



# ON THE COVER

## Celebrating Australian Food and Agribusiness Innovations



Food Innovation Australia Ltd (FIAL), the Growth Centre for the Food and Agribusiness Sector, recently published *Celebrating Australian Food and Agribusiness Innovations*. The book is the first of its kind to celebrate innovation and promote the successes of the Australian food and agribusiness industry.

From pie making equipment to vegetable crackers, from a blade-stopping mechanism for bandsaws to almond milk for baristas, the book showcases how small and big businesses can take advantage of opportunities, overcome challenges and turn an idea into profit!

The book features 50 leading innovations in food, agribusiness, packaging and drink, chosen by an expert panel of judges from the research and industry sectors with great technical expertise and experience.

BARLEYmax™ is one such innovation – a story of how science and commercial collaboration can create smart, innovative products such as this *healthy grain*. With twice the dietary fibre of regular grains and four times the amount of resistant starch, BARLEYmax™ has great potential to positively impact health outcomes. A range of cereal products has been developed and launched with great success.



Peter Schutz, chair of FIAL, says the book is evidence that Australian food and agribusiness companies have plenty to be proud of, adding that the sky is the limit for creative innovators who can “convert an idea into an invoice”.

FIAL has plans for a second edition of the book, only this time there will be calls for submission of expressions of interest. This allows food and

agribusiness companies who have developed creative products to nominate themselves, and get the chance to showcase their achievements in this book. Watch this space...

The book is available for purchase from the FIAL website, [www.fial.com.au](http://www.fial.com.au)



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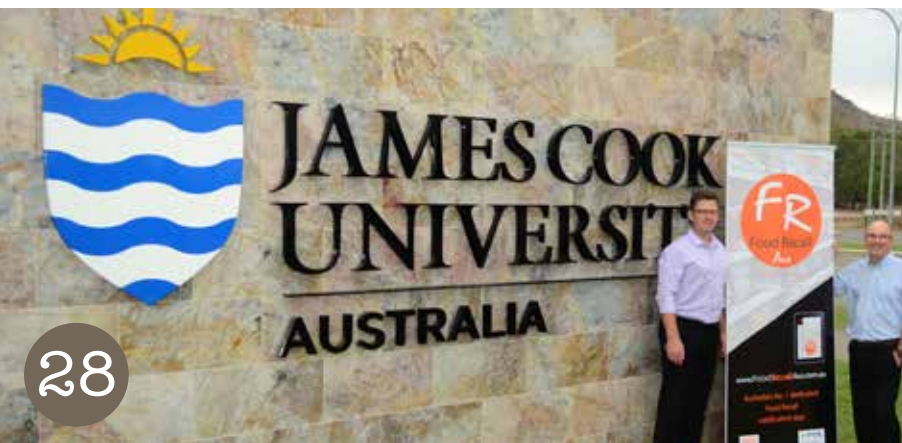


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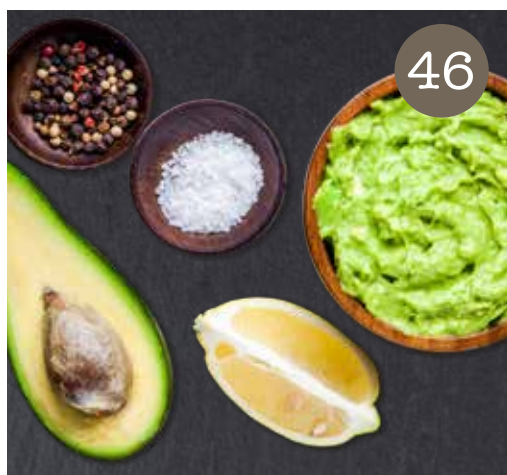
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# food australia

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## IN THIS ISSUE

Welcome to the August/September issue of *food australia*.

It was wonderful to catch up with many of our readers and industry professionals at our recent 49th Annual AIFST Convention in Brisbane. Australia's food industry is a dynamic one, and one that is clearly working together well to build a stronger, more secure and smarter food and agriculture sector for Australia.

In this issue of *food australia*, we recap the insightful presentations and happenings at the Convention with a futuristic look from CSIRO's Data 61 senior principal scientist, Dr Stefan Hajkowicz, at where our industry will be in 2020 and beyond, as well as the achievements of our upcoming food scientists (page 16).

On page 20, the Australian Food & Grocery Council sets the record straight on the Health Star Rating and how it was developed into the new national front of pack labelling system and on page 22, our own industry services manager, Sarah Hyland, outlines the food trends to watch.

The role packaging plays in reducing our food waste is considerable. On page 26, Alan Davey recaps his presentation at the Australian Institute of Packaging Conference, and on page 28, we highlight a new FoodRecallAus app from James Cook University – a world first in mobile alerts for allergen detection.

On page 32, Watermark Intellectual Asset Management looks in depth at the data you need before investing in innovation and on page 34, Rabobank explains the impact of the Brexit vote on our agriculture and food sectors.

In our sensory feature on page 38, Dr Gie Liem studies the differences in the sensory perception of children and in Final Word, on page 46, we look at a new Australian invention that keeps avocado flesh green.

It's a busy issue of *food australia*, full of wonderful Australian innovations. Enjoy reading!

#### Narelle Schuh

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## A NATION FULL OF CHOCOHOLICS

Good news for chocolate lovers among us with two new studies suggesting chocolate is more popular than ever, and that it may not contribute to overweight and obesity rates as much as we think.

New Roy Morgan research shows Australians are eating more chocolate now than they were two years ago, with the consumption rates up by as much as four per cent.

The surge in chocolate eating is consistent across all types of chocolate, whether it's chocolate blocks, chocolate bars or boxes of chocolates.

In terms of favoured variety, Cadbury is king. The well-known brand was the most popular chocolate bar, with 17 per cent of Australians eating Cadbury Chocolate Bars; was the most popular chocolate block, with 12 per cent of Australians enjoying Cadbury Dairy Milk; and was the most popular boxed chocolates, with five per cent of Australians eating Cadbury Favourites.

In more good news for chocolate lovers, confectionery may not be as big a cause of overweight and obesity as perceived.

A systematic review of confectionery and obesity rates in children and adolescents by University of Melbourne, Murdoch Childrens Research Institute and Royal Children's Hospital Melbourne was recently published in the *American Journal of Clinical Nutrition*, and found that confectionery is not a major driver of obesity. In fact, children and adolescents who were overweight or obese reported eating less confectionery than those who were considered slim.

The researchers agree this could be for a number of reasons including a direct causal link that suggests people who consume more confectionery or sugar may consume less fat and therefore less kilojoules, or a reverse causality whereby overweight or obese children and adolescents eat less confectionery because they believe it is contributing to their weight gain.



*of Australians say they eat chocolate in any given four weeks, up from 65% in 2013.*



*the number of Australians eating Cadbury chocolate bars – Australia's most popular.*



*eat chocolate bars – the most popular type of chocolate, followed by chocolate blocks and boxed chocolates.*

*Nestlé's Kit Kat is the second most popular chocolate bar, eaten by 12% of people.*



*is the sample size analysed by researchers.*

*The odds of being overweight or obese were approximately 20% lower for those who ate more confectionery.*





## CHINA GOING NUTS FOR AUSTRALIAN NUTS

Toowoomba-based tree nut grower, processor and market Stahmann Farms Enterprises has launched a new direct marketing e-commerce site in China.

The new platform will see Stahmann Farms branded retail products featured on Alibaba's Tmall global cross-border e-trade platform, which allows overseas exporters to sell directly to Chinese consumers.

Stahmann Farms, with bases already in Queensland's Toowoomba and Moree, already sells pecans and macadamias to China in bulk, but this new platform will give the brand greater recognition in the Chinese market.

Ross Burling, Stahmann Farms CEO, said the move was a milestone in the company's long and distinguished history.

"Stahmann have been nut farmers since 1932, establishing the pecan industry in Australia in the 1970s and building one of the first nut processing plants in the country in 1982.

"Now we are taking not only our Australian nuts but also our Australian brands directly to consumers in the world's most dynamic economy," said Mr Burling.

China is a major market for tree nuts, consuming more than 20 per cent of the world's total production across most varieties.

Stahmann Farms sales manager Andrew Waddell said that as this consumption continues to grow, so too does the proportion of nuts now being sold online.

"Most Chinese consumers still buy flavoured nuts in their shell," Mr Waddell said.

"However, with consumer preferences rapidly changing, there has been a shift and we are now targeting the emerging urban middle class that are looking for safe, healthy, clean and convenient food, much like their Western counterparts."

World tree nut trade is currently worth around US\$30 billion with online sales alone in China expected to top \$1 billion by 2017, a figure that is close to the equivalent of all Australian tree nut production.

## HELPING HAND FOR FARMERS

Improvements to the Federal Government's farm management deposits (FMD) scheme have now come into effect, with a raft of changes expected to help farmers better manage their cash flow.

The changes, which came into effect on 1 July, give farmers greater flexibility in managing fluctuating financial situations from prolonged weather conditions, such as drought.

Among the changes, farmers will now be able to withdraw their farm management deposits early without losing tax concessions they have claimed, and set aside twice as much in their schemes, with the deposit limit doubling from \$400,000 to \$800,000.

The restriction on farm management deposits being used as loan offsets has also been removed, meaning farmers will now be able to put money towards paying off their farm business loans quicker.

Rural Bank has already announced it will offer farmers the option of using their FMD to offset their farm loan interest and it is expected that other financial institutions will follow suit.



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## A NATIONAL APPROACH TO FOOD SAFETY CERTIFICATION

A new national approach to food safety certification will be piloted in the baked goods sector over the next 12 months in an effort to reduce regulatory burden on the Australian food industry and enhance the reputation of Australia's certified safe manufacturing of food.

A partnership between Food Innovation Australia Ltd. (FIAL) and the Australian Food & Grocery Council (AFGC), the project aims to establish a model framework by working in one food category – shelf-stable baked cereal based goods – that can then be applied across the food industry.

According to project lead, AFGC's Fiona Fleming, the initiative has the potential to boost to the competitiveness of the food industry through cost savings across the whole industry and by providing a clear point of difference for Australian products exported to overseas markets.

"Our vision is to create a framework that can lead to greater efficiency of food safety management in Australia. In doing so it will provide opportunity to promote Australian food products in international markets on the basis of the superior quality of the food safety systems that underpin their production, manufacture and supply," said Ms Fleming.

The current regulatory environment encompasses compulsory requirements and voluntary commercial and proprietary standards, resulting in significant auditing of food businesses.

Enforcement agencies conduct periodic audits of food businesses to monitor compliance with compulsory food safety regulations, although through better coordination between agencies and the move to risk-based frameworks, this burden of regulatory audits has been reduced in recent years.

In addition to audits by enforcement agencies, retailers, quick service restaurants, food service companies and major manufacturers also commission a large number of audits of their suppliers for compliance with these private standards.

"There is significant overlap with companies being audited against similar but different private standards, multiple times over short time periods representing an appreciable cost and resource burden on companies," said Ms Fleming.

By better aligning commercial and proprietary standards and auditing activities, it is anticipated that the National Approach to Food Safety Certification will establish a mutually supportive cross-industry framework for food companies to demonstrate compliance to both regulatory and commercial food safety requirements.

The pilot project will be managed by AFGC and overseen by a management committee made up of representatives from across the food industry. A stakeholder reference group will be convened for broader industry consultation.

The results of the pilot are expected to be ready in late 2017. For more information, email [fiona.fleming@afgc.org.au](mailto:fiona.fleming@afgc.org.au).

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## INTERNATIONAL LOVE OF AUSSIE WINE CONTINUES

Australian wine exports have reached record highs, with Wine Australia reporting an 11 per cent boost in exports for the 2015-16 financial year.

According to Wine Australia's recently released export report, demand for fine Australian wines continues to grow around the world, particularly in North America and Asia.

Bottled exports grew by 15 per cent to \$1.7 billion and the average value of bottled exports increased by 9 per cent to \$5.35 per litre, the highest since October 2003.

"Our finest wines contributed to almost half of the total value growth in the last 12 months, with exports priced at \$10 free on board and over per litre up to 26 per cent to a record \$499 million," said Wine Australia CEO Andreas Clark.

"This increased demand for Australia's finest wines was reflected in all of our top five export markets."

Exports to mainland China grew by 50 per cent to \$419 million and when combined with Hong Kong (\$124 million), it is the largest market for Australian wine exporters.

Exports to Japan increased by four per cent to \$45 million while exports to South Korea were up 29 per cent to \$13 million.

Growth was also seen in the USA, which remains Australia's biggest market by value and exports.

"There is still much work to do in increasing the awareness and availability of premium Australian wine in the US. To continue growth in our most valuable market requires a long-term approach and a focus on re-establishing relationships and confidence in the category, supported by significant, consistent investment to drive the Australian fine wine message," said Mr Clark.



## UNLOCKING SORGHUM'S WEIGHT LOSS POTENTIAL

The sorghum grain could be a dieter's best friend, thanks to new research suggesting it can keep you feeling full between meals.

Researchers from the Illawarra Health and Medical Research Institute (IHMRI) and the University of Wollongong, NSW, conducted a clinical trial on the gluten-free grain among 40 people and found sorghum increased satiety or the feeling of fullness between meals.

Led by Advanced Accredited Practising Dietitian Anita Stefoska-Needham, Associate Professor Eleanor Beck and Senior Professor Linda Tapsell, the trial suggests sorghum may be one of Australia's great untapped food sources for humans.

Related to millet, sorghum is the third largest crop in Australia, where it is predominantly used as animal feed. However, it is widely cultivated around the world due to its adaptability to arid conditions.

## RECORD YEAR FOR PULSES

Australian pulse producers are staring down the barrel of their biggest year yet in pulse production and export.

Coinciding with the United Nations International Year of Pulses, the Australian market's 2016-17 season is likely to achieve over \$2 billion in value.

Pulse Australia chair Peter Wilson said that represents a huge increase for the industry.

"Just over 10 years ago, Australia's pulse exports were only worth around \$420 million" he said.

"This year it has been a near perfect start to the growing season for pulse crops across all regions. It is estimated that there will be around two million hectares sown to pulses with desi chickpeas being the country's largest sown pulse crop, followed by sweet lupin (narrow leaf), lentils, faba beans, field peas and kabuli chickpeas."

With vitamins, dietary fibre, antioxidant compounds and slowly-digestible starches, the researchers' trial found it to enhance satiety between meals.

Through a grant from the Australian Research Council Linkage Project, the researchers partnered with Sanitarium as well as Curtin University to formulate flaked breakfast cereal biscuits made from white, red and brown sorghum wholegrains.

Participants then ate 50 grams of one of the three different flaked sorghum biscuits or a whole wheat control biscuit four times following a 12-hour fast, to simulate breakfast.

They found the sorghum-based flakes enhanced acute subjective satiety and increased satiety-enhancing hormone levels over four hours of eating, compared to the whole wheat biscuit, with the red sorghum getting the best result.

The researchers also conducted a randomised controlled trial with 60 overweight or obese participants and found those who ate sorghum-flaked cereal biscuits for breakfast every day for 12 weeks lost weight, and improved their fasting glucose, insulin, cholesterol and key inflammatory biomarkers.

"Findings from both these trials indicate that sorghum whole grain is a promising novel ingredient in foods targeting satiety as an adjunct for weight control," said Ms Stefoska-Needham.

"Multinational corporations and smaller entrepreneurial food companies now need to invest in launching sorghum-based product formats with the potential to become popular in these markets," she said.

The pulse industry has received considerable exposure in 2016 as part of the UN's push to highlight the crop as a sustainable and healthy food source.

A Charles Sturt University PhD student has even created a pasta made from pulses.

A finalist in the AIFST Student Product Development Competition at the 49th Annual AIFST Convention, which called on students to be innovative with pulses, PhD student Neeta Karve, and Dr Saira Hussain, developed a pasta using yellow peas.

The pair used the germination process of yellow peas to create a yellow pea flour, which they could then turn into pasta.

The pulse push will continue throughout 2016 with the Australian Pulse Conference to run from 12-14 September 2016 in Tamworth.



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## NEW AND REVAMPED BIOSECURITY LAWS

In the biggest overhaul to biosecurity legislation in over a century, the new *Biosecurity Act 2015* came into force in June 2016. It replaces the dated *Quarantine Act 1908* and enhances Australia's defence against potentially damaging biosecurity threats from abroad.

Head of Biosecurity at the Department of Agriculture and Water Resources, Lyn O'Connell, said the new Act represented a comprehensive modernisation of Australia's biosecurity legislation.

"The new act is a significant step forward in our ability to respond to global threats posed by exotic pests and diseases that have devastated other countries' agricultural industries and environment," Ms O'Connell said.

"We all recognise the critical role biosecurity plays in maintaining the health of Australia's agricultural industries and trading relationships.

"As an island nation, Australia is very fortunate to be free of many pests and diseases prevalent throughout the world and this legislation will help us to keep it that way."

The new legislation replaces the *Quarantine Act 1908*, which was originally designed to respond to diseases like the bubonic plague, measles and cholera at a time when people and goods only arrived by sea. It had been amended more than 50 times to cater for changing technology, transportation systems and international trade, resulting in complex legislation with overlapping powers and provisions.

According to the Department, the new legislation is designed to be easier to read and understand, and reduce duplication and regulatory impacts. It supports the biosecurity system into the future and accommodates advances in transport and technology.

### What does the new *Biosecurity Act 2015* mean for you?

If you're an importer or are involved in transport or supply chain logistics, it is important to make sure you're across the legislation and whether there will be changes for you.

The *Biosecurity Act 2015* introduces new requirements that affect how the Department of Agriculture and Water Resources manages the biosecurity risks of goods, people and conveyances entering Australian territory.

"Australian territory" has been updated to mean 12 nautical miles from the coastline, and includes Australia, Christmas Island, the Cocos (Keeling) Islands, and other external territories if they are prescribed by the Act, such as Norfolk Island. It also includes the airspace over the coastal seas of these areas.



There are a number of tools available to see how the new biosecurity laws may affect your business, including the Introduction to the Biosecurity Act Interactive e-learning tool for industry, as well as a dedicated hotline and mailbox to respond to enquiries from the public about the new legislation. These are available on the Department of Agriculture and Water Resources website.

Six key principles underpin the *Biosecurity Act 2015*:

1. Legislation for a strong agricultural industry – the *Biosecurity Act 2015* provides a strong, clear and flexible legislative framework.
2. Clear legislation to manage biosecurity risks – the *Biosecurity Act 2015* clearly sets out the powers that can be exercised by officials as well as the requirements of those being regulated.
3. Increasing efficiency and decreasing regulation – the *Biosecurity Act 2015* is outcomes focused and based on a key principle of achieving the best biosecurity outcome while minimising regulatory impact.
4. Improving compliance – the *Biosecurity Act 2015* enables more effective and efficient targeting of non-compliant behaviour or activities, while reducing the burden on those that are compliant.
5. Providing protection from public health risks – the *Biosecurity Act 2015* contains a range of biosecurity measures to manage the public health risk posed by serious communicable diseases.
6. Meeting Australia's international obligations – the *Biosecurity Act 2015* allows for the management of biosecurity risks in a manner that is consistent with Australia's international obligations.



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## NEW HOME FOR CALYPSO MANGOES

Perfection Fresh Australia has purchased the exclusive sales and marketing rights to the Calypso mango and has plans to increase consumption of the fruit both domestically and internationally.

The acquisition, from OneHarvest, will establish Perfection Fresh Australia as one of the country's leading mango marketers, responsible for more than a third of Australian domestic mango industry sales.

The family-owned fresh-produce company has marketed mangoes for more than 30 years with a portfolio that also includes Kensington Pride, Pearl, Keitt and R2E2 mango varieties.

Perfection Fresh Australia chief executive officer Michael Simonetta said it was an exciting acquisition with benefits for our mango growers, retailers and consumers.

"OneHarvest and the Calypso grower network have done an outstanding job establishing the brand and we look forward to continuing to build consumer awareness and increasing product consumption in Australia and abroad," said Mr Simonetta.

"We are thrilled to bring Calypso mangoes into our family of products and brands and will work closely with the Calypso grower network and supply chain to ensure we deliver a consistently high quality product with full season availability for the major chain stores and independent retailers.

"We plan to drive sales with tailored and targeted consumer campaigns focussing on the unique attributes of Calypso mangoes and the health benefits of consuming mangoes."

Calypso mangoes are known for their vibrant colour, greater amount of flesh providing more mango and less seed, longer shelf life and delicious flavour. They are grown in the northern regions of Australia by a dedicated network of growers. Ten million kilograms of Calypso mangoes were sold last season with a significant increase expected this season.

Mr Simonetta said while the primary focus was to support the domestic market, the company also planned to significantly increase export sales.

"Exports currently account for seven per cent of total Calypso mango sales and we are aiming to double export sales over the next three years," he said.

Perfection Fresh Australia will take over the Calypso mango marketing immediately, ahead of the mango harvest season expected to commence in September.



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## HORTICULTURE CALLS FOR TRADE CO-INVESTMENT

Horticulture Innovation Australia's Research and Development Corporation has launched a multimillion dollar initiative to strengthen trade opportunities in the arc between Jordan and Japan.

The new dedicated Asian Markets Fund will focus on boosting industry's capacity to export and build stronger relationships with key countries. It will also obtain vital trade data insights and deliver innovations that anchor Australia's position in market and drive efficiencies along the value chain.

Horticulture Innovation Australia chief executive officer John Lloyd said the bold initiative is being delivered in strong collaboration with industry.

"We are now calling for co-investors – such as research institutions, government departments and private sector

agencies – to join us in propelling Australia's trade activities to levels never before seen."

The Asian Markets Fund includes three foundation investment programs: Growth for Asian Markets and Market Intelligence and Data, and the recently established Australia Fresh Collaborative Market Development initiative.

"Growth for Asian Markets will focus on enabling businesses to expand and accelerate their capability to become export-ready through education on the trade opportunities available, and the processes and procedures required," Mr Lloyd said.

He said activities to grow businesses will be delivered through dedicated training programs with reputable and suitably qualified education providers.

## FISH LABELLING

The NSW government will support its local fishermen, announcing plans to introduce seafood labelling on NSW restaurant menus.

Under the NSW government proposal, a new labelling scheme would involve source of origin labelling, with the details of the scheme to be determined following consultation with fishing and catering industries as well as retailers.

Currently, the Commonwealth mandated country of origin labelling requirements exempt restaurants, cafes and outlets selling seafood for immediate consumption, meaning customers don't know information about where it is sourced.

"Seafood caught in NSW is among the highest quality and most sustainably caught in the world – and we want to make sure that all customers have the knowledge to choose our top-quality NSW products over cheaper, imported fish," said NSW Deputy Premier, Troy Grant.

"The only way a scheme like this works is if we develop it working hand-in-hand with commercial fishers, wholesalers and food service to make sure it delivers benefits to everyone."

The NSW government says it will invest \$400,000 into the campaign.

Weak seafood labelling has been an ongoing problem for the industry and consumers, with approximately 72 per cent of the seafood eaten in Australia, coming from overseas.

However the Restaurant & Catering Association has previously voiced concerns over the disrupted local supply chain resulting in imported fish taking the place of local species on diners' plates.

"In terms of locally supplied seafood, we have a very disrupted supply chain," CEO John Hart told ABC News.

"And restaurants need to have certainty of supply at a quality they can serve. It's just not the case that we can rely on the supply of local product or that we can all year round."

The Northern Territory currently has legislation that requires country of origin labelling for fresh seafood in restaurants, shops and hotels. A federal bill to change seafood labelling laws was rejected by the two major parties in 2015 despite being recommended by a Senate Inquiry into seafood labelling.



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## NEW GRANT TO IMPROVE MEAT EXPORT LOGISTICS

Safely exporting meat in a temperature-controlled environment may be easier for exporters in the future thanks to a new funding grant to the Tasmanian Institute of Agriculture (TIA).

Meat & Livestock Australia has granted \$1.5 million to TIA to develop new food safety technologies and management tools for transport temperatures for domestic and export red meat.

The funding will go towards developing a science-based decision support tool that enables better definition, manipulation and management of vacuum packed beef and lamb shelf-life, and research into commercially applying a new TIA technology to reduce bacterial contamination on meat carcasses.

While the quality retention of red meat in storage is well-known across the industry, researchers believe the new technologies will take the guess work out of meat storage and transportation and uphold Australia's international reputation for quality red meat products.

"We know how long meat retains excellent quality at ideal storage temperatures, but we can now easily track meat temperature in 'real time' using data loggers. If there is a break in the system we can use the tool to work out the effect on quality of deviations from ideal storage and transport conditions," TIA Food Safety Centre Associate Professor Tom Ross said.

"The team will help the industry make informed, accurate decisions about whether the meat is still suitable to sell, or for example, if they need to reduce the use-by date and sell it sooner."

As it currently stands, beef has a shelf life of 20 weeks and for lamb, 12 weeks when vacuum-packed and held at proper storage temperatures.

With food safety top of mind for many Asian export markets, commercialising technology that vastly reduces the number of microbes on foods is likely to be of enormous benefit to the export industry.

This includes reducing potential food poisoning bacteria such as *Salmonella* and *E. coli*.

"Australia has a very strong reputation for producing clean and safe beef and lamb, but some other overseas exporters do not achieve the same standards," said Associate Professor Ross.

"Unfortunately, not all export markets recognise this quality difference in meat processing practices and are now requiring that all export meat receive some form of treatment to the exterior of carcasses to reduce the risk of bacterial contamination of the meat.

"The technology we are developing will eliminate harmful bacteria without reducing the quality of the meat. This promises to provide a big boost to industry productivity and profitability. It will reduce the chance of bad bacteria being in meat products and also reduce reliance on expensive testing.

"We are focused on developing the technology with industry in mind. This means we need to do it in a cost-effective way that complements current industry technologies and can be easily adopted by Australian industry. We have done some trials in meat processing plants already."

Australia currently exports red meat and livestock to more than 100 countries, with exports accounting for over 60 per cent of production. 





**Mr Alexander McDonald**

**Cattleman honoured by beef industry**

A pioneer of the ethical production of beef has been posthumously honoured by the Australian beef industry.

Cloncurry cattleman Alexander ‘Zanda’ McDonald has been awarded the 2016 Merial Howard Yelland Beef Industry Award by the Australian Beef Industry Foundation and Marcus Oldham

College for his outstanding contribution to the industry.

Mr McDonald had managed McDonald Holdings, one of the biggest beef operations in Australia spanning 11 properties and more than 200,000 head of cattle. He was also the chair of the Northern Australia Beef Research Committee, where he worked with CSIRO to research and introduce genetics to improve the meat quality of tropical beef production.

Australian Beef Industry Foundation Chair John Gunthorpe praised the late farmer, who was tragically killed in a farm accident in April 2013.

“Under Mr McDonald’s stewardship, the family cattle company was transformed from a live export producer into a global food exporter of branded quality beef product to 18 countries,” said Mr Gunthorpe.

“Ethical production of beef and animal welfare was a passion. Zanda worked with research organisations to pioneer the development and use of anaesthetic sprays to reduce trauma of branding, dehorning and castration in beef cattle.

“Well before his time he recognised the importance people place on understanding that the products they consume were raised and processed ethically.”



**Ms Brianna Casey**

**Foodbank Australia appoints new CEO**

Australia’s largest food relief organisation Foodbank has announced Brianna Casey as its new chief executive officer. Ms Casey joins Foodbank from the Australian Childcare Alliance NSW, where she was CEO for three years. She has also held roles with NSW Farmers and the Queensland Farmers’ Federation.

Foodbank Australia chair Tony Froggatt said the appointment comes at a critical time for the organisation, with hunger is reaching crisis levels in Australia.

“It’s time to bring this hidden issue out into the open and put it on the national agenda. Brianna is an advocacy and policy professional with established networks at all levels of government and industry, who I am confident will be able to take on this challenge,” said Mr Froggatt.



**Dr Dana Cordell**

**Dana Cordell shortlisted for Global Australian Award**

Dr Dana Cordell from the Institute for Sustainable Futures at the University of Technology Sydney has been shortlisted for an Outstanding Global Australian award.

Recognising her work in the field of sustainability research, Dr Cordell often provides commentary to international media

and is frequently invited to speak at international, industry and community-based conferences.

The prestigious Advance Global Australian Awards celebrate Australians living overseas who have remarkable talent, exceptional vision and ambition.

Dr Cordell leads the Sydney’s Food Futures project, which models current and future food production scenarios to support stakeholder dialogue and decision-making on resilient food futures for Sydney in the face of climate change and urban growth.



**Mr Graeme Kruger**

**Change of guard for rice growers**

Graeme Kruger has been appointed the new executive director of the Ricegrowers’ Association of Australia (RGA), replacing Andrew Bomm.

With extensive experience in advocacy, management, business development and community engagement, Mr Kruger will be charged with improving value for

members while also strengthening the RGA as an organisation and advocating on behalf of the industry.

“RGA is delighted to be able to announce that Graeme Kruger will be our new executive director. Throughout his career, Graeme has consistently demonstrated a capacity for delivering outcomes, often in challenging circumstances. He is an excellent communicator who engages positively with all people,” said RGA president Jeremy Morton.

Mr Kruger thanked Mr Bomm for his six-year tenure with the RGA and said he was eager to start.

“I look forward to working for the benefit of members as part of the unique and dynamic Australian rice industry. I look forward to meeting many of the members over the coming months including at the RGA Annual Conference in Deniliquin in August.”



## NEW-LOOK MINISTRY TO STEER FOOD DIRECTION

Following the Coalition's win at the recent Federal election, the food industry's future now sits under a number of new ministers.

Former Minister for the Environment, Greg Hunt, replaces Christopher Pyne as the Minister for Innovation, Industry and Science, with Craig Laundy replacing Wyatt Roy as Assistant Minister.

The pair will drive the National Innovation and Science Agenda, which for agriculture and food, specifically outlines a Global Innovation Strategy to provide funding for collaborations projects; the Incubator Support Program, which focuses on regions and sectors with high innovation potential, and a range of research funding incentives.

Deputy Prime Minister Barnaby Joyce remains in the Agriculture and Water portfolios, which he has held since 2013, and gains an Assistant Minister in South Australian Senator, Anne Ruston.

While Mr Joyce's experience in the industry is well known, Senator Ruston also has agriculture experience. She was the inaugural chief of the National Wine Centre and in her role as a Senator, initiated two inquiries into the Australian citrus and wine industries.

The Trade ministry has also undergone a makeover, with Queensland MP Steve Ciobo appointed Minister for Trade, Tourism and Investment. With several free trade agreements on the Government's agenda, Mr Ciobo says he will continue to push for free trade with the European Union, the UK and explore free trade options with Canada, Mexico and Columbia.

## INSTITUTE FAREWELLS MEL MALLOCH



After more than 26 years with AIFST, we say farewell to Marilyn (Mel) Malloch in August. She has made an enormous contribution to the Institute over the years, and leaves it a stronger organisation than when she joined in 1990 as the journal manager for *food australia*.

Back then *food australia* faced several challenges. Under Mel's leadership, it transitioned from a jointly owned publication between the Council of Australian Food Technology Associations (CAFTA) and the Australian Institute of Food Science and Technology (AIFST), to being a sole asset of the Institute, and was returned to a financially stable position just one year later.

Mel continued to work closely on the journal throughout her time at AIFST, most recently in her role as advertising and subscriptions manager, and helped to build *food australia* into the well respected asset it is today.

Away from *food australia*, Mel instigated and led several new AIFST initiatives to raise the profile of food science and AIFST's important contribution to the Australian food industry. This includes her work to develop a national list of food science and technology related courses, as well as developing 'Case studies in the food industry',

a publication to support the introduction of food science into NSW schools as part of the curriculum. Mel also led the FoodWorx project, another initiative to raise awareness of careers in the food industry.

Mel worked on several other publications during her 26 years, including revising 'Foodborne Microorganisms of Public Health Significance', 'Spoilage of Processed Foods: Causes and Diagnosis', developing 'Cook Chill for Food Service and Manufacturing' and launching the AIFST history book 'Birth of a Profession' at the 43rd Annual AIFST Convention.

Many within the industry may not realise how Mel's contribution to the AIFST Convention built it into the annual flagship it is today. One of Mel's career highlights includes hosting the 10th International Union of Food Science and Technology Congress in 1999, which attracted 3000 delegates and paved the way for the AIFST Conventions to be delivered in-house.

In more recent years, under Mel's leadership the Continuing Professional Development program was introduced in 2014 including the Career Tools Package.

The AIFST Board, staff and members would like to extend our deepest thanks to Mel for all she has delivered and provided to AIFST during her 26 years of service. The organisation wishes Mel and her family all the best for their future endeavors. 🍷



## FROM THE CEO



That's a wrap on another successful AIFST Convention! It was fantastic to see so many members at the Convention in Brisbane supporting the Institute and its endeavours.

A big thankyou to all the speakers who helped shaped the theme, ***The Pulse of the Industry***, around food innovation, science and technology.

Also thanks to our wonderful sponsors, without whom the event would not have been possible. Special thanks to our major sponsors: bioMérieux Industry, Food Innovation Australia Ltd and POD Research & Strategy.

This year, the Convention was co-located with FoodTech Queensland, the new trade event for the food and beverage manufacturing industry in Queensland. We hope delegates enjoyed the networking and socialising opportunities both on the trade floor and at the Wine and Cheese Tasting Sensation evening.

It is hard to pick out Convention highlights, but for those who attended the **Current Challenges and Opportunities for Australia's Food and Beverage Sector Industry Roundtable**, the Hon. Ian Macfarlane's keynote address and Stefan

Hajkowicz's session on digital disruption, you must agree these were stand-out presentations.

We are already underway with planning our special **50th Anniversary Convention** celebrations in Sydney next year. Co-located with **foodpro**, this is an event not to be missed.

In other exciting news, AIFST has established a network of **Communities of Interest (COI)**, an evolution of the existing AIFST Branch and Interest Group Structure that recognises the role members can play in supporting other members and contributing to the success of the Institute as a whole.

The 13 AIFST COI committees will ensure AIFST can fulfil its purpose and deliver relevant information, services and products for our members. This is a very exciting time for members and we will continue to keep you updated with our committees' voting and appointment details.

If you have any questions or feedback, please don't hesitate to get in touch at [georgie.aley@aifst.com.au](mailto:georgie.aley@aifst.com.au) or call **02 9394 8650**.

**Georgie Aley**  
CEO

Save the date for the 50th Anniversary AIFST Convention to be held 17-19 July 2017 at the International Convention Centre, Sydney.

## CONVENTION ROUND-UP

Covering everything from innovation, new technologies, exporting, foreign investment and digital disruption, the 49th Annual AIFST Convention was another success.

This year, the Convention was co-located with FoodTech Queensland, with the two events combined attracting more than 3500 people.

**The Hon. Ian Macfarlane, former Minister for Industry and Science**, officially opened the AIFST Convention. During his opening address, he reinforced the importance of innovation in agribusiness and highlighted Australia's poor record of converting research and development investment into commercial outcomes.

**Phil Ruthven, futurist and founder of IBISWorld**, presented the keynote address, saying that long-term exports are in danger and may require a major re-think and where we produce food.

Day one wrapped up with the much-loved **Wine and Cheese Tasting Sensation**, with a plethora of Queensland produce and wine available for guests to try.

Tuesday morning kicked off with the inaugural **Young Professionals in Food Networking Breakfast**, with a panel of industry experts sharing their advice on advancing careers in the food industry.

Foreign investing incorporating land ownership and exporting were two major topics debated during the **Current Challenges and Opportunities for the Australian Food and Beverage Sector Industry Roundtable**.

A panel of leading food and agribusiness industry experts agreed that while innovation is the key to ensuring a viable future for the food and agribusiness industry, the concern around foreign investment is impacting markets and hindering the collaboration that is urgently required.

The panel, chaired by former ABC journalist Peter Couchman, was made up of some of the industry's leading decision-makers, including Peter Schutz (FIAL), Dr. Michele Allan (Science and Innovation Australia), Richard Katter (Ernst & Young), Dr André Teixeira (CSIRO), Terry O'Brien (Simplot), Janice Rueda (Archer Daniels Midland), Dr Ben Lyons (TSBE) and Alastair McLachlan (Preshafruit).

Experts at the AIFST Convention also discussed challenges facing the industry, such as Australia's increasing ageing population, as well as how digital technologies will disrupt the food and agriculture industries.





# WHERE WILL AUSTRALIA'S AGRIFOOD INDUSTRIES BE IN 2020 AND BEYOND?

*This paper is based on the closing plenary session presented by Dr Stefan Hajkowicz, senior principal scientist – strategy and foresight at CSIRO's Data61 at the 49th Annual AIFST Convention.*

Words by Dr Stefan Hajkowicz

Ageing populations, rising demand, increased health and wellbeing needs and digital disruption are all elements shaping the future of the food industry. This presents a range of opportunities and challenges for Australian agrifood industries as we look to the future and the exciting world of 2020 and beyond.

## Food supply and demand

According to the United Nations, the world will need to produce 60-70 per cent more food if they are planning to meet demand by the year 2050 as a result of population growth and income growth.

Past improvements in the production of food have lifted the availability of food to 2770 calories per person per day, which is adequate to ensure a well-fed population. It is the distribution of this food that remains problematic, with one-third of the world's population currently living off just 1840 calories per person per day, a less than adequate energy intake for many.

The food and agribusiness industry needs to continue to ensure the production of food will be adequate for the future. Split into meat and cereals, the relative growth required to meet demand in 2050 is about 46 per cent for staple grains and 76 per cent for animal protein in order for an overall improvement in nutritional standard in most countries to be achieved.

## Emerging economies

There is a definite shift in the world's economy, with projections claiming the centre of the global economy will be in Asia by 2030.



China is advancing faster than many other countries, taking just 20 years to build major cities, whereas these similar developments took Europe 400 years.

Over recent years, there has also been a major increase in Asian exports, with a rising demand for foreign produce and products. This is evident in the quantity of bananas imported by China, which we have seen rise from 75,000 tonnes in 1993 to almost one million tonnes in 2011. There is a similar story for pineapples, as well as dairy products following China's 2008 melamine milk crisis.

## Health and wellbeing

Australia's population is ageing. Currently, 14 per cent of the population is over 65 years old, and this is expected to rise to 25 per cent by 2050.

An ageing population comes with a need for increased health care. Today,

Australia spends 25 per cent of all government taxes on healthcare. This is projected to be 40 per cent by the year 2043. It is also forecast that 60-70 per cent of the Australian population will be overweight and one-third obese by 2025 due to poor diets and lack of physical activity.

In line with rising health and wellbeing standards and trying to combat the rising rates of obesity, consumers are becoming choosier, wanting to know all the information possible about a product immediately. Consumers also increasingly want to know more about the product, such as how, where and when it was produced.

We will see this come to life through the development of technologies and apps that allow consumers to scan a product in the supermarket with their smartphone that immediately informs how certain products suit personal nutritional needs.



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This story behind the food is becoming a driver for many consumer purchases, and most want this story to be organic or free range.

### Digital technology

Digital technology plays a big part in transforming the way companies and agencies operate, and how they talk to their customers. This is no different for the food and agribusiness industries.

The rising influence of digital and online technologies means that what we have seen previously disrupt the markets, including everything from digital cameras to smartphones, will quickly be disrupted by an even newer technology.

Digital technology continues to reduce barriers even further for products and companies. For instance, in the past, car companies only competed with other car companies, although they now face threats from unexpected competitors such as Google's self-driving car.

Much of the industry's existing strategy is premised on the assumption future shoppers, workers, consumers and so on will think, act and choose products similar to us now.

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However, we are seeing the digital natives, Gen Z and A, introducing new world views and paradigms that have not yet been thought of by current organisations.

In order for the food and agribusiness industries to thrive on future opportunities, companies need to find the central intersection of digital technologies, emerging economies, health and wellbeing, as well as being able to meet food supply and demand.

Digital disruption, in particular, will play a big part in the future of food. It is already happening and Australia needs to be exploiting it. The recent Free Trade Agreement announcement between Australia and China means there is potential for Australia to easily cash in on the healthy food demand across Asia, and adopting digital technologies for food manufacturing is key.

*Dr Stefan Hajkowicz is the senior principal scientist – strategy and foresight at CSIRO's Data61. He presented on digital disruption and the implications for food markets at the 49th Annual AIFST Convention, held in Brisbane recently.*

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## STUDENT COMPETITION

Two students from RMIT University were the winners of the 2016 AIFST Student Product Development Competition (SPDC) held during the AIFST Convention.

The students, Charlize Snyman and Naomi Cutler, have developed innovative chickpea and coconut and cookies called **Eat Me**, a healthier, low-allergen alternative to cookies currently available on the market with the iconic taste of an Anzac biscuit.

Free from dairy, eggs, nuts, soy and wheat, **Eat Me** cookies are suitable for people with allergies or intolerances to these foods, as well as being suitable for vegans and vegetarians. Their single wrap packaging makes for a convenient and on-the-go snack.

As part of the prize, Ms Snyman and Ms Cutler will join Australia's largest multi-food franchiser operator, the Retail Food Group (RFG), in a unique work placement.

The winning team will work with the RFG Product Innovation team to commercialise and refine the cookies, with the hope of serving them to consumers through RFG's franchised brands such as Brumby's Bakery, Michel's Patisserie and Gloria Jean's Coffees.

In addition to getting their work experience placement with Retail Food Group, the duo also won \$10,000 and a fully funded trip to Chicago, USA, in July to represent Australia at the **Love Pulses** Showcase hosted by the Global Pulse Confederation held at the Institute of Food Technologists (IFT) Expo. This is a global showcase development of novel food products containing pulses as core ingredients.

The annual Student Product Development Competition provides food science and product development students with an opportunity to develop a new or significantly renovated



*Ms Charlize Snyman and Ms Naomi Cutler*

product for a predetermined market. This year's theme was pulse-based products in line with the United Nations' declared International Year of Pulses in 2016.

**Many thanks to our 2016 SPDC supporters: ADM; Chobani; the Department of Industry, Science and Innovation; Simplot; Sanitarium; and Foods from the Earth.**

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# INNOVATION SWEEPS AWARDS



A new technology that detects allergens in food products has taken out the AIFST 2016 Food Industry Innovation Award at the AIFST Convention.

The Allergen Bureau was awarded the prestigious award for its VITAL Online platform, a web-based calculator that reviews the allergen status of all ingredients in a product and the processing conditions that could impact on the allergen status.

The technology gives the global food industry a standardised allergen risk assessment tool that both

incorporates new allergen science as it comes to hand, and provides secure intellectual property data storage for manufacturers.

The VITAL program was developed by the Allergen Bureau as an initiative of the Australian Food and Grocery Council Allergen Forum with support from FIAL and has been successfully commercialised through a subscription access service.

For more information visit [allergenbureau.net/vital](http://allergenbureau.net/vital)

## CPD UPDATE

The 2016 CPD Program has a busy schedule of important events planned for the remainder of the year, all designed to support the ongoing skill and capacity building of food industry professionals. For more information, visit [www.aifst.asn.au](http://www.aifst.asn.au) or contact Bronwyn Graham at **Bronwyn.graham@aifst.com.au** or phone 03 9742 6216.

### 24 August – AIFST & CSIRO present Toddler Foods, Sydney

Following on from the very successful “Foods for Infants and Toddlers” CPD event this workshop will focus specifically on toddler foods.

### 26 August – New product development AIFST/Chadderton food safety workshop, Melbourne

This workshop held by AIFST and Chadderton Food Safety will explore new product development for food professionals.

### 9 September –Packaging performance for your product, Melbourne

This seminar will provide participants with information to ensure the choice of food packaging complies with current regulations and draw on some of the innovative practices currently being used across the industry.

### 15 September, Perth; 16 September, Adelaide; 6 October, Brisbane – Step-by-step to constructing a compliant food label

Presented by John Chadderton of Chadderton Food Safety, the workshop will cover the relevant standards and

regulations required to construct a food label within the Australian food industry and the hands-on construction of a food label ensuring compliance is maintained.

### 12 October – Plan. Prepare. Prevent. Food recall workshop, Sydney

This workshop will help make sure you build a food safety culture and are prepared and ready to respond when issues arise, ensuring consumers and your brands are protected. 🍷



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# THE HEALTH STAR RATING – SETTING THE RECORD STRAIGHT

*The Health Star Rating is still generating confusion and concern for some commentators but it needn't be – it's actually very straightforward.*

Words by *Geoffrey Annison*

Two years ago the Health Star Rating (HSR)<sup>1</sup> front of pack labelling scheme was introduced on a voluntary basis for a five-year transition period. A two-year review of the scheme is now complete and, as this article goes to press, is being considered by the Ministerial Forum on Food Regulation.

Uptake of the HSR labelling by industry has been very rapid, far exceeding expectations, with over 3000 products now carrying the HSR labelling in one form or another. Initially heralded as an unprecedented success resulting from an also unprecedented level of cooperation between the food industry and its stakeholders, we are now witnessing an avalanche of criticism of the HSR in the popular press from academics, public health groups and consumer organisations. Many of these critics were directly involved in the development of the labelling system.

At best this criticism reveals a fundamental lack of understanding of the purpose of the HSR; at worst it is gross mischief-making by those seeking to portray the industry and its use of the HSR in the worst possible light. This is possibly a prelude to launching again a push for mandatory front-of-pack nutrition labelling by those organisations.

Readers will recall that the HSR scheme was introduced following a protracted public debate between food industry supporting the 'informative' Daily Intake Guide labelling and consumer organisations and the public health sector supporting an

'interpretive' multiple traffic-light system. The impasse was broken when the Commonwealth Government, responding to the Blewett Labelling Review<sup>2</sup> invited representatives from industry, the public health sector, consumer organisations and government to jointly develop a new front-of-pack labelling system that combined both informative and interpretive elements.

Space doesn't allow a detailed description of the process but the consultation was exhaustive across all stakeholders, with the stated objective being to develop a front-of-pack labelling scheme *"To provide convenient, relevant and readily understood nutrition information and/or guidance on food packs to assist consumers to make informed food purchases and healthier eating choices"*.

Utilising a nutrient profile database of around 3500 processed food products across all major categories, the Nutrient Profile Scoring Criterion algorithm underpinning Standard 1.2.7 Nutrition, Health and Related Claims of the Australia New Zealand Food Standards Code<sup>3</sup> was adapted to provide a 10 point (five stars with half star increments) rating scale.

The intent all along was that the HSR apply only to packaged manufactured foods for two reasons. First, their nutritional value is often opaque to consumers (despite the Nutrition Information Panel) and secondly, the HSR was seen as an incentive to drive the reformulation of food products.

Generally the algorithm works well. Products with higher levels of nutrients

we should limit score poorly (fewer stars), and products with lower levels score better (higher stars). During its development, however, it was recognised that the algorithm may not work well for all packaged foods.

These cases were termed 'anomalies' and indeed one example is bottled water. As the algorithm balances positive and negative components, water (which is equally devoid of both) scores only mid-range in the HSR. Water is the recommended beverage of the Australian Dietary Guidelines (ADG) and so it was decided it should be labelled with five stars under the HSR. The Health Star Rating Advisory Committee (which oversees the HSR system) assesses anomalies, which may be brought to its attention by stakeholders. They judge that an anomaly occurs "when a star rating is inconsistent with the ADG, or when used to make comparisons within a food category or across comparable food categories would mislead consumers".

These are important points. The ADG recommend restricting energy, saturated fat, sodium and sugars and supports the consumption of plant foods and protein foods (core foods) – the HSR reflects this in the way the algorithm operates. The HSR is designed to assist consumer choice within categories of manufactured foods, not across categories, and it works well in this way.

So what are the concerns of the nay-sayers? They fall into two broad categories – those with philosophical objections, and those with technical

objections, but they all stem from their own ideologies of 'healthy and unhealthy foods' not aligning with the HSR rating for many processed food products, particularly when they, deliberately or misguidedly, compare HSR ratings across categories. This is the cause of the widespread criticism of the HSR and it reveals a fundamental misunderstanding of the value of the HSR and how it should be used.

The HSR has never been presented as a robust, scientifically perfect instrument able to flawlessly distinguish between healthy and unhealthy food products. Indeed, it is unlikely that such an instrument can ever be developed. Notwithstanding this, if the HSR label appears on a large number of processed food products, particularly in the mainstream categories, and if a reasonably large number of consumers use the label to select products with a higher HSR rating, population level dietary patterns will align more closely with the ADG.

The concept underpinning the HSR is that it is a tool for healthy diet selection, not healthy food selection.

As a public health intervention, it is not necessary for the HSR to be on every food, and for consumers to use it at every moment to guide what they consume. The idea is to get large numbers of people positively influenced by the intervention and in this respect, the HSR can still have a positive influence on food choices, dietary intakes, nutritional status and eventually, hopefully, health outcomes.

It's time for the critics to take a step back and let the HSR do its job. Constant carping from the sidelines might win stories in the media, but it will undermine the credibility of the HSR labelling for consumers, limiting its effectiveness. The constant negative reporting also risks discouraging more food companies from implementing the labelling. We are already two years into the five-year implementation period. There will be ample time for all parties to engage with the consultative process anticipated as part of the five-year review.

The Australian Food & Grocery Council remains committed to supporting food companies

implementing the HSR, and committed to supporting efforts by the Federal Government to promote its understanding with consumers. It's a gross breach of faith by organisations that contributed to the development of the HSR to now gratuitously self-promote their own relevance in contestable public health policy advocacy at the expense of the HSR scheme.

Rather than attempting to out-do each other in their vociferous criticism of the HSR, they should work with government and industry to ensure that consumers have confidence in the system and use it to assist healthy diet selection. 4

*Dr Geoffrey Annison, PhD, is deputy chief executive and director of health nutrition and scientific affairs at the Australian Food & Grocery Council.*

1. <http://www.healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/Home>
2. Labelling Logic. Review of Food Labelling Law and Policy. Commonwealth of Australia. 2011
3. ANZ Food Standards Code, [www.foodstandards.gov.au](http://www.foodstandards.gov.au)



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# WHAT TRENDS ARE INFLUENCING FOOD AND HEALTH?

*An abridged version of a presentation given by Sarah Hyland, AIFST general manager industry services, to the corporate nutrition interest group – Dietitians Association of Australia.*

Words by Sarah Hyland

Our food consumption and eating patterns are constantly shaped by the world around us. Historically, we see food trends influenced by social change and world events, the environment, economics, medicine and technology. However, we must also acknowledge that if you are in the food business, you are also in the fashion business.

So here are four trends emerging as well-articulated influences on food development, food marketing and consumer choices.

## 1. Transparency

It is now important for consumers to know more about their food, including where it's made, how it's made, who made it, and what exactly is in it. This information is appealing to consumers for safety, transparency and inspiration.

The transparency trend continues to grow and is becoming part of the grand narrative that producers, manufacturers and purveyors of food tell to consumers. If your product is grown or manufactured ethically, sustainably, safely, organically or all of the above, then a significant proportion of your target market wants to know.

A possible reason for this is food safety. As the global food system becomes increasingly interconnected, food poisoning outbreaks, such as bovine spongiform encephalopathy (BSE) or 'mad-cow disease', and general threats of cross-contamination are increasingly front-of-mind.

This was certainly the case in Australia in 2015 with the outbreak of hepatitis A in connection with Nanna's Frozen



Mixed Berries. The contamination story and the processing of this product in Chinese factories re-invigorated the country-of-origin labelling debate.

## 2. A true story

For the consumer, there is something appealing about a product that carries a lovingly hand-crafted back story. But there are some cases where that story has been stretched to unsuspecting consumers, and the brands have brought themselves decidedly undone.

The Mast Brothers, which sells 'bean to bar' chocolate produced in its small-scale batches in Brooklyn, New York City, is a prime example. Rick and Michael Mast did not originally make their own chocolate from scratch, as they claimed to have always done.

The chocolate community suspected early on that the brothers were remelting chocolate. They noted that the bars had a taste and texture profile that closely resembled industrial chocolate – smooth, very refined and somewhat flavourless, compared with known 'bean to bar' formulations that exhibit distinctive tastes tied to its origin, made plain by minimal processing.

The true story trend probably still has room to run, and may even become as mainstream as gluten free. However, caution must be exercised to ensure the story remains transparent and relevant. Too much brown-paper graphic design, hand-written labelling, 'methods unchanged' messaging and strongly retrospective narrative may start to deter consumers through a perceived lack of authenticity.

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### 3. The ancestral diet - the next step in personalised nutrition?

Is there a future where people can unlock the keys to their personal physiology and design diets based on their own ancestry or genetic make-up? Nutrigenomics is the next step in personalised nutrition.

Some evolutionary biologists theorise that over the past 10,000 to 20,000 years, the novel environment changed the action of natural selection among populations in Eurasia and elsewhere. They theorise that some human populations adopted extensive agricultural cultivation of grass species and the use of milk from other mammals for nutrition, and their ability to process foods evolved.

But now millennia on, surely this no longer impacts our ability to process farmed foods? According to the ancestral diet principles, this depends on your ancestral heritage, or how long you have been exposed to agriculture.

For example, people from the Middle East are thought to have the best adaptation to wheat. Those from Northern Europe have the best tolerance for dairy and those from northern China have a good tolerance to wheat with all the conditions. People from southern China and Asia on the other hand have a strong tolerance for rice. No ancestry has any tolerance for highly processed food of modern times.

So what are the perceived benefits of this knowledge?

#### **Fewer diseases**

We know certain people are at a higher risk for developing diseases based on family history. Trace the family tree back a bit further, and the solution could be as simple as changing eating habits.

While there is still more research to be conducted, knowledge of our genetic structure could lead to dietary recommendations long before any negative symptoms from diseases crop up.

#### **Weight control**

It is possible that reverting to a diet similar to the one your ancestors

consumed could be the key to staying slim. *Today's Dietitian* magazine examined obesity trends in the USA and found that African-American women experience the highest levels of obesity compared to other population groups with around four out of five being overweight. Many traditional African and Caribbean diets are largely vegetarian, and the people are far healthier. The research also found that those who maintained a diet centred on the foods that Africans typically eat didn't develop the same issues as those who adopted a Western diet.

However, there are also some obvious difficulties in attempting to eat an ancestral diet...

#### **Availability**

Though many tout the heart-healthy benefits of a Mediterranean diet, seafood isn't necessarily an option for landlocked areas, at least not fresh seafood. The same is true for ancient grains. While many have begun to seek out these high-fibre foods, such as farro, these are difficult to find in the supermarket. Even if people manage to get their hands on some, most are unfamiliar with the correct way to cook these unfamiliar ingredients.

#### **Diverse ancestry**

Trying to identify the optimal and most correct ancestral diet is going to be nearly impossible if, like most people, you have mixed ancestry that traces back equally to people who consumed mostly meat as well as people who ate chiefly grains and vegetables.

### 4. Quest for optimum health

Increasing consumer demand for natural and 'less processed' food and drink is forcing companies to remove artificial ingredients. Consumers are looking for natural recipes with ingredients they recognise. Companies such as Kellogg's, General Mills, Kraft and Campbell Arnott's are all committed to reducing anything artificial in their products – from ingredients to preservatives and packaging.



Running in parallel with this trend is the increasing value of good health, fuelling rising interest in all the things that promote it. As the USA, Europe and Japan face ageing populations, more and more people are looking for products to help them stay healthy well into their twilight years.

Over the past decade, sales of vitamins, minerals, and nutritional and herbal supplements have surged and many new companies have entered the space. Globally, the market is now valued at \$82 billion and is destined for year-on-year growth.

Ironically, many of these supplements are highly processed into tablet and powder form, with graphics and devices that suggest a wholesome and potent 'shot' of health, taken from the source and representing an altogether natural offering. It is worth exploring whether these products indeed belong in the food basket rather than down the medicine aisle. 🍌

*Sarah Hyland is AIFST's general manager of industry services. If you are interested in learning more about trends in food and nutrition, please contact Sarah on 02 9394 8650 or at [sarah.hyland@aifst.com.au](mailto:sarah.hyland@aifst.com.au).*



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# HOW PACKAGING CAN REDUCE FOOD WASTE

*Food waste continues to be an issue for the food industry. How can food producers make sure their products can outlast the waste?*

Words by Alan Davey

If packaging were invented today, it would be regarded as one of the greatest green technologies available, due to its ability to protect and preserve food, as well as minimise food waste.

According to the United Nations' Food and Agriculture Organization, around one-third of food produced for human consumption is lost or wasted globally, which amounts to around 1.3 billion tonnes per year.

## Why does so much food go to waste?

Food is spoiled at different stages of the supply chain. From harvesting and production to transportation and retailing, as well as in consumers' homes, minimising waste at every stage of the entire supply chain is key. The prevention and reduction of food waste must be given thorough consideration and be on the agenda for all supply chain parties involved to ensure food reaches its end destination in optimum condition.

Protecting the contents is the critical function of packaging. Sometimes this means slightly more packaging is needed to protect a product through the supply chain to prevent damage and food spoilage. However, the food waste created in the transition from farm, or factory, to fork that results from poor packaging design, is often not taken in to consideration. When energy, carbon and resource investment in packaging is just five per cent of that in the product that it protects, it makes absolute sense to get the packaging right.

Food packaging should be seen as a green technology, not an environmental issue. It extends the shelf life of food products and in some cases also addresses portion control, further helping to benefit consumers' health and wellbeing.

## Food waste in Australia

According to Foodwise, the Australian campaign for sustainable food production, it is estimated today that Australians throw out \$8-10 billion of food every year, with four million tonnes of food ending up in landfill each year.<sup>1</sup>

The amount of food that goes to waste each year is clearly unacceptable, both from a cost and sustainability perspective. The high levels of food waste emphasises how important it is for all the links in the food supply chain to work together to achieve significant food waste reductions.

Well-designed packaging delivers both protective and preserving qualities. Imagine a world without packaging; the manufacture, transportation, distribution and consumption of virtually every consumer good would be impossible. Effective and efficient packaging ensures food can be transported around the world safely and securely.

According to Food South Australia, the majority of food thrown away in Australia is fresh fruit and vegetables. However, bread, meat, fish, dairy, rice and pasta are also all in the top most wasted foods.<sup>2</sup>

## Protecting baked goods

Food waste is particularly prevalent in the bakery sector. Consumers expect fresh, well-presented bread, appetising patisserie and morning goods and stand-out celebration cakes. Whether produced in store, or sourced from industrial bakery suppliers, the packaging of fresh or chilled, delicate goods can be critical to their retail success.

The challenge for the packaging manufacturer is to develop products that address the presentation and freshness aspects, while minimising environmental impact and retaining the robustness required to survive the supply chain. Once a consumer purchases a product, they expect it to be protected on the journey home, and good enough to present at table. This means it needs to look as good when serving as it did in store.

The packaging material, which provides the best presentation and protection to fresh, chilled and delicate products is polyethylene terephthalate (PET). PET offers crystal-clear presentation of products, and is a recyclable, low-carbon packaging material that minimises waste, cost and impact on the environment.

Retailers and consumers are driving growth in the PET market by demanding packaging that has strong environmental credentials. Recycled PET (rPET) is sourced from recycled drinks bottles and is easily recycled several times. rPET can further reduce the carbon footprint of a typical plastic pack by up to 70 per cent.

Today, the English packaging company, LINPAC, utilises up to 95 per cent rPET in the majority of its rigid plastic packaging solutions for the meat, fish, poultry, convenience foods and bakery market sectors. The company has also invested in in-house super cleaning technology to process its rPET flake and guarantee its use of recycled material is totally food safe under all circumstances.

While there are numerous packaging formats available to the bakery sector, from plastic or carton containers and hinged boxes to trays and paper bags, the use of rigid plastic containers is popular. Many bakers and retailers use these innovative packaging solutions to ensure the crystal-clear presentation of their delicate goods, as well as maintain the freshness expected from their products.

There is also the option for food producers to choose packaging designs that are hinged, airtight or semi-airtight, as well as a variety of base and lid solutions. The options available for unique product presentation in store are therefore enormous. Hinged boxes can also be designed in an airtight format allowing sponge-based products to retain their moisture within the pack and stay fresher for longer. There are also packs available that are slightly vented on three sides to allow air to circulate and make sure that pastry products, such as croissants, retain their crispness.

Food packaging companies, along with LINPAC, are working smarter than ever before to develop packaging that has targeted functionality, is lighter, stronger and more recyclable and yet is still fit for purpose in terms of protecting, preserving and presenting food to a high standard.

## The role of packaging in sustainability

Globally, the demand for food is currently outweighing supply. With the population forecast to increase by over 2.3 billion in the next 35 years, the food supply problem is set to increase. The World Bank has said food grown around the globe needs to increase by over half by 2050 in order to feed the expected global population of 9.6 billion. Therefore, the food waste agenda is only going to increase in attention and awareness.

In summary, packaging development has to be a complete systems approach. If designed correctly for the product and for the supply chain and with appropriate material selection, efficient packaging can provide more time in the supply chain. This will enable products to be on shelf longer, but maintain their fresh appearance and minimise waste and impact on the environment. A win-win for everyone. 🍷

*Alan Davey is the director of innovation at LINPAC and recently presented at the Australian Institute of Packaging Conference in Melbourne, recently.*

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### Fundamentals of Baking

16-17 August 2016  
and 28-29 March 2017

The course is designed for bakers, managers, administrators, marketers, sales and distribution personnel within the baking and allied industries.

*COURSE CONTENT • Bread ingredients and formulae • Understanding flour • Stages in the bread making process • Machinery used in commercial bread making • Product quality assessment / measurement • Alternative bread making processes*



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# LIFE SAVING FOOD RECALL APP

*Declaring food allergens on packaged food labels is mandatory but undeclared allergens remain the largest cause of food recalls in Australia. So, how does that help the consumer?*

Words by Michael Sheridan & Prof Andreas L. Lopata



In 2015 James Cook University food allergy researcher Professor Andreas Lopata and PhD student Michael Sheridan had an idea for a food safety app tool to alert food allergic consumers to undeclared allergen food recalls.

## The background

A survey of Australian food recall tools revealed there was a gap in the market for an easy-to-use, up-to-date and convenient method for communicating potentially life-saving food recall information.

The survey found that limited food recall advice, particularly in the form of mobile applications, was available to Australians. The available options included the Australian Competition & Consumer Commission (ACCC) recall app, which was the only mobile app that displayed food recalls in Australia.<sup>1</sup> Back then, the app notified its users of all recalls, not just food recalls, with important food recall information interspersed with other non-food products. Consumer reviews also indicated the ACCC app was cumbersome to use, and difficult to navigate.<sup>1</sup>

Some food recalls are incorporated into websites as feeds such as the Allergy & Anaphylaxis Australia website.<sup>2</sup> The Federal Government's ACCC website also displays food recalls along with non-food recalled products.<sup>3</sup> Even Food Standards Australia & New Zealand (FSANZ), a Government website dedicated to food safety which displays food recall notifications<sup>4</sup>, does not offer consumers a dedicated food recall notification app.

Thus, in late 2015, the FoodRecallAus app – Australia's first and only dedicated food recall notification app was developed.

## The app

It took six months of research and development, and a steep digital learning curve for the lab-based researchers before the FoodRecallAus app became available for anyone to download from the Google Play and iTunes stores for less than \$1.50. This innovation brings food recall notifications direct to consumer mobile devices. Push notifications were incorporated to instantly alert app users to the latest food recalls.

FoodRecallAus app incorporated a 'Quick Recall' section, a direct RSS feed to FSANZ<sup>4</sup> recalls; a 'Full Recalls' section with comprehensive food recall information and images; and a 'Food Watch News' section RSS feed derived from Australian Food News [www.ausfoodnews.com.au](http://www.ausfoodnews.com.au)<sup>6</sup>, which delivers news updates related to food safety, the food industry, and food policy. An accompanying website [www.FoodRecallAus.com.au](http://www.FoodRecallAus.com.au)<sup>5</sup> was also developed to complement and advertise the FoodRecallAus app.

## Who uses it?

The FoodRecallAus app gained national endorsement from Environmental Health Australia<sup>7</sup> – the peak body representing Environmental Health Officers (EHOs), and has endorsed the FoodRecallAus app as a food safety tool for EHO use.

EHOs perform food safety compliance audits, inspections and investigations. The app assists them in rapid awareness of food recall notifications and provides a food recall notification tool that assists food services personnel.

EHOs performing Food Safety Plan and kitchen audits at facilities such as child care centres, P&C school tuck shops, aged-care facilities, hospital kitchens, and licensed food premises, for example, are able to inform kitchen staff and personnel of the availability of the FoodRecallAus app. The app has recently affiliated with Healthy-Kids Association ([Healthy-Kids.com.au](http://Healthy-Kids.com.au)) and Allergy and Anaphylaxis Australia.

## Why is it important?


The FoodRecallAus app was 'triggered' by the highly publicised 'berry scare' food recall. This involved mixed berries imported from China, re-packaged and sold in Australia, and subsequently found to be contaminated with hepatitis A virus, which was linked to 34 cases of illness in early 2015.<sup>8</sup> The incident highlighted demand for better Country of Origin Labelling<sup>9</sup> and the Federal Government is now introducing new country of origin food labelling laws to help clarify the current ambiguous labels and assist consumers in making better informed purchase choices.<sup>9</sup>

In the last few years, tragic anaphylactic reactions have highlighted the importance of accurate food labelling of mandatory declared food allergens on packaged foods.

From August to November 2015, the Department of Agriculture & Water Resources, responsible for food importation compliance,<sup>10</sup> was directed to test every imported coconut milk product for any undeclared allergens. This generated a spike in food recalls due to the compulsory testing of coconut milk products containing undeclared dairy allergen, with at least 19 imported coconut milk products recalled.

This increased surveillance of imported coconut products resulted from the tragic death of a 10-year-old boy in 2013 who consumed a can of coconut juice containing an undeclared dairy allergen.<sup>11</sup> There was unfortunately a substantial delay between the death of the child and testing of all coconut imports.

Food recall numbers have increased in recent years. From January 2005 to December 2014, there was a total of 586 recalls – an average of 59 per year. The highest number of food recalls was recorded in 2015 with 81. There has been a steady increase of undeclared allergen food recalls in the past three years – 16 in 2013; 27 in 2014; and 39 in 2015.<sup>12</sup>

The FoodRecallAus app is an essential tool in the arsenal of those who suffer from food allergies and for concerned parents of children with severe food allergies. 

*Michael Sheridan is a PhD candidate at James Cook University and environmental health officer. Professor Andreas Lopata is the head of the Molecular Allergy Research Laboratory at James Cook University, the Associate Dean of Research at the College of Public Health, Medical and Veterinary Sciences and key researcher for the Australian Institute of Tropical Health and Medicine.*

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# CSIRO TAKES INNOVATION TO IFT16

*CSIRO recaps its involvement at last month's IFT16, where it showcased new technology and won several international awards.*

Megasonics processing and ready-to-eat high pressure thermal processed meals were some of the expertise areas featured by CSIRO's food innovation centre at the Institute of Food Technologists Annual Meeting and Food Expo (IFT16) last month in Chicago.

The Institute of Food Technologists (IFT) – AIFST's US counterpart – holds one of the world's largest food industry events annually, attracting over 23,000 visitors and more than 1000 exhibitors.

CSIRO had a significant presence, with scientists presenting at technical sessions, holding symposia, on committees, judging posters and also exhibiting for the first time.

Professor Martin Cole, CSIRO Agriculture and Food's deputy director, director of IFT and long-time active member of AIFST, presented on the impact of international food regulations on the global supply chain.

Dr Pablo Juliano and Dr Kai Knoerzer received on behalf of CSIRO one of three innovation awards for their successful commercialisation of megasonics technology in the palm oil industry. Megasonics processing uses soundwaves to enhance aqueous-based oil extraction from oil milling processes, thus also reducing residual oil lost to effluent. CSIRO holds the worldwide patent for megasonic processing in edible vegetable oils and in addition to palm oil is developing applications in the olive, coconut and soybean industries.

Dr Juliano also won IFT's WK Kellogg International Food Security Award and Lectureship for his work on regional development models for value addition to under-utilised whey in South America's dairy industry.



*Dr Pablo Juliano and Dr Kai Knoerzer from CSIRO with the IFT Food Innovation Award trophy at IFT16 CSIRO booth*

Advances in safe, high-quality stabilised fruits and vegetables, emerging non-thermal separation technologies, and next-generation extrusion processing were the focus of symposia conducted by Drs Knoerzer and Juliano, Dr Roman Buckow and Kirthi De Silva.

Sandra Olivier presented on advances in high-pressure processing for healthier foods, specifically non-proteolytic *Clostridium botulinum* spore inactivation by the emerging technology, high-pressure thermal pasteurisation. She also discussed a ground-breaking patented innovation, invented by a team at CSIRO led by Dr Knoerzer, that will finally allow industry to adopt this technology on a commercial scale using existing high-pressure processing machines.

On the back of this innovation, CSIRO also featured its new commercialisation venture, Meals by Design, which will

harness this disruptive technology to deliver a taste revolution in healthy, chilled convenience meals. Concept products have been developed using recipes from Australia's most popular weight management program, CSIRO's Total Wellbeing Diet, and the Improvy program, with plans to roll out a premium, chilled meals range to Australian consumers.

As with IFT and AIFST, CSIRO has involvement in a range of scientific events and collaborations around the world. It has increasing food sector engagement activity in China and a representative based in Indonesia.

The food and ingredient sector is becoming more global and as such international engagement is becoming increasingly important for Australian companies as well as CSIRO in order to innovate. Look out for more global-facing innovation from the national researcher in the future. ☺



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# INNOVATE TO STAY FRESH

*Innovation in the food sector is key to staying ahead of competitors. So how can your business determine 'how' and 'where' to innovate efficiently and cost effectively?*

Words by Dr Chris Vindurampulle

## Driving innovation with analytics

There is no denying that innovation is the buzzword of the moment. Simplistically, innovation in business can be defined as 'change' or 'transformation' that adds value. The ability to drive innovation within a business depends on a multitude of factors. Developing a vision for your business is a starting point. But knowing the landscape in which your business operates and monitoring the activities of your competitors will help build a framework that will be fundamental to shaping the innovation pathways of your business.

Most businesses will know who their closest competitors are and what they do, but what about the broader landscape, and particularly overseas markets? With respect to making decisions about new strategic directions, how does one avoid wasting money on R&D that has been done before?

An example of these points is the recent explosion in craft beer and functional beverage manufacturing. Ingredients and flavours that impart unique tastes and health benefits appear key to carving a niche in those markets. If you are a business operating in these sectors, which is looking to innovate, how would you identify and source non-traditional flavours and functional ingredients? Targeting Asian markets, such as China, where craft beers and functional beverages are taking off, may be part of your business's strategic direction. So how does one assess the landscape in those regions?

One way to simultaneously analyse competitor activity and to identify

possible areas for innovation is to analyse information contained in patents. According to data published by the World Intellectual Property Organization, more than 2.5 million patent applications are filed each year globally. It has also been reported elsewhere that 80 per cent of the information in patents is never published anywhere else. Published patents therefore represent the largest single body of technological information that is freely available. Even if your business does not actively patent innovations, patent databases represent an invaluable resource.

There are many online tools (such as Google Patents) that can be used to gain free access to patent literature.

Platforms such as this make it possible to quickly find documents that might relate to a development that your business plans to undertake. Using these online tools can provide an initial, low-cost view of the landscape in which you operate while simultaneously providing the opportunity to increase knowledge that will add ongoing value to your business's innovation process.

## The big (data) picture

A more comprehensive view of the patent landscape can be obtained using analytical software. The advantage of using this software is that large patent databases can be interrogated quickly and in real time to create interactive

Figure 1.





images that enable visual digestion of the underlying data.

For instance, the figures throughout the article have been created by isolating patents relating to beer brewing that have been filed in the past five years. The colour wheel (Figure 1) categorises patents according to particular themes that appear in those documents. The data generated can also be used to depict key players in the sector (Figure 2) who can be ranked according to the number of patents in their name. Additional information can be overlaid, such as publicly available financial data. Patents underlying particular sectors of the chart (Figure 1) relating to flavour profiles, or those belonging to particular players in the sector (Figure 2) can be further isolated and studied.

If the aim is to identify alternative 'flavour' or 'functional ingredient' sources, an alternative approach might be to search for patents containing those keywords. This would enable the identification of non-traditional ingredients used in other food products that could be suitable for use in craft

beers or functional beverages.

Another way of analysing patent data is by landscape mapping, where groups of related patents are collated into clusters and displayed on an interactive topographical map. Clusters that have a large number of patents are represented as snow-capped peaks or mountains, whereas areas that contain few closely related patents are represented as deserts or islands in an ocean. This can allow for quick, visual identification of 'hot' areas of patenting activity and, conversely, untapped areas of innovation. Again, the data underlying the map can be dissected in many different ways.

The flow-on effect of analysing patent data using big data analytical techniques is that it enables strategic business decisions to be made more rapidly but with greater awareness and diligence.

Organisations that provide software tools and services for analysing patent data are becoming increasingly prevalent. However, significant added value can be provided by specialist organisations that have the skills to analyse the patents underlying data,

remembering that patents are in essence legal documents. This is particularly the case where you are determining your businesses freedom to operate in a crowded marketplace with high patenting activity.

Other useful information that can be provided by analysing patent data includes the identification of potential collaborators, investors, innovation trends, market preferences and prolific inventors who may be future employment acquisition targets. <sup>1</sup>

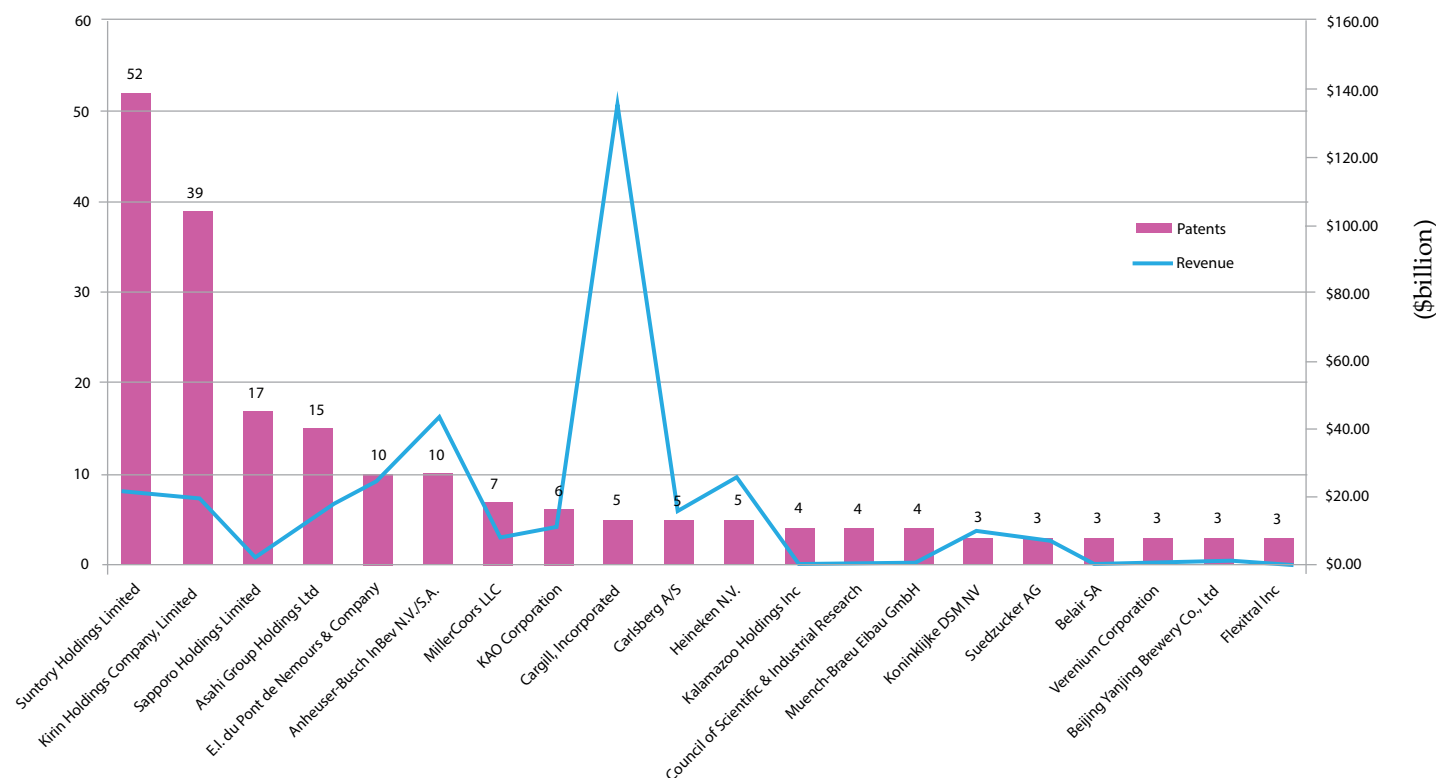
*Dr Chris Vindurampulle is an associate and patent and trade marks attorney at Watermark Intellectual Asset Management.*

Acknowledgement

Figures 1-2 produced using Innography, Inc software

Figure 2.

### Patents per Company (with Revenue)





# IMPACTS OF BREXIT ON AUSTRALIA'S FOOD AND AGRI SECTOR

*The Brexit vote in the United Kingdom sent shockwaves across world markets. So what does it mean for Australian exporters?*

Words by Rabobank senior analyst Marc Soccio

Britain's recent surprise vote to leave the European Union created initial shockwaves around the world as countries worried about the implications for global markets and trading relationships. The reality for Australia, however, is that it is likely to be relatively contained.

The United Kingdom and the EU-27 nowadays account for only a relatively small share of Australia's food and agricultural (F&A) exports – 1.4 per cent and 4.6 per cent respectively by value. So, for the Australian agricultural sector as a whole, the direct trade implications of the UK's historic decision to leave the EU will be limited.

However, for some sectors – particularly wine and sheepmeat – the direct export exposure is more significant. These sectors in particular will be exposed to any sustained negative impact Brexit has on the UK economy and household incomes, as well as price inflation due to adverse currency moves.

Coupled with this, wine and sheepmeat – in addition to wool and canola – are also some of the more significant Australian exports to the EU-27.

For Australia's wine sector in particular, the UK has long been its largest export market by volume, taking one-third of all wine volume exported by Australia to the world.

For dairy producers, while the direct trade relationship is negligible, any weakening of the Euro resulting from Brexit could increase the competitiveness of European dairy products in already over-supplied global markets.

For Australia's beef sector, the EU-27 and UK markets are relatively small in

UK & EU-27\* share of Australian F&A exports, 2015

	UK SHARE OF VALUE	EU-27* SHARE OF VALUE
Beef	1.3%	2.0%
Lamb	4.7%	1.7%
Wool	0.4%	10.1%
Wine	16.2%	9.4%
Oilseeds	0.0%	54.4%
Total F&A exports	1.4%	4.6%

\*Excludes the UK Source DFAT/Rabobank 2016

volume terms, but represent a small but significant market by value. Apart from the financial and currency impacts of the Brexit decision, which have the ability to impact beef trade, the biggest question for the Australian beef industry will be around what might happen to the quota positions into the EU and UK.

More broadly speaking, the implications of Brexit on both market access and UK food prices will need to be watched in the future. The most immediate impact will be seen should the sharp depreciation in the British pound become a longer-term proposition.

Furthermore, it remains to be seen how trade tariffs, duties and quotas may change between the UK and the EU-27, and how elimination from the Common Agriculture Policy (CAP) impacts UK food producers. Any imposition of trade barriers and reduction in producer subsidies would act to raise the cost of food sourced domestically and from the EU-27.

In the longer term, high food prices may be alleviated through free trade agreements with trading partners beyond the EU.

Looking at the broader economy, volatility in financial markets naturally raises concerns over any longer-term spill-over into the real economy around the world, coming at a time of heightened tension in financial markets and fragile global economic growth.

There are also the potential knock-on effects to foreign investment in Australian agribusiness.

Almost one-fifth of the total stock of foreign investment in Australia originates from the UK, and yet a small, but significant, share of this finds its way into our food and agricultural businesses.

One might suspect that investment flows might be compromised in the near-term as investors reassess the foreign currency impacts of the Brexit. In times when we have seen the UK economy struggling and the British pound weaker than we currently see it against the Australian dollar, for example in the period 2010 to 2013, direct foreign investment in Australia from the UK dipped, before again recovering in line with these fundamentals. ●

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# CHOC SHOCK! LOW-FAT CHOCOLATE ON ITS WAY

*A healthier chocolate could be hitting our supermarket shelves thanks to a new method that uses electric shocks to blast away fat content. Here's a summary of the recent research paper by Temple University and funded by Mars Chocolate, Inc.*

A group of researchers from the Department of Physics at Temple University in Philadelphia, USA, have developed a new application of electrorheology that can effectively reduce the fat content in a piece of chocolate.

The researchers conducted a series of experiments using the electric shock technology and discovered that they can effectively remove the fat while still maintaining the chocolate flow – which was the main barrier in previous attempts at creating a low-fat chocolate.

But why does the world need low-fat chocolate?

Chocolate is widely consumed the world over. While it's popular in Europe, where chocolate giants such as Nestlé and Lindt are based, Australia sits at number seven on the list of countries that eat the most chocolate, according to *Forbes* magazine.

However, chocolate products currently contain too much fat, mainly cocoa butter, which researchers say leads to obesity – a growing problem in Western nations. Temple University researchers say a typical mould chocolate contains various fats from cocoa butter, oils and other fats, which make up 40 per cent of the chocolate.

Previous attempts at a low-fat variety by large manufacturers, Proctor & Gamble and Nabisco, failed in the past by substituting cocoa butter with a low-calorie fat. But as chocolate without the cocoa butter is no longer chocolate, the product was not allowed in many countries.

A new way forward was needed. And simply removing the fat from the cocoa

butter was not an option, as it caused the chocolate flow, and therefore the production, to jam.

With partial funding from Mars Chocolate, Inc, researchers focused on the basic science of liquid suspensions and how properly applied electrorheology can transform liquid particles. In previous attempts to remove fat, researchers found that when the concentration of cocoa solid was high and close to the maximally random jammed (MRJ) density, removing a small amount of fat jammed the chocolate flow. So they set about challenging chocolate's MRJ density and a particle's intrinsic viscosity.

To do this, the researchers examined the basic science of soft matter. Using Einstein's work on the viscosity of dilute liquid suspension of uniform spheres (cocoa solid particles are spherical) they established a formula that showed the lowest level of fat possible before liquid chocolate becomes jammed and makes production impossible.

They then determined that they needed a new method which would reduce the viscosity of liquid chocolate effectively at high volume fraction of solid particles for chocolate production and proper texture while also increasing the MRJ density.

The researchers discovered that by using unconventional electrorheology, applying an electric field in the flow direction of liquid chocolate can change the solid particles, breaking the microstructure and leading to increased MRJ density and significantly reduced viscosity.

The key difference, researchers say, is the use of unconventional

electrorheology as opposed to traditional. Traditional electrorheology is when the electric field is applied perpendicular to the flow direction, leading to increased viscosity and solidifying fluids. Unconventional electrorheology, on the other hand, applies the electric field in the flow direction and reduces the viscosity of the particles in the flow direction.

So why does unconventional electrorheology work?

By changing the microstructure along the field direction, the particles change to short chains and MRJ density changes depending on the particle shape. This allowed researchers to determine the base liquid – that is, melted fat – and reduce it by 22.2 per cent. And secondly, the aggregation of short chains along the field direction breaks the rotational symmetry, changing the viscosity of the liquid chocolate, and improving its flow.

The researchers claim they can reduce the total fat in a piece of chocolate from 40 to 31.8 per cent, and believe with this technology, it can be applied to all types of chocolate.

And the taste? The researchers say the process doesn't diminish the chocolate flavour and even claim that it slightly enhances the cocoa solid flavour.

However, there was no direct analysis conducted on the taste. ☺

*Temple University currently holds patents on the methodology to alter the viscosity of liquid chocolate through the application of an electric field. The full paper 'Electrorheology leads to healthier and tastier chocolate' is available for download from Proceedings of the National Academy of Sciences of the United States of America.*



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# A CHILDISH APPROACH TO SENSORY

*The Australian population exists of roughly 4.4 million children under the age of 15 years. At any given time, supermarket shelves have a large variety of foods aimed at children. The taste of these products is the key driver of children's repeated consumption.*

Words by Dr Gie Liem

Research consistently shows that children live in a different sensory world, which makes reliable sensory testing with children needed. Since the late 1970s we have learnt a lot about children's sensory perception, but there is still a lot not understood. More knowledge of how children's taste perception and preferences differ from those of adults and how they are influenced by biological development, learning and product cues, enables the food industry to develop healthy food products that children repeatedly want to consume.

Children have an inborn preference for sweet and an aversion for bitter taste as suggested by facial expressions of newborns,<sup>1</sup> and ingestive and sucking behaviour.<sup>2</sup> Preference for sweet taste remains high throughout childhood and decreases when adulthood is reached as shown by longitudinal studies.<sup>3,4</sup> Hypothetically, children's high preference of sweetness reflects their energy need for rapid growth and development, which is reflected by the positive correlation between preference for sweetness and bone growth biomarkers in teens.<sup>5</sup>

Despite children's general high preference for sweet taste, large variation in sweet taste sensitivity due to genetics and exposure does exist.<sup>6</sup> Observational studies suggest that children who prefer high sweetness as tested in a sensory lab also consume more sweet foods such as sugar-rich pudding and beverages than those with preferences for lower levels of sweetness.<sup>7,8</sup> However the link between children's sweet preference and subsequent sugar consumption from the diet is much debated. Changes in sugar consumption and availability of



sugar in the food supply do not relate to changes in children's preference for sweet taste, which has been remarkably stable over the past 25 years.<sup>9</sup>

In contrast to sweet taste, infants have an inborn aversion to bitter taste.<sup>10</sup> Many toxic substances in nature have a bitter taste, which can explain the natural avoidance of bitter substances by children. The variation in children's strong dislike for bitter foods, such as cruciferous vegetables, can partly be explained by differences in their genetic make-up. During the lifespan we learn to appreciate bitter taste in a select number of foods such as coffee and alcoholic beverages. Many of these bitter tasting foods that we appreciate as adults combine the bitter taste with

a positive feeling during and after consumption, which is likely one of the mechanisms through which we learn to appreciate tastes (and flavours) that were initially rejected.<sup>11</sup>

Other differences between children and adult taste preferences are evident with sour and salty tastes. Roughly one-third of children like extreme sour foods, which potentially relates to children's thrill-seeking behaviour<sup>8,12,13</sup> and is partly influenced by genetics.<sup>14</sup> The number of studies investigating salt preferences of children is limited. It has been suggested that children have a high liking for salt (NaCl) in foods<sup>15</sup> and that children prefer a higher salt concentration in foods than adults.<sup>16,17</sup> Although not conclusive, some studies

suggest a positive association between children's liking for salt taste and the amount of sodium in their diet,<sup>17</sup> or the consumption of certain salty fast food.<sup>18</sup>

The majority of sensory research with children applied simple sensory tests such as rank-order and pairwise comparisons to measure preference and liking.<sup>19,20</sup> These methods take into account children's limited attention span, reading comprehension and bias toward answering all questions in the affirmative way (e.g. do you like this sample...Yes. Do you like the other sample....Yes).

Although children as young as four years have been shown to provide reliable preference data, caution needs to be taken when asking children below the age of five years more analytical type questions, such as taste intensity and recognition. In one of our earlier studies, we found that although four-year-olds had difficulties with ranking sweet intensity of a series of sweet solutions, they had no difficulty with ranking these same solutions according to their preference.<sup>21</sup> This is most likely due to four-year-olds' limited grasp of the concept "sweetness", rather than a lower sensitivity to sweetness.

Analytical sensory tasks require more cognitive effort and because of children's limited cognitive ability as well as attention span, these task can be challenging.<sup>22</sup> A child-friendly instruction that keeps children intrinsically motivated to continue paying attention during the test has been shown to improve the reliability of such a test with children as young as six years.<sup>23</sup> Several studies investigated the use of descriptive sensory methodologies such as CATA, and rapid profiling with mixed success. The consensus is that the reliability of such methods performed with children is questionable as it is not reliable for children below the age of eight years.<sup>24</sup>

It is important to take into account that most taste preferences are learned and shaped by repeated exposure,<sup>25</sup> so good sensory tests should be designed accordingly. Products that are initially liked by children might suffer from boredom once they have been tried

on several occasions. This was shown in a study where children consumed different snack foods daily for three weeks, suggesting that the initially most liked product also decreased the most in liking during a three-week consumption when compared to the initially less liked products. To our knowledge, many sensory tests with children fail to test children's changing liking for newly developed products.

Overall, more attention needs to be given to sensory marketing to children. The integration of what we see, feel, hear, taste and smell is mostly a result of experience and learning, which rapidly takes place during childhood. Understanding how this integration is learned might enable us to optimise products children repeatedly desire to consume.

Sensory testing with children can be challenging, but understanding the key driver of children's repeated food consumption is instrumental for market success.

*Dr Gie Lim is a Professor at Centre for Advanced Sensory Science (CASS) Deakin University, Australia.*

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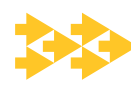
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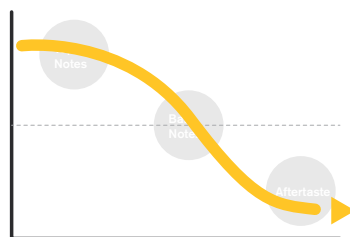
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# SENSORY AND CONSUMER RESEARCH UPDATE

Overview of the latest research in sensory and consumer science.

Words by Drs Russell Keast, Gie Liem, Megan Thornton and Sara Cicerale

## Thin sculptures – a dieting aid?

Thin, human-like sculptures (by Swiss artist Alberto Giacometti) present in a food consumption situation have been found to facilitate the reduction of unhealthy food intake and promote healthy snack choices in a small number of studies. However, the process behind this Giacometti effect, remains largely unknown and the current study set out to investigate this phenomena.

Members of a sensory consumer panel (n=128, mean age 46 years, 73 per cent female) participated in a chip tasting session within a laboratory setting. The chip tasting acted as the cover story for the study. A 2 (cue vs. no cue) by 2 (high vs. low cognitive load) between subjects design was employed. Approximately half of the consumer panel participated in the cue condition, where they were exposed to computers containing screensavers projecting thin, human-like sculptures by Alberto Giacometti (1901-1966) within the sensory booths they were seated in. The other half of the participants were exposed to computers projecting static white screensavers within their sensory booths. A cognitive load task was also included to investigate the effect of the sculptures in the presences of cognitive resources. Approximately half of the participants were assigned a high cognitive



load activity (memorising a 10-digit number within 30 seconds). The remaining participants received a low cognitive load activity (memorising a two-digit number within 30 seconds).

Upon entering the test room, each participant was seated in a booth. For approximately 30 seconds, the participants were exposed to the screensavers. The participants were then given a cognitive load task of memorising either two or 10 digits. Afterwards, each participant was served 20 chips on a plate. The participants tasted and rated the chips in terms of liking and were instructed to eat as many chips as they wanted. After the tasting, the participants were asked to recall the digits from the cognitive load task. Following the test, participants in the cue condition were asked questions about their recollection of the screensaver and using a 7-point scale, assessed the degree to which they believed the screensaver influenced how many chips they had eaten.

Participants who had been exposed to the Giacometti thin sculpture screensaver were found to consume less chips ( $11.48 \pm 6.18$  g) compared with the participants who had been exposed to the white screensaver ( $M = 14.56 \pm 9.37$  g),  $p = 0.03$ . The Giacometti effect occurred independently of the cognitive load ( $p=0.91$ ). With regards to the level of participant consciousness of the cue and its perceived influence, results

demonstrated that 75 per cent of the participants in the cue condition remembered the details of the cue itself and 97 per cent did not think that they

had been influenced by the screensaver.

In regards to the cue's actual influence for those who recalled it and those who did not, no difference in chip consumption was found between the two groups,  $p = 0.69$ . When the cue, liking of chips, and their interaction on consumption volume were investigated, the Giacometti effect appeared to be facilitated by participants' liking of the chips  $p = 0.04$ . For instance, the Giacometti screensaver had an increasing influence when the participants liked the chips, upwards of 3.81 on the 7-point Likert scale.

In summary, the present study demonstrated that thin, human-like sculptures by the artist Alberto Giacometti, when applied as an environmental cue, facilitated reduced intake of an unhealthy food in motivated eaters. This effect was apparent, even when only few cognitive resources were available. These findings demonstrate the effortless influence of the sculptures. The effortlessness of a cues' influence has been deemed to be a crucial advantage for the effectiveness of dieting cues in complex, everyday settings, where individuals possess limited cognitive resources to deal with a multitude of demands. Therefore, simple, environmental cues such as those discussed, may be able to help individuals achieve their diet and weight goals more effortlessly.

Stämpfli AE and Brunner TA (2016) The art of dieting: Exposure to thin sculptures effortlessly reduces the intake of unhealthy food in motivated eaters. *Food quality and Preference*, 50:88-93.

## Using texture to increase fullness

In a simplistic view, people gain weight when they consume more calories than they burn. People are more likely to start eating when they



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feel their bodies require energy, and terminate food consumption when they feel comfortably satiated. From a physiological point of view one could argue that the more energy dense a food is, the less we need to consume to restore our depleted energy levels. However, the high rates of obesity in the world highlights that our body does not cope well with high energy food, resulting in many people consuming more energy than they require.

The link between calorie contents of a food and perceived satiety upon consumption of these foods is not straightforward. It has been long understood that different nutrient compositions result in different levels of perceived satiety, even if the foods contain the same amount of calories. In general, foods high in protein provide a high level of satiety. Recent studies suggest a positive correlation between the effort involved in chewing the food and perceived satiety. Hypothetically, the longer the food is in the mouth and chewed the higher the sensory oral exposure will be, which impacts feelings of satiety. This could explain why the frequent consumption of sugar-sweetened beverages is being positively correlated with weight gain in both observational studies as well as experimental studies.

A recent study in the journal *Appetite* suggests that in addition to nutrient composition and oral processing time, texture complexity of food might be related to perceived satiety.

To test the hypothesis that texture complexity influences perceived satiety independent of macronutrient composition and oral processing time, researchers from the University of Auckland developed High Complexity and Low Complexity test foods. These foods were only different in complexity and were the same in terms of macronutrient composition, calories and oral processing time required to consume the foods. In the study, 26 untrained consumers were given the test foods in a crossover randomised trial. Test foods were provided in a one mouth-full size format and given as a preload, after which an *ad libitum* test meal was given to estimate participants' level of satiety. Satiety was also measured with a questionnaire, using Visual Analogue Scales, which was



repeated five times in order to track changes in perceived satiety.

The results show slight differences in satiety ratings. When participants consumed the High Complexity food they tended to feel less hungry, reported a lower desire to consume food and a higher feeling of fullness, compared to when they consumed the Low Complexity food. This was in line with the amount of food that was consumed after the consumption of each test food.

Previously, it has been argued that complex foods generate a high level of sensory specific satiety, resulting in people consuming less food when the food is perceived as complex. However, many of those studies did not control for oral transit time. This study now suggests that perceived texture on its own, is able to influence the amount of food people consume. Future studies are needed to investigate if texture manipulation can impact repeated food consumption. Hypothetically the influence of texture on food consumption fades away once consumers had been repeatedly exposed to the high texture foods. Maybe they can only be 'tricked' once.

The outcomes of this study can be used to prevent people from eating too much food, but can also be used when the aim is to make food more morish.

Larsen DS *et al* (2016). Increased textural complexity in food enhances satiety. *Appetite*, 105, pp 189-194



### Fining for finer wine?

The subtle hints of certain fruits, flower or other aromas that we perceive in wine are often due to the vintage, region and aging processes used. However, the use of fining agents, utilised to remove suspended solids to improve juice clarity, stability, or colour, can also affect the aroma chemistry of wines.

Researchers from Auckland, New Zealand, recently investigated how pre-fermentation fining may affect the aroma of Marlborough sauvignon blanc from two vineyards (labelled A and B). In particular, the effects of activated carbon (AC), gelatin (G), polyvinylpolypyrrolidone (PVP), and a mixture of PVPP, bentonite and isinglass (M), were evaluated.

Free run (FR) and press (PF) fraction grape juices were collected, free SO<sub>2</sub> added, and °Brix, pH, titratable acidity, free and total SO<sub>2</sub> and yeast available nitrogen (YAN) were measured. Following the application of fining agents (at concentrations used in the wine industry), fermentation, and bottling, the treated wines (and controls) were each analysed in triplicate across both vineyards, two fractions and all four fining treatments (however, a PVPP triplicate for vineyard B -PF was lost at the bottling stage). Higher than expected fructose levels for vineyard B-FR treatments resulted in

'sluggish fermentations', and vineyard A-FR samples also experienced slow fermentation, potentially also due to high residual sugar content.

Using Gas Chromatography-Mass Spectrometry (GC-MS), standard calibration curves, and either solid phase extraction (SPE) or Headspace-Solid Phase Microextraction (HS-SPME) sample preparation, the wines were analysed for the presence and quantities of varietal thiols and other volatiles. For each aroma compound, ANOVA with Tukey HSD post-test was used to compare the effects of fining agents on the different vineyards and fractions. In total, the presence and quantities of 38 aroma compounds were determined, and compared to their perception thresholds.

Varietal thiols associated with Marlborough sauvignon blanc wines – 3-mercaptopentyl acetate (3MHA, fruity) and 3-mercaptopentyl-1-hexanol (3MH, tropical, fruity) – were unaffected by fining agents in PF wine samples, however 3MH was decreased in FR-AC wines and 3MHA decreased in vineyard B-PF-M wines. However, in all wines these thiols were still found above their perception thresholds. Significant changes in linalool (lavender, lower in AC treatments),  $\beta$ -damascenone (apple or honey, higher in FR fractions), hexan-1-ol (flower, green, lower in PF-AC treatments), and ethyl isobutyrate (sweet, higher in all FR and A-PF-M

wines) were also identified. Changes in other compounds including benzaldehyde (almond), 3-hexen-1-ol (grass), and ethyl isovalerate (apple) were also identified, however these were not significant.

Overall, fining agents affected different aroma compounds, across the different vineyards and fractions in different ways. Therefore, no definitive method or agent could be identified for the least effect on aroma. It was noted that the reduction of linalool, an undesirable aroma in sauvignon blanc wines, could be achieved using AC. It would be interesting to see the effect of these fining agent-treated wines on a trained sensory panel.

Parish KJ, *et al* (2016). Pre-fermentation fining effects on the aroma chemistry of Marlborough sauvignon blanc press fractions. *Food Chemistry* 208: 326-335

### Preference or pleasure

In this study the author used students from the University of Birmingham, UK with the aim of distinguishing between preference for a sample of apple juice and the pleasure experienced consuming the sample. The paper is long and relies on psychophysical theory to establish validity – this can make for difficult reading!

The apple juice was manipulated with added acid or sweetener to create extremes of preference/aversion and pleasure/displeasure. Preference behaviour was assessed in one

experiment, pleasurable experience in another. Ideals and rejection points were calculated for each assessor.

According to the author, the results showed that just four samples were sufficient to estimate ideal points and rejection points for sweeteners in a familiar juice. If this is correct the methodology used must be very good; however it could also be that the concentration ranges used were too extreme and forced the ideal and rejection points.

The methods, results and writing were overly wordy, but the author wanted to make a point that has practical implications for those working in industry. That is that consumers can identify an ideal point and range of tolerance for a sensory characteristic (for example sweetness), and that such measures are central to sensory studies. It is a worthy point to make and is justified for attributes such as sweetness, which are easy for consumers to identify. I doubt whether the approach will work for more complex attributes that make up 90%+ of the characteristics of complex foods. <sup>5</sup>

Booth, D. (2016) I like it preference actions separated from hedonic reactions. *Journal of Sensory Studies* 31 213-232

*Drs Russell Keast, Gie Liem, Megan Thornton and Sara Cicerale are members of the Centre for Advanced Sensory Science at Deakin University, Victoria.*

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## THE GREEN MACHINE

*The days of browning, unappealing avocados may be over thanks to a new Australian invention.*

Tired of paying \$4 for an avocado only to have it brown and spoil within days? That frustration could now be a thing of the past thanks to a revolutionary technology in Queensland that could transform the avocado industry.

Queensland food technologists Frank Schreiber and Jeff Hastings of Naturo-All Natural Technologies have developed a new technology that prevents an avocado's flesh from turning brown, and extends its life for up to 10 days.

Dubbed the 'Avocado Time Machine' as a nod to its life extending powers, the technology uses pressure fluctuations generated by steam to switch off the fruit's enzyme responsible for browning. It took four years of research, testing and development to discover that the offending enzyme, known as Polyphenol Oxidase, responds well to pressure fluctuations from steam, and when applied, can keep an avocado looking fresh and green without any artificial acids or preservatives.

"By understanding the avocado's lifecycle and the complex correlation of enzymes involved in the browning process, we have made it possible for the world to enjoy 100 per cent natural, ready-to-eat avocado slices, dices, chunks or pulped products while retaining the flavour and fresh taste of avocado without browning," says Mr Hastings.

"Although there is a range of avocado products currently on the market, nearly all of them contain additives such as antioxidants, acids and preservatives which not only alter the taste of the fruit but do very little to stop the browning once the packaging is opened," adds Mr Schreiber.

The pair came up with the idea of the 'Avocado Time Machine' after they were approached by avocado farmers, who were looking for ways to extend their product line, add value to their avocado business and stop spoilage of already harvested avocados in a natural way.

That was back in 2013, and now, the company has a worldwide patent and trademark and has secured its first Australian processor, with the first avocado products scheduled for production later this year.

Australia is responsible for around three per cent of the approximately five million avocados produced around the world each year, with our farmgate prices valued at \$180 million. As demand increases around the world, the pair believes this technology will radically change the industry.

The farmers will be able to use all harvested avocados, including the second-grade, undersize and 'ugly' fruit, there is less wastage, spoilage and a higher yield, and the processors will be able to process and exploit more fruit, and for wholesalers, retailers, food service and restaurants, they will be able to offer a constant supply of ripe avocados to their customers.

"It is difficult for people to select, buy and enjoy the perfect avocado because more often than not, the fruit has already deteriorated or started its browning process," says Mr Hastings.

The 'Avocado Time Machine' can process any cut of avocado or avocado pulp, and can churn through 4000 avocados an hour. With less wasted fruit, complete safety compliancy and energy efficiency, the inventors hope this will mean more guacamole for everyone.

"This is a rare win-win-win situation for everybody involved," says Mr Hastings. "It's a win for avocado farmers, a win for the food industry and ultimately a win for consumers." 🍋



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