

September/October 2015  
Vol.23 No.3

# what's <sup>new</sup> in **Food** technology & manufacturing



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## READ ONLINE!

*This issue is available to read and download at*  
[www.foodprocessing.com.au/latest\\_issues](http://www.foodprocessing.com.au/latest_issues)



# Warning:

do not read this article if you are about to go on holidays

**H**ow long do you think it takes before a high-fat diet begins impacting on our health? A year? Six months?

How about five days!

New research has found that after just five days of eating a high-fat diet, the way in which the body's muscle processes nutrients changes, which could lead to long-term problems such as weight gain, obesity and other health issues.


"Most people think they can indulge in high-fat foods for a few days and get away with it," said Matt Hulver, an associate professor of human nutrition, foods and exercise in the Virginia Tech College of Agriculture and Life Sciences. "But all it takes is five days for your body's muscle to start to protest."

When food is eaten, the level of glucose in the blood rises. The body's muscle is a major clearing house for this glucose. It may break it down for energy or it can store it for later use. Since muscle makes up about 30% of our body weight and it is such an important site for glucose metabolism, if normal metabolism is altered, it can have dire consequences on the rest of the body and can lead to health issues.

Hulver and his colleagues found that muscles' ability to oxidise glucose after a meal is disrupted after five days of eating a high-fat diet, which could lead to the body's inability to respond to insulin, a risk factor for the development of diabetes and other diseases.

To conduct the study, healthy college-age students were fed a fat-laden diet that included sausage, biscuits, macaroni and cheese, and food loaded with butter to increase the percentage of their daily fat intake from normal levels of around 30% to about 55% fat. Their overall kilojoule intake remained the same as it was prior to the high-fat diet. Muscle samples were then collected to see how it metabolised glucose.

Although the study showed the manner in which the muscle metabolised glucose was altered, the students did not gain weight or have any signs of insulin resistance. Hulver and the team are now interested in examining how these short-term changes in the muscle can adversely affect the body in the long run and how quickly these changes in the muscle can be reversed once someone returns to a low-fat diet.

The results of the study were published in the online version of the journal *Obesity*. 





# Reliable Flow Measurement



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# Food

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## Tracking food poisoning outbreaks with genomic sequencing

Scientists took more than a decade and spent nearly \$3 billion to unlock the entire human genome, but today the cost of genomic sequencing is less than \$100, and the technology is now commonly used in public health, including the tracking of food poisoning outbreaks.

Dr John Besser from the US Centers for Disease Control and Prevention attended the Communicable Disease Control conference held recently in Brisbane. ABC News reported on his use of genomics to track *Listeria* food poisoning outbreaks.

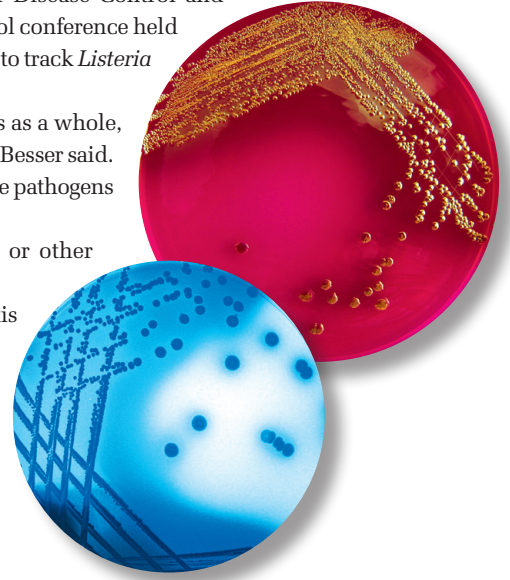
"Genomics is looking at all of the DNA in the bacteria or virus or fungus as a whole, instead of just looking at little pieces of it the way we've done in the past," Dr Besser said.

"It's looking at the entire DNA sequence, the blueprint of every one of these pathogens to get all the maximal amount of information from them.

"That allows us to link cases together [and] to contaminated foods or other exposures more precisely than ever before," Dr Besser said.

The technology could be used in cases such as the outbreak of hepatitis A in Australia earlier this year, which has been linked to contaminated berries. Dr Besser said that genomics would enable public health officials to determine which cases were linked if the genomic sequences were the same.

If the cost of the technology continues to drop, it will eventually replace current methods and change the way governments and agencies deal with public health issues.



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## Dematic to construct Smith's high-bay warehouse

Dematic will build a high-bay warehouse at The Smith's Snackfood Company's Regency Park manufacturing facility in Adelaide. The facility will support Smith's distribution network, which operates out of the Regency Park site.

The automated storage and retrieval system (ASRS) will consist of four RapidStore Storage Retrieval Machines (SRMs), 30-m high double-deep pallet racking, pallet conveyors, automatic guided vehicles, associated control systems and Dematic's Warehouse Control System.

"This high-bay warehouse is another step in our ongoing relationship with Smith's. The Smith's order is the second ANZ high-bay warehouse project to integrate Dematic's new RapidStore SRMs, in conjunction with Australian-manufactured Colby racking systems," said David Rubie, Dematic's manager of food and beverage.

## New microbial source for asparaginase safe, says FSANZ

A new microbial source for asparaginase has been assessed and declared safe by Food Standards Australia New Zealand (FSANZ).

Asparaginase can be used to reduce the risk of acrylamide formation, which can occur when frying or roasting food such as potatoes, coffee and cereal-based products.

The application relates to asparaginase sourced from a genetically modified strain of *Bacillus subtilis*.

"FSANZ has concluded that there are no public health and safety issues associated with using the enzyme preparation as a food processing aid," said FSANZ Chief Executive Officer Steve McCutcheon.



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## Quick and healthy: Australia's snack habits an opportunity for veg industry

The latest Project Harvest report, produced by Colmar Brunton on behalf of Horticulture Innovation Australia, has found that over the last decade snacking in Australia has increased by more than 400% in frequency, penetration and monetary value.

This fact, combined with the study's finding that consumers have greater knowledge and expectations of their food's nutritional value than

they did a decade ago, has created market openings for healthy, consumer-friendly snacks, according to AUSVEG, the horticultural body representing 9000 Australian vegetable and potato growers.

The research has identified that more than a third of consumers already enjoy vegetables as snacks, with 37% of Australians munching cucumber and 35% crunching celery.

"We know people prioritise really quick, clean food options for snacks, and what we've found is that for a lot of consumers, raw vegetables like celery, cucumber and carrots fill that need — they take seconds to prepare and there's very little waste," said AUSVEG Deputy CEO Andrew White.

"This is a great chance for industry to capitalise on the snacking trend. There are already vegetable products internationally which are tailored to this market — for example, a snack pack product has recently been launched in South Africa which includes pre-cut cucumber wedges."

## Lowering sodium without sacrificing flavour

High levels of sodium have been linked to health problems such as hypertension and cardiovascular disease, but salt plays an important functional role in food products. Striking the right balance may become easier thanks to a new salts mix, which could potentially be used to meet the high demand for products that are low in sodium without sacrificing favourable sensory qualities.

In a study reported in the June 2015 issue of the *Journal of Food Science*, published by the Institute of Food Technologists (IFT), researchers from Brazil's University of Lavras partially replaced sodium chloride in shoestring potatoes with a salts mix consisting of potassium chloride and monosodium glutamate. Using the salts mix reduced sodium content by 65% on average and had a high sensory acceptance from a pool of 100 consumers.

The report's authors say that more research is needed to discover if the salts mix can be used effectively with other food products.



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## JBT Corporation acquires European filling and sterilisation provider

JBT Corporation has announced it will acquire European filling and sterilisation solutions specialist Stork Food & Dairy Systems for €47 million.

Stork Food & Dairy Systems designs, manufactures and supplies integrated aseptic processing and sterilisation technologies, and filling systems, to beverage and food processing companies.

The company specialises in extending the shelf life of packaged foods, including standard and flavoured milk, coffee drinks, cream, yoghurt, desserts, fruit juices, soups and sauces.


Steve Smith, executive vice president and president of JBT FoodTech, a technology solutions provider to the food processing industry, said the acquisition will significantly strengthen the company's ability to provide complete solutions to customers in the liquid foods industry.

Tom Giacomini, JBT's chairman, president and chief executive officer, added: "Stork Food & Dairy Systems B.V. will be our second acquisition in the liquid foods sector, following the purchase of ICS Solutions in 2014."

The transaction is expected to close in the third quarter of 2015.

# Food

FOR  
thought



## Producing egg whites without chickens

Clara Foods has secured US\$1.75 million in seed funding as it seeks to create the world's first animal-free egg white.

The growing popularity for low-cholesterol, high-protein foods has seen the market for egg whites grow to over US\$3 billion in the US alone. But there is also growing concern for the environmental, animal welfare and public health compromises of industrial-scale egg production.

Clara Foods aims to resolve this moral and economic deadlock by taking the chicken out of the equation, creating an egg white that is free of *Salmonella* and avian flu and uses far less land and water inputs, while matching the taste, nutritional value and culinary properties of chicken-laid egg whites.

The start-up describes the process of creating the animal-free egg white as being "similar to brewing beer or wine. However, instead of using yeast to convert sugar into alcohol, our yeast is specialised to convert chicken DNA into egg white proteins."



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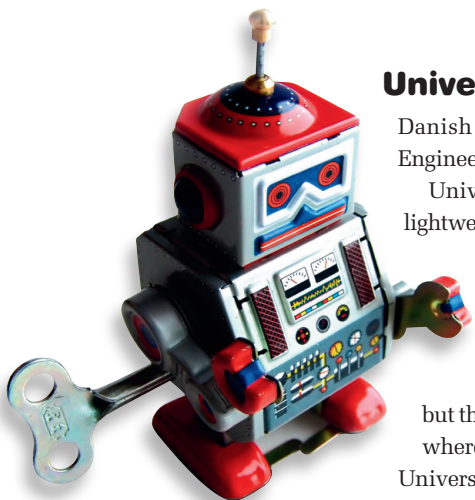
## Robot automates bacteria screening in wine samples

A robotic liquid handling system at the Australian Wine Research Institute (AWRI) is automating the screening of large numbers of malolactic bacteria strains.

Using miniaturised wine fermentations in 96-well microplates, the Tecan EVO 150 robotic system is screening bacteria, sourced from the AWRI's wine microorganism culture collection and elsewhere, for MLF efficiency and response to wine stress factors such as alcohol and low pH.

The robot can prepare and inoculate multiple combinations of bacteria strains and stress factors in red or white test wine and then analyse malic acid in thousands of samples over the course of the fermentation. For example, in one batch, 40 bacteria strains can be screened for MLF efficiency and response to alcohol and pH stress in red wine, with over 6000 individual L-malic acid analyses performed.

The AWRI says that this high-throughput approach provides a quantum leap in screening capabilities compared to conventional MLF testing methods and can be applied to a range of other research applications. Additionally, the phenotypic data obtained from this research is being further analysed with genomic information, which will identify potential genetic markers for the stress tolerances of malolactic strains.



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## Universal Robots appoints ADDE as distributor

Danish manufacturer Universal Robots has appointed Andrew Donald Design Engineering (ADDE) as a distribution partner for the Australian market.

Universal Robots is developing a new class of collaborative robots which are lightweight, simple to program and can work alongside employees with no safety caging.

Barry Hendy, managing director of ADDE, said that his company was seeing an increasing market need for compact, cost-effective robotics solutions, so these selling points were key factors in their decision to become a UR distributor.

"We have traditionally been a distributor of high-speed industrial robots, but the benefits of collaborative robots are appealing to a wide range of manufacturers where the robots can work alongside workers at a bench or on the production line. Universal Robots' products will enable us to offer tailored solutions to clients that want an automated offering that is compact and easy to program," said Hendy.



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# Sensor technology sniffs out cargo pests

Researchers are working on a method to detect a notorious insect pest in food cargo, without ever opening the container.

**S**maller than a grain of rice, the khapra beetle is listed as a high-risk cargo pest in Australia, while in the US it is the only stored product pest with quarantine status. Able to survive nearly anywhere if protected from cold temperatures, detection of the khapra beetle is particularly challenging as the beetle is capable of living years without food and can be found in non-food commodities such as textiles or packaging materials.

The beetle can destroy a significant proportion of unprotected grains stores due to its 'dirty eating' behaviour, which sees the beetle eat only a little of a single grain before moving on to others. Contamination in food products also presents a food safety concern as the hairs associated with larvae and cast skins are potential allergens and respiratory hazards, particularly for young children.

To address the khapra issue, US scientists at the Edgewood Chemical Biological Center (ECBC) are working on easier, more effective way to inspect bulk food supply for khapra beetles.


ECBC researchers are studying the use of colorimetric sensor arrays (CSAs) to detect this invasive species in shipping containers. The inexpensive, disposable sensors, manufactured by iSense, are approximately 6.5 cm<sup>2</sup> and spotted with 73 dyes which change colour in response to various vapours. Samples are identified by the combination of colour changes across multiple spots forming a 'fingerprint' that can be used to identify compounds. The CSA colour changes are sensitive enough to detect even trace amounts of some vapours (odours),

allowing for the broad spectrum detection of a number of volatile organic compounds (VOCs).

During an assay, CSA sensors are exposed to odours emitted into the headspace above bulk grain infested with beetles. Over time, changes in the coloured spot patterns emerge, and by using software designed specifically for this project, unique colour fingerprints are revealed. The goal of the project is the development of unique and individual spot patterns capable of differentiating between invasive, quarantined khapra beetle infestation and other non-invasive species.

ECBC envisions a solution where an inexpensive, disposable reader could be placed within a crate prior to shipment, then later queried by a smartphone to allow inspectors at the port of destination to assess food security and quality without ever having to open the container.

The first step in making this method a reality is the development of a reproducible signature library capable of differentiating between beetle-infested grain and pristine grain. Since khapra beetles are a quarantined species, scientists began testing the CSAs using the common warehouse beetle, which is closely related to the khapra beetle.

While the research is still in its infancy, researchers have been able to distinguish between the warehouse beetle-infested and non-infested grain based on the response of the CSAs to the VOCs present in the headspace above the grain. The group expects to complete its first round of testing during the second half of 2015. 



# packaging & labelling





## Tackling food waste with sous-vide

In the Café des Amis, located in Missouri, USA, owner Guillaume Hanriot wanted to tackle the issue of food waste to reduce costs.

“We often had problems with assessing the correct amount with all dishes, which in turn meant that there were a great deal of leftovers,” recalled Guillaume.

In early 2013, the cafe introduced the sous-vide method, where meat, fish and vegetables are sealed in a vacuum bag and then cooked at relatively low temperatures of 50 to 85°C in a water bath.

“Since we package the raw foods and ingredients in vacuum bags, their shelf life has been extended to up to 30 days. Vacuum-packed food that has already been cooked has a shelf life of up to seven days,” said Guillaume Hanriot.

Café des Amis purchased a Multivac C200 vacuum chamber machine, a compact stainless steel tabletop machine with a 465 mm sealing bar. The C200 offers precise setting of desired sealing time and can store popular recipes for future use. It has a glass viewing window for accurate monitoring of the evacuation process, automatic progressive ventilation for gentle packaging of softer, liquid or



more delicate products, and vacuum quick-stop in the case of burst bags. It also features a clean double-seam sever-seal. It is easy to clean due to its hygienic design with a removable sealing bar and filler plates, and the absence of corners, edges or areas for contaminants to collect. The machine is suitable for a range of products, film pouches and pouch sizes.

Thanks to sous-vide, the owner of Café des Amis can now prepare the portions without being rushed and has a better handle on portion size. The kitchen and refrigerator are cleaner because all the ingredients are stored in sealed film pouches.

Guillaume Hanriot attributes the consistently high ratings by his guests to the sous-vide cooking process and the newly structured kitchen processes. “We now have more control regarding hygiene, inventory, consistency and costs.

The sous-vide method is perfect for our small kitchen. Our profit margin is now significantly higher as we are able to offer premium cuisine with fewer leftovers and waste.”

*Multivac Australia Pty Ltd*  
[www.multivac.com.au](http://www.multivac.com.au)

## Vanta packaging and handling equipment

Vanta's range of liquid packaging and handling equipment is available from Motion Technologies. The equipment features a 'whole of line' approach, including: water pre-treatment; PET blow moulding; filling; blowing/filling/capping combo; labelling; wraparound and case packer; shrink wrapping; carton erecting; packing/unpacking; online inspection sorting and packing robot; and palletiser/de-palletiser.

Pre-treatment systems include: sand and carbon filters, ultrafiltration, nanofiltration, reverse osmosis, UV steriliser and CIP (clean in place) systems. The range is suitable for products such as bottled water, beverages, beer, edible oils, condiments and dairy.

*Motion Technologies Pty Ltd*  
[www.motiontech.com.au](http://www.motiontech.com.au)



## Mono packaging trays

Faerch Plast has introduced containers created from MAPET II mono material. Designed for the robust top sealing of fresh meat, poultry and fish, the packs offer the same properties as multilayer materials but are said to be more secure and environmentally friendly than non-recyclable laminates.

Produced from a single substrate using post-consumer recycled plastic (rPET), the trays can be sorted and recycled where the right waste infrastructure is in place. There is a wide range of colours available, and transparent versions offer good clarity due to the absence of a hazy PE layer. This allows consumers to assess the quality and integrity of the food item prior to purchase.

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### Image-based code reader

SICK's Lector 642 image-based code reader product family can handle changing object heights and reading distances, wide visual ranges, randomly aligned 1D and 2D codes and fast transport speeds.

Features include high camera resolution and fast serial image shooting and decoding functions, as well as a variety of fieldbus options and analysis functions.

The code reader is available in a Flex version with individually adjustable illumination settings and lenses. The PANORAMA accessory part for all models makes it possible to achieve a field of view that is about 50% larger with the same code resolution. The code reader offers a resolution of 1.7 MP, meaning the device can reliably identify a standard 1D code with a line width of 0.35 mm in a reading field with a width of 400 mm.

The code reader is suitable for automated sorting processes within the field of intralogistics. Manual handling and sorting processes can be semi-automated with the Lector 642, while the device's full potential is utilised in the field of factory automation, such as in the end-of-line area of packaging systems.

**SICK Pty Ltd**

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

### Upgraded in-line leak detection system

Witt has released an upgraded version of Leak-Master Mapmax, which enables non-destructive detection of leaks using CO<sub>2</sub> as a trace gas.

Integrating into any packaging line, it is able to check the entire volume of a line for leaks. A vacuum in the test chamber creates pressure differences between the packaging and the chamber. Leaks in the packaging allow gas to escape and this is detected by fast, highly sensitive sensors. The technology focuses on the detection of carbon dioxide leaks as this gas is already present in most inert gas packaging.

In the upgraded version, the checking of small-volume packages with low gas content (such as sliced products) has been improved, with optional dynamic area compression within the chamber. The machine has been equipped with a welded stainless steel frame that offers vibration stability. The vacuum pump requires low maintenance and does not produce any heat. If the machine needs to be checked, the easily removable access lids allow most maintenance tasks to be conducted during operation. Quick-release fasteners enable wearing parts, such as filters, to be quickly replaced.

The switch cabinet and other add-on parts have been compactly integrated into the system's hygienic stainless steel housing, which simplifies operation and enables the user to enter data through an enlarged colour touch screen. A barcode reader can be attached.

The detector can be connected to a company's electronic network via ethernet to enable controlling and data logging.

**Niche Gas Products**

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

### Pharmaceutical inspection machines

Bosch Packaging Technology has released the KHS 1 and AIM 3 pharmaceutical inspection machines.

The KHS 1 is designed for container closure integrity testing of ampoules, vials, bottles, cartridges and syringes using laser headspace analysis (HSA). It measures the absorbed light passing through the headspace region via laser spectroscopy. HSA is applicable to lyophilised products and medicines filled under vacuum or purged with inert gas. The machine inspects both standing and non-standing containers at outputs of up to 600/min and can combine HSA with optional near infrared (NIR) measurement and container coding. A built-in automatic recalibration is continuously performed using certified reference containers.

The AIM 3 is able to perform both visual inspection and high-voltage leak detection (HVLD) for ampoules and vials containing solutions and suspensions at outputs of up to 400 containers/min. In order to sort out damaged containers before they enter the main inspection turret, the machine is equipped with a pre-inspection station. The core module features a high-resolution CMOS camera with high-speed interface for particle and cosmetic inspection, as well as a re-inspection function. The customisable platform can be retrofitted on-site to add further visual inspection stations or the HVLD module. The latter delivers equivalent measurement results for all glass qualities, such as moulded and tubing, as well as clear and amber glass. Both inspection steps are controlled via one common human machine interface (HMI).

To develop its inspection portfolio, Bosch collaborated with Lighthouse Instruments, a provider of non-destructive laser spectroscopy headspace analysis systems.

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# How 3D printing could make use-by dates obsolete

The past decade has seen rapid advances in additive manufacturing technology, resulting in 3D-printed prosthetics, medical implants, toys, vehicle parts, building materials and even food. What had been missing was the ability to produce sensitive electronic components via 3D printing.

But that milestone too has now been passed, with engineers succeeding in 3D-printing electrical components, such as resistors, inductors, capacitors and integrated wireless electrical sensing systems.

And they've put the new technology to the test by printing a wireless 'smart cap' for a milk carton that detected signs of spoilage using embedded sensors.

The findings, published in the open-access journal *Microsystems & Nanoengineering*, are the first demonstration of 3D printing for working basic electrical components, as well as a working wireless sensor.

"One day, people may simply download 3D-printing files from the internet with customised shapes and colours and print

out useful devices at home," said senior author Liwei Lin, a professor of mechanical engineering and co-director of the Berkeley Sensor and Actuator Center at the University of California, Berkeley.

The flexibility of polymers has made them popular materials in the world of 3D printing; however, such materials are poor conductors of electricity. To get around this, the researchers built a system using polymers and wax. They then removed the wax, leaving hollow tubes into which liquid metal was injected and then cured.

The shape and design of the metal determined the function of different electrical components. For instance, thin wires acted as resistors, and flat plates were made into capacitors.

To test the electronic components, the researchers integrated them into a plastic milk carton cap to monitor signs of spoilage. The smart cap was fitted with a capacitor and an inductor to form a resonant circuit. A quick flip of the carton allowed a bit of milk to get trapped in the cap's capacitor gap, and the entire carton was then left unopened at room temperature (about 22°C) for 36 hours.

The circuit could detect the changes in electrical signals that accompany increased levels of bacteria. The researchers periodically monitored the changes with a wireless radiofrequency probe at the start of the experiment and every 12 hours thereafter, up to 36 hours. The property of milk changes gradually as it degrades, leading to variations in its electrical characteristics. Those changes were detected wirelessly using the smart cap, which found that the peak vibration frequency of the room-temperature milk dropped by 4.3% after 36 hours. In comparison, a carton of milk kept in refrigeration at 4°C saw a relatively minor 0.12% shift in frequency over the same time period.

"This 3D-printing technology could eventually make electronic circuits cheap enough to be added to packaging to provide food safety alerts for consumers," said Lin. "You could imagine a scenario where you can use your cell phone to check the freshness of food while it's still on the store shelves."

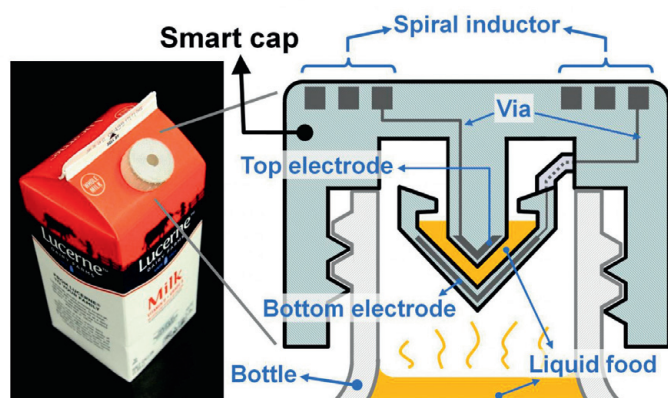


Image caption: UC Berkeley engineers created a 'smart cap' using 3D-printed plastic with embedded electronics to wirelessly monitor the freshness of milk. Photo by Sung-Yueh Wu.



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DOMINO



## Gable top carton for UHT milk

Elopak's E-PS120A aseptic filling machine provides filling of both high- and low-acid products in ambient distribution. The machine has been in production in the juice industry for some time, and the technology is now able to support the use of the aseptic Pure-Pak gable top carton for UHT milk.

Depending on the product, a shelf life of up to 12 months can be achieved, with up to 12,000 cartons filled per hour.

The filling machine has a modular, compact design with an integrated cap applicator for maximum flexibility in manufacturing, assembly, operation and maintenance. It requires a minimal floor space of 25 m<sup>2</sup>, has the ability to changeover designs and caters to 500, 750 and 1000 mL cartons.

The line is also fitted with the ELOEE (Elopak Line Overall Equipment Effectiveness) data acquisition system that enables central data storage with remote access to reports.

**VisyPak Operations Pty Ltd**  
[www.visy.com.au](http://www.visy.com.au)



## Compostable packaging film

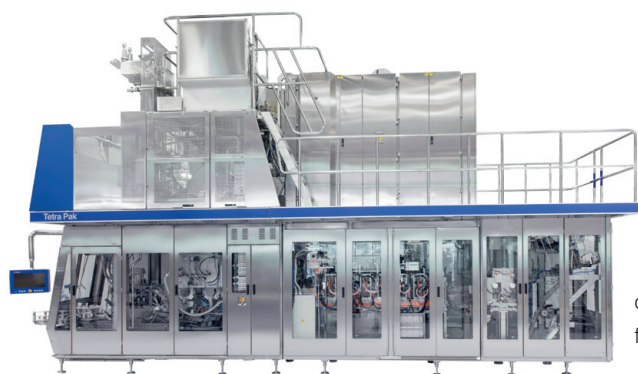
Innovia Films has released NatureFlex NK Matt, a compostable cellulose-based packaging film. The film, which has been developed primarily as a lamination grade, has a premium natural paper appearance. It is suitable as the outer web of duplex and triplex structures, for use in laminations to other bio-polymers and for extrusion coating.

The film is suitable for a range of products, including confectionery, dry foods, snacks and beverages. The films provide a good barrier to gases, aromas and mineral oils.

The product has 97% renewable content (ASTM D6866 Carbon Testing) and meets the European EN 13432 and American ASTM D6400 composting norms. It is suitable for anaerobic digestion, aiding the diversion of organic wastes from landfill.

Other features include: inherent dead-fold, antistatic properties, printability and resistance to grease.

**Innovia Films Pty Ltd**  
[www.innoviafilms.com](http://www.innoviafilms.com)



## Filling machine with electron beam sterilisation

Tetra Pak has launched the Tetra Pak E3, a filling machine that uses electron beams, not hydrogen peroxide, to sterilise packaging material.

The eBeam sterilisation technology works by focusing a controlled beam of electrons onto the surface of packaging material as it runs through the filling machine, killing any bacteria or microorganism present.

The use of eBeam removes a physical limitation to carton packaging speed: the hydrogen peroxide sterilisation process. With eBeam, speeds of up to 40,000 portion packs/h, or 11 packs every second, can be achieved. According to the company, this increased capacity can save beverage manufacturers as much as 20% in their operational costs.

The replacement of hydrogen peroxide in packaging material sterilisation improves environmental performance, making water recycling easier, lowering energy consumption and cutting waste.

The modular design of the platform also offers increased production flexibility, enabling manufactures to switch between pasteurised and extended shelf life (ESL) production orders on the same filling machine.

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



## Depositor streamlines production for traditional ice-cream maker

Granny Gothards is a traditional ice-cream manufacturer located on Gothards Farm in Somerset, South West England. The milk for the company's ice-cream products is collected fresh from the milking parlour each day, so the ice-cream comes from 'pasture to pot' in one day.

Committed to producing handmade ice-cream by traditional methods, Granny Gothards nevertheless wished to respond to growing customer demand and recognised the need to improve production processes, including the efficient filling of its ice-cream product into pots. The filling process by hand was proving both time consuming and labour intensive.

The company selected a depositor from Riggs Autopack, which was able to handle the ice-cream, with its large delicate inclusions, and produce a final product as aesthetically pleasing as if it was filled by hand.

Business owner Amanda Stansfield is very happy with her investment. "Riggs Autopack worked with us to provide



a cost-effective solution. They built us a depositor that works perfectly and we can now confidently take on more orders for our small pots due to the extra capacity the depositor has given us. Since using the machine, we have been able to supply an independent cinema chain, theatres [and] private airline catering, as well as more retail outlets."

The Riggs Autopack semi-automatic and automatic depositors are suitable for dosing hot and cold liquid, semi-liquid and suspended solid goods. They deposit a wide range of ready-meal products — such as stews, mashed potato, casseroles and curries — and are able to deposit fragile vegetables and cooked meats in sauce with particulates up to 38 mm cubed. The Riggs

Autopack range is available in Australia from HBM Packaging Technologies.

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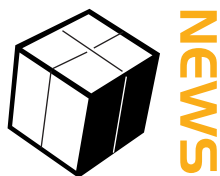
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# Packaging



## Introduction to packaging now available in bite-sized chunks online

The Institute of Packaging Professionals' Fundamentals of Packaging Technology is now available online to the packaging industry in Australasia through the Australian Institute of Packaging.

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The Fundamentals of Packaging Technology online course is ideal training to prepare for the Certified Packaging Professional (CPP) exam offered through the AIP and the IoPP.

To access the detailed information on the single lessons, lesson bundles or the full course, visit <http://aipack.com.au/education/fundamentals-of-packaging-technology-on-line-course/>.

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## Food-based slippery coating delivers every last drop of mayonnaise

LiquiGlide has announced a licensing agreement with Orkla, giving the branded consumer goods company rights to use LiquiGlide's slippery coating for mayonnaise products in selected European countries.

LiquiGlide is a permanently wet, slippery coating that enables viscous products to slide easily. The product is suitable for a range of consumer and industrial applications, from oil and gas, to consumer goods, to high-tech medical equipment. The ingredients for each custom coating are selected from hundreds of materials based on the specific needs of the application.

The coating for Orkla's mayonnaise products is made from natural ingredients, meeting all safety standards, and enabling the products to slide easily from the packaging, eliminating food waste.



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## Recycling agricultural waste into food packaging

German eco-business partners Zelfo Technology and Upgrading have carried out trial production of an upcycled wheat straw-based Micro and Nano Fibrillated Cellulose (M/NFC) packaging solution. The material uses only the food producers' lingo-cellulosic fibre and requires no additional binder.

Designed for food industry packaging, the resulting products have a robust and flexible form and smooth 'closed' product contact surface.

The trials used wheat; however, the developers say that almost all fibre-based crop residue or waste sources are suitable for conversion to packaging.

The resultant packaging will be recyclable, non-toxic and biodegradable.



## Standard for testing transmission of water vapour in packaging

ASTM is developing a new standard to test the transmission rate of water vapour into packaging materials. Understanding water transmission rate is a key component for the shelf life of many products.

“The materials and packages covered by this standard affect nearly every package one sees in grocery stores, pharmacies and hospitals,” says ASTM member Joel Fischer, laboratory manager, MOCON.

The proposed standard (WK49124, Test Method for Water Vapor Transmission Rate through Packages Using a Modulated Infrared Sensor) is based on another ASTM standard (F1249) that measures water vapour through plastic film and sheeting with a pressure-modulated infrared detector.

“This detector lends itself well to testing whole packages, including bottles with closures, sealed pouches, tubing and small blister cards,” notes Fischer.



## Detecting tiny metallic contaminants with magnetisation

Researchers in Japan have been working to improve the detection of metallic contaminants in food.

Existing inspection methods have limitations; the X-ray radiation method cannot detect contaminants with sizes smaller than 1 mm and it cannot be applied for the inspection of foods that have lactic acid bacteria because X-ray radiation causes ionisation of such foods.

Researchers at the Department of Environmental and Life Sciences at Toyohashi Tech have developed a system to detect small metallic contaminants via magnetisation.

The detection system uses three high-Tc RF superconducting quantum interference devices (SQUIDs), which record the remnant magnetic field of a contaminant. SQUID is a high-sensitivity magnetic sensor based on the superconductivity phenomenon.

In the process, a strong magnetic field is applied to food to magnetise the metal fragments inside, and subsequently, these metals, if they are contained in the food, can be detected by sensing their magnetic fields using the SQUID sensors. The method is safe and provides a high resolution.

Professor Tanaka, whose team has developed the method, said the system permits contaminant detection in a food package with a height of 100 mm.

In experiments, the developed system was able to clearly detect a steel ball with a diameter as small as 0.3 mm. The system was robust and not affected by electromagnetic waves from nearby mobile phones or from the motion of nearby steel objects.

This study is featured in the July 2015 issue of the TUT Research e-newsletter from Toyohashi University of Technology.

## Matthews appointed as Compact agent

Matthews Australasia has been appointed as the Australian agent for Compact Labelling Systems. The company introduced the Compact range at AUSPACK 2015.

The agency expands Matthews' range of labellers from label print and apply systems to in-line labelling solutions, offering Matthews clients even more options.

“The easy-to-set-up, robust units are designed for low maintenance, with minimal downtime and maximum efficiency, so manufacturers

can confidently run their labellers for even the most demanding production lines. The modular designs have a smaller footprint, are simple to use and very cost-effective to operate,” said Mark Dingley, the general manager of Matthews.

Compact's automatic, in-line labellers suit a variety of applications, including top labelling, wrap labelling, wrap labelling with seam

orientation, front and back, a combination of front and back and wrap, wrap labels oriented to flip marks on tubes, and wrap labelling or partially wrap labelling cones.

The portable, semi-automatic models are suitable for slow production lines, low volumes or short runs to label bottles, jars, tubs, cans, tubes, etc.







## Checkweighers

Multivac checkweighers can be integrated with Multivac packaging machines and labelling systems: loading a new recipe in the HMI 2.0 control terminal automatically controls the settings for the checkweigher and, if present, the metal detector. The integration simplifies the operation, reduces the interaction between man and machine, and increases the level of both automation and process reliability.

The checkweighers are available in three weight ranges from 10 to 6000 g. The checkweighers are designed as dual-range weighers and can be equipped with metal detectors as an option. These are adapted to the specific application in order to achieve the required sensitivity. They detect all types of metals, such as iron, stainless steel, copper, aluminium, brass, bronze and titanium.

The transport conveyor and weighing modules are mounted on a twin-beam carrier, onto which configurations of different conveyor modules can be fitted. The floor stands are designed for rigidity against flexing, resistance to torsion and for reduction of vibration, ensuring maximum weighing accuracy for the checkweighers.

A twin-track version of the checkweigher is available for multitrack packaging lines. Both tracks are controlled by one control terminal, and simultaneous weight checking on both tracks ensures that high output is achieved.

**Multivac Australia Pty Ltd**

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

## Cannery traceability system

Allpax has introduced a comprehensive system for tracing cans, trays and pouches from filling through sterilisation, to lower the risk of product recall of shelf-stable foods. The system encompasses tighter information integration between packaging machines, retort room baskets and the electronic sterilisation records of each retort in the cannery.

The cannery traceability system gives plant operations personnel an electronic record from filler to retort room for every sterilised batch of products cased and ready to be shipped. The system records whether the contents of each retort basket were properly sterilised. Should problems or questions about a batch crop up, the system provides information that plant personnel can use to trace back through the packaging and sterilisation process and identify the conditions that led to the potential quality or health issue.

A barcode tracking system can be added to baskets if the baskets are being loaded manually. In automated retort rooms, software is used to track baskets.

**Allpax**

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## Guide to copyright, contracts and intellectual property law

*Owning It: A Creative's Guide to Copyright, Contracts and the Law* is a 560-page, full-colour hardback book written by Melbourne intellectual property lawyer Sharon Givoni. The book, which is available from the Australian Institute of Packaging, aims to demystify copyright, contracts and intellectual property law for Australians working in creative industries and running their own businesses.

Comprising expert insights and explanations of intellectual property law in 'plain English', the book explains key legal concepts through real-life case studies. The book also contains user-friendly flowcharts and tables that simplify legal terms, processes and procedures that creatives regularly encounter.

The guide discusses various topics, including: the protection of designs, trademarks, copyright, reputation, confidential information and other intellectual property; how to reduce the risk of inadvertently infringing someone else's rights; contract basics; licensing; how the law applies online and to certain aspects of social media; and how to better achieve positive legal outcomes.

**Australian Institute of Packaging**

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



## Tea company selects bio-based packaging for organic range

US company Carrington Tea has selected bio-based NatureFlex packaging films for their Carrington Organics Tea line. The flexible packaging material, developed by Innovia Films, is derived from wood pulp sourced from managed plantations. It is certified to be over 90% bio-based and home- and industrial-compostable.

“For our organic tea, we felt that a compostable package would complement our product and speak to people who want to make a positive impact on the environment. Flexible material also offered us a unique packaging approach and a chance for differentiation, as tea bags are predominantly packed in a box or can. Functionally, NatureFlex delivers the freshness barrier that our teas require along with excellent receptivity to inks, communicating our branding through vibrant print,” explained Debbie Shandel, executive vice president and chief marketing officer at Carrington.

The teas are offered in three flavours - Chamomile, Soothing Herbal and Green Tea Lemon - and are packaged in a 20-bag retail-ready ‘soft pack’, developed in conjunction with Fastik Label and Supply.

Innovia Films Pty Ltd  
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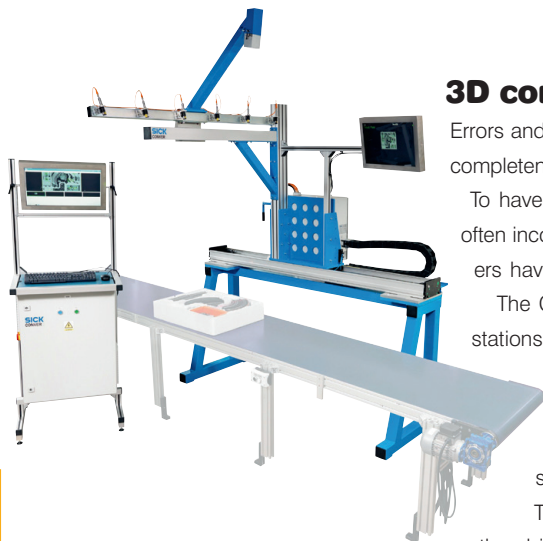
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### 3D content verification for packaging

Errors and mistakes are an inevitable part of manual packing processes, which is why downstream completeness checks are essential to ensure product quality and customer satisfaction.

To have these quality control processes carried out by staff is expensive, time-consuming and often inconsistent. The ConVer quality control system from SICK checks whether boxes or containers have been filled correctly and include all the required contents.

The ConVer system comprises a scalable number of inspection stations that can be positioned along a belt wherever they are required. Each station is fitted with a Ranger E 3D vision sensor and a laser platform with six 2M lasers. The lasers generate a 1 m wide laser line that is powerful yet still safe for the eyes.

The Ranger E uses this laser to collect 3D information about the objects passing the sensor. This information is then compared in real time with reference images that have been taught-in previously. If any variance is detected, the system stops the belt straight away. Signal lamps and the monitor display guide the operator to quickly correct the packaging error.

ConVer is suitable for companies that offer a wide range of different products in either large or small batches as the product can be changed in seconds.

To teach-in reference images for the checking process, the packaged object is transported once through all stations of the packaging process and the operator sets parameters, such as characteristic features. The measurement data and images recorded by the system can also be used in subsequent systematic evaluations to identify any errors in the upstream production process that would otherwise remain undetected.

**SICK Pty Ltd**

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### Can seamer for powder products

JBT's SeamTec for Powder creates closures for metal or composite double-seamed cans used for packing infant formula, milk powder, instant coffee, chocolate or sports drinks powder.

The cans can be fitted with a peelable, easy-open lid, typically covered with a plastic cap for re-closability.

The system incorporates enhanced hygiene and cleanability, quick and easy changeover and gentle, zero-defect can handling.

The 6-head seamer can run up to 127 cans at speeds up to 450 cans/min (27,000 cph). The combi variant is fitted with a seaming head preset for two can diameters.

The system comes in several possible configurations to meet each can packaging principle, pre- or post-gassing requirements.

The seamer is equipped with an oil-lubricated triple screw cover feeding system. It automatically detects reversed covers which can be removed during operation. A continuous cover stack pressure control guarantees consistent and gentle cover feed.

A synchronised can stop turret and infeed scroll avoids denting, while powder spillage at a line stop is prevented by a can stop turret.

The system incorporates quick can and cover format changeover. The lower seaming arm can be changed quickly without disassembly and easily positioned with a spline and a locating pin. Hygienic qualities are achieved by avoiding powder spillage, not exposing lubricants and an overall easy-to-clean design. The seamer is available in a dust explosion-safe version.

**John Bean Technologies**

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



# Heineken looks to reinvigorate brand with groovy new can

Heineken is seeking to rejuvenate its sales by replacing the iconic 'keg' can with a new design, aimed at re-energising the brand's shelf presence in the competitive retail market.

Heineken's main target group is open-minded young adults who are up to date and curious. To engage this market, Heineken approached its long-term partner Ball Packaging Europe to develop a new packaging solution.

"One of the challenges the team faced in development was creating a new look within the parameters of the embossing and debossing technology without compromising Heineken's distinctive and powerful design elements — aspects which are obviously key to on-shelf product recognition," said John Reed, manager product commercial at Ball Packaging Europe. "We wanted to include a significant amount of debossed features in the design in order to give the can a unique look without compromising the structural integrity of the package."



The solution was to create a horizontally grooved can, leaving the bulk of the can's surface unprinted and relying on the natural reflective qualities of the metal to create a compelling visual effect.

"In the race to grab consumer attention, our trials showed that the best approach was not to overwhelm the can with colour," Reed explained.

With grooved edges running horizontally around its entire body, the distinctive 330 mL can offers consumers an enhanced tactile experience that also provides a stable grip on the chilled can.

"Special products like this are particularly beneficial in markets that rely heavily on packaging to directly communicate with consumers," Reed

continued. "Thanks to this joint team approach, we have given the Heineken can a special look and tactile experience that will get people talking."

The can was launched into the UK market in April 2015.

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## Gently does it for automated biscuit packaging



Established in 1882, Macedonia-based Evropa employs over 500 people to produce more than 10,000 tonnes per year of chocolate products such as biscuits, wafers and candies.

Evropa was seeking an automated solution for the packing of its wafer and biscuit brands, which would reduce the high costs, slow speeds and excessive giveaway of the existing manual operation while avoiding chipping or breakage of the fragile products.

The process of hand-weighing and sealing in bags had been extremely labour intensive, involving 30 personnel to pack around 27 bags per minute. With the installation of the Ishida CCW-RS Gentle Slope multihead weigher, linked to



an Ilapak bag maker, the company is achieving 30 bags per minute with just five people. Giveaway has been reduced from 5% to 0.7%, resulting in payback on the machine being achieved within one and a half years. The improvement in pack quality has also enabled Evropa to export its products throughout the EU.

The Ishida Gentle Slope design has a number of characteristics suitable for the delicate task of packing fragile food products. Key features are specially designed hoppers and a ring shutter, which is placed between the weigh hoppers and the timing hopper.

The reduced angles of the hoppers enable the products to slide rather than fall through the weigher into the bag maker. Once the combination of weighed product leaves the weigh hoppers, it reaches the ring shutter, which is coated in an absorbent material. The ring shutter holds the product before discharging it into the timing hopper, which then places it into the bag maker. By slowing down the speed of each weighment as it passes through the weigher, breakages are significantly reduced.

The Ishida weigher, available in Australia from Heat and Control, can handle different pack weights of 125, 150 and 200 g, with changeovers taking just 10 min.

*Heat and Control Pty Ltd*

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

## Co-extrusion die technology for twin fillings

Baker Perkins has developed die technology for the snack industry that extends the co-extrusion process by producing tubes containing two fillings.

Co-extrusion involves extruding a hollow tube of cereal while simultaneously injecting low-moisture cream or paste fillings into the centre. This enables the production of snacks with contrasting or complementary fillings, such as chocolate and orange cream or chili and salsa.

The capability can be incorporated by companies operating a Baker Perkins SBX Master extruder. Other optional modules include a co-extrusion die and pillow crimper for filled pillows, sticks and wafers; specialist cutters for chipsticks or croutons; a sheeting die and oven for baked crisps; plus dryers, fryers, ovens and coolers.

**Baker Perkins Inc**

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





## BOPP film with mineral oil barrier

Innovia Films' Propafilm RCU is suitable for packaging products such as chocolate and confectionery, because the BOPP film provides protection from mineral oil migration and offers barrier to water vapour, flavours and aromas.

According to the company, the film provides up to 1.5 years of protection from mineral oil migration.

**Innovia Films Pty Ltd**  
[www.innoviafilms.com](http://www.innoviafilms.com)



## Side beam X-ray inspection system

Ishida bottle X-ray inspection system IX-GA-B3043 is capable of detecting both metallic and nonmetallic contaminants (such as glass, stones and rubber) within products packed in PET bottles, tetra packs, carton brick packs and pouches.

With 310 mm of headroom in its inspection chamber for upright containers, the IX-GA-B3043's short footprint makes it easier to fit in when line space is limited. The system also offers automatic bottle pitch control.

Like the other models in the Ishida IX-GA range, the side beam X-ray offers good interaction, via ethernet or cards, with existing information systems to provide secure, retrievable records.

The X-ray unit's colour touchscreen interface is simple to learn and operate and the entire system is designed for fast, easy cleaning.

Partly owing to Ishida's Genetic Algorithm, which greatly improves image processing, the system offers high sensitivity and can pick up even tiny pieces of metal, glass, bone, shell, grit, plastic or hard rubber.

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## Custom coffee conveyor an instant success

In its production facility, US-based company Eight O'Clock Coffee had been using mechanical and dilute-phase pneumatic conveyors to move whole bean and ground coffee from roasters to the packaging equipment.

Seeking to improve efficiency and increase productivity, Eight O'Clock Coffee installed a new high-speed packaging system at its plant. The addition of the new packaging equipment required an additional conveying system that could transfer coffee from 11 roasters to bagger hoppers above the packaging equipment while minimising material degradation.

Eight O'Clock Coffee engaged Spiroflow to design a customised conveying solution to support the packaging system.

The automated Cableflow Tubular Drag Conveying system supplied by Spiroflow transfers coffee from multiple roasters at the touch of a button. It gently moves whole beans and ground coffee to the packaging line at a rate of over 4.5 t/h.

Eight O'Clock Coffee Plant Manager Richard Holiday said: "Tubular drag conveying is a slow moving system that allows us to gently convey a lot of coffee. It's very reliable and dependable and our operators love it."

Other features Holiday cites as beneficial include the tubular drag conveyor's ability to make directional changes, its slide gates that allow material to go to several different machines, its gentle conveying for whole beans and its clean-out cylinder. This cylinder allows the coffee to be easily drained into a tote with no need to connect pipes, drains or hoses, which the previous system required.

Designed to fit into the existing plant footprint, the conveying system runs with minimal operator interaction for optimum productivity, eliminates dust in compliance with OSHA, improves sanitary operations with advanced handling



techniques and provides Eight O'Clock Coffee with a rapid return on its investment.

Spiroflow has now supplied six tubular drag conveyors to Eight O'Clock Coffee. All utilise 304 stainless steel cables with UHMW polyethylene discs and are fitted with Spiroflow's Dynamic Automatic Rope Tensioning system (DART), which maximises cable life and minimises operator maintenance.

The conveyors and process equipment are fully automated and integrated with a central controller, allowing remote control and monitoring of the entire process from one location. Using the controller interface, an operator enters the code for one of the company's coffee products and pushes the start button. The controller then automatically opens and closes the necessary valves, and the conveying system moves the beans or ground coffee through the production process from the roaster to the packaging system.

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# fruit & vegetables







# Tracing contaminated produce

has not been easy  
— until now

Edible, invisible barcode equivalents are on the verge of revolutionising traceability in the fresh produce and processed foods industries.

Even though about one person in every six is affected by food poisoning each year, most of the time the source of the contaminated food is not identified.

Contaminated fruit and vegetables can be especially problematic from a traceability standpoint. By the time people start feeling the symptoms of *Salmonella* or *E. coli* poisoning, tracing the origin of the contamination might be tricky, time-consuming and expensive. The store where the product was purchased may have received produce from multiple farms and have already disposed of shipment boxes. The contamination might not even have occurred on the farm, but somewhere en route as part of the distribution process. A typical process to trace food includes interviewing consumers and suppliers and examining every detail of the supply chain — a tedious procedure that takes weeks at best to complete. But a solution to this is in the pipeline.

Lawrence Livermore National Laboratory (LLNL) researchers, in collaboration with the start-up Safe Traces (formerly DNATrek), have developed a cost-effective and highly efficient method to accurately trace contaminated foods (including fruit and vegetables) back to their sources. This SafeTraces (formerly DNATrax) technology was initially designed by LLNL to track indoor and outdoor airflow patterns.

“One of the unexpected capabilities from DNATrax was being able to apply it to food products,” said George Farquar, an LLNL physical chemist who led a team of researchers that developed the technology for biosecurity applications. “You can spray it on food products in the field to identify and track the source of the food.”

The technology is based on using sugar and non-living and non-viable DNA particles as invisible barcodes. The odourless and tasteless particles have been approved by the Food and Drug Administration as a food additive and safe for consumption.

The invisible barcode tracing system will allow food producers and distributors to apply unique, edible, plant-based barcodes directly on or in food products such as fresh produce or prepared foods. It can be applied in many different ways — mixed directly with the food or sprayed on as part of rinses, washes

and food coatings. That is why it can be applied to pretty much every type of food, including olive oil, cantaloupe, honey, coffee beans, seafood, meat, apples and leafy greens.


It has been estimated that if SafeTraces was applied on every single food item a person consumed it would add only about 70 cents to their annual grocery bill.

The barcodes contain complete traceability information. Each piece of produce carries with it information about where it was grown, who picked it and when, equipment used, farming methods etc. If there is a problem, long after the packaging has been thrown out, the origin of any food product can still be identified.

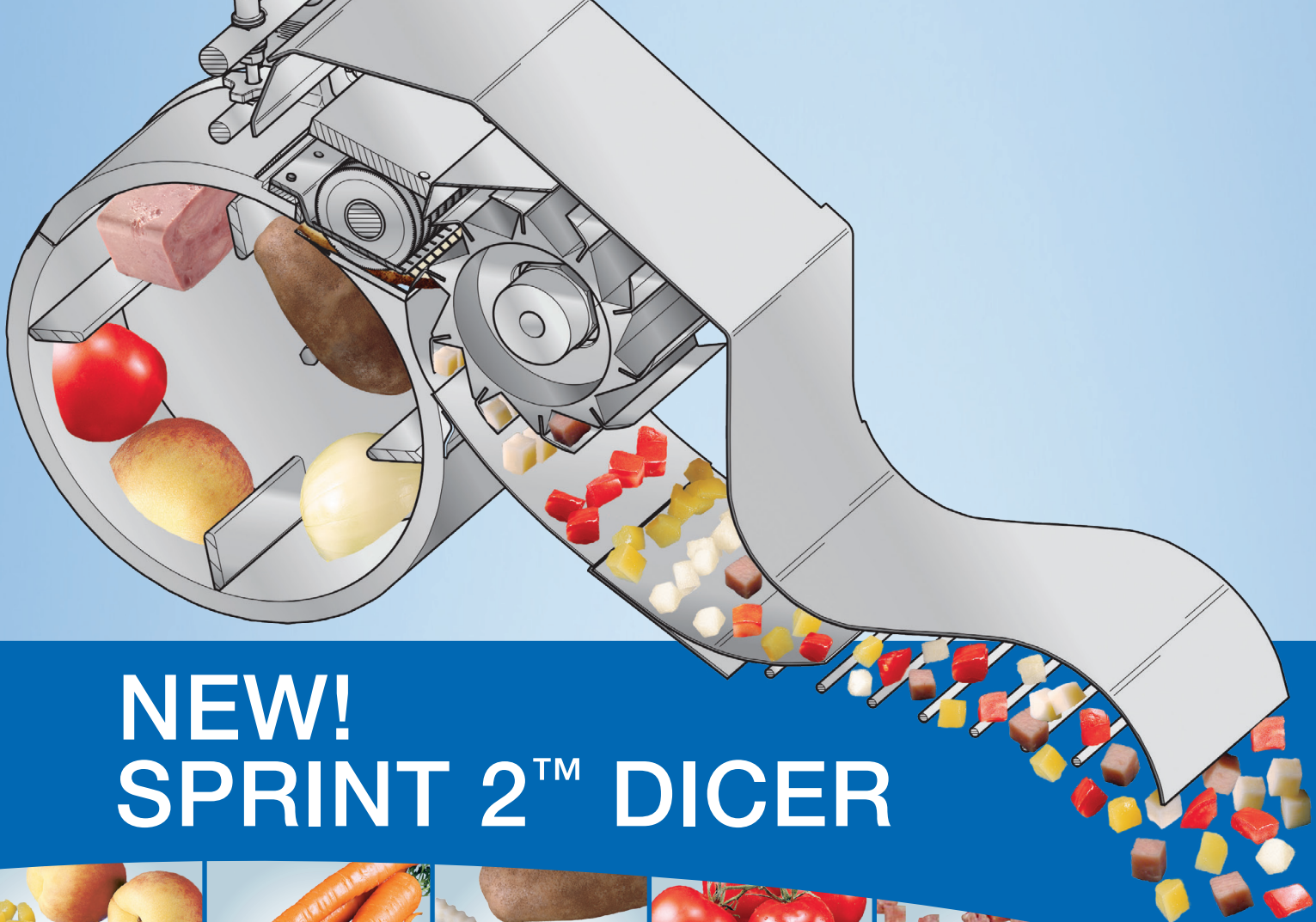
Tracing food back to its source with SafeTraces will take minutes versus the weeks needed using existing methods that often yield inconclusive results, if any. Tracing contaminated produce back to the farm within minutes will also enable producers and wholesalers to issue very targeted recalls rather than the widespread, costly precautionary recalls that are frequently used today.

The same process also works for detecting food adulteration or fraud. Mislabelled foods are becoming a serious problem that is costing the food industry billions of dollars. It's particularly problematic with premium goods such as olive oil and wine. Milk, honey, olive oil, juices and other food products are frequently adulterated with less expensive ingredients and clouding agents, and sometimes with dangerous ingredients, such as melamine, formaldehyde and toxic dyes.

By applying SafeTraces to these foods, users will be able to determine whether they have been tampered with. This is done by precisely measuring the ratio of SafeTraces to the food. If the ratio has become smaller, other ingredients have been added.

In the case of olive oil, SafeTraces can be added to the olives as they are pressed into oil. If the fraudulent bottle is pulled off a store's shelf, a quantitative analysis can be done on the SafeTraces to determine how much of the oil has been diluted. This technology will take traceability, accountability and food safety in the fruit and vegetable industry to a whole new level. 





# NEW! SPRINT 2™ DICER



## Merging the Cutting Advances and Features from the DiversaCut Sprint® and the Model G

The new Sprint 2™ Dicer combines the legendary Model G Dicer footprint and similar infeed/discharge heights with the cutting advances offered by the popular DiversaCut Sprint® Dicer. The new dicer offers a convenient solution for food processors seeking to replace their existing Model G, G-A, GK-A, H, or H-A Dicer.

The Sprint 2 Dicer produces a wide variety of dices, granulations, slices, and strips of vegetables, fruits, bakery products, meats, and seafood. The cutting principle is based on the DiversaCut Sprint technology turned at an adjusted angle. The Sprint 2 also offers an optional stainless steel 3 HP (2.2 kW) motor with VFD (variable frequency drive) that offers more power than the DiversaCut Sprint or the standard Model G-A.



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## Scanner grades blood oranges from the inside out

With a background which includes Sicilian and Calabrian heritage, Anthony, Vito and Leonard Mancini of Redbelly Citrus established blood orange orchards in Australia in 2005. Grown in the fertile soils of the Riverina in Southern NSW, the environmental conditions directly match those of Catania, Sicily.

Redbelly Citrus is experiencing unprecedented demand for its blood oranges this year, with over 350 tonnes to be distributed to international markets following successful crop conditions. The company said it will export 30,000 cases of produce this year, compared with just 10,000 cases exported by Australia as a whole five years ago.

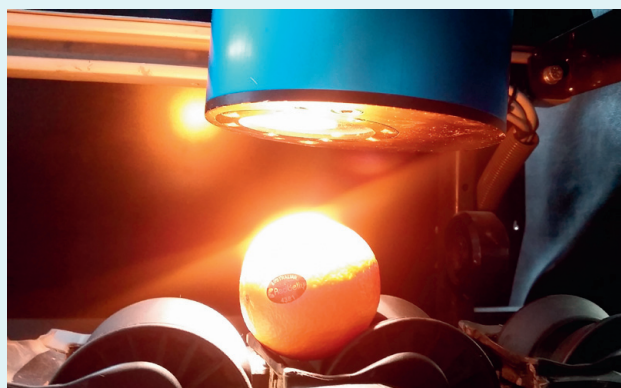
The spike in demand for the blood orange is due to the distinct, sought-after red colouring of the flesh. The darker the flesh, the more valuable the orange. However, achieving this colouration consistently has been challenging, and the only way to check has been to cut the fruit.

Now, the company is trialling a technology employing near-infrared screening to conduct an internal assessment of each piece of fruit. The scanner shines a bright light into the fruit, and the internal characteristics can be determined based on the light that scatters back out. A spectrograph is created, which will have a particular signature for each chemical constituent of the fruit.

The pigment that makes a blood orange red is called anthocyanin. It is picked up by the scanner and graphed so there will be a particular signature for an orange with lots of anthocyanin and one for fruit with low levels.

If the trial is successful, Redbelly Citrus will be able to use the process to provide various grades of blood oranges based on internal colour levels.

"The use of this new technology would take all of the guesswork out of the equation and we would be able to provide consumers with a product that would not fail to impress, 100% of the time. No more sneaky anaemic blood oranges," said Leonard Mancini, co-director of Red Belly Citrus.



The scanner has been set up to work with the company's existing optical graders. Len said they are working towards measuring not only colour but also the sugar to acid ratio of the fruit.

He said the company's aim is to be able to offer high-end businesses, like providores and restaurants, the consistency they want.

"We want to produce blood oranges that are guaranteed to be super dark, super black. It will change the way we can market blood oranges in this country and probably overseas as well," he said.







## Automatic fruit misting system

Spraying Systems has developed an automated system that adds moisture to the fruit prior to the application of produce stickers, allowing for stronger adhesion.

The AutoJet Model 2008+ Spray Control System uses hydraulic AA250AUH automatic spray nozzles to apply a fine mist to the fruit prior to packaging. The nozzles are mounted above the packaging line, producing an even spray which eliminates over- and under-wetting problems. The system utilises Precision Spray Control to ensure uniform coverage and accurate flow rate adjustments based on line speed.

**Spraying Systems Co Pty Ltd**  
[www.spray.com.au](http://www.spray.com.au)



## Hydro-cooler with multiple flow paths

The Wyma Laned Hydro-cooler has a maximum of three lanes dividing the internal belt conveying fresh produce through the cooling chamber. This cooling option allows packers and processors to refrigerate loose fruit and vegetables after they have been graded or sized. The aim is to minimise handling, as some produce (such as carrots) is more susceptible to damage once cooled.

The laned cooler averts the need to run multiple types of equipment to cool the different grades. Traceability may also be facilitated with various grower or production line batches able to be conveyed at once.

Immediately removing field heat is an important step in extending shelf life. The cooler uses water showering down the produce as the cooling medium. Water is cooled to below freezing temperatures as it passes through a heat exchanger constructed from coils. This cooled water then deluges down onto the loose produce to rapidly reduce its core temperature.

Hydro-cooling is a suitable method of cooling in packhouses and food processing plants as it maintains moisture levels and allows rapid reduction in the core temperature of produce. This translates into minimal weight and quality loss by dehydration, maximising saleable produce.

**Wyma Engineering (NZ) Ltd**  
[www.wymasolutions.com](http://www.wymasolutions.com)



## Belt slicer


Summit Machinery Services has introduced the FAM LIFIS<sup>2</sup> belt slicer.

The slicer is suitable for all types of lettuce and leafy vegetables, elongated vegetables such as rhubarb, leek or celery and firm round vegetables like cabbage heads.

The long, v-shaped conveyor belt results in good product alignment as it travels into the cutting wheel, without the need for hold-down belts that can crush product.

Sanitation and machine safety features include: smooth stainless steel finish, sloped surfaces to eradicate build-up to the hinged discharge chute and quick-release belts. Magnetic safety switches and trapped safety key ensure that the machine won't operate if any covers are open.

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## NEWS



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### Robotic harvesting of broccoli

In news that will strike fear into the hearts of greens-loathing children everywhere, the production of broccoli could soon be easier and cheaper.

A team of UK researchers is working towards the development of a fully automatic robotic harvesting system for the vegetable by testing whether 3D camera technology can be used to identify and select when broccoli is ready for harvesting.

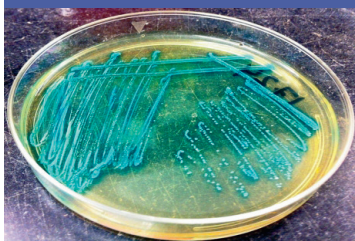
This will be a key step towards the development of a fully automatic robotic harvesting system, which will significantly reduce production costs.

Project lead Professor Tom Duckett, group coordinator of the Agri-Food Technology Research Group at the University of Lincoln, said: "Broccoli is one of the world's largest vegetable crops and is almost entirely manually harvested, which is costly. This technology is seen as being an important move towards developing fully automatic robot harvesting systems, which could then be used for a variety of different crops.

"In all our agri-related research work, our mission is to develop new technological solutions for the business of producing food through agriculture. The long-term impact of our research includes safer food, less waste, more efficient food production and better use of natural resources, as well as promoting human health and happiness."



### Produce safety enhanced by timing harvesting



*Listeria monocytogenes* like moist, damp conditions, and rain or irrigation creates soil conditions that are more hospitable to the bacteria. Now new research has shown that if farmers put off harvesting for at least 24 hours following rain or irrigation, the likelihood of exposing consumers to the bacteria is reduced.

In Australia, the food-borne disease Listeriosis, which is caused by the ingestion of *Listeria monocytogenes*, is on the Communicable Diseases Network Australia (CDNA) list of communicable diseases so it is imperative that food processors do

everything they can to protect consumers from exposure.

Factors such as proximity of a field location to water and other landscape features also play important roles in the presence of *Listeria*. Cornell scientists, along with other US agricultural researchers, tested fields in a variety of locations throughout New York and found that after rains or irrigation, the chances of finding *Listeria* were 25 times greater. But, after the fields dried at least 24 hours, the chances of detecting *Listeria* dropped dramatically, to levels similar to baseline. Their results have been published in the journal *Applied and Environmental Microbiology*.

"We're looking at the science that helps governmental entities, such as the US Food and Drug Administration, and private entities create policies that keep our food supply safe," said Daniel Weller, a doctoral student in the field of food science and the lead author of the new work, Spatial and Temporal Factors Associated With an Increased Prevalence of *Listeria monocytogenes* in New York State Spinach Fields. The other authors are Martin Wiedmann, Cornell's Gellert Family Professor in Food Safety, and Laura Strawn, Ph.D. '14, assistant professor at Virginia Tech.

Currently in the US, the FDA has proposed rules allowing farmers to apply "wait periods" after application of irrigation water. This would allow for "potentially dangerous microbes to die off", said the FDA.



Laura Strawn, Ph.D. '14, conducts research on *Listeria monocytogenes*.



## Record year for NZ fruit exports

New Zealand fruit exports reached an all-time high of NZ\$2 billion in the year ended June 2015.

The value of fruit exported increased by 20% (NZ\$330 million) compared with 2013/14, with the rise attributed to higher prices and a 9% increase in export quantities.

Statistics New Zealand's international statistics manager Jason Attewell said the country had achieved record monthly fruit exports in April, May and June 2015, with May recording the highest-ever value of fruit exports for a month (NZ\$445 million).

Kiwifruit and apples led the monthly increases; exports in May 2015 were the highest value recorded for both kiwifruit (NZ\$280 million) and apples (NZ\$157 million). These increases occurred despite a 5.3% fall in the canopy area of kiwifruit and a 4.8% fall in the area planted in apples, between 2012 and 2014.

Kiwifruit (59%), apples (28%) and avocados (5.7%) made up 92% of the value of total fruit exports for the June 2015 year.

Over a quarter (27%) of New Zealand fruit exports went to the European Union. Japan (14%) and China (13%) were the other top destinations in 2014/15.



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## Pre-packaged potatoes preferred

Australian consumers prefer their potatoes pre-packaged.

The latest report from AUSVEG's Potato Tracker consumer research project has shown that one- to two-kilogram packages are the most favoured by consumers, with 24% indicating a preference for one-kilogram bags that offer convenience, while a further 28% would like two-kilogram bags that also offer value.

"Only 8% of consumers indicated that they don't purchase pre-packaged potatoes. With so many Australians choosing bagged spuds, there is a great opportunity to tailor products to specific markets," said AUSVEG spokesperson Alexander Miller.

"As the demographics of Australia continue to evolve and with more people living on their own, we are seeing a change in preferences amongst consumers and see this as an opportunity for potato growers and retailers," he said.

In a promising statistic for the potato industry, over 95% of Australians surveyed intend to continue purchasing the same amount of potatoes, or more, in the future as they currently do.



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## \$10 million upgrade for McCain's Tasmanian potato processing plant

The McCain Foods Smithton plant in Circular Head, Northern Tasmania — which processes potatoes for French fries and potato products for the local and interstate markets — is getting a \$10 million makeover. Over the next two years, the on-site storage facilities will be upgraded and a new packing line will be installed.

McCain Foods will spend an estimated \$7.9 million on the on-site storage and \$1.6 million on the new packing line.

The improved storage facility will hold up to 55,000 tonnes of potato for processing.

McCain Foods Australia/New Zealand Agriculture Director John Jackson said the investment in upgrading storage and a new packing line will increase efficiencies and make the plant more sustainable.

"While this added investment will increase the plant's capability and efficiencies, we still have a number of challenges before us in maintaining the competitiveness of the plant to ensure its long-term survival," he said.

"One of the challenges, in such a competitive market, is maintaining and increasing efficiencies to drive cost reduction. Even in Northern Tasmania, we have to realise that we are competing in a global commodities market.

"In addition, rising local water and energy costs impact on the plant's cost base, reducing its overall profitability against global competitors."



## Rotor mills upgraded

Retsch rotor mills have been upgraded to improve performance, handling and flexibility.

The speed of the rotor beater mill SR 300 has been increased and can be set between 3000 and 10,000 rpm, allowing for optimum adaptation to application requirements. Further new features are the removable cassette and push-fit rotor that can be taken out for cleaning without using tools. The cassette allows for almost 100% sample recovery.

The grinding chamber, feed hopper and material inlet and outlet of the SR 300 are made from high-quality stainless steel, making it suitable for use in pharmaceutical and food laboratories.

The cross beater mill SK 300 now also operates with higher speed, which can be set from 2000 to 4000 rpm. The grinding insert and rotor are as easily removable.

Both mills, which are available from MEP Instruments, can be equipped with an optional cyclone that improves material discharge, particularly for very fine particle sizes, and provides additional cooling of the sample.

The rotor mills can accept material feed size up to 25 mm and are suitable for applications in the laboratory as well as for small-scale production.

**MEP Instruments Pty Limited**

[www.mep.net.au](http://www.mep.net.au)

## Automatic titration analysis system

The Hach TitrLab AT1000 titration laboratory analysis system is a one-touch, automatic titration system with preset methods that can quickly deliver results. By providing automatic titrations that reduce testing complexity, the system increases confidence in results and eliminates operator interpretation commonly associated with manual titration.

The titration system includes an application-specific kit to make it quick and easy to set up and operate a test. The application-specific kits include a USB key that automatically programs the required endpoints and calculations — to ensure testing is done according to standards, without complex programming.

The product interfaces are easy to use and the system is compatible with Hach IntelliCAL probes. The product series is suitable for municipal and industrial markets for testing pH, total acidity, free and total  $\text{SO}_2$ , moisture content (KF) and salt content.

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## Handheld industrial thermometer

optris has released a range of infrared thermometers suitable for the recognition of object temperature from 0 to 2000°C.

The thermoMETER P20 adopts non-contact measurement, detecting target temperature at a maximum distance of 12 m. Integrated laser aiming, together with optional telescopic sight, allows exact sighting of measuring targets.

The temperature sensor has adjustable emissivity from 0.100 to 1.000 with spectral range from 525 nm to 14  $\mu\text{m}$ . The range is suitable for used in blast furnaces, forging processes, temperature measurement of liquid metals and OEM.

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## Portable microbiological air samplers

Many industries — including pharmaceutical and food companies, hospitals, schools and workplaces in general — need to determine the level of environmental microbial contamination. This helps provide protection for both product quality and the health of workers in accordance with international standards.



VWR International has introduced the SAS (Surface Air System) portable microbiological air samplers. The SAS is an open system and can be used with 60 or 90 mm petri dishes. The same kind of contact plate can be used for air and surface sampling and is applicable to GLP and GMP air sampling operations.

Three key models are available. The Super ISO100 and ISO180 have specifically been designed for the pharmaceutical and hospital sectors, allowing a sampling rate of 100 or 180 L/min.

The DUO SAS Super 360 has two aspirating heads, which allows for each head to use a different media to capture different microorganisms or the same media to allow for greater sampling confidence. Sampling on the two heads can halve the process time, providing an advantage for busy users.

**VWR International Pty Ltd**

[au.vwr.com](http://au.vwr.com)

## System for testing chocolate flow properties

Measuring chocolate viscosity and determining the Plastic Viscosity and Casson Yield Value are critical steps to optimising chocolate flow properties. The Brookfield DV3T Rheometer, Small Sample Adapter and a Circulating Water Bath provide a suitable system for testing chocolate samples. Together they allow confectioners to maintain precise temperature control during testing, assuring reproducible comparisons.

Plastic Viscosity is a measurement of flowing chocolate. It accurately predicts the resistance to flow in pumping, moving or mixing situations. Casson Yield Value measures the amount of force (shear) that is necessary to get the chocolate to start moving.

Together these two factors play a critical role in the manufacture of chocolate products including: even, controlled coverage when enrobing goods; draining away excess chocolate after coating; filling in holes and gaps on products; releasing air bubbles; minimising excess 'foot' formations.

The testing conforms to National Confectioners Association and Bureau of the Technical Committee Office Internationale du Cacao et du Chocolat.

**John Morris Scientific Pty Ltd**

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



## Pre-moistened swabs for sampling

When screening a production environment for total counts, coliforms or pathogens using microbiological swabbing, dry tipped swabs need to be moistened prior to taking a sample to ensure any microorganisms are able to be effectively picked up. This can necessitate the operator carrying around a saline bottle that is cumbersome and prone to contamination.

The Pre-Moist Hygiene Swab from TSC overcomes this issue. The swab contains enough diluent to moisten the tip and comes in its own self-sealing tube. The user simply takes the swab sample and returns it to the tube ready for immediate testing or transport to an external laboratory.

The diluent used is a neutralising buffer, which prevents inhibition of growth by sanitisers that can also be picked up during swabbing, and complies with ISO18593.

The Pre-Moist Hygiene Swab is ready to use and is available in a pack size of 160 swabs.

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# Detecting gutter oil faster

The emergence and widespread use of gutter oils in recent years has forced companies to authenticate the oils they use in their foods.

**G**utter oil is a term used in China and Taiwan to describe illicit cooking oil which has been recycled from waste oil collected from sources such as restaurant fryers, sewer drains, grease traps and slaughterhouse waste.

Now the Food Safety and Technology Research Centre under the Department of Applied Biology and Chemical Technology of The Hong Kong Polytechnic University (PolyU) has developed a new method for rapid authentication of edible oils and screening of gutter oils.


The conventional analytical approach for edible oils is not only labour-intensive and time-consuming, but it also fails to provide a versatile solution for screening of gutter oils. By setting up a simple analytical protocol and a spectral library of edible oils, the new approach is able to determine the authenticity of a labelled edible oil sample and hence screened gutter oils within five minutes.

The conventional approach for edible oil authentication involves labour-intensive and time-consuming sample pretreatment and the subsequent chromatographic separation to separate complex sample mixture before mass spectrometric detection, a commonly used technology for identification and quantitation of chemical compounds. The whole process takes a few hours to analyse one sample.

On the other hand, identification of gutter oils mainly involves detection of certain food residue markers or toxic and carcinogenic chemicals in the sample. However, due to the

vast diversity of gutter oils, and the fact that target compounds could be removed by processing, a universal strategy to screen gutter oils is not available at present.

PolyU researchers have developed a simplified method for direct analysis of edible oils using matrix-assisted laser desorption/ionisation mass spectrometry (MALDI-MS). In the new MALDI-MS approach, only simple sample preparation, automatic data acquisition and simple data processing are involved. High-quality and highly reproducible MALDI-MS spectra results can be obtained using this method, and a preliminary spectral database of labelled edible oils available in the market has been set up. Since different types of edible oils have different MALDI-MS spectral patterns, the authenticity of an edible oil sample can then be determined within five minutes by comparing its MALDI-MS spectrum with those of its labelled oil in the established database. Since this method is capable of authenticating edible oils, it also enables a rapid screening of gutter oils, given fraudulent mislabelling is a common feature of gutter oils.

The related paper has been recently published on *Analytica Chimica Acta*. The research team will establish a more complete MALDI spectral library of various edible oils in the coming two years and improve the library searching technique. In addition, more testing of edible oil samples with different MALDI-MS equipment will be carried out to further validate the new approach. 

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# Bulk, storage & logistics







# \$12 million salmon processing facility

## opens in Tasmania

Not only does Huon Aquaculture's new plant look beautiful, it is expected to deliver more than one million dollars in cost savings for the company in its first year of operation.





**H**uon Aquaculture has officially opened its new Smokehouse and Product Innovation Centre in Parramatta Creek, Tasmania. Designed and constructed by Australasian food manufacturing specialist Wiley, the 2500 m<sup>2</sup> value-added salmon processing facility and a 750 m<sup>2</sup> administration facility doubles Huon's footprint.

The state-of-the-art salmon processing facility centralises Huon's operations and is expected to deliver more than one million dollars in cost savings for the company in its first year of operation under one site.

Majority privately owned, the Huon Aquaculture Group produces around 17,000 tonnes of fresh salmon per year and is recognised globally as being the premium producer of fresh and smoked salmon products. Huon currently employs around 520 people in most states of Australia.

With almost a century of experience in designing, engineering and constructing food and beverage facilities, Wiley

has the technical process engineering expertise to deliver world-class customised solutions. Highlights of Huon's new facilities include:

- A suspended walkway installed across existing and new processing facilities provides access to staff entry areas, as well as viewing facilities for customers and visitors. Visitors get to see first-hand Huon's clean, efficient and transparent fish processing facility.
- The new 750 m<sup>2</sup> office and staff amenities include state-of-the-art meeting rooms, boardroom, laboratory and product development and extended car-parking facilities. The dining room and commercial kitchen are complemented by staff breakout and bbq areas for 100 employees.
- The aesthetic of the administration facility was designed to showcase the client's corporate identity and branding, provide an impressive roadside impact and be aligned with Huon's open culture.
- The existing fresh salmon processing facility, completed in Stage One, received a reconfiguration of process areas and upgrades works to drainage and floors with a new epoxy finish.
- Wiley was committed to using local subcontractors on the project, supporting the ongoing growth of the local economy with 100 local jobs created.
- LED lighting has been incorporated throughout the new facility providing an improved environment for the staff and saving on energy consumption and maintenance.
- An innovative solution was delivered to accommodate the switch room and plant room for refrigeration. A 40' high cube container was customised to accommodate both functions and sited in the most cost-efficient location on-site. The primary driver behind this solution was to remove the need for development approval and save both construction time and costs.

Huon Aquaculture Managing Director Peter Bender said: "I really appreciate Wiley's expertise and felt confident through the whole process. Our new facility will enable us to increase our production capacity and efficiency, while reducing our environmental footprint.

"We produce around 17,000 tonnes of fresh salmon each year, with our new facility part of our four-year \$160 million controlled growth strategy.

"This world-class site will incorporate whole fish, fresh fish, and value-added cold and hot smoked production, successfully bringing together our full range of seafood processing at a single location."

Wiley Managing Director Tom Wiley said: "As a long-term partner with Huon Aquaculture, we were very pleased to





support Huon through this landmark project and we value the relationship.

“Over 10 months, we designed and constructed a state-of-the-art facility on time and on budget with a great spirit of collaboration.

“A key focus was ensuring that we futureproofed the facility, which involved ensuring everything we designed could be further expanded over the years as the company continues to grow.

“This has been a very rewarding project for our team, including our 100 local subcontractors, and I’d like to congratulate Huon for this excellent result driven by their vision, leadership and collaboration.

“Together we’ve been able to innovate a design that consolidates two operations, reduces inefficiencies, delivers a safe working environment for staff and continues producing high-quality products that only serve to enhance Huon’s global reputation as a premium producer of fresh and smoked salmon products.

“We feel very privileged to have been able to work with the entire Huon team.”

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## High-speed insulating roll door

DMF International has available the Efaflex SST high-speed insulating roll door.

With door panels from 40–100 mm thick, the door is designed for internal or external applications that require a high level of temperature control. The door's speed minimises loss of the conditioned atmosphere.

The door blade is made from a PU foam core filled aluminium section, with U values of down to 0.5 W/m<sup>2</sup>K achievable, and door speeds from 0.7 to 2.5 m/s. Maximum door clear opening sizes can be up to 8 m H x 8 m W, and the door is equipped with full safety sensors, an emergency opening lever in case of power failure and full locking for after-hours security.

**DMF International Pty Ltd**

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

## Compact spiral freezer

The Frigoscandia GYRoCOMPACT 60 Spiral Freezer replaces the GYRoCOMPACT M6 and Classic 600 Spiral Freezers. It is more compact and is said to offer a 65% reduction in drive power compared to the previous generation.

The product's outfeed drive eliminates the need for a gearbox, thereby eliminating synchronisation issues. Its automatic lubrication system lowers normal consumption by approximately 20%, while high-efficiency fans provide lower energy consumption and baseload. Efficient stainless steel evaporators meanwhile enhance heat transfer rates and reduce energy load.

Other features include a PProLINK user-friendly control panel, high capacity and good hygiene.

**John Bean Technologies**

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



## Ambient and chilled air cooling system

FOODesign has launched the cryo-jet 5 ambient and chilled air cooling system. Utilising ambient air impingement technology, the system cools food products up to 10 times faster than systems based on forced convection or natural convection cooling, significantly reducing pre-packaging and pre-freezing cooling times and maintaining product quality.

Suitable for applications including baked goods, snacks, bars, confectionery and fried foods, the cooling system uses hundreds of high-velocity jets of ambient air to rapidly strip heat from the product while maintaining critical properties such as appearance, taste and shape. The technology also reduces freezer downtime and wear and tear by increasing time between defrost cycles when used before a spiral or deck freezing system.

The system is available as a stand-alone unit for mounting on existing conveyors or as a complete cooling system together with a wire mesh or plastic belt conveyor. The cryo-jet system is available in a variety of sizes and is constructed in heavy-duty stainless steel for ease of cleaning, servicing and maintenance. The cooling system can be provided with an air filter mounted in a stainless steel housing fitted to the inlet of the fan. Additional features include fan inlet protection and removable jet plates for sanitation.

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## Siemens outdoor panels for extreme conditions

Siemens' Simatic HMI TP700 and HMI TP1500 Comfort Outdoor Panels are equipped with a UV-protected device front with degree of protection IP65 and are suitable for industries such as dairy farming, mining, refrigerated buildings or ships.

The devices can be used to visualise and log performance data about machines, and enable export or remote access data for operational data analysis.

The panels feature low glare, automatic dimming and a broad reading angle, and can be used in a range of temperatures from -30 to 60°C and in air humidity levels of up to 90%.

Available in 7" or 15" displays, they feature a wide-screen 16:9 aspect ratio that displays in up to 16 million colours and can handle complex process or plant images. The panels can be installed upright and operated in portrait mode.

The touch panels are integrated into the automation solution via Profinet and are configured using the Simatic WinCC engineering tool in the TIA Portal. Other industrial networking protocols and interfaces are also available.

**Siemens Ltd**

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

## Heavy-duty collaborative robot

The FANUC CR-35iA heavy-duty collaborative robot uses a form of integrated vision technology called iRvision to automatically stop itself from functioning as soon as it touches the human working alongside it. This means that the robot will not require safety fences.

The robot is able to lift payloads of up to 35 kg, making it suitable for a variety of manufacturing environments. A soft covering material reduces the force of any impacts and prevents human operators from being pinched by the mechanism. If the robot comes too close to an operator, they can simply push it away.

The 990 kg, 6-axis robot is suitable for duties such as transferring heavy workpieces or assembling parts. The robot complies with ISO 10218-1:2011, Cat 3, PL d. It has a reach of 1.8 m and can move at speeds of up to 250 mm/s — or 750 mm/s if the area is monitored by a separate safety sensor. The servo-driven machine has a repeatability of  $\pm 0.08$  mm.

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Nitrogen used in breakfast cereal packaging

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## Wall-mount cable and hose hanger bracket for food and beverage plants

AdeptDirect has released a wall-mount cable and hose hanger bracket for safely and hygienically elevating hoses, air lines, cables and power leads.

The bracket minimises trip hazards and potential bacteria breeding areas by securing cables and hoses along walls and work platforms. The heavy-duty backing plate has two keyholes for screws, allowing for rapid installation and later removal.

The large steel backing plate combines with the 90° frame to position the insulated skyhook to safely support up to eight power leads, cables and hoses. The 'prongs', or fingers, of the skyhook prevent leads or cables from flicking out of the hanger bracket.

The steel section of the bracket is finished in a hard-wearing, bright yellow, powder-coat finish and the insulated hook is moulded from high-density hygienic polyethylene.

**Adept Direct - Cable Rollers & Lead Stands**

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



## IQF freezer

The OctoFrost IQF (individually quick frozen) freezer has a mono-block design and easy interior access for cleaning. It has been equipped with air knives that blow high-pressure air in the coil during production, to help keep the coil free from product particles, prevent it from building up snow and optimise run time between defrost. To decrease downtime and speed up the cleaning process, more spray nozzles for warm water have been installed.

Inside the freezers, the removable bedplates have a click design that will significantly decrease handling time for the plant staff. Energy-friendly LED lights have also been installed to improve cleaning inside the freezer.

The octagonal design and aerodynamics of the freezer make it suitable for high capacity per hour, with lower energy consumption than similar products on the market, according to the company. A dry air infusion system has been installed in the operating panel, lights and motors, eliminating condensation due to the variation of temperature in the freezer. Additionally, the freezer has been reinforced with stronger fins in the coil and an anti-slip shockproof floor.

To address the challenge of quick-freezing sticky products, the freezer uses a combination of vibrating product beds and a pulsator. The pulsator will use the fan's capacity to pulse the air to separate the fruit dices.

**Scanz Technologies**

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



## Bulk bag conditioner with height-adjustable rams

The BLOCK-BUSTER Hydraulic Bulk Bag Conditioner from Flexicon conditions bags ranging from short to extra tall using hydraulically actuated rams that automatically adjust in height during conditioning cycles. Hydraulic bulk bag conditioners are utilised to loosen bulk materials that cannot be loosened by pneumatically actuated flow promotion devices integral to bulk bag dischargers.



The rams provide approximately 2 m of vertical travel — said to be double the range of most conditioners employing scissor lifts to raise the bag — while the fixed-height turntable reduces loading deck height by about half.

The user can program single or multiple heights at which the rams condition the bag, the amount of pressure applied by the rams' contoured end plates, the frequency of ram actuations and the number of 90° rotations of the turntable, loosening solidified materials throughout the bag for discharge through the bag spout. The system controller can be mounted remotely or on the exterior of the safety cage, which incorporates full-height, interlocked doors.

The unit measures 221 x 338 x 198 cm, requires only an electrical power connection for operation and is available constructed of stainless steel or carbon steel with durable industrial coatings.

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# Coming in from the cold

The importance of food  
traceability in cold storage  
environments

*David Thompson, Australian Business Manager,  
Honeywell Scanning & Mobility, ANZ*





**The Australian food storage and transport sectors face increasing operational challenges. As demand for food products grows across Australia and around the world, food growers, manufacturers and distributors who supply perishable goods must ensure they are not only getting the right products to the right customer, but that they are also delivering goods in the right condition.**

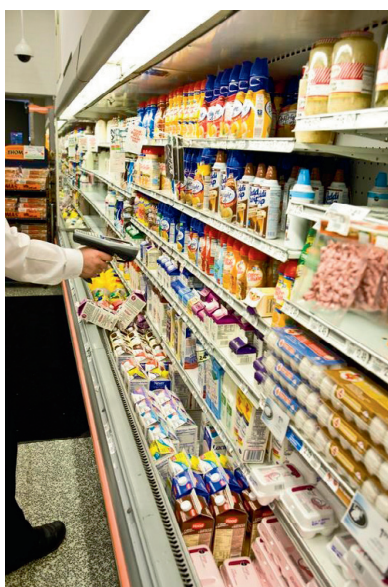
It is vital that Australian cold storage and distribution operators understand that just as cold temperature conditions such as cold air, frost and condensation can make life a challenge for workers operating in these environments, they also create a specific challenge for tracking goods throughout the supply chain.

Importantly, and what some Australian food manufacturers, distributors and retailers are still not fully appreciating, is that just as coats, hats and gloves are essential for workers to function for more than a few minutes in cold storage areas, mobile data-collection computers, barcode readers, voice solutions and wireless networking equipment must be developed to perform under freezing conditions.

### Driving global food traceability

Large supermarket chains have been key global drivers in the push for greater supply chain automation in cold storage areas and higher product quality assurance over recent years. Perishable goods that must be transported and stored at chilled temperatures to ensure they meet government food standards and internal quality control measures, such as dairy products, require specialist supply chain support and technology.

For Australian exporters, the concept of tracing products through cold storage environments (whether that be in chilled store rooms, insulated containers or refrigerated trucks), is all the more important when considering some of the food safety importation laws in place around the world. For example, in 2005 it was announced that European food safety requirements for fresh product traceability would become an import criterion, meaning that local exporters needed to be able to guarantee a high level of traceability for tracking their cartons and pallets. These laws mean that all food and feed businesses must have effective systems and records to ensure that all foodstuffs can be traced throughout the food chain 'from farm to fork'. Known as the 'one-step-backward, one-step-forward' approach, each business must be able to tell who all their suppliers are and who they supply to themselves



(with the exception of consumers). That all European Food businesses should have withdrawal/recall procedures for unsafe food, and must notify authorities immediately in the event of a food and/or feed safety scare, only means that the proper structures and technologies need to be in place throughout the entire supply chain.

### The right technology for the work environment

Standard retail tracking computers and devices don't perform to adequate levels when confronted with cold storage situations. LCD screens can freeze up, barcode readers will not function if frost or condensation covers their optical ports and mobile computing batteries won't release energy when temperatures drop below certain levels. These challenges contribute to situations whereby workers may resort to manual data entry, which severely reduces productivity and increases error rates — just to ensure that product tracking is occurring at all.

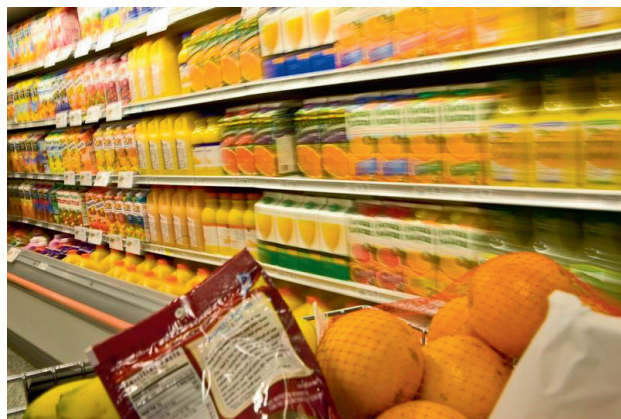
Operating in cold storage environments requires the ability to adjust to specific environmental conditions to ensure continued product traceability. To ensure automated supply chain systems and mobile computers function satisfactorily in these harsh operating environments, it is necessary to use equipment that is adapted with a special casing/housing along with internal screen heaters, which sets them apart from traditional mobile computing equipment. Supply chain workers operating in cold storage environments who try to use traditional mobile computing devices for tracking and tracing goods risk equipment failure, which can result in lost productivity as well as unnecessary repair and replacement costs.

Fortunately, specialist technology being developed by leading supply chain technology providers such as Honeywell Scanning & Mobility can now deliver Australian food producers and retailers with supply chain tracking and tracing solutions that perform even in freezing temperatures. For instance, Honeywell's TectonCS mobile computer can operate in temperatures as low as -30°C and offers internal heaters and screen defrosters allowing workers to carry out product tracking tasks regardless of temperature.



With freezer-capable mobile devices, Australian food producers, transporters and retailers can automatically record the storage locations of all frozen inventory and products so they can be tracked by lot, supplier and best-if-used by dates, and traced to specific customer shipments or inventory locations. Cold storage-capable mobile computers can also help reduce costs and improve efficiency for businesses operating in the Australian food industry, especially in a product recall situation — if workers operate with paper production sheets, product tracing might take days, whereas with the use of automated traceability solutions it could instead take minutes.

For specialty food producers, such as organic farmers, an alternative traceability method often used is RFID cold storage tracking tags, which best position them to demonstrate the credibility of their products to global markets. For instance, RFID technology is being deployed in the organic beef sector to not only help ensure product quality but also to adhere to government food safety regulations. In Australia, the National Livestock Identification System in 2005 brought in legislation that mandated RFID tagging for cattle stock. As a result of this push, organic beef producers in the country are tagging individual animals with RFID, ensuring rapid and accurate traceability as they move through the livestock chain. Importantly, RFID technology is also helping organic beef producers to meet one of the



key drivers identified by Farmers of Australia's General Manager, Holly Vyner, as supporting growth in the organic food sector over recent years — buying food produced with animal welfare in mind. The ECOA Animal Welfare Task Force (AWTF) identifies in its publication 'Animal Welfare on Organic Farms' that in relation to cattle branding, "Cattle should not be branded (given it can be a painful procedure for the cattle); alternative methods of identification such as RFID tags should be used."\*

### Ensuring a place in the global food industry

In cold storage settings, supply chain tracking tasks that might be very easy outside of these harsh conditions become all the more difficult. What can seem like minor problems — such as ensuring mobile devices have the required battery capacity to continue to do a particular job — can become onerous as the colder temperatures can sap batteries and delay productivity. Also, devices which aren't properly equipped for usage in cold storage environments are at risk of failure due to condensation build-up within the device itself. Deploying devices that aren't suited to cold storage environments will inevitably increase operating costs by reducing productivity, increasing errors and threatening on-time performance.

For Australian food producers, transporters and suppliers who are looking to operate in a global food industry, it is particularly important that they optimise their traceability performance to ensure they are able to keep up with the growing level of competition and regulations in the industry.

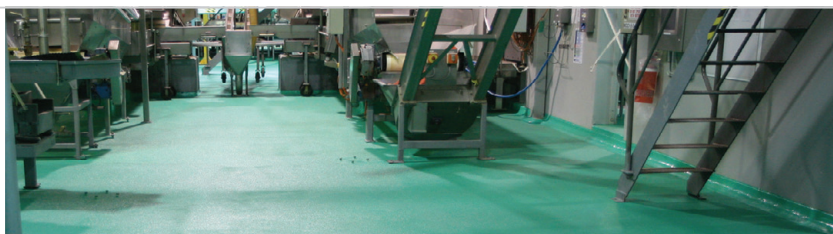
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## Recipe weighing belt

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Up to 99 recipes can be stored with a desired target weight for each component. The current weight of the component and the achievement of the target weight is indicated to the operator by light signals and the display on the touch panel. The operator confirms the weight by the foot switch and immediately receives the weight of the next component. According to the weight of the last component, the product is discharged to the left or right by pressing the foot switch.

The belt is equipped with a tap framework, which allows it to completely empty the crates of raw materials.

The recipe weighing belt can be operated in two modes. In the first mode the contents will be transferred to a slope conveyor, allowing a quasi continuous flow in a processing line. The second mode combines the weighing belt with a slope conveyor for transferring the mixture to a packaging line or similar.

The weighing function is carried out by four stainless steel bending beam-type load cells, additionally equipped with a stainless steel cover.

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## Cheese company chooses forklift that can access all areas

Founded in 1989 by owners Jim and Julya Konas, Hellenic Cheese introduced the concept of milking sheep and goats on a commercial scale in Australia and combined it with traditional Greek handmade cheese-making techniques to offer a range of dairy products.

The company recently chose a Toyota BT walkie stacker forklift for its material handling needs due largely to its ability to access confined spaces.

Hellenic Cheese Company Pty Ltd commissioned the Toyota BT Staxio SWE120S walkie stacker for use in its factory in the Melbourne suburb of Epping. Jim Konas bought the Toyota BT forklift through Toyota Material Handling Australia (TMHA). It replaced an electric stacker from another manufacturer.

"We were specific in our model selection as we needed a high degree of manoeuvrability to get into confined areas, and the BT forklift is handling that and other tasks very well."

TMHA Melbourne Branch Area Sales Manager Adem Shemshedin said the Toyota BT SWE120S walkie stacker forklift met Hellenic Cheese's requirements for its combined factory, cold store and warehouse.

"Its 208° steering range gives it the manoeuvrability they were after, and it's a very versatile forklift to use," he said.

The Toyota BT Staxio SWE120S has a maximum lift capacity of 1.2 tonnes and a maximum lift height of 4755 mm.



Support arms straddle loads to make it possible to handle closed pallets.

Toyota BT Staxio stackers are compact, easy to use and include low-maintenance/high-efficiency AC drive motors. They are designed according to BT's 'Totalview' concept, to optimise operator visibility at both ground level and when positioning the forks at height.

Acceleration, speed and braking characteristics are programmable to suit individual operators' needs.

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## **Stainless steel pumps**

Tsurumi Pump SFQ series pumps are designed for use in corrosive applications including pumping fatty acids, citric acid, milk, brine and lactic acid.

The SFQ range includes 2" and 3" three-phase pumps with heads to 44 m and flows to 2000 Lpm, and a high-capacity semi-open style impeller.

The stator housings, casings, impellers and suction covers are all cast 316 stainless steel. The grade of stainless steel used has a higher content of carbon for strength

and a high proportion of nickel and molybdenum for improved corrosion resistance. No welds are required, which means no pitting and reduced oxidation. The material is also capable of withstanding abrasive liquids.

The anti-wicking cable gland prevents water from wicking down inside the cable, so the motor is protected even if the cable is damaged or the end accidentally immersed.

The pumps have a double silicon carbide mechanical seal. Both seal surfaces are submerged in an oil chamber, well away from the pumped liquid. An oil lifter ensures the mechanical seal faces are lubricated and cooled, even if the pump is installed horizontally.

**Australian Pump Industries Pty Ltd**

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

## **IBC cleaning system**

Suncombe's IBCWashBooth cleaning system for IBCs is able to recirculate the washing solution, reducing water consumption by up to 80%.

Users can choose to recirculate the washing solutions or maintain single pass cleaning. The choice of recirculation or single pass can be switched on or off within every step of every wash program, allowing companies to achieve a fully repeatable, validatable recipe while minimising water usage without affecting the washing quality.

The company has incorporated its Spurge Bar technology into the booths to minimise liquid flow rates, while reducing consumption of cleaning additives, energy usage and effluent generation.

The system uses an innovative spray technique and high-impact accurate spray targeting, and is built to hygienic and sanitary standards, complying with ASME BPE, GAMP, ISPE and 21CFR11. It is available in single-door or pass-through versions.

The Suncombe DuoBooth is used on high-throughput systems, where two IBCs are cleaned simultaneously in a single booth. Other features of the unit include: 316L stainless steel construction; crevice-free washing chamber; inflatable door seals for full containment; one to four chemical dosing systems; and HEPA filtered air drying and cooling.

**Suncombe Ltd**

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## Collaborative robot handles 1.5 million eggs per day

Cascina Italia processes millions of eggs per day. The competitive nature of the fresh food market means that the company must respond quickly to market demands.

In order to do this effectively, Cascina Italia sought to optimise its internal processes through automation. However, traditional robot solutions can be expensive and difficult to implement into a live production environment.

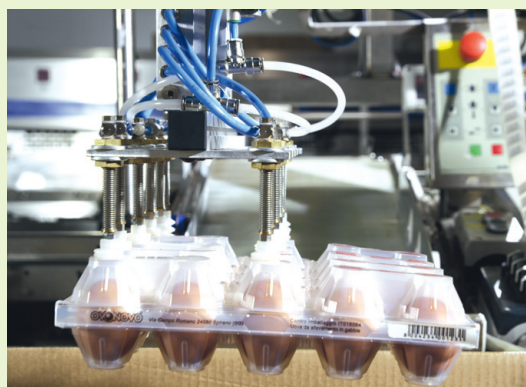
Safety is also a major concern — the egg processor has limited space for additional equipment and any solution that they chose needed to be installed in close proximity to employees.

Cascina Italia worked with Alumotion to design and specify a collaborative robot solution that prepares boxes on the packaging facility production line. The UR5 robot from Universal Robots is installed on one of the 24 production line output stations and handles around 1.5 million eggs per day.

This pilot installation is aimed at relieving the facilities operators from one of the most arduous processes — preparing the bulky packages for large-scale distribution — while improving flexibility and operational efficiency at the factory.

The UR5 robot prepares boxes containing 144 cartons of 10 eggs. The small compact size of the robot allows the unit to be installed directly on the production line without having to sacrifice valuable space. And, as the UR robots can operate without fencing, after a safety audit they have been able to work alongside employees without protective barriers.

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Scan the QR code to see the video of the system in use.

### Magnetic flowmeter platform upgraded

Emerson Process Management has announced the addition of Modbus RS485 and a low power offering to its Rosemount 8700M magnetic flowmeter platform. The platform's intelligent diagnostics help users across a variety of industries take advantage of improved installation, maintenance and process management practices.



Diagnostic features include SMART meter verification and electrode coating detection, providing users with information about the flowmeter, installation and process. This enables more informed decision-making, easier identification of process issues and simplified flowmeter verification.

The scalable power supply options enable access to the reliability of a magnetic flowmeter, coupled with the large amount of data available through the Modbus protocol to provide a solution especially suited to remote locations where power is limited.

The platform also leverages human-centred design concepts for easier installation. Enhanced terminal compartments offer more space and more robust connections on the sensor and transmitter, making installation and field wiring easier. The ProLink III PC-based configuration tool has been enhanced to provide a simple and intuitive way to configure the Rosemount Modbus magnetic flowmeter transmitters.

Emerson Process Management  
[www.emersonprocess.com.au](http://www.emersonprocess.com.au)



### ARBS 2016 invites speaker submissions

Air-conditioning, refrigeration and building services industry professionals are invited to submit abstracts for seminars, panels and workshops at ARBS 2016, Australia's international air-conditioning, refrigeration and building services exhibition, to be held in Melbourne, 17–19 May 2016.

The seminar program is a key component of the exhibition, providing leading-edge education and networking for HVAC&R and building services professionals.

The call for papers invites submissions in areas such as (but not limited to):

- Case studies and real-world applications
- Future technologies
- Innovation
- War stories — what went wrong and lessons learnt
- Hot industry issues
- Energy efficiency/green design
- Emerging trends in building design, and the impact for HVAC&R
- Sustainable applications
- Regulatory and compliance issues
- Standards and rating tools
- Project and facility management
- Legal and risk management
- Renewable technologies/geothermal and alternative power

The format can be a seminar, panel session or workshop, between 30 and 90 minutes in duration.

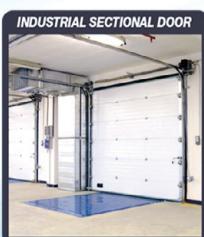
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# Australian businesses taking risks

with long, unmanaged supply chains

**A global survey of supply chain managers has been described as a “wake up call” for Australian businesses, with 70% of businesses unable to guarantee their supply chains are free from malpractice, including child labour, slavery, fraud or corruption.**

**T**he research has highlighted the potential risks associated with long, complex supply chains, with 57% of Australian respondents admitting to having zero visibility beyond the second tier of their supply chain, and only a quarter of businesses having visibility of their entire supply chain.

The survey of 645 supply chain managers worldwide also found:

- Half of supply chain managers admitted to avoiding a major crisis in the past 12 months.
- Only 8% of businesses have close relationships with suppliers at all stages of their supply chains.
- 1 in 5 Australian businesses have lost out financially because of poor supply chain management.

Four out of five (79%) Australian businesses surveyed currently outsource from emerging markets in Asia. According to David Noble, Group CEO of the Chartered Institute of Procurement & Supply (CIPS), emerging risks associated with poor practices and standards in these markets are hard to manage: “By increasingly turning to emerging Asian suppliers to maintain their price competitiveness, businesses are also becoming more exposed to risk. Having visibility and good supplier relationships at the first tier of the supply chain is clearly no longer enough, as these risks do not always exist in the first tier, but often further down supply chains.”

With consumers increasingly willing to punish brands with a bad reputation by going elsewhere, the risks for business of being associated with malpractice in their supply chains can easily outweigh any savings from lower labour and operating costs.

“Supply chain issues such as poor health and safety standards for workers, labour abuse and environmental degradation are endangering both consumers and the economy. Despite that, there has been so little action in this area from Australian businesses,” said Noble.

Should a supply chain crisis occur, over half (54%) of Australian businesses admit they do not have a risk mitigation strategy in place all the way down their supply chain. When coupled with data which shows that only two in five (43%) would take responsibility upon themselves for any disruption, then there are clearly concerns about where responsibility and accountability begins and end, according to the CIPS.

“Only by investing in a better understanding of the principles of good supply chain management and also forging closer relationships with suppliers across the entire network can Australian businesses ensure their supply chains are safer and more sustainable. Employing trained and skilled professionals with a licence to practise will go a long way towards realising this potential,” said Noble.





# Processing



# Chemical-free

## food preservation using blue light

**Blue LEDs in conjunction with cold temperature and acidic conditions can kill off foodborne pathogens making chemical-free preservation a possibility for a range of foods.**

**F**resh-cut fruits and ready-to-eat meats are just some of the foods which are mildly acidic (pH 4.5) that could use this preservation technology to avoid the use of chemical preservatives and present the 'clean label' that consumers desire.

A team of scientists from the National University of Singapore (NUS) has found that blue light emitting diodes (LEDs) have strong antibacterial effect on major foodborne pathogens and are most effective when in cold temperatures (between 4 and 15°C) and mildly acidic conditions of around pH 4.5. These findings were recently published in the *Food Microbiology* journal in June 2015.

### Enhancing blue LEDs' ability to deactivate bacteria

While LEDs are most commonly known as an energy-saving light source, they have also been known to have an antibacterial effect. Bacterial cells contain light-sensitive compounds that adsorb light in the visible region of the electromagnetic spectrum (400-430 nm), which is mainly blue LED light. Exposure to illumination from blue LED light can hence start off a process within the cells that ultimately causes the cells to die.

Existing studies on the antibacterial effect of LED illumination mostly evaluated its efficacy by adding photosensitisers to the food samples, or by using very close distance of less than 2 cm between the bacterial suspension and LED light source. These conditions would not be viable for application on food preservation.

The NUS team, led by Assistant Professor Yuk Hyun-Gyun, from the Food Science and Technology Programme at the NUS Faculty of Science, is the first so far to show that factors such as temperature and pH levels, which are typically related to food products, can affect the antibacterial effect of LEDs.

In this study, the team placed three major foodborne pathogens — *Listeria monocytogenes*, *Escherichia coli* O157:H7 and *Salmonella Typhimurium* — under blue LED illumination and varied the pH conditions from acidic to alkaline. The team found that higher bacterial inactivation was achieved at acidic and alkaline pH conditions than when neutral. In particular, acidic conditions were more detrimental than alkaline

conditions for *L. monocytogenes*. For *E. coli* O157:H7 and *S. Typhimurium*, alkaline conditions were most detrimental although acidic conditions were also sufficiently effective in deactivating them.

A previous study in 2013 by the same team had also looked at the effect of temperature on blue LED's ability to deactivate bacterial cells and found the antibacterial effect to be most enhanced in chilling temperatures.


Asst Prof Yuk said, "Taken together, our two studies point to a potential for preserving acidic foods in combination with chilling temperatures without chemical treatments. This could meet the increasing demand for natural or minimally processed foods without relying on chemicals such as acidulants and artificial preservatives to preserve food products."

The team's findings can potentially be applied to food chillers or the cold supply chain to preserve fresh-cut fruits, ready-to-eat seafood such as sushi and smoked salmon, as well as chilled meat products. This technology can also be useful for retail settings, spanning hawker centres, food courts to supermarkets, as well as for food suppliers.

"The next step for us is to apply this LED technology to real food samples such as fresh-cut fruits, as well as ready-to-eat or raw sea foods and meats products, to investigate whether LED illumination can effectively kill pathogenic bacteria without deterioration of food products," said Asst Prof Yuk.

"Since November 2012, we have also been collaborating with the Agri-Food & Veterinary Authority (AVA) to apply this LED technology to fresh-cut vegetables to determine whether LED will help preserve or improve the nutritional quality of vegetables during storage," said Asst Prof Yuk.

As part of this three-year study, AVA has been studying the effects of LED on some key quality parameters of vegetables (such as vitamin C, chlorophyll and betacarotene) to investigate if the quality of the vegetables under this LED treatment will be maintained. The results will be available once the study is complete.

"AVA hopes that the research will affirm the potential of LED as a food preservation technique that can help reduce food loss in Singapore's fresh produce industry," said Miss Khoo Gek Hoon, director, Post-Harvest Technology Department, AVA. 



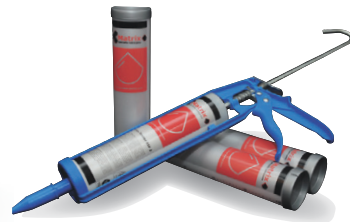


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## Asset performance monitoring technology

Honeywell Process Solutions has launched Uniformance Asset Sentinel, which continuously monitors equipment and process health, assisting industrial facilities to predict and prevent asset failures and poor operational performance.

The technology expands the Uniformance software suite and supports the emergence of the Industrial Internet of Things (IIoT) in the process industry, enabling companies to collect, organise and analyse data for a specific asset or 'thing'. The analytics can help industrial plant operators avoid unplanned downtime and improve plant performance and safety.

According to the company, the technology helps companies increase utilisation of industrial assets by up to 10%, by reducing unplanned downtime. They say it can also cut maintenance costs by up to 15% by predicting and preventing catastrophic equipment failure and inefficient operations.

The technology works by continuously accessing data from a variety of sources, including process parameters, vibration data and alarms. Using a real-time complex event processing engine, it continuously performs performance, health, efficiency and safety-related calculations and compares those results of the current actual performance to an expected performance model. Predicted or detected deviations from these models are used to generate notifications to facilitate investigation and intervention to minimise the cost and frequency of an event.

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## Power supply boxes for mobile water disinfection

UV-Guard has released a PLC-operated controller to enable its off-grid and mobile customers to disinfect water via UV treatment.

The controller, which can operate on 12 and 24 VDC power supplies, can control UV-Guard's UV systems up to a power of 40 W. This means that recommended UV dose rates can be provided at flows of up to 60 Lpm by using the SLF, SLT and S-Series of systems. It can also control the T-series of storage tank headspace disinfection systems.

The range has a number of optional features, including: weatherproof IP65-rated box; user-friendly service menu and digital display; digital lamp hour run meter to indicate when the lamp has reached its operational life; integrated UV intensity monitoring to ensure correct UV intensity and sufficient disinfection is being achieved; Building Management System (BMS) connection for remote monitoring; remote controllable.

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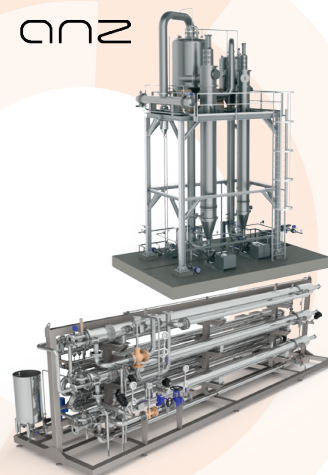
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## Compact pressure transmitters for mobile applications

PU type pressure transmitters from ifm efector have a response time of 2 ms. The units feature a welded stainless steel housing, a measurement accuracy of  $<\pm 0.8\%$  and a repeatability of  $<\pm 0.05\%$ .

The pressure transmitters with DEUTSCH or AMP connector enable a simple installation in mobile machines. The units are compact, requiring a width across flats of 19 mm. The thin-film measuring cell is directly welded with the process connection (G 1/4 male).

The sensors are suitable for hydraulic and pneumatic applications with a high operating pressure. With a protection rating IP67/IP69K, high vibration and shock resistance, and good EMC compatibility and E1 conformity, the series supports use in mobile machines.

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Alfa Laval Unique Mixproof Valves make it possible to handle two different fluids at the same time, with no risk of cross-contamination.

Using two independent plugs and seals means a single mixproof valve can often replace two or more valves of other types. The range consists of several different designs, all with leakage detection, that enable users to design versatile set-ups tailored to their requirements.

For instance, the Large Particle Valve is suitable for handling fluids with high viscosity or large particles such as lotions, soups and yoghurts. This valve is designed with large openings, handling particles up to 45 mm in diameter, to minimise pressure loss and secure product integrity.

The valves also provide water, chemical and heating savings during cleaning-in-place.

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## Air/gas flow meter for HVAC boilers

The ST98 air/gas flow meter from Fluid Components International allows facility engineers to monitor and control the precise amount of fuel needed to run HVAC boilers efficiently.

The meter's thermal mass flow sensor design provides direct mass flow measurement without the need for additional temperature or pressure sensors or density-calculating devices. Its insertion-style configuration makes the meter simple to install in existing piping.

The meter is suitable for service in plant natural gas and other process gases; hydrocarbon-mixed or dirty gases; biogases including methane; and plant-compressed air and HVAC systems.

The flow meter's accuracy is  $\pm 1\%$  of reading, plus  $\pm 0.5\%$  of full scale, with repeatability to  $\pm 0.5\%$  of reading. The flow range is from 0.21 to 172 NPS in air at standard conditions.

The thermal mass flow sensing element is constructed with two all-welded 316L stainless steel thermowells, protecting two matched platinum precision resistance temperature detectors (RTDs).

The meter's transmitter converts the differential temperature signal to a standard 4-20 mA output signal. The transmitter and its RS232C communications port are housed in either a NEMA Type 4, Type 4X (IP66) enclosure or an explosion-proof enclosure, and can be integrally or remotely mounted.

With no moving piece construction, the meter is unaffected by plant vibration and there is virtually no maintenance or recalibration required. The meter features a broad range of agency approvals: FM, ATEX, IEC, CSA, CRN, GOST/RTN, NEPSI, CPA, PED and CE Mark (system approvals).

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# Drink less than 1 litre of beer/day to minimise exposure to toxic metabolites

**If you drink more than a litre of beer a day you may approach or even exceed the recommended daily safe intake of mycotoxins.**

**H**owever, for the rest of us, the mycotoxins produced by certain microscopic fungi in beer and dried fruits, such as figs and raisins, meet food regulations according to researchers from the University of Valencia.

Mycotoxins are toxic metabolites produced by fungi that contaminate fruits, cereals and derivative products. The scientists analysed those of the *Fusarium* genus in 154 brands of beer on the market in Europe.

The results, published in the journal *Food Chemistry*, confirm that the average consumer's exposure to these toxins is low and that they carry no associated toxicological risk. Even the two most abundant, deoxynivalenol or DON — which appeared in almost 60% of samples — and the so-named HT-2 — present in 9% of cases — are present at “levels that cannot be deemed high”.

The average concentrations of DON and HT-2 detected in beers approached 30 µg/L. There is no maximum legal



limit of mycotoxins in these drinks, but in general this value is considered low if compared to the maximum DON limit established by EU legislation for cereal-based foods, set at 200 µg DON/kg.

So, the study highlights that, in people who drink a lot of beer, the contribution of these harmful substances to daily intake “is not negligible, approaching or even exceeding the safety levels”. The maximum tolerable daily intake (TDI) established provisionally by the Scientific Committee on Food, an organisation that advises the European Commission, is taken as a reference.

“Considering only consumption amounting to one litre a day of the brands of beer that showed the highest contamination levels, intake of deoxynivalenol would be equivalent to 60% of the maximum TDI, and the safety levels for HT-2 would be exceeded,” one researcher pointed out.

The researcher insists that these kinds of consumers are exceptional, and even that if someone drinks a litre of beer per day, “before having problems linked to the toxicity of mycotoxins, he/she would have others, such as liver problems”.


The study reveals that beer consumption varies quite a lot between European countries. For the Spanish population, the FAO finds it to be 75.3 kg/year, compared with

the European average of 70.1 kg/year (equivalent to around 0.19 L/day). According to the figures from this institution, Ireland is where most beer is drunk (142.8 kg/year), followed by the Czech Republic (136.6 kg/year) and Austria (107 kg/year).

### Mycotoxins in dates, figs and raisins

In another study conducted at the UV, the same research group also detected the presence of 16 mycotoxins in dried fruits sold in Spain and Tunisia. The study is published in the journal *Food Control*.

Overall, 228 samples were analysed, and the frequency of contamination was 83% in dates, 80% in raisins, 64% in figs, 59% in apricots and 26% in the plums analysed. The most abundant mycotoxins were enniatins, followed by aflatoxins and ochratoxin. No Spanish samples exceeded the maximum levels set out by EU legislation for the toxins legislated.

There were only 13 samples from Tunisia with concentrations of aflatoxins exceeding the limits established. Apparently they came from travelling street markets, where health and safety controls are not very rigorous. In general, results were not alarming and danger is only possible where there is continual exposure to these mycotoxins. 

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## Vacuum technology for suction conveyance of powders

Wander AG, maker of Ovaltine and Caotina chocolate malt drinks, has had production facilities in Neueneegg, Switzerland, since 1927. Every year, 18,000 tonnes of the fine-grained final product leave the factory, to be delivered to customers all over Europe.

Over a period of 18 months, the production operation has been completely restructured. Production and packaging has been combined under one roof and modernised, with further automation of internal transport routes and processing operations, including investment in pneumatic conveyor systems, which convey everything from the various raw materials to the final products.

From the dry silos, via premixers and mixers, to packaging, Wander's fine-grained products are exclusively transported by suction conveyor systems. In the past these conveyor systems were equipped with oil-lubricated rotary vane vacuum pumps. For the past three years the factory has been investing only in conveyor systems that are equipped with Busch Mink claw vacuum pumps, which work without oil lubrication.

This is possible since the moving parts do not touch the inside of the vacuum pump. No friction is created and there is no wear.

Using dry-running vacuum pumps in suction conveyance means a reduction in maintenance costs thanks to the removal of oil-related maintenance work. And, because no moving parts touch the inside of the vacuum pump, the vacuum pumps have a high efficiency rating, which translates into energy savings.



Pre-product production work at Wander continues around the clock, seven days a week, with individual vacuum generators operating for approximately 20 min/h. During the production of finished products, work takes place five days/week on two shifts.

Wander's technical and maintenance manager, Kurt Pfäffli, praises the reliability of the Busch Mink claw vacuum pumps, describing them as a "reliable element" in the production system.

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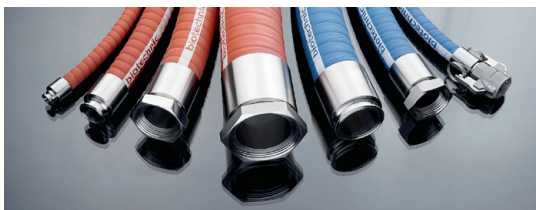
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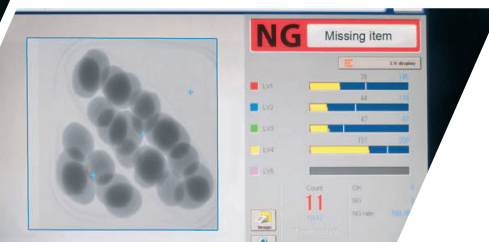
Industrial-grade functionality enables use of the touch screen while wearing protective gloves or through a protective screen cover. Applications can also be accessed through a second display via the DVI interface and managed remotely through an app for mobile devices.

The device has a robust aluminium housing and wide power supply (12-24 VDC) and temperature (0-60°C) ranges.

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# ChAFTA is here — are you ready?

*Paul Schroder and Meredith Paynter, Partners, King & Wood Mallesons*

The China Australia Free Trade Agreement (ChAFTA) has been signed and tabled in the Australian Parliament following a decade of negotiations and seven months of document review and finalisation. Good things come to those who wait (and persevere). This historic milestone will boost trade and economic growth in both countries for years to come.

**T**he formal agreement and ancillary arrangements are consistent with the summary material released by DFAT in November. The key issues are now well-traversed: investment protections and facilitation, reduction or removal of tariffs, and increased access for services businesses. We set out below some headline thoughts on where the biggest opportunities are.

## **Key benefits**

A number of fundamental investment protection mechanisms have been included which will safeguard and facilitate cross-

border investment between Australia and China, including changes to:

### **Foreign Investment Review Board (FIRB)**

Chinese investors into Australia can be confident they will be placed on a level playing field with investors from USA, Japan and Korea through the increase of the general FIRB monetary threshold from AU\$252m to AU\$1094m.

Lower investment thresholds for agricultural land and agribusiness will be applied. An AU\$15m threshold for rural land (calculated on a cumulative basis including existing rural





landholdings) was already in force from 1 March 2015 and an AU\$55m threshold for agribusiness is expected to come into force from 1 December 2015.

Australia will also consider further the position of Chinese government investors — State Owned Enterprises (SOEs) and Sovereign Wealth Funds (SWFs) — in the initial 3-year revision period. The Australian business community has suggested options for reform to encourage foreign investment.

#### **Workforce mobility**

Under ChAFTA, certain infrastructure development projects which are majority or substantially owned by a Chinese enterprise will be able to operate under an Investment Facilitation Agreement (IFA). IFAs streamline and relax Australia's immigration law requirements. IFAs will be permitted where a project has expected capital expenditure of AU\$150m.

IFAs will also apply to projects in a broader range of sectors including food and agribusiness, resources and energy, transport, telecommunications, power supply and generation, environment and tourism sectors.

IFAs will operate within the framework of Australia's existing 457 visas and applicable laws, including work health and safety law and relevant Australian licensing, regulation and certification standards. However, the IFA will allow a departure from skill requirements (to allow lower skilled workers foreign workers to work in Australia) and labour market testing requirements. IFAs are designed to make it easier for foreign labour to be utilised on Chinese sponsored infrastructure projects while maintaining compliance with the

safety net of minimum employment conditions provided for Australian employees.

ChAFTA commitments to reduce labour mobility barriers between China and Australia will also provide improved access for a range of Chinese and Australian skilled service providers, investors and business visitors. In turn, this is intended to facilitate Chinese investment into Australia and contribute to economic opportunities for Australian communities. In particular, China will guarantee access to Australian citizens and permanent residents who are categorised as intra-corporate transferees, contractual service suppliers, installers and maintainers, and business visitors (including, if over 12w months, accompanying spouses and dependents). In return, Australia will provide guaranteed access to Chinese citizens who fall into the same categories.

#### **Investor State Dispute Settlement (ISDS)**

The ISDS mechanism will allow investors to bring a claim in an international tribunal if a change in regulation unduly disrupts the FTA's promises to investors. This protects both Chinese and Australian investors against perceived sovereign risk. The receiving government promises to ensure the investment will be treated at least as well as domestic investors.

The ISDS regime already exists in some of Australia's other FTAs and treaties, but to date only one case has been brought against Australia. As more countries adopt ISDS (for example, it is planned to be part of the Trans Pacific Partnership) it may become a more mainstream way of protecting investments.

The inclusion of the ISDS is expected to be debated in the Senate because these provisions have permitted claims against the Australian Government for its tobacco plain paper packaging legislation, and would have permitted claims in response to the mooted carbon tax reforms. For the Australian public, this is controversial because it could restrict regulation in the public interest. However, the ISDS provisions will not impact legitimate government regulation (for example, necessary to protect human life or health, and conservation of the environment).

The ISDS doesn't substitute the need for clients to take sensible precautions to mitigate for ordinary trade risks, which will be the lion's share of capital flows between both nations. Traders must think about whether their contracts protect them against recovery risk if disputes arise, usually through the use of international arbitration.

#### **Most favoured nation**

A "most favoured nation" provision is included in the agreement. This is intended to ensure that Australia's competitive position is futureproofed against more beneficial treatment granted to other trade partners for certain services. We think that beneficial treatment is more likely to follow from China's rapid pace of deregulation, particularly in relation to foreign investment. For example, since ChAFTA was announced in November, a number of the key "concessions" in the financial services and telecommunications sectors have already been superseded.

#### **Opportunities for agribusiness and processed foods**

ChAFTA means that in some sectors, Australia has been granted "best ever access". This means Australian businesses can either



operate wholly owned subsidiaries or operate with fewer restrictions relative to companies from other countries. The agreement facilitates a virtuous circle when trade leads to greater investment and investment leads to increased trade. However, this window of opportunity will not remain open indefinitely. Businesses will need to act now to ensure that they are prepared to take advantage of developments in key areas while Australia still holds a competitive advantage.

The agribusiness sector is set to be one of the key beneficiaries of the ChAFTA. The agreement covers a range of measures in this area which will facilitate opportunities in the sector, including:

**Significantly reduced tariffs over the next 4–9 years:** Tariff cuts have been agreed for beef, dairy, sheep, live animals, hides, skins and leather, horticulture, wine and seafood. Reductions have also been agreed for a number of processed foods, including orange juice, natural honey and canned fruits (tomatoes, peaches, pears and apricots). Most of these tariff cuts will only come into force in the next 4–9 years. These tariff cuts will make relevant Australian products as competitive as, or even more competitive than, equivalent New Zealand and Chilean products.

**But other major Australian exports have missed out:** There are no tariff reductions for sugar, rice, wool, cotton, wheat, maize or canola. However, Australia will receive an exclusive Australia-only duty-free annual quota of 30,000 tonnes of clean wool (equivalent to approximately 43,000 tonnes of greasy wool), which will grow by 5% each year to almost 45,000 tonnes of clean wool (equivalent to approximately 64,300 tonnes of greasy wool) by 2024.

**Discretionary safeguard measures retained for beef and milk powder products:** If Chinese imports of these products from Australia exceed the specified “trigger” levels for any given calendar year, China may apply additional customs duties. The

trigger starts at 170,000 tonnes for beef (10% above the historic peak export levels) and 17,500 tonnes for milk powder products (40% above the amount of whole milk powder exported to China over 2012/13). There is a review mechanism in place that provides for removal of these safeguards if it is concluded that Chinese imports of these Australian products do not cause serious injury to the corresponding Chinese domestic industry.


#### **Incentives for increased investment in Australian agriculture:**

Australia’s more competitive position will provide incentives for Chinese investors (and Australian and other foreign investors) to invest in Australian agriculture to build capacity. Chinese investors may be preferred by Australian businesses if they can also provide Chinese import and market development assistance.

**Promise of increased transparency and collaboration:** No specific non-tariff barriers have been eliminated. However, there are consultative and notification measures, which are aimed at minimising the burden of customs procedures, sanitary and phytosanitary measures and other technical barriers to trade.

**Don’t forget about Australia’s highly regarded agricultural technology and services:** Australian businesses will be permitted to take a majority stake in joint ventures that provide services incidental to agriculture, forestry, hunting and fishing in China. Australian R&D providers will be allowed to offer R&D services in China through wholly owned subsidiaries. They will be treated no less favourably than corresponding Chinese service providers.

#### **Next steps**

Across the spectrum, the work is clearly not yet complete. However, the signing of ChAFTA means that businesses can assess with certainty what the opportunities are for them. Across a range of sectors, this planning can and should begin now. ChAFTA means that Australian businesses will be in a better position than competitor nations when they enter or do business with one of the world’s fastest growing economies. However, China is currently negotiating FTAs with a number other countries and the concessions given to Australian businesses under ChAFTA will likely very soon become the norm under China’s other agreements. It will be important for Australian businesses to quickly and effectively take their first mover advantage before it is eroded. 

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## Spray dry nozzle safety guidelines

Spray Nozzle Engineering has released an updated safety booklet, entitled '10 Facts Spray Dryer Nozzle Design'.

The booklet is a guide to pressure nozzle spray dryer safety, highlighting operational safety and risk mitigation. Selection, design and operation of nozzle technology in explosive environments is a critical consideration in new and existing plant design. The guide makes clear points relating to considerations such as ASME pressure code compliance, sealing standards in assembled nozzles, spray performance, product quality, fire risk and safety.

The booklet also serves as a practical guide on innovations in pressure nozzle technology such as concentricity, high-pressure seals, swirls, orifices, glands and valves, as well as how to avoid and solve common problems in spray dryers, such as beard-ing, scorched particles, thread binding damage, worn O-rings and leakage.

Suitable for plant managers, operators, OHS, reliability and continuous improvement engineers, underwriters and government consultants, Spray Nozzle Engineering's technical knowledge in nozzle technology and spray dry safety is adapted to suit a wide readership of the booklet. The PDF can be downloaded from [www.spraydrysafety.co.nz](http://www.spraydrysafety.co.nz) and printed copies are available on request.

**Spray Nozzle Engineering**

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

## Real-time energy management information system

Emerson Process Management has released Energy Advisor, a real-time energy management information system that automates the process of monitoring and managing energy consumption across mills, plants and refineries. With real-time, meaningful information about a site's energy performance, process manufacturers can identify inefficiencies and irregularities and take corrective action, saving on average 5-10% in energy costs annually, according to the company.

The system pulls energy data from various sources, including Emerson's DeltaV and Ovation distributed control systems, as well as its wireless infrastructure, to provide real-time analysis and historical context. Using Emerson's process models, manufacturers are able to analyse and compare three critical items: the amount of energy a system is designed to use, what it has used over time and what it is consuming in the moment.

Key features of the technology include: Consumption Monitoring, which identifies and logs root causes for energy over-consumption events; Data Integrity Checker that verifies integrity of energy data before it is used; Energy Target Calculator, which creates models from past historical data to predict target energy consumption; and Standard Reports, including cost per unit of production, energy performance trends and electrical demand cost.

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## Hygienic inductive conductivity measuring system

KROHNE has introduced the OPTISYS IND 8100 hygienic inductive conductivity measuring system for the food and beverage industry. It is suitable for applications in the field of product separation/identification or in CIP plants to shorten transition phases and save cleaning fluids.

The 3A and EHEDG certified measuring system offers two 4-20 mA outputs for conductivity, concentration and temperature. Within the conductivity measuring range from 50  $\mu\text{S}/\text{cm}$  to 1000  $\text{mS}/\text{cm}$ , the system features 14 preset range/output combinations. Alternatively, the analog output can be set.

For media separation, four conductivity ranges can be defined.

The concentration output can be used to display the concen-

tration of four factory-set mediums/ranges, such as caustic soda, nitric acid or a customer-set medium, where the concentration curve can be programmed via a 30-point linearisation. The short response time of the integrated Pt100 temperature sensor ( $T_{90} < 15 \text{ s}$ ) allows for fast indication of changes in medium or process conditions. The corresponding conductivity is also indicated ( $T_{90} < 2 \text{ s}$ ) for fast identification of CIP reagents to prevent blending and save costs.

The system features different selectable display modes and warnings. There are two solid-state relay contacts configurable as limit switches.

The compact design with IP67/69K housing is suitable for pipes with small diameters  $> \text{DN}40/1\frac{1}{2}"$ . The sensor is encapsulated in a PEEK body for use in hygienic processes or direct in concentrated acids or alkalis. Various hygienic process adapters such as Tri Clamp, DIN 11851, SMS or Varivent N are available.

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# The physics of salad dressing

**Random molecular collisions are not responsible for phase separation in liquids like salad dressings.**

For more than 30 years the conventional belief is that random motion and resulting droplet collision and coalescence is responsible for phase separation — such as that seen when oil and water separate in salad dressing. Now, researchers at the University of Tokyo have shown that phase separation in liquids is a result of the ordered motion of droplets. Initially, a great number of small droplets are formed which then grow into larger (coarse) droplets, and such coarsening of droplets proceeds as a result of the regular motion of the small droplets.

Phase separation is a universal phenomenon that can be observed in many common situations, such as when oil and water in a salad dressing separate out after having been well shaken. It is known that the mechanism by which droplets grow depends on the volume ratio between the two liquids. In particular, for an intermediate volume ratio between the two liquids, neither extremely large nor extremely small, it is known that coarsening proceeds by droplet collision and coalescence.

Professor Hajime Tanaka and postdoctoral fellow Ryotaro Shimizu at the Institute of Industrial Science used simulations to show that the collision and coalescence of liquids, which was believed for a long time to be driven by random thermal Brownian motion of droplets. Contrary to this, the research group has shown that it is, in fact, driven by the regular motion of droplets due to local concentration differences that arise as a result of differences in droplet size. Specifically, when a large droplet is near a small droplet they approach each other, while droplets of equal size move apart. This mechanism can be understood as a consequence of dynamical coupling between concentration diffusion and fluid flow.

This finding indicates that transport can be due to either diffusion, flow or a combination of the two, but always takes place from smaller to larger domains: domain coarsening obeys the rule that “big always wins over small”. This also has implications for how systems evolve in non-equilibrium processes. 





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