range, germ resistance and anti-oxidation.

In addition to features including anti-corrosion, green material, rugged enclosure, low maintenance, easy to clean, SUS315 anti-oxidation and wide range temperature resistance, the device also supports versatile mounting, auto-dimming, RFID system, PCT/RT touch screen options and various sizes of display.

Key features include: Celeron N2930, 4th/6th/7th Gen. Core i, Freescale iMX6 and Display; 10.1"/12.1"/15"/15.6"/17"/19"/21.5"/23.8" TFT-LCD; SUS304 stainless steel enclosure (SUS316 for option); touch on/off buttons on the side edge for hygienic cleaning; RFID built in for option.

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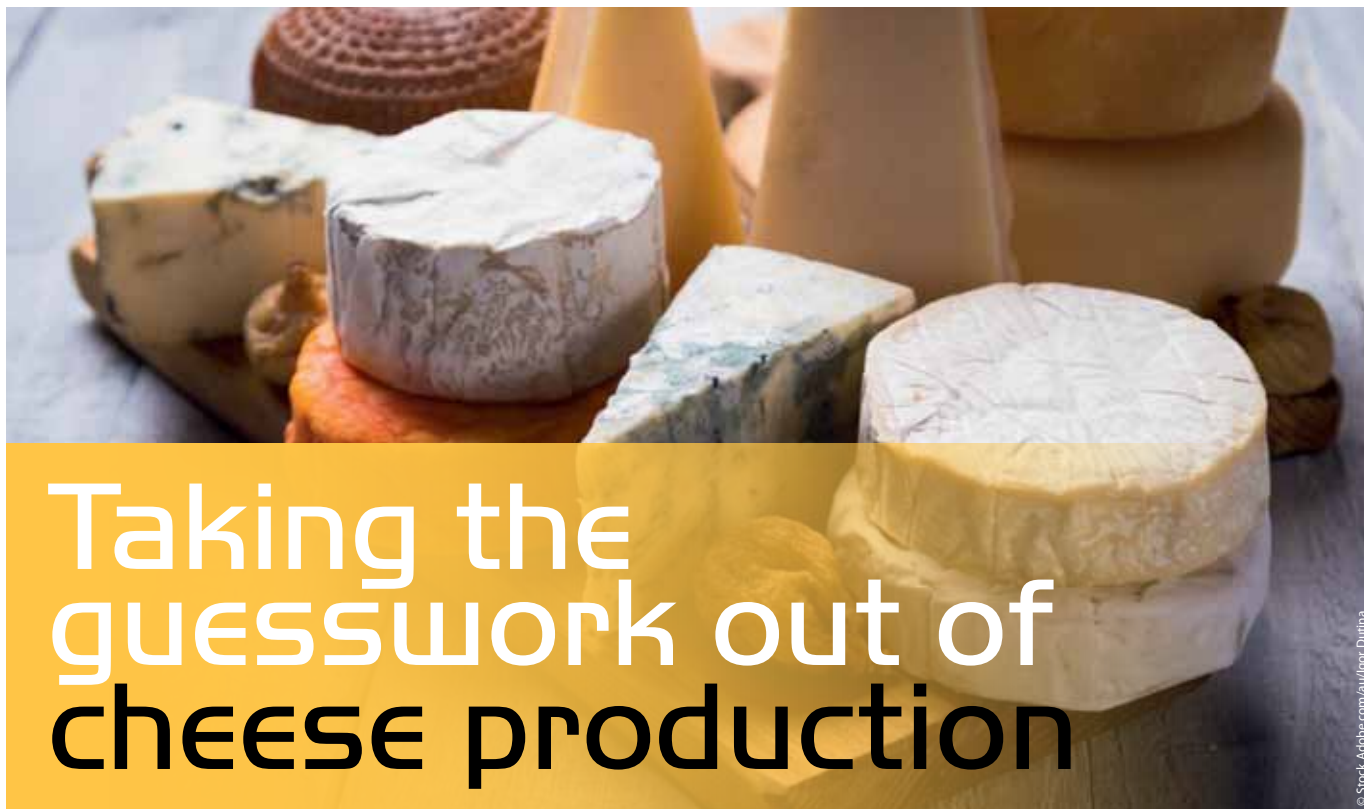
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# Taking the guesswork out of cheese production

**R**esearchers have devised a method that is designed to allow cheese quality to be checked much earlier and more precisely, making cheese production more efficient. The RMIT University research team sought to remove the guesswork out of cheese production, giving manufacturers a better chance to react to issues with the ripening process.

Currently, the method for identifying problems in cheese production is slow and complicated, taking potentially years for the issue to surface.

RMIT researcher Dr Roya Afshari said it is part of why cheese is so complex and expensive to make.

"A factory could invest lots of time and money into what they think will be a top-graded batch, only to discover it's a flop when it's too late to fix."

The team devised a method to expose cheese's biomarkers — or fingerprints — to show unique combinations of chemicals and milk-derived components that make up the perfect block.

Afshari said once scientists know the chemical profile of a successful cheese, they can compare it to new batches as soon as 30 days into the ageing process.

"It's like a pregnancy screening test for cheese — we analyse the biological data early in the development to see if there are any red flags," she said.

"This could be done alongside traditional analyses like tasting to highlight future potential problems."

The team looked at different commercial cheddar cheeses in Australia and applied multi-omics — a biological analysis typically used in human medicine to detect diseases early.

Researchers studied the biological make-up of different brands and grades of cheese and worked with data experts to interpret and compare the results for known batches.

"Once we knew the unique properties of a finished cheese, we compared them to ripening batches and worked out which compounds distinguished the best cheeses," Afshari said.

With larger datasets, it will be possible for these techniques to let manufacturers know if their batch will age properly. This is because they can check to see if the key compounds have developed early in the ripening process or that the bad ones haven't.

What's more, the practice of grading a cheese's quality and maturity will no longer need to be left to subjective human senses.

Afshari said incorporating multi-omics analysis into testing cheese gives professional cheese graders more tools to assess quality accurately.

"Cheese chemical fingerprints can be compared against those found in the perfect product, along with traditional grading methods. Now we can identify different types and grades of cheese more accurately than a taste test."

The researchers have published three recent studies demonstrating how interpreting the biological profile of cheese can aid manufacturing and grading.

In separate studies, they used multi-omics analyses to differentiate cheddar cheeses based on their age and brand, compare cheese of varying quality and group artisanal and industrial cheddar cheeses based on type and brand.

## From cheese to wine

The method devised by the RMIT team is scalable and, with more development, could be used to test just about any food or beverage product, including wine, for quality and authenticity.

This is significant, as counterfeit wines are a multi-billion-dollar problem plaguing the industry.

Professor Harsharn Gill, Chief supervisor of this research project, said the days of counterfeit food and drink products could be numbered as bioanalysis technology becomes commercially available.

"Some product's fingerprints are so unique and detailed that we can narrow down a sample to its origin," he said.

"Clues like the type of grapes used in the fermenting process can be answered by studying wine and comparing results to a trusted sample.

"We're still a long way off from having the technology affordable and therefore widely accessible, but we're open to working with industry using facilities in the RMIT Food Research and Innovation Centre."

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# Rising to the kombucha bottling challenge

RISE Kombucha jumped on the sparkling fermented beverage trend in 2009, selling its product primarily in vegan restaurants.

Even as sales exploded, operations were still entirely manual. As late as 2017, the company had 40 employees bottling the fermented tea beverage by hand. Then the decision was made to expand production capacity and automate the process. Thanks to more than CA\$10 million (AU\$10.2 million) in growth capital, RISE Kombucha was able to build a new kombucha production facility, which features a Krones filling line.

## A new twist on an age-old tea beverage

Kombucha is a fermented tea beverage thought to have originated in China more than 2000 years ago. Brewing it starts with the kombucha culture, which is called a SCOBY (symbiotic culture of bacteria and yeast). RISE Kombucha likes to refer to its SCOBY as 'mother'. This mother is a

yellowish-brown gelatinous pancake whose yeasts metabolise freshly brewed, sweetened tea into alcohol and carbon dioxide (carbonation) through oxidation. The bacteria then convert the alcohol into organic acids, which give the drink its signature tart-sweet flavour. Kombucha generally contains up to five grams of sugar and between 0.5 and 2% alc/vol.

RISE produces its product in 25,000 L batches.

"Good kombucha can't be pasteurised. It has to be alive when it reaches the consumer," said Axel Kalbarczyk, President of RISE Kombucha.

"We are one of the few producers that can accomplish this and ensure that the alcohol content stays below 0.5% alc/vol, which we do through a proprietary process. We keep it below 0.5% as the laws vary across Canada."





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According to Bottling and Sanitation Director Jocelyn Malo, kombucha behaves similarly to beer during filling.

“Just the pH value is somewhat lower, at 3.0 to 3.5, and the residual sugar is a bit higher. It foams during the filling process, so you must continually monitor pressure and CO<sub>2</sub> content. We bottle it cold, at about 2°C,” he said.

The kombucha must be distributed chilled since fermentation does not stop until it hits 4°C.

“Cleaning and sanitisation are also extremely important since it’s a live product and secondary contamination can be dangerous.”

### The filling line

Krones delivered the entire wet end of the new line, which is designed to handle 21,000 bottles per hour. RISE was

one of Krones’ first kombucha customers — but the broad House of Krones portfolio made it possible to quickly find a suitable solution for filling.

RISE installed an Autocol labeller upstream of the filler, which applies self-adhesive labels to the empty bottles since condensation on the cold-filled bottles would make later labelling difficult.

RISE also installed a 55-valve Modulfill HRS short-tube filler — a glass bottle filler with a vent tube and mechanical filling system. The Modulfill helps achieve low-oxygen filling, which is essential to the process of safely bottling kombucha.

The Modulfill HRS is linked in a bloc with a Moduljet rinser, which cleans the new glass bottles prior to filling. A Checkmat FM-X checks the fill level.

The entire bloc is housed in a cleanroom to keep the filling process separate from the rest of the production environment, improving hygiene.

The line fills the different kombucha varieties into 414 mL and 1 L glass bottles, which have a cylindrical form and minimalistic label design to make them easily recognisable.

Staff were also given intensive training to ensure that each of the four operators per shift could handle every machine.

Malo said the effect is clear at changeovers.

“We are averaging around 90% efficiency on the 1 L bottle. The line currently runs one-day shifts five days a week and is cleaned each night. Meanwhile, the kombucha brewers work seven days a week to produce the fermented beverage.”

### Kombucha on trend

The growing demand for kombucha has been driven in part by the vegan food movement and increased awareness of health and nutrition. RISE Kombucha uses fresh, organic ingredients, which include everything from the teas (herbal, green and black) to the sugar and the flavorings (eg, ginger, rosemary, elderflower, lychee and jasmine). The company currently has eight different flavour varieties and two seasonal brews. In 2020 it launched a new product line called 1g, which contains just one gram of sugar per serving.

**Krones (Thailand) Co Ltd**  
www.krones.co.th





## Industry Insights for Save Food Packaging design

Nerida Kelton MAIP Executive Director – Australian Institute of Packaging (AIP)  
Vice President Sustainability & Save Food – World Packaging Organisation (WPO)

Sadly, Australia is one of the worst offenders for food waste and loss in the world with a staggering 34% (2.5 million tonnes) of all food wasted in the household, followed very closely with 31% (2.3 million tonnes) in primary production. In economic terms, food waste in Australia has become a \$20 billion problem that sees each person waste on average 298 kg of food a year. Add to that the environmental impacts that sit behind food production, including water, land, energy, labour, capital, and the fact that far too much food waste is heading to landfill and creating greenhouse gas emissions.

Australia needs to build a sustainable food system that delivers food security, considers social, economic and environmental impacts and no longer sees food waste heading to landfill. This is where innovative Save Food Packaging (SFP) design has a role to play within the food system.

### What is Save Food Packaging (SFP)?

SFP uses innovative and intuitive design features that can contain and protect, preserve, extend shelf life, easily open and reseal, provide consumer convenience and portion control — all the while meeting global sustainable packaging targets.

To embed SFP design into businesses, we first need to understand whether manufacturers consider food waste and loss, how packaging technologists are designing food packaging; if marketers are ensuring that on-pack communication provides the best messaging to consumers; and what the barriers are to implement SFP strategies.

As a core participant of the Fight Food Waste Cooperative Research Centre, the Australian Institute of Packaging (AIP) Save Food Packaging design project has released two stakeholder industry insight reports that will help to set a baseline for current design practice and enable a path forward for areas of improvement.

The Save Food Packaging Consortium is made up of the Australian Institute of Packaging (AIP) as project lead; RMIT as the Research Partner; Project Contributors will



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be Zipform Packaging, Sealed Air, Multivac and APCO; Project Partners are Plantic Technologies, Result Group and Ulma Packaging. The Extension Network consists of Australian Food Cold Chain Council (AFCCC), Australian Food and Grocery Council (AFGC) and Australian Institute of Food Science and Technology (AIFST). The consortium is made up

of experts who work in Save Food Packaging design to ensure that the project develops practical guidelines that are suitable for the industries they will serve. The two reports are called:



### 1. Industry Insights Report: Stakeholder Online Survey of Product-Packaging Design Processes



### 2. Industry Insights Report: Stakeholder Interviews of Product-Packaging Design Processes

As Australia's first industry insight reports for Save Food Packaging, the reports represent the current landscape of the food and packaging industry regarding perceptions and practices of food waste and Save Food Packaging.

The AIP encourages everyone to access the reports and consider using some of the recommended Save Food Packaging design features in their packs.

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





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The StePac technology is also designed to limit dehydration and product weight loss during storage, shipment and home use and has inbuilt condensation control to ensure high visibility of the packed products, even under challenging supply chain conditions.

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## Colour indicator freshness labels

Result Group will distribute the FreshTag time-temperature indicator (TTI) labels that signpost the freshness of food with easy-to-read colour codes.

Also called intelligent packaging or sensory labels, the TTI labels are designed to reduce food wastage and motivate changes in the behaviour of personnel and consumers who maintain chill chains. Poor chill chain management within the supply chain and uncertainty about how long ago food packs were opened after purchase are a couple of the issues the labels can address. The labels can help to assure the consumer that the product was properly handled and would thus indicate remaining shelf life based on the actual time and temperature conditions experienced during distribution and handling.

The fully automated, time-temperature indicator label is suitable for managing perishable products in supply chains, at retailers and with consumers.

Providing a cost-effective alternative to hardware-based sensory devices, the labels provide a way to individually monitor the condition of products throughout the distribution cycle.

The labels are customisable and allow for calibrating the needed time or temperature profiles to fit with a variety of fresh and perishable produce such as fresh meats, cheese and vegetables as well as time- or temperature-sensitive pharmaceutical products.

The tags can be used at various levels too, such as at the pallet, case or individual item level.

There are several benefits of deploying sensory labels that have earned the trust of supply and distribution chains including: shelf life can be extended as losses due to temperature abuse can be reduced; stock management can be simplified and standardised across the entire supply chain; and there is a better indication of real product life compared to date codes. Furthermore, the labels can instil consumer confidence in the quality of the produce, by indicating that the food is still fresh for consumption.

**Result Group**

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







## Keg filling machines

The Innokeg Transomat and Innokeg CombiKeg are part of the KHS keg filler product line.

The Transomat is a modular system for interior washing and filling, designed — depending on the configuration — for the medium-capacity range of 80 to 800 kegs/h holding between seven and 58 L. This makes it suitable for breweries of all sizes.

The CombiKeg is suitable for craft brewers who have outgrown the small-capacity range and need a machine with an output of up to 85 kegs/h. Its compact format fits into a standard overseas container. This saves a considerable amount of space and makes for a quick installation and commissioning process. Everything is pre-installed — from interior and exterior washing to filling — so that the system is ready for operation within a short time.

Numerous technical upgrades enable the machines to adapt to many different containers and fill a diverse range of products — from beer as the key product through carbonated soft drinks, wine and syrup to water.

**KHS Pacific Pty Ltd**

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

## Sidel's new rPET bottle inspired by Greenland

Manufacturing company Sidel has unveiled the design for its new recycled PET (rPET) water bottles.

Sidel's art designers have created the NUUK bottle concept, drawing inspiration from the purity of ice and its formations. The brand takes its name from Greenland's capital and the fjords that make it famous.

Produced from clear, 100% recycled PET, the container is designed for premium water brands.

The distinctive 500 mL bottle has a transparent pressure-sensitive label (PSL) decoration which is inspired by authentic Viking art, more specifically the Borre style.

Laurent Lepoitevin, Sidel's Packaging Design Engineer, said the bottle was designed by the company's patented Base Over Stroke System (BOSS).

"The mechanical forming which takes place during the blowing process optimises the material distribution in the final bottle base profile," Lepoitevin said.

The consistent blowing process is designed to use a minimum amount of material. The wide cap, with its ice shape and blue colour, enhances the brand's premium look and perception. The bottle is also compatible with tethered cap solutions to meet environmental requirements and forthcoming regulations.



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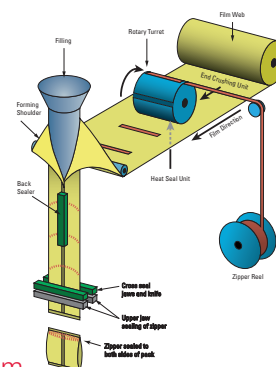
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## NEWS

### Could bigger be better?

New research has found shifting from small to medium-sized plastic bottles could reduce the production of polyethylene terephthalate (PET) waste in the USA.

The US research found that a 20% shift in beverage sales from smaller bottles could result in more than 9000 tonnes of waste being saved annually.

University of South Carolina's Rafael Becerril-Arreola and University of California's Randolph Bucklin weighed 187 differently sized PET bottles sold by the best-selling beverage brands in Minnesota, USA.

This was done to identify which bottles sizes were the most efficient at delivering the highest beverage volume for the lowest packaging weight. To validate their findings, the researchers combined data on sales of different sized PET bottles and the weight of PET waste in Minnesota from 2009 to 2013. The data was used to estimate the effect that changes in the sales of certain PET bottle sizes could have on PET waste.

The authors found medium-sized bottles delivered the highest beverage volume for the lowest packaging weight, compared to small and large-sized bottles. The most efficient bottle capacity was approximately 2265 millilitres. When the proportion of mid-size PET bottles sold was relatively high, the weight of PET waste was lower. By simulating the effects of a 20% shift of sales from small to medium-sized PET bottles, the authors estimate that the amount of PET used could be reduced by 1% each year, leading to a potential reduction of 9052 tonnes of PET waste across the USA per year.

The study suggests the next step towards implementing the findings would be to encourage consumers about the benefits of switching between beverage sizes.

The researchers said bottling companies could print a scale that depicts volume on medium-sized bottles to help consumers regulate their portion sizes of beverages without relying on small bottles.



### Case packer range

Sidel's Cermex WB47 case packer can run RSC and HSC cases with an increased speed of 22 cases/min compared to 15 cases/min with the traditional RSC case-packing range.

The wraparound version can also run at up to 30 blanks/min. If brand operators still operate with RSC cases, choosing a WB47 will allow them to switch easily in the future to wraparound blanks, due to the common platform and an upgrade kit.

The range can manage a variety of primary and secondary packaging types, including complete wraparound blanks, trays, trays with ledges, two-piece packaging (tray plus lid), and provide shelf-ready packaging (SRP) and easy-to-open functionalities.

Additionally, the WB case-packing platform can perform 'easy-to-operate' up to fully automatic changeovers, reducing downtime when changing products, packaging, batch sizes or configurations. The average time for the changeover is 5 min, depending on the version.

**Sidel Oceania Pty Ltd**  
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## Corona's six-packs made from surplus barley straw

Corona has launched a new circular form packaging for beer six-packs — harnessing surplus barley straw to create a sustainable paper packaging solution.

Barley seed will continue to make the beer but barley straw, a leftover from farmers' harvests, will now be used through a unique pulping process built to handle its relative fragility.

Three years in development by AB InBev's Global Innovation and Technology Center (GITEC), the process reimagines the use of barley, giving the essential beer ingredient new life as a sustainable packaging solution.

Combined with 100% recycled wood fibres, this process creates a paper board that is as strong and durable for a regular six-pack but designed to be better for the planet.

The process used to turn barley straw into paper fibre uses 90% less water in its production than the traditional virgin wood pulping process, along with less energy and fewer harsh chemicals. Corona sees this as one path forward to eliminate the need for virgin trees and raw material from their supply chain in the future.

Upon completion of the successful pilot, AB InBev, Corona's parent company, will review rolling out the technology to other brands.

Felipe Ambra, Global Vice President of Marketing, Corona, said: "Corona is a brand born at the beach. We're deeply connected with nature and appreciate all that it has to offer, so we want to continue to do our part to protect it. Our deep reverence for nature is what inspires our vision to become a sustainability leader in the CPG industry, because we want everyone to be able to keep enjoying paradise."

"Starting with our own packaging, we assessed where we could make changes within our production and supply chains to make a real difference. We are proud to announce this first step in reinventing the future of packaging for our industry."

Keenan Thompson, Director of Packaging Innovation at AB InBev, said: "We're excited to finally launch this new packaging innovation we've been developing over the past three years. At AB InBev we are continually pushing boundaries by developing scalable solutions. Today is a proud moment for us, not only are we providing an opportunity for farmers but we're also delivering a more mindful solution to the consumer."

The new packaging launched with an initial 10,000 six-packs rolling out as a pilot in Colombia in March, followed by Argentina later in 2021 as Corona looks to scale the new solution globally.



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## The Absolut Company begins collaboration with Siemens to increase manufacturing efficiency and flexibility

### A world-leading spirits brand

For a connoisseur, the choice of vodka is not something to be taken lightly. It should be world-class, which characterises the spirits of The Absolut Company, a subsidiary of Pernod-Ricard. With production in the small Swedish village of Åhus, the attitude within the The Absolut Company operations is both proactive and uncompromising. Quality, efficiency and climate awareness are characteristic features, from raw material to production and distribution.

Absolut Vodka is made from winter wheat harvested in the southern parts of Sweden with water from its own deep wells. The production method, based on founder L. O. Smith's from 1879, is a continuous distillation process, with several stages to remove unwanted compounds and impurities. This process must take place in a meticulously controlled, automated and energy-efficient production loop.

The Absolut Company is the Swedish food industry's flagship and the world's sixth-largest spirits brand with a presence in approximately 150 markets globally — a position that places high demands on all stages of production, from start to finish. "We have a production philosophy that reflects these high ambitions:

'One source, one community, one superb vodka,'" said Emil Svärth, senior automation engineer, The Absolut Company. "This slogan says a lot about our quest to always deliver world-class manufacturing, and the Industry 4.0 concept will be a crucial factor in living up to current and future production, consumer and environmental requirements." This quest involves collaboration with partners who share the company's approach, including Siemens, whose software and hardware play key roles in production.

### Manufacturing operations management transforms production

Opcenter™ software for manufacturing operations management (MOM) is critical to The Absolut Company's production processes. Opcenter is part of the Xcelerator™ portfolio of integrated solutions and services from Siemens Digital Industries Software. With Opcenter as a base, The Absolut Company is creating a dynamic platform to transition to digital control and line configuration of the five production lines in the Åhus facilities.

"The solution fits us perfectly, because it has been developed to cover the entire value chain, from receiving incoming

materials to distribution of produced goods, including quality control, product planning and scheduling as well as reporting, trends and advanced analysis," Svärth said.

The Absolut Company has implemented Opcenter Execution Process software in a project in one of its factories in Åhus, a first step in the rollout to the three factories that produce premium beverages for global distribution. At present, the company has a fully digitalised production line and is working on its remaining four production lines to go live in 2021.

### Digitalisation as competitive advantage

The Absolut Company understands that digitalisation is the key to continuing to be at the forefront of a changing industry. Developing into a fully digitalised, cutting-edge company is one of the pillars of the business. "With fully automated production lines and increased regulatory requirements there will be a need for increased traceability of product data and integration with business systems," Svärth said.

"The Industry 4.0 concept is part of our production strategy," Svärth explains. "Like other digital investments, Industry





4.0 is important for keeping pace with developments in the market and the digital disruption that is taking place. We are convinced that we will find new types of value creation within the framework of both Industry 4.0 and digitalisation in general. But not only for the business community, but also for our customers and consumers. It will require competence development, existing and new partnerships, collaborations, testbeds and investments. However, I think it will go fast, and we must be prepared."

The Åhus site produces vodka in all its forms, including vodka for mixing into ready-made drinks and limited editions. In total, 125 million bottles are produced per year. The water comes from The Absolut Company's wells, with a particularly suitable calcareous water, located under Kristianstad plains. The distillation process is a continuous process controlled by temperature and pressure to remove unwanted compounds. The original recipe specified eight stages. "Today this has developed and within the same batch we can actually run the continuous process over a hundred times before total purity has been achieved," said Svärth. "In addition we are extremely energy efficient — 98% better than the industry average — which is equivalent to

98% less climate impact per liter of distilled alcohol."

### Environmental sustainability

The Absolut Company uses 125 million glass bottles annually, but the company buys bottles from a supplier that uses 49% recycled glass. Currently, production uses more than 85% renewable energy, and the company's goal is to be 100% CO<sub>2</sub>-neutral in the entire value chain by 2030. The Absolut Company is influencing companies in its value chain to develop cleaner, electrically based means of transportation, and transports the majority of its production by boat for global distribution, which is the most energy-efficient mode per litre.

### Fully automated production

The Absolut Company strives for fully automated production. "We can say that the first time a person's hand touches a bottle is when it is placed on the shelf for sale, the second time when the customer takes it," said Svärth. "This is a logical consequence of a fully automated production, from defoiling incoming glass to the filled and labelled bottles going out on a pallet, transported directly to a high-bay warehouse in the port for later shipping into the world."

The site in Åhus has five fully automatic production lines and a flexible line for smaller special series.

"A majority of the control systems come from Siemens and we also use Siemens' supervisory control and data acquisition system SIMATIC WinCC as our visualisation software," Svärth explains. "We generally build the production lines by connecting components and machines from several different suppliers."

A growing challenge for The Absolut Company is producing smaller and more substantively varied batches. "We need higher efficiency," Svärth explains. "We have a high utilisation rate and an overall equipment efficiency between 70 and 75%. We strive to maintain this level, even though the batches are getting smaller in the wake of an increasingly richer number of flavours and bottles. We are focusing a lot on this area together with Siemens and we are building the platform to meet our future demands."

### Opcenter and enterprise resource planning

Opcenter is integrated with the company enterprise resource planning (ERP) system.

Both systems create an integrated work order that includes different information coming from several business systems and merged with other line-specific data. This work order is the basis for the production line setup and selection of operations that should be executed for the products to be manufactured.

"We build a dynamic digital path for each work order," Svärth said. "If we want to change, add or delete any operation, we can now do it digitally. It increases our agility and allows us to meet the changes that will come."

"With digital development, the concept of material movements and value chains take on a new meaning," said Svärth. "It is no longer only the physical value chain that must be managed and developed, but also the digital reflection of these flows. It is about integrating data and information points that are in completely different systems. This is where the Opcenter Execution Process platform comes in. Doing this will uncover new exciting opportunities, like having data to help us in our continuous improvement or improving traceability through block chain technology. I'm confident that digitalisation will bring new value both to manufacturing and to our consumers."

### Leveraging the digital twin of production

"For every physical value chain there has to be an equivalent digital value chain," said Svärth. "The digital twin is a requirement. We invest in creating an accurate digital replica of the production lines and the value chain to get a better basis for simulations of digitally configured batch runs. In this way, we can digitally test and validate that a run works as intended. If something needs to be changed, we can do it digitally before we start the physical equivalent. In fact, it will be faster, qualitatively better and, above all, cheaper."

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## CASE STUDY

### Lion Australia futureproofs supply chain with AGVs



Lion Australia has futureproofed its supply chain and manufacturing operations at its Tooheys Brewery in Lidcombe, NSW, with Dematic automated guided vehicles (AGVs).

The Tooheys facility brews up to 300 million litres of beer per year and produces up to 120,000 cartons of product per day, which is equivalent to 2 million litres per day.

With the beverages supply chain running in a 24/7 cycle, Lion's core motivation for streamlining supply chain and manufacturing operations with AGVs was to help the company meet the needs of its consumers, while also looking after its own employees by providing a safe and well-managed workplace.

Tim Symonds, Packaging Manager at Tooheys, said the implementation of AGVs was part of a widespread initiative to optimise operations within the Tooheys Brewery and across the entire business.

"While the number of products we make across our beer business continues to grow, we needed a definitive way to improve our productivity to keep up with demand. To achieve this, we invested in AGV technology to better deliver services to our core assets — our people, brands, production facilities and suppliers — and to generate better value for our customers," Symonds said.

"The AGVs have helped give us real dependability for our end-of-the-line process. By deploying Dematic's AGVs, we are able to work within an area of operations that was once problematic — the transportation of pallets from palletising to despatch. With the AGVs, we know that they are reliable, and they have given us the confidence that

our products are accurately and safely delivered to the end consumer with ease."

Since implementation, the AGV solution has supported Lion to provide a consistent measurement of product picking time, as well as eliminate any wastage, inaccuracies or mistakes made by human error throughout all phases of the product picking process.

Additionally, the AGV solution has enabled Lion to introduce a predictable logistics strategy. This has allowed the company to gain insights into the number of vehicles in action within the warehouse, and how many pallets can be produced per day, per shift and per year.

Tony Raggio, Dematic's head of AGV sales, said using AGVs greatly improves reliability, as they are capable of working non-stop, 24/7, every day of the year, thereby streamlining operations to deliver a return on investment.

"The deployment of AGVs at the Tooheys Brewery has enabled Lion to improve the efficiency, productivity and accuracy of its operations, thus minimising mistakes, product damage and workplace accidents, which additionally provides significant improvements to occupational health and safety standards."

Following the successful launch of the Dematic AGVs at the Tooheys Brewery in Lidcombe, and the operational benefits and improved throughput already achieved, Lion will look to deploy more AGVs at other breweries across Australia in the near future.

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# Bulk bag discharger

## ups efficiency of cocoa powder line

**M**alaysian-based company JB Cocoa manufactures cocoa butter, cocoa powder and cocoa mass products made from locally grown cocoa beans. At its facility located in the province of East Java, Indonesia, it can process around 50,000 tonnes of cocoa beans annually.

The beans are cleaned, roasted and winnowed to separate the cocoa nibs, which are treated to enhance flavour and colour. The nibs are then ground into cocoa liquor, which is squeezed by a 'butter press' to yield cocoa butter used in making chocolate, and crumbled cocoa 'presscake' that is pulverised into cocoa powder.

A portion of the presscake is shipped directly to customers in 1-tonne bulk bags, but most is processed into cocoa powder and packaged in handheld sacks.

To increase efficiency of the cocoa powder line, the plant installed a Flexicon BULK-OUT BFC-C-X bulk bag discharger to handle loose cocoa presscake being put in storage before being reduced to powder and packaged for customers.

The discharger is configured with an electric hoist and trolley that ride on a cantilevered I-beam, allowing bulk bags to be loaded into the frame without the need for a forklift.

To connect a bag, the operator slips the bag straps into four Z-Clip strap holders of a bag lifting frame and uses a pendant to hoist the bag into the discharger frame. A Tele-Tube telescoping tube pneumatically raises a Spout-Lock clamp ring, allowing an operator to make a high-integrity sealed connection between the clean side of the bag spout and the clean side of the equipment.

With the bag spout secured, the operator pulls its drawstring, allowing presscake to discharge into the surge hopper.

Releasing the telescoping tube's air pressure allows the clamp ring to maintain constant downward tension by gravity as the bag empties and elongates to promote material flow. Additional flow promotion is provided by Flow-Flexer bag activators that raise and lower opposite sides of the bag bottom to promote complete discharge through the bag spout.

The 226 L capacity surge hopper with top-mounted enclosure is vented to a side-mounted Bag-Vac dust collector that creates negative pressure within the sealed system to prevent displaced air and dust from escaping into the plant environment.

The enclosure also serves to contain spillage that might otherwise escape through seams in the bag and folds in the spout, and is equipped with a hinged access door and folding bag shelf, allowing manual dumping of under-filled sacks.

A rotary valve at the hopper outlet metres the presscake into a pneumatic conveying line that moves it to a storage silo. From there, it is mixed and milled into six different recipes of cocoa powder and packed into 25 kg bags.

Constructed of stainless steel finished to sanitary standards, the discharger is certified for operation in food-grade environments.

"The use of the Flexicon bulk bag discharger provides a safe and hygienic way to unload cocoa cake from bulk bags," said JB Cocoa's Redi Koerniawan. "It ensures efficient unloading with little to no dust released into the processing environment."

**Flexicon Corporation (Aust) Pty Ltd**  
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## 4-wheel battery electric counterbalance forklifts

Mitsubishi and Nichiyu have introduced a range of 4-wheel battery electric counterbalance forklifts.

The latest addition to the FBCB series offers a choice of nine models with an updated design and capacities ranging from 1000 to 3500 kg.

The trucks have a variety of optional features and are waterproofed at a rating of IPX4, allowing them to work across all platforms of light- and heavy-duty work cycles.

The driver compartment is ergonomically designed and spacious, while the narrow dashboard, high-visibility mast, small steering wheel and optimised lever placement are designed to maximise safety without compromising on control.

With a low centre of gravity, electric hydraulic power steering and curve control, the forklifts are designed to provide increased operator confidence when travelling, cornering and lifting with intuitive speed control.

The trucks keep travel consistent on inclines, responding as if they were driving on a flat surface.

They also feature a choice of operation modes, which can be adjusted to meet the driver requirements associated with the operator's skill level, workplace conditions and operator's preferences.

An additional ECO mode can be selected to make energy consumption more efficient, extending working hours per charge (up to 11.5 h) while also reducing running costs.

**MLA Holdings Pty Ltd**

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

## Vacuum tube lifter

The vacuum tube lifter JumboFlex allows users to move goods, from lighter goods to up to 50 kg, ergonomically and with high cycle rates.

The control handle fits comfortably in hand and allows the operator to work for long periods.

It has one-finger controls for easy lifting, lowering and releasing of the load.

It comes standard with a quick-change system for replacing the vacuum grippers.

Workpieces that are gripped from the vertical side automatically swing back into the horizontal position where they can be continuously rotated.

The Highstack version can be used to stack pallets up to 2.5 m.

Workpieces near floor height can also be handled while the operator maintains an upright posture.

**Schmalz Australia Pty Ltd**

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



## Vibratory food processing equipment

Melbourne-based Enmin designs and manufactures vibratory and product handling equipment that can align, sort, spread, sprinkle, size, separate, meter, deliver, blend, weigh and screen a variety of products across food and allied industries.

Enmin's Mi-CON is a hygienically designed full washdown conveyor system that has multiple standardised components.

This provides users with the flexibility to select what will best suit their specific product and production needs.

All Enmin vibratory feeders are also fully constructed with 304 stainless steel, providing good durability.

The feeder and the conveyor can work together seamlessly due to the conveyor's modular construction.

**Enmin Pty Ltd**

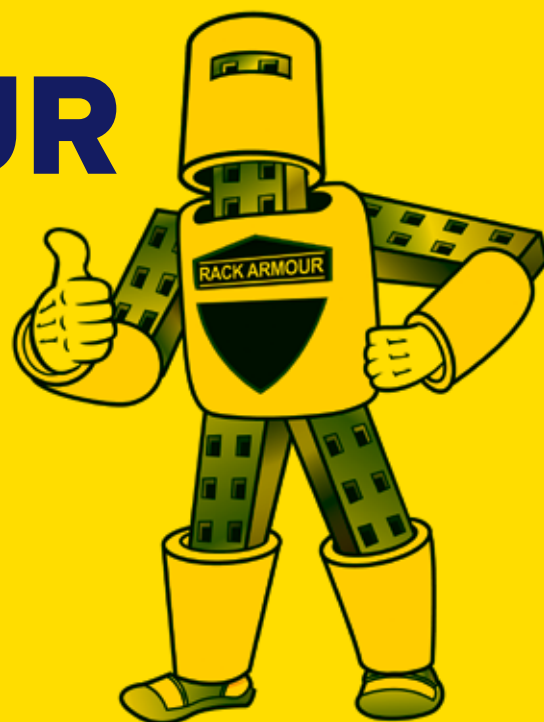
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## Powder handling system

Matcon has added the Manual IBC Cone Valve (MCV) to its range of Intermediate Bulk Container (IBC) systems. Suitable for the food, beverage and chemical sectors, the MCV is designed to overcome the problems of mix segregation that can be associated with butterfly valve IBCs.

The manually operated Cone Valve is designed to promote mass-flow discharge of free-flowing powders, preventing segregation of powder mixes and ensuring product quality. It has been tested as an effective butterfly valve alternative, overcoming the issues of core flow and particle rolling that can be experienced with standard butterfly valves.

The valve can be easily retrofitted to existing flanged IBC outlet, providing a way of delivering powder handling capabilities to an entire IBC fleet.

It works positioned in the IBC outlet, where the cone is lifted by pushing on a lever handle. As the valve rises inside the IBC, an annular gap is created, enabling powders to exit under mass flow. As the powdered material moves simultaneously, there's no particle rolling and hence no mix segregation. Bridging and rat-holing, which are common problems with butterfly valve IBCs, are also eliminated.

The operator can lock the lever in the open (100 mm height) or closed position with a locking handle, or at any intermediate position in between, depending on the desired product discharge flow rate.

Each unit has a nominal internal diameter of 250 mm and is designed to fit a vessel or process with the same outlet size for discharging free-flowing bulk material. A typical example of discharge time achieved when discharging 1000 kg of salt from a 1000-L IBC is only 90 s.

Key features include: simple hand operation; 100 mm stroking Cone Valve; variable stroke position locking; fast assembly/disassembly; promotes mass flow powder discharge; and prevents segregation of free-flowing powder mix.

In applications involving sticky, cohesive powders or where automation is required, the Classic Matcon IBC System is recommended.

**IDEX**

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# Dendritic tags: technology-enabled food traceability



**A** multidisciplinary project is creating dendritic tags to enable food traceability at any point in the supply chain.

Funded by the US Department of Agriculture, two Arizona universities (ASU and NAU) have partnered together in the venture, which hopes to use the technology to tackle the problem of foodborne illnesses.

Dendrites are shapes that occur abundantly in the natural world, such as the branches of trees, streams and tributaries of river systems and blood vessels and nerves in the human body.

Michael Kozicki, a professor of electrical engineering at Arizona State University, said these patterns form with a high degree of entropy, so no two dendrites are the same.

"And since dendrites are relatively easy to produce electrochemically or photochemically, we can cheaply manufacture dendritic tags or labels offering truly singular identities that are effectively impossible to forge or duplicate, unlike a barcode or QR code."

## Testing to the rigours of the supply chain

Application of the dendritic technology could include labelling every head of commercially grown lettuce with the identity of the farm, field and row from which it is sourced. Such precision could enable a level of traceability that can reduce the impact of a contamination incident. A small batch of tainted lettuce could be more quickly identified and isolated in the supply chain, preventing human illness and sparing tons of safe but suspect food that currently is destroyed out of caution.

Kozicki and Yago Gonzalez Velo, an assistant research professor of electrical engineering at ASU, have started working with students in the lab to improve and scale the currently manual and time-consuming process of dendritic fabrication using an electrolyte solution. Alongside tag production, they will test their output with stretching, bending, abrasion, heat, humidity and other factors representing the rigours of the food supply chain.

## Digitalising the innovation

Northern Arizona University assistant professor Abolfazl Razi of NAU's School of Informatics, Computing, and Cyber Systems was recently awarded \$140,205 in funding to assist with the project.

Razi will design and implement the processing pipeline, testing procedure and algorithmic foundation for using identity tags for their intended purpose.

Director of NAU's Wireless Networking and Smart Health Lab, Razi will use his image processing expertise to develop the algorithm and the reading system necessary to verify tag data using mobile phone-based and cloud-based software platforms.

"On the network side, we'll need a reference library of images with which we can develop the algorithm to authenticate these dendritic tags," Razi said.

"We'll be implementing techniques like graph theory and also deep learning methods to reconstruct an image of what is actually a 3D shape and then verify its legitimacy down to the nanoscale. Additionally, we need to develop a cell phone adapter device and an app to make this system easy to use by industry and consumers."

## Integrating the innovation with current food systems

Another critical aspect of the real-world application is integrating this technology with current food systems' processing materials and equipment. This part of the project will be led by Mark Manfredo, a professor of agribusiness at ASU.

"We look forward to working with our local industry contacts to help test what is being developed," Manfredo said. "We're already engaging with a large grower of organic greens, and we also hope to work with a melon grower in the state. We need to learn more about the supply chains for these commodities and ultimately evaluate the new tags in commercial settings."

Manfredo said the project team also needs to consider the most economically feasible place within the supply chain to adopt these dendritic identifiers in the context of current systems. "Is it with the growers? Or the processors? Or with retailers?" he said. "So, we'll look at all the incremental costs of implementing the tags at different stages."

Manfredo noted there is incremental value to consider in adopting this innovation. "What is the economic value of applying these unclonable tags? Certainly, there is value in waste reduction. But the data also represent marketing opportunities," he said. "And, of course, the public health value is just enormous."





## Automated cleaning-in-place (CIP) process system

GEA's No Intervention Fines Return System (FRS) is designed to automate the cleaning-in-place (CIP) processes for dairy and food powder producers' spray dryer fines return systems.

In spray dryers, powder fines are often separated from the exhaust air via cyclones and bag filters. A fines return system returns the fines to the drying process, either for agglomeration or integration with the final powder outlet.

Typically, cleaning cyclones and fines return systems first requires opening and dismantling the fines return system from the cyclones outlet. After cleaning, both must be reconnected again, which increases the risk of recontamination as well as the potential for mistakes in reassembly.

Designed for food and dairy spray dryers, the FRS uses valves to create a smoother and fully automated CIP process, which negates disassembly before and after cleaning. All connections within the fines return system remain closed and once cleaned, can directly be used for production. The valves were developed to comply with hygienic design criteria of the European Hygienic Engineering and Design Group (EHEDG).

**GEA Group**

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

## Vehicle-mounted computer

Winmate's FM07 is a fixed-mount computer that is built to handle the road and help achieve work efficiency. Resistant to vibration and shock, the mounted computer is compliant with the MIL-STD-810G standard, and is also IP65 waterproof and dustproof with M12 waterproof connectors.



The product supports both VESA mount and RAM mounts while also featuring wireless connectivity Wi-Fi, BT and GPS. There is also an option available to add a WWAN feature for in-vehicle IoT applications.

The application on the screen of the mounted computer has five programmable function keys. The product has wide power input, with an ignition control feature that detects the ignition signal status and allows users to control the on or off delay time setting through the customised software utility.

The 7" computer can operate in temperatures from -20 to + 60°C and is suitable for cold storage applications.

**Backplane Systems Technology Pty Ltd**

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



## Plastic pallets rental service

When it comes to renting plastic pallets, many companies in the food industry have been seeking ways to reduce costs in daily rental rates and at the same time move to a pallet that meets the higher standards that modern automated processing systems demand.

Australian plastic pallet specialist company Ozkor is providing a rental service of plastic pallets for companies who require high standards of product performance at reasonable rates. The pallets are suitable for industries with hygiene requirements and where extreme operational conditions exist.

The PPX-1165 is a heavy-duty plastic pallet designed with patented technology to enhance its impact-resistant capabilities under extreme operational conditions and will safely handle 1350 kg of product in drive-in racking, which increases racking safety and unit load efficiencies.

For example, the specialised grade of virgin polypropylene copolymer materials chosen will operate in extreme temperatures ranging from -30°C to as high as 50°C in warehouse environments. Side blocks are given extra protection against materials handling equipment damage by incorporating patented nylon inserts inside the block structure which enhances impact resistance in what are normally vulnerable areas.

The PPX-1165 plastic pallet can be rented over multiples of three, four or five years and the longer terms will have a more attractive arrangement.

**Ozkor Pty Ltd**

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





**Tim Symons**  
Packaging Manager, Tooheys

# Supply Chain of the Future

## **Dematic AGVs help keep the beer flowing at Tooheys Brewery.**

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


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

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 **DEMATIC**





# Skin-like sensor

## allows gripper to do challenging tasks

Researchers have developed a soft tactile sensor with skin-comparable characteristics.

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**T**he team, co-led by City University of Hong Kong (CityU), mounted the sensor to a robotic gripper at the fingertip and found it could accomplish challenging tasks such as stably grasping fragile objects and threading a needle.

The research provides new insight into tactile sensor design and could contribute to various applications in the robotics field. The study has been recently published in the scientific journal *Science Robotics*, titled 'Soft magnetic skin for super-resolution tactile sensing with force self-decoupling'.

### Mimicking human skin characteristics

A main characteristic of human skin is its ability to sense shear force, meaning the force that makes two objects slip or slide over each other when coming into contact. By sensing the magnitude, direction and subtle change of shear force, our skin can act as feedback and allow us to adjust how we should hold an object stably with our hands and fingers or how tight we should grasp it.

Researchers Dr Shen Yajing and Dr Pan Jia designed the soft tactile sensor to mimic this function.

The sensor is in a multilayered structure similar to human skin and includes a flexible and specially magnetised film, about 0.5 mm thin, as the top layer. When an external force is exerted on it, it can detect the change of the magnetic field due to the film's deformation.

### Decoupling

The researchers said one of the most important features of the sensor is that it can 'decouple'.

Decoupling is when external force is automatically decomposed into two components — normal force (the force applied perpendicularly to the object) and shear force,

providing the accurate measurement of these two forces respectively.

"It is important to decouple the external force because each force component has its own influence on the object. And it is necessary to know the accurate value of each force component to analyse or control the stationary or moving state of the object," said Yan Youcan, PhD student at CityU's Department of Biomedical Engineering (BME) and the first author of the paper.

### Robotic gripper with the new sensor completes challenging tasks

By mounting the sensor at the fingertip of a robotic gripper, the team showed that robots can accomplish challenging tasks. For example, the robotic gripper stably grasped fragile objects like an egg while an external force tried to drag it away, and also threaded a needle by remote control.

"The super-resolution of our sensor helps the robotic hand to adjust the contact position when it grasps an object. And the robotic arm can adjust force magnitude based on the force decoupling ability of the tactile sensor," Dr Shen said.

### Applications

Designing a nimble, responsive gripper has been one of the challenges that have stopped the use of robotics for various applications in the food processing industry.

The variety in shape, weight and firmness of natural food products has made them difficult to handle for robotic grippers.

Currently, CityU's soft tactile sensor is still in its infancy and its potential remains unrealised.

But breaking down the barriers of what makes a robotic gripper different from a human hand will likely increase the chance that the technology can be utilised in various applications.



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## Enzymes for cakes, breads, sweet rolls and buns

DuPont Nutrition & Biosciences has launched POWERFresh Special and POWERSoft Cake 8010 enzymes in Japan.

The range of enzymes can be used by industrial bakeries as an anti-staling solution that provides texture, softness and long-lasting freshness to cakes, breads, sweet rolls and buns whilst maintaining their shape.

The enzymes — POWERFresh Special 8100 GF and 8013, as well as POWERSoft Cake 8010 — are aimed at improver houses, oils and fats manufacturers, and bakeries in Japan to facilitate novel eating experiences.

The enzymes will also help provide sweet rolls, buns and cakes with a long shelf life and high resiliency, while providing bakeries with a solution that can be applied in a broad variety of recipes with its good sugar tolerance, without influencing the overall production process.

**DuPont (Aust) Limited**  
[www.dupont.com.au](http://www.dupont.com.au)



## Dry blend baby formula protein

Arla Foods Ingredients' dry-blend protein ingredient is designed for infant formula manufacturers.

Lacprodan Premium ALPHA-10 is rich in alpha-lactalbumin, the most abundant whey protein in human milk, and essential amino acids.

The process of dry blending can allow manufacturers to reduce energy usage and production costs. It can also provide greater flexibility to produce more recipes from one base powder.

The dry protein is produced according to the highest food safety standards. It is free from *Cronobacter sakazakii*, a bacterium that can cause serious infections in infants, and compliant with new Chinese food safety standards.

The company claimed the enrichment of formulas with alpha-lactalbumin can result in a closer match with the protein composition of human milk, promote gut comfort and healthy growth, and enhance protection from intestinal infections.

**Arla Foods Ingredients**  
[www.arlafoodsingredients.com/](http://www.arlafoodsingredients.com/)

## Vegan and Halal food testing assays

Thermo Fisher has added assays for vegan and Halal testing to its RapidFinder Meat and Fish ID Kit range.

The real-time PCR-based species detection and quantification solutions fit seamlessly within existing RapidFinder workflows to return rapid, accurate results while maximising laboratory efficiency.

The range also includes kits for detection of beef, equine, chicken and many other animal and fish DNA.

The flexible workflow allows for DNA extraction from samples of up to 20 g, using either a manual or automated procedure for the higher throughput of multiple samples.

Identification targets mitochondrial DNA — the RapidFinder Halal ID Kit, which tests for pork, has a sensitivity rate of 0.0005%.

After detection, the RapidFinder Quant Multi-Meat Sets provide same-day, accurate quantification via qPCR. An internal amplification control (IAC) is included in each PCR reaction to rule out the false negatives sometimes associated with food stuffs that can prevent PCR from occurring effectively.

The new assays follow the same sample preparation and PCR procedures as other RapidFinder Meat ID assays, enabling them to be run together with existing workflows to maximise laboratory efficiency.

The RapidFinder Meat ID assays feature fast results; simple to use; compatible with any food or feed sample, both raw and processed, with meat quantification kit available; and incorporate efficient DNA extraction and IAC.

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## Natural cyan blue food colouring developed

Scientists have developed a naturally sourced colourant that could replace synthetic blue food colouring in the food industry.

The long-sought-after natural cyan blue, obtained from red cabbage anthocyanin pigments, may provide the alternative to FD&C Blue No.1 — although more testing is needed to determine the compound's safety.

“Blue colours are really quite rare in nature — a lot of them are really reds and purples,” said Pamela Denish, a graduate student working with Professor Justin Siegel at the University of California, Davis Department of Chemistry and Innovation Institute for Food and Health.

Having the right blue colour is also important for mixing other colours, such as green. If the blue isn't right, Siegel said, it will produce muddy, brown colours when mixed.

Red cabbage extracts are widely used as a source of natural food colourings, especially reds and purples. Previous studies have indicated that red cabbage anthocyanins produce a vibrant blue colour in a pH-neutral solution, but it had been too violet to replace the artificial blue dye.

Denish and Siegel screened public libraries of millions of enzymes for candidates that might do the job and tested a small number in the lab. Based on those results, they used computational methods to search a huge number of potential protein sequences — 10 to the power of 20, more than the number of stars in the universe — to design an enzyme that would accomplish the conversion with high efficiency.

“We used these tools to search the universe for the enzyme we're interested in,” Siegel said.

With this enzyme, they converted the anthocyanin blue from a tiny fraction of red cabbage extract into a primary product, allowing the researchers and other collaborators to characterise the new blue colouring.

The researchers observed that while many naturally sourced colourants have limited stability over time, the new colour only diminished by 14% in sugar syrup over 55 days. The research also demonstrated the colourant's ability to create blue and green colours in several foods and confectionery products, where it showed excellent stability over 30 days when stored at room temperature.

With their study now published in *Science Advances*, Siegel and Denish have founded a start-up company, PeakB, to develop the technology for commercial applications. Enzymatic conversions are very widely used in food production, for example in making cheese, Siegel noted.

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# Test method to combat olive oil fraud

Extra virgin olive oil is one of the most popular foods in Europe, but inferior counterfeits are coming onto the market in increasing number. A research team led by Prof Dr Stephan Schwarzingner from the University of Bayreuth has now developed a rapid test to combat this food fraud, which can assess the quality, authenticity and origin of olive oils within just one hour.

Counterfeits of extra virgin olive oil have been a problem for many years. As explained by Prof Dr Schwarzingner, “Cheap alternative vegetable oils are dyed green and sold as olive oil, rancid oil is mixed with good oil or old oils are glossed over with special technologies and come back into circulation as extra virgin olive oil.”

Comprehensive tests of the quality and authenticity of olive oils could until now only be carried out using different test procedures applied one after the other, making them time-consuming and expensive. The new method, developed in cooperation with the University of Athens, analytical laboratory ALNuMed and partners from the olive oil industry, overcomes these obstacles with the help of nuclear magnetic resonance (NMR) spectroscopy, a technique that enables the rapid and simultaneous analysis of many parameters.

“Over several years, we collected and systematically analysed more than 1000 different samples of extra virgin olive oil,” said Prof Dr Schwarzingner, who heads the Working Group for Quality and Authenticity of Food and Materials at Bayreuth’s Northern Bavarian NMR Centre (NBNC). “The NMR measurement provided us with an individual profile for each sample that includes all properties relevant to quality and authenticity.”

The rapid test is based on the ability of NMR spectroscopy to detect ingredients that occur in very different amounts

with high resolution and reproducibility. Practically, this means highly concentrated main ingredients — such as the fatty acids in olive oil — as well as very low concentrated substances can be detected. These include polyphenols, which act as antioxidants in the human body and have a positive effect on health. The test therefore indicates whether the oil examined is entitled, in principle, to bear a health claim according to the corresponding EU regulation.

Taste impressions are also tested, which are important for consumer acceptance. In addition, a comparison with existing olive oil profiles can be used to check how credible the declaration of origin of the respective producer or trader is. NMR spectroscopy can be used to check whether the examined olive oil sample comes from Greece, Italy or Spain, for example.

Prof Dr Schwarzingner recently presented the basics of the olive oil rapid test at the BioFach trade fair, which was this year held online due to the COVID-19 pandemic. “Our new test option met with broad interest,” he said.

“The olive oil experts were very impressed by how quickly and thoroughly the quality and authenticity of olive oils can be determined. It is already clear that this can significantly improve the transparency of olive oil supply chains and markets. We hope that our development will now be quickly implemented in contracting laboratories and brought to market.”





## Clean better, save money

Every food processor that has purchased a Euro Pumps EP50-75.SRT unit has saved money and reduced cleaning cycle times.

- Beef abattoir ... achieved labour savings of 30%.
- Smallgoods ... achieved labour savings of 45%.
- Salad ... went from 4 hours to 1 hour of cleaning.
- Bacon ... went from 5 staff to 2 staff.
- Fish ... went from 2 staff @ 2 hours to 2 staff @ 0.75 hours.
- Food Processor ... went from 16 staff to 11 staff.

### How do they do it?

Using a Euro Pumps EP50-75.SRT; the most advanced, flexible cleaning platform in the world. It is a smart, high-temperature ready (up to 90°), hi-flow, variable pressure trolley. Your Euro Pumps SRT platform is a mobile cleaning platform which can clean anything in a food production or critical clean facility.

### Real proof not sales BS

In June 2018, Euro Pumps was contacted by an Australian abattoir QA Manager asking us to visit the site as a consultant to view the cleaning cycle and advise improvements on their cycle. We attended site Pre-Op and staying the whole night to view everything.

A report was provided to the plant QA and Management noting Euro Pumps' observations and advice. We agreed to a trial with one of our SRT units to allow management and supervisors to see how time and labour would be saved. After a month of trialing, it was obvious to all parties that they would save labour and time so they initially purchased five machines.

### One year on

Over the 12 months between 2018–2019 we noted that the company had saved 25% labour. Euro Pumps attended the site quarterly to make sure they got the best

out of the equipment. We were proud to be helping the client get the best cleaning results possible, it was a great pleasure working with an energetic 'can do' group of people.

### 2 years on

Euro Pumps visited the site in January 2021 and the cleaning crew are now comfortably running a 2-hour cleaning cycle. With work finishing at 2am on the main floor and 2.45 by the time the packing room is finished, 2 hours later production staff are walking in to get ready to go again.

Everyone is impressed with results, and management is maximising the production capability of their plant. Jo Field said: "It's a pleasure working with people that get things done." The client has now purchased another SRT for their newly extended boning room.

Euro Pumps SRT units will reduce scourer use, we have ultra-fast cleaning times & excellent micro results. Most customers are using the trolley and nozzle alone!

When you purchase a Euro Pumps SRT, staff get the training and support to use the equipment properly. The training is Hands-On so the cleaners can be confident and learn. If you would like to discuss reducing cleaning cycle times, contact us today.

SRT's variable pressure, high-temperature capabilities provide faster better cleaning, foaming and sanitising, using less water and producing better cleaning KPIs. Standard SRTs are capable of running Cold to Abattoir hot at up to 50 L/min, with built-in PLC System that manages protection, safety and maintenance features like oil pressure sensor, input flow sensor to create what we believe is the best wash and foam trolley.

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





# Flavoured water bottle gets a facelift

**S**idel's Shanghai packaging team has redesigned the package of Menton flavoured water to target young consumers in China. Using a straight-wall lightweight PET bottle which weighs only 17.85 g for the 500 mL format, the company hopes the design will also convey sustainability and differentiate it in the ready-to-drink (RTD) flavoured water market.

Menton is an RTD product sold in convenience stores and markets around schools in medium-sized cities in China. After three years of rapid sales, its flavoured water faced growing competition in the market so the company decided to restyle it into a premium brand.

A new packaging design was developed and the bottles are being produced on three Sidel Aseptic Combi Predis PET packaging lines at a rate of 60,000 bottles per hour (bph) per line.

The bottle concept was inspired by the product's main ingredient, lemon, which is harvested in Europe.

"Following the overall packaging design trend in China, we decided to create something more contemporary for young people, who are the main target audience for the drink, moving away from complex and technical design structures," Sidel Packaging Director of Greater China Steven Xie said.

The production process of the re-styled bottle is also more sustainable, reducing material and energy consumption due to its light weight. The new bottle also achieved performance requirements for transportation and storage.

Based on customers' insights, specifications, supply chain conditions and product goals, Sidel supported from packaging conceptual graphic design and technical design to label design.

The company also provided all feasibility studies and performance tests, including dimensional and mechanical tests for thickness and weight.

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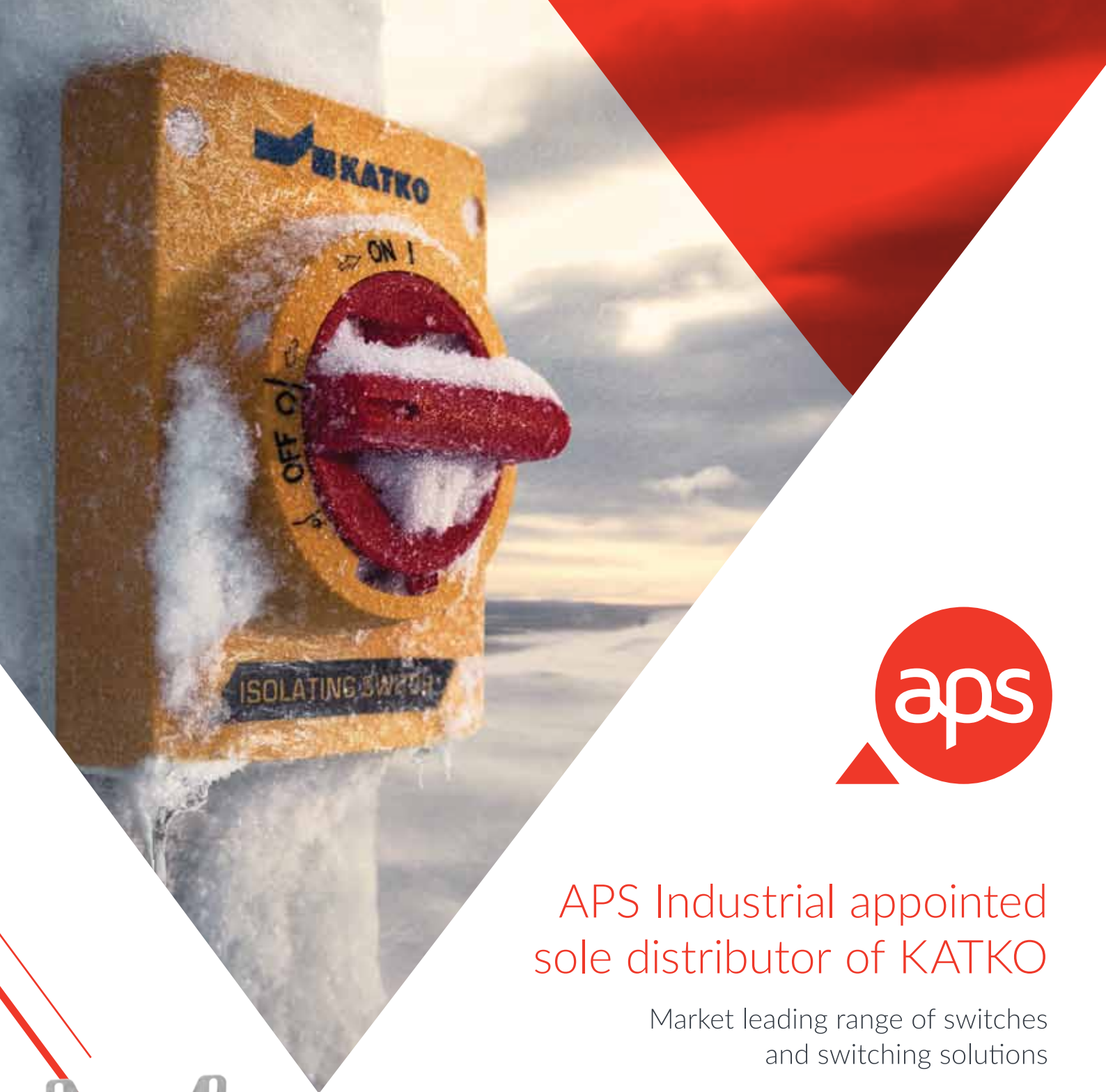
# NEW FROM LABEL POWER – THE VIPCOLOR VP600 COMPACT MEMJET LABEL AND TAG PRINTER



## The VP600 features

- Fast print speed up to 8 inches per second. That is to say, you get **1,600 4" x 3" labels within 10 minutes.**
- Print one to 10,000 labels anytime on-demand. In other words, VP600 is suitable for **short run label printing.**
- High resolution up to 1,600 x 1,600 dpi. This is great for crisp text, fine barcode. Moreover, you get **brilliant colors for prime labels!**
- Compact size. This makes VP600 the perfect desktop **small color label printer for tight spaces.**
- Individual 200 ml ink tanks to **reduce replacement cost.** You get more labels between ink change and fewer user intervention than many entry level printers





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