March/April 2019
Vol.26 No.7

what's new in FOOD technology & manufacturing

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March/April 2019

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Unhealthy food production is killing us

Forget obesity, malnutrition or car accidents — industrial food production could be our leading cause of preventable deaths.

Hidden killers, including air pollution, water contamination, pesticide exposure and excessive use of antibiotics and fertilisers are making healthy eating impossible and the problem is escalating, according to a recently released report.

The Ellen MacArthur Foundation report — Cities and Circular Economy for Food — claims industrial food production factors could be implicated in 5 million deaths/year within 30 years. This death statistic is twice the current number of people killed by obesity and four times the number of people killed in road traffic crashes globally. The report, produced with analytical support from SYSTEMIQ, was launched at the World Economic Forum Annual Meeting in Switzerland.

Even when trying to make healthy food choices, consumers are at risk because of the way food has been produced. Synthetic fertilisers, pesticides and mismanaged manure exacerbate air pollution and contaminate soils and water.

The report highlights the enormous environmental damage caused by food production which is currently responsible for almost a quarter of global greenhouse gas emissions.

The Foundation sets out a vision for a new system based on circular economy principles, where food is grown locally and in a way that regenerates natural resources, waste is eliminated through better redistribution and by-product use, and healthy food is produced without the need for harmful practices.

The report finds that eliminating waste and improving health through the circular economy could be worth US$2.7 trillion a year to the global economy. Health costs caused by pesticide use would decrease by US$550 billion a year and antimicrobial resistance, air pollution, water contamination and foodborne diseases would reduce significantly.

Greenhouse gas emissions would be expected to decrease by 4.3 Gt CO_2e, the equivalent of taking one billion cars off the road permanently. The degradation of 15 million hectares of arable land would be prevented and 450 trillion litres of fresh water saved annually.

The way we produce food today is not only extremely wasteful and damaging to the environment, it is causing serious health problems. It cannot continue in the long term. We urgently need to redesign the system. People around the world need food that is nutritious, and that is grown, produced and delivered in a way that benefits their health, the environment and the economy.

Cities are key to alleviating this crisis. By 2050 they will consume 80% of food, giving them the power to drive the shift to a healthier system. Cities themselves can unlock US$700 billion a year by using organic materials to help produce new food and products and by reducing edible food waste.

The report is available for downloading at www.ellenmacarthurfoundation.org/assets/downloads/Cities-and-Circular-Economy-for-Food_EMF.pdf.

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Food FOR thought

Mass, flow and pressure gear for F&B

Mass, flow and pressure technology specialist company Bronkhorst has announced it is partnering with AMS Instrumentation & Calibration to make its equipment available in Australia.

AMS's long experience in supplying measurement and control equipment means the company is well able to provide technical and logistical support for Australian companies interested in using Bronkhorst paraphernalia.

Bronkhorst gear has many applications in the food and beverage area, for example:

- Aeration of food products
- Dosage of additives (flavour, colourant, antioxidant, vitamins, odorants)
- Fermentation process control (fermentors, bioreactors)
- Disinfection and PH-level adjustment to improve the taste of (drinking) water (using CO_2)
- Sealing, coating and sterilisation/aseptisation of packaging (cartons, PET bottles, glass bottles, etc) for (eg) juice or dairy products (milk, yogurt, etc)
- Blanketing with inert gases (nitrogen, argon) to increase the shelf life of packaged food products.

Witch cheese taste uncopyrightable

In a decision that would cover 'taste' in general, the Court of Justice of the European Union (CJEU) has rules that the taste of a food product is not eligible for copyright protection.

Cheese manufacturer Levola Hengelo, maker of a spreadable Dutch cheese Heksenkaas (witch cheese), took its competitor Smilde Foods to court alleging that the taste of Smilde's Witte Wievenkaas infringed Levola's copyright.

The case was dismissed because the CJEU found the taste of a food cannot be defined with precision and objectivity and so does not qualify as a "work".

There are two cumulative conditions that must be met for something to qualify as a "work": the subject matter needs to be original in that it is the author's own intellectual creation and also the expression of that creation.

Basically, the ruling means that until a taste can be identified in a precise and objective manner it cannot be protected by copyright.

NZ introducing new biosecurity fines

To help protect itself from harmful diseases and pests entering the country, New Zealand is introducing new infringement offences for sloppy biosecurity practices by arriving vessels, transitional and containment facilities and cruise ships.

Under the changes which will come into effect early next year, Biosecurity New Zealand's quarantine officers will be able to infringe transitional and containment facilities that do not have an approved operator or don't comply with operating standards.

International vessels will face fines for failing to notify Biosecurity New Zealand of their arrival and for failing to declare what steps they have taken to meet relevant craft risk management standards when asked to do so.

The new offences will introduce fines of $400 for individuals and $800 for other entities, such as companies, for low-level offending that is not significant enough to warrant prosecution, said Steve Gilbert, Border Clearance Services Director for Biosecurity New Zealand.

"The infringements will send a strong message about the importance of biosecurity and will deter people and organisations from breaking the rules."

Cool chooks

AgriFutures Australia has released a publication by Mark Dunlop that describes the first Australian trial of a low-pressure, overhead sprinkler system that reduces the need for conventional evaporative cooling pads or high-pressure foggers in meat chicken houses.

Evaporative cooling in the grow-out sheds is used to cool the birds during warm weather but uses a lot of water and also increases the relative humidity in the shed. In contrast, in-shed sprinkler systems intermittently apply relatively small quantities of water directly onto the birds at regular intervals, which keeps the bird cool while using much less water — 56% less over a one-year period.

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The publication, *Effect of an in-shed sprinkler cooling system on temperature, relative humidity, water usage, litter conditions, live weight and mortality*, is available for purchase or download on the AgriFutures Australia website.

Patties going ready

Patties Foods is extending its product range and entering the vibrant ready-meal market. The company has just acquired Simplot's Pakenham facility in outer Melbourne — land, building and equipment — to facilitate this expansion.

Patties will continue to produce its savoury baked goods at its Bairnsdale site and will move its fruit production line to Pakenham, where it will also contract manufacture Leggo's pasta products for Simplot Australia as it also moves into ready meals and pastas.

With Patties pie sales experiencing double-digit growth, its Bairnsdale plant is not going to be neglected. A $20 million expansion of this facility will support a 25% increase in its output of of Four'N Twenty, Patties, Herbert Adams and Nanna's pies.

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Multi-syllable ingredients and chemophobia

In consumers' minds the terms 'clean label' and 'natural' mean 'safe', but this simply isn't correct.

Food safety depends on combinations of the intrinsic factors (pH, salt, sugar, preservatives) and food manufacturers who change, reduce or eliminate any of these factors in the quest for a 'clean label' must consider if they are increasing risk of food poisoning and/or reducing the shelf life of their product.

Right across the food and beverage processing industry manufacturers are reformulating their products to be clean label to make their product appeal to health- and sustainability-conscious consumers.

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This activity is in response to popular memes like 'Don't eat anything your grandmother couldn't pronounce' and 'Don't eat anything containing unpronounceable substances'. But this anti multi-syllable chemophobia could be laying the groundwork for some food safety disasters.

Think about the standard antimicrobials like potassium sorbate and sodium benzoate. In acidic foods they have safely functioned as effective preservatives for many years where they have not only prevented mould and yeast growth but been effective against *Listeria*, *Salmonella* and other harmful bacteria.

In fact food preservatives have probably saved more lives than antibiotics.

It is somewhat weird to look at where the clean label reformulation is taking us. Researchers are looking for natural sources of existing preservatives.

Celery extract, which is high in nitrate, is being used as an alternative to nitrite in some cured meats. However, to be effective the nitrate must be bacterially converted to nitrite. It is much more difficult to control nitrite levels when it's produced bacteriologically rather than synthesised in a laboratory. Premature spoilage has occurred because of insufficient nitrite in uncured processed meat.

Natural sources of benzoates are around. Benzoic acid is present in tomatoes, apples, blueberries and many vegetables but extracting sufficient quantities to replace the synthetic chemical would dramatically increase the cost only to produce exactly the same chemical.

Really the consumer needs to be educated about food safety rather than simply respond with antipathy to any words they don't understand. How to achieve this is, however, a mystery.

Food FOR thought

Campylobacter rates forecast to double

Climate change could result in the rates of *Campylobacter* caused food poisoning doubling by 2080.

Although *Campylobacter* is one of the leading causes of foodborne illness worldwide it is not well understood. Its transmission is complicated and involved multiple hosts and reservoirs but one hypothesis is that house flies move the bacteria between reservoirs and humans.

Researchers at the University of Guelph used an infectious disease transmission model which describes *Campylobacter* dynamics in Ontario to project how disease dynamics may change due to increased fly activity and fly population sizes in climate change scenarios.

Fly populations flourish in summer and with climate change, fly populations are likely to grow as the environment warms.

After modelling fly population sizes under different climate change scenarios the researchers found that when fly numbers were increased by a quarter, there could be an accompanying 30% increase in food poisoning cases caused by *Campylobacter*. This model predicted that human disease may more than double by 2080 in this scenario.

The research funded by the Canadian Institute of Health Research, Ontario Veterinary College scholarship and Canadian Research Chairs Program has been published in *Royal Society Open Science*.

How *Listeria* grows in foods

When cells are exposed to environments that are mildly stressful — such as a gradual increase in temperature — they develop resistance not only to this particular factor but to others as well, via a mechanism called "cross protection". As a result, by 2050 it is estimated that more people will die from bacterial infections than cancer.

By studying how *Listeria* grows in foods — particularly when novel, milder processing techniques are applied — the University of Surrey's BioProChem group is hoping to understand the mechanisms behind the development of antimicrobial resistance which could have implications for the food processing industry.

The research could provide useful information for food processors as antimicrobial resistance becomes an ever-increasing challenge. Conventional sterilisation techniques are being abandoned by food processors in response to consumer demand foods that have undergone minimal processing and have high nutritional value and sensory characteristics, which are lost during sterilisation. Food manufacturers are therefore looking at alternatives such as processing with natural antimicrobial compounds, ultrasonic treatment, hydrostatic pressure or milder heat treatment, which could all contribute to the increased development of antimicrobial resistance.

In the project, food products were remodelled so the researchers could examine how bacteria develop antimicrobial resistance in a highly controlled chemical and structural environment — in particular, how *Listeria* responds to nisin (a natural antimicrobial produced by lactic acid bacteria present in dairy products) and to heat in such a controlled environment. They found that in food models containing both proteins and polysaccharides, the bacteria grow exclusively on the protein, suggesting that *Listeria* has a mechanism which decides on where growth will take place.

"Our research could enable manufacturers to tailor products and processing techniques more effectively. The long-term aim is to ensure safety from 'farm to fork' and to find out how bacteria can develop resistance throughout the food chain as a result of a food's specific chemical and structural properties, explained Dr Eirini Velliou, who has led the recent project at Surrey.

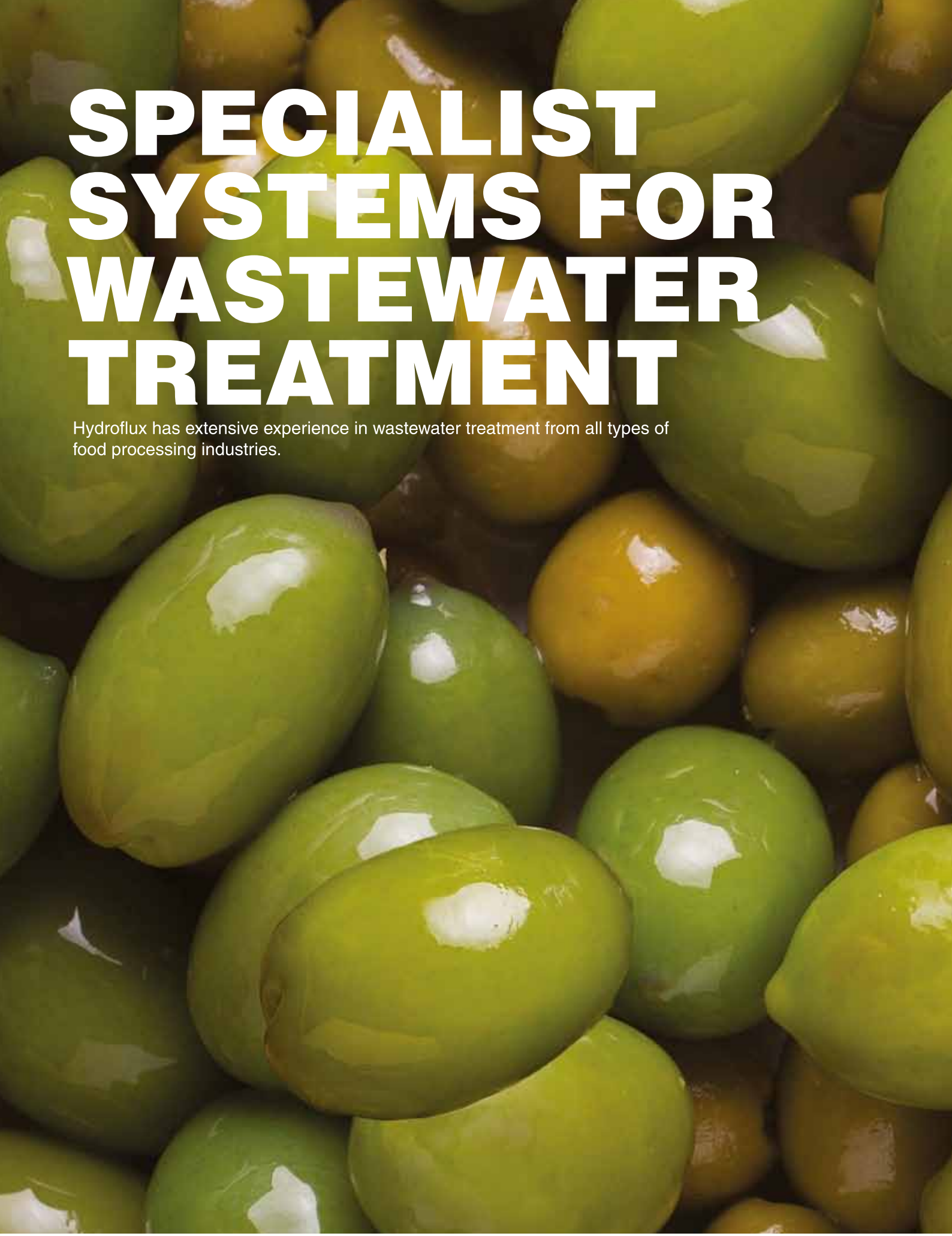
The research, led by the BioProChem group within the Department of Chemical and Process Engineering, has been published in the *International Journal of Food Microbiology*. It was conducted in collaboration with Surrey's School of Biosciences and Medicine and KU Leuven in Belgium.

New Australian service partner for SPX Flow

FDPI Spares & Maintenance's expertise in liquid processes within the dairy, food and beverage industries is behind SPX Flow appointing the company as a service partner. The new partnership will complement SPX Flow's existing service coverage and enhance service response times.

FDPI offers considerable service expertise on heat exchangers, separators, homogenisers, pumps and valves with 24/7 accessibility. The new partnership will include the provision of original SPX Flow spares and FDPI engineers will be fully trained and certified to provide service on key SPX Flow equipment brands including APV, Waukesha Cherry-Burrell and Seital Separators.

Common spare parts will be held in stock at an approved SPX Flow location to further reduce response times.



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Hydroflux has extensive experience in wastewater treatment from all types of food processing industries.

Food FOR thought

tna appoints new CEO

tna has named Jonathan Rankin as Chief Executive Officer (CEO), promoting him from his role as Chief Sales Officer (CSO).

Rankin has three decades of experience in the food industry, including various global management roles at tna from 1993 until 2003, and his recent return to the company to oversee its global sales division. He also previously served as general manager for food processing specialist Marel, where he was responsible for the successful growth of the company's Oceania operations.

In his new role, Rankin will draw on his experience to lead tna's day-to-day operations, while focusing on the implementation of new processes that will improve its operational efficiencies and growth.

Since it was founded in 1982, tna has grown into a global leader of food processing and packaging solutions for a wide range of industries, including snacks, confectionery, and fresh and frozen produce. It now operates out of 30 sites and employs over 500 people globally.

Alf Taylor, tna co-founder and Managing Director, noted Rankin's role in the company's recent growth. "Over the last 36 years, we've added some truly amazing people to our team, gained a fantastic bunch of customers and established ourselves as a global leader on the snack food manufacturing market," he said. "Jonathan celebrated some of our most important milestones with us and played an instrumental role in our growth. We were thrilled when he decided to come back and can't wait to see just how much further he'll take the business."

Flour dust goes to court — and loses

In the UK, a bakery company has been fined for safety breaches after its workers were exposed to flour dust.

Flour dust is a respiratory sensitiser and is known to cause allergic rhinitis and occupational asthma, with 'bakers' asthma' being one of the most common types of occupational asthma. Flour dust is also an irritant and may give rise to short-term respiratory, nasal and eye symptoms, and even chronic bronchitis.

The Leeds Magistrates' Court was told that Coopland & Son employees suffered long-term exposure to flour dust, with some developing medically diagnosed occupational asthma.

An investigation by the Health and Safety Executive (HSE) found there was no effective method of control to prevent the dust becoming airborne and employees being exposed to breathing in the dust.

The company pleaded guilty to breaching Section 2(1) of the *Health & Safety at Work etc Act 1974* and has been fined £159,080 and ordered to pay £4594 in costs

After the hearing, HSE inspector Geoff Fletcher commented: "Exposure to flour dust in an industrial setting can cause serious and debilitating health effects.

"Companies should be aware that HSE will not hesitate to take appropriate enforcement action against those that fall below the required standards."

Process olives without hurting the environment

To make olives palatable, commercial processors remove the bitter-tasting phenolic compounds such as oleuropein and ligstroside from the fruit. This is usually done by soaking the fruit in a potassium or sodium hydroxide solution and then washing it several times. This process is doubly bad for the environment as it consumes large amounts of water and produces toxic wastewater.

However, now a more environmentally method is in the offing following work by researchers from the Department of Food Science and Technology, University of California, Davis. Macroreticular polymeric resins were assessed to find if they could assist debittering and decrease water use. Four resins, Amberlite resins XAD4, XAD16N, XAD7HP and FPX66, were evaluated for the ability to adsorb bitter and/or high-value phenolic compounds with FPX66 proving particularly effective.

FPX66 reduced oleuropein in whole olives suspended in a 1.0% acetic acid brine to 0.635 mg/kg wet weight in 2.5 months with no further processing. This concentration is below levels measured in commercial California-style black ripe olives (0.975 mg/kg wet weight).

Not only is this method much more environmentally sustainable, the high-value phenolic compounds could be recovered from the resins by alcohol extraction.

These results have been reported in ACS's *Journal of Agricultural and Food Chemistry*.

what's new in food technology & manufacturing

prepared food

Prepare and cook high quality prepared foods with Heat and Control's single source solutions.

HEAT AND CONTROL

Mastermatic® Compact Fryer – ideal for a variety of Prepared Foods and Snacks

The cultural diversity of the Australian population has seen major influence and changes occurring in the food industry over recent years. New varieties of food, tastes, flavours and ease of ability to share recipes and ideas has seen consumers willing to try different types of food they otherwise might not have considered. Consumers are looking to food operators to cater to their new tastes, providing an opportunity for businesses to develop niche, high quality products.

The ability of a business to identify opportunities to value-add to their existing product lines can see them increase market share and revenue, and be seen by consumers as a brand innovator. The busy lifestyle of Australian consumers is seeing technology investment in the prepared foods industry continue to grow, as there is more demand for a greater variety in the menu of ready-made meals. This new generation of food products requires more creative processing techniques and equipment to allow us to duplicate and supply these foods on a commercial scale.

Heat and Control's range of multi-product Mastermatic Compact Fryers can provide food operators the control they need to cook superior prepared foods and snack products. The advantage of the Mastermatic Compact Fryer range is that processors have the capability to fully and efficiently cook a wide range of products on the same line, with most new processing lines installed to be as flexible as possible, allowing for multiple varieties of products.

They can accurately control temperature and conveyor speed to uniformly fry a wide variety of prepared foods such as chicken nuggets, meatballs & patties, spring rolls, onion rings, fish sticks, hash browns and french fries. As well as snacks such as pellets, nut meats, tortilla chips and fried noodles.

Low oil volume provides fast oil turnover for fresh product with a long shelf life and direct-heating without hot spots promotes oil and product quality.

The Mastermatic fryers provide a large frying area and require very little floor space, so they are perfect for smaller operations. From countertop size to larger free-standing models, all fryers are self-contained, including operating controls. Each fryer is delivered pre-wired and ready for operation and are the perfect continuous multi-product fryer for small and medium sized businesses.

The Mastermatic Compact Fryers are available in three different sized models:

Model 350: Space-saving countertop fryer provides 106cm of frying area from a 30cm wide conveyor belt and is electrically heated.
Model 450: Larger capacity countertop fryer with 135cm of frying area and a 30cm wide belt and is electrically heated.
Model 700: With nearly 213cm of frying area and a 50cm wide belt, this fryer meets the demands of the busiest food service operation and can be powered by natural gas or electrically heated.

There are many ways in which food processers can add value to their prepared foods and snack products. Keeping their production lines lean and using the most efficient processing and packaging technology will reduce downtime, boost speed of product output and increase yield.

The Mastermatic Compact Fryer will be on display at the Heat and Control booth D150 at Auspack in Melbourne.

For more information on how Heat and Control can assist you with adding value to your ready meal options, please contact Heat and Control at **info@heatandcontrol.com** **www.heatandcontrol.com** or call **+61 7 3877 6333**

HEAT AND CONTROL®

As consumer needs continue to rapidly evolve, propelled by convenience and food experiences that are setting the bar higher and higher, there has never been a more crucial time for food manufacturers to innovate to survive and thrive.

Emerging food trends
that will take a bite out of 2019

Rebecca Vella, Head of Insights and Innovation, Kraft Heinz Australia

It's imperative to understand the lifestyle, culture and values motivating consumers' food choices and the consumption trends emerging as a result. The food companies bound to thrive in 2019 will be those that are innovating based on consumer needs, despite the temptation to opt for short-term financial gain or operational ease. It's all about creating products, experiences and brands that resonate with the consumer by aligning with their world.

In today's environment, being truly consumer-led is challenging, but it's our core focus at Kraft Heinz. Consumer-first is one of our values, and consumer insights are at the forefront of everything we do. There is nothing more powerful than the voice of consumers so we make it our priority to talk to our retailers and shoppers as often as we can.

Here are some of the key trends impacting food manufacturers as we move into 2019.

Sugar avoidance

As people work to keep pace with today's connected, fast world, a healthy diet is becoming an increasing priority. According to a global study conducted by Nielsen, 64% of consumers follow diets that limit certain ingredients — with fat, sugar and sodium top of the list. Research by Nielsen also shows that over one-fifth of sugar-conscious Australians are willing to pay more for low-sugar products.

Food companies need to respond by reducing sugar while ensuring their classic products remain full of flavour. We've seen sugar replaced with artificial sweeteners, natural sweeteners and more recently with naturally occurring sugars such as honey and maple syrup. This is a result of consumers becoming increasingly informed about the difference between natural sweeteners and artificial sweeteners devoid of nutritional benefits. Looking ahead, we will continue to see a move towards sugar reduction, rather than replacement. Many beverage companies are gradually reducing the added sugar content of their products, and we also reformulated our Heinz tomato ketchup to include 50% less added sugar, which was incredibly well received. As this trend continues to grow, it will be crucial for food manufacturers to also ensure their products keep the sensory profile consumers are used to.

Work hard, play hard

The Australian 'work hard, play hard' ethic sees consumers with a holistic, healthy lifestyle embracing treats occasionally,

meaning their place on grocery shelves remains solid. These products respond to the emotional and functional needs of consumers — indulging in an occasional sugary item isn't broadly perceived as threatening to a healthy diet. But when they do want to be bad — its bad to the bone! Phrases like "not worth the calories" have never been more common.

Looking ahead, we will be seeing further polarisation in new product development particularly in the snacking space as consumers take indulging to the extreme while still embracing healthy lifestyles from Monday to Friday. Enter a world of experimentation and next-level thinking for food manufacturers, as they're truly given permission to go calorie crazy for the 'work hard, play hard' consumer. This trend influencing the food space poses great risk to products that are on the fence and halfway on the health spectrum. Food manufacturers will need to either meet extraordinary indulgence needs, or go down the opposite route and pursue nutrition-packed products with reduced sugar, and functional benefits for clean eating needs.

Power to the plants

As consumers navigate many contradictory messages around healthy ingredients, solace is being found in the certainty of plant nutrients and associated 'clean eating'. Manufacturers are fast responding to this trend with the integration of fruits, vegetables, nuts, grains, botanicals and seeds into more food products.

The market also experienced over double the number of vegan food product launches in the past five years, growing by almost twofold between July 2013 to June 2018, while vegetarian product launches remained relatively stable, according to Mintel. We can expect to see a further rise in plant-based products in 2019, driven by a dramatic rise in vegetarian, flexitarian and vegan lifestyle choices. At Kraft Heinz, we're increasing plant protein in more everyday products such as soups as well as baby foods, to adapt to the changing culture of consumers.

As more people move away from meat, there will be trendier takes on vegetarian/vegan versions of traditional dishes, such as eggplant parmigiana, as well as a new wave of products offering meat alternatives for those who still enjoy the taste of meat.

Multisensory experiences

Food experiences are no longer just about the food and taste profile of products. Demand is increasing for unique multisensory food experiences that provide culinary magic from how a product tastes, feels, its aroma and the feasting of our eyes. As a result, food manufacturers are developing new products with a series of differentiators in terms of taste, colour and texture. Think popcorn with both sugar and salt, or black vodka and chocolate with chewy caramel, crunchy nuts and anything else that can be jam-packed in the wrapping. This trend has manifested itself in the indulgent and fast food space, but we will also see a multisensory explosion in the savoury and clean eating spaces soon.

The rise of snacking

The evolution of our lifestyle is driving food products to accommodate time-pressed schedules with more flexible food options. According to Mintel, we are witnessing "the rise of a snacking society" with 32% of Australians claiming they tend to prefer frequent snacking as opposed to sticking to the traditional three meals per day regime.

The snacks most successful in this space align a high nutritional profile and a variety of formulations, tastes and textures, with portability. Consumers are increasingly attempting to squeeze as many nutrients as possible into their time-poor schedules, generating an array of snacks incorporating super foods and plant protein. There is also a demand for beverages packed with fruit and vegetables.

Eat like the locals do

Consumers' obsession with international cuisine and new and exciting foreign flavours will continue, as globalisation becomes engrained and consumers are exposed to more influences from across the globe. When they are not enjoying their favourite international cuisine while eating out, consumers are looking to incorporate these tastes at home with readily available ingredients. Sauces are becoming a way for consumers to tap into foreign flavours while also allowing for self-expression and customisation. Leveraging off our global portfolio, Kraft Heinz has effectively grown its table and cooking sauce portfolio to expand into global cuisines.

The future of innovation in food manufacturing is bright and delicious as we look towards the new year, peppered with great opportunities for creativity and experimentation. As food preferences and consumer lifestyles continue to evolve, the opportunities for food products to align with new trends are boundless. However, food manufacturers who experience the most success in 2019 will be those who anticipate or even influence food trends. This can only be achieved through truly understanding, and anticipating, the needs of the consumer, who belongs at the heart of the product innovation process.

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IMCD

Value through expertise

Is glove juice contaminating your product?

Hand hygiene is a prerequisite program in nearly every HACCP program in the food and beverage industry, but anyone who thinks simply supplying disposable gloves ensures safe food is kidding themselves.

The proper use of gloves in food processing and food service is predicated on the maintenance of glove integrity. An unnoticed pinhole in a glove can release tens of thousands of bacteria or virus particles into product within seconds.

The atmosphere in most gloves is hot and sweaty, which creates 'glove juice'. Bearing in mind that it has been shown in the UK that 30% of caterers do not wash their hands after going to the toilet and that the area around the fingernails is the most contaminated on the hands and this area is flushed with glove juice — just think of what is in the glove juice that is dripping into your product.

Properly used gloves do a good job — but care must be taken to ensure the right gloves are used and they are changed regularly and immediately if their integrity is compromised.

It is important that the gloves themselves are not a source of contaminant. Pretty well all of the gloves used by food handlers in Australia and New Zealand are manufactured in South-East Asia where they are not necessarily subjected to levels of monitoring or scrutiny considered the norm in local production. To be safe for contact with food the gloves should not allow migration of deleterious substances, colours, odours or tastes to food.

Gloves also have to be kind to users' hands — occupational skin disease is one of the most frequent causes of lost time in the food industry and skin damage associated with the use of the wrong gloves for the job can result in unnecessary turnover.

Latex in gloves is notorious for causing allergies to the extent that many food types can cross-react with the latex allergen resulting in allergies to foods such as banana, avocado, chestnut, kiwi, tomato and potato. The more severe reactions to latex and cross-reacting foods can be life-threatening.

Glove choice and HACCP plans

The questions that food safety managers need to ask are:

- What is the intrinsic potential for system failure?
- What role can gloves play in preventing that failure?
- To what extent are the failures hidden as sporadic complaints or shelf-life problems?
- What is the catastrophic potential if multiple parts of the system fail simultaneously?

What to consider when choosing disposable gloves:

- Match the working load and tensile strength with the glove.
- Check for allergic reaction potential and insure skin health.
- Size gloves properly and consider ease of donning and comfort of fit.
- Proper hand-washing and glove-changing protocols are in place and effective.
- Powdered or powder-free.

Types of gloves

- **Polyethylene** (PE) copolymer gloves are generally the least expensive of all glove types. They are available in high-, medium- and low-density forms. Typically loose fitting, dexterity is lower than that of any other glove

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type. PE gloves tear quite easily and are not suitable for use around high heat as the heat welded seams on PE gloves are a typical failure region.

- **Vinyl** (polyvinyl chloride or PVC) gloves are sometimes considered to be an acceptable alternative to latex as they provide snug fit capabilities and some degree of dexterity. They are more resistant to ozone and oil than natural rubber latex (NRL) and can be worn around heat sources without risk of melting. Stretching the gloves as they are donned can cause holes.
- **Nitrile** (carboxylated butadiene-acrylonitrile) gloves are less elastic than latex but are more durable. They feature good physical properties and provide the wearer with good dexterity. Nitrile gloves are resistant to many chemicals but are sensitive to alcohol degradation. While they are abrasion- and puncture-resistant, once breached, they tear easily.
- **Natural Rubber Latex** (NRL) makes comfortable, tight-fitting elastic glove types that offer good dexterity, a snug fit, good tactile sensitivity and can withstand high heat. However, many people are now either allergic to latex or to the chemical additives used in the glove-making process. NRL gloves will deteriorate over time by exposure to oxygen, ozone or ultraviolet light and are degraded by oils and solvents such as alcohol.
- **Polyurethane** (PU) gloves are free of chemical additives other than the pure polymer itself, consisting of polymeric methylene diphenyldiisocyanate. These glove types offer high tensile strength and durability.

> *Food safety demands both proper hand hygiene and correct disposable glove use.*

Workers hands were implicated in 89% of food poisoning outbreaks in restaurants where the food was found to be contaminated by a food worker. Food safety demands both proper hand hygiene and correct disposable glove use.

Dogs and cats are going vegan

Pet owners are more likely to be vegetarian or vegan than members of the general population, which is not surprising considering many choose not to eat meat or animal products due to concerns for animal welfare. However, they face a moral dilemma when it comes to feeding their pets foods containing animal products.

Canadian researchers wanted to estimate the number of meat-avoiding pet owners, identify concerns regarding pet food and estimate the number of pets fed a plant-based diet. A survey of 3673 pet owners revealed that 6.2% were vegetarian and 5.8% were vegan, which is a higher prevalence than has been reported in the general population. They found that, with the exception of one vegetarian pet owner, vegans were the only ones who fed plant-based diets to their pets.

While only 1.5% of pet owners fed their cats and dogs solely plant-based diets, an additional 15% were interested in doing so. The most commonly reported concern regarding meat-based pet foods among all pet owners was the welfare of farmed animals (39%), which could explain the interest in plant-based diets. However, 74% expressed concerns about the nutritional completeness of strictly plant-based pet foods, and 45% wanted more information demonstrating their nutritional adequacy. The availability of these diets, veterinary approval and costs were also concerns.

Despite these figures, the majority of pet owners (65%) reported they would not feed their pets a plant-based diet even if one met all of their criteria. The researchers said this was expected considering the majority of people consume an omnivorous diet themselves. They concluded: "It is clear that an association exists between the diet a pet owner has chosen to follow and the diet they choose to feed their pet."

Considering the number of pet owners already, or at least considering, feeding plant-based diets to pets, and the implications on pet nutrition, the researchers also suggested that further research is needed.

The research was published in *PLOS One*.

Prevent pastry dough discolouration naturally

White pastry doughs often change colour during storage due to enzymatic browning and so become less attractive to consumers.

The browning is driven by polyphenol oxidases, the same enzymes that are responsible for browning in apples and bananas. The enzymes catalyse the oxidation of different phenols to the corresponding quinines and these highly reactive compounds then polymerise to brown-coloured melanins.

While there are additives available that can help suppress this reaction, more and more consumers are requesting natural ingredients in their foods, so manufacturers are seeking alternative ways to preserve pastry, cake and pie doughs.

Swiss researchers, with funding from Jowa AG and Swiss Food Research, looked at ways of preventing or at least minimising pastry dough discolouration.

Initially they investigated various synthetic additives and showed that they had different effects on dough. For example, some caused a slight discolouration when initially added, but prevented further discolouration upon storage, while others kept the dough white from the get-go.

Turning to natural products, the researchers experimented with white wine, grape juice and lemon juice. They observed that a combination of white wine and lemon juice did the best job of inhibiting PPO activity and preventing enzymatic browning.

The paper's abstract is available at http://pubs.acs.org/doi/abs/10.1021/acs.jafc.8b04477.

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Ever heard of the food allergy FPIES?

Most of us, including medical professionals, have never heard of FPIES and so this poorly understood food allergy is often misdiagnosed.

FPIES, food protein induced enterocolitis syndrome, mostly impacts children under two. These children suffer an allergic reaction after ingesting a trigger food. The most common food triggers for the allergic response in descending order are: rice, cow's milk, egg, oats and chicken.

One to four hours after eating the trigger food the children present with symptoms including profuse vomiting, pallor and lethargy, hypotension, hypothermia, diarrhoea, neutrophilia and thrombocytosis.

Lack of awareness of FPIES means these children are often misdiagnosed as suffering sepsis or gastroenteritis.

No blood test exists for FPIES, and the treatment in an acute setting is fluid replacement, with ondansetron also believed effective. Long-term management involves confirming diagnosis via a food challenge, and avoidance of identified trigger foods.

The FPIES Foundation explained that FPIES is a non-IgE food allergy, which, unlike classic food allergy, cannot be diagnosed with readily available food allergy tests such as a skin prick test (SPT) or a blood test that measure food IgE antibodies (RAST). These tests are helpful to identify triggers for typical food allergies that result in immediate hives, wheezing and swelling, and are characteristically negative in FPIES. An FPIES diagnosis is usually made by considering the history of the characteristic symptoms and exclusion of various alternative illnesses.

"Diagnosis is often hampered by the lack of awareness of FPIES, absence of reliable biomarkers, the non-specific nature of the presenting symptoms, and the delay between allergen exposure and symptoms," according to Dr Sam Mehr, a paediatric immunologist and allergist at Royal Melbourne Hospital, and Professor Dianne Campbell, Chair of Paediatric Allergy and Clinical Immunology at the University of Sydney, and Children's Hospital, Westmead.

"It is likely that improved understanding of the immunological basis of FPIES will, in the future, facilitate the development of a sensitive and specific biomarker," Mehr and Campbell concluded. "Until that time, use of standardised diagnostic criteria, improved recognition, timely fluid resuscitation, avoidance of trigger foods, and education form current best practice."

Mehr and Campbell's narrative review has been published in the *Medical Journal of Australia*.

High-purity stevia sweetener

BESTEVIA Reb M Stevia Leaf Sweetener is a non-caloric, high-purity stevia sweetener with a clean, sugar-like taste, without the bitterness associated with some stevia sweeteners.

The production process starts with the stevia leaf and uses a patented bioconversion process to achieve high quantities of Reb M, economically unattainable from traditional stevia extraction methods.

Food Standards Australia New Zealand (FSANZ) has approved it for use as an intense sweetener.

Ingredion currently distributes the sweeteners in North America, Colombia, Peru, Australia, New Zealand and additional countries as regulatory approvals are granted.

Ingredion

www.foodinnovation.com

Compact direct-flow water purifier

The Bluewater Pro Water Purifier offers water delivery capability to foodservice, restaurant and catering businesses, efficiently generating up to 6900 L of direct-flow water a day.

The compact water purifier measures 46.5 cm high and 22.6 cm wide. WQA certified, it harnesses the company's reverse-osmosis technology called SuperiorOsmosis, which ensures the membrane is continuously washed while in use to increase filtration efficiency, boost operating capacity and provide a long service life.

Features include: alerts on water quality, pressure leakage, filter capacity and replacement; user-friendly and easy maintenance with automated valves, pumps and cleaning; and a long-life membrane. The product is eco-friendly, with reduced water wastage.

Bluewater

www.bluewatergroup.com

what's new in

food

technology & manufacturing

processing

Infrared technology helps meat processing in Asia

Korean food supplier HJF has further expanded its offering of healthier and more ecological processed foods to customers in Asia by purchasing its second Infrabaker oven.

Infrabaker International specialises in the development and production of infrared applications for the food industry.

HJF purchased its first 3 m Infrabaker for large industrial-scale production of fully direct grilled products in 2014, coinciding with its motto "Health and Values to customers". With grilled chicken breast in high demand, the company has recently invested in another 6 m of Infrabaker cooking equipment that will be installed at its new production plant at the Megapolis Industrial complex in Chungcheongnam-do, South Korea.

The 11.550 m^2 plant will offer room for approximately 80 new employees, and production on the Infrabaker is expected to start in early Q2 2019.

GEA to build infant formula plant in China

GEA will build an infant formula plant in China for Shijiazhuang Junlebao Dairy, with commercial production expected to begin in 2020.

The company secured an order from the Shijiazhuang Junlebao Dairy in September 2018 to supply the country's largest spray dryer for the manufacture of infant milk formula, with a planned production capacity of six tonnes per hour.

The new plant is being built adjacent to a similar one completed in 2016, and GEA will supply wet mixing, evaporation, drying and downstream powder handling. The company is also responsible for the plant design, project execution, installation and commissioning, and automation

It will include the GEA MSD-1600 multistage spray dryer, which combines spray and fluid-bed drying in a three-stage drying process. The drying tower produces formula powder products to customer specifications and achieves an excellent agglomeration effect.

Fonterra's Brightwater boiler conversion cuts emissions

Fonterra's Brightwater milk processing plant in Nelson has reduced its carbon footprint using its newly converted boiler that co-fires with wood biomass.

The Brightwater boiler conversion, which was officially switched on by the Energy and Resources Minister Megan Woods, slashes the amount of coal used and cuts carbon emissions at the site by around 2400 tonnes a year — roughly the same as taking 530 cars off the road.

Robert Spurway, Fonterra COO Global Operations, said it is part of Fonterra's plan to reduce emissions across all sites and will help the company achieve its targets to reduce carbon emissions by 30% by 2030 and net zero by 2050.

"We'll take what we learn from this conversion and apply it to our longer-term co-firing strategy for other boilers across the country. Brightwater shows what's possible when it comes to reducing our reliance on fossil fuels."

Spurway said achieving these targets will involve a combination of energy options and energy efficiency gains. "On the electrification front, we've been exploring a number of options. We've completed a feasibility study to convert our Edendale operations to electricity and in August announced our plan to replace coal with electricity at our Stirling site in South Otago," he explained.

Andrew Caseley, Chief Executive of Energy Efficiency and Conservation Authority (EECA), which provided funding support for the boiler, said this project demonstrates how co-firing can be used to reduce energy emissions for process heat.

"Co-firing has wide potential for replication with other businesses that use coal boilers, with the ultimate goal of replacing fossil fuels with renewable energy.

"EECA support for the Brightwater boiler conversion is an example of how we can successfully work together to achieve positive outcomes for the environment."

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Using beer production leftovers

Mia Malmstedt

The leftovers from beer production — spent grains — contain a high amount of fibres and protein, and could be the basis of new foods. However, usually this spent grain goes to waste or at best, to animal feed. Swedish researchers are trying to change this.

In 2016, 263 million litres of Swedish beer was produced, and this is increasing with microbreweries popping up everywhere, in particular in Gothenburg.

As more beer is brewed there is a growing opportunity to take advantage of the spent grain. Swedish breweries produce over 50,000 tons of spent grain annually. Today, this sidestream is viewed as waste, although it contains more than 50% fibres and about 20% protein, and could make the basis for excellent and nutritious foods.

"Small breweries are paying for someone to come and remove the spent grain. They would like it to be used as animal feed, but it's tricky and a logistical challenge," said Joshua Mayers, researcher at the Chalmers University of Technology Department of Biology and Biological Engineering, who is now aiming to take a closer look at these processes, together with researchers from RISE and representatives from both the food and brewery industries.

In a first project, headed by Chalmers Industriteknik, the researchers map out the life cycle of the spent grain, prerequisites for a new way of handling this raw material, and the breweries' interest in making change happen.

"The really big breweries have solved this issue by selling their spent grain as animal feed, or using it as biofuel in their own production plants. This year we could also observe an increase in the amount of spent grain going to animal feed, even at the smaller breweries. We believe this to be a result of the summer's drought; farmers are in need of alternative feed. This solution benefits both farmers and breweries, who then don't pay for disposal," Max Björkman at Chalmers Industriteknik explained, and Mayers added: "The smaller players don't really have a long-term plan. But we think a change will come. We also see a big interest in developing foods from spent grain. There are many projects going on in the United States and even within Europe — Sweden, however, is falling behind."

Cereals, flour or meat replacement

Spent grain has previously been used in Sweden in a few small-scale projects with flour, for example, in pizza dough, but there's a huge variety of possible uses. Spent grain could be used as an ingredient in energy bars or breakfast cereals. It could also replace potato or corn starch, be puffed into cheese doodle-like products or even become a replacement for meat and soy products.

"The raw material might not have the same taste, but the nutrition value is certainly higher as it contains less carbohydrates, and more protein and fibres," Mayers said.

An investment might be needed by the breweries to make use of the spent grain, but they could also save money on disposal while producing a new product. First of all, however, logistics and handling of spent grain — which have a high water content and spoil quickly — must be solved. The researchers also want to look more closely at the spent grain's effect on the texture of a product, as well as the taste.

An interest in alternative solutions

"We know that spent grain could be used, but there's a lot of questions to answer. There are challenges — but we also know that there's a big interest in solving this," Mayers said, and gets support from Erika Brockberg, Head of Quality Control at the brewery Poppels: "Spent grain makes up a vast majority of our overall waste, so being able to dispose of it in a reliable and responsible way is important. We currently donate our spent grain to be used as animal feed, but if that plan ever got interrupted, it would stop the flow of brewing, put our whole production schedule at risk and quickly become an expensive problem to solve. We're glad to be contributing to this project and we're excited to see what alternative solutions are out there."

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High-temperature resistant pressure transmitter

Bestech Australia has introduced a pressure transmitter specifically designed for the food industry, the series 35 X HTC. It is a high-temperature resistant pressure transmitter capable of measuring pressure at media temperature up to 300°C. What makes it possible is the oil-filled capillary situated between the flush diaphragm and the silicon measuring cells, which functions as a cooling spiral.

This piezoresistive pressure transmitter is digitally compensated for temperature and non-linearity using a micro-processor electronics integrated with 16-bit A/D converter. This allows the sensor to achieve a maximum measurement accuracy of 0.05% with long-term stability. The sensor is also capable of generating both analog output of 4–20 mA or 0–10 V and digital output of RS485.

The sensor is best operated with the READ30 and PROG30 software to monitor the pressure signal and the temperature of the inside electronics, respectively. Using a BUS-system, up to 128 transmitters can be hooked together and data can be displayed in a single PC. Monitoring the temperature of the inside electronics is crucial as the temperature may not exceed 120°C. Sensors can also be customised with different materials for pressure measurement in a highly aggressive media.

Key features include pressure range of 3–1000 bar, 0.002% full-scale resolution and optional IP67 protection level.

Bestech Australia Pty Ltd
www.bestech.com.au

Food-grade bio-degreaser

CRC Industries has introduced an NSF A1-rated CRC Food-Grade Bio-Degreaser which expands its CRC GREENLIGHT Food Safe Program range.

The bio-degreaser is a heavy-duty cleaner formulated to penetrate and dissolve tough grease, oil and contaminants for easy removal, safely. Biodegradable, non-toxic, non-hazardous, non-flammable, pH balanced and water soluble, the bio-degreaser's formula is non-abrasive, non-corrosive and solvent-free.

The product can be used on all metals and alloys and will not damage bright metals, including aluminium and brass. It is safe for use on fibreglass, glass, plastics, rubber, painted surfaces and laminates. It is also gentle on the environment with all ingredients readily decomposable.

It is suitable for use in many applications, especially where there are regulations or restrictions in place concerning the types of products that can be safely used or allowed. It can be used to quickly to clean mechanical equipment motors, tools, benches, walls, floors, filters, grills, drills, grinders, rollers, dies, moulds (injection, plastic, steel, aluminium), chains, conveyers, wire rope, robotics, hoists and more.

It is available in 5 and 20 L bulk containers as well as a 750 mL trigger pack.

CRC Industries Australia Pty Ltd
www.crcindustries.com.au

Compact hopper feeder

The compact Enmin Electromagnetic Hopper Feeder is engineered to optimise the user's food production processes. This robust, yet compact unit holds bulk dry food products and ingredients and is designed to consistently deliver the product at a metered rate.

The hopper feeder is suitable for a variety of food production facility needs. Designed for mobility and to take up minimal floor space, it can be used as a standalone unit or as part of an integrated-modular turnkey system. The hopper feeder significantly reduces manual handling and food wastage by hygienically storing and accurately delivering product to a secondary process.

Designed in Australia, the company's Electromagnetic Hopper Feeder range can be customised to meet the user's specifications, requires minimal maintenance and is built to withstand the demands of food production and handling.

Enmin Pty Ltd
www.enmin.com.au

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Using compliance
to restore consumer trust in food

Dominique Stucki, Head of Operations for Manufacturing Execution Systems, ABB Control Technology

In light of a growing number of food recalls in recent years, the food industry is in a precarious situation where consumers are trusting manufacturers less than ever before. However, consumer trust can be rebuilt with the effective management of compliance.

There was widespread panic across Europe in mid-2017 when millions of eggs were recalled because they were contaminated with Fipronil — a highly toxic insecticide that is banned in the EU. Eggs were found to contain high levels of the toxin, which led to products being removed from shelves in Belgium, Germany and the Netherlands.

This of course only addressed part of the problem. Since eggs are a staple ingredient in many delicacies and dishes prepared and sold through supermarkets, the extent of the contamination is still unknown. Sadly, this is only the latest in a long line of blows to consumer trust of food manufacturers in the twenty-first century.

While the use of banned insecticides is indefensible, particularly in this incident, the recall does highlight a persistent issue in the international food chain. Fipronil, while outlawed in the EU, is legal for sale and use in the US agricultural sector. There are similar inconsistencies in product and practice legality in the food industry, which underlines the importance of best practice when managing compliance.

If we consider best practice as being the most effective means of businesses achieving compliance, it is important that food plant managers also effectively manage the requirements of the regulations their products are subject to.

For smaller businesses that source, manufacture and sell products entirely within one country, this is not too challenging. The difficulty arises in exported products, which require businesses to produce several recipes for products that meet the specific needs of each territory being exported to.

An example of this is alcohol manufacturer Sazerac, which had its Fireball whiskey temporarily removed from sale in Finland, Norway and Sweden in 2014. This was because the product contained amounts of propylene glycol in excess of EU limits of one gram per kilogram of product — yet in an amount that met US market requirements. In a statement, Sazerac regarded this as a "small recipe-related compliance issue".

Fortunately, plant managers can effectively manage compliance alongside things such as traceability by using suitable food manufacturing operations management (MOM) systems or manufacturing execution software (MES). MOM and MES systems unite the disparate equipment and systems in a plant and collate process data into one central location in a clearly presented way.

This means that plant managers can use these systems to create a strong digital footprint for every product, which can

validate raw materials, trace ingredient origins and provide a clear overview of production recipes — including ratios of ingredients against regulatory limits.

Management of processes is an area of food production where many plant managers often fail to realise best practice, yet it will become increasingly critical to operations. Recent years have seen a significant rise in the uptake of internet of things (IoT) technologies in the food sector, as well as a growing number of initiatives prompting businesses to invest in it. This will make effective data management and food manufacturing IT a necessity.

For example, the EU has been funding the Internet of Food and Farm 2020 (IoF2020) since the start of 2017. The initiative aims to increase the large-scale uptake of IoT systems in the agricultural, farming and food processing sectors by the end of 2020. If successful, this will make the modern food plant highly connected featuring hundreds of points of data collection.

This data is only worthwhile if it is managed effectively. Plant managers using MES systems can not only collect and review this performance data quickly, but also set quality parameters for those systems to ensure that all products meet quality standards.

This is the key to not only delivering peace of mind to consumers but also to ensuring long-lasting regulatory compliance. Society is becoming increasingly data-driven and there is a rising expectancy for information pertaining to the history of products, whether for hygienic or ethical reasons.

For example, it's realistic that conscientious consumers will soon be able to use smartphones in stores to view data on product history and ingredients. Plant managers can already use that same data in an MES to ensure that, before any product leaves the plant, it is safe for consumption and regulatory compliant.

Regulations change frequently, so managing compliance is about more than understanding multiple market standards. It's about having the ability to flexibly react to changes in regulation without downtime or reduced output. Plant managers using MES have the organisational agility to respond to these adjustments quickly and effectively, without risking releasing an unsuitable product to market.

The growing number of food recalls has undoubtedly shaken consumer trust in the food industry. In fact, a food consumer trust survey conducted shortly after 2013's horsemeat scandal showed that 69% of people consider it important to know where their food is produced.

The onus is now on food plant managers to restore consumer trust and safeguard the future of the food industry. This can only be achieved by going beyond compliance as a box-ticking exercise and investing in best practice to ensure long-term safety and success.

Dough temperature control

Baker Perkins' Tweedy SuperCool process combines bowl cooling with control technology to provide precise management of dough temperature in any climate.

The system can be retrofitted to existing installed mixers. The technique features a redesigned cooling system that can increase heat transfer from the dough to the cooling jacket during mixing.

The company's software measures flour and ambient temperature and relates them to energy requirement for the mixing process. It then regulates incoming water temperature and applies jacket cooling to achieve the exact dough temperature required.

This creates complete control over dough temperature, which is fundamental to efficient downstream handling. The target temperature for dough is normally 26 to 30°C.

The effectiveness of the system is demonstrated by a reduction in final dough temperature of 'X'°C on a large batch industrial mixer.

It is suitable for high-output plant bakeries making tin and pan bread, burger buns, rolls and pizza bases, including the sourdough, liquid sponge and sponge and dough processes.

The system enables the Tweedy high-speed mixing process to be used in hot climates including the Middle East, Latin America and Asia where effective dough temperature control is a potential problem. Mixer bowl cooling is cost-effective compared to the capital and energy costs of flour cooling equipment and bakery air conditioning.

Baker Perkins

www.bakerperkins.com

Safety laser scanners for mobile applications

With the microScan3 Pro, SICK is expanding the product family of the microScan3 safety laser scanners, which are suited for safety and navigation in mobile applications as well as the intelligent protection of complex stationary applications.

The safeHDDM scanning technology increases the reliability of the microScan3. It functions well in dust and ambient light. It increases the productivity and availability of machines. Smart connectivity facilitates safe integration into networks and cuts cabling costs. Using Safety Designer software, the microScan3 can be intuitively configured and commissioned. The operational status can be called up and read on the display or via the network.

SICK Pty Ltd

www.sick.com.au

Multiscan metal detector

The Thermo Scientific Sentinel 5000 Multiscan Metal Detector utilises multiscan technology to overcome the limitation of fixed single or dual frequency metal detectors that can miss metal contaminants hidden in product signals.

Multiscan technology scans a combination of up to five user-selectable frequencies making it a universal solution for multiple applications. This enables users to identify contaminants that are up to 70% smaller in volume than previous technologies and provides a high probability of finding ferrous, non-ferrous and stainless steel metal contaminants. It is like having five metal detectors in one.

In today's fast-paced, right-sized world, everyone is busy balancing never-ending demands. With this in mind, the Sentinel 5000 software has been designed with user-friendly software to allow field set-up and balance in minutes to get processors and manufacturers detecting metals faster, across mixed production lines providing time saving.

The Sentinel 5000 is suitable for challenging products and applications such as dairy, meat, poultry, bread and other products or packaging with high signal distortion during production and final fill.

Thermo Fisher Scientific

www.thermofisher.com.au

Differential pressure transmitter

Dwyer Instruments' Series 629HLP Differential Pressure Transmitter is suitable for monitoring differential pressure in applications such as air handlers, heat exchangers, chillers and hydraulic systems.

It is a high static, low differential pressure transmitter that is suitable for measuring overpressure or under-pressure conditions. The IP65-rated enclosure provides a robust exterior, while the compact and lightweight assembly allows for trouble-free installation.

The series can detect a low pressure differential across high static pressures, allowing for improvement of measurement accuracy and providing the ability for the system to react quickly to changes. Integral dual pressure sensors are able to convert pressure sensors into a customer-selected 4 to 20 mA or 0 to 10 VDC output signal. Ranges are available up to 6 bar (90 psi) with accuracy up to 1% full-scale.

Dwyer Instruments (Aust) Pty Ltd
www.dwyer-inst.com.au

Sandwich biscuit production system

The Capptronic HS from GEA Comas allows users to produce sandwich, filled or spot-deposited biscuits directly in line with the baking oven from GEA Imaforni to eliminate the use of complex, expensive, traditionally used stacking systems.

It is equipped with a biscuit tilting system and has a manifold design for weight accuracy. It is designed for high performance and depositing accuracy, and the machine control is completely electronic owing to the use of brushless motors on all the control devices.

The working parameters can be adjusted while the machine is running without having to stop production.

GEA Australia
www.gea.com

Abattoir reduces labour with Euro Pumps consulting

Joanne Field, Product Development Manager

Last year, Euro Pumps was contacted by E.C. Throsby in Whittingham (near Singleton), NSW, to undertake some consultancy on improving their cleaning cycle. They wanted the following:

- Assess E.C. Throsby's current cleaning practices.
- Advice on any cleaning improvements and equipment.
- Advice on shortening cleaning time to allow for increased production.
- Complete a written report.

Initial visit

I attended the plant and viewed the entire cleaning process from start to finish. When undertaking assessments, everything was checked: water, chemical, staffing and anything that uses water, as there may be additional savings that can be made.

Recommendation

After my visit, I submitted my report suggesting changes to the cleaning process, cleaning equipment, staffing levels and training.

The major recommendations were staff training and updating the cleaning equipment as it was outdated and not up to the task. I recommended a trial of the Euro Pumps FLX trolley to improve cleaning speed. The FLX trolley is a product we have developed from lessons learnt from our own cleaning cycle. It provides better pressure and flow while eliminating the cost of pipework from the system.

Trial of recommendations

My report recommended a labour saving of up to four people using the (speed/quality) improvements from the FLX trolley. This is a big potential saving to E.C. Throsby, so it was important to manage the staff correctly in order to make this work. The GM of Throsby requested a trial for a 2- to 4-week period as he had to see it work.

The trial was organised and a trolley was sent to Singleton. In the end, the trial went for 2.5 months as the original timeframe would not have worked as the cleaners spent the first couple of weeks getting used to the new wash hose. This prompted us to do a second training visit to demonstrate the correct cleaning techniques.

Second visit

During the secondary visit to follow up with the cleaners, I was accompanied by an experienced Euro Pumps Cleaning Manager, Wellington Masamha, to assist with demonstrating hosing techniques and further training.

The Cleaning Manager has 10 years' experience with the Euro Pumps scrubber, which is our trickiest tool to implement correctly and his experience makes cleaning look fast and easy. This Euro Pumps scrubber gun will save time, so it's important to get it right.

We all agreed that Wellington visiting the site was beneficial as it showed first hand a better result at higher speed is achievable and he provided good feedback.

Having Wellington on site also allowed us to map out 'how Euro Pumps would run it'. This does not mean we would be running anything but it gives us ideas and creates a positive result. It's easier to stay the same but if you do you will never make a saving. Labour is labour.

During the trial, E.C. Throsby worked closely and honestly with their crew, which we found helpful and important. The cleaning staff had read my reports so they were aware from day one what the end goal was, and they adjusted well. My reports are very detailed with savings; I wasn't aware they were going to read it. Lesson learnt — tiptoeing around is probably worse and it's best for staff to be informed of the end results.

Trial conclusion

When the trial was coming to an end and the labour saving was evident E.C. Throsby made an order for four trolleys and requested to keep our trial trolley until theirs arrived, which we agreed to. A few weeks later, four trolleys where delivered and commissioned, and E.C. Throsby have since asked to retain one of the trial units as an additional unit.

Problems, solutions and lessons learnt

Less movement saves time

One of the first lessons learnt was working out what trolley goes where and when/if it gets moved during cleaning. This minimised lost time and additional work as, like other current trolleys on the market, they are not the lightest machines.

Solution: Plan your cleaning flow, anywhere you can save time by not moving an item is a saving.

Mixing water

E.C. Throsby has three lines on site — hot, cold and warm — therefore we had to mix water to get our desired 65 degrees. Mixing water is problematic and costly with mixing valves being expensive. The first mixer failed, but luckily, we only ran one pump on this as only one was installed. The other valves were manually controlled, which worked throughout the trial. The only problem is it depended on a human, which could fault one day. The one that ran of this failed mixer ran hot (70 degrees) and cavitated. Although this sounds bad, I learnt a few things. Pressure gauges are destroyed instantly by cavitation and the top blew off. Since then, we learnt about the snubbers that can be installed to take the initial shock. The hose was not in good condition as the cavitation caused the hose to rub on the hose it was touching. The pumps need positive water. E.C. Throsby's GM sorted a new automatic mixing valve from Italy, which can be re-kitted and are available in sizes up to 2 inches. The other bonus is that you can mix one area rather than the whole plant. They were a success and we took note of this brand. Now we can track the life of these.

Solution: Trained the Cleaning Manager to not assume mixers are working. Use a thermometer to learn temperatures. I can get very close estimating by feeling the pipe or pump head, feel it as you walk past.

Pump running in bypass

Cleaner error, a pump was left running in bypass with the pressure gun attached to the hose making a closed loop, causing the water to get too hot. It destroyed all the valve cages and the plastic went through everything, including gun, turbo heads etc. It was all sorted by EP Engineering.

Solution: Reinforced training on using the FLX Trolley.

Shorter hoses

We banned 50 m lengths of hose and cut them in half. I had a heart attack watching them being rolled up. I am really strict on treating hoses properly.

Solution: Connected 25 m to 25 m with quick connect fittings. This was to reach areas in the boning room. Note: Do not use grease on quick connect fittings the EPDM O-rings will swell, and make sure to keep them clean. Use CRC on rotation.

Electrical connection safety

The cleaners burnt a couple of 3-phase plugs. Originally, Euro Pumps cleaners did this as well, due to unfamiliarity with the plug type.

Solution: Train the cleaners to plug it in and screw it in tight, 32 AMP plugs cannot be loose or they will blow. We also found 20 AMP plugs work too, if not using full motor potential and the water pressure is good.

Milky oil

The pump with the blown-out gauge from above was the only machine with milky oil and although the water was not spraying onto the machine, somehow this affected it. All other machines' oil was perfect.

Maintenance and spares

Running the FLX Trolleys at 60 degrees we would expect to get a year of operation from the actual pump. In our experience the cleaners can be taught to be fairly self-sufficient in looking after their own machines at night and only involve engineering staff where required.

Spares: It's important that every site has all the spares they need (O-rings, turbo head, unloader and a few fittings), plus all tools to fit these and training for correcting any small issues.

Trial outcome

The final numbers:

- After three months there is a labour saving of 25%, and the savings from these changes made will mean that machines are paid off in under 12 months.
- Cleaning tasks can be completed within the cleaning window, saving overtime and preventing start-up delays.
- Swab data has improved.
- Time has also been saved.

We will further this case study in a few months after the cleaners have had more time and practice.

Euro Pumps Pty Ltd
www.europumps.com.au

Optimising anaerobic digestion

in waste food treatment

Removal of water from biogas increases an anaerobic digestor plant's overall energy efficiency in waste food treatment facilities.

The majority of food waste anaerobic digestion (AD) plants produce electricity (with or without using the heat generated) using combined heat and power (CHP) generation units. When using CHP to create energy from the biogas produced by AD, one area which is often overlooked is ensuring that any water present in the raw biogas is removed; if water enters a CHP engine it can decrease its efficiency, resulting in reduced biogas yields and engine damage.

The HRS Heat Exchangers Biogas Dehumidification System (BDS) removes water from biogas, protecting CHP engines from corrosion and cavitation. It also comes with a heat recovery section as standard, increasing an AD plant's overall energy efficiency.

Increased profits

The importance of optimising your AD plant cannot be underestimated. While many of today's food waste plant operators invest time and money in performance-enhancing additives and systems, removing water present in the raw biogas can be a lower priority. But with CHP engines being one of the most expensive pieces of equipment to replace on an AD plant, this is a false economy. Additionally, an inefficient CHP engine will result in lower electrical output and higher capex, and therefore reduced profits — a 1 MW digester operating at even 80% capacity could be losing around $13,000 each month in lost electricity sales.

"The BDS reduces biogas temperatures from around 40°C to approximately 5–7°C, condensing more than 90% of the water volume," explained HRS International Sales and Marketing Director Matt Hale. "It works via a chiller system which supplies a coolant that is transferred to heat exchangers. Biogas flows on the product side of the exchanger, while the coolant flows on the service side. As the biogas cools, the water condenses from the gas, leaving a clean and dry biogas ideal for use in CHP engines."

HRS Heat Exchangers Biogas Dehumidification System.

Energy efficiency

Heat recovery comes as standard with the HRS BDS. The resulting cold biogas is used to pre-cool any incoming biogas, reducing the load on the final cooling heat exchanger and recovering as much as 20% of the energy needed for the process. Any extra investment required is soon recouped in energy cost savings.

Suitable for AD plants of all sizes, the HRS BDS comes skid-mounted for easy access and freedom of movement, and features an automatic control panel for full process control.

Futureproof your AD plant

"Following a series of enquiries for a system to dehumidify biogas, we are delighted to launch the HRS BDS," Hale said. "With a CHP engine being one of the most expensive pieces of equipment on a food waste AD plant, protecting it makes good business sense. By removing water from biogas before it enters a CHP engine, the HRS BDS helps to extend an engine's lifespan, protecting it against corrosion and cavitation. We are expecting a high demand from existing AD operators looking to optimise their process even further and prolong the lifespan of their CHP engine."

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

Magnet auditing service

Attention to food purity has never been greater, making it imperative for manufacturers to detect and eliminate foreign objects and ferrous metals such as needles, rust, nails, scale, work-hardened stainless and bolts, well before the end product reaches the consumer.

The use of permanent magnetic separators helps draw out fine tramp metal along critical points of the production line. These separators come in different styles and in various magnetic strengths, depending on the application. Periodically, they should all be tested to confirm their strength and to ensure compliance with current international food safety standards.

Eriez conducts magnet audits for food manufacturing companies across Australia, using procedures and documentation recommended by HACCP International. Certifications can be provided that give producers the documentation necessary to demonstrate their efforts to maintain product purity.

Eriez offers magnet pull tests and application inspection. On completion, our technicians will provide a report which includes a validated test certificate. Even if it is not an Eriez product, Eriez specialists will audit your magnetic separation equipment, evaluate its effectiveness and offer recommendations that could improve the separation performance. They will check the physical condition of the magnet, access and address any safety concerns. The specialists will also test the magnet's strength and if possible, compare to previous audits or OEM specifications to confirm it is still as strong as when first installed. More importantly, the company can provide recommendations and advice regarding HACCP International Food Safety Standards. Pull tests are an essential quality control tool used to monitor magnet strength to ensure optimum performance.

Eriez Magnetics Pty Ltd

www.eriez.com.au

Sweetening the sugar industry's energy efficiency

Robert Glass

The typical American currently consumes 35 kg of sugar every year, which keeps the sugar industry vibrant. Now electrification in sugar milling is making the industry more energy efficient.

Humanity has had a strong relationship with sugar for at least the last 10,000 years. Yet it was only in the 1700s that a mechanised means of producing sugar emerged, using steam engines for production. Surprisingly, steam power is still prevalent. In a time when energy efficiency underpins competitiveness of manufacturers you need to ask: how efficient is your sugar milling process?

It's fair to say that the human race is hooked on sugar. What started as an almost religious ingredient in ancient New Guinean culture has spread globally and, over the course of 10,000 years, come to underpin the modern food industry. In 1800, it is estimated that the average person in the US ate the equivalent of 8 kg of sugar every year — a number that rose to 45 kg per year by 1900. In the words of author Rich Cohen for *National Geographic*, "Sugar was the oil of its day."

With such a sugar-hungry market, sugar manufacturers' main focus is remaining competitive. This involves increasing throughput and, more often, improving energy efficiency to reduce costs.

From ABB's experience in working with sugar businesses, one of the biggest areas of energy inefficiency is the sugar milling process. While the first steam-powered sugar production machine was introduced in the 1700s, many sugar plants continue to use steam as a way of powering milling equipment.

Theoretically, this makes sense: bagasse, a by-product of sugar production, can be fed into boilers to generate steam that powers turbines that operate milling systems. This creates a circular economy in the manufacturing plant.

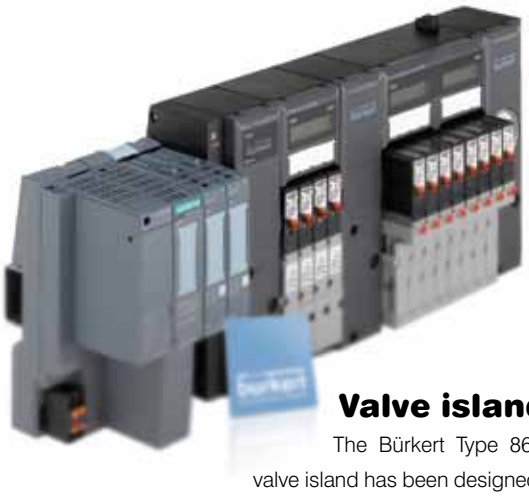
This does make good use of waste by-product, but it is often unreliable and inefficient due to the energy expended. Instead, manufacturers are investing in energy-efficient motors and drives to electrify the process. Using a variable frequency drive (VFD), in addition to a high-efficiency electric motor and a generator, allows engineers to not only have greater control over the energy usage of the milling equipment, but also reduce energy costs by up to 40%.

For example, ABB recently worked with a sugar mill in Pakistan to deliver a similar project. The mill had previously relied on steam turbines to power its crusher, using bagasse as its sole source of energy. ABB worked with the mill to modernise its systems, allowing it to use the bagasse to create steam, and that steam was used to turn a generator. The electricity produced fed a high-efficiency motor and an ABB drive powering the mill.

Due to the motor's design, it provides uptime despite the harsh operating conditions — avoiding remnants of sugar cane fibres interfering with the motor. This new system required only 350–400 kW of power compared to the 650–700 kW of the previous system power, providing a saving of more than 40%.

With the world's love affair with sugar unlikely to come to an end any time soon, significant energy savings such as this are a necessary factor in remaining competitive. By looking at ways to improve existing processes and modernise equipment, plant managers and engineers can ensure their company is primed to reap the full benefits of the sugar rush.

ABB Australia Pty Ltd
www.abbaustralia.com.au



Valve island

The Bürkert Type 8647 AirLINE SP valve island has been designed to be compatible with the Siemens I/O system SIMATIC ET 200SP, enabling maximum system availability for pneumatic controllers.

The valve island was developed for use in the food and beverage, pharmaceuticals and cosmetics industries, as well as in water treatment systems. To save space it can be mounted in the control cabinet together with different Siemens modules for controlling up to 64 valve functions. The valves are directly connected to the Siemens I/O system. This enables fast and seamless integration both at the time of commissioning and later, during monitoring of operation.

The display of the number of switching cycles allows optimal preventive maintenance of the system to minimise wear and downtimes. Maximum system availability is achieved by means of the pneumatic valves in the supply channel: they are hot swap capable, so they can be replaced during operation.

The valve island features pressure sensors and an LCD, which displays detailed status information such as the position of the pilot and process valves directly at the device — both by means of icons and plain text. This enables fast detection and elimination of faults. The use of ring topology and the Media Redundancy Protocol (MRP) ensures continued operation of the system in the event that a communication client fails. This increases system availability.

The product has a crucial safety function: check valves in the exhaust duct. They ensure that pilot valves and actuators operate properly, by preventing pressures peaks. This eliminates the possibility of any mixing of different media.

Burkert Fluid Control Systems
www.burkert.com.au

Steam infusion technology

Steam infusion is claimed to achieve faster, more efficient cooking and to offer health improvements to a range of products, including soups, sauces and ready meals.

Using the technology enables manufacturers to increase their cooking capacity, eliminate burn-on and Maillard reactions, reduce fat in dairy products by up to 20% and create a creamier mouthfeel, while at the same time achieving reduced cleaning and cooking times and lowering energy consumption.

Steam infusion uses a processing device called a Vaction Unit to deliver steam to simultaneously heat, mix and pump ingredients in a cooking vessel or directly in-line. A steam infusion cooking lance can be easily retrofitted into new or existing cooking vessels, or fitted directly into the line, and typically achieves twice the cooking capacity.

Process Plant Network Pty Ltd
www.processplant.com

Brewery finds itself ahead of user requests

It's a strange problem when an IT department can put too many features on the system. Usually, it's the other way around: more often than not, it is the IT department that is overwhelmed with requests.

"We find that we can overload our users with new features," said David Lewis, business analyst for Sierra Nevada Brewery Co. "It's so easy to build stuff, we're way ahead of the user-curve. We have found that we have to wait for them to digest what we've built, and then wait for them to start asking for more."

Sierra Nevada Brewery Co is the sixth-largest brewery in the United States. Its beer is produced exclusively in Chico, California, and is distributed in all 50 states and exported to Europe and Asia. Its flagship product is Sierra Nevada Pale Ale, complemented by a year-round program of seasonal and specialty beers.

Lewis explained that before implementing Inductive Automation software, there had been a lot of requests — and those requests took a long time to develop. Accessing production system data was the biggest IT development hurdle. After implementing the new software, data was easily obtained from anywhere in the plant.

"Now, all of a sudden the data is all there," Lewis said. "It's the keys to the kingdom: we've now been able to manage some pretty heavy workflow problems."

But it wasn't initially easy to find those keys to IT bliss. Anytime IT makes a decision to put new software on a system, they need to proceed with caution to ensure no disruption to the plant's production.

"We approached the software with scepticism," Lewis explained. "There was no support among our automation engineers for using it as a control system for both philosophical and practical reasons: philosophically, because we treat our control system as a standalone system — completely unconnected from any other network — and practically, because our corporate Windows-based PC network had such a rotten reliability record.

"Fermentation is a 24/7 process, so our plant controls staff were in no mood to introduce Windows-style downtime to their lives. The Inductive Automation software was so inexpensive, however, that we decided to try it for data acquisition and production reporting — two areas where there were no good alternatives on the market."

The first experience with the software proved to be very user-friendly.

"It was easy to configure," explained Jonathan Swisher, system developer. "The reason it is easy is because I only

had to install it on the server: it took me almost no time. There are no clients to install individually."

From a technical knowledge perspective, Swisher said the software had a very easy learning curve. It's familiar to individuals trained in standard office technology such as web, Java, SQL databases, etc.

"Most of it seemed intuitive," Swisher explained, referring to Inductive Automation's Jython scripting. "All the functions are well documented. Python is clean and concise, which makes Jython really familiar, and super easy to learn."

System developer Ron Mayfield said that various interactions with the company's SQL database had always been problematic in the past. When they rewrote all of the data to go through Inductive Automation's software, life got easier.

"Once we realised that this was possible — to work with the PLCs and other SQL production databases — we found we could bring it all together and put it on one screen," he said. "That kind of synergy of info was previously off-limits."

They could now help all departments communicate seamlessly. One example he gave was their filtration-to-packaging workflow.

Before a tank of beer is ready to be packaged, it has to be processed by the filtration department and then sampled and tested by the lab. Test information was then handwritten onto a series of whiteboards around the plant. They faced a very simple problem: as the plant grew, people had to remember to write that information down in more and more places — a round trip of nearly half a mile.

Now, with web-launched client screens bringing together PLC data (tank statuses, etc), lab test data (from lab devices) and workflow data (approvals, comments, out-of-spec alerts), all the information is now available through any PC in the plant.

Lewis, Mayfield and Swisher agreed that changes aren't always easy. Especially when the IT department can make more features than their users can take in at a time. They've actually had to slow down the pace of how many features they add to the system, just so users get a chance to accept the new changes.

"But I think everyone agrees that the changes are good," Lewis said. "We're a growing company. Five to ten years ago when we had to make a production decision, we would simply walk over and talk to someone... but now you can't always find that person. Using Inductive Automation's software, we can always find the screen. Operation is much easier than before."

ESM Australia
www.esm.com.au

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Coating system for crumb-coated snacks

Crisp Sensation's ZeroFry coating system enables manufacturers to produce crispy, crumb-coated snacks without the need for pre-frying or deep-frying. The crumbed products can be prepared in an oven or air fryer.

The coatings offer the same crunchy sensation and taste as pre-fried products, but allow for a fat reduction of 50%, the company claims.

As deep-frying is not necessary, production output is not limited to the capacities of the deep-fryer — often the bottleneck in the production line of crumb-coated snacks. The existing line set-up can still be used with the addition of an oil sprayer. Savings on oil, energy and cleaning can be achieved, as well as an increase in production and product safety. For substrates that don't require heating or cooking, this step in the production process can be skipped.

Crisp Sensation

www.crispsensation.com

Hygienic transmitters

Emerson's Rosemount 326/327 line of transmitters is designed for hygienic applications in the food and beverage industry, with a compact form factor that will enable manufacturers to minimise downtime and lower production costs.

The Rosemount 326P Pressure transmitter is used for hydrostatic level measurement on fermenter tanks, storage tanks and silos, as well as static pressure measurements on pipes or near pumps to ensure line pressures are in tolerance.

The Rosemount 326T Temperature and Rosemount 327T Temperature transmitters monitor process temperature, an important factor in all steps of food and beverage processing such as fermenting or pasteurisations, storage tank temperature, or ensuring clean-in-place processes are within FDA approved limits for an effective cleaning cycle.

To keep product lines running and reduce downtime, the Rosemount 326L Level transmitter will monitor continuous level in small- to medium-sized storage, holding or buffer tanks.

All comply with 3-A and FDA specifications, and are available with nine common industry process connections to ensure the right fit for new tanks and pipe fittings, as well as capability to be retrofitted on legacy systems. The small transmitters can be mounted in tighter locations common on packaging machinery. Conventional 4–20 mA outputs and IO-Link connectivity make the transmitters easy to integrate with automation systems.

Emerson Automation Solutions

www.emerson.com/en-au/automation-solutions

Face shield range

The Honeywell Turboshield face shield range provides comfort for longer wear, easy visor exchange and optimal balance.

The system is suitable for workers exposed to falling or flying objects, impact, splash, molten metals/hot solids, UV and airborne debris, and can be comfortably worn with most goggles, respirators and earmuffs.

The flexible, head-cushioning suspension cradle has triple the contact area compared to traditional suspensions, according to the company, eliminating pressure points for all-day wear.

A simple push-button release system allows for easy visor exchange in seconds. It helps users feel safer with more chin coverage, without the need for bulky accessories.

Control knobs are large and ergonomically designed for easy adjustment, even while wearing gloves.

The visor slides back 170 mm, improving balance and weight distribution when worn with the Turboshield Hard Hat Adapter. A dual-hinge hard hat adapter design increases clearance by 100 mm and keeps accessory slots open for compatibility with other PPE.

Honeywell Industrial Safety

www.honeywellsafety.com

Which vacuum pump is best

for packing fresh foodstuffs?

This article compares the efficiency of oil-sealed screw vacuum pumps and rotary vane pumps when packing fresh foods.

Vacuum pumps are important components in the packaging of fresh foodstuffs. Which vacuum pump achieves the highest efficiency factor? A direct comparison can answer this question, as long as the test set-up has been designed sensibly. A recently published comparison study suggests the superiority of an oil-sealed screw vacuum pump. However, this result only came about using a test set-up that seems very unrealistic. Now, the independent testing organisation TÜV Süd has also carried out a comparison of the vacuum pumps involved. This entailed the realistic simulation of a standard industrial process. Under these conditions, the result is clearly in favour of the oil-lubricated rotary vane vacuum pump.

This article compares two comparison tests. For the sake of clarity, they are referred to as Test 1 and Test 2, and for better readability, the oil-sealed screw vacuum pump is abbreviated as SVP and the oil-lubricated rotary vane vacuum pump as RVVP.

Test 1: Demand-driven control vs full-load operation

This test was initiated by the manufacturer of the oil-sealed screw vacuum pump (SVP). The company mainly specialises in compressors, and the machine in question is a derivative of compressor technology. It was compared to an R 5 RA 0630 C oil-lubricated rotary vane vacuum pump (RVVP) from Busch. However, the test set-up does not allow a realistic comparison for several reasons.

The test cycle simulated various vacuum-supported processes. However, production breaks, including nightly downtimes during which the RVVP, unlike the SVP, continued to run, were obviously also included. In the test, the SVP was operated as part of a system with frequency converters and integrated control system that stopped the vacuum pump during breaks. On the other hand, the RVVP was apparently connected as an isolated machine that ran continuously at full power.

Test 1 proverbially compared apples with oranges. The continuously running vacuum pump naturally consumed more electricity than its regulated counterpart, which was automatically stopped in the breaks. The RVVP could also have been equipped with a frequency converter and a control system — Busch offers such a version of this vacuum pump. This would have created similar starting conditions. This was obviously not done. Unfortunately, the description of the test lacks precise information about such essential framework conditions.

Due to its design, an RVVP has in general the highest power consumption in the start-up phase between atmospheric pressure and approximately 300 mbar (Figure 1). However, the power consumption decreases drastically as the inlet pressure decreases. An SVP, on the other hand, consumes approximately the same amount of power between atmospheric pressure and ultimate pressure. This means that an RVVP requires considerably less power in the operational range between ultimate pressure and 100 mbar than an SVP.

Test 2: Equal conditions

The second comparison test (Figure 2) was recently carried out by the independent testing organisation TÜV Süd. The same vacuum pumps were used as in Test 1. However, this time real operation was simulated, without breaks or nightly shutdowns. Test 2 simulated the working cycle of a vacuum packaging machine. This is a common use for vacuum pumps in industry. As is often the case with such applications, both vacuum pumps were additionally supported by an identical vacuum booster. In addition, the test set-up and procedure were checked by a well-known manufacturer of vacuum packaging machines and confirmed as a realistic simulation.

As an application example, a packaging machine with a large chamber volume was chosen, such as is used in the packaging of meat or cheese products. Typically, such a machine with automatic product supply handles several cycles per minute.

In the test, the machine was simulated using a 300 L chamber and an 11.5 m pipe system between the chamber, vacuum booster, and vacuum pump. The chamber was evacuated cyclically to a vacuum level of 5 mbar.

The time for evacuation depended on the performance of the vacuum pumps. The time between evacuation cycles was set at 14 seconds — a typical time span for this size of packaging machines. The required pump-down time of the vacuum pumps and their energy consumption were recorded.

To find the results of this comparison please visit www.foodprocessing.com.au/content/processing/article/which-vacuum-pump-is-best-for-packing-fresh-foodstuffs--635192629

Busch Australia Pty Ltd
www.busch.com.au

Successfully going digital

Transforming meat and baked goods packaging and distribution

A large membership-based wholesaler decided to digitalise the production and distribution of both its bakery and meat-packing and distribution operations in North America and implement a comprehensive Manufacturing Execution System (MES) based on the ISA-95 standard. The ISA-95 standard is a mature Manufacturing Operations Management standard that allows complying solutions to be interoperable allowing for exchange of information between the shop-floor systems, the operations applications, and the enterprise software.

As meat-packing and baking facilities are high-speed operations, the MES solution needed to allow fast data entry by operators, with intuitive, friendly user interfaces. The wholesaler had several key drivers for the project:

- Optimisation of inventory on the shop floor — both products and packaging materials.
- Optimisation of inventory in the warehouse and throughout the supply chain.
- Complete traceability throughout the production and distribution process.
- Procedural standardisation using an unambiguous recipe-based approach.
- A transparent and well-controlled verification process.

The solution chosen was Siemens SIMATIC IT MES which allowed the wholesaler to pack and distribute from multiple facilities to more than one thousand retail locations across the USA, Canada and Mexico.

While SIMATIC IT MES provides the core functionality of the MES, the front-end was completely customised by ATS Global to the user's business. With a strong focus on high-quality user experience, task-oriented screens accessed through a web client allow operators to quickly interact with the MES.

Applying the Industry 4.0 concept of the Digital Twin, all the production processes were simulated using Siemens Tecnomatix allowing those processes to be verified. In the virtual space, MES software and warehouse control systems were analysed and validated before any commitments were made to development and deployment in the real world.

This MES implementation means that product registration, planning, product tracking, shipping and performance management are now all paper-less. Digitalised information is immediately available to the rest of the business and supply-chain stores now have visibility of not just consignments, but the products and genealogy contained within them. Production requirements and material planning are converted to production schedules using the finite-capacity scheduling capability of Siemens SIMATIC IT PREACTOR, which exchanges recipe data, sales demands and inventory levels with the MES.

Both meat and bakery goods have short shelf lives and consequently, the MES ensures that the customer can implement a quality-assured First Expired First Out shipping process.

Direct integration with the shop-floor equipment ensures that, where possible, there is automatic registration of all consumption and production transactions into the MES. That same shop-floor integration allows for visibility of in-process inventory levels and machine performance data (OEE, downtime).

The MES solution has delivered a digitalised paperless shop-floor and information stream for the supply chain. And, importantly, resource allocation is now optimised to suit the dynamic demands of the market. All these factors have led to significant direct and indirect cost savings for the customer.

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

High-temperature IEPE quartz accelerometer

Dytran Instruments has introduced the model 3525A3 single-axis IEPE hermetically sealed quartz accelerometer with a built-in impedance converting amplifier, capable of operating continuously at high temperatures up to 200°C.

Internal electronics allow the measuring of shock and vibration in high-temperature applications without the need for external charge amplifiers, reducing the cost and complexity of high-temp testing. The sensor has been tested at 200°C for 1500+ continuous hours in a thermal HALT/HASS chamber.

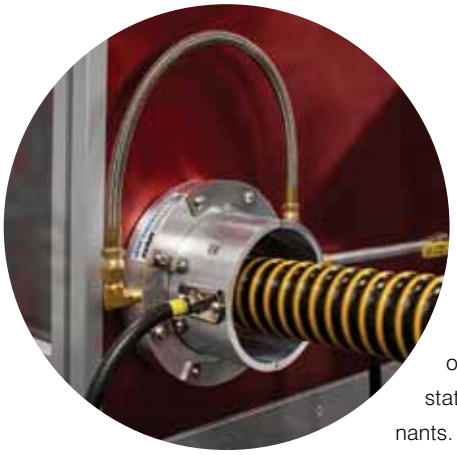
It utilises an inverted quartz sensing element to minimise the unwanted effects of base strain on the accelerometer signal. The use of quartz provides long-term thermal stability and a low thermal coefficient of sensitivity, meaning there is little change in sensitivity when the sensor goes from room temperature to 200°C.

The small, low-mass, hermetically sealed, stainless steel housing makes it suitable for use in locations inaccessible to larger high-temperature accelerometers. Typical uses include applications such as down-hole oil industry, environmental test chambers, HALT/HASS chambers for control, automotive applications including engine and exhaust hot zones, as well as for any general-purpose high-temperature IEPE applications.

It is available with a sensitivity of 10 mV/g and a 5 to 10,000 Hz frequency range (±5%). The model features a top-mounted 10–32 micro coaxial connector and is installed using an integral 10–32 mounting stud.

Metromatics Pty Ltd

www.metromatics.com.au



360° static eliminator

EXAIR's Gen4 Super Ion Air Wipe provides a uniform, 360° ionised airstream that clamps around a continuously moving part to eliminate static electricity and contaminants. It is suitable for removing dust, particulates and personnel shocks on pipes, cables, extruded shapes, hoses, wires and more.

The device uses a small amount of compressed air to entrain high volumes of room air. Two shockless ionising points powered by a UL Component Recognised 5 kV power supply fill the airstream with static eliminating ions. That airflow attaches itself to the surface of the material running through the air wipe and neutralises the charge.

Design features include a metal armoured high-voltage cable to protect against abrasion and cuts, a replaceable emitter point, integrated ground connection and electromagnetic shielding. It has an aluminium construction that is lightweight and easy to mount using the tapped holes provided. It is available with a 51 or 102 mm diameter and there are no moving parts to wear out.

The product has undergone independent laboratory tests to certify it meets the rigorous safety, health and environmental standards of the USA, European Union and Canada that are required to attain the CE and UL marks. It is also RoHS compliant.

Compressed Air Australia Pty Ltd

www.caasafety.com.au

Taking the headache out of wastewater for food industries

Managing wastewater can be time-consuming, costly and often confusing for food industries, yet with robust and reliable wastewater treatment options in place — this can actually become a simple and efficient part of your daily operations.

Having a wastewater treatment system that complements any commercial food business can save on trade waste costs while ensuring you operate a sustainable and compliant manufacturing facility.

What is considered wastewater?

Industrial wastewater is generally considered the by-products from the production of the primary product. Typically, and particularly in the food and beverage industry, a large amount of wash water is required during the cleaning processes. This wash-down water is often contaminated with production components and by-products.

The quality and quantity of wastewater from food processing plants varies significantly, however is commonly made up of fatty solids and soluble matter, such as dissolved sugars.

As a business grows, so does its wastewater

Traditional grease traps can work well for small operations. However, once the flow rate increases or the concentration of suspended solids (SS) or fats, oils and grease (FOG) becomes stronger, grease traps can't cope and end up sending contaminants to sewer. This means many food manufacturers will either have to pay trade waste costs to their local water authority, or install a wastewater treatment system to avoid these costs.

Wastewater treatment systems such as a DAF or MBBR are much more efficient than a grease trap and can remove SS, FOG and BOD much more easily. Investing in an efficient and product-specific wastewater treatment system prevents major operational downtime and reduces or removes trade waste cost.

Wastewater management company Aerofloat has extensive experience and knowledge across an enormous range of applications including dairies, breweries, poultry, meat, confectionary and packaged food plants, as well as smaller food business operations. Aerofloat can scale a solution to meet different needs and budgets.

Michael Anderson, General Manager – Engineering of Aerofloat, says that wastewater systems don't need to be a headache for business.

"When thinking about wastewater treatment, it's worthwhile investing in a system design that complements your business and has room for growth long-term. In most cases, a basic off-the-shelf product creates risk, increases costs down the track and can create operational downtime. Get in the experts and install a system that can grow with your business.

"Aerofloat's engineers specialise in designing systems for challenging sites and utilise 3D CAD modelling to address any issues prior to signoff. So our customers know exactly what they're getting before manufacturing commences."

Aerofloat's offering

Aerofloat has been working in the wastewater industry since 1973 and prides itself on being able to tackle complex wastewater problems. Aerofloat's engineers provide custom solutions to suit different needs.

Aerofloat also has a suite of proprietary technology at its disposal. Its patented AeroDAF and patent-pending AeroMBBR are designed to be low-maintenance, compact, and affordable for food manufacturers.

For food industries producing significant fatty waste, the AeroDAF removes fats and suspended proteins by floating and separating solid particles.

"The patented AeroDAF is a simple solution for food industry wastewater and is a set and forget system. It automates chemical dosing and make-up, level control, water consolidation and pH correction. Maintenance and cleaning is minimal due to the unique self-cleaning shape of the DAF with hopper top and bottom tanks, that recirculate settled solids," says Anderson.

The AeroMBBR uses a biological treatment technique to treat dissolved compounds, such as sugars and lactose. Aerofloat has developed patent-pending aeration lances in its AeroMBBR that can easily be removed and maintained while the process is still operating, without draining the tank or removing the biomedia. This significantly reduces any downtime and maintenance requirements.

Thus, ensuring wastewater is compliant and can be discharged safely to sewer or reused within the factory. Any remaining solid waste can often be re-purposed as a form of beneficial reuse such as compost material — or further treated with dewatering technology.

Wastewater made easy

"We can provide expert advice onsite or by remotely logging in to the systems. We also provide ongoing service and maintenance contracts to ensure plant operators get the benefit of our knowledge and experience," says Anderson.

Effective management of the wastewater treatment plant reduces environmental impact, optimises operational costs and prolongs the longevity of the plant.

With Aerofloat caring for businesses' wastewater systems from start to finish, this allows companies to focus on their core business.

Aerofloat
WASTEWATER TREATMENT SPECIALISTS

Aerofloat (Australia) Pty Ltd
www.aerofloat.com.au

Mouldy food power

Poor food preparation or packaging delayed the latest SpaceX Dragon cargo launch from Florida's Kennedy Space Center.

The unmanned CRS-16 mission was due to deliver 2540 kg of supplies and science experiments to the International Space Station (ISS). Among the supplies was food intended for the experimental mice but the whole launch was delayed after some of the mouse food bars were found to be mouldy.

The Rodent Research-8 (RR-8) investigation is looking at the physiology of ageing in response to microgravity and the role of ageing in the onset and progression of disease. Two groups of 20 BALB/cAnNTac strain female mice (10 young and 10 old per group for a total of 40 mice) live aboard the ISS in specially designed rodent habitats for durations of one and two months.

The first group of young and old mice returns to Earth live after 30 to 40 days. The second group of animals remains on the ISS for approximately 60 days. In both cases, animals are euthanised and tissue samples are harvested for subsequent study and comparison with Earth-based control groups.

The tissue samples taken from the mice are highly sought after and can provide researchers with better insight into disease processes related to bone loss, immune dysfunction, cardiovascular deconditioning and loss of skeletal muscle mass and strength, to name a few. These insights may lead to new therapeutics for use in space or on Earth.

Putting food-safety detection in the hands of consumers

Rob Matheson

Simple, scalable wireless system uses the RFID tags on billions of products to sense contamination.

MIT Media Lab researchers have developed a wireless system that leverages the cheap RFID tags already on hundreds of billions of products to sense potential food contamination — with no hardware modifications needed. With the simple, scalable system, the researchers hope to bring food-safety detection to the general public.

Food safety incidents have made headlines around the globe for causing illness and death nearly every year for the past two decades. Back in 2008, for instance, 50,000 babies in China were hospitalised after eating infant formula adulterated with melamine, an organic compound used to make plastics, which is toxic in high concentrations. And this April, more than 100 people in Indonesia died from drinking alcohol contaminated, in part, with methanol, a toxic alcohol commonly used to dilute liquor for sale in black markets around the world.

The researchers' system, called RFIQ, includes a reader that senses minute changes in wireless signals emitted from RFID tags when the signals interact with food. For this study they focused on baby formula and alcohol, but in the future, consumers might have their own reader and software to conduct food-safety sensing before buying virtually any product. Systems could also be implemented in supermarket back rooms or in smart fridges to continuously ping an RFID tag to automatically detect food spoilage, the researchers say.

The technology hinges on the fact that certain changes in the signals emitted from an RFID tag correspond to levels of certain contaminants within that product. A machine-learning model 'learns' those correlations and, given a new material, can predict if the material is pure or tainted, and at what concentration. In experiments, the system detected baby formula laced with melamine with 96% accuracy and alcohol diluted with methanol with 97% accuracy.

"In recent years, there have been so many hazards related to food and drinks we could have avoided if we all had tools to sense food quality and safety ourselves," said Fadel Adib, an assistant professor at the Media Lab who is co-author on a paper describing the system, which is being presented at the ACM Workshop on Hot Topics in Networks. "We want to democratise food quality and safety, and bring it to the hands of everyone."

The power of "weak coupling"

Other sensors have also been developed for detecting chemicals or spoilage in food. But those are highly specialised systems, where the sensor is coated with chemicals and trained to detect specific contaminations. The Media Lab researchers instead

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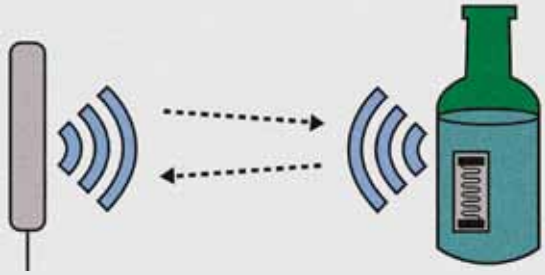
aim for broader sensing. "We've moved this detection purely to the computation side, where you're going to use the same very cheap sensor for products as varied as alcohol and baby formula," Adib said.

RFID tags are stickers with tiny, ultrahigh-frequency antennas. They come on food products and other items, and each costs around three to five cents. Traditionally, a wireless device called a reader pings the tag, which powers up and emits a unique signal containing information about the product it's stuck to.

The researchers' system leverages the fact that, when RFID tags power up, the small electromagnetic waves they emit travel into and are distorted by the molecules and ions of the contents in the container. This process is known as "weak coupling". Essentially, if the material's property changes, so do the signal properties.

A simple example of feature distortion is with a container of air versus water. If a container is empty, the RFID will always respond at around 950 MHz. If it's filled with water, the water absorbs some of the frequency, and its main response is around only 720 MHz. Feature distortions get far more fine-grained with different materials and different contaminants.



MIT Media Lab researchers have developed a wireless system that leverages the cheap RFID tags already on hundreds of billions of products to sense potential food contamination. Image courtesy of the researchers, edited by MIT News

"That kind of information can be used to classify materials … [and] show different characteristics between impure and pure materials," Ha said.

In the researchers' system, a reader emits a wireless signal that powers the RFID tag on a food container. Electromagnetic waves penetrate the material inside the container and return to the reader with distorted amplitude (strength of signal) and phase (angle).

When the reader extracts the signal features, it sends those data to a machine-learning model on a separate computer. In training, the researchers tell the model which feature changes correspond to pure or impure materials. For this study, they used pure alcohol and alcohol tainted with 25, 50, 75 and 100% methanol; baby formula was adulterated with a varied percentage of melamine, from 0 to 30%.

"Then, the model will automatically learn which frequencies are most impacted by this type of impurity at this level of percentage," Adib says. "Once we get a new sample, say, 20% methanol, the model extracts [the features] and weights them, and tells you, 'I think with high accuracy that this is alcohol with 20% methanol.'"

Broadening the frequencies

The system's concept derives from a technique called radiofrequency spectroscopy, which excites a material with electromagnetic waves over a wide frequency and measures the various interactions to determine the material's make-up.

> *"The technology hinges on the fact that certain changes in the signals emitted from an RFID tag correspond to levels of certain contaminants within that product."*

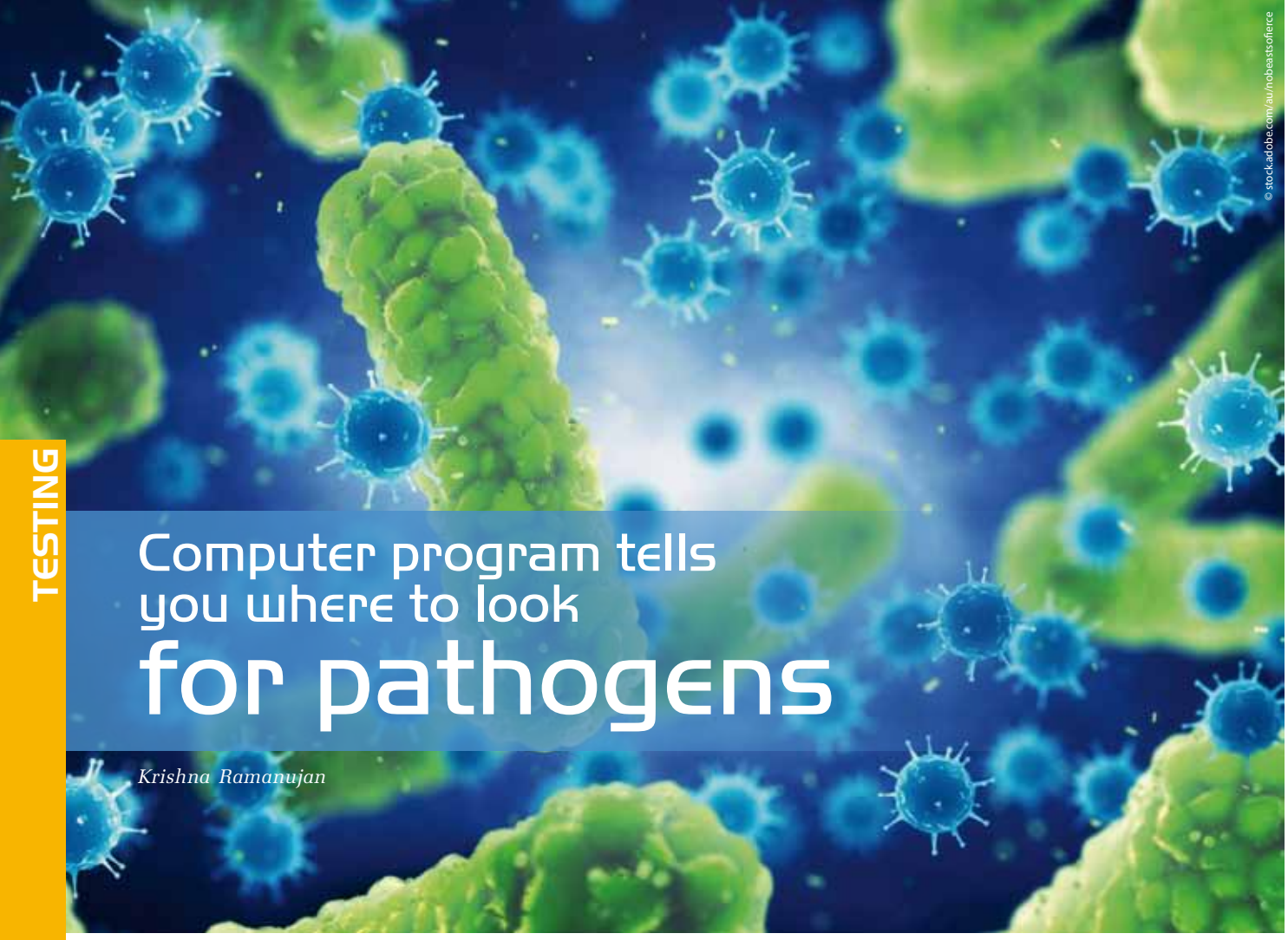
But there was one major challenge in adapting this technique for the system: RFID tags only power up at a very tight bandwidth wavering around 950 MHz. Extracting signals in that limited bandwidth wouldn't net any useful information.

The researchers built on a sensing technique they developed earlier, called two-frequency excitation, which sends two frequencies — one for activation and one for sensing — to measure hundreds more frequencies. The reader sends a signal at around 950 MHz to power the RFID tag. When it activates, the reader sends another frequency that sweeps a range of frequencies from around 400 to 800 MHz. It detects the feature changes across all these frequencies and feeds them to the reader.

"Given this response, it's almost as if we have transformed cheap RFIDs into tiny radiofrequency spectroscopes," Adib said.

Because the shape of the container and other environmental aspects can affect the signal, the researchers are currently working on ensuring the system can account for those variables. They are also seeking to expand the system's capabilities to detect many different contaminants in many different materials.

"We want to generalise to any environment," Adib said. "That requires us to be very robust, because you want to learn to extract the right signals and to eliminate the impact of the environment from what's inside the material."



Computer program tells you where to look for pathogens

Krishna Ramanujan

A computer program developed at Cornell University could help food safety professionals keep production facilities free of foodborne pathogens.

The program, Environmental Monitoring With an Agent-Based Model of listeria (EnABLe), lets users simulate the most likely locations in a processing facility where the foodborne pathogen *Listeria monocytogenes* might be found. Food safety managers may then test those areas for the bacteria's presence, adding an important tool to prevent food contamination and human exposure to the pathogen through tainted food.

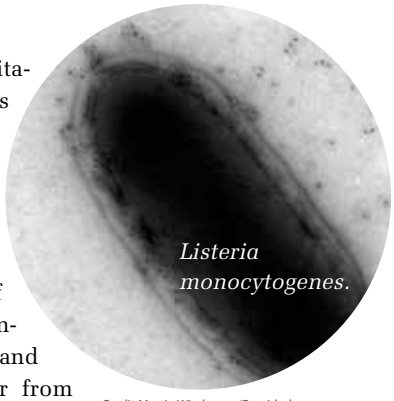
The computer model has the potential to be modified for a wide range of microbes and locations.

"The goal is to build a decision-support tool for control of any pathogen in any complex environment," said Renata Ivanek, associate professor in the Department of Population Medicine and Diagnostic Sciences. The researchers want to eventually apply the framework to identifying contamination from pathogens that cause hospital-acquired infections in veterinary hospitals or *E. coli* bacteria in fruit and vegetable processing plants.

Food safety professionals at processing facilities keep regular schedules for pathogen testing. They rely on their own expertise and knowledge of the building to determine where to swab for samples.

"Whenever we have an environment that is complex, we always have to rely on expert opinion and general rules for this system, or this company, but what we're trying to offer is a way to make this more quantitative and systematic by creating this digital reality," Ivanek said.

For the system to work, Zoellner, Ivanek and colleagues entered all relevant data into the model — including historical perspectives, expert feedback, details of the equipment used and its cleaning schedule, the jobs people do, and materials and people who enter from outside the facility.



Listeria monocytogenes.

Credit:Martin Wiedmann/Provided.

"A computer model like EnABLe connects those data to help answer questions related to changes in contamination risks, potential sources of contamination and approaches for risk mitigation and management," Zoellner said.

"A single person could never keep track of all that information, but if we run this model on a computer, we can have in one iteration a distribution of *Listeria* across equipment after one week. And every time you run it, it will be different and collectively predict a range of possible outcomes," Ivanek said.

The research, funded by the Frozen Food Foundation, has been published in *Nature Scientific Reports*. The paper describes a model system that traces *Listeria* species on equipment and surfaces in a cold-smoked salmon facility. Simulations revealed contamination dynamics and risks for *Listeria* contamination on equipment surfaces. Furthermore, the insights gained from seeing patterns in the areas where *Listeria* is predicted can inform the design of food processing plants and *Listeria*-monitoring programs. In the future, the model will be applied to frozen food facilities.

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ThermoFisher SCIENTIFIC

Hyperspectral imaging for food assessment

Hyperion hyperspectral imaging systems from Camlin Photonics make repeatable hyperspectral measurements that are adaptable to a variety of processes and applications. They provide users with an all-in-one system that can measure, display and prepare calibration models and analyse hyperspectral imaging (HSI) data, with a clearly defined workflow.

HSI is a suitable analytical tool for food assessment as it is non-destructive and non-contact, and can determine several parameters in real time.

It can determine many parameters of fruit and vegetable quality, measure cereals and other grains, and predict freshness of red meat and fish. It can also be used to empower high-speed sorting and grading as it allows for the determination of a substandard product, contamination, presence of foreign bodies and defects.

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SI Instruments

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Gas detectors

Bacharach has introduced the MGS-400 Gas Detection Series for commercial and industrial refrigerant and gas leak detection applications.

The gas detectors support safety compliance inside of machinery rooms, mechanical equipment rooms, chiller plants, cold storage facilities and walk-in freezers by monitoring for dangerous refrigerant leaks for numerous gases including HFCs, HFOs, HCFCs, CO_2 and NH_3 (ammonia). The ability to detect refrigerant leaks and quickly initiate alarm systems helps to protect personnel and achieve compliance with safety standards like ASHRAE 15, CSA-B52 and EN 378.

The gas detectors are supported by a mobile app user interface, making configuration, calibration and maintenance simple and intuitive. Reducing commissioning and installation time, they deliver efficiency while allowing for plug-and-play, precalibrated sensor installation and replacement in the field. Using the mobile app and plug-and-play sensors, the gas detectors are installed quickly. Calibration certificates can be generated from the mobile app and sent by email or shared to cloud storage platforms.

The optional MGS-408 Gas Detection Controller supports up to eight sensor channels and enables a centralised alarm and power system. With Modbus connectivity, the controller integrates with any facility's existing building management or automation system. The controller also connects with the MGS-250 IR-based refrigerant monitor and the dual-sensor MGS-550, allowing for flexibility of individual site requirements. Power and communication connectivity from the controller to all sensors can be done with a single cable in a daisy-chain design.

System Control Engineering Pty Ltd

www.systemcontrol.com.au

Better testing needed for 'gluten-free' food

More frequent gluten testing may be needed in food factories after a study found almost 3% of manufactured foods labelled as 'gluten free' contained gluten.

Many people follow a gluten-free diet for health reasons, such as those suffering from coeliac disease, but they may not be able to trust food labels claiming a product is gluten-free, as researchers found one in 40 'gluten-free' labelled foods do not comply with the national standard of 'no detectable gluten'.

The study tested 256 of Australia's most popular manufactured gluten-free foods, such as noodles, rice snacks and pasta, at the National Measurement Institute in Melbourne. They confirmed gluten contamination by rechecking the levels, and purchasing and analysing further samples to see if the contamination affected multiple batches.

Seven samples from six manufacturers contained gluten at levels of up to 49 parts per million (ppm), and five out of the seven contaminated foods still contained gluten in a different batch, suggesting it was not an isolated issue.

"It's troubling to think that these foods could be hindering the careful efforts of patients trying their best to avoid gluten," said lead researcher Dr Jason Tye-Din, head of coeliac research at the Walter and Eliza Hall Institute and gastroenterology consultant at the Royal Melbourne Hospital.

"For instance, the study found a 'gluten-free' pasta which contained more than 3 mg of gluten in a standard single serve. This could have a harmful impact on patients with coeliac disease if consumed frequently."

All the manufacturers of products containing detectable gluten were notified, and the researchers made recommendations to improve gluten regulation in factories.

"The findings indicate that gluten contamination does occur in packaged food available in Australia and is generally not restricted to a single batch of food. More frequent testing will improve detection and allow companies to take steps to identify and address the underlying cause. Ultimately, this will reduce the risk of gluten exposure to people with coeliac disease," Tye-Din said.

"In addition, many of the items that failed the test were produced in dedicated gluten-free factories, so gluten contamination of externally sourced ingredients may be a factor and should be carefully examined."

The results follow on from an earlier study that tested 'gluten-free' foods at 127 food businesses in Melbourne and found one in 11 samples were contaminated with potentially harmful levels of gluten.

The study, published in the *Medical Journal of Australia*, was supported by Coeliac Australia and the Victorian and Australian Governments.

Wash-up from US's romaine lettuce *E. coli* O157:H7 outbreak

Five died and hundreds were sick following the US's largest *E. coli* O157:H7 outbreak in a decade.

It was ultimately established that romaine lettuce irrigated by contaminated canal water in the Yuma region in Arizona was the source of the outbreak. Now the US Food and Drug Administration is looking at the whole incident so that necessary actions to prevent future outbreaks can be put in place and the safety of leafy greens improved.

The FDA is sharing an environmental assessment that details final findings from this investigation. Here are what it has found and decided so far.

One of the investigation's main objectives was to identify factors that potentially contributed to the introduction and spread of the strain of *E. coli* O157:H7 that contaminated the romaine lettuce associated with this outbreak. The FDA, the Centers for Disease Control and Prevention and the Arizona Department of Agriculture launched an investigation of the outbreak, leading to the collection of samples in Yuma in order to help gather evidence needed to identify the source of the outbreak.

The environmental assessment confirms the presence of *E. coli* O157:H7 in three samples of irrigation canal water collected as part of this investigation in the Yuma region. It considers that the most likely way the romaine lettuce became contaminated was from the use of water from the irrigation canal, since the outbreak strain was not found in any of the other samples collected in the region. How the water contaminated the lettuce is uncertain. But based on interviews with growers and pesticide applicators, possible explanations include direct application of irrigation canal water to the lettuce crop or the use of irrigation canal water to dilute crop-protection chemicals applied to the crops through both aerial and land-based spray applications. We cannot rule out other ways the lettuce became contaminated. It's important to note that we have no evidence that any other product grown in Yuma was contaminated by this water.

How was the canal water contaminated?

When and how the irrigation canal became contaminated with the outbreak strain of *E. coli* O157:H7 is also uncertain. We know that a large concentrated animal feeding operation (CAFO) is located adjacent to this stretch of the irrigation canal where the samples were collected. This is one potential source. However, the investigation did not identify an obvious route for contamination of the irrigation canal from this facility. In addition, samples collected at the CAFO did not yield *E. coli* O157:H7. The investigation did not exclude other ways the irrigation canal could have become contaminated with this outbreak strain.

How to prevent another outbreak

The environmental assessment recommends a number of steps that can be taken to reduce the likelihood of another tragic outbreak from occurring in the future.

Fully implementing the Food Safety Modernization Act (FSMA) is critical to these efforts. The FSMA's Produce Safety Rule must be advanced in collaboration with state regulatory partners and ensure that agricultural water standards work across the incredible diversity of commodities and growing conditions.

Because leafy greens are a highly perishable commodity, the ability to trace back the route of a food product as it moves through the entire supply chain, or traceability, is critical to removing the product from commerce as quickly as possible, preventing additional consumer exposures and properly focusing any recall actions. During the romaine investigation the typical trace-back process was found to be to be particularly challenging because much of the finished lettuce product contained romaine that was sourced from multiple ranches. As a result, the investigation involved collecting documentation from each point in the supply chain to verify the movement of product back to the Yuma area. Complicating this already large-scale investigation, the majority of the records collected in this investigation were either paper or handwritten.

Going forward, both FDA and industry need to explore better ways to standardise record keeping and determine whether the use of additional tools on product packaging could improve traceability.

The FDA is strongly encouraging the leafy greens industry to adopt traceability best practices and state-of-the-art technologies to help assure quick and easy access to key data elements from farm to fork. It is also strongly encouraging the leafy greens industry to explore modern approaches to standardised record keeping and the use of additional tools or labels on product packaging that could improve traceability.

"Going forward, both FDA and industry need to explore better ways to standardise record keeping and determine whether the use of additional tools on product packaging could improve traceability."

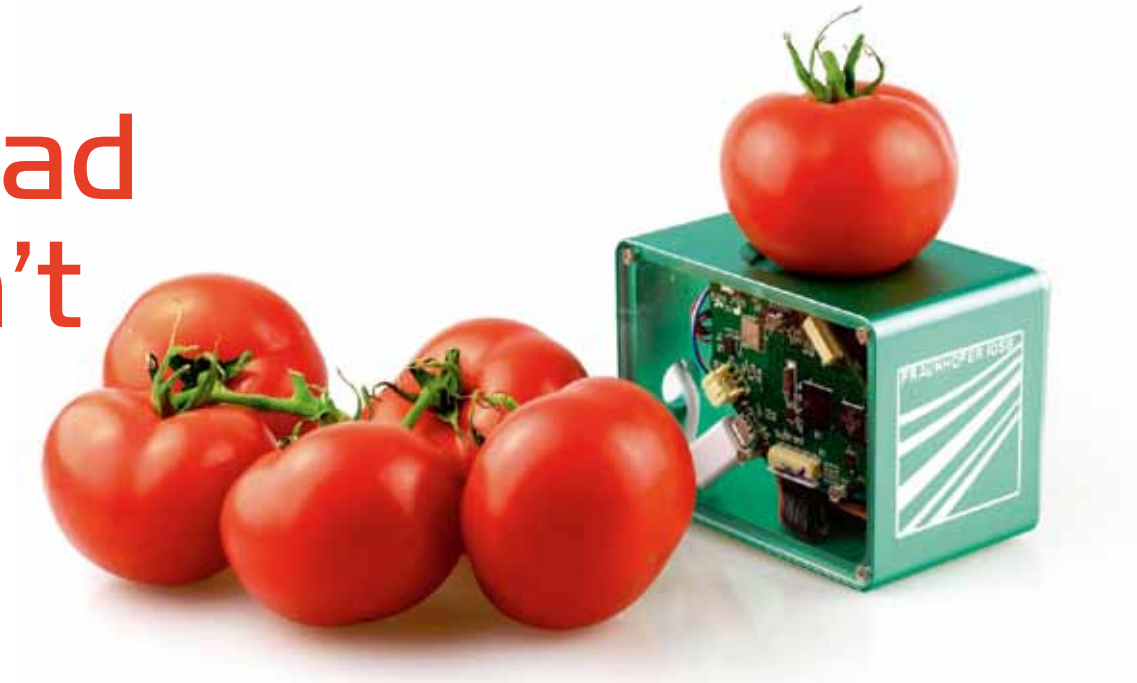
The FDA is exploring ways to best tap into new technologies to significantly reduce the time needed for trace back investigations.

The agency is taking steps to improve its response times and provide actionable information to consumers as quickly as possible. It is also looking at regulatory options and considering appropriate enforcement actions against companies and farms that grow, pack or process fresh lettuce and leafy greens under insanitary conditions. The agency is continuing to explore additional ways to improve these processes and urge all segments of the leafy greens industry to review their operations in the same way.

As a next step, the FDA plans to collect and analyse romaine lettuce samples through a new special surveillance sampling assignment for contamination with human pathogens. This will help us determine whether products are safe to enter the US marketplace. If samples are found to be contaminated, the FDA will follow up with fresh-cut leafy greens processors and their growers or suppliers to determine if these foods were produced under insanitary conditions that render them harmful to consumers and take the appropriate action to remove them from the market.

Whilst recognising and appreciating the efforts that the leafy greens industry has taken to date, the FDA is conscious that more must be done on all fronts to help prevent future foodborne illness outbreaks.

Is it bad or isn't it?



Every year millions of tons of food are thrown into the garbage even though the food is still absolutely edible.

Is this yoghurt still good? Are those vegetables still edible? When there is doubt, people tend to chuck food into the garbage. Many products are thrown out simply because they no longer look appetising or have superficial blemishes, or because they are past their best-before date.

However, a solution may be in sight — a mobile food scanner will allow consumers and supermarket operators in the future to test whether food items have gone bad.

The pocket-size device uses infrared measurements to determine the ripeness and shelf life of produce and display the results via an app. Fraunhofer researchers developed the system, which exists in demonstrator form, together with partners in a project commissioned by the Bavarian Ministry of Food, Agriculture and Forestry.

In future, the inexpensive pocket-size device will determine the actual freshness of food, whether packaged or unpackaged. Researchers at the Fraunhofer Institute for Optronics, System Technologies and Image Exploitation IOSB, the Fraunhofer Institute for Process Engineering and Packaging IVV, the Deggendorf Institute of Technology and the Weihenstephan-Triesdorf University of Applied Sciences are developing the compact food scanner, which has been built as a demonstrator with data for two foodstuffs and also permits the shelf life of products to be estimated.

Using infrared light to determine the authenticity of food

The core of the mobile scanner is a near-infrared (NIR) sensor that measures the ripeness of the food and identifies the amount and composition of its contents. "Infrared light is beamed with high precision at the product to be investigated and then the scanner measures the spectrum of the reflected light. The absorbed wavelengths allow us to make inferences about the chemical composition of the food," explained Dr Robin Gruna, project manager and scientist at Fraunhofer IOSB. "In the laboratory, we've long been able to quantify individual components using near-infrared spectroscopy. What's new is that this can now be done with small, low-cost sensors," added Julius Krause, a member of Gruna's team.

"Foodstuffs are often counterfeited — for example, salmon trout is sold as salmon. Once suitably trained, our device can determine the authenticity of a product. It can also identify whether products such as olive oil have been adulterated," said the physicist. But there are limits to the system, too: it can only evaluate the product quality of homogeneous foods. At present, it struggles to inspect heterogeneous products containing different ingredients such as pizza. To this end, the scientists are investigating high-spatial-resolution technologies such as hyperspectral imaging and fusion-based approaches using colour images and spectral sensors.

To be able to determine the quality of food based on the sensor data and the measured infrared spectra and compute the shelf life predictions, the research teams are developing intelligent algorithms that search for telling patterns and regularities in the data.

"Through machine learning, we can increase the recognition potential. In our tests, we studied tomatoes and ground beef," said Gruna. For example, we used statistical techniques to correlate the measured NIR spectra of ground beef with the rate of microbial spoilage and derived the remaining shelf life of the meat from the results. Extensive storage tests, whereby the research teams measured microbiological quality and other chemical parameters under various storage conditions, showed good correlation between the computed and actual total germ counts.

App displays shelf life of food

The scanner sends the measured data via Bluetooth to a database for analysis. This database is a specially developed cloud solution in which the evaluation methods are stored. Next, the test results are transmitted to an app that displays them to the user and shows how long the food item will remain fresh under different storage conditions, or indicates that its shelf life has already expired. In addition, the consumer is given tips on alternative ways of using food that is past its best-before date.

A test phase is due to begin in supermarkets at the start of 2019, which will investigate how consumers respond to the device. More broadly, it is expected that the versatile technology will be used throughout the value chain, from raw material to end products.

Its ability to detect changes in quality at an early stage facilitates alternative uses and helps reduce waste, but the scanner is more than just an instrument for testing food items. It might be better described as a general-use, cost-effective scanning technology that can be easily adapted. For example, the system could be used to sort, separate and classify plastics, wood, textiles and minerals. "The range of potential applications is very wide; the device just needs to be trained accordingly," Gruna said.

what's new in food technology & manufacturing

packaging & labelling

All in one day

2019 AIP National Technical Forum and 2019 PIDA Awards

WHAT
2019 AIP National Technical Forum
WHEN
30 April 2019
WHERE
SOFITEL Wentworth, Sydney

REGISTRATION http://aipack.com.au/event-registration/?ee=191

The Australian Institute of Packaging (AIP) will be holding its biennial National Technical Forum and the 2019 Australasian Packaging Innovation & Design (PIDA) Awards for Australia and New Zealand on 30 April at the SOFITEL in Sydney.

AIP National Technical Forum

Having served the industry for over two decades, the AIP National Technical Forum brings together packaging technologists, designers, and sales and marketing people from all industries to better understand the technical side of packaging design. The 2019 AIP National Technical Forum will be designed to focus on showcasing best-practice and award-winning Save Food & Sustainable Packaging Designs and Innovative packaging across Food, Beverage, Pharmaceutical and Domestic Household.

This educational event will allow attendees the opportunity to be inspired by what other companies are already developing in key industries and markets.

Speakers will be coming from all over Australasia and will include TetraPak, McCormick Diageo, SPC, Campbell Arnott's, Feed My Fur Baby, Delicious Food Australia, the Orangutan Alliance, BioPak, Planet Protector, ICEE Containers, Polatote and many more.

2019 Australasian Packaging Innovation & Design Awards

The 2019 Australasian Packaging Innovation & Design Awards (PIDA), which are coordinated by the AIP and Packaging New Zealand, are designed to recognise companies and individuals who are making a significant difference in their field in Australia and New Zealand. The PIDA Awards are the exclusive award program for all Australia and New Zealand entries into the prestigious WorldStar Packaging Awards, which are coordinated by the World Packaging Organisation (WPO). The AIP is the ANZ Member for the WPO.

The Design Innovation of the Year company awards will recognise organisations that have designed innovative packaging materials within each of these five manufacturing categories:

- Food
- Beverage
- Health, beauty and wellness
- Domestic and household
- Labelling and decoration (new award)

There will be three special awards available:

- Sustainable packaging design special award
- Save food packaging design special award
- Accessible packaging design special award (new award)

In addition there are three awards designed for people who have made specific contributions to the packaging industry.

These Individual Awards will include:

- Young packaging professional of the year
- Industry packaging professional of the year
- Packaging New Zealand scholarship

The 2019 PIDA Awards will be held in the evening after the National Technical Forum. All of industry is invited to attend the awards night. Register to attend now and get two great events in a single day.

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Vertical and horizontal band sealers

The Venus Packaging VH882VC Band Sealers offer continuous sealing of plastic pouches and bags.

The machines can be tailored to suit custom packing applications allowing ease of use for the operator, with all components designed to require a minimum of maintenance.

The VH872 model, which is available in both vertical and a horizontal designs, features the latest drive mechanism and a user-friendly printing unit.

The vertical band sealer is suitable for products packaged in bags that are sealed in an upright position. For efficient packing of 'lay flat' items such as bakery products or loose items, a horizontal band sealer is preferred.

The band sealers are designed for quick and easy packaging into pre-made bags and can seal a variety of poly bags, laminated bags and stand-up pouches.

Venus Packaging
www.venuspack.com.au

Liquid nitrogen dosing system

The CryoDoser FleX Liquid Nitrogen Dosing System has the ability to serve every dosing application within one unit. This dosing system can be used from the slowest production lines to the fastest.

The CryoDoser FleX system is offered with two controllers — Craft Custom or Pack Premier.

Chart Industries
www.chartdosers.com

Capping chuck

GMD Innovation's New Generation capping chuck was designed to replace the traditional fixed-diameter and friction type chucks, which are responsible for a multitude of problems in machine efficiency and package quality in the packaging industry.

The design of the New Generation capping chucks provides for easy closure entry and exit from the chuck while automatically increasing grip during the closure tightening. They are also claimed to outperform and outlast fixed-diameter chucks.

Use of the chucks results in a reduction in downtime due to cocked caps, leaking packages, overtightened closures and broken closures.

GMD Innovation
www.gmd.com.au

Brand protection solution

Systech UniSecure is a non-additive product authentication solution that leverages existing product barcodes and packaging to create a unique signature that cannot be duplicated, hence ensuring product authenticity.

Print operations are dynamic, whereby environmental factors combine to produce micro-variations or 'noise' in printed marks. These variations are random, unique and beyond the controllable resolution of any printer. UniSecure takes advantage of these variations by detecting measurable patterns and harnessing them to generate an inherent, covert security feature from existing package print marks.

The ability to uniquely identify and authenticate individual products helps to mitigate counterfeit and diversion risks in the supply chain, while protecting brand equity and assuring consumer safety.

Foodmach Pty Ltd
www.foodmach.com.au

High-speed vacuum packaging

StarVac Systems' Jupiter series intelligent high-speed vacuum packaging machines are suitable for use in the red meat and cheese industries, with packaging speeds up to 42 packs/min. The machines can handle all product sizes for the lamb, beef, pork and cheese industries.

The packers feature a high packaging rate, small footprint, a reduction in energy consumption and environmentally friendly operation. The packaging machines are designed to provide maximum packaging efficiency and can be customised for individual users. Installation is simple as the packers are 'plug and play', with all parts, including the vacuum system, integrated inside the machine.

The machines are designed by applying hygienic design rules and all parts are in stainless steel. The combination of the Busch vacuum system and minimal moving parts leads to almost maintenance-free machine operation.

Starvac Systems Pty Ltd
www.starvac-systems.com

Recyclable solution for packaging authentication

ECOT by Finnish company Stora Enso is a new, sustainable RFID (radio frequency identification) tag technology designed for intelligent packaging functionalities in supply chain, retail and e-commerce applications. The technology enables paper-based RFID tags, providing a plastic-free and recyclable solution for packaging authentication.

RFID technology allows packaged products to be automatically tracked, traced and tamper-proofed throughout the entire supply chain. The wireless technology can be used for the transfer of data that are electronically stored on tags attached to a package. The technology can identify several hundred items in sub-second speed and without line-of-sight interaction. Moreover, it allows communication between the brand owner and the end user by use of a near field communication enabled smartphone.

Now Stora Enso's ECO technology enables the RFID tags to be produced on a 100% fibre-based paper label, unlike traditional plastic tags, resulting in a lower carbon footprint for sustainability-conscious B2B and B2C companies.

ECO technology offers a recyclable and plastic layer-free option for RFID end users, thus enabling a digital and sustainable packaging infrastructure.

By integrating the RFID tag with a paper label, the manufacturing process becomes more scalable and, as result, also more cost-effective — all without compromising on performance and reliability. The ECO tag can be recycled in an environmentally friendly way together with paper and board materials. Moreover, it offers high conductivity at a lower cost compared with graphene or silver printed antennas. The ECO technology is available for use in multiple ongoing projects across multiple sectors.

Non-toxic adhesive from soy

A soy-based adhesive created in Jonathan Wilker's lab at Purdue University could solve glue's toxicity problem.

Wilker studies how marine animals, such as oysters and mussels, create natural adhesives. Unlike most glues these adhesives are non-toxic and many hold up underwater. While trying to re-create a new glue in his lab one day, Wilker noticed something strange.

"Things were sticking when they shouldn't have been," he said. "We found that the components being used, proteins and sugar, were reacting and turning into an adhesive."

This is the essence of Maillard chemistry — it happens when you grill a streak or bake bread in the oven; after a while, the edges start to brown and a savoury smell fills the air. Chemically, sugars and proteins are combining to create aromatic compounds.

Usually, it takes heat to kick off this process, but Maillard chemistry is a whole class of messy reactions, and it can happen a few different ways. Products of each reaction get involved in their own reactions and can release chemicals that we experience as flavours.

"When foods brown, certain molecules are linking together. Proteins can connect to one another by reacting with sugars," Wilker said. "When sea creatures make their adhesives, they are also cross-linking proteins together. They use totally different chemistry, but the idea is somewhat similar; cross-linking proteins can create an adhesive."

Image credit: Purdue University photo/Jonathan Wilker

A new natural, non-toxic adhesive is as strong as Gorilla Glue. When two pieces glued together were pulled apart by a machine to test its strength, the wood ripped.

This new soy-based adhesive doesn't hold up well under water but it may find use in packaging of organic-certified food products.

"Food packaging usually relies on typical petroleum-based adhesives, which can leach out toxins," Wilker said.

The findings were published recently in the *Journal of the American Chemical Society*.

To test the strength of the adhesive, Wilker's team glued two pieces of wood or aluminum together. The far ends have a hole for a pin, and a machine pulls them in opposite directions to test their strength. The new adhesive was so strong on wood that the pin ripped through the hole.

Although the soy-based adhesive was pretty strong, the team achieved even better results with a different protein, bovine serum albumin (BSA). BSA is a generic protein often used in labs for experiments. It's cheap for researchers, but not cheap enough to make a BSA-based adhesive affordable on a large commercial scale.

"If you want to break into the adhesive market, your product needs to be cheap, high-performance and the material also has to be available on large scales," Wilker said. "This new soy-based adhesive may be able to hit these requirements while also being grown renewably."

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How to kill pathogens on seafood

Controlled release antimicrobial film makes seafood safer.

Seafood may be contaminated with bacterial pathogens, such as *Vibrio* and *Salmonella*, which can survive long-term freezing conditions. Vibrio naturally occur in marine environments and Salmonella can contaminate seafood during production or processing and both are concerns for the seafood industry.

However, a solution may be at hand. A biodegradable, edible film made with plant starch and antimicrobial compounds may control the growth of foodborne pathogens on seafood, according to a group of international researchers.

Catherine Cutter, professor of food science, Penn State, explained, "We have the ability to develop a film with antimicrobial activity that can kill foodborne pathogens on food surfaces. Given the recent outbreaks that we have seen with a number of food products, coming up with something that can be used by the industry to kill microorganisms on the surfaces of food is a noble area of research to investigate.

"*Vibrio* and *Salmonella* are somewhat susceptible to freezing," Cutter said. "So, if you treat bacterial cells with antimicrobials and then freeze them, the approach can be more lethal."

Freezing does not kill bacteria. However, when freezing food, ice crystals can form from the water in food. The ice crystals, Cutter said, can act like "daggers" and pierce the bacterial cell wall, causing damage to the cell.

Researchers used a blend of thermoplastic starch, a biodegradable polymer made from tapioca powder and a gelatin coating containing antimicrobials known as Nisin Z and lauric arginate (LAE).

The team of researchers in Thailand then created a 'culture cocktail' of the bacteria and inoculated slices of tiger prawn and big-eye snapper. The experimentally inoculated seafood samples were tested using different compositions of Nisin Z and LAE to see which variations would give the 'best kill'. After dipping the samples into the edible film composed with antimicrobials, some of the slices were vacuum packaged and chilled for up to a month, and other samples were frozen for 90 days.

"If you just dip shrimp into any antimicrobial — it's not going to stick very well," Cutter said. "But if you put the antimicrobial into an edible film, and then dip the shrimp into the film and pull it out, that film is going to form around the shrimp. The film then releases the antimicrobials over time."

Cutter emphasised the importance of a 'controlled release' of the antimicrobials over time in order to get the maximum kill, which is made possible by the edible film's unique properties. Applying just the antimicrobials directly onto the food products would result in the antimicrobials dripping off or diluting.

"If you're going to make an edible film, you want to make a film that has similar properties to plastic," Cutter said. "You want these edible films to be transparent because consumers aren't going to buy something they can't see, you want them to be flexible and you want the film to mould to the food product. By using edible films, you are doing it in a way that is biodegradable."

Cutter said a big challenge that the food industry faces is reducing the reliance on plastic packaging, something the food industry has been using for the past 40–50 years.

"How do you get the industry to change something they and consumers are so used to using?" Cutter said. "This research demonstrates through proof of concept that antimicrobial edible films work. So how do we get this type of packaging into a commercial application? That's the next logical step in the progression of this type of research."

The team's findings will be published in the *International Journal of Food Microbiology*.

How Europe is making beverage cartons recyclable by 2025

Veolia and Tetra Pak have formed a partnership with the aim of making all components of used beverage cartons collected within the European Union recyclable by 2025.

Currently, the paperboard component of the average beverage carton can be converted into high-quality paper pulp for use in both industrial and consumer products but the plastic and aluminium foil, which is recovered as polymer and aluminium (PolyAl) mix, is not recyclable.

So while 75% of the carton can be converted into high-quality paper pulp for use in both industrial and consumer products, 25% currently can't be recycled.

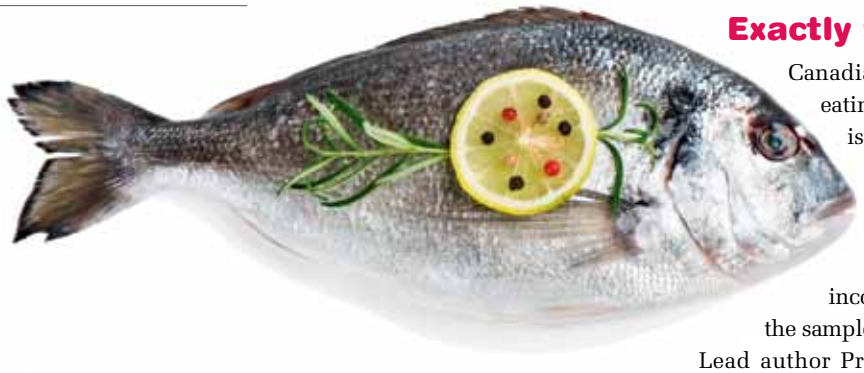
The Tetra Pak/Veolia partnership intends to process the extracted PolyAl at dedicated facilities where it will be converted into raw materials for applications within the plastic industry.

In this way, the overall value of used beverage cartons is expected to double, making the value chain for collection and recycling more efficient and viable.

As the partnership becomes more proficient, the participants would like to expand to more markets around the world.

"All materials from beverage cartons can be fully recycled into something new and useful. Our approach to recycling involves working with many partners along the value chain, because a chain is only as strong as its weakest link. The challenge in the EU is to achieve the economies of scale and turn PolyAl into high-value secondary materials," explained Lisa Ryden, Recycling Director, Tetra Pak.

Laurent Auguste, Senior EVP Development, Innovation & Markets, Veolia added, "This partnership joins together our resource management expertise and Tetra Pak's packaging material expertise. We will develop an environmentally and economically sustainable solution to recycling PolyAl, first in the EU, and then Asia, to improve collection, technology and processes."



Exactly what fish is this?

Canadian consumers may not know what fish they are eating, as University of Guelph researchers found fish is mislabelled before it is imported into Canada and throughout the supply chain.

A study conducted in collaboration with the Canadian Food Inspection Agency (CFIA) found 32% of fish was mislabelled and the number of incorrectly identified samples became compounded as the samples moved through the food system.

Lead author Professor Robert Hanner, from the Department of Integrative Biology at U of G, said: "It seems it's not isolated to foreign markets, but it's also happening at home."

U of G researchers examined 203 samples from 12 key targeted species collected from various importers (51), processing plants (11) and retailers (141) in Ontario. Researchers used DNA barcoding, developed at U of G, to identify the samples.

Overall, 32% of the samples were mislabelled: 17.6% at the import stage, 27.3% at processing plants and 38.1% at retailers.

"The higher mislabelling rate in samples collected from retailers, compared to that for samples collected from importers, indicates the role of distribution and repackaging in seafood mislabelling," said Prof Hanner.

"It's either economically motivated — meaning cheaper fish are being purposely mislabelled as more expensive fish — or it's inconsistent labelling regulations between countries and the use of broader common names being used to label fish, instead of scientific species names, that are leading to mislabelling."

In Canada and the US, fish are labelled using a common name, such as tuna, rather than a specific scientific name, which Prof Hanner said creates ambiguity and allows for human error or fraud. He continued: "It also makes it more difficult to track species at risk or indicate if a fish is a species that has higher mercury content. At the end of the day, Canadian consumers don't really know what type of fish they are eating."

European countries that recently included species names along with common names have seen less fraud, and Prof Hanner suggested this might help curb the problem with fish imports. This study shows a need for verification testing at multiple points along the supply chain.

"The next step would be to follow one package from import to wholesale to retail and see what happens," he said.

The study was published in the journal *Food Research International*.

Nestlé to create research institute for sustainable packaging

Nestlé plans to address the issue of plastic waste and minimise the impact of packaging on the environment with a new research institute for packaging in Lausanne, Switzerland.

The Nestlé Institute of Packaging Sciences will focus on the development of functional, safe and environmentally friendly packaging solutions. It will employ around 50 people and include a state-of-the-art laboratory complex and facilities for rapid prototyping.

This initiative is a step towards achieving its commitment to make 100% of its packaging recyclable or re-usable by 2025. Nestlé CEO Mark Schneider said, "We want to be a leader in developing the most sustainable packaging solutions for our food and beverage products. To achieve this, we are enhancing our research capabilities to develop new packaging materials and solutions."

In collaboration with the company's global R&D network, academic partners, suppliers and start-ups, the institute will evaluate the safety and functionality of various sustainable packaging materials. Research focus areas will include recyclable, biodegradable or compostable polymers, functional paper, and new packaging concepts and technologies to increase the recyclability of plastic packaging. Nestlé will test the solutions in various product categories before they are rolled out across its global portfolio.

"Packaging plays a crucial role in helping us deliver safe and nutritious products to our consumers. The new Institute of Packaging Sciences will enable us to accelerate the redesign of our packaging solutions. Cutting-edge science as well as a close collaboration with globally leading academic institutions and industrial partners will deliver a pipeline of highly performing, environmentally friendly packaging solutions," said Nestlé Chief Technology Officer Stefan Palzer.

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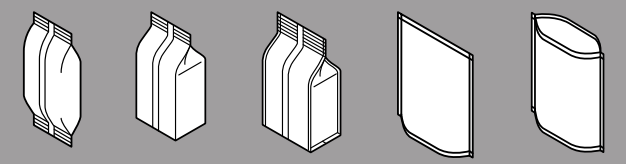

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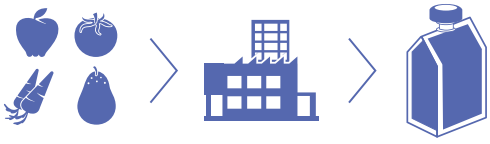

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Breathable oriented film

Hosokawa Alpine's MDO technology improves film optics, increases mechanical values and can additionally lead to specific properties, such as breathability.

Film thicknesses of 12–25 g/m^2 are customary market standards and are commonly produced with film width of 2.5 mm, which aligns with Alpine's MDO25. Specialised for low thicknesses in the range of 12–15 g/m^2, Alpine's blown film line with MDO inline is claimed to prevail over previously used cast technology, achieving good breathability and improved mechanical properties.

Hosokawa Alpine
www.hosokawa-alpine.com

Optical brightening agent for food-contact packaging and paper

Archroma's Leucophor AFCN liq is an optical brightening agent (OBA) specially designed for food packaging and paper.

It has approval for use in food-contact paper and paperboard under FDA Food Contact Notification 1921, which became effective on 9 November 2018.

The OBA is suitable for stock application and for use in coating formulations that contain polyvinyl alcohol (PVOH), carboxymethyl cellulose (CMC) or casein as a secondary binder.

It is a disulphonated OBA, with a characteristically high substantivity in the wet-end delivering the papermaker cost savings through the ability to make more rapid grade changes.

Archroma
www.archroma.com

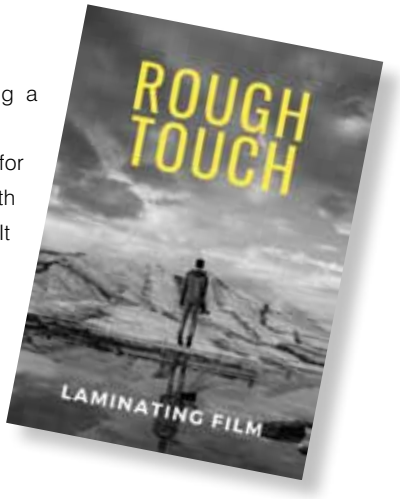
Textured matte laminating film

Jet Technologies has announced the Rough Touch textured matte film, featuring a unique, rough, gritty feel.

The versatile film provides a new touch and feel that meets consumer demands for luxury looks and sensations in products. It provides a high-quality matte finish with enhanced colour and is applied in the same way as any other conventional film. It offers extra protection for printed jobs through avoiding scuffing and curling.

The film is compatible with a range of finishes such as spot UV or hot stamping and is able to be glued and printed on by traditional offset with oxidative inks (specifically for non-porous materials), offset UV and screen printing.

Jet Technologies
www.jet-technologies.com.au



3-in-1 biogas measurement instrument

The Vaisala MGP261 is a 3-in-1 biogas measurement instrument that gives continuous readings of methane, carbon dioxide and water vapor directly in the biogas process pipeline. It is Ex certified up to Zone 0 inside pipes and Zone 1 outside, which means it can be installed in explosive atmospheres.

It is optimised for biogas production processes, such as anaerobic digestion of waste from agriculture, industries and municipalities, and the utilisation of landfill gas.

The biogas measurement instrument offers real-time gas composition without sample extraction or treatment. With stable methane measurement, the compact instrument helps biogas plant operators gain comprehensive control over their process and optimise their combined heat and power (CHP) engine performance. The instrument also enables operators to control humidity in order to reduce wear in the CHP engines and process components.

It is easy to use and install, and it can be fitted to any existing system. The in situ installation makes sample treatment unnecessary, enabling measurements without any sampling lines, pumps or moisture removal traps.

Vaisala Oyj

www.vaisala.com/en/

Aseptic double-seat valve

The Alfa Laval Aseptic Mixproof Valve is an aseptic double-seat valve that has a hybrid diaphragm with a PTFE face and reinforced EPDM backing. It reduces the total cost of ownership, yet still ensures the hermetic seal required for sterile processing.

Users are able to configure the valve to meet their requirements. Choose a standard valve body and a tangential valve body or use two standard valve body types. Built on the same Alfa Laval Unique SSV platform, the aseptic double-seat valve is easy to mount either in a horizontal or vertical position.

The optimised design makes cleaning and sterilisation easier, proven by CFD flow simulations. This ensures more production uptime and greater product safety through full protection against the intrusion of harmful microorganisms, even during unwanted pressure spikes. With a highly flushable design and no domes in the product and steam areas, the valve provides good cleaning capabilities.

The aseptic valve follows the same maintenance routines as most wear parts are interchangeable. This will help users streamlining replacement parts inventory.

The valve comes in three seat-lift versions, five steam valve types and a range of options for steam temperature monitoring. They all comply with the strict requirements of 3-A Sanitary Standards.

Alfa Laval Pty Ltd

www.alfalaval.com.au

Packaging and coding verification

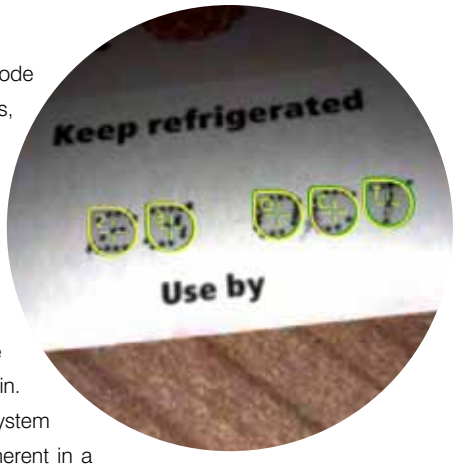
The AutoCoding packaging and coding verification solution automatically sets up date-coding equipment using product data from a secure central database. This removes the need for operators to program devices which, in a time-pressured environment, can lead to errors. Online scanning of the packaging throughout the job run ensures the correct packaging and artwork version is used; if a rogue piece of packaging is detected the line will stop.

As well as the increased speed and reliability of packaging line set-up, downtime during product changeovers is reduced. For improved traceability and accountability, all events that take place on the packaging line are recorded in the audit log giving an unbroken history of actions.

The entry-level option offers simple code deployment and packaging verification, but enhanced functionality can be achieved with the addition of various modules, such as paperless quality control, line performance reporting and inspection reporting.

AutoCoding Systems Pty Ltd
www.autocodingsystems.com

Vision system for date code verification



OAL has launched an artificial intelligence-based vision system, APRIL Eye, for date code verification. The system removes the operator from the date code verification process, achieving full automation to reduce the risk of product recalls caused by human error on packaging lines.

By taking photos of each date code, the system can read them back using scanners to ensure they match the programmed date code for that product run, allowing food and beverage manufacturers to achieve unmanned operations and full traceability. Running at speeds of over 300 packs/min, it also allows them to increase throughput without compromising product safety. The production line comes to a complete stop if a date code doesn't match, ensuring that no incorrect labels can be released into the supply chain.

The system uses basic cameras backed up with an artificial brain to deliver a vision system that can deal with variations such as lighting, positioning, print quality and placement inherent in a food or beverage plant, and read anything that is legible to the naked eye. It is designed to eliminate errors and protect both consumers and the brand, while reducing labour costs and waste.

OAL
www.oalgroup.com

Premium package appeals to health-conscious consumers

Danone wanted the packaging of its new all-natural spoonable yoghurt to appeal to health-conscious consumers. It wanted premium-looking packaging that is durable and increasingly sustainable for its yoghurt.

In collaboration with Danone, Amcor developed a transparent 200 mL polyethylene terephthalate (PET) jar with a wide-mouth opening and an aluminum-PET-aluminium closure with a 65 mm over cap in clear polypropylene (PP).

"This wide-mouth PET jar is an entirely new format offering for cold-fill dairy products," said Martin Darmandrail, New Business Development Director for Amcor in Argentina. "In a market historically dominated by thermoformed PP and polystyrene containers, we've shaken things up with a yoghurt package with the durability, freshness, performance, manufacturing and sustainability benefits of PET."

The new PET jar supports the 100% natural positioning of Danone's La Serenísima's yogurt with featured engraving, a finely finished base and a body-wrap label. To protect the contents, the jar includes a 55 mm finish with aluminum-PET-aluminum-foil barrier seal and an ultraviolet blocker.

With consumers increasingly eager to see products before they buy, the transparent packaging allows people to see the fresh yoghurt.

"We have developed La Serenísima Original, a product inspired by the first yoghurt made by La Serenísima 55 years ago, which revolutionised the category in 1963," said Maximiliano Sassone, R&I Director for Danone Argentina. "We carefully select the ingredients, including milk from Argentine family farms, and pay respect to every step of the original process, creating a 100% natural product without preservatives, so that our consumers can connect to their memories of the original product."

Amcor optimised the two-step reheat process to produce the wide-mouth jars using a Matrix blow-moulding machine — an industry first — for high-volume yoghurt containers, according to Darmandrail.

Amcor Global
www.amcor.com.au

Hot melt jetting head

Robatech's SX LongLife is a hot melt jetting head for long-lasting precision adhesive application. It is a further development of the Diamond series and therefore compatible with most of the company's application systems.

The insulated application head is suitable for precision dot and bead application at medium to high speeds. Due to a specially developed jetting element and robust solenoid valve, it is long-lasting, with the potential to reach up to 200 million operation cycles.

Designed for the contact-free application of low- to medium-viscosity thermoplastic hot melt adhesives, the small dimensions of the product makes it suitable for upgrades and installation in systems with restricted space. An integrated filter in the heating block prevents nozzle blockages, ensuring adhesive application over the long term.

The application head is modular and available in different variants, and can be flexibly adapted to the respective application. This reduces the spares inventory, since various components such as the filter, nozzles and heated hoses are the same.

The CoolTouch insulation of the application head means that both the operator and the products to be glued are well protected. It increases safety in case of accidental contact. This heat-resistant insulation also saves energy and contributes to resource-friendly, sustainable production.

The latest generation of the Diamond series combines high switching frequency with maximum service life, making it suitable for flexible use in a variety of industries.

Robatech Australia Pty Ltd
www.robatech.com.au

UHT system for smaller pack sizes

JBT Corporation has launched the SteriCompact processing system, the latest in the company's Sterideal HX UHT range of systems, which has been adapted to meet demand for smaller pack sizes.

The system will cater for the move towards reduced scale milk and juice production and pack sizes in developing economies, as well as specialised products in high-end markets. The system is designed for a smaller volume production in smaller packages of down to 80 mL.

As well as standard dairy applications, the system, which handles lower-range capacity production of 2000–4000 L/h, can be configured with optional modules to process extended shelf life milk, juices with small fibres and soy products. The system is designed around one central skid containing all the process components including the electrical system, which results in reduced installation time and cost.

JBT FoodTech
www.jbtfoodtech.com

ProPak Asia

ProPak Asia will be held from 12–15 June in Bangkok, Thailand. 1900 exhibitors from 50 countries will display 20,000 products and solutions.

ProPak Asia is divided into nine targeted zones for visitors including ProcessingTechAsia, PackagingTechAsia, DrinkTechAsia, PharmaTechAsia, Lab&TestAsia, Materials Asia, Coding, Marking & Labelling Asia, Coldchain, Logistics & Warehousing Asia and Printech Asia.

There will be 18 pavilions from 13 countries including Australia, China, Denmark, France, Germany, Italy, Japan, Korea, Singapore, Spain, Taiwan, UK and USA.

In 2018 ProPak Asia attracted 48,799 buyers from 79 countries who were particularly interested in technology and automation solutions. There is still some space available for exhibitors and time for visitors to book their tickets to Bangkok.

Packing lollies

for millennials and everyone else

Packaging generates brand identity and sets trends, and it is particularly significant in point-of-sale items like confectionery and snacks.

Whether the relevant point is aesthetics, functionality, protection or sustainability, packaging that convinces through its design is what counts at the point of sale.

The significance of the packaging design as a means of distinction has increased strongly over the past years, along with the incredible variety of lollies on the shelves.

Presenting the brand

Premium brands strive to appeal to the senses directly from the shelves — a clear design, haptic characteristics and striking embellishments are frequently part of the packaging. However, in today's era of sustainability and transparency, visual appearance is long since not everything.

"Today's consumers display high awareness for wellbeing and the environment," confirmed LuAnn Williams, Director of Innovation at Innova Market Insights.

It is thus no surprise to her that the consumers are placing more importance on the intelligent usage of resources, for instance in the form of biodegradable and renewable packaging.

The desired goal is a closed loop across the value chain, and some of the innovative packaging already achieves this.

The thinner and lighter, the better

Lightweight folding boxes are just one of the ways of minimising raw packaging material consumption. Foil solutions are increasingly joining the ranks of sustainable packaging solutions while market experts are expecting the global demand for plastic pouch packaging in the food section to increase up to around an average of 4.2% per year by 2025.

This trend goes hand in hand with the strong demand of consumers for products that are packed in a practical manner with easy-opening characteristics. Intuitive handling when opening and closing the packaging is just one aspect that the designers have to consider.

From this point of view, doypacks are one of the especially dynamic growth segments. They are resealable, compact, lightweight and non-breakable. They are already used to pack snacks such as vegetable chips and nuts and are also being used with filled chocolates and seasonal items.

The consumption of fossil-sources raw materials is being reduced since the introduction of biobased foils, in which the polymers are made from sugar cane ethanol or milk proteins.

New customising technologies and intelligent packing material combinations are also being introduced. Doybacks made without the use of aluminium and which can be produced from a digitally imprintable paper compound are now available.

Individuality is in

The more individual the packing, the more likely the young consumers are to pick up the product at the point of sale and inspect it more closely. Mass-produced goods are out as millennials choose snacks and sweets which suit their personal lifestyles.

Digital printing means that small and medium-sized confectionery manufacturers can design their products much more creatively. High-performance digital printing machines can be used on site to produce smaller and medium-sized volumes of high-quality folding boxes that rival those made on offset machines.

If you want to be absolutely up to date with every facet of the confectionery industry, you must go to ProSweets 2019. Held in Cologne from 27–30 January 2019, ProSweets will have on display a comprehensive covering of packaging for every snacks and confectionery market trend.

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Designed to protect overhead assets from accidental damage from moving vehicles.

This ceiling-mounted barrier provides audible and visible alarms to prevent damage before it happens, averting vehicle impacts and changing driver behaviour over time.

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Alarm Bar

Designed to protect overhead assets from accidental damage from moving vehicles.

This ceiling-mounted barrier provides audible and visible alarms to prevent damage before it happens, averting vehicle impacts and changing driver behaviour over time.

Quick and easy to install, it can be used to safeguard doorframes, loading docks, infrastructure and overhead walkways, as well as key safety assets such as sprinkler systems and ventilation pipes.

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Going continuous triples output

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The largest producer of cooked pasta in Sweden, Mixum AB, tripled output and cut clean-up and changeover times by 85% when it moved from batch cooking and cooling pasta to continuous production.

Mixum supplies pasta-based salads to 3000 Picadeli salad bars chain in Sweden, Scandinavia and much of northern and western Europe. The company's success is due largely to its attention to product quality, food safety and streamlined manufacturing initiatives. Mixum operates in compliance with HACCP (Hazard Analysis and Critical Control Points) and is certified through FSSC (Food Safety System Certification) 22000 and ISO 14001.

In 2012, Mixum rebuilt its entire production facility into a model food processing plant, with some emphasis on energy efficiency. One of the key systems installed was a line of continuous-process blanching and cooling equipment for pasta, which replaced a batch processing system being used for more than a decade.

"We were cooking our pasta in batch vessels," explained Magnus Franzen, CEO of Mixum. "This did not give us much control of our cooking and cooling times. We were looking for a solution that could both cook and cool the pasta, maintain better control over the entire process and get more consistent product quality."

Mixum also needed to increase its production throughput to keep pace with growing demand for its pasta products. It needed shorter runs of a wider selection of pasta to be processed, with increasing need for quick changeovers and faster clean-up and turnaround times.

"After reviewing many process options, we decided on a continuous-process Clean-Flow XT blancher, from Lyco Manufacturing, and a continuous-process Easy-Flow cooler, also from Lyco," Franzen said.

The Clean-Flow XT blancher addresses Mixum's need for more consistent pasta quality and faster clean-up and changeovers. The blancher has a 1 m diameter auger with flights to move the pasta through water, fully submerged, from input to output. It is equipped with Hydro-Flow agitation, a Lyco development, which enables more uniform cooking and cooling. Hydro-Flow uses water flow to create turbulence, so it keeps the pasta moving to achieve a more even cook — eliminating under- and over-cooking of the pasta and losses from sticking and clumping.

Faster sanitary clean-up time is key. What would normally take several hours for a thorough sanitary cleaning can now be done in 30 minutes, reducing labour hours and increasing flexibility for more frequent changeovers to accommodate shorter production runs. A clean-in-place system, using spray manifolds, cleans 98% of the auger and tank by itself.

The pasta exiting the blancher is gently deposited into the Easy-Flow cooler via a flume, where it is quickly and evenly cooled to bring it down to the required 4.5°C final temperature.

Traditionally, pasta products take 12 minutes to cook and another 5-10 minutes to cool to 4°C. Mixum's Easy-Flow cooler receives the 82–93°C pasta and chills it to 4°C or less in under 30 seconds.

When the pasta enters the cooler, it is pulled into a damage-free, Venturi-action water plenum and mixed with cold water where the heat begins to be removed. The cooler consists of four zones, or chambers, for cooling the pasta. Each zone submerges and mixes the pasta in chilled 0.5°C water where it rapidly discharges heat. The first stage cools the pasta to below 21°C in under 10 seconds. The second stage cools the pasta to 13°C, the third and fourth stages bring the pasta temperature down to 4.5°C or less.

Automatically controlling the pasta cooking and cooling, with consistent parameters for temperatures, process times and recipes, has completely outperformed the batch method used formerly by Mixum.

"With the batch method, we were running about 300 kg of pasta per hour," Franzen explained. "With the new blancher/cooler, we are processing about 1000 kg/h and still not running at full capacity. We can achieve more exact process temperatures and times, and the pasta quality is much better."

Automation and Packaging
www.autoandpack.com.au

Magnetic extraction system saves thousands in winery equipment repair

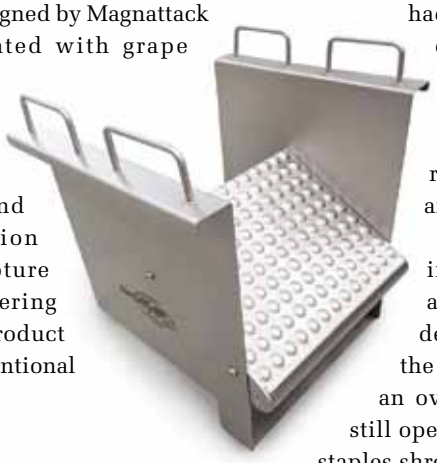
One of the largest risks to profitability in winemaking is damage to expensive processing equipment. Metal contaminants such as wire and vine fencing staples, and small- to medium-sized tools such as hammers and brackets, enter the grape receivals area and cause significant damage to downstream equipment.

Magnattack Global technicians were recently contacted by a winemaker in the Barossa Valley who was experiencing this problem. Loss of productivity and costly emergency repairs and replacements during the grape-crushing period were impacting the business.

Solution

After investigating the application, Magnattack technicians recommended the RE80 Dimple-Mag Extraction System.

The system consists of a specially designed Magnetic Plate paired with a high-intensity RE80 10–11,000 gauss magnetic separation bar. It was designed by Magnattack to overcome problems associated with grape bunches and debris becoming entangled around Multi-Finger Receival Bin Magnets, another magnetic system that has become popular throughout Australia and New Zealand. The configuration of the system improves the capture of magnetics and without hindering product flow or compromising product coverage as experienced with conventional bar/grate magnets.



The Dimple-Mag was installed in the de-stemmer hopper under the grape receival discharge screw.

Results and achievement

- Reduced equipment maintenance and repair costs
- Reduced downtime in production for repairs
- Reduce unplanned shutdown
- Fast return on investment — the magnet paid for itself within the first week
- Control over incoming foreign metal contaminants.

Wine processing equipment are not only valuable assets but are also expensive to repair, especially if emergency repairs are required during the high-pressure time of the year at grape-crushing time.

As soon as the grape-crushing season began, the customer experienced the benefits of having a high-strength, effective magnet in their grape receivals. Commenting that the system had paid for itself multiple times within three days, the customer reported that large lumps of steel, long blades and small hammers had been collected by the magnet, preventing damage to their equipment that would have resulted in unplanned production shutdown and costly repairs as in previous years.

The customer also noticed a significant improvement in the condition of sensitive assets downstream such as their bag press, de-stemmer, lacerated knife valves, etc. For the first time, their Must Pump did not require an overhaul at the end of crush because it was still operating efficiently due to the absence of sharp staples shredding the internals.

Over a season the magnet helped reduce wear and tear on process equipment that could accumulate a significant expense.

Typical damage costs associated to intakes without adequate magnet protection:

- $2500 for repair of bag press (or $15,000–$20,000 for replacement)
- $8500 repair of pump
- $8000 repair of de-stemmer
- Plus costs of downtime for investigation/repairs and loss of production.

Reduce your risks of equipment damage

The RE80 Dimple-Mag System is a low-cost solution for a high-cost risk. Also available from Magnattack are the RE80 Multi-Finger Style Receival Bin Magnets.

It is important that your magnet supplier fully understands the application in order to provide an effective solution. Magnattack technicians can provide advice on how to reduce your risk of equipment damage, repair costs and plant downtime to suit the configuration of your existing process line.

Magnattack Global
www.magnattackglobal.com

What's inside the ZR VSD+ is what sets it apart

Building on our years of experience in compressors, we have designed our most advanced oil-free air compressor to date. Available up to 160 kW, the ZR VSD+ provides the oil-free compressed air and eliminates any risk of oil contamination.

This great box comes fully loaded with TWO water-cooled IPM motors and our start-of-the-art NEOS invertor, all developed in-house. These features deliver significant energy savings over wide operating loads. Available with the option of an integrated dryer that can deliver guaranteed dry air to - 40°C PDP. It is a space saving and reliable air compressor loaded full of features. It truly is what's inside that sets this air compressor apart. Speak to a specialist today on 1800 023 469.

www.atlascopco.com.au

Sanitary conveyors

QC Industries HydroClean HC200 Conveyors encompass a sanitary design for handling all types of applications including food products, medical devices, pharmaceutical and clean room industries, and wet and washdown environments. The HC200 conveyors offer a variety of options to fit the user's unique application.

The stainless steel conveyors are purpose built for easy cleaning. Every conveyor can be disassembled without tools to simplify the cleaning protocol. The design ensures opportunities for bacteria to accumulate are minimised. The systems comprise sealed ball bearings, hex head fasteners, slotted frames and soft angles to promote drainage.

The unique tension release technology operates at the pull of a pin to relieve tension on the belt. Cleaning under the belt is quick and easy, with no tension or tracking adjustments required. Belt changes are simple and tool-less. Suitable antimicrobial totally encapsulated and plastic chain belting options are available.

All HC200 include crowned pulleys and V-guided belts for positive tracking, especially in wet environments. The systems operate at speeds of up to 1.5 m/s with loads up to 54 kg. Their 60 mm profile will fit in space-limited applications. The conveyors are offered with accessories to complement the product and complete the user's design requirements. These include stands, mounts, side and guides, drive packages and washdown gearmotors.

The HC200 conveyors feature a 10-year warranty.

TEA Transmissions Pty Ltd
www.tea.net.au

Anti-corrosion surface treatment

NORD DRIVESYSTEMS has developed the nsd tupH anti-corrosion treatment for use in demanding environments with stringent hygiene requirements.

The surface treatment provides anti-corrosion protection for gear units, smooth surface motors, frequency inverters and motor starters in washdown-optimised cast aluminium housings. The aluminium surface has similar corrosion resistance properties to stainless steel. It can be easily cleaned and is largely resistant to acids and alkalis.

The use of high-pressure cleaners or contact with many types of aggressive media is possible, making the drives a robust and durable alternative to painted geared motors or stainless steel versions. The treatment is available for all NORD products made from aluminium. DIN and standard components, including drive shafts, are manufactured in stainless steel. Fanless motors do not spread germs and are available as synchronous and asynchronous motors with efficiency classes IE2, IE3 and IE4.

NORD Drivesystems (Aust) Pty Ltd
www.nord.com

Electric reach truck series

The Mitsubishi RBF-CA electric reach truck series, with its compact structure and powerful drive system, is ready to perform in any warehouse where floor space is at a premium.

It comes in three models, 1.4, 1.6 and 2.0 tonnes, and can deliver lift heights to 10 m.

An optimised operator experience is ensured by the SICOS-AC control system that integrates the hydraulics, travelling and steering functions. Also integrated is a self-diagnostic function that constantly monitors for malfunctions. Any faults discovered are communicated via diagnostic codes making it easy to identify the problem and rectify.

AC motor technology delivers a smooth, powerful drive and low maintenance costs. A regeneration function charges power back to the battery through plugging, coasting and braking to ensure longer operating hours from one charge.

The operation interlock system deactivates travelling when the operator is not seated. A neutral safety feature prevents sudden movement should the accelerator or hydraulics be accidentally activated, while a sensitive lift speed control automatically slows lifting and steering when the truck is above a certain speed.

MLA Holdings Pty Ltd
www.mlaholdings.com.au

New high-speed door manufacturing facility for Victoria

Arbon Equipment is set to open a high-speed door manufacturing facility at Laverton North, in Melbourne's west, in January 2019.

The 1200 m² facility will be staffed by a local workforce and officially endorsed as a Made in Australia manufacturer. Local Australian production will decrease lead times on doors from three months to a matter of days with 100% spare parts availability.

Product lines will include the Rite-Hite FasTrax doors series, including the FR (freezer), Standard and LD (large driver) models. Doors will be offered in blue and carbon.

Adjacent to the manufacturing space, a 450 m² Arbon Equipment showroom already features a variety of industrial equipment, including doors, loading dock levellers and vehicle restraints. The full-size equipment displays give customers a chance to take part in comprehensive product demonstrations.

Arbon is the Australian service and distribution arm of Rite-Hite, a global manufacturer of loading dock and industrial facility equipment. Principal product lines include: vehicle restraints, dock levellers, integrated controls, dock seals and shelters, industrial power doors, HVLS fans, aftermarket products and preventive maintenance services.

Compressed air for smoked meats

New Zealand smoked meats producer Texas BBQ Foods recently installed a Kaeser Aircenter 6 at its Inglewood facility to meet its requirement for a reliable supply of clean compressed air.

The family-owned and -operated company produces a range of Texas-inspired smoked beef brisket, pork belly, cheeses and butter along with rubs and sauces, and follows the traditional Texas BBQ style of preparing meat. Firstly, a rub is applied to the NZ-grown beef and pork, before it is smoked in one of the plant's four big meat smokers using mesquite-chips. Once the meat is cooked it goes straight into a blast chiller, before it is sliced, vacuum packed and chilled, ready to be dispatched. The vacuum-packing process ensures the products retain their integrity for longer.

Director of Texas BBQ Foods Ash Peters explained: "A critical factor in selecting a compressed air solution for us was to find one that would deliver a reliable supply of clean air. We also wanted it to be easy and low maintenance, quiet in operation and a nice tidy unit that would be simple to install."

Compressed air would be required across the facility for various purposes, including powering the thermoformer packing machine. This automated machine places the finished meats into trays before a vacuum seals the packets.

Kaeser partner Pace Power & Air installed a Kaeser Aircenter 6 that would operate with a food-grade lubricant, along with two Kaeser F6 filters — one KE and one KA. Within one compact package, the Aircenter includes a Kaeser rotary screw compressor, an energy-efficient refrigeration dryer and an air receiver.

It was designed to be user- and maintenance-friendly, has excellent accessibility to all service points, and includes a Sigma Control 2 controller for ease of system control and monitoring. With this internal controller, compressor performance can be precisely adjusted to match respective compressed air consumption for optimum efficiency.

At the heart of the Aircenter's rotary screw compressor lies a premium quality screw compressor block featuring the Kaeser Sigma profile rotors. These flow-optimised rotors are able to achieve power savings of up to 15% compared with conventional screw compressor block rotor profiles. It also features sound levels as low as 62 dB(a).

To meet the air purity level required for food manufacture, two Kaeser filters were also installed. The range uses modern deep-pleated filter media to remove particles and aerosols, while a carbon fibre mat traps oil vapours. Together with innovative flow dynamics, they deliver filtration efficiency with minimal pressure loss.

Peters concluded, "We are finding it to be reliable, nice and quiet in operation, and user-friendly, requiring only minimal checks."

Kaeser Compressors Australia
www.kaeser.com.au

Electric forklift trucks

Nichiyu 3-wheel electric forklift trucks are suitable for the logistics and food industry, providing clean and robust power with nearly maintenance-free operation.

With ultracompact design and good manoeuvrability, the FBT series is suitable in confined working areas such as narrow aisles and in containers. It is equipped with a 48 V battery, efficient AC power traction and hydraulic motors and regenerative systems.

While these trucks are suitable for indoor applications where noise, pollutants or particulate contamination is undesirable, they also come with an IPX4 rating, which means the forklift and its systems are protected against water spray from all directions and angles, making them safe to operate in rain.

Electric power steering, good visibility, ergonomic controls, comfortable seat and leg room create good working conditions for operators.

It has integrated speed control on slopes. On an upslope, if the accelerator or brake pedal is released, the truck will only roll backward at a speed of less than 1 km/h, providing peace of mind for the operator.

The forklift comes with an in-dash digital load indicator. Operators can quickly tell the weight of the load to prevent overloading. When overloaded, the truck will warn the operator through the display and by a warning buzzer.

MLA Holdings Pty Ltd
www.mlaholdings.com.au

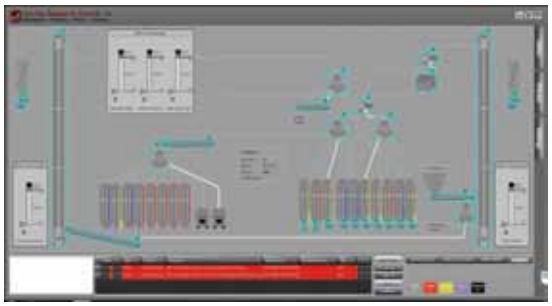
Automatically cleanable magnetic separator

Goudsmit Magnetics' automatically cleanable Easy Clean magnetic separator can be used to remove metal particles (>30 μm) from powders. The Easy Cleanflow magnet has a high magnetic flux density of over 12,000 gauss on the bars that come into direct contact with the product, as well as a deeply penetrating magnetic field that effectively makes powders and granulates iron-free at high flow rates.

The magnet is dustproof to an overpressure of 1.5 bar and includes a simple controller. The user-friendly cleaning requires 6 bar air and a 24 VDC start signal. The captured ferrous particles land in a collection tray.

The pneumatic magnetic bars simplify the cleaning process. The magnetic bars are slid out along a guide and, once outside the housing, the magnetic bars are exposed by blowing them out of the tubes. A plate then retains the captured metal particles, after which they fall into a collection tray. The Easy Cleanflow magnet is also suitable for the separation of small, weakly magnetic stainless steel particles.

Goudsmit Magnetics Group
www.goudsmitmagnets.com



Loadout automation application

Sterling Systems & Controls has announced its automation application module for the loadout of feed materials in feed mills, pet-food manufacturing facilities, and other agricultural and industrial applications.

The loadout application system ensures the transport of the correct product to the desired location, quickly and efficiently. With the ability to custom fill a truck with multiple orders, the system identifies the load needing to go into the truck trailer and then fills it with the correct material based on the order. It validates that all product is loaded into the correct truck and compartment, and delivered to the correct customer.

The custom-designed software application can meet users' requirements. It offers high performance, data management, report generation and exporting, with simple menu-driven screens that are easy to use and understand.

Sterling Systems and Controls Inc
www.sterlingcontrols.com

Dry screw vacuum pump

Atlas Copco's Industrial Vacuum division has launched the DHS 065-200 VSD+ dry screw vacuum pump which is built for rapid cycling and continuous operation applications.

It is a clean, zero contamination dry vacuum pump that requires no water or oil cooling. Certified as oil-free in the category 'Class Zero' according to ISO standard 8573-1, the pump is free of oil emissions, including aerosol oil content in the outlet air stream. The reduced number of parts within the pump combined with the variable pitch screw design helps increase efficiency and reduce maintenance.

Due to the completely dry operation, no oil migrates in the pump environment. It helps to create a clean and safe working environment.

Housed in a noise-reducing canopy provides a quiet, vibration-free operation with a low pitch sound level, the pump is equipped and controlled with the MK5 Elektonikon. This integrates the pump to plant management systems. Users get the latest status updates on running and stopped hours, warning, and fault and shutdown indications. Combined with the company's SMARTLINK, the pump offers remote monitoring capabilities.

The grease-lubricated bearings and the belt are the only parts which require replacement. The belt itself can be changed without external service support within 30 min. The robust canopy retains the integrity of the internal parts and can be removed easily.

Atlas Copco Compressors Australia

www.atlascopco.com.au

Keep road/rail containers cold for 120 h without power

University of Birmingham experts have worked with one of China's biggest railway rolling stock companies, CRRC Shijiazhuang, to develop what is claimed to be the world's first shipping container using materials that store and release cold energy.

Using phase change material (PCM), the 'refrigerated' truck-to-train container is claimed to be easier and more efficient to operate than conventional equipment.

Once 'charged', PCM inside the container — which can be transferred from train to truck and vice versa — can keep the inside temperature between 5 and 12°C for up to 120 hours. The technology has recently completed commercial trials carrying real goods for 35,000 kilometres of road and 1000 kilometres of rail transport across different climate zones.

Professor Yulong Ding, Director of Birmingham Centre for Energy Storage, who led the research at Birmingham, commented: "Energy storage is an area of world-leading expertise at the University of Birmingham and cold chain technologies research is one of the most important topics at our Centre for Energy Storage.

"We have developed a productive collaboration with CRRC Shijiazhuang and this innovative technology marks the beginning of developing an efficient and economic rail and road freight cold chain.

"We are proud to contribute to the development of safe and clean low carbon energy technologies in China and beyond, which will ultimately help us to reduce the energy burden on our planet and tackle climate change."

Cooling is essential to modern society, which already causes twice the global greenhouse emissions of shipping and aviation combined with the cold chain being a significant cause of pollution. Increasing demand for cooling will result in spiralling energy usage with a potentially disastrous environmental impact, if left unchecked.

"Without ambitious intervention, research shows that energy demand from cooling could increase five-fold by 2050, putting an increased pressure on global energy resources," Professor Ding said. "How the world meets its demand for cooling could have a major impact on climate change and air pollution."

Several cold chain logistics companies in China have expressed strong interest in the container, which provides a more stable temperature, compared with the mechanical units, and hence a higher quality of goods at the destination. It does not need a power supply during its journey making transfer between road and rail easier. The container's location and temperature can also be monitored in real time using mobile communication technologies.

Clean design conveyor

Australis Engineering has developed a purpose-built, clean design conveyor — Hygenius — which leverages clean design principles from the European Hygienic Engineering Design Group (EHEDG), making Hygenius suitable for dairy, meat, smallgoods, poultry and seafood applications.

The Hygenius conveyor design minimises surfaces and removes hidden and hard-to-reach crevices to make cleaning faster and easier, resulting in reduced cleaning costs and downtime for the user. Fundamental to the Hygenius design has been the removal of material as users don't have to clean what isn't there. The company uses EHEDG principles and approved components to deliver a smart and easily cleaned conveyor.

Additionally, Australis has developed a patent pending Clean Belt Tensioning and Tracking System that further minimises cleaning and maintenance. The Hygenius conveyor utilises full washdown and antibacterial rated components while remaining safe for conveyor operators, which is a key element of the design.

Australis Engineering Pty Ltd
www.australiseng.com.au

Minimise spore counts
in milk powder

Typically spore counts in spray dried milk powder increase exponentially through each production run. A process that minimises this increase has just been patented.

Caloris has patented its low-spore powder production process in the US. US Patent No. 10,182,580, System and method for production of low thermophile and low spore milk powder, details a robust processing sequence that minimises an increase in spore counts throughout the critical processing steps, while maintaining continuity of the production process.

In a typical process, spore-forming microorganisms present in the raw milk establish biofilms particularly in the feed preheating and initial product concentration sections of the evaporator throughout each production run. After maturing for about 10 hours, these biofilms start to release spores into the milk,

> *Thorough cleaning just as the biofilms begin to reach maturity prevents any significant contamination of the product with spores from biofilms.*

resulting in significantly increased spore counts through the remainder of the production run. The Caloris Low-Spore Process simply takes away the opportunity for the microorganisms to establish biofilms and release spores into the finished product.

The key to the Caloris process is well-timed evaporator system CIP cycles, which eliminate the presence of mature biofilms during operation and thereby prevent contamination of the milk product with spores. The configuration of the process allows these CIP cycles to occur without interrupting the powder production of the spray dryer system.

Thorough cleaning just as the biofilms begin to reach maturity prevents any significant contamination of the product with spores from biofilms. This also provides the added benefits of cleaning evaporator surfaces before they develop any significant solids fouling, allowing the evaporator to consistently operate at highest energy efficiency throughout the day, minimising the soiling of recovered CIP chemicals and requirements for fresh make-up chemicals, and reducing the daily loading of waste solids discharged to the plant waste treatment systems.

To avoid any disruption to downstream spray dryer systems from frequent evaporator CIP cleanings, the Caloris Low Spore Process separates the initial pre-evaporator systems from the subsequent high concentration evaporator and spray drying systems. These pre-evaporator systems operate at around 20% above the capacity of the downstream high concentrator and spray dryer systems, producing an inventory of skim condensed sufficient to maintain uninterrupted spray dryer operation for two hours.

After a specific period of operation on product, the pre-evaporator systems undergo a complete CIP cycle (product-to-product) within a period of two hours, returning to production of skim condensed before the inventory supplying the spray dryer system is depleted. In the high concentration evaporator and spray dryer feed system components, the higher solids concentration suppresses the rate of biofilm formation and maturation, allowing those systems to operate continuously for longer periods of time without biofilms contaminating product.

This process won the 2018 American Dairy Products Institute Breakthrough Award for Dairy Ingredient Innovation.

Optical sorters

The Key Technology VERYX modular platform chute-fed sorters detect and remove defects and foreign material to improve product quality and to meet specific needs.

VERYX optical sorters virtually eliminate false rejects and so maximise efficiency.

The sorters, which are also available in belt-fed versions, can be used for a wide range of applications, including nuts, berries, cereal, dried fruit, IQF and seafood.

Heat and Control Pty Ltd

www.heatandcontrol.com

Re-usable plastic pallets and totes

S&J Industrial's re-usable plastic pallets, totes, dunnage and bulk systems can be used to improve the flow of product to reduce costs, enhance profitability and add sustainability.

Using data from individual companies S&J Industrial can calculate the economic and environmental impact of re-usable packaging to the company's supply chain. Users can then compare re-usable packaging with single-use packaging, in terms of ROI, cost per trip, savings over the life of the packaging, and solid waste, energy and greenhouse gas emission impacts.

The service gives real, unbiased data to help companies make informed packaging decisions.

S&J Industrial

www.sjindustrial.com.au

Shipping container desiccant

The Absorgel Hanging 1kg is a shipping desiccant that rapidly removes moisture from containers, moisture that can lead to container rain, rust, mould growth and ultimately the loss of stock. It is easy to install and works in temperatures from -20 to 80°C.

The Absorgel Hanging unit removes moisture from containers using calcium chloride, absorbing up to 2.25 L. The absorbed water is bound into a gel so no liquid water is formed, which prevents the risk of leakage.

The Absor-Hook makes it easy to install, removing the need for ladders and labour time. A versatile unit, the Absorgel Hanging is designed to occupy minimal container space sitting within the corrugated recesses of the shipping container, or alternatively hung horizontally above the cargo.

Absorgel Hanging is best suited to tightly loaded containers and can be used for any type of cargo that only needs 25 mm between the cargo and the Absorgel Hanging unit.

Absortech Australia

www.absortechaustralia.com

Muddy Boots Software, Australian first for cloud-based food safety management

Muddy Boots Software has announced its Greenlight Quality Control carries the HACCP certification mark, making it the only cloud-based food safety and quality management software to do so. This assures food businesses that operate a HACCP-based food safety program of its integrity and fail-safe characteristics.

Food supply chains must manage risks with speed and accuracy, and Muddy Boots Software identified a need for quality assurance for the food supply chain. The single automated system is designed to simplify the complexities of managing safe food, product quality and compliance across entire operations.

"Muddy Boots' Greenlight Quality Control impressed our evaluation team with its ability to handle complex food safety system requirements within a simple, user-friendly interface. The system encourages and supports operators to perform their tasks properly, and provides all the information that quality and food safety managers need in a secure and easy-to-access format," said Director of HACCP International Clive Withinshaw.

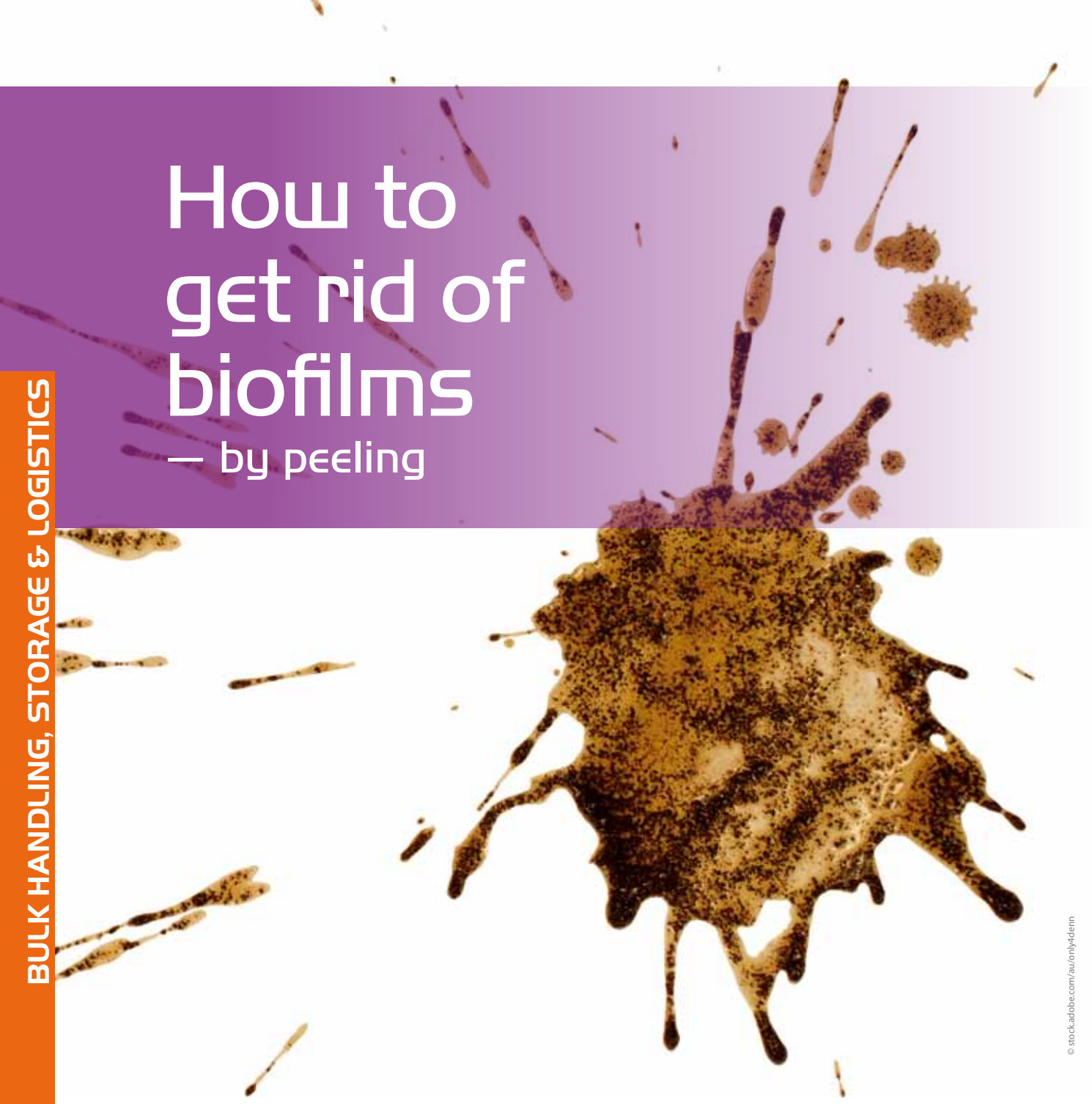
The cloud-based quality management system provides users with real-time data, giving a clear picture of processes, critical control points and inefficiencies across operations. It facilitates communication across the supply chain and enables quick and informed decision-making.

"Our solution helps food manufacturers streamline day-to-day tasks so they can focus on what they do best. For instance, tasks can be scheduled for a given time or frequency and operators can be prompted to carry out these tasks," explained Jason Considine, General Manager of Muddy Boots Software Australia and New Zealand.

Karen Constable, Technical Manager at HACCP International, said the system features 'fail-safe' characteristics, data integrity features, record verification functions and a corrective actions manager.

Greenlight Quality Control is currently used by suppliers, manufacturers, retailers and brand holders.

How to get rid of biofilms — by peeling



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Biofilms, those slimy, hard-to-clean bacterial mats that foul industrial equipment and contaminate product, are notoriously hard to get rid of. But now, researchers at Princeton have found a way to cleanly and completely peel off these sludges.

By looking at the films from a mechanical engineering perspective, as well as a biological one, the researchers showed that water penetrating the junction between biofilms and surfaces, coupled with gentle peeling, can result in immaculate removals. That outcome contrasts with traditionally ineffective methods of scraping or mechanically dislodging biofilms, which sometimes leave behind still-adhered patches that regrow and re-contaminate.

The new removal method should help in thwarting harmful biofilms, as well as controlling the beneficial biofilms increasingly relied on for wastewater treatment, microbial fuel cells and other applications.

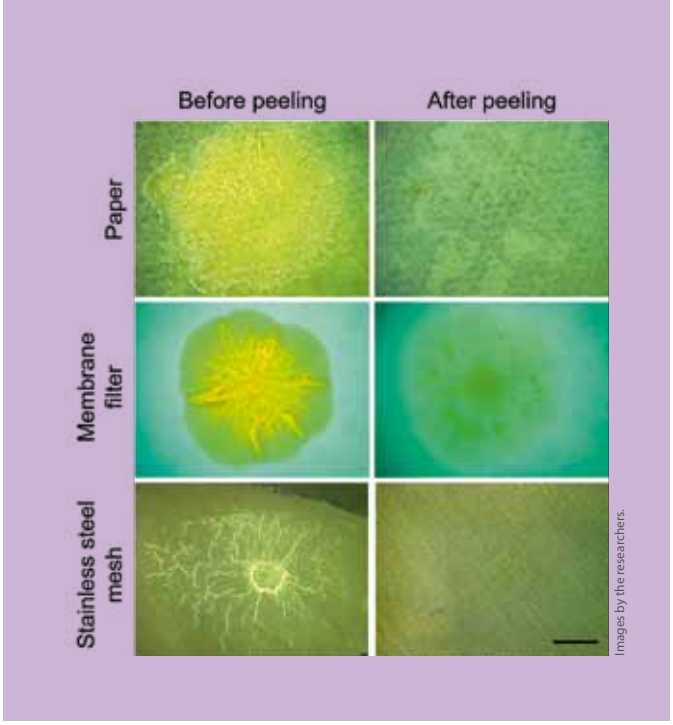
"We have discovered an easy and effective way to remove nasty biofilms from a variety of surfaces," said Jing Yan, an associate research scholar working jointly in the Princeton labs of Howard Stone, the Donald R. Dixon '69 and Elizabeth W. Dixon Professor of Mechanical and Aerospace Engineering; and Bonnie Bassler, the Squibb Professor of Molecular Biology and Howard Hughes Medical Institute Investigator.

The work, bridging molecular biology, materials science and mechanical engineering, took advantage of the collaborative research communities between molecular biology and engineering.

"By investigating and defining the material properties of bacterial biofilms, rather than their biological properties, we have invented a new method for detaching entire biofilms," said Bassler.

For their investigation, the Princeton researchers turned to the bacterium *Vibrio cholerae*, which forms biofilms in seawater and fresh water and in the human intestine. Measurements revealed that the biofilms it produces exhibit mechanical behaviours very similar to hydrogels, which are materials extensively studied in Stone's lab.

Well-characterised, manipulable hydrogels have many applications, especially in biomedicine, including wound dressing, drug delivery and tissue engineering. Both biofilms and hydrogels are largely made of water (about 90%). They possess



defined structural networks that make them soft, viscous and elastic. Their stretchiness has a limit, however. If disturbed too vigorously, biofilms and hydrogels will break into pieces. This fragility poses a challenge for biofilm removal. It also hinders the intentional transfer of beneficial films between surfaces, for instance in industrial settings, and when running experiments in the lab to better understand biofilms in the first place.

To learn how to avoid such fragmentation, the Princeton team examined the attachment of the *V. cholerae* biofilms to a variety of surface types. The researchers saw that the edges of the biofilms were water repellant, while surfaces they adhered to were sometimes water-attractive. Based on this insight, the researchers sought to drive a wedge between the biofilm and attached surface by driving water into the space at which the materials meet. This technique, known as capillary peeling, successfully created a lengthening crack that culminated in full separation of the biofilm from the surface. The water-assisted peeling must go slowly to prevent biofilm tears — akin to carefully removing a sticker — but the results showed that the extra time was well worth it.

"Our capillary peeling method worked astonishingly well," Yan said.

One obstacle for deploying the method outside the lab is that many biofilms exist in already-aqueous environments, where capillary peeling would appear to be a non-starter. For those cases, Yan and colleagues have proposed two potential solutions to explore in future research. For biofilms initially grown underwater, the film and its adhered-to object could be removed from solution and dried out before removal attempts. Alternatively, introducing bubbles to the biofilm-substrate interface might deliver the same sort of capillary force.

Overall, the new study illustrates the value of a multidisciplinary approach, bridging different fields to make key new insights.

Suresh Rebello

Choosing safe flooring

With slips, trips and falls the most common injuries sustained by foodservice workers, a bit of advice on picking the right flooring to prevent accidents and related damages might prove useful.

Foodservice workers are particularly prone to occupational accidents involving slips, trips and falls at the workplace. This is unsurprising considering the multiple hazardous activities carried out around the clock at F&B facilities, from commercial kitchens to food-processing areas. For example, it is common for spillage to occur, making the floorings damp and slippery. Regular cleaning of the spills may affect the ongoing operations or leave the floors wet, again posing a slip hazard.

According to the Australian Workers' Compensation Statistics Report 2016–17, slips, trips and falls accounted for 24% of workplace accidents during the review period, costing employers AU$11,500 in compensation claims for every employee injured at work.

Flooring hazard

One of the biggest hazards is flooring. Many food employees have tripped over the rubber mats that are placed on the work floors to reduce slips, trips and falls, ironically making the mats themselves the actual hazard. Most often, these mats are poorly maintained and when the floor gets wet, slide around. Using certain cleaning products on these mats can also accelerate the deterioration process. Failure to prevent workplace injuries can lead to litigation and financial losses for employers, especially when there are insufficient safety features in place. Other possible repercussions include a high staff turnover, low employee morale and damaged business reputation.

Slip resistance

Installing a flooring system with slip-resistant properties is fundamental to ensure work safety in F&B environments. In wet process areas, floors are often laid to allow water and liquid spillages to flow to drain. Heavy-duty resin systems are available in both smooth and textured profiles so users can customise their flooring according to the type of slip resistance required.

Preventing falls and trips

Durable flooring is necessary to reduce the chances of peeling and cracking with prolonged use, which may cause users to trip and fall. The tougher the flooring, the more durable it is likely to be, reducing the need for repair and replacement. The flooring chosen needs to be able to withstand heavy impacts and feature high energy absorption capacity to prevent cracks, hence preventing trips and falls.

Compliance needs

Food and beverage manufacturers must comply with global hygiene standards, such as International Food Standard (IFS), Hazard Analysis Critical Control Point (HACCP) systems and the Eurofins IAC Gold Certification criteria, forcing them to have regular wet and hot cleaning leading to increased risk for workplace safety. This calls for a tough floor withstanding hot water/steam cleaning combined with slip-resistant profiles.

In addition, F&B business operators are best advised to comply with two widely used standards measuring the slip resistance of workplace flooring — DIN Standard Ramp Testing and the Pendulum Test — to provide a safe environment for their staff to work in.

It's important to remember that each processing plant has its own specific operational needs, including traffic and aesthetics, so decision-makers are advised to consult reputable experts on what choices they should make. Talking to the experts can help define the right product for you, with the right appearance and slip resistance, the right thickness to meet your temperature requirements and the robustness to provide a cost-effective yet long-lasting solution.

BASF Australia Ltd
www.basf.com.au

Using air to brew beer

US-based brewery Suffolk Punch Brewing installed a compressed air system from ELGi to accommodate its current air demand whilst allowing for future growth.

The company began by making small batches of beer in a garage, but today it has formulated more than 40 recipes and has expanded dramatically. To accommodate its growing need for automation, Suffolk Punch Brewing selected ELGi's EN 05 screw air compressor for its reliability and low noise levels.

"The tank-mounted compressor with a refrigerator dryer system is equipped with coalescing and carbon filters to provide clear, dry, oil-free air. Suffolk Punch Brewing uses the compressor to run the keg washer that cleans and sanitises the container, eliminating the possibility of residue. Any residual air could affect the quality and taste of the next batch," explained Tom Fyfe, Managing Director for Pulford Air and Gas and President – ELGi Australia. "The compressor helps to operate a recently installed canning assembly line and the project has been a great success."

Fyfe also said that such compressed air systems are in demand on local shores too. Beer has been around for nearly as long as humankind, dating back to 5000 BC, and it is an economic driver for Australia. The Brewers Association of Australia states that the beer industry underpins $16.9 billion a year in economic activity, accounting for 1.02% of Australia's GDP.

"With an increase in automation demands by microbreweries and companies operating in the sector, ELGi has seen some great installation success stories," Fyfe said. "Our systems are proving to be low maintenance, reliable and cost-effective."

ELGi
www.elgi.com

Searing, grilling and bar marking

The Marlen Afoflame, Afogrill and Afomarker Select Series continuous grill equipment features gas-powered direct flame technology and/or infrared radiation, with optional bar marking.

The continuous grills are engineered to give an authentic flame-grilled appearance and taste, on raw, cooked, chilled or frozen product including poultry, vegetables, burgers, beef, fish and pork.

Features include: stainless steel construction, independently controlled heat source either flame and/or infrared radiation to achieve optimal temperature operating condition for each product, variable residence time, height adjustment on flame position to control product highlights, and integrated belt wash for easy cleaning.

The Siemens HMI facilitates easy control for the operator, with multiple recipes, automatic start-up and shutdown. Data capture of operating information and upgrading of software can be uploaded or downloaded through Wi-Fi connectivity.

Reactive Engineering Pty Ltd
www.reactive-eng.com.au

Rapid drying of industrial spiral freezers

JBT has launched the LVS QuickDry, a system for fast drying of industrial spiral freezers after cleaning, helping save hours of time attempting to take moisture out of freezers after defrosting.

It makes use of a patented system of condensation cycles to quickly and efficiently remove all droplets of water from spiral freezers. The system condensates the moisture to the evaporator before heating it again quickly using hot gas, so the moisture that has frozen to the evaporator drips down to the floor. This gets most of the moisture out of the freezer as quickly as possible.

Unlike most traditional drying systems, which rely on fans and can take an average of 2.5 h to achieve results, leading to substantial downtime, the product shortens effective drying time by up to 1 h.

The LVS Refrigeration System optimises the refrigeration system by reducing energy consumption, improving freezer performance in the process.

JBT FoodTech
www.jbtfoodtech.com

Pallet wrapping net

Anderson Wholesale Packaging's EZY BREATHE Stretch is used like conventional film but its reinforced vent holes allow air to circulate inside the pallet. This allows gases to escape, reduces condensation and products chill faster.

The product is particularly suited to beverages that are palletised hot as EZY BREATHE stops condensation and allows for faster chilling time. By enabling faster cool down times and minimising condensation, product sweat and potential mould growth are reduced.

Fruits and vegetables stay fresher during transport and storage as EZY BREATHE allows air to enter freely and gases given off from fruit and vegetables to escape.

By facilitating the quick and uniform freezing of products users can save time, money and energy.

Anderson Wholesale Packaging
www.awpack.com.au

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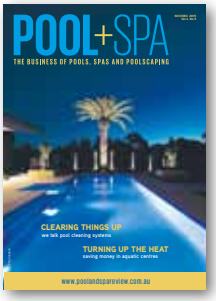

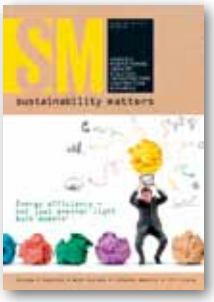

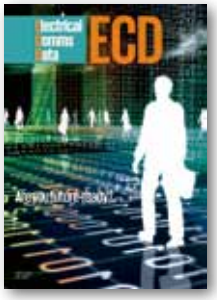

www.WFMedia.com.au/subscribe

Technology makes commercial paints and coatings antimicrobial

Israeli company Bio-Fence claims the intensive field trial on its innovative antimicrobial technology, Pentagon, has been successful.

Held in Milouoff, one of the largest ready-to-eat poultry production sites in Israel, the trial demonstrated superior results for Bio-Fence technology compared to alternatives. Milouoff found the technology to have clear benefits over existing antimicrobial solutions and to be safe, potent and rechargeable.

The trial involved monitoring the performance of an epoxy floor coated with Bio-Fence antimicrobial technology compared to a commercial silver ion coating and a designated control area. Samples were collected by Milouoff QA teams and sent for analysis by the independent Israeli Institute for Food Microbiology.

The results showed a significant 3–4 log reduction of Total Count and Enterobacteriaceae presences on the area coated with Bio-Fence, compared with the area coated with silver ion and the control coatings.

Bio-Fence technology converts commercial coatings and paints to potent antimicrobial surfaces that are highly active, safe, low cost and regenerable.

Applying Bio-Fence technology reduces the presence of hazardous pathogens in production environments and minimises the danger of food contamination.

Bühler and Microsoft partner to increase availability of safe food

At Hannover Messe, Bühler Group and Microsoft have committed themselves to build an alliance that will increase the availability of safe food and enhance food integrity and traceability. The alliance will extend the partnership the two companies have just built. Microsoft and Bühler aim at rolling out cloud-based solutions to eliminate contaminated grains and to rapidly introduce new services to improve the availability of safe and healthy food. An important part of the planned cooperation is blockchain applications, the feasibility of which is currently being evaluated.

Food safety and availability is still one of the most demanding global challenges. While 30% of all food is lost or wasted, 800 million people are starving. The application of digital technologies, such as offered by Microsoft's Azure cloud, artificial intelligence and blockchain technologies, combined with inspection and processing technologies of Bühler and partners, will provide transparency and greater efficiency in food value chains.

New technologies such as blockchain applications have an immense potential to enable full traceability within food value chains. They could be key to ensuring food integrity and in the fight against food fraud. "We live in exciting times; digitalisation has now reached the global food system," said Roberts.

Modern mango monitoring

Work on a new pilot project promising to enhance quality monitoring of northern Australian mangoes and reduce food waste kicked off at a North Queensland mango farm on Saturday.

Blockchain experts Trust Provenance (T-Provenance) have implemented the solution at Manbulloo's Horseshoe Lagoon property, south of Townsville, trialling their new monitoring technology as produce is loaded onto trucks ready to be sent to market.

The $755,000 project collaboration between T-Provenance, Manbulloo and Growcom was awarded $272,700 in funding from the Cooperative Research Centre for Developing Northern Australia (CRCNA) as part of the organisation's open funding call in October 2017. Since then, T-Provenance have been honing their platform tech and waiting for the mango harvest to hit full stride at the Burdekin property.

T-Provenance will use a network of sensors attached to fruit trays and pallets to track tens of thousands of mangoes on their journey from the farm to the retailer. The sensors will time stamp the fruit as it is boxed, then provide real-time data feedback on temperature and humidity. The data will help those along the supply chain better understand how various factors influence the quality of the fruit that ends up on consumer's plates and provide retailers more information to help them reduce fruit spoilage and waste.

The platform will provide valuable insights to growers, packers, logistics providers and retailers as it incorporates Internet of Things (IoT) technology for measurement and monitoring capabilities, and new blockchain technology to ensure food safety, food quality, food traceability and food authenticity.

T-Provenance Chief Technology Officer Jackson Virgo said this was the first time the team have trialled the tech on a real-time basis, with further testing to take place in Mareeba early in 2019.

"Using our newly developed blockchain platform, we'll be able to link the track-and-trace systems of multiple parties along the supply chain in a trustworthy fashion," Virgo said.

"Most importantly, we'll be able to give all parties access to data such as ambient temperatures via a blockchain system which integrates directly with their own system.

"We're confident we'll be providing the most comprehensive view of what happens to the beloved mango from farm to the fruit shop," Virgo added.

Dust reduction in bulk bag unloading

The Sterling Systems & Controls line of bulk bag unloading systems is available with integral dust containment. The integral dust containment system provides operator access to the bag spout for connecting a full bag, or disconnecting an empty bag, within a dust containment box.

Operator access to a positive shutoff valve to turn flow from the bag on and off as needed is provided within the dust containment box. This valve (iris type valve) allows the operator to connect a full bag and untie its spout without an immediate flow of material from the bulk bag.

Once the operator is ready and a new bag is connected, the operator slowly opens the valve manually until it is full open. The same process is performed in reverse when the bag is empty. Significant dust can be present when the bag is 'empty', if the operator does not account for residual material left in the bag at the empty condition. If the spout is left open, dust can easily escape during removal or when compressed for disposal or recycling.

Sterling Systems and Controls Inc
www.sterlingcontrols.com

Wastewater treatment options in New Zealand

When Hydroflux was founded, the intention was to quickly establish Hydroflux as the "go to" company for anything associated with wastewater treatment in the municipal or industrial sector. "Now," claims Hydroflux Director Andrew Miley, "that has been achieved!"

"We are very optimistic about the future. We have an increasing number of loyal customers who choose to work with us year after year and, as our skills and capabilities in treatment plant design and construction improve, we are able take on ever more challenging projects," he said. "The continual growth that the company experiences enables us to invest in our people, regional expansion and design innovations."

It would have come as no surprise to many that opening a New Zealand office was the latest offering to provide a local presence to a niche market.

Orod Roostaee heads up the New Zealand companies as General Manager. The companies have been set up to provide equipment and process solutions to municipalities and industry.

In addition to the Hydroflux proprietary range of products, the NZ company has exclusive agreements with HUBER and MENA Water for the region. "I have been working with HUBER for over 20 years now and I am excited about cultivating HUBER's presence in another region" said John Koumoukelis, Hydroflux Director. MENA Water (which is 50% owned by HUBER) also opens doors for a high-quality range of packaged water and sewage treatment plants.

Orod Roostaee

Over the past 15 years, Orod has worked on numerous water and wastewater treatment projects in many different regions of the world. He has worked in many disciplines to expand his experience in roles as project engineer, design engineer, project manager and regional manager.

Orod brings to Hydroflux his vast experience working as a product development manager at MENA Water, which provided a backbone for the development of the agency agreement between the Hydroflux Group and Mena Water throughout the Australia Pacific region.

"I am looking forward to developing the NZ market with Hydroflux," said Orod.

"I believe there are far better solutions and options available to many clients than what they may be aware of and I would like to introduce these advanced water and wastewater treatment processes to them."

Hydroflux Industrial Pty Ltd
www.hydrofluxhuber.com.au

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