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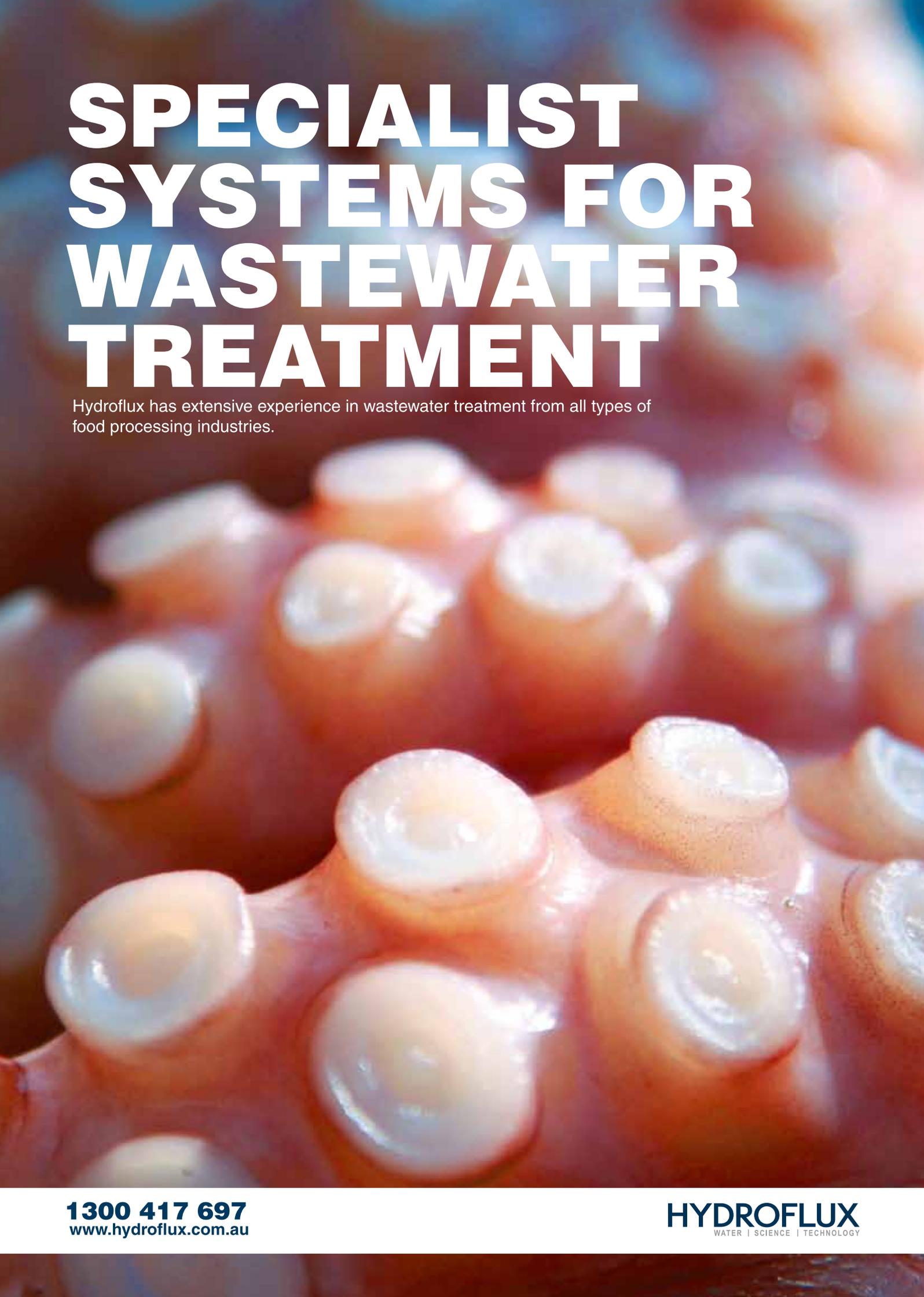
what's ^{new} in
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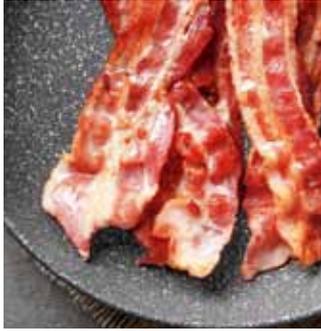


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Saving our bacon

Australia and New Zealand are currently free from African swine fever (ASF) but are on high alert as the disease nears closer to our shores. At stake is our local pork producing industry, alongside the tens of thousands of jobs that depend on it in rural and regional communities.

ASF is a highly contagious disease affecting wild and domestic pigs. First detected in Eurasia during 2007, it then spread to Russia and parts of Europe. By 2018, the disease had spread to China and then infected other Asian countries including Vietnam, Cambodia, Laos, Myanmar, Mongolia, Cambodia and the Philippines. The disease has now moved ever closer to our shores — reaching Timor Leste in September — less than 700 km away from Australia.

While not dangerous to humans, the disease is fatal for pigs and there is currently no vaccine available. However, University of Madrid researchers are working on a vaccine, which is showing promising results.

A quarter of the world pig populations have already been killed or culled because of the spread of ASF and this is predicted to skyrocket even further as it moves throughout China, with some estimating losses of up to 200 million pigs by the end of the year.

The disease is difficult to diagnose based on clinical signs or lesions due to its similarity with other haemorrhagic diseases. Infection can spread from pig to pig by aerosols from infected discharges and faeces; consumption of infected meat; bites from soft ticks, lice and mice; and from contaminated syringes. Contaminated feed, water, clothing, footwear, vehicles, equipment, soil and wildlife can also spread the disease.

One of the greatest risks of ASF introduction is from people illegally bringing pork or pork products into Australia or New Zealand from overseas and these being fed to or eaten by pigs.

The Australian Liberal National Government has increased inspections of people and meals arriving from countries affected by AFS. Australia has suspended the trade of high-risk pig products from affected countries and banned travellers from bringing in pork products from all countries. Earlier this year, changes to immigration legislation were implemented so international visitors bringing in undeclared high-risk items could be refused entry to Australia and have their visas cancelled for up to three years.

The increase in border checks has seen one woman deported for smuggling uncooked pork and over 27 tonnes of pork seized from travellers, with around 15% of it testing positive for the virus.

Because of its close vicinity to Timor Leste, Northern Territory is under increased scrutiny. An experienced biosecurity labrador capable of sniffing out potential threats has been deployed at Darwin Airport. The dog will help sniff out pork products being carried by international passengers and cargo arriving from countries where AFS has already had a devastating impact.

Biosecurity NZ is also monitoring the spread of ASF overseas, and implementing additional safeguards based on the available science.



THE COOLEST SOLUTION

Oxford Cold Storage isn't alone in experiencing a constant stream of cost pressures. With retailers dropping prices for their consumers, flow-on austerity down the chain means tighter margins for distribution companies. For Oxford Cold Storage, implementing a fleet of Automated Guided Vehicles (AGVs) from Dematic offered long-term savings. Able to operate around the clock and run overnight with the lights out, the addition of AGVs in the freezer warehouse meant a reduction in OH&S issues and elimination of human error. Plus, the increase in operational throughput provided by switching to automation allowed the company to remain in their existing warehouse rather than build a new facility, potentially providing savings in the millions. Learn more at dematic.com.au/oxford-cs.

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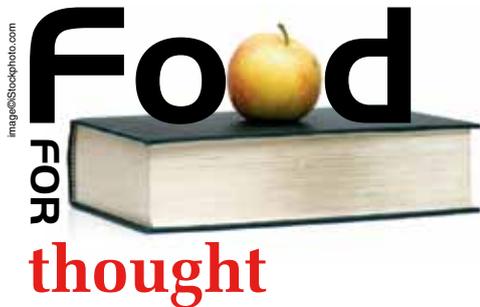
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Food

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Australian PMI reports growth in food and beverage sector

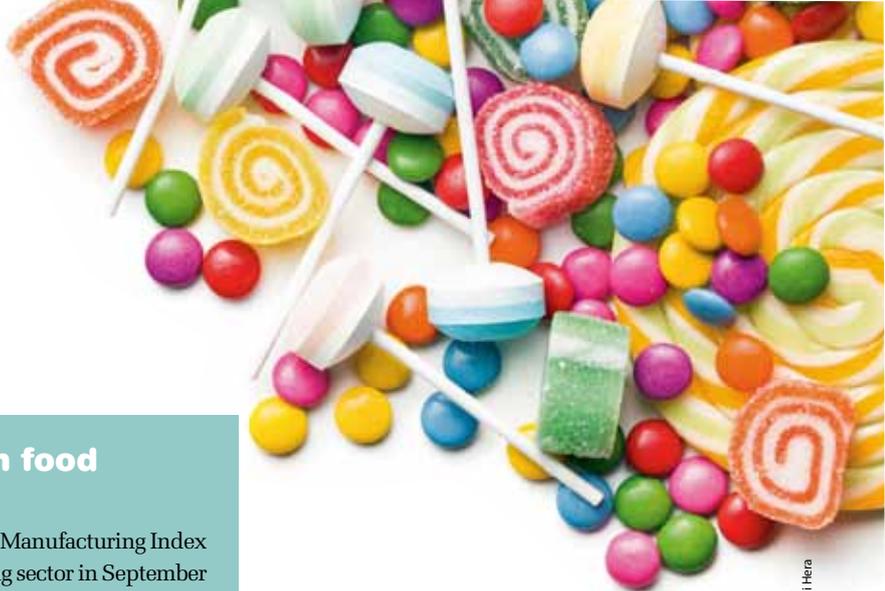
The Australian Industry Group Australian Performance of Manufacturing Index (Australian PMI) indicated growth across the manufacturing sector in September 2019, improving by 1.6 points to 54.7. An Australian PMI reading above 50 points indicates increases in manufacturing activity, with points below 50 indicating a decline in activity. The distance from 50 indicates the strength of expansion or decline.

The Australian PMI uses the ANZSIC industry classifications for manufacturing sub-sectors and sub-sector weights derived from ABS industry output data. Employment and new orders accelerated in September, driven by continued strength in the food and beverages sector. The food, beverages and tobacco sector produced \$27.6 billion in real value-added output in the year to Q2 2019 (27% of manufacturing real value-added output). The sector employed 237,000 people in August 2019, making up 27% of manufacturing employment.

“Performance was most robust in the large food and beverage and the machinery and equipment sectors, and was supported by positive contributions from the chemicals and building products sectors. While sales and production were down in September, the lifts in employment and new orders are encouraging pointers for coming months — particularly as the favourable impacts of income tax cuts, interest rate falls and the lower Australian dollar continue to build,” said Innes Willox, Chief Executive of the AI Group.

Four of the seven activity indexes in the Australian PMI indicated accelerating and expanding conditions in September, with employment up 6.2 points to 57.6 and new orders up 3.8 points to 57.1. Four of the six manufacturing sectors expanded in September, with food and beverages up 0.2 points to 59.2, followed by a resurgence in machinery and equipment, up 2.5 points to 56.7.

Food and beverage manufacturing makes up over a quarter of manufacturing in Australia, with new orders and employment elevated in September. The sector has been steadily expanding since 2012. The production index was broadly stable in September, after falling 3.4 points to 49.8 points (seasonally adjusted). Food and beverage and machinery and equipment manufacturers reported strong production for the month. The input prices index reported its highest reading of 2019 in September, up 5.7 points to 71.9, while the selling prices index fell back into contraction, down 3.8 points to 48.9.



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Sweet trends

New textures, novelty flavours and reduced sugar are some of the trends to watch in the APAC confectionery sector this year, according to GlobalData.

Rising concerns related to high sugar, artificial ingredients and boredom with regular sweet indulgences are driving consumers to move away from traditional confectionery products, thereby forcing the manufacturers to develop exciting and healthy products, said the data and analytics firm.

Dharma Teja, Consumer Analyst at GlobalData, highlights the major innovation trends for the remainder of 2019:

Indulge in new flavours: 24% of APAC consumers are willing to experiment with new flavours of confectionery products. Accordingly, confectionery manufacturers are putting efforts to introduce new flavours. For example, Mars launched Skittles-Flower Fruit in China.

Less sugar: 43% of APAC consumers feel that healthy products are often associated with a ‘low in sugar’ claim. Against this backdrop, Mondelez International Inc launched a 30% less sugar variant of ‘Silk’ in India in June 2019.

Try out new look: 24% of APAC consumers tend to buy a product if it is unique in style, such as texture and packaging. In line with this, Taiwan Kaiser Foods launched Kaiser Boba Chocolate, which has a unique style of chocolate presentation. It comes with a gummy tapioca ball inside a milk tea flavouring chocolate ball, which is uncommon in chocolate confectionery.

Clean label: 45% of APAC consumers perceive ‘Clean Label’ is often associated with ‘free from artificial ingredients’. The claims such as gluten-free, vegan and dairy-free are acting as anchor themes to attract this particular target group. For instance, Fante Chocolate launched hazelnut and pumpkin seed chocolate in India in 2018 with gluten-free and diet-friendly claims.



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Bottling technology uses less plastic at Coca-Cola Amatil

Coca-Cola Amatil has opened a US\$24m high-tech bottling line in Indonesia that produces lightweight plastic bottles coated with a thin layer of glass for durability. With a capacity for 42,000 bottles/h, the line produces bottles that are claimed to be just as durable as regular containers but require 1000 tonnes less plastic each year to produce.

Group Managing Director Alison Watkins (pictured) said the company's new Affordable Single Serve Pack (ASSP) line was only the second of its kind for the company.

"The new line produces high-quality lightweight containers with improved durability compared with regular bottles but with a lower plastic content," Watkins said.

"The extremely thin glass coating helps deliver the quality that our customers expect, and cuts our plastics use by 1000 tonnes a year."

The line will enable Coca-Cola Amatil Indonesia to supply 260 million of the lighter plastic bottles to East Java and East Indonesia including Bali and Eastern Islands, Sulawesi, East Kalimantan and South Kalimantan.



Coca-Cola Amatil Group Managing Director Ms Alison Watkins at the ASSP line event

Would you like some vitamin D with your toast?

With vitamin D deficiency on the increase, researchers at the University of Birmingham have suggested the introduction of mandatory fortification of vitamin D in wheat flour. The research concluded that fortifying flour with vitamin D would save the public purse £65 million by reducing demand for health care and treatment for vitamin D deficiency and its complications. Meanwhile, the team projected that adding vitamin D to flour could cost just 12 pence per person per year.

Dr Aguiar said that a similar national food fortification policy in Finland has reduced vitamin D deficiency from 13% to 0.6% in the population.

The Birmingham researchers' latest analysis showed that the optimal way to prevent vitamin D deficiency would be to combine flour fortification with offering vitamin D supplements to key groups.



Science catches gluten in the rye

Detecting gluten proteins in the original grain is relatively simple, but when they're in food products that have been baked, extruded or processed in other ways with other ingredients such as salt and sugar, it's a lot more complex.

Current commercial tests can only tell that gluten is present in a food but not the grain it's from. The various detection kits currently available also give variable results of how much gluten is present.

The CSIRO solution is capable of showing which grain the gluten comes from. By covering gluten detection in the less well-studied grain, rye, CSIRO has now completed the 'Grand Slam' of detection in gluten-containing grains — wheat in 2015, barley in 2016 and oats in 2018.

CSIRO Protein analytics expert Prof Michelle Colgrave, explains how completing the picture with rye can help consumers and food manufacturers.

"Being able to detect any protein in diverse foods and beverages will help food companies ensure that what's in the pack is what's on the pack, and help consumers trust pack labelling around gluten-free claims," Prof Colgrave said.

"This technology offers many applications for the food industry, from helping track contamination in their raw ingredient supply chain to improving product quality, food safety and meeting regulations."

The researchers analysed 20 cultivars of rye from 12 countries, which they milled into flour, extracted the gluten proteins and used high-resolution mass spectrometry to identify and quantify the proteins. The analysis revealed six proteins specific to all rye varieties but that don't appear in other grains.

The team tested a range of commercial flours, breakfast cereals and snack foods and detected the six rye proteins in all the foods that contained rye as a labelled ingredient. They found one "gluten-free" breakfast cereal that contained trace amounts of rye, which did not appear on the ingredients list, and one sample of flour from the wheat-related grain spelt, which was contaminated with about 2% rye.

The research has been recently published in the American Chemical Society's *Journal of Proteome Research*.

The next steps are to validate the method's ability to accurately quantify the level of glutens present in a food and work with the food industry and commercial testing laboratories to help commercialise the technology.

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Food

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tna co-founders receive AM for charitable efforts

Nadia and Alf Taylor received insignias commemorating their appointment as Members (AM) of the Order of Australia for their philanthropic efforts. Her Excellency, the Honourable Margaret Beazley, Governor of New South Wales, presented the medals, in October at an Investiture Ceremony at Government House Sydney.

“This recognition is an endorsement of tna’s mission and values that aims to embrace inclusive growth. We are both humbled and deeply honoured to be recognised for our endeavours to lend support to the less fortunate, especially children and socially excluded groups, through tna’s humanitarian programs. Alf and I may be at the forefront of this, but it is the unstinting support of every team member that allows us to share tna’s success with the disadvantaged,” said Nadia Taylor, co-founder of tna and the Nadia and Alf Taylor Foundation.

The Nadia and Alf Taylor Foundation was established in 2002, following tna’s success in food processing and packaging solutions. The foundation has supported over 150 charities across 39 countries.



tna co-founders with Governor of NSW at the Investiture ceremony.



Nestlé to close tinned milk factory in Victoria

The planned closure of Nestlé’s tinned milk factory in Tongala, Victoria, has been blamed on a decrease in consumer demand and cheaper imports.

Nestlé announced its plans to close its Tongala factory in Victoria on 28 August. The factory mainly produces tinned milk products and the closure will be staged progressively over a period of up to 18 months.

Unfortunately the factory closure will result in 106 jobs being made redundant. This could have a significant impact on the small regional town of Tongala, located in the Goulburn Valley region of Northern Victoria.

General Manager Andrew McIver thanked colleagues for their strong contribution to the company and said the closure was in no way a reflection of their efforts.

“People just don’t buy tinned milk like they used to, and cheaper imports have eroded our business further,” McIver said.

“At the same time, the equipment in this factory is old, and the investment we need to make sure it can operate reliably in the future means that the factory is no longer viable,” he said.

Hygienic Engineering Design Group branches out to Australia

Founded in 1989, the European Hygienic Engineering Design Group (EHEDG) is a non-profit foundation with a principal goal to promote safe food by improving hygienic engineering and design in all aspects of a food manufacturing supply chain. The group has contributed to a safer food production on a global scale by helping to improve the cleanability and food safety of industrial processing and packaging installations.

The organisation encourages membership engagement from individuals, companies and educational institutes to work towards this common outcome and currently has over 500 global company members and 35 established regional sectors around the world.

With the inclusion of the Australian regional sector in 2019, the Australian food manufacturing industry will now have greater access to the benefits that EHEDG can bring to the food industry locally.

The organisation provides guidelines, training and certification programs,

supporting the food industry to design, install and validate equipment, contributing to food safety. It aims to help members: improve process safety and sustainability; safeguard regulatory compliance; minimise food safety risks; reduce lifecycle costs; protect food quality; maximise production time; create new business opportunities; and exchange know-how and best practice.

The newly established Australian Regional Board of EHEDG Australia comprises: Chair — Rick De Sousa (RDS Technical Services); Co-Chair — Jasmine Laci-Lee (DTS Food Assurance); board members — Dr Catherine Collins (University of NSW), Arthur Seiler (Wiley, The Project Delivery Company), Liz Sharrock (WR&D Wells) and Karin Blacow (Commercial Food Sanitation).

The Australian regional sector has indicated it will be planning events in Sydney, Melbourne and Brisbane in 2020.

To find out more about EHEDG, visit www.ehedg.org.



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Gourmet processed food

A current trend in the food industry involves creating gourmet versions of mass-produced products, reflecting the consumer desire for familiar products with new and improved flavour profiles. Darcy Simonis, industry network leader for ABB's food and beverage segment, explains how manufacturers can get on board with this new trend.

The development has stemmed from the increased access that consumers have to specialty food items. In fact, in 2018, 65% of consumers in the US bought specialty food items, an increase of over 11% since 2015. These figures show that consumers are looking for food products that are special and a level above store cupboard staples.

At first glance, this may seem to be a rebellion against the overt standardisation of flavours and products that we have become used to. However, this is not the case. Gourmet processed foods are instead a step forward using a postmodern approach to the structure of food itself. A postmodernist approach deconstructs what food can and cannot be gourmet, levelling any perceived hierarchical structure around the value of food types. In a postmodern framework, any food can be gourmet from a plate of French fries to a Wagyu steak.

From a producer's point of view, however, this can cause issues. Consumers are now looking for products that are not homogenous, are still high quality at mass-produced prices and provide a unique experience every single time. The question, therefore, becomes whether it is possible to mass-produce products with near bespoke levels of quality and innovation.

While this growing trend is not actually a rebellion to food culture, the solution to this problem is not a rebellion away from current methods either. It could be perceived that reducing the amount of control in a production line will

increase the randomisation of the manufacturing process, making each product unique. This sort of method would, however, be disastrous for the quality of the product. Therefore, it shows that the best method is to increase the levels of control to incorporate manufactured uniqueness to the products in question.

ABB's manufacturing operations management (MOM) software can provide in-depth oversight to operations managers, such as tracing products throughout the plant or giving each batch a digital passport. Control over products at this level of detail means that the exact tracking where each ingredient has been can be stored. With this level of control, production can become much more customisable, as detailed instruction can be fed into the system.

For example, a production line of chocolate biscuits with patterned melted chocolate on top could have the patterns randomised via the MOM software. The system could be given instructions to make different melted chocolate patterns on the chocolate biscuits, while also tracking the different patterned biscuits to prevent duplicates being inserted in the same packet.

Simonis encourages food producers and manufacturers to embrace mass-produced gourmet foods, as consumers are developing a taste for high-end products. By installing gourmet levels of control across production lines, producers can satisfy consumer demand for unique products.

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what's new in
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A cooling system without harmful refrigerants

A team of researchers at the Fraunhofer Institute for Physical Measurement Techniques IPM is developing efficient magnetocaloric cooling systems that make do without harmful refrigerants. The researchers hope to achieve 50% of the maximum efficiency level with their process. Comparable existing magnetocaloric systems reach only approximately 30%.

Many research groups around the world are working on refrigerators, industrial cooling systems and air conditioners that pump heat using magnetocaloric materials. The heating and cooling cycle generated by magnetisation is well suited for cooling. Physicist Dr Kilian Bartholomé and his team at the Fraunhofer IPM in Freiburg, Germany, are using this technology to develop an efficient thermal conductivity concept which eliminates the need for environmentally damaging refrigerants.

There is great demand for innovative cooling technologies, since the conventional hydrofluorocarbons (HFCs) used today are powerful greenhouse gases. For this reason, the EU has significantly restricted the use of HFCs. There are alternatives to HFCs, such as the natural refrigerants butane and propane, which are used, for example, in domestic refrigerators. These gases are flammable, but not considered hazardous in the amounts used in household refrigerators. Still, they are not a viable option for larger cooling systems. The industry is working on alternative refrigerants but has yet to come up with convincing solutions.

A magnetocaloric cooling system requires no harmful refrigerants. The researchers are using an environmentally friendly lanthanum-iron-silicon alloy as a magnetocaloric material, which heats up when a magnetic field is applied and cools down when the field is removed. Kilian Bartholomé and his team have developed and patented a special procedure for transferring the heat produced.

Bartholomé's cooling system makes use of latent heat, ie, the energy required by a liquid to turn into vapour. "Since water absorbs a lot of energy when it changes from a liquid to a gaseous state, we use the evaporation process to transfer

the heat," the physicist said. "This is a highly efficient means of transferring the thermal energy."

In deciding to use the evaporation process for heat transport, Kilian Bartholomé and his colleague Jan König were inspired by heat pipes used, for example, as pipe collectors in solar power systems and for cooling computers. A heat pipe is an evacuated container, where a small amount of fluid has been enclosed. If one side of the pipe is heated, the fluid evaporates on this heated side and condenses again on the cold side. Very high heat transmission rates are achieved in the process.

The magnetocaloric heat pipe being developed at Fraunhofer IPM, however, is significantly more complex. It consists of many small chambers containing the magnetocaloric material. The alloy has a finely porous structure so that it can be optimally penetrated by the water vapour. The method for producing the porous alloy is the work of Dr Sandra Wieland and Dr Martin Dressler at the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM.

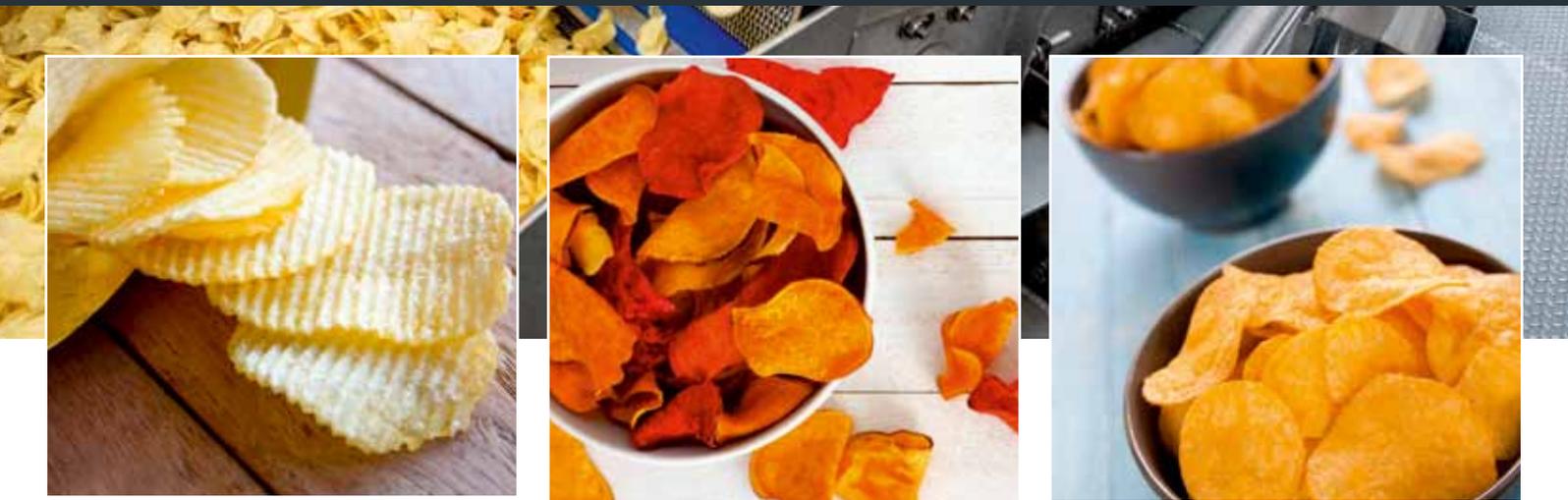
In order to even further increase efficiency, Bartholomé arranges the segments of the heat pipe in a circular pattern and places a rotating magnet in the middle. It is expected that the demonstrator will generate 300 W of power by the time it is finished at the end of the year.

By way of comparison: the compressor in a household refrigerator produces from 50 to 100 W of power. The current system operates at a very high frequency already. The researchers in Freiburg plan to use the demonstrator to break a world record for magnetocaloric cooling systems with regard to system frequency. The long-term objective is to achieve 50% of the theoretical maximum efficiency level. Comparable existing systems reach approximately 30%.



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Live monitoring of milk supply chains

Swinburne University is leading a milk logistics research project valued at over \$2 million to develop technology that allows live monitoring of milk supply chains. The Director of Swinburne's Internet of Things Lab and project researcher, Professor Dimitrios Georgakopoulos, spoke to us about the project's ambitions.

Australia's milk supply chain logistics are currently not perfect, said Prof Georgakopoulos. Therefore, he said the two main objectives of the Milk Supply Chain Project are to improve the operational efficiency of the milk supply chain and as a result create opportunities to generate revenue for the Australian dairy industry.

The project will develop an Internet of Things (IoT)-based system using over 700 sensors, to measure specific aspects of the supply chain that links dairy farms, milk carriers and a milk processor, and allows live monitoring of milk supply chains.

Sensors will be installed to monitor both the temperature and quantity of the milk collection process, Prof Georgakopoulos explained. "The project will also develop a milk quality sensor to detect protein in the milk," he said. This means that the high-quality milk (ie, milk that contains a high amount of protein) can be kept separate and then used for the production of high-yield products such as probiotic yoghurts. "At the moment, all the milk is mixed, but if it was separated out, the high-quality milk could have the potential to achieve four times the profit when used for high-yield products."

Environmental sensors will also be used to monitor weather "as this plays a big part in the production of milk, especially temperature and humidity", Prof Georgakopoulos said. The data collected will enable highly accurate milk supply forecasting.

During the milk pick-up process, sensors will be used to identify the trucks, and microphones will sense when

important tasks, such as washing tanks, are completed. "This is designed to help avoid mistakes that can lead to product wastage; it also allows for dynamic pick-ups based in real time."

As the supply is added, the milk collection sensors will advise the quality and quantity of the milk, and the sensors on the truck will locate the trucks for dynamic scheduling in real time.

"The milk price is also determined by how long the milk is stored and the temperature kept," Georgakopoulos said. "Therefore, by optimising the transport capacity based on collection data, it creates the potential for achieving a higher price for the milk produced."

Swinburne's Milk Supply Chain Project will be conducted in collaboration with Bega Cheese and 100 Australian milk suppliers using Telstra's Narrowband Internet of Things (NB-IoT) network.

The 'Live Inbound Milk Supply Chain Monitoring and Logistics for Productivity and Competitiveness' project (Milk Supply Chain Project) has received \$600,000 under round 7 of the federal government's Cooperative Research Centres Projects (CRC-P).

The project is part of Swinburne's Industry 4.0 Initiative, which helps global industry solve challenges and create opportunities from the profound changes wrought by the industrial revolution.

Prof Georgakopoulos said that some initial results from this two and a half years-long project will be available next year, adding that there is the potential for the technology to be adopted for other applications, such as during the milk processing stage.

The Atlas Copco logo is located in the top right corner of the advertisement. It consists of the brand name "Atlas Copco" in a white, serif font, centered between two horizontal white bars. The logo is set against a blue rectangular background.The background of the advertisement is a detailed still life of various food items. In the center is a glass pitcher filled with white milk, with a smaller glass of milk in front of it. To the left is a whole fish, possibly a sea bream, with a sprig of parsley. To the right are several brown eggs, a wedge of yellow cheese, and a pile of red kidney beans. In the foreground, there are slices of whole-grain bread and a pile of almonds. The background also includes a purple eggplant, a red tomato, a yellow bell pepper, and a head of green lettuce. The entire scene is set on a dark wooden surface.

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Electric pallet truck

The PT12Li is the smallest of the Noblift lithium-ion-powered pedestrian pallet movers. Thanks to its compact design, the PT12Li is a good choice for material transportation over short distances or in confined spaces. With the environmentally friendly lithium battery, the pallet mover is especially suitable for food, chemical or pharmaceutical industries that require a clean environment.

The ergonomic pallet mover has a capacity of 1200 kg and is designed with a long tiller. The overall length of the product is 1590 mm, with a turning radius of 1340 mm.

Powered by the innovative Li-ion battery, the PT12Li allows operators to take advantage of 'opportunity charging' with no risk of battery damage occurring. The batteries allow for run-times up to four to five times greater than lead acid batteries. As Li-ion batteries do not contain acid and don't require water, they are maintenance-free.

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CASE STUDY

Sidel lends Nestlé a cobotic hand at tea factory

Nestlé has installed two units of CoboAccess_Pal, an industrial and easy-to-use cobotic palletising solution from Sidel, at its site in Orbe, Switzerland. Automating the palletising of Special.T tea capsules allowed Nestlé to gain higher pallet quality and improved operations for workers.

"In the past this plant was handling palletising manually. As volume and productivity needed to increase, we were looking to use cobotic palletising to avoid repetitive non-ergonomic tasks for operators," said Cédric Rey, Fill & Pack Maintenance & Improvement Manager at Nestlé.

The team at Nestlé approached Sidel with their cobotic requirements back in 2017. As Sidel was already developing a new cobotic palletising solution, the company directly embedded Nestlé's requirements — primarily those of ensuring pallet stability throughout the supply chain — into the program.

"Accurate case placement on the pallet and tight layers are major requirements to guarantee pallet stability, to ensure products end up in consumers' hands without any damages. Additionally, we also needed to ensure the safety of our operators. Maintaining worker safety during the transition from manual labour to cobotic technology was imperative. For us, the user-friendliness of the new cobotic solution was extremely important as well: for instance, an intuitive navigation of its HMI was a must," Rey said.

Two cobotic palletisers have been installed at the Nestlé Orbe site, featuring an industrial automation platform with PC and PLC. This improves pallet quality and provides smooth transportation through the supply chain. The palletising solutions also minimise downtime through an immediate restart function, in case of potential problems or emergency stops.

The CoboAccess_Pal's HMI is based on an intuitive tablet approach, facilitating daily jobs for operators. The tablet allows operators to access standard operating procedure (SOP) and maintenance sheets for easier and faster troubleshooting and root cause analysis.

Following its collaboration with Nestlé, Sidel is extending its cobotic palletising range, with the CoboAccess_Pal M. With a Fanuc CR-15iA robotic arm, the machine can run six cycles a minute, with DCS software and safe contact stop technology.

Sidel Oceania Pty Ltd
www.sidel.com



Image credit: Sidel

CASE STUDY

Warehouse automation increases productivity for Asahi by 250%



Dematic has installed an automated storage and retrieval system (ASRS) at Asahi Beverages' Heathwood distribution centre, to improve operation efficiency.

Asahi produces and distributes alcoholic and non-alcoholic products across Australia and New Zealand, and has a number of distribution centres located across Australia. Operating across multiple locations, the company uses manual forklifts for block stacking, which presented many disadvantages and challenges.

"We previously had a very labour-intensive system in place, with every truck that came in having to be unloaded by a forklift. We then had to receive the paperwork manually, check the pallets manually, move the pallets into the storage location and then do all that in reverse to pick them," said Nathan Lucinsky, Manager of Heathwood Distribution Centre.

High bay racking at the Asahi Heathwood DC is 13 levels high and 34 bays deep, necessitating an automated storage and retrieval system that extends six pallet positions deep on either side of the six cranes, accessed by satellite carts. The Heathwood distribution centre has approximately 31,500 pallet storage positions.

"After assessing Asahi's warehouse requirements, we knew that the best solution for them was the six-deep satellite ASRS," said Dominic Figliano, Project Manager of Dematic. "The ASRS we built for Asahi uses Dematic's newest and fastest crane, the 1200 H1. This is also the tallest satellite system we have built in Australia," Figliano said.

The automated system eliminates the manual handling of pallets, which is claimed to create a productivity boost of 250% and improvements in worker safety by not having to use as many forklifts.

"We've now automated our warehouse processes and only use manual processes where it makes sense," Lucinsky said. "In fact, most of our pallets won't be touched by a human until they get to our customer DC."

Alongside the ASRS, Dematic also equipped the Heathwood distribution centre with integrated third-party equipment including skate docks, label applicators, a pallet inverter and a stretch wrapper machine.

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Keeping it chilled

Scott Varker, Director, Pollen Asset Advisory

When I first moved to Australia 12 years ago and started travelling, my first impressions were how big it was and how hot it was. Not exactly inspirational, but still two points we often fail to comprehend when we consider the cold chain in Australia.

We have a challenging marketplace where there is constant demand for new products, chasing the latest trends from both Europe and the US as well as our somewhat closer Asian neighbours, from ready meals to matcha ice-cream. How few of these new products make it from concept to success, with on-shelf quality and cost being major contributors to failure and deletion.

Understanding the consumer and developing a product to meet their evolving demands is challenging enough, but where we often fail is ensuring it reaches the point of consumption with the desired quality. We often consider that chill chain is a food safety requirement to ensure shelf life is maintained, but do we consider the impact on quality, the resulting consumer experience and the repurchase rate for new products?

If we are to manufacture a consistently high-quality product, then both our processes and our environments must be consistent, but is this really the case in most factories? While most companies producing chilled food have refrigeration systems cooling their production and storage rooms, how many of them continuously monitor and log this information for all rooms? It is also not uncommon to see these systems switched off “to save energy” or doors left open resulting in warm environments and dripping condensation. Progressive companies are linking SCADA and building management systems to ensure that the environment is consistent and meets both food safety and food quality requirements; however, at the other end of the spectrum a quick look up and you will see clogged evaporators and dirty air filters.

The starting point is to ensure that you are getting the most out of your existing systems. Planning and ensuring the service of refrigeration systems are completed on time by trained contractors is not rocket science, but can improve process control, reduce running costs and avoid costly equipment breakdowns.

When was the last time you reviewed the cost and effectiveness of your refrigeration contractor?

Even if our manufacturing is well controlled, your product quality is still subject to the vast distances and high external temperatures through the supply chain. When we check the cold chain it is often limited to static checks in storage locations. Products may leave the manufacturing site and arrive at the customer DC at the correct temperature, but has this really been maintained for the complete journey? It is still not uncommon to see ambient cross docking of both chilled and frozen products, especially when transferring between third-party transport companies, in remote areas.

Often new product transport trials are completed to test the pallet and product stability and occasionally this will include temperature loggers. However, this is commonly a round trip and is not necessarily representative of the day-to-day operation, due to the difficulty of retrieving and returning data loggers. This is forecast to change over the next 5 years. With IoT open platforms, availability of sensor technology and the combination of pallet/carton RFID systems, it will soon be possible to track not only where the product is in the supply chain, but what temperature it is at, with confirmation it has not broken the chill chain at any stage. Imagine this could be built into every pallet, with access to the data for all three parties: manufacturer, 3PL and customer. With individual barcoding, how long before the consumer will have the ability to check this with an app for every product they buy?

With more than \$26 billion spent annually on refrigeration in Australia, including equipment energy and refrigeration gas, this is a major cost to our industry. The questions you need to ask is how effective are my freight and refrigeration in supporting my product quality and how much are they costing me?

Pollen Consulting Group
www.pollenconsultinggroup.com

Semiautomatic batching system

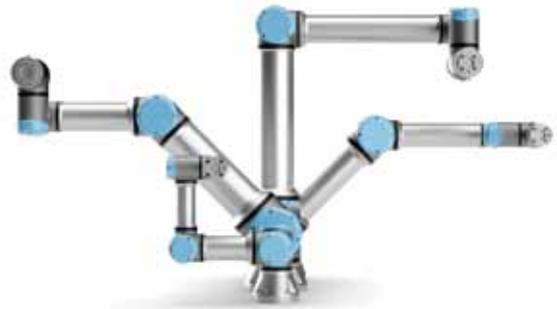
Sterling Systems & Controls' Affordable Batching Controller is a semiautomatic batching system that requires operator involvement through each step in the batching process but provides automated operator instructions/prompting, ingredient validation and lot tracking, and automatic weighing with over/under tolerance control.

It eliminates bad batches that result from operator error and interruption. The automated hand prompt batching station can keep track of where the operator is in the batching process.

The PC and touch-screen display will ask the operator to weigh ingredients. The batching system sequences an operator through a formula one ingredient at time. The system ensures that each ingredient is added to the container, is within a programmed weight tolerance, and is from the correct ingredient lot before the controller will index to the next ingredient to be added. This will ensure the validity of all batches created by the operator.



Sterling Systems and Controls Inc
www.sterlingcontrols.com



Heavy-duty payload cobot

The Universal Robots UR16e cobot has a 16 kg payload capability, a reach of 900 mm and pose repeatability of ± 0.05 mm.

Designed to carry out critical tasks across a range of production environments, the cobot is suitable for automating tasks such as heavy-duty material handling, heavy-part handling and machine tending.

The cobot provides frictionless deployment with easy programming, making accelerating programming easy and fast.

The e series cobot features built-in force sensing, 17 configurable safety functions (including customisable stopping time and stopping distance) and an intuitive programming flow. It also meets the following safety standards, for safe human-robot collaboration: EN ISO 13849-1, PLd, Category 3 and full EN ISO 10218-1.

Universal Robots
www.universal-robots.com

WHEN SIMPLICITY MEETS PRODUCTIVITY

The new RBF-CA sit-on reach truck from Mitsubishi: Easy to operate, excels in productivity, creates space efficiency in busy warehouse environments.



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Reach truck range

The Mitsubishi RBF14-16-20CA sit down reach truck range is the latest addition to Mitsubishi's warehouse products. The range comes in three models, each powered by a 48 V traction battery and weighing 1.4, 1.6 and 2.0 tonnes.

All three models use AC motor technology, providing power efficiency and lift heights of up to 10 m. The SICOS-AC control system provides an optimised operator experience, integrating hydraulics, travelling and steering functions. A self-diagnostic function is also integrated, which monitors for malfunctions, communicating any discovered faults via diagnostic codes.

AC motor technology decreases maintenance costs, while a regeneration function charges power back to the battery through plugging, coasting and braking, to extend operating hours. Integral side shift is a standard feature, and steer by wire 360° steering means there is no need for switch back.

The Operation Interlock System deactivates travelling when the driver is not seated, while a Neutral Safety Feature prevents sudden movements from inadvertent activation of the accelerator or the hydraulics. A sensitive life speed control automatically slows lifting and steering when the truck is above a certain speed. The armrest console also contains direction control, a horn and an emergency stop button, for ease of access.

The RBF14-16-20CA Mitsubishi reach trucks are designed to accommodate a large variety of warehouse needs.

MLA Holdings Pty Ltd

www.mlaholdings.com.au

Robot digital converter and EoAT changer

Denmark-based OnRobot has introduced the Digital I/O Converter Kit and Quick Changer, which are designed to create a one-system solution that simplifies automation.

The Digital I/O Converter Kit allows the OnRobot end-of-arm tooling (EoAT) to work with a full range of collaborative and light industrial robot brands. OnRobot EoATs are deployed in the food industry. For example, Denmark's Rosborg Greenhouse uses the RG6 Gripper to automate the process of packing delicate herbs by precisely boxing and feeding the conveyor belt that leads to palletising.

Building on that initiative, all OnRobot products now have a unified mechanical and communications interface based on the Quick Changer. An additional Dual Quick Changer incorporates these same new capabilities while allowing the use of two tools in one cycle, mixing and matching to suit application needs and maximising robot utilisation.

With the Quick Changer, a single cable provides a universal interface for tools and communications, so there is no need to disconnect cables when changing tools, and extended communications options support a full range of robotic platforms.

Scott Automation & Robotics Pty Limited

www.scottautomation.com



Learning the recipe for streamlining food processing

Earlee Products has been creating ingredients and processing food products for around 30 years. The company has partnered with leading food and beverage manufacturers across Australia, and the world, using technical expertise to solve challenges and identify new opportunities in the food innovation space. With the ability to customise food processing methods and capitalise on consumer trends, the company focuses on enhancing taste, texture or visual appeal of food products, improving manufacturing cost efficiencies, offering cleaner, more sustainable alternatives, and ensuring food safety, quality and functionality.

The challenge

Earlee Products produces a wide range of food product lines for different customers. This means the production lines are changed frequently throughout the day, which can cause disruption to the work crews and workflow. Wet and dry production are completely different processes involving long and time-consuming changeovers. The company wanted to streamline these processes in order to reduce changeover and lead time as well as reduce waste, so they enlisted the help of 'lean' consulting company TXM Lean Solutions (TXM).

Senior Lean Consultant at TXM Gary Pollard worked alongside Earlee Products for 16 months to implement people-centric process improvements based on lean thinking for their operation.

When Pollard first started with the company, all the departments had no real understanding of lean and its benefits. It was clear that employee buy-in was therefore going to be crucial for the success of the project.

Pollard discovered that the departments operated like silos; they only really talked to each other when there was a problem that needed solving. The siloed communication created a considerable barrier to the success of the project, so the staff from all departments would need to be engaged.

The lean solution

Lean thinking is a methodology that can be applied to food processing by focusing staff on streamlining workflows in a manner that can deliver more value while eliminating waste.

'Value stream mapping' was used to identify the departments and their communications channels — this further highlighted the lack of communication between departments. The mapping

session then identified which products would limit process line changeovers and which work needed to be prioritised each day.

TXM created a lean crash course program for every employee, which provided them with an understanding of lean and its benefits. Senior management undertook a week-long intensive lean masterclass on lean implementation and what it would mean for the success of the project. Every employee completed a 40-minute lean training session. Managers of all departments were brought together to demonstrate how they would contribute to the transformation.

This accelerated learning and progress of the teams allowed the company to get runs on the board fairly quickly. The Operations Manager was appointed 'lean champion' with other supervisors becoming 'quasi-lean champions' for their departments.

A communications structure and daily meetings were introduced across all departments to communicate issues and raise concerns.

Extensive visual management was introduced across all departments with daily stand-up meetings.

Improved work standards were introduced with the workload spread across teams/departments.

Each department now has its own continuous improvement (CI) board where a CI Initiative is developed each month as a means of continuing their lean journey and empowering new employees in the new culture.

The results

The TXM support delivered outstanding business improvements:

- DIFOT (the number of orders that were delivered on time) increased from 70 to 98% within 9 months.
- Business roles were re-aligned.
- Production waste is monitored and has reduced by 50% over the last 18 months.

According to Michael D'Allura – Commercial Manager at Earlee Products: "Gary Pollard is an enthusiastic mentor who was able to take our entire company on the lean journey. He built sustainable and meaningful platforms for our team enabling a continuous improvement environment."

TXM Lean Solutions Pty Ltd
www.txm.com



Shellfish and seaweed aquaculture potential

Australia has potential for commercial shellfish and seaweed aquaculture that provides food while benefiting the health of our oceans, according to research.

Some of the greatest global opportunities for the development of shellfish aquaculture lie in the waters around the South Australian Gulfs, the coasts around Tasmania and the Manning–Hawkesbury region of NSW, according to Australian and international research.

The research is published in the journal *PLOS ONE*, a study titled ‘A global spatial analysis reveals where marine aquaculture can benefit nature and people’, and represents a collaboration between scientists from international conservation non-profit The Nature Conservancy, NOAA’s National Centers for Coastal Ocean Science (NCCOS) and the University of Adelaide.

The geographic regions, governments, NGOs and investors that should focus on new aquaculture efforts were identified in the research. Australian coasts ranked highly, and they were only pipped for top spot by the North Sea in Europe. The waters off Tasmania and the south-west coast of WA were also shown to have high potential to develop seaweed aquaculture.

The report highlighted that while Northeastern New Zealand has an active shellfish aquaculture industry, it didn’t have an established seaweed aquaculture industry, which could help provide additional ecological function.

With a growing body of evidence indicating that, when done well, the commercial production of shellfish and seaweed can generate food and jobs while also having a net-positive effect on the surrounding environment – filtering polluted waters and providing habitat for commercially important seafood species, this study examines the global potential for this concept, which The Nature Conservancy refers to as ‘restorative aquaculture’.

“Commercial shellfish and seaweed aquaculture present a rare opportunity to utilise commercial enterprise to directly benefit the health of our oceans and improve human wellbeing,” said Robert Jones, Global Lead for Aquaculture at The Nature Conservancy. “This publication is a key step in improving our understanding of where and how that’s possible.”

Based on an extensive study of spatial data, the study’s results were also informed by engaging an international aquaculture expert panel that included representation from the World Bank, NOAA and Taylor Shellfish Farms, among other government, NGO, academic and industry bodies.

“The study brings together global-scale spatial datasets representing key environmental, socioeconomic and human health considerations, and provides insights into specific geographic regions where governments, international development organisations and investors should prioritise new aquaculture efforts. By encouraging progress in public policy, capacity building and business planning, the study team hopes to help unlock the full economic and environmental potential of restorative shellfish and seaweed aquaculture,” Dr Theuerkauf added.

Some key results:

- The opportunity for restorative aquaculture is truly global — there are marine ecoregions within all inhabited continents that have significant potential for shellfish and seaweed aquaculture to provide benefits to ecosystems and people.
- The top 10 highest opportunity regions for shellfish aquaculture development centred in Europe, Oceania and North America, while the highest for seaweed aquaculture centred in Europe, Asia, Oceania and South America.
- Europe’s North Sea marine ecoregion was consistently identified as the highest opportunity marine ecoregion for restorative shellfish and seaweed aquaculture development. The region’s coastal waters suffer some of the world’s most substantial nutrient pollution and widescale loss of shellfish reefs, and receives significant fishing pressure — commercial seaweed and shellfish farming could help to address some of these ecological challenges.
- Some identified high-opportunity marine ecoregions, such as the East China Sea, already have robust shellfish and seaweed aquaculture industries. In such cases, the authors suggest reform or modifications in aquaculture practices could improve or optimise ecological benefits of farms.



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On-farm abattoir creates new jobs in Central Queensland

An on-farm boutique abattoir established by a family-owned pastoral company will create over 80 new jobs, with support from the Palaszczuk government's \$175 million Jobs and Regional Growth Fund.

Signature OnFarm, part of the Angus Pastoral Company, will build a \$27.9 million abattoir on its Sondella station, 125 km north-west of Moranbah, Queensland.

The small-scale facility will be export accredited and capable of servicing up to 200 head of cattle a day when fully operational. The Angus Pastoral Company is a privately owned, fourth-generation cattle breeding operation, dating back to 1960. The company is a significant supplier of beef, running 35,000 cattle across four properties on 400,000 acres in Central Queensland.

"Due to the property's relatively remote location, the on-farm abattoir project will also include the construction of a workers village to cater for up to 70 employees, including abattoir workers and other support staff," said Cameron Dick, Minister for State Development and Manufacturing.

"The expansion is a great example of the innovative job-creating projects that the Palaszczuk government's Jobs and Regional Growth Fund is designed to assist. We are committed to ensuring the benefits from Queensland's continued economic growth are felt in regional and rural communities right across the state, not just in the big centres," said Mark Furner, Minister



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for Agricultural Industry Development and Fisheries.

Alongside supplying the domestic market, the Angus Pastoral Company has experienced increasing demand for its beef products under its Signature brands for the past 13 years. This understanding of export markets will potentially assist the company's expansion plans. The on-farm facility will minimise the need for live cattle to be transported interstate for specialist processing services approximately 1250 km away.

"At Signature Beef we pride ourselves on our quality, and having the abattoir just 500 m from the feedlot will improve animal welfare, resulting in a superior finished product," said Blair Angus, co-owner and Manager of Angus Pastoral Company.

Signature OnFarm will install equipment and use specialised processing techniques in the facility to enhance the product's traceability and provenance. This will also create an engaged and higher skilled workforce. Construction of the facility is expected to be completed in a year.

Fresh meat: D'Orsogna opens facility in Victoria

D'Orsogna Limited has commenced production at its \$66 million food manufacturing facility in Victoria. The 11,000 m² facility was officially opened at Merrifield Business Park by Victorian Minister for Jobs, Innovation and Trade Martin Pakula.

While providing employment for 200 people at the facility's new production base in Victoria, D'Orsogna's headquarters will remain in Palmyra, Western Australia, where the company employs a further 550 people. Having first opened a family butcher shop in Perth in 1949, D'Orsogna now produces a range of cured and cooked whole and sliced hams, gourmet continental goods, bacon and cooked sausages.

Addressing the opening function, Managing Director Greig Smith, asserted that the new manufacturing facility has established the D'Orsogna name, brand and products on the east coast.

"We've taken a measured approach to such a substantial investment after establishing a modest footprint in Victoria 10 years ago at Mt Waverley. The new Merrifield production facility will secure the future of the D'Orsogna business," Smith said. Speaking at the opening of the facility, Smith also acknowledged the financial contributions made towards the new facility by the Victorian Government and City of Hume.

"We commit today to repaying that investment by the state and local community with this first-class food

manufacturing business that already employs local citizens and delivers environmentally, socially and financially," Smith said.

Minister Pakula said the Victorian Government supported the expansion by D'Orsogna, bringing jobs to Melbourne's north and providing opportunities for export and growth in a vital food and fibre sector, valued at \$14 billion.

The new facility is expected to double D'Orsogna's production capacity and generate development opportunities for its range of ham, bacon and other meat protein products.

"Proximity to major local and export markets, streamlined manufacturing processes and state-of-the art equipment, all supported by well-trained staff, a committed management and board, and supportive customers, should ensure its success," said Tony Iannello, D'Orsogna Chairman, adding that the company had "ambitious expansion plans over the next few years".

The facility has increased productivity per square metre and incorporated modern energy and water conservation technology, for sustainable and efficiently processes to provide fresh meat protein products to consumers. The facility also features 8500 m² of rooftop solar with a one-megawatt system to reduce on-site carbon emissions.



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CASE STUDY

Meat provider switches to solar



Andrews Meat Industries (AMI) is introducing a solar installation that covers almost 90% of the roof at its Lidcombe facility. Approximately 6000 m², the installation is set to generate around 20% of the company's energy needs from renewables (1202 megawatt hours per year), which equates to a decrease of more than 19,000 tonnes of emissions per annum.

The AMI 836 kW solar installation is the second for the JBS Australia Group, following the Primo Foods 3.2 MW installation at the Wacol facility in late 2018.

With the meat industry contributing heavily to the world's carbon emissions, AMI Director Harry Andrews said the solar installation was a logical move to reduce the organisation's carbon footprint.

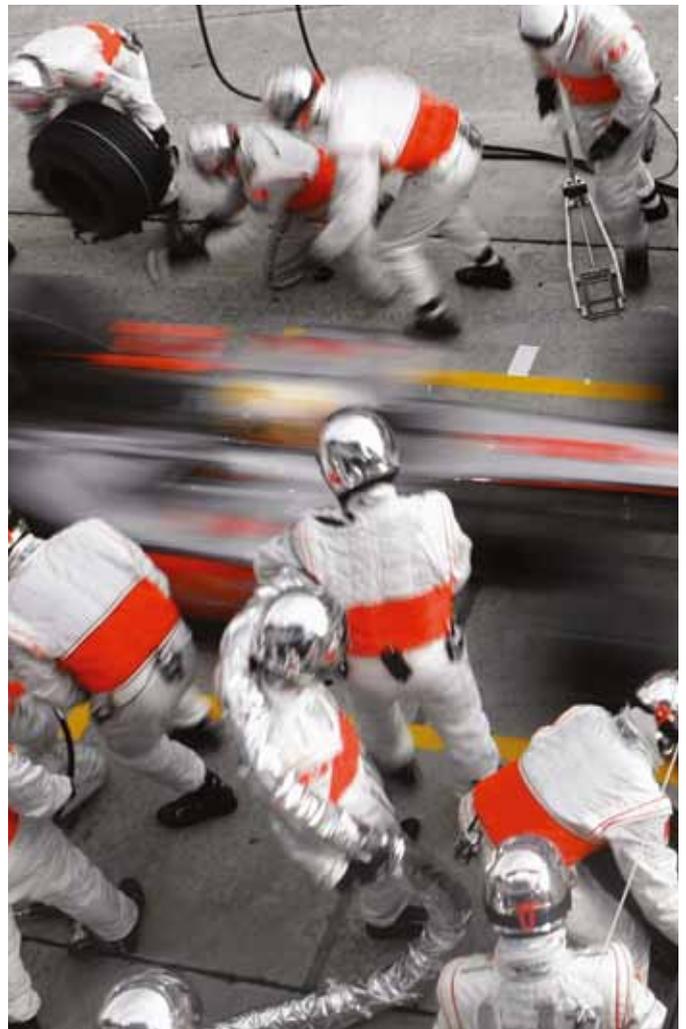
The renewable energy installation is part of other recent sustainability initiatives implemented by AMI, including:

- Water consumption management — implementing washdown practices/times/pre-clean hygiene and ensuring the use of the most efficient spray nozzles, supplied by low pressure regulated pump stations.
- Use of environmentally safe cleaning detergents.
- Recycling of cardboard and paper products.
- LED lightening installation — upgrade stage one completed.
- Reduction of transport movements through greater customer delivery consolidation.
- Refrigeration — scheduled preventive plant maintenance to ensure efficient systems operation and minimise breakdowns, in order to achieve lower electricity and refrigerant consumption. Also implementing good work practices throughout the facility to ensure cold areas are well contained/insulated.

"As a market leader in the foodservice industry, we are committed to sustainably meeting the needs of our customers domestically and internationally," Andrews said. "Operating in an industry with increasing and expensive energy usage means we need to take measures to reduce the environmental impact of our operations through sustainable business practices."

"As we strive to continually improve our resource efficiency and reduce our carbon footprint, the 2300-panel installation will make a considerable impact on our reliance on grid energy usage," Andrews said.

Todae Solar, the same team who constructed the installation at Primo's Wacol facility, will be implementing the solar solution at the AMI Lidcombe site. Aris Hovardas, General Manager Sales for Todae Solar, said: "We are happy to see an increasing number of food processing facilities offsetting their carbon emissions and reducing their electricity costs through self-generation."



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MoU for Australian and Chinese meat sectors

A new memorandum of understanding (MoU) between the Australian and Chinese meat sectors was finalised on Tuesday, 24 September 2019. It highlights the importance of China to Australian industry and underlines a commitment to collaboration on both sides, according to Australian Meat Industry Council CEO Patrick Hutchinson.

“This MoU is a demonstration of the depth of relationship between our meat industry and the Chinese industry and the mutually beneficial outcomes that can be achieved by working together,” Australian Minister for Agriculture Bridget McKenzie said.

Hutchinson signed The China Australia Red Meat Agreement (CARMA) MoU with the China Meat Association in Chengdu, China on behalf of the Australian Meat Industry Council, Meat & Livestock Australia and the Australian Meat Processor Corporation.

“China is the biggest export market for Australian meat, and maintaining and enhancing our relationship with this critical partner is essential for the future of our industry. This MoU serves to reinforce the strong value our sector places on the relationship and our great respect for China as a very important trading partner,” Hutchison said.

In the year to August, Australia has sent more than 172,000 tonnes of beef, 45,000 tonnes of lamb and 39,000 tonnes of mutton to China, with a total market value of close to \$2 billion.

“The aim of this MoU is to establish long-term and formal cooperative relations, strengthen effective and practical food safety processes, and enable bilateral exchanges around technical know-how, marketing, and research and development investment. Ultimately, the MoU will help secure trade outcomes that are beneficial to all parties.”

The longer-term aims of the CARMA include development of both sides’ red meat industries, an enhanced supply chain for Australian meat into China, and working to streamline product specifications and labelling requirements.

“Demand for Australian meat products continues to grow in China and this MoU is another step towards securing and growing this important relationship. I extend my gratitude to the China Meat Association, Meat & Livestock Australia, the Australian Meat Processing Corporation and my own team at AMIC for all their hard work in creating this agreement, and I look forward to continuing to work towards the best outcomes for our industry,” Hutchison said.

Under the terms of the MoU, a working group to help implement the goals of the CARMA will be formed to initiate the cooperative program.



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Salmonella detector for poultry industry

A biosensor that rapidly detects the presence of bacteria in both raw and ready-to-eat food along the food production line is being developed by researchers at the University of Missouri (MU).

The MU research study focused on poultry products, such as chicken and turkey.

While most poultry manufacturers have accurate tests in place to determine positive cases of *Salmonella* — for instance culturing samples and extracting DNA to detect pathogens — the tests may take anywhere from one to five days to produce results. The research team has now developed a device that is said to produce results in just a few hours.

Mahmoud Almasri, associate professor of electrical engineering and computer science at the MU College of Engineering; Shuping Zhang, Veterinary Medical Diagnostic Laboratory at the MU College of Veterinary Medicine; and Lincoln’s Majed Dweik have been developing the portable bacteria sensors for a few years and recently published their findings, ‘A microfluidic based biosensor for rapid detection of *Salmonella* in food products’, in journal *PLoS ONE*.

The biosensor uses a specific fluid that is mixed with the food to detect the presence of bacteria, such as *Salmonella*, along a food production line in both raw and ready-to-eat food. That way, producers can know within a few hours — typically the length of a worker’s shift — if their products are safe to send out for sale to consumers. The researchers believe their device will enhance a food production plant’s operational efficiency and decrease cost.

“Raw and processed food could potentially contain various levels of bacteria,” Zhang said. “Our device will help control and verify that food products are safe for consumers to eat and hopefully decrease the amount of food recalls that happen.”

The biosensor has been designed to simultaneously detect multiple bacteria with concentration as low as seven cells per millilitre in both raw and ready-to-eat poultry in less than an hour without the need for enrichment culture. The testing panel for raw poultry included *Salmonella* serogroups B, D and E, while for ready-to-eat (RTE) poultry products *Salmonella* serogroups B, D and E and *E. coli* O157:H7. The team are in the process of testing for *Listeria* and *Campylobacter*.

The researchers said the next step would be testing the biosensor in a commercial setting. Almasri said he believes people in the food processing industry would welcome this device to help make food safer.

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Red meat vs soy protein

Findings from a New Zealand study reveal that three weekly servings of fresh, unprocessed red meat over eight weeks neither lowers nor raises heart disease in already at-risk men, with soy protein having equal effects on heart disease risk in this population group.

Fifty men aged between 35 and 55 years who were already at risk of heart disease participated in the study. The participants were randomly split into three groups, receiving three total servings (total 500 g) a week for eight weeks of either grass-fed Wagyu beef or a soy-based meat alternative. The participants had an otherwise normal diet, except for the inclusion of other red or processed meat, oily fish and omega-3 supplements to avoid confounding results.

Prior analysis by the research team of New Zealand pasture-raised Wagyu beef, from specially bred and fed cows, reveals that it has a notably different fat profile to grain-fed beef. It is rich in a fat called conjugated linoleic acid, or CLA, and other so-called 'good' fats including omega-3 fats. Pasture-raised Wagyu beef also contained on average less than half the saturated fat in ribeye, striploin and tenderloin cuts compared to grain-fed beef.

A diet heavy in saturated fats raises risk of cholesterol and heart disease, while CLA and omega-3 are anti-inflammatory and can help protect against heart disease. Through the study, researchers



wanted to determine if the fats in Wagyu beef could reduce risk of heart disease when eaten in moderation, with findings revealing that all three food conditions had the same neutral effect on heart disease risk.

Blood sample analyses showed reduced levels of 'bad' LDL cholesterol and total cholesterol, and of fatty acids circulating in the blood across all participants. Participants also experienced drops in total body fat percentage and waist circumference. However, specific biomarkers for heart disease risk normally used in research, remained unchanged.

Consuming 500 g a week — the recommended level of intake by dietary guidelines in New Zealand and Australia, and by the World Cancer Research Fund — did not have a detrimental effect on heart health over the study's eight-week period.

The study was co-funded by a program grant from New Zealand's High-Value Nutrition National Science Challenge and by New Zealand Wagyu beef producer First Light Foods to AgResearch, and led by Liggins Institute Professor David Cameron-Smith, Research Fellow Dr Amber Milan and AgResearch Senior Scientist Dr Emma Bermingham.

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Label Power bring colour LCD screen compact DT and TT printers to market.

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All Label Power TX200 series printers feature a large 3.5" color TFT display, 320 x 240 pixels. This makes setting up and using the printers a breeze.

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- RS-232



TX200



AP550



LX910



AP362

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TX200 Series

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- Ribbon capacity up to 300 m (984')
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- ENERGY STAR® qualified

The TX200 Series of thermal transfer desktop barcode printers supports more printing applications than any other printer in its class. With three models available, the four inch wide TX200 Series can address everything from higher volume 4x6 shipping labels, higher resolution product marking and graphic solutions, to high resolution labels used in electronics marking applications.

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Nerida Kelton, Executive Director, AIP



Vacuum pad series

Efficient and adaptable vacuum solutions are needed in the packaging, pharmaceutical, food and printing industries. SMC's vacuum pads comply with FDA requirements and are designed for efficient handling, featuring a blue silicone rubber pad to prevent wrinkles.

The ZP3P series is equipped with a thin, soft pad skirt, which provides a strong grip and reduces leakage. This makes it a useful tool for thin workpieces that can be deformed during absorption. The product can be used to handle delicate objects like vinyl and film, due to the flat shape of the vacuum pad. Made from FDA compliant silicone rubber, the vacuum pad prevents wrinkles and damage to the product and is suited to a number of applications in the food and pharmaceutical industries. The product's blue colour also improves its visibility during contamination inspections.

SMC has also released the fluoro blue ZP3P-JT Series, with a flat-style vacuum pad to handle soft film, paper or foil packages and sheets. The bellows style can absorb a larger range of bag shapes and pouches filled with food. In both cases, the rib design provides a fast and secure grip.

The pad design of the product is suitable for applications such as film packaging, palletising, printing and labelling. Consumers can choose from seven different types of adapters, and also have the option of a buffer.

SMC Australia | New Zealand

www.smcanz.com

Accessible packaging design can often be overlooked by the food and beverage industry. How many times have you grabbed a knife to open a package, spilt food when opening a pack or been unable to read the instructions on the pack (even with your glasses on) and then vowed to never buy that brand again? Now, imagine you were an arthritis sufferer or a consumer with a disability.



Food and beverage companies disregard Accessible Packaging at their peril. It is vital that manufacturers consider how their packaging design could affect a consumer's ability to eat, drink and dispose of the waste, and the flow-on impact that consumers' packaging frustration has on their brand.

So what can you do?

Step 1: Follow the guidelines

Arthritis Australia, in conjunction with the Georgia Tech Research Institute, have compiled Accessibility Packaging Design Guidelines for food and beverage manufacturers. Research from Arthritis Australia indicates that while all consumers struggle with packaging, the growing ageing population, consumers with disabilities, arthritis sufferers and children are impacted the most.

The guidelines state that packaging must be easy to open and use for those with limited functional abilities, packaging labelling must be highly legible and packaging should be fit for purpose and able to demonstrate accessibility.

Step 2: Attend training

The Australian Institute of Packaging (AIP) has developed a half-day training course on Accessible Packaging Design that allows attendees to understand the design requirements and the ease-of-use packaging design tools. It also provides statistics on changing household demographics, meal preparation requirements and case studies from users. The hands-on course includes testing with simulation gloves that have been developed by Georgia Tech Research Institute and reading glasses from a UK researcher. Attendees are sure to leave the course with a different approach to packaging design.

Step 3: Get recognised for innovation

The AIP, in conjunction with Arthritis A/NZ, has developed an Accessible Packaging Design Award, to recognise packaging that is accessible, intuitive, easy to open and innovate. The judges are looking for accessible packaging that includes measuring techniques and consumer satisfaction levels with packaging accessibility.

The 2019 Gold Award went to SPC Ardmona for its ProVital Easy-Open Diced Fruit in Jelly range that is designed for all consumers to open, including those with reduced fine motor skills, dexterity and strength, and on-pack communication is clear, crisp and legible for all.



Bottling UHT milk in PET in Russia

In 2007, Vladimir Kayshev took over Pyatigorskiy Dairy, formerly a state-run operation dating back to the 1980s. The equipment was in dire need of upgrading and was capable of processing only 20 metric tons of raw milk per day. Four years later, Kayshev decided to invest heavily in the plant and gradually transform it into a state-of-the-art dairy.



The city of Pyatigorsk is in the far south of Russia, in the foothills of the Caucasus Mountains. The region is famous for its hot springs and many mineral springs. That is one reason why the area within a 120 km radius around Pyatigorsk is a protected natural area. Heavy industry is not permitted. “That ensures that the feed our cows get from our 10,000 or so hectares of meadows and fields is especially pure. And that, in turn, has a positive impact on the quality of our milk,” said the dairy’s president Konstantin Sukharev. The water the cows are given to drink is also anything but ordinary. The herd drinks lukewarm mineral water that is pumped up from 1600 m underground. “It’s high in calcium and magnesium, which promotes healthy bone growth,” Sukharev explained.

With 2500 cows, the dairy’s own farm produces around one-tenth of the raw milk Pyatigorskiy processes. A second farm is currently being established for another 6000 dairy cows. Once that is complete, the dairy hopes to supply around one-third of the milk it processes. The remaining milk will continue to come from small local farms.

UHT and PET make a good team

UHT milk remains Pyatigorskiy Dairy’s main product. “Demand on the Russian market is growing year by year,” Sukharev said. Retailers prefer UHT milk because of its longer shelf life. Besides that, consumers prefer it because their buying habits have changed: they want to spend less time on shopping, so they buy larger quantities to have on hand — which means the products have to keep longer. In southern Russia, summertime temperatures can rise above 40°C. It would be complicated to keep larger quantities of fresh milk in the cold chain. And then there’s the fact that UHT is the only way to go for transporting milk to other parts of the vast country.

“At the same time, PET bottles are becoming increasingly popular as a packaging material for milk,” Sukharev explained. “So far, though, they have only been used for fresh milk. Now we have combined PET packaging and UHT milk — and for that we chose a Krones aseptic line.” PET has several things going for it as a packaging material:



- Consumers find PET bottles visually appealing and easy to use.
- Bottling and packaging in PET can cost half as much as packaging in cartons.
- A PET filling line is far more flexible than a carton packaging line, since switching to different container sizes and shapes entails less effort and cost. And that enables producers to respond flexibly to market demands.
- Carton packaging, on the other hand, is more susceptible to damage during transport — up to 1.5% of carton packaging is compromised in the delivery process.

Modern technology in a historic building

For the expansion of its production capacity, Pyatigorskiy is using an existing, Soviet-era building, outfitting it with state-

of-the-art UHT systems, homogenisers and centrifuges. Renovations have been and continue to be made while production is ongoing: over 300 km of piping and tubing have been replaced, four new carton packaging systems have been installed in addition to the new Krones aseptic line and storage capacity for 200 metric tons of pasteurised milk and cream has been created. The company plans to complete this construction phase by the end of the year. Today, the dairy is capable of accepting 300 metric tons of raw milk per day. The company plans to double that capacity by 2021.

The PET line from Krones is designed for aseptic filling of low- and high-acid products. This versatility is important for the dairy because of the very different pH values of the two products it has so far run on the line: milk has a pH of around 6.8, while kefir's is around 4.3. Pyatigorskiy fills the UHT milk into transparent containers and the kefir into round, opaque white containers. Both container varieties have a volume of around 900 mL. The preforms used for the white kefir bottles have an integrated low-level oxygen and UV barrier.

When changing over from kefir to milk, the PET-Asept D line is properly cleaned and sterilised with hydrogen peroxide (H₂O₂) in order to prevent contamination of the milk. Even the considerably higher viscosity of kefir does not present a problem for the aseptic block. It can operate for 144 h at a stretch before a two-hour sterilisation is required. "It's a great line," Sukharev said. "It runs outstandingly well with just two operators per shift. And Krones Academy coaches trained those operators onsite."

Options for expansion

The company intends to gradually expand the range of products and containers processed on the PET line. It is already set up to fill yoghurt smoothies with and without fruit bits and to handle 1.3 L and 0.3 L bottles. The dairy also wants to bring a square-shaped bottle to market sometime in the future, with higher

barrier properties that should increase the shelf life of UHT milk to an entire year. "Some regions of Russia in the north and far east are logistically impossible to reach for as much as nine months of the year because of their extreme climates. And transport from Pyatigorsk to these areas takes 21 days as it is. So, a longer shelf life than the 45 days [that] you generally get with normal preforms definitely makes sense," Sukharev said.

The PET aseptic line was validated and went into operation in January 2019. "The Krones line has opened up a new market segment for us. UHT milk in these containers is a brand-new and unique product on the Russian market," said owner Vladimir Kayshev. "We are confident that we will be operating at full capacity on the new line within a year — once the products have really hit the market."

Traditional kefir production

Kefir is a thick dairy beverage that originated in the Caucasus Mountains but has since become popular across all of Russia. The probiotic beverage is said to help people live longer because it can suppress pathogens in the human digestive system. That is why it's considered the drink of centenarians.

Kefir makes up about 20% of Pyatigorskiy Dairy's total production output. While some Russian dairies use pure yeast cultures to produce kefir on an industrial scale, Pyatigorskiy still follows the traditional recipe using milk kefir grains, also known as kefir mushroom. "The kefir mushroom is very sensitive. The grains contain up to 200 different microorganisms in a symbiotic colony of bacteria and yeast (SCOBY) that looks like cauliflower. We have a separate room for propagating and storing the culture, in which daylight and outside noises are excluded," Sukharev explained. "One of our employees cleans and collects the kefir grains by hand. She can't wear gloves, nail polish or perfume, and the grains can't come into contact with metal. The grains even react differently when a different employee takes care of them." The kefir grains are cultured in two stages, first in a low-fat milk and then with progressively higher fat-content milk. It ferments the milk within about 24 hours.

Extremely compact line

The new dry aseptic line from Krones runs 12,000 containers per hour and consists of the following components:

- PET-AseptBloc D aseptic block with H₂O₂ sterilisation, consisting of a Kosme KSB 6R Synchro stretch blow-moulder and Modulfill Asept VFJ filler with an aseptic capper
- Contiroll wraparound labeller
- Sleeveomatic sleeve labeller with Shrinkmat steam tunnel
- Checkmat FM-X and Checkmat EM inspection systems for monitoring fill heights as well as cap and label placement
- 20-metre Acculoop buffer system
- Variopac Pro FS packer

The line, which is located on the second floor of the building, is extremely compact, occupying just 750 m² of space. Krones made that possible by erecting a stainless steel platform that serves as a second level, housing the two labellers and the packer. Finished 6-bottle shrink packs are passed back down to the ground floor by way of a vertical screw conveyor, where they are placed by hand onto pallets and then transferred to the warehouse.

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

Printable paperboard tray forming system

G. Mondini's tray packaging system, Paperseal, uses renewable resources with printable paperboard with an easy-to-remove plastic lining for recycling at end of use.

The tray forming system fabricates a MAP tray from a pre-cut flat paperboard blank in a one-step process before the tray sealer. The paperboard blank is first formed into a tray, then using ZERO technology a barrier liner is applied to the tray. ZERO technology is designed to eliminate process waste by using this technology with the Paperseal tray forming technology. This also reduces the plastic content of the paperboard tray by up to 80%, according to the company.

The pre-formed paperboard trays are then ready to be sealed with top seal, modified atmosphere and vacuum skin formats using different liners and paperboards. The packaging system is recommended for fresh meats, processed meats, ready-made products, frozen foods, cheese, snacks, salads and fruit.

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www.selectequip.com.au



Filling and packaging machines

DOSOMAT technology provides fully automatic filling and sealing for a range of food choices into pre-made cups, pouches and spouted pouches. Waldner DOSOMAT specialises in handling liquids, pasty products, powders, lumpy products and layered products having pastes with powder and chunks on top. These machines process a range of packaging materials including containers or closures made of cardboard, plastic, co-ex material, aluminium, sheet steel or glass.

With over 60 years' experience in filling products for the food industry, Waldner has delivered over 2500 packaging machines across the world, filling products such as natural and fruit yoghurts, yoghurts with granola, cream, sour cream, fresh cheese and cheese spreads, specialty salads of different kinds, soups and sauce pastes, dressings, mayonnaise, mustard, butter, margarine, sandwich spreads, honey, jams, pastes, animal feed, cosmetic creams and jelly, among other items.

Machines are available in wide capacity ranges, from small rotary-type machines for low outputs to high-capacity inline machines with multiple lanes. All the machines are available with an automatic change from one cup/pouch size to the other. Waldner DOSOMAT is designed to provide nearly no downtime, ensuring machine-effectiveness of more than 95% according to DIN 8743.

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Reinventing soup using the right packaging

Re:Nourish is a UK-based business that makes four soups made from natural ingredients, including vitamins and micronutrients. The product is supplied in a ‘grab and go bottle’ that allows the contents to be heated in a microwave. This enables consumers to quickly enjoy the product on the move.

The distinctive rectangular-shaped bottle was conceived by Re:Nourish founder Nicci Clark and developed for manufacture by Design. Blow moulded in transparent polypropylene, it creates an impression on-shelf with the soups clearly visible to emphasise their natural properties. The large decoration area features high-impact black and white labels to establish a brand identity.

In addition, the 500 mL bottle is strong but lightweight to ensure effective protection of the soups while providing safe and easy handling for the user. It is also fully recyclable.

“With these soups, we are breaking all the rules and reinventing them,” Clark explained. “We see soups as the new ‘juices’ in delivering a flavour-filled experience that is both delicious and healthy. As part of this, the right packaging was essential. M&H Corby has done a fantastic job in producing a quality bottle that projects strong brand messaging, maintains the freshness of our soups and provides the simplicity and ease of use that busy consumers demand.”

Re:Nourish soups are prepared using only fresh vegetables and plant-based ingredients. In addition, each one features a special ingredient with a particular health benefit.

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PACKAGING & LABELLING



High-speed vertical packaging system

GEA has redesigned the SmartPacker TwinTube high-speed vertical packaging machine. The machine is designed to be intuitive and features a modular system with increased functional efficiency, promoting higher operational uptime.

The continuous motion vertical machine can package small food products, such as candy, nuts and dried fruits, in pillow bags of different sizes. Part of a complete packaging process with upstream and downstream equipment, the machine can operate in a dry manufacturing facility.

The machine can process up to 500 bags/min (weighing 10 to 18 g each) with its two parallel forming tubes. Calorie packs of different widths and designs can also be filled simultaneously by running differ-

ent film reels for each tube. A Jumbo Roll has been implemented in the machine, allowing film reels weighing up to 100 kg to be used for long production runs, improving overall efficiency.

The machine's modular construction allows users to add new options and upgrade existing machines. It also has toolless adjustment features for shorter changeover times and error-free machine set-up, including printers, labellers and the vertical sealing unit.

The TwinTube is equipped with automated web tracking to detect if the film deviates from its path due to variances in the film roll. This allows the machine to automatically correct the direction of the film, without manual adjustment. Web tracking also safeguards the quality of the resulting bags and saves machine downtime.

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Glass filler for beer and CSDs

The Craftmate G glass filler for beer and CSDs can handle up to 24,000 bottles per hour and can be combined with up to two closers for crowns, screw caps or aluminium roll-on closures. The device resembles the fillers from Krones' Modulfill series, operating with the HRS system featuring a vent tube, to provide accurate fill levels.

In order to keep the filler as compact and simple as possible, however, there are also differences from the Modulfill series. For example, necessary gush-type jetting systems have been integrated, though exterior cleaning is performed manually.

Syskron, Krones' subsidiary and specialist for digitalisation, will be showcasing the design enhancement of Share2Act. A platform with multiclient capability, the product mutually links all machines in the production operation, but also performs the classic functionalities of MES systems, uniting them on a single user interface.

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



Stainless steel panel PC

Backplane Systems Technology has introduced the Winmate IP69K Stainless P-Series panel PC.

Available in screen sizes ranging from 15–23.8”, the unit features a user-friendly P-Cap Touchscreen and a waterproof conduit pipe for extra cable protection. The unit is made from SUS304 stainless steel, making it suitable for demanding environments with hygiene requirements, such as in the food, chemical or pharmaceutical industries.

The housing is full IP69K-rated water-, dust- and corrosion-proof, designed to withstand extensive washdowns with corrosion resistance against cleaning agents, especially against close-range, high-pressure (up to 30 bar) and high-temperature (up to 80°C) washdowns.

The custom-built waterproof conduit pipe is pre-installed to provide an additional layer of protection for the peripheral cables connected to the device. The included air vent valve comes with an automatic mechanical system to act as a safety device that controls and maintains pressure without the user’s assistance in order to avoid air-related problems.

The unit is available with versatile mounting options, including panel, yoke and VESA mount. Equipped with an Intel Core i5-7200U Kaby Lake processor to handle multimedia content, the unit also has Wi-Fi and Bluetooth support.

Backplane Systems Technology Pty Ltd

www.backplane.com.au



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CASE STUDY

Ovenable pouch designed for frozen seafood

Pacific West required a convenient packaging solution that allowed its frozen marinated seafood products to be directly cooked in both the microwave and oven.

The Ocean Chef Oven Bake Pouch was tailor-made by O F Packaging to conform with Pacific West's requirements. The three-side seal flat pouch was constructed as an inner pouch for containing and cooking individual marinated fish fillets, which are then housed in an external display carton. The pouch features a kraft paper multi-laminate construction with clear rectangular window for product viewing. The kraft section of the pouch provides a sturdy printing surface for the cooking instructions.

The films, inks and adhesives used in the pouch all had to be specialised for both microwave and oven cooking, maintaining product safety and minimising contamination risk.

In order to be successful, the pouch had to conform to the basic needs of the product itself. As both the fillets and marinade are frozen, their barrier needs differ to that of fresh product, ie, reduced barrier to external gases such as oxygen and water vapour. However, the material still needed to provide an adequate strength to hold the product and resist puncturing.

As the pouch had to be both microwave- and oven-safe, the use of extensive imagery and message communication had to be placed on the external carton packaging, while the vital cooking instructions still feature on the pouch itself to enforce proper use.

As the pouches were filled by automated machinery, the pouch needed to provide the required wide opening for product filling, and the ability to be automatically sealed. The material of the pouch also had to be freezer-safe for product storage conditions after packing.

Unlike other flexible pouches, this baking pouch is designed to be entirely oven-safe. Using a specialised heat-tolerant internal layer to house the seafood product, OF Packaging was able to



create a vessel that could still function with normal heat-sealing equipment.

Cooking directly in the pouch eliminates the need for extra preparation and washing-up. Marinades and sauces can be contained in the pouch with the seafood item at time of packing, instead of requiring further consumer effort to open, mix and add seasoning.

Despite the higher cost of the oven-proof pouches compared to standard plastics, the utilisation of the same pouch design for multiple SKUs meant that Pacific West could order these pouches in larger quantities and reduce printing and transportation costs.

The results

Extensive trials and testing on the pouches were performed at the factory laboratory in China before being implemented for customer use in Australia. During the trialling process, a peel-and-seal option that uses heat-resistant adhesive to allow sealing by third-parties and consumers at home without the need for a heat-sealing machine was also provided.

According to O F Packaging, the Ocean Chef pouches are effective at providing an evenly cooked product, while the materials resist the high cooking temperatures for extended periods of time. Despite going from the freezer to the oven or microwave, the pouch maintains its structure without warping or delamination. This keeps the fish and liquid of the marinade safely inside the pouch throughout cooking, with the material easily discarded at the end.

The functionality of the pouch enhances the Pacific West philosophy of 'delicious seafood without difficulty'. It has provided the company with a point of difference to provide a seafood product that can be oven-cooked directly in the pouch.

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what's new in

Food

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Tripling shelf life of ready meals

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Using a microwave-assisted thermal sterilisation process, Washington State University scientists have developed a way to triple the shelf life of ready-to-eat macaroni and cheese.

“We need a better barrier to keep oxygen away from the food and provide longer shelf life similar to aluminium foil and plastic laminate pouches,” said Shyam Sablani, who is leading the team working to create a better protective film. “We’ve always been thinking of developing a product that can go to Mars, but with technology that can also benefit consumers here on Earth.”

With space travel in mind, the researchers also worked closely with the US Army, to develop a way to keep their ‘Meals Ready to Eat’ (MREs) tasty and healthy for three years.

Currently, plastic packaging can keep food safe at room temperature for up to 12 months. The WSU researchers demonstrated in a recent paper in the journal *Food and Bioprocess Technology* they could keep ready-to-eat macaroni and cheese safe and edible with selected nutrients for up to three years.

How it works

The food itself is sterilised using a process called the microwave-assisted thermal sterilisation (MATS) system, developed by WSU’s Junming Tang. The food must be sterilised in plastic, since metal, like tin cans, can’t be microwaved and glass is fragile and not a preferred choice of packaging for MREs. Glass is also too heavy for military or space uses.

Adding a metal oxide coating to a layer of the plastic film significantly increases the amount of time it takes for oxygen and other gases to break through.

The metal oxide coating technology has been around for almost 10 years, but it develops cracks when subjected to sterilisation processes. That eventually compromises the food shelf life, said Sablani, a professor in WSU’s Department of Biological Systems Engineering. WSU researchers have been working with packaging companies to develop new films that keep oxygen and vapour out longer.

The packaging films are made up of multiple layers of different plastics. These few-micron thin layers have different purposes, like being a good barrier, good for sealing, good mechanical strength or good for printing, Sablani said.

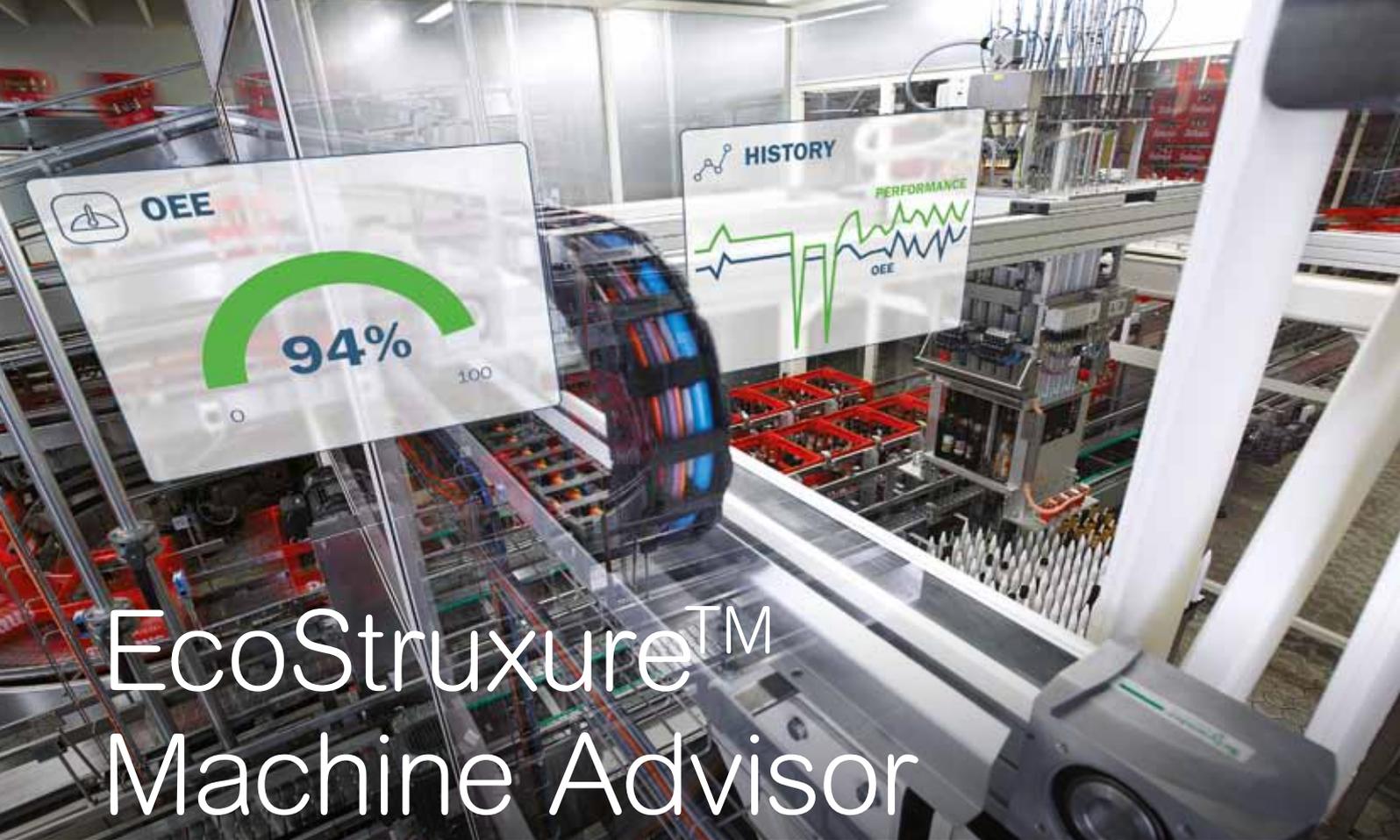
“We are excited that an over-layer of organic coating on metal oxide helped protect against microscopic cracks,” he said. “Multiple layers of metal oxide coating have also increased the barrier performance. Our research guided development of newer high-barrier packaging.”

Testing

In taste panels conducted by the Army, the mac and cheese, recently tested after three years of storage, was deemed just as good as the previous version that was stored for nine months.

To ensure the process works fully, the Army plans to do testing under field conditions. So these new MREs will be stored longer, then sent to deployed soldiers to eat in the field.

For space travel, it’s not really possible to field-test for a trip to Mars. But Sablani plans to reach out to NASA to talk about how to test the WSU films to make sure that packaged food stays edible on a space mission where failure isn’t an option.



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CASE STUDY

French potato chip manufacturer makes the most of leftovers



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Biogas plant builder Weltec Biopower, in collaboration with Weltec France, has built a biomethane plant for ALTHO, a manufacturer of potato chips in Saint-Gérard, Brittany. The plant allows the company to generate around 200 standard m³/h of biomethane from production waste and sludge of its own wastewater treatment plant.

ALTHO holds over a third of the market share with its chips brand, Bret's. Producing the chips yields 22,000 tonnes of leftovers and sludge a year, with the potato and starch leftovers, alongside other production waste, making up half the substrate. The rest comprises the sludge from the washing process.

The solid and liquid substrates are first mashed and shredded in the MULTIMix input system. After this pre-processing, the mixture is fed into the stainless steel digester.

dioxide, steam and other components. This three-stage separation reduces the methane slip to less than 0.5%.

The upstream compression provides another benefit, as it provides the right pressure for the methane to be fed into the natural gas grid without further compression. The separation occurs at ambient temperature, without using chemicals. In this way, 400 standard m³/h of raw biogas yield about 200 standard m³/h of processed biomethane.

"Owing to the durable membranes, the plant availability is high and the maintenance overhead is low. In Saint-Gérard, we ensure uninterrupted gas feed-in with our custom-developed LoMOS PLC," said Alain Priser, who is responsible for Weltec's business in France.

With this equipment, ALTHO is able to focus on its core business and make efficient use of accumulating leftovers.

A post-digester is the last step in the material cycle and the digestate is sold to local farmers, who use it as fertiliser.

When transforming the biogas into biomethane, Weltec Biopower conditions the biogas by integrating the membrane technology in a compact container solution. In the container, the raw gas passes through special membranes that separate it from carbon

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WHEN RELIABILITY MATTERS

Embedded PC

The BOXER-6640 multi-core embedded controller from Aaeon is a standalone PC featuring a sixth or seventh generation Intel Core i socket processor, fanless operation and extensive I/O.

Released by Interworld Electronics, the compact-sized product is based on the Intel H110 chipset to provide a multi-core embedded platform. The product has many supported processor options, including seventh generation Core i7-7700T, i5-7600T, i3-7300T and sixth generation core i7-6700TE, i5-6500TE, i3-6100TE. Equipped with two SODIMM sockets supporting up to 32 GB of DDR4 system memory, the product also contains two Gigabit RJ-45 Ethernet connectors, four USB 3.0 ports, three USB 2.0 ports and three RS-232 ports.

With one RS-232/422/485 port and 8-bit DI/O, the product comes with a 2.5" SATA hard drive or an mSATA SSD that can be internally mounted for operating system and data storage. The product enables system expansion via two full-size Mini-Card slots and one LPC connector. The Intel HD graphics engine supports high-resolution displays and provides two HDMI or DP outputs via combination connectors, as well as one VGA output.

The heat sink and fanless design of the BOXER-6640 coupled with an operating temperature range of -20 to 55°C provides long-term operation in industrial and embedded environments. A 9~36 VDC source provides power to the product, while an optional 240 VAC power pack is also available.

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The smart food revolution that's (nearly) here

In the ever-competitive world of food processing, the challenges of changing conditions, be it shifting consumer trends, supply chain constraints or international relationships, are omnipresent. The battle to maintain a competitive edge dictates that the operations and facilities we build today must be prepared to compete in tomorrow's landscape.

The hype of Industry 4.0 (I4.0) and its relevance to the food processing sector has been increasing since 2013 when the concept was conceived by the German government and for a concept which has existed for only six years, I4.0 is fairly mature. While the concept of I4.0 might be mature, it is not the tidal wave of technological upheaval it is frequently made out to be, nor is it knocking down the door of business. As we shall see, industry is now just starting to transition to something which could be referred to as I4.0, and there's a long road ahead.

Wiley's Chief Future Officer, Brett Wiskar, elaborates on what I4.0 is and how it can deliver value to the food industry.

To get a handle on the value proposition I4.0 offers to the food industry we first need a clear understanding of what it means beyond the buzzword. While it's clear to most people that I4.0 is something involving technology, computers and integration in the supply chain or within a facility, industry consensus frequently ends there.

For clarity, I4.0 can be defined as: "The implementation of ubiquitous sensors and big data analytics connecting cyber-physical systems."

In practice, this is the collection and analysis of data generated in every aspect of an operation providing previously impossible-to-access insights. These insights lead to enhanced strategic and operational decision-making. This applies to every aspect of food processing — from batch sizes to machine maintenance, to training and performance, logistics inventory, energy and water consumption, waste management and interoperability between process units. I4.0 affects every aspect of the food processing industry and its operations and hard assets.

This is distinctly different to Industry 3.0, which is characterised by the implementation of microprocessors for the automation of production. For example, consider the transition between Henry Ford's factories and those of Toyota in the '80s and '90s. Toyota implemented microprocessors



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to automate their machines but did not implement prolific sensors and data analysis tasked with enhancing operations through real-time insights. It is these characteristics that are the hallmarks of I4.0.

With those two ends of the spectrum understood, it's possible to appreciate industry's progression from Industry 3.0 towards 4.0. Currently, a disappointing 16% of industry members use hard data to underpin process flow improvement. In what could be characterised as Industry 3.0 behaviour, the vast majority of process flow improvements come from human observations. Only 29% of manufacturers have access to instant, real-time information on every product they are producing. In a Deloitte survey, 94% of executives stated digital transformation was among their top priorities but only 37% of Australian executives said they feel ready for I4.0, with many fewer successfully implementing the technology.

These statistics point to an industry taking the first steps in transitioning to I4.0 as opposed to the "here and now" message we often hear in the press.

While it is very likely I4.0 will empower businesses like never before, there are steps processors must take before we can say we've reached the aspired position of being a business empowered by I4.0.

The implementation of ubiquitous sensors as a first step is already underway and will continue until we find ourselves discussing what's beyond 4.0. The next half-dozen years in

“ Only 29% of manufacturers have access to instant, real-time information on every product they are producing. The next half-dozen years in the food I4.0 space will be characterised by the question "what data should be collected?" ”

the food I4.0 space will be characterised by the question "what data should be collected?" As answers become more advanced, there will be a gradual increase in focus on analysing the data to ever greater precision and insight. Finding a balance between what we can track and what we will act on if we track it is the difference between overinvesting or not investing enough to empower outcomes.

Finally, as with any business management challenge, the change will come down to people and implementation. A culture of implementing I4.0, finding the insights and having the team and the resources who are willing to act on them is going to be as large as the technical challenge.

Once the food industry reaches I4.0 what awaits?

Interconnectedness and abundant information will be used to empower enhanced decision-making. I4.0 will empower industry to monitor, synchronise and correlate different elements of business highlighting how separate process units impact one another and the overall operation. Increased data flow will empower accelerated decision-making and response times. This is much more than cutting down on unplanned maintenance time, it's an industry-wide shift in mindset. A shift away from "you can have any colour you want as long as it's black" towards mass customisation, shorter supply chains and more effective and efficient activity on the factory floor. The core outcome will not only be an increase in efficiency but an increase in agility.

As a concept conceived in 2013, I4.0 has a level of maturity commensurate with the time it's been evolving. As sensors and business practices develop, the full value proposition of I4.0 will continually crystallise.

For the food executives of Australia, there are two key takeaways: I4.0 is not here yet but it is coming, and perhaps more importantly, there are very real benefits to adopting this technology. Faster adoption means greater actionable insights and paired with a culture of striving to do better will lead to a true competitive advantage over the laggard in industry.

"While the transition to I4.0 will not be easy, the companies with clear leadership and strong implementation will be the ones to come out on top of the 4th Industrial Revolution," Wiskar concluded.

Wiley & Co Pty Ltd
www.wiley.com.au

CASE STUDY

Multifunctional filler for Moon Dog Craft Brewery



Image credit: Moon Dog.

The GEA Visitrone Filler All-In-One multifunctional processing technology is able to fill glass bottles, cans and PET containers on a single filler. Australian-owned Moon Dog Craft Brewery plans to integrate the filler into its new plant in Melbourne.

Operating for nearly 10 years, the independent Moon Dog Craft Brewery has outgrown its original facility in the Melbourne suburb of Abbotsford, and has now moved to Preston. The new 12,000 m² facility has a production capacity of over 10 million litres per year, thus necessitating GEA's filler which has a capacity of 8000 bottles and cans per hour.

"The All-In-One filler allows us to operate a single filling line for both cans and bottles with quick changeover between formats. This gives us benefits in terms of floor space utilisation, and simplicity in maintenance and operation," said Josh Uljans, co-founder and CEO of Moon Dog Craft Brewery.

The lean monoblock filler was developed by GEA VIPOLL to help breweries meet their sustainable packaging requirements. Designed to save time during filling and format changeovers,

the compact machine rinses, fills and caps, and can switch to handle different products and container formats. The product's rinser is equipped with universal grippers, the filler uses an electro-pneumatic filling valve and a single capping turret can accommodate different closure types.

The multifunctional system can be used to fill glass, cans and PET containers, and is able to handle different formats and seal them with diverse cap types. The product can fill carbonated or still drinks, using a hot or cold fill method.

From brewing to bottling and storage, GEA has developed a range of products suitable for breweries. The Moon Dog Craft Brewery facility will also feature other GEA products, including the DICAR-B carbonation system, an ECO-FLASH pasteuriser and a Plug & Win 100 centrifuge from the technology group.

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Apple-processing facility research to improve pathogen control

PROCESSING

Apple-processing facilities, in which *Listeria monocytogenes* has been persistent, have been under research in order to improve pathogen control in the apple supply chain.

Penn State research suggests that pathogenic bacteria in apple-packing facilities may be sheltered and protected by harmless bacteria known for its ability to form biofilms.

The study researched three fruit-packing facilities in the US where contamination with *Listeria monocytogenes* was a concern. With the collaboration of the apple industry, the aim of the research was to understand the microbial ecology of food processing facilities. The ultimate goal is to improve pathogen control in the apple supply chain in order to avoid foodborne

disease outbreaks and recalls of apples and apple products.

“This work is part of Penn State’s efforts to help producers comply with standards set forth in the federal Food Safety Modernisation Act, often referred to as FSMA,” said researcher Jasna Kovac, assistant professor of food science at the College of Agricultural Sciences.

As part of the study, researchers analysed the composition of microbiota in apple-packing environments and its association with the occurrence of *Listeria monocytogenes*. The research revealed that packing plants with higher *Listeria monocytogenes*

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occurrences were dominated by the bacterial family *Pseudomonadaceae* and the fungal family *Dipodascaceae*.

Studying the properties of the microorganisms revealed them to be good biofilm formers. “Based on our findings, we hypothesise that these harmless microorganisms are supporting the persistence of *Listeria monocytogenes* because they protect the harmful bacteria by enclosing them in biofilms. We are testing this hypothesis in a follow-up study,” said lead researcher Xiaoqing Tan, a member of the Penn State Microbiome Centre.

Biofilms are microorganisms that attach to a surface and then

release a slimy material that affects the penetration of cleaners and sanitisers. “If a pathogenic bacterium is enclosed in a biofilm formed by microbiota, it is more likely that cleaning and sanitising procedures will be less effective,” Kovac said. “This may well explain how *Listeria monocytogenes* has persisted in food-processing plants despite repeated efforts to kill and remove it.”

Published in *Microbiome*, the findings of the research provide insight into the *Listeria* contamination problem and could lead researchers and the apple industry closer to solving it. Kovac pointed out that a key factor causing the development of *Listeria monocytogenes* is the equipment in fruit-processing plants, such as brush conveyors, which can be difficult to clean and sanitise.

Kovac’s team of researchers is experimenting with some of the non-pathogenic strains of bacteria that are not harmful to humans, to determine if they can be used as biocontrols.

“Once applied on the surfaces of the equipment in these environments, they may be able to outcompete and suppress *Listeria*, thus reducing food-safety risks and potential regulatory action. We are still exploring that approach in a controlled laboratory environment. If it proves to be feasible, we would like to test it in apple-packing and processing facilities,” Kovac said.

It is suspected that the challenges presented by microbiota hiding *Listeria monocytogenes* are not limited to fruit-processing facilities or produce. Penn State researchers are now set to investigate microbial communities in dairy processing facilities, to determine the microbial composition and ecology of these environments.

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The EXAIR No Drip Atomizing Spray Nozzles atomise fluids in a range of spray patterns for a variety of uses, including washing, rinsing, coating, cooling, quenching, wetting (moistening), humidification and dust control. They combine liquid and compressed air to create an adjustable mist of atomised liquid and have the added benefit of positively stopping liquid flow when the compressed air is shut off.



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

No Drip Internal Mix Atomizing Nozzles mix the liquid and air inside the air cap and produce fine atomisation; for liquids with a viscosity up to 300 cP; both air and liquid sides are pressure fed.

No Drip External Mix Atomizing Nozzles feature high flow rates and allow the air and liquid flows to be adjusted independently; best where precise liquid flow is needed; for liquids with a viscosity above 300 cP; both air and liquid sides are pressure fed.

No Drip Siphon Fed Atomizing Nozzles require no liquid pressure and can be used with gravity fed liquids or lift liquids from a siphon height up to 36" (914 mm); for liquids with a viscosity up to 200 cP.

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CASE STUDY

Completing the line

Available in Europe, the Middle East and the US, Jermuk is a well-known brand of bottled mineral water and natural spring water.

In 2010, Jermuk Group constructed new production facilities, which included KHS PET and glass bottle filling systems, with further expansion occurring in 2017 to meet growing market demand. Jermuk approached KHS for its filling and stretch blow moulding technology, also purchasing pallet technology, clean-in-place (CIP) and blending systems, a shrink packer and KHS's holistic Bottles & Shapes consulting program, which optimised Jermuk's bottle designs.

Following the 2017 restructure, problems in the production process emerged. Jermuk's entire production line was supplied by KHS, with one exception: Jermuk had opted for another manufacturer to supply its labelling technology and was not satisfied with the results.

Labelling the problem

The labelling quality of Jermuk's initial choice of labeller did not live up to the bottler's expectations of a premium product. Although the labels themselves and the bottles were flawless, damaged labels were a frequent occurrence. Together with KHS, Jermuk determined that the third-party labelling technology was the culprit: it was unreliable and not precise enough for the paper labels being used.

Determined to provide a high-quality product to its customers, Jermuk rectified its choice of labelling technology and, in 2018, commissioned a KHS Innoket Neo labeller on each of its two lines.

Jermuk Group President Ashot Arsenyan explained, "The problem was solved as soon as the two labellers were put into operation. The quality of the packaging is now 100% compatible with our special product."

Oliver Schneider, KHS Vice President of the Eastern Europe region, said: "At up to 25,000 bottles per hour for the glass line and a maximum of 20,000 for the PET line, for KHS the project is more in the low-capacity range; the chances of further growth in Armenia are thus good."

KHS Pacific Pty Ltd
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Jermuk water in green glass bottles is filled entirely using KHS technology.



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MVE External Stainless Steel electric motovibrators are corrosion resistant and specifically developed for food applications. The products' smooth finish, terminal box protection and water- and moisture-proof body means they can be used as flow aids, on bin activators to improve material discharge and as drives on vibrating machines for purposes such as conveying, screening and sizing.

When the MVE is switched on, a centrifugal force is provided by rotation of the eccentric weights. With only one MVE fitted on a vibrating machine, a rotating force is provided, resulting in a circular movement of the machine. Two counter-rotating MVEs fitted in parallel on the same machine provide a linear force resulting in a linear movement of the machine. The requirement of circular or linear movement depends on the application.

Product features include: centrifugal force: 105~1122 kg; vacuum-impregnated windings using Class F insulating materials; premium-quality bearings; sturdy FMEA-designed casing; ATEX ExII3D and ETL Class II Division 2 certification for hazardous environments; and AISI 316 body with AISI 304 mass covers. The product has multiple voltages to meet global electric specifications.

Oli Vibrators

www.olivibrators.com.au



X-ray inspection system

The X34 X-ray inspection system from Mettler-Toledo is designed to allow food manufacturers to identify small contaminants in a fast and reliable manner. It provides detection of metal, glass, high-density plastic, mineral stone and calcified bone fragments across a range of packaged foods.

The system comes with advanced software that enables automated product set-up, decreasing risk of human error and reducing the number of false rejects.

Features include a 100 W 'Optimum Power' generator, automatically maximising detection sensitivity; a 0.4 mm detector to accurately detect minuscule contaminants; and ContamPlus inspection software to further enhance detection capabilities.

The system can be equipped with the ProdX advanced data management tool that stores images of foreign body contamination, which can be viewed remotely. It also features a capacitive touchscreen, allowing users to increase the viewing angle of stored images while maintaining image consistency.

The X34 offers ingress protection, with an IP65 rating as standard and IP69 available through upgrade. An air conditioner enables cooling, allowing the product to operate in high ambient temperature environments.

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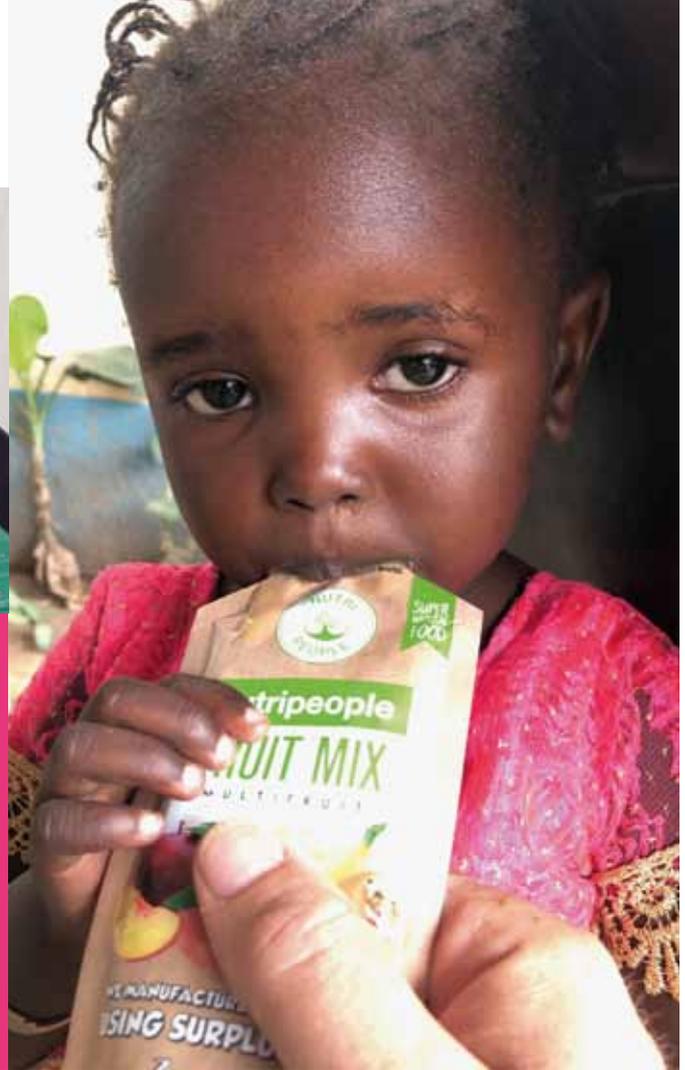
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From waste into food pouches

to tackle global hunger



Spanish food producer Nutripeople is turning Europe's surplus fruit and vegetables into a nutritionally enriched, easy-to-digest and 100% natural foodstuff for people in need, with equipment and support from HRS Heat Exchangers. Nutripeople now produces 42 million pouches of its products each year, helping those in developing countries avoid hunger and malnutrition.

Data from the Food and Agriculture Organisation of the United Nations (FAO) about the global food waste crisis reveals that 1.43 billion tonnes of food are lost or wasted every year, equating to approximately one-third of all the food produced for human consumption. Meanwhile, 795 million people do not have enough to eat, with those in developing countries most vulnerable to food shortages.

Through alliances with Spanish fruit and vegetable producers, Nutripeople has turned surplus produce into a new foodstuff with a high nutritional value, thanks to the addition of natural additives such as vegetable proteins and vitamins. The food producer's target customers are global organisations addressing hunger, such as UNICEF and Oxfam, alongside food banks. A percentage of each sale also contributes to social projects or NGOs dedicated to feeding those most in need.

It takes roughly 400 L of water to produce 0.5 kg of fruit, alongside the additional labour and transport costs and carbon emissions. By recovering this produce and re-using it elsewhere, the project helps to preserve vital resources and reduce the carbon footprint of food production.

To aid the process of turning surplus fruit and vegetables into finished food pouches, HRS Heat Exchangers installed a simple production line at Nutripeople's factory in Murcia. HRS Heat Exchangers supplied two tanks with mixers, a

heating jacket and a high shear stirrer, alongside a series of pumps, to aid the mixing line. The first stage in the production process, the mixing line preheats and blends the produce with proteins and vitamins to enrich its nutritional value.

The produce then passes through a homogeniser, supplied by HRS, which exerts pressure up to 2900 psi, before being pasteurised at 95°C with the HRS R Series scraped surface heat exchanger.

"The hygienic R Series range pasteurises viscous products such as fruit and vegetables, preventing fouling, as the rotating movement of the scrapers mixes the product whilst cleaning the heat exchange surface. This keeps heat transfer high and reduces downtime," said Francisco Hernández Ortiz, Food Business Development Director at HRS.

The finished products are filled into environmentally friendly pouches, ready for distribution, with a shelf life of two years without refrigeration.

HRS's turnkey approach and practical solutions strive to simplify and streamline Nutripeople's production line. With the production line fully functional since October 2018, Nutripeople has plans to replicate it in other locations, to make the most of local fruit and vegetable resources.

*HRS Heat Exchangers Australia New Zealand
www.hrs-heatexchangers.com/au/*

Vision inspection camera

The Omron FHV7 smart camera is designed for advanced vision inspections on food production lines. The camera features a multi-colour light and high-resolution image sensor, to achieve high standards of precision. The multi-colour light eliminates the need to change lighting when product designs are changed, or when new products are added to the production mix.

Integrated into pre-existing systems and machine platforms, the smart camera can be combined with robots for picking and assembly applications. The camera allows users to identify the causes of defects, accurately measuring objects in different colours and sizes on the same production line.

The camera's image processing reaches high speeds, while the camera delivers high resolution for precise inspections, maintaining quality without slowing production. The 12 MP camera has a dual-core CPU and an autofocus lens that covers a focal distance between 59 and 2000 mm.

The product facilitates the easy addition of external lights and filter replacement, with a modular structure that allows users to combine lens and lighting variants. High-speed image logging allows measurements to be conducted while simultaneously saving data. The product also allows users to maintain production cycle times, even if resolution is increased or inspection times are added. The camera's waterproof hood allows it to be operated in wet conditions.



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Semiautomatic ingredient batching system

The Kitchen Batching System by Sterling Systems & Controls, Inc. is an ingredient batching system. Suitable for the baking, food and other industries, the system is designed to improve speed and efficiency of the ingredient batching process, when compared to the manual recipe batching process.

The semiautomatic, multiple-bin batching system controls and verifies operator involvement and actions, providing accurate weighments and batches. It also provides for ingredient lot tracking and traceability, and batch validation.

The system is available with a range of standard and optional features, including multiple ingredient bins/totes (made of plastic or stainless steel), stainless steel tables, second scale functionality, remote supervisory control and a barcode scanner to assist in lot tracking.

Other optional features include a moving stainless steel workstation table with touchscreen display and a platform scale, a control panel with PC and weight instruments, and a choice of platform scale sizes and capacities. The ingredients used in the system can be dry or liquids. The system also features optional RFID scanning for lot tracking and batch validation with overall plant automation system.

Sterling Systems and Controls Inc

www.sterlingcontrols.com



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Wireless probe temperature sensor

The EpiSensor TES-2X is a fully wireless probe temperature sensor. Able to record temperature data at regular intervals and deliver it to users via EpiSensor's Gateway, the temperature probe is useful for monitoring and energy management applications. Single (TES-21) and dual probe (TES-22) versions are available.

The temperature sensor is housed in a waterproof polycarbonate enclosure so it can be used in a range of harsh environments, from manufacturer to consumer. The onboard lithium battery is designed to last up to 10 years (at 30 min reporting interval).

All temperature sensors are battery powered with user-replaceable batteries that last up to 10 years. The sensors can be calibrated through the Gateway's web interface or API.

The industrial IoT platform powers the applications used to monitor the health and performance of refrigeration systems, by tracking the temperatures of fresh and frozen produce. This helps provide quality and energy efficiency while also reducing food waste.

The monitoring system provides real-time visibility of temperature-controlled environments and assets, enabling managers to make more informed decisions, preventing problems before they happen.

EpiSensor's system combines enterprise-class security from sensor to server and ease of installation. The fully mobile system can be moved from site to site to calibrate existing equipment.

The temperature sensor has a range of features, including 3G/4G bidirectional communications to the Gateway, real-time data delivery in open formats, self-healing mesh technology and factory or field calibration. The temperature sensor can also monitor total energy usage, including electricity, water and gas.

Metromatics Pty Ltd

www.metromatics.com.au



CASE STUDY

Bühler catches mealworm bug

Through the development of various technologies and capabilities, Bühler can provide production and processing solutions for the insects industry. The company opened an industrial black soldier fly plant in June 2019 and is now opening a facility in the Netherlands for another species, the yellow mealworm (*Tenebrio molitor*).

The global mealworm market has experienced significant growth over the last few years, which is predicted to continue.

As the yellow mealworm has good nutritional value, including proteins, fatty acids, vitamins, minerals and dietary fibres, it has shown promise for various food products. In addition, mealworm farming could offer a new source of income for farmers by making better use of their resources. For example, mealworm can grow on wheat bran and rice husks, which are by-products on some farms.



A farmer in the Netherlands has already worked on the concept of producing yellow mealworm in an old pig farm. Bühler will now support the project and design, installation and commissioning of a 2300m² mealworm production facility, which will allow modularised mealworm production in an automated and hygienic way.

“Our technological solutions can be readily integrated into existing farms, but larger-scale facilities can also be realised.

Once the first plant is completed and producing profitably in the Netherlands, it will offer livestock farmers an alternative option for gaining a sustainable business with attractive margins,” said Andreas Aepli, CEO of Bühler Insect Technology Solutions.

Buhler AG Australia NZ
www.buhlergroup.com



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perfect roundness and an accurate finished diameter.”

The four welds running the length of the fabricated bends are food grade approved.

Other industries that the bends have been used in is cheese curd, wineries, breweries, raw potato chip processing and sugar blow lines. Global Stainless also manufactures stainless steel spheres and hemispheres for vacuum and pressure vessels, dished and flanged domes for tanks and vessels, and roll bends up to 4-inch all for the food, beverage and pharmaceutical industries.

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- Wine skin processing
- Beer mash pumping
- Raw potato chip transportation



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CASE STUDY

Liquid courage: making beer more sustainable

As a company committed to making positive impact within the communities it serves, 4 Pines Brewing Company is dedicated to the planet and addressing climate change and water use. The brewery estimates it sells the equivalent of 20 million pints of beer annually.

Without compromising on hygiene, 4 Pines sought to:

- reduce its resource dependency, particularly water, in the brewing cellar;
- lessen chemical exposure for its team and improve overall chemical handling;
- drive operational efficiency, with no impact to product quality.

Working together with Ecolab, 4 Pines has implemented a number of custom-built solutions to help reduce water and energy consumption, while positively impacting overall operations by ensuring safety and hygiene are not compromised.

This includes a cleaning in place (CIP) solution that has the capabilities to recover, treat and re-use caustic and final rinse water to save both chemistry and water. To further conserve water (and chemicals), 4 Pines is also running inline treatments periodically to eliminate the need to drain and refill its caustic tanks. What's more, the CIP system is automated and incorporates wireless technology to control both the tank supply valve pulsing as well as the mobile CIP return pump, ensuring optimal water use at all times.

In a bid to reduce turnaround times on the fermenters for 4 Pines, Ecolab has also developed and installed a carbon dioxide (CO₂) extraction system to purge the gas from its tanks to improve operational efficiency and energy use. This



process reduces the levels of caustic depletion during CIP, further saving chemical losses and downtime from rework. As a result, 4 Pines can improve tank availability and production output significantly.

Ale in a day's work

Chris Willcock, Chief Brewer, 4 Pines, said, "Ecolab's custom-built solutions helps us reduce our water and energy consumption, whilst ensuring

our beer is produced and bottled as safely and hygienically as possible."

Working with Ecolab, over the last nine months, 4 Pines has:

- experienced a reduction of water use in the production of beer. An overall reduction from 3.8 L to 3.4 L per litre of beer produced which equates to water savings of up to 60,000 litres a week. In one particularly busy week, the team brought its water use down to 2.6 L of water per litre of beer.
- increased health and safety. A safer system for cleaning and sanitising its fermenters and beer tanks, which reduces the exposure of its team to chemicals.
- improved cleaning reliability and control. Trending data and automated systems mean that 4 Pines is confident that its process hygiene is as good as it's ever been.

4 Pines Brewing Company was established as a microbrewery in 2008 in Manly, New South Wales. The company now resides within the Carlton & United family of breweries.

Ecolab Pty Ltd
www.ecolab.com

Hygienic DIN fittings

Alfa Laval's range of DIN tubes and fittings have smooth, crevice-free interiors and secure, self-aligning joints. They are designed for the food, dairy, beverage, home/personal care and biotech/pharma process applications.

All products meet ISO 9001 and ISO 14001 standards, which define the requirements for quality management systems and environmental management systems, respectively.

The range includes unions, clamp fittings, flanges, bends, tees, reducers and tubes and ensure corrosion resistance. Dimensional accuracy and structural integrity make them easy to install. All DIN fittings fulfil the 11851/11853/11864 family standards.

Tubing is manufactured to the company's specifications, making it a good match for the fittings. All products are labelled with a barcode, product information and manufacturing date, which provides identification and ensures they arrive to the job site in a clean orbital weld condition.

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Food-contact polymer for plain and spherical bearings

Igus has developed two optically and magnetically detectable materials for its plain and spherical bearings: the iglidur FC180 and igumid FC. The materials can be used in the food industry, as they comply with FDA and EU10/2011 regulations.



The tribologically optimised plain bearing material iglidur FC 180 is designed for food contact, and is visually detectable by its blue colour. The product can also be detected using metal detectors due to the inclusion of appropriate, food-compatible additives. This allows broken pieces to be detected and removed if the system is damaged. The product's low moisture absorption and lubrication-free property also make it suitable in applications in the food technology, beverage and packaging industries.

The igubal spherical bearings range relies on detectable material; igus has now introduced self-adjusting igubal bearings, with the housing material igumid FC in combination with iglidur FC180 as spherical ball material. The detectability of the materials is confirmed by Sesotec GmbH, a specialist for foreign body detection and manufacturer of metal detectors for the food industry.

Small fragments can still be identified on a conveyor belt when passing through a metal detector. The product's vibration dampening bearings are resistant to corrosion and media due to their polymer base, allowing them to withstand cleaning with water and other cleaning agents.

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Stainless steel industrial air curtains

Fanquip stainless steel industrial air curtains are suitable for a range of projects, particularly those which will be used in the food handling or primary industry. The technology is simple in design and made with stainless steel construction to provide a long life, decreasing the potential for rust and facilitating easy cleaning of the unit.

The product exceeds the AQIS standards, with a velocity of 8 m/s at 900 mm above the floor across the opening, and a minimum thickness of 50 m.

Rated IP56 or IP66 as an option, the product strives to keep flies out of a premises and retain the integrity of cold storage premises. The technology is compliant with AQIS and MSQA requirements for hygiene and atmospheric control.

The air curtains are available in 900, 1200 and 1500 mm widths that can be fitted over a range of doorway dimensions.

Fanquip

www.fanquip.com.au



Flat pack inductive sensors

The compact IQ IO-Link inductive sensors in a rectangular housing are suitable for the limited space found in conveyor technology and factory automation. The flush installation of the sensor facilitates mounting and prevents mechanical damage. Together with high impact and vibration resistance and a wide temperature range, this is said to ensure long life.

In order to solve demanding position detection tasks, the distance value is continuously provided via IO-Link. Two switch points can be set to the nearest millimetre via IO-Link. The sensor also provides various configuration options, such as NO/NC or PNP/NPN, designed to reduce storage costs for different sensor types.

The product is offered with protection ratings of IP65, IP67 and IP68, and has an operating temperature range of -40 to +85°C.

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

Safety and Environment

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

Increased Cleanliness

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

Protection and Longevity

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

Savings

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



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Contract cleaning service

After a 5-year break from contract cleaning, Euro Pumps noticed that cleaning benchmarks had not lifted like the rest of the food industry. The company has now reintroduced its contract cleaning service, which is claimed to use less labour, water and chemicals than other cleaning programs.

Using the Euro Pumps hygiene model that has been developed and tested for the food industry, the cleaning cycle can be completed in 4 h. This allows for maximum productivity, delivering potential for production cycles to run up to 20 h/day.

The company has partnered with two cleaning companies that will be trained in accordance with Euro Pumps' hygiene model.

The contract cleaning service can be designed to suit each company's plant requirements.

Euro Pumps Pty Ltd
www.europumps.com.au



Air amplifiers

Exair's Air Amplifiers can help cool, dry, clean and move air, smoke, fumes and lightweight materials. Using a small amount of compressed air as their power source, the amplifiers pull in large volumes of surrounding air to produce

high-volume, high-velocity outlet flows. Designed to be quiet and efficient, they can create output flows up to 25 times their air consumption rate.

The compressed air-powered Air Amplifiers have no moving parts, allowing them to be operated with minimal maintenance. Flow, vacuum and velocity are designed to be easy to control and outlet flows can be adjusted by opening or closing the air gap. Supply air pressure can also be regulated to fine tune outlet flow.

Applications include venting smoke, cooling hot parts, drying wet surfaces, distributing heat in moulds or ovens, ventilating confined areas, dust collection, exhausting tank fumes and more.

Both the vacuum and discharge ends of the device can be ducted, allowing them to draw fresh air from another location, or move contaminants away.

Compressed Air Australia Pty Ltd
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CASE STUDY

Solar installation allows more fruit to be processed

The Nine Mile Fresh apple processing and packing facility in South East Gippsland has installed industrial solar power stations to reduce onsite energy use by one third, and minimise the facility's energy bills.

The 1.14 megawatt system is made up of 2850 solar panels installed across 17,600 square metres of industrial roof space in Tynong, about 60 kilometres south-east of the Melbourne CBD. The project is one of several megawatt-sized solar generators installed at large commercial and industrial businesses surrounding Melbourne over the last seven months.

The sorting, grading and packing facility processes 150,000 kilograms of apples each day that are supplied by 50 growers across Victoria and Tasmania. The apples are processed through 51 separate channels of bruise-free water, pictured, as part of the facility's grading and sorting system. The new solar stations allow more fruit to be processed by the facility, using 5700 megawatt hours each year.

The solar power station is claimed to be able to reduce energy use by one-third and greenhouse gas emissions by 1600 tonnes each year, providing a notable environmental benefit to the facility.

The project was managed by Australian energy services business Verdia and financed by the Bank of Melbourne's energy efficiency program, with support from the Clean Energy Finance Corporation.

Verdia CEO Paul Peters said the solar installation would provide clean, emissions-free electricity, at a lower price than power sourced from the grid.

"The system will pay for itself in just under six years and then provide a third of onsite electricity for free," Peters said.

Nine Mile Fresh outsourced the financial and technical management of the program, due to concerns about competing needs for capital, a lack of specialist resources and the risk of choosing poor quality vendors. Outsourcing the program removed the risk from delivering the program in-house.

"Ultimately, it meant we could see the financial benefits sooner and hedge against future price shocks for a large portion of our electricity use," Ryan said.



"We spend more than one million dollars on electricity, so it's a significant outlay and an obvious area where we can be more efficient and reduce our operating costs. It is also becoming much more important for consumers and retailers to choose a product that has a lower environmental footprint. Reducing our energy use and emissions and improving our sustainability helps achieve that," Ryan said.

Verdia develops and delivers renewable energy projects to reduce energy costs through rooftop or ground mounted solar PV, lighting retrofits, power purchase agreements and energy storage. Verdia also works with the Bank of Melbourne to provide customers with low-cost, tailored finance via the bank's Energy Efficiency Finance Program.

Despite their ineligibility for state government subsidies, commercial and industrial-sized installations are still providing substantial financial and sustainable benefits to businesses. The Clean Energy Australia Report indicates an 80% increase in medium-scale solar PV installations between 100 kilowatts and five megawatts in 2018 across Australia, generating 102 megawatts of solar energy.

Verdia
verdia.com.au

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Centrifuge control

Installation of optek sensors at the inlet and outlet of a centrifuge can improve separation performance, reduce losses and improve product consistency.

Feed/inlet: The feed often has high variable solids loading. Separation efficiency can be improved by installing an optek AF16-N or AS16-N prior to the separator. The separator feed rate can then be optimised based on real-time solids concentration measurements.

Flow may be adjusted to meet system requirements for optimised performance and prevent overloading or clogging of the separator.

Outlet (discharge): The separator outlet (discharge) is the most common point of installation for process photometers. Monitoring at this point can help to maximise the efficiency of the system. Some systems control discharge based on time parameters set from the previous run, which is only valid with an average constant feed load.

A more efficient approach is to control the discharge based on need, which can be monitored by an optek inline sensor. Using an optek turbidity sensor to control the discharge by need, the number of discharge cycles can be reduced significantly. This can increase yield, ensure consistency downstream, reduce mechanical wear and help avoid 'blinding' of downstream filters.

Typically for cell culture processing, an optek TF16-N scattered light sensor is installed to ensure immediate detection of lowest concentrations. An optek AF16-N absorption sensor is commonly used for higher density fermentation processing.

Solids discharge: When measuring the absorption in the solids discharge stream of the separator, an optek sensor equipped with a small optical path length will accurately correlate absorption measurements directly to weight-percent. This enables accurate yield measurement and control of product quality.

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Flow meters and controllers for liquids

Bronkhorst develops micro to low flow liquid metering instruments based on a thermal mass flow measuring principle. A wealth of experience has been gathered which has

resulted in three product series that cover full scale flow ranges from 75 mg/h up to 20 kg/h.

With the introduction of the CORI-FLOW series, the company expanded its liquid flow measurement and control capacities to 600 kg/h, using a Coriolis type mass flow sensor with high performance. With ranges down to 0.05 to 5 g/h for the mini CORI-FLOW series, it has become an (ultra) low flow specialist.

The ES-FLOW liquid flow meter for 4 to 1500 mL/min operates on an ultrasonic measuring principle. This liquid flow meter can be combined with a control valve or pump to constitute a compact liquid dosing device.

Additionally, Bronkhorst develops a series of (ultra) low flow Coriolis mass flow meters and controllers. These flow meters and controllers are fluid independent and can be used for both gases as well as liquids.

AMS Instrumentation & Calibration is the official sole distributor for the Bronkhorst range of instrumentation.

AMS Instrumentation & Calibration Pty Ltd

www.ams-ic.com.au

Automated titrator series

The Thermo Scientific Orion Star T900 series of automated titrators are designed to offer a reliable and easy-to-use solution for potentiometric titration. Their compact, rugged design can provide high value in a small bench space. A large touchscreen provides access to a library of methods which can be customised depending on sample needs.

The Orion Star T910 pH titrator is suitable for dedicated acid-base titrations critical for product formulation and based total acid number (TAN), total base number (TBN) determination.

For dedicated redox titrations, the Orion Star T920 redox titrator provides quantitation of sulfite, ascorbic acid (vitamin C), dissolved oxygen and peroxide.

The Orion Star T930 ion titrator is designed for dedicated ion concentration measurements including salt, calcium, chloride, ammonia and Total Kjeldahl Nitrogen (TKN).

The Orion Star T940 all-in-one titrator can perform pH, redox and ion concentration titrations, offering more flexibility for food manufacturers.

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A day in the life of a food science laboratory technician

Hayley Pfeifer from Riverland Almonds won the Leaders of the Future award at the annual APAC Food Safety Awards, which was hosted by SAI Global in August 2019. Entrants in the Leaders of the Future award category displayed a unique perspective on food safety, a drive towards continuous improvement and leadership potential through vision.

In this article, we take a look at what has inspired award-winner Hayley Pfeifer. In the process, we get a glimpse of a day in her life as a laboratory technician at Riverland Almonds, one of three major almond handlers in Australia.

What inspired you to start a career in food science at Riverland Almonds?

I completed a Bachelor degree in Human Nutrition majoring in Biochemistry at Latrobe University in Melbourne. Throughout my degree I found my passion for food science and the many areas that food science encompasses. Upon completion of my degree I was given the opportunity relocate to Loxton, South Australia, to begin employment at Riverland Almonds as a laboratory technician.

Why is food safety so important for almond processing?

Almonds, like all ready-to-eat foods, pose a risk to the presence of pathogens and other food safety risks that can cause illness and be potentially life threatening if consumed. Ensuring the implementation of a rigorous testing schedule that includes the testing of raw and finished product, as well as the environmental conditions the product is stored and processed in, reduces the risk of pathogen contamination and allows any issues to be identified quickly to ensure contaminated product is not distributed to the public.

Do you have a mentor; and if so, what have you learnt from your mentor?

I have learnt a lot from the Technical Officer at Riverland Almonds that I report to, Renee Morelli. Renee has an abundance of knowledge about compliance, good laboratory procedures/expectations and safety. Additionally, through Renee I have had

the opportunity to develop my skills in attention to detail, data analysis, problem solving and organisation, as well as an overall awareness on what is required in maintaining a high technical standard in a processing facility.

What does a typical day as a food science laboratory technician involve?

A typical day involves microbiological and chemistry testing of all product received into the factory for pathogens and other bacteria, toxins and yeast and mould counts that correlate to shelf life, safety and sensory characteristics. Similarly, any stock that has undergone any kind of treatment (ie, pasteurising or dry roasting) must also be tested before it is released into the market to ensure the process has been successful. In maintaining contracts with customers, to whom the product is marketed, it is also a requirement to uphold specific compliance tasks. Additionally, maintaining an environmental swabbing schedule to ensure the hygiene of the facility is kept at a high standard, as well as ensuring laboratory equipment is calibrated and validated before use.

Which SAI courses are you most interested in attending as part of your prize? (The award includes a food safety learning scholarship with SAI Global, valued at \$10,000.)

There are so many excellent courses to choose from that I know I will get a lot out of! Those that I am particularly interested in completing are Principles and applications of HACCP, Internal food safety auditor, Lead food safety auditor, Quality assurance and food safety management and Implementing SQF systems — manufacturing edition 8. I am interested in improving my skills and knowledge of food safety auditing and manufacturing expectations.



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Sanitiser kills bacteria on organic food

A combination of lactic acid and food-grade sodium hypochlorite could offer a sanitising strategy to the organic food processing industry, researchers suggest, with tests on broccoli sprouts showing promising results.

Sanitisers help kill bacteria and other microorganisms that can cause foodborne

illness. However, washing sanitisers traditionally used to disinfect freshly cut produce, such as chlorine solutions (sodium hypochlorite, 50–200 mg/L), may not be able to meet the regulatory requirements for processing organic produce under the United States' National Organic Program (NOP).

A team of National University of Singapore (NUS) food scientists, led by Professor Yang Hongshun from the Food Science and Technology Programme at the Department of Chemistry, tested the sanitisation ability of combined organic acid (lactic acid, 2% v/v) and food-grade sodium hypochlorite (4 mg/L) on organic broccoli sprouts containing *Listeria innocua*. This is a common, non-pathogenic bacterial species that is similar to *Listeria monocytogenes*.

The combined treatment, which uses sanitisers approved by the NOP, was found to reduce the bacteria population by about 1.8 log CFU/g (colony forming units per gram) on organic broccoli sprouts after washing treatment for 2 min. There were also no adverse effects on the sensory quality (colour, texture and smell) of the sprouts over a storage period of six days, the researchers said.

The research was published in *International Journal of Food Microbiology*.

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Fermented soft drinks feature undeclared alcohol, survey reveals

A survey coordinated by the Implementation Subcommittee for Food Regulation (ISFR) investigated whether businesses are adequately controlling alcohol production in fermented soft drinks, and if the labelling of alcohol content of fermented drinks complies with the Australia New Zealand Food Standards Code.

Led by the Victoria Department of Health and Human Services, the survey tested the alcohol content of kombucha, water and dairy kefir, and other fermented soft drinks including ginger beer, across five Australian jurisdictions (Victoria, NSW, Queensland, South Australia and Tasmania) in 2017 and 2018.

Results revealed that a proportion of kombucha and water-based kefir beverage samples contained excess or undeclared alcohol, including many considered to be non-compliant with the Code. To address the issue, an industry and regulator roundtable meeting was held on 31 May 2019, convened by the Australian Government Department of Health on behalf of the Food Regulation Standing Committee (FRSC).

The purpose of the roundtable was to raise stakeholder awareness of the results of the survey and the associated public health concerns, and to ensure public safety through risk management. The outcomes of the roundtable meeting can be found on the Food Regulation website.

It is the responsibility of manufacturers of fermented soft drinks to ensure their products meet the requirements of the Code and local liquor licensing regulations. The Victoria Department of Health and Human Services FoodSmart supplement is a resource that also assists the beverage industry in managing alcohol content in fermented soft drinks. Meanwhile, Australian states and territory food authorities will continue to monitor the compliance of fermented soft drink products in the marketplace, taking action as necessary.

The compliance survey was conducted as part of ISFR's Coordinated Food Survey Plan and led by Victoria DHHS. A summary report of the survey has also been released.



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Organic bitter blocker

Australian and New Zealand manufacturers are increasingly faced with the challenges of reducing sugar within new product developments, often resulting in off and undesirable flavours being produced. Now there is a solution, ClearTaste, a natural bitter blocker derived from mushrooms.

ClearTaste is completely water soluble and acts as a true bitter blocker, blocking 11 of the 26 bitter receptors on the tongue. This gives formulators a great deal of freedom when faced with the current challenges of sugar reduction as it eliminates astringent and sour notes, along with metallic and other general off flavours in a myriad of applications. ClearTaste also aids in mouthfeel, which is an added benefit.

The product is made in the USA and has only been on the market for a short period of time. Successful applications include coffee, sweeteners, juices, proteins, milk-type products, health bars and soft drinks, to name a few.

Naturally extracted from mushrooms, ClearTaste bitter blocker has Organic, Kosher, Halal, Non-GM and FEMA GRAS certifications.

Victus International
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Chocolatey moments with Industry 4.0

Meet Jack. He loves chocolate. Jack really doesn't care about how chocolate is made, he just loves it.

He doesn't care about how the raw ingredients are managed, about production scheduling or supply chain issues. At ATS Applied Tech Systems we do and we know that if you're in the food and beverage industry you probably do too.

With three offices in Australia and a global partnership with Siemens, we can help you realise the benefits of Industry 4.0 and digitalisation. Whether you're thinking about taking that first step into Industry 4.0 and digitalisation or have plans to realise all of the benefits, we're here to help.

At Spanish manufacturer Chocolates Valor, Preactor APS drives the digitalisation of industrial processes by streamlining production scheduling. Chocolates Valor's competitive advantage is its reputation for high-quality products, accompanied by a manufacturing strategy focused on achieving excellence. The company selects raw materials at source and processes them at its plants ensuring the traceability of cocoa from origin through to finished product.

Chocolates Valor operates two modern production sites which produce almost 21,000 tons of chocolate annually. For Chocolates Valor, digitalising the company is essential as it means obtaining available and more accurate information, which simplifies decision making. "A high degree of standardisation is required in all processes," said Jordi Barbero, supply chain manager

at Chocolates Valor. "Starting from that and with the appropriate training for our staff, very good results can be achieved in an acceptable period of time."

Before implementing Preactor APS software, Chocolates Valor used Microsoft Excel. This required a lot of manual effort to capture data from the plant, was time-consuming and resource hungry. The information retrieved was often inaccurate and did not enable a flexible and efficient decision making process. It also offered little visibility on relationships between various production processes, making the whole supply chain less transparent.

"Our chocolate manufacturing process maximises the quality of the final product," said Barbero. The company thus decided to invest in digitalisation solutions for the production environment, using Preactor APS, which is a family of products for production planning and scheduling that improves the synchronisation of manufacturing processes and offers greater visibility and control. "We decided on the Preactor APS solution because we needed to be more flexible and accurate when it came to production," Barbero said.

The implementation of Preactor APS delivered significant benefits. The solution enabled Chocolates Valor to sequence production orders faster and to conduct more accurate production planning. It also streamlined updating of production master

plans and enhanced interdepartmental communications. The amount of time required for production planning time was reduced and on-time delivery of products improved.

Chocolates Valor plans to continue with the digitalisation of its factories. The main goal is to be able to display information in real time across the whole supply chain to improve flexibility across the organisation. The company is aware that having efficient processes is not enough, they also need to be a flexible organisation and digitalisation plays an essential role in enabling that.

ATS Applied Tech Systems is an Independent Solution Provider for Smart Digital Transformation and a proud Siemens Preactor Partner. Just like Jack we love chocolate, but unlike Jack we really do care about how it is made. We also care about how other food and beverage products are manufactured and distributed. If you would like to know more about Siemens Preactor and how it can improve productivity for manufacturers, contact Bill Ellerton on 0458 377 351 or at bill.ellerton@ats-global.com and he'll send you the information you are looking for and a nice block of chocolate.



ATS Applied Tech Systems Pty Ltd
www.ats-global.com

Turmeric laced with lead — doesn't sound so healthy

Turmeric — or more accurately, the curcumin extracted from it — is a spice commonly used throughout South Asia. The spice's popularity has grown in recent years after being billed for health benefits such as anti-inflammatory effects. No longer just an ingredient for curries, turmeric can even be found atop lattes in your local cafe as a trendy flavour choice.

A Stanford-led study has now revealed that turmeric is sometimes adulterated with a lead-laced chemical compound in Bangladesh, one of the world's predominant turmeric-growing regions.

Often unaware of the dangers of lead, some spice processors in Bangladesh use an industrial lead chromate pigment to imbue turmeric with a bright yellow colour prized for curries and other traditional dishes.

"People are unknowingly consuming something that could cause major health issues," said the paper's lead author, Jenna Forsyth, a postdoctoral scholar at the Stanford Woods Institute for the Environment. "We know adulterated turmeric is a source of lead exposure, and we have to do something about it."

The first study, available online in *Environmental Research*, involves a range of analyses, including interviews with farmers and spice processors in several of Bangladesh's districts, which together produce nearly half of the nation's turmeric. Many traced the issue to the 1980s when a massive flood left turmeric crops wet and relatively dull in colour. Demand for bright yellow curry led turmeric processors to add lead chromate — an industrial yellow pigment commonly used to colour toys and furniture — to their product. The practice continued as a cheap, fast way to produce a desirable colour.

The researchers did not find direct evidence of contaminated turmeric beyond Bangladesh, and they point out that food safety checks by importing countries have incentivised large-scale Bangladesh spice processors to limit the amount of lead added to turmeric destined for export. However, the researchers caution, "The current system of periodic food safety checks may catch only a fraction of the adulterated turmeric being traded

worldwide." In fact, since 2011, more than 15 brands of turmeric — distributed to countries including the US — have been recalled due to excessive levels of lead.

While these recalls and previous studies found the presence of lead in turmeric, none clearly identified the source (some suggested it might be linked to soil contamination), proved the link to blood lead levels or revealed the problem's pervasiveness and incentives perpetuating it.

"Unlike other metals, there is no safe consumption limit for lead, it's a neurotoxin in its totality," said the paper's senior author Stephen Luby, professor of medicine and the director of research for Stanford's Center for Innovation in Global Health. "We cannot console ourselves proposing that if the contamination were down to such and such level, it would have been safe."

The researchers now plan to focus on shifting consumer behaviours away from eating contaminated turmeric and reducing incentives for the practice. They suggest more effective and efficient drying technologies for turmeric processing. They also recommend that import inspectors around the world screen turmeric with X-ray devices that can detect lead and other chemicals.

Although few low-cost answers seem readily available in Bangladesh, the researchers suggest engaging consumers, producers and other stakeholders focused on food safety and public health could provide the seeds of a solution.

Among other goals, the team plans to develop business opportunities that reduce lead exposure. One team member is developing low-cost technologies to measure lead in turmeric, blood and other sources. Other collaborators are studying ways to shift demand and create business opportunities for lead-free turmeric.



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Look closely at who supplies the food industry with the very best food safe materials, services and equipment.

What do these companies and others like them have in common?



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YILD Technical spaces are fully flexible and ready-to-go technical lab spaces that could be adapted to any scientific, clinical or commercial use. The spaces resemble US-style incubators for start-ups and other scientific industries.

Suitable for any pharmaceutical, food and beverage, research, teaching and biotechnology operations, the YILD Technical spaces are located in the Norwest Business Park of Sydney.

The spaces provide full flexibility to the owner to innovate and grow, but also offer full customisation of the space according to their needs and specifications for future growth.

They are designed with a low-cost entry with no strings attached. YILD does not require any share of intellectual property or investments and shares of the company — the company operates with a philosophy of 'you do science, and we do space'. Users can not only start immediately, but they are in full control of their space.

Features of the spaces include: a collaborative multi-tenant environment, combined with modern PC2-grade wet-and-dry labs; a mix of lab spaces supported by hot desks; meeting rooms, kitchen, break-out areas, along with premium lab furnishings and lab fittings; lab-grade AC and exhaust systems with air-balancing technology; HVAC balancing systems; articulated exhaust devices; safety and storage cabinets; and emergency showers.

The spaces are designed to provide the opportunity to advance ventures in the STEM sector in Sydney. Other locations in Brisbane and Melbourne will be opening soon.

YILD Technical Spaces Pty Ltd

www.yild.com.au

Wine oxygen management

Jet Technologies has partnered with the global wine closure solutions provider Vinventions to deliver a solution that gives Australian winemakers control of their oxygen management in real time.

The portable NomaSense O₂ analyser allows winemakers to measure oxygen levels in the winery, including oxygen dissolved in wine and in gas phases. Oxygen can be measured at every stage of the winemaking process, including during the bottling stage, whether that's within bottles or a bag-in-box product.

Being able to measure and control oxygen and gas levels from the beginning of the winemaking process right through to it being tasted by the customer is an advantage for winemakers. The non-destructive real-time measurements provide accuracy over samples taken from the cellar and moved to a laboratory where oxygen will be measured several hours later and may have used up a significant proportion of the oxygen present.

The technology from Vinventions is based on luminescence combined with the use of remote sensors. It is one of the few devices available to the wine industry that allows the measurement of both dissolved and headspace oxygen, and that also provides accurate total package oxygen (TPO) values.

The analyser's measuring capabilities also match analytical and research laboratories' requirements in terms of trace analysis for measuring permeabilities of different package types (especially wine closures) or monitoring very low dissolved oxygen concentrations during ageing steps.

The analyser was validated through a scientific collaboration with global institutes and many wine research centres are now using it to better understand oxygen's influence on wine development.

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Food: What am I missing?

The food and beverage industries are amongst the highest consumer-driven markets globally. Recent studies have indicated a strong consumer-driven preference for candid transparency relating to the food they consume, driven by a magnitude of factors including health and wellbeing, social responsibility, social economic status, and advances and adoption of new technology. This has increased the demand for transparency in the food we eat.



Consumers are driving change in the food industry, from an essential commodity to a premium product. Today's consumers select products based on a range of criteria, including geographical origin, species, nutritional content, sustainability, ecological impact, brand and reputation. This developing consumer behaviour has pushed for regulators both locally and globally to implement new labelling laws, detailing specific characteristics from nutritional content and product stability to country of origin, to name a few.

Whilst it is clear the general population is in the best position ever to select foods that meet their ethical, nutritional and quality needs, consumers are becoming increasingly aware of fraudulent activities impacting the food they buy.

As food has moved from an essential commodity to a premium product, the attraction of supplementing high-value components with lower-value substitute has increased dramatically across the world. Driven by greed and the desire to profit, we have seen an amplification in the incidence of fraud. Fraud has been identified in all food markets — from producer to consumer, there are more opportunities for misleading consumers. The impact of food fraud is significant to suppliers, manufacturers and retailers; aside from the expected financial impact, it can at a basic level damage a

brand, but the significant impact can extend to the trade status of a country.

Food fraud is estimated to cost the global food industry US\$30 to \$40 billion every year. Estimates for Australia alone could be in the order of \$2–3 billion. To put that into perspective, Australia's total food and agriculture exports is valued at around \$45 billion.¹

Australian and New Zealand are both significant contributors to the global food export market, and they have implemented very strict guidelines relating to food fraud, specifically in relation to the origin of food.

Meanwhile industry and science have evolved to meet the growing and ever-changing demands of the consumer, with an arsenal of tools to combat food fraud.

The Global Food Safety Initiative (GFSI), a global industry network, aims to build consumers' trust in the food they buy — no matter where their food has come from, nor where in the world they live — by improving food safety management practices.

GFSI recommendations for mitigating risk of food fraud includes two new key elements, as endorsed in the GFSI Guidance Document, that require a company:

- to perform a food fraud vulnerability assessment; and
- to have a control plan in place.²

To support the new GFSI standards, powerful and affordable screening

technologies are now providing a greater level of confidence in the foods we eat.

New applications to combat food fraud include solutions:

- to identify the geographical location of where raw materials were produced (produce, meats, fish, feed, honey)
- to analyse the composition of raw ingredients and finished products (nutritional components, trace elements, pesticide residues, antibiotic residue, allergens, honey); and
- to determine the biological origin (species) of raw ingredients and finished products (spices, herbs, produce, meats, fish).

If you want to find out more about the technologies driving these new applications, attend the Thermo Fisher Scientific Innovations in Food Authenticity and Safety Roadshow.

For more information, visit www.thermofisher.com.au/authenticity.

References

1. PwC Food Fraud Vulnerability Assessment and Mitigation; The Pursuit of Food Authenticity UCLA
2. Tackling food fraud through food safety management systems, May 2018

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On the shelf: Beer with Kellogg's Corn Flakes

Partnering with local microbrewery One Drop Brewing Co., Kellogg has introduced a limited-edition Kellogg's Corn Flakes Nitro Milkshake IPA. It is a craft beer you shake before drinking, and the taste is described as creamy with a tropical bitterness of strawberry, passionfruit, coconut and mango.

Kellogg has been making Corn Flakes at Botany, NSW, for 90 years, and this is also the location of One Drop Brewing Co. Hence, the beer was brewed and canned in Botany.

Bruno Madonna, Director of Research and Technology at Kellogg, said: "We've always had a love of combining innovation with great tasting product at Kellogg.

"Kellogg's Corn Flakes has been a catalyst to many amazing creations over the years so partnering with local Botany brewery, One Drop, seemed like a no brainer. This beer is a fun way to remind Aussies of the versatility of cereal."

Nick Calder-Scholes, Head Brewer of One Drop Brewing Co. said: "We've seen the craft beer market grow exponentially the past few years and we wanted to bring a fresh take to the scene. Using one of Kellogg's best-selling cereals to produce a trendy Nitro Milkshake IPA was an amazing opportunity to create something different."

What were the challenges?

When asked about the challenges faced when making this Kellogg's innovation, Calder-Scholes said the manufacturing process didn't differ much to its normal beer process. "Corn Flakes is such a versatile cereal, and was used in the same way we would use any base grain — pre-milled and mixed together in our mash tun. We supplemented a portion of our original Gladfield Malted Barley with Kellogg's Corn Flakes and used them in the same way.

"The main challenge we faced was during the sparging (or rinsing) process. We found the Corn Flakes to be a softer substance, which disintegrated much more than our regular barley usually does, stretching out the rinsing process from 1.5 to over 3 hours. Afterwards, we sent both the barley and Corn Flakes to our farmer to be re-used for livestock feed."

The Nitro Milkshake IPA is available until stock runs out.



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The Variovac Optimus EasySkin HD is the optimal solution for the packaging of high-quality products. The high dome system enable the process of product of up to 60mm. The tracked top film pre-heating allows stress-free and perfect sealing of the product in a superb design and appearance.

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The CC215 is an attachment for the production of sausage in an alginate casing. The sausages can either be discharged on a hanging unit or individually on a belt.

The CC215 is ideal for production of fresh grilling sausage product, merguez or even sausage by the meter (long smoked sausages or snack sticks). With the C215 there really is no limit to the calibre of your specialties. Everything between calibre 8 and 32 is now possible.

Every vacuum filler in the HPE and DPE Series as well as the Robot 500 can be used for portioning of sausage meat. As a B-machine, the HP Coex alginate filler delivers directly to the coextrusion head, where the meat is encased in a casing of uniform thickness. The highly accurate casing thickness guarantees reproducible quality and material costs — for an accurate calculation and satisfied customers. Immediately upon exiting the coextrusion head of the CC215, the finished alginate is sprayed with a calcium chloride solution, which immediately begins the curing process.



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