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food australia

SEPTEMBER – NOVEMBER 2019

OFFICIAL PUBLICATION OF AIFST

70th ANNIVERSARY EDITION

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Ensuring a safe food supply

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September - November 2019

FEATURES

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Food for Thought

Welcome to the Spring edition of *food australia*. We are celebrating a significant milestone for our journal – August 2019 marks the 70th anniversary of the establishment of the journal Food Technology in Australia, the forerunner of today's *food australia*.

Our article "Back in time to read *food australia*" (page 26) takes a look at the food technology landscape in 1949.

In reading through old copies of the journal I came across the following gem from Kenneth Pilcher on the importance of technical literature (Food Technology in Australia, August 1949):

"The time and money spent on technical literature is never wasted – one hint from a journal or a technical book can open whole new avenues for the enterprising professional man – and nowhere in the world is there more scope for new trends than in Australia today"

While we may have access to many other sources of information these days, the importance of technical literature has not diminished over time.

As we celebrate 70 years of technical literature, I would like to acknowledge the contribution of our editors, past and present, writers, advertisers and production teams who have continued to support *food australia* over 70 years.

Fast forward to 2019 and we celebrate the outstanding achievements of our members and the contribution they have made to the Institute, as well as the Australian food industry, as recognised at the 2019 AIFST Convention awards ceremony – turn to page 20 to see our award winners for this year.

In this edition of *food australia*, we continue the Health Star Rating: where to from here? journey with the second instalment of this story (page 30). We also share insights into the sustainable future of food (page 37), the future of safe food (page 38) and the role of food processing technologies to support the needs of future populations (page 41).

And finally, as always, I encourage all members to take an active role in engaging in the Institute. Please talk to us in 2020.

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The state of global food security and nutrition

The United Nations' 2030 Agenda for Sustainable Development puts forward a transformational vision recognising that our world is changing, bringing with it new challenges that must be overcome if we are to live in a world without hunger, food insecurity and malnutrition.

While the world population has grown steadily, many countries have not witnessed sustained growth. The global economy is not growing as much as expected and various factors, including conflict and climate change, have led to major shifts in the way food is produced, distributed and consumed and created new food security, nutrition and health challenges.

The recently released report, *The State of Food Security and Nutrition in the World*, is the third the FAO has produced.

Recent editions of the report showed that the decline in hunger the world had enjoyed for over a decade was at an end, and that hunger was again on the rise. This year's report shows that the prevalence of undernourishment on a global scale has stabilised, but the absolute number of undernourished people continues to increase.

The report notes that if current trends continue, 2030 Sustainable Development Goals and 2025 World Health Assembly targets won't be achieved, and concludes that actions to tackle these trends need to be bolder.

The number of people who suffer from hunger has **SLOWLY** increased

More than

820 MILLION

people in the world were still hungry in 2018

Hunger is on the rise in almost all African subregions, making Africa the region with the highest per capita prevalence of undernourishment at almost

20%

Western Asia shows a continuous increase since 2010 with more than

12%

of its population UNDERNOURISHED

Hunger is also slowly rising in Latin America and the Caribbean, although its prevalence is still below

7%

It is estimated that over

2 BILLION

people do not have regular access to safe, nutritious and sufficient food, including 8% of the population in Northern America and Europe

In 2018, an estimated

40 MILLION

children under five were OVERWEIGHT

One in seven newborns, or

20.5 MILLION

babies globally, suffered from LOW BIRTHWEIGHT in 2015

No progress has been made in reducing low birthweight since 2012

With 149 MILLION children still stunted, the pace of progress is too slow to meet the 2030 target of halving the number of stunted children

OUT OF 65 COUNTRIES WHERE RECENT ADVERSE IMPACTS OF ECONOMIC SLOWDOWNS AND DOWNTURNS ON FOOD SECURITY AND NUTRITION HAVE BEEN STRONGEST, 52 RELY HEAVILY ON PRIMARY COMMODITY EXPORTS AND/OR IMPORTS

Carbon neutral cattle

North Australian Pastoral Company (NAPCo)'s newly launched premium beef range, Five Founders, has raised the stakes and released Australia's first to market carbon neutral beef.

The range was officially certified as 'carbon neutral' after meeting the Australian Federal Government's strict criteria, a certification process that took 12 months.

NAPCo's CEO Phil Cummins said the move to launch a sustainable beef product was to satisfy the appetite of the environmentally conscious consumer and lead the pack in the beef industry.

"Foodies are becoming increasingly conscious of what they are dishing up, especially among younger generations such as millennials - not only do they want an excellent eating experience, but one that respects their affinity for sustainability and animal care," Mr Cummings said.

"We launched Five Founders to meet the demand of the mindful meat-lover and instil confidence in consumers that they can reduce the environmental impact of their dietary choices while enjoying a delicious steak," he said.

In addition to their carbon neutral practices, Five Founders is also delivering a sustainable approach to consumption by making use of the whole carcass across the range.

Founded in 1877, NAPCo is one of Australia's largest and oldest cattle producers, managing around 200,000 head of cattle across Queensland and the Northern Territory.

Five Founders' carbon conscious cuts are already proving popular at iconic Brisbane restaurants and will be available in gourmet butchers and delis in Australia, China and Singapore, before expansion to other markets.

Agribusiness precinct for western Sydney aerotropolis

The western Sydney aerotropolis is set to become greater Sydney's newest economic hub.

The NSW Department of Primary Industries (DPI), in collaboration with the Western City & Aerotropolis Authority (WCAA), has conducted a feasibility study to identify what a world-leading agribusiness precinct might look like.

The study found an agribusiness precinct, adjoining the new western Sydney international airport, currently under construction, could support the production of sustainable, high-quality fresh produce and pre-prepared consumer foods and bring opportunities to existing and new businesses, markets and products.

With a direct link to the freight operations of the new airport, an agribusiness precinct has the potential to enable delivery from farm gate to international consumer plate within 24 hours. The study found, with increasing demand for fresh food from both domestic and overseas markets, an integrated intensive production hub at scale could transform fresh food production in Western Sydney and Australia.

Further information can be found at: wcaa.sydney/agribusiness-precinct

Mars' Seeds of Change accelerates innovation

Alex Blow, R&D Innovation Manager at Mars Food Australia and program lead for the Seeds Of Change Accelerator, addressing finalists at the pitch event.

Mars Food Australia has selected six innovative food start-ups to take part in its inaugural Seeds of Change Accelerator program.

The finalists include start-ups focused on edible bugs, Australian native superfoods, meats based on shredded shiitake mushroom stems, fermented foods, plant-based cheeses and ready-made meals for better mental health.

The Seeds of Change Accelerator is designed to help early stage Australian food-focused start-ups fast track growth and build a healthier and more sustainable future. A panel of expert judges chose the final six start-ups from 15 finalists shortlisted from 224 applicants received nationwide.

In addition to a grant of up to $40,000, each of the final six start-ups will undertake a tailored four-month program to help tackle the biggest individual challenges to their business growth, whether that's branding, product development, market intelligence, sales or supply chain.

Mars Food Australia research and development director and program mentor, Peter Crane, said the world is changing at a rapid pace.

"Consumer needs are evolving and new approaches and technologies are transforming the food business. We hope this accelerator acts as a catalyst to help forward-thinking innovators bring their purpose-driven food-focused visions to life," Mr Crane said.

Manuka honey most trusted

Natural healthcare company Manuka Health New Zealand has retained its position as the 'most trusted honey brand' in Australia after earning the most votes in the *Reader's Digest Most Trusted* awards for the second year running.

The brand has enjoyed several consecutive years of recognition, featuring amongst the top three honey brands in these awards since 2016. The brand received highly commended in 2016 and 2017 and was awarded the 'most trusted honey brand' in 2018.

This year's trusted brands survey polled more than 3,000 members of the Australian public asking for their votes and feedback on consumer products in more than 70 categories.

Kate Kember, general manager, marketing at Manuka Health, said: "Our company continues to be driven by a desire to use science to unlock the real potential of New Zealand bee products and we are looking forward to building on the success of our honey range with more natural health solutions over the coming months."

All about allergens

A potentially life-saving online food allergy training program is now available free of charge for cooks and chefs.

The training is funded by the Australian Government Department of Health and was launched in July this year by the National Allergy Strategy, a partnership between the Australasian Society of Clinical Immunology and Allergy (ASCIA) and Allergy & Anaphylaxis Australia (A&AA).

Developed in conjunction with chefs and cooks with experience in commercial kitchens, "*All About Allergens: The next step for cooks and chefs*" focuses on food preparation, handling and storage, and highlights the importance of effective communication between the kitchen and other staff and consumers with food allergy.

Associate Professor Richard Loh, co-chair of the National Allergy Strategy and past president of ASCIA, said food allergy rates are continuing to rise in Australia.

"We know the majority of fatalities from food-induced anaphylaxis occur when people are eating out which is why eating out is an area of focus for the All About Allergens training program," Associate Professor Loh said.

"We had great uptake of the first stage of the free All About Allergens program for people in the food service industry, so we've developed this next stage specifically for cooks and chefs to maximise their understanding of food allergies and hopefully reduce the number of food-induced allergic reactions we see," he said.

The first All About Allergens online food allergy training program has seen almost 11,000 food service industry workers enrol in the course from all over Australia since its launch in July 2017. This next stage of the training program provides information specific to cooks and chefs and aims to educate on the safest way to handle, prepare, cook and store food to prevent food-related allergic reactions.

The new training program is offered in two versions, one for general food services such as restaurants and cafes, and one for camp food services such as school camps or sports camps.

Maria Said, CEO of A&AA, believes the responsibility for helping prevent allergic reactions lies on both sides.

"Hospital admissions for food-induced allergic reactions have increased five-fold over the past 20 years, and fatalities from food-induced anaphylaxis are increasing by about seven per cent every year," Ms Said commented.

"While we know that food allergen management in kitchens needs to improve, we're certainly not wanting to point the finger at cooks and chefs. What we do want to do is encourage a sense of shared responsibility when it comes to preventing episodes of anaphylaxis and food-related allergic reactions," she said.

Some of the most common causes of food-related allergic reactions in commercial settings are:

- Wait staff not communicating the customer's food allergy to cooks and chefs
- A chef or cook not checking ingredients in a garnish
- Using utensils across multiple food types, including knives, tongs and spoons
- Suppliers changing ingredients without informing the kitchen staff
- Customers not clarifying whether their request is due to an allergy, intolerance, or that they simply dislike something

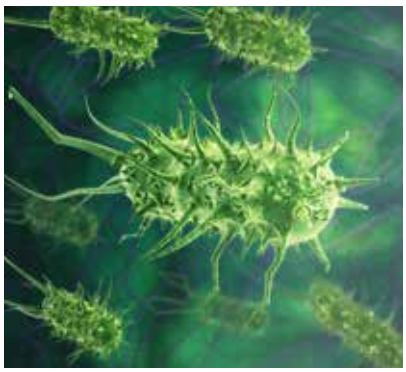
Further information can be found at *www.foodallergytraining.org.au*

New capsule samples microbiota in the gut

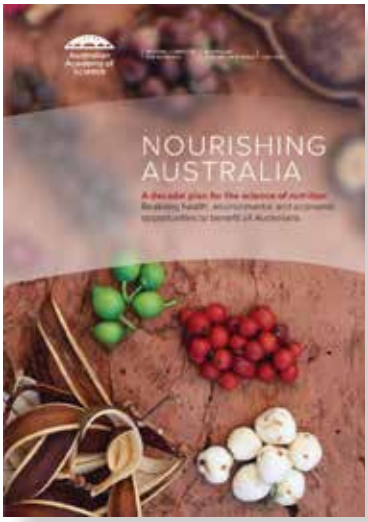
DuPont Nutrition & Biosciences has partnered with BioMe Oxford and the University of Sheffield's Advanced Manufacturing Research Centre (AMRC) to speed up development of an orally delivered capsule that can sample gut microbiota in both humans and animals.

BioMe Oxford, an early stage start-up in Oxford in the UK, has been developing the new BioCapture technology to provide unique insights into the impact live microbes and other microbiome modulators have on gut microbiota in the gastrointestinal tract.

BioMe Oxford co-founder and CEO, Dr Soren Krogsgaard Thomsen, said targeted and minimally invasive sampling using BioCapture has the potential to open up new areas of microbiome research by enabling routine access to previously unchartered territories.



Action needed to better understand Australian diets



A 10-year plan for better understanding Australian diets - *Nourishing Australia: a decadal plan for the science of nutrition* - has recently been launched by the Australian Federal Minister for Agriculture, Senator Bridget McKenzie.

The plan addresses questions such as what does the typical Australian diet look like; how can it be improved - from paddock to plate to target health and wellbeing for all Australians at all ages; and how can consumers make sense of the blizzard of unreliable and conflicting nutrition advice.

The plan identifies four essential areas where the science of nutrition will contribute to enhancing the health of Australians:

1. Social factors that determine dietary choices
2. Nutrition mechanisms underpinning healthy and productive lives
3. Precision and personalised nutrition that account for differences between people
4. Education and research training to ensure that Australians are empowered to make knowledgeable dietary choices.

The plan goes on to outline how these four pillars will generate a greater understanding of why individuals make the dietary choices they do, and how new knowledge of nutritional genomics and individualised nutrition therapies can be developed. It recognises that Australians are hungry for information about nutrition, healthy foods and dietary patterns, and the effects they have on the body.

Chair of the Academy's National Committee for Nutrition, Professor Mike Gidley from the University of Queensland, said Australia does not currently have large-scale longitudinal data on food intake, nutrition status and relationships with societal determinants and health outcomes for its population.

"There is an urgent need to utilise new tools and digital technologies to assess the national diet on a population-wide scale," Professor Gidley said.

A copy of the decadal nutrition plan can be downloaded from the Australian Academy of Science website, www.science.org.au, under the Science Policy and Analysis section.

AFR awards recognise food and beverage manufacturers

Five food and beverage companies were voted the top ten most innovative manufacturing and consumer companies in Australia in the annual Australian Financial Review BOSS Most Innovative Companies Awards.

Freedom Foods Group came sixth in the most innovative companies category and also won Best Manufacturing and Consumer Goods Innovation Program for Like Milk. This product is the first plant-based beverage in Australia to be made using pea protein, formulated with the same level of calcium and protein as full-cream dairy milk, but with zero fat and lower levels of sugar.

The other food and beverage manufacturers recognised in the most innovative companies category were Carlton United Breweries for its non-alcoholic beer Carlton Zero, Twinings for its new range of fruit-flavoured infusions designed to be used in cold water, Brownes Dairy for their Top Down Yoghurt and De Bortoli Wines which came tenth for their De Bortoli Rosé.

Australian food safety week gets cracking

The Food Safety Information Council (FSIC) will host the 23rd Annual Australian Food Safety Week from 9 to 16 November 2019 with a new theme - 'excellent eggs - handle them safely'.

This year's theme was chosen to support the Food Regulation Forum which has made reducing the high rates of foodborne illness from *Salmonella* in Australia one of their three-year priorities.

FSIC has set up a project to improve the safety of eggs among food handlers with a focus on educating the Australian community about safe handling.

FSIC will be carrying out consumer research regarding the consumption of raw egg dishes as well as consumption of eggs with runny yolks such as soft boiled, poached and fried.

FSIC recommends vulnerable people, such as pregnant women, the elderly and immune compromised, do not consume raw or minimally cooked egg dishes because of the risk of potential contamination. Instead, eggs should be cooked so the yolk starts to thicken, and scrambled eggs or omelettes should be cooked until the egg becomes set.

Another option is to use pasteurised eggs.

FSIC is keen to hear from any industry members who would like to become more involved. Contact the FSIC team via email info@foodsafety.asn.au or visit their website foodsafety.asn.au where you can subscribe to their e-newsletter to keep up-to-date with news on this initiative and share it with your networks.

Australians embrace solo dining

Solo dining has become a primary industry driver in Australia for three consecutive years, according to the latest trends report by *Consumer Reports on Eating Share Trends* (CREST), released by global research company The NPD Group. The report shows that dining out solo accounts for 40 per cent of traffic share within the food service industry.

Gimantha Jayasinghe, deputy managing director, APAC, at The NPD Group, said the modern time-poor population sees solo dining as a way to eat alone and avoid having to make dining arrangements.

"The latest Census data shows there's been a rise in single households to almost one in four, so all signs are pointing to the necessity, the ease and convenience of eating out alone," Mr Jayasinghe said.

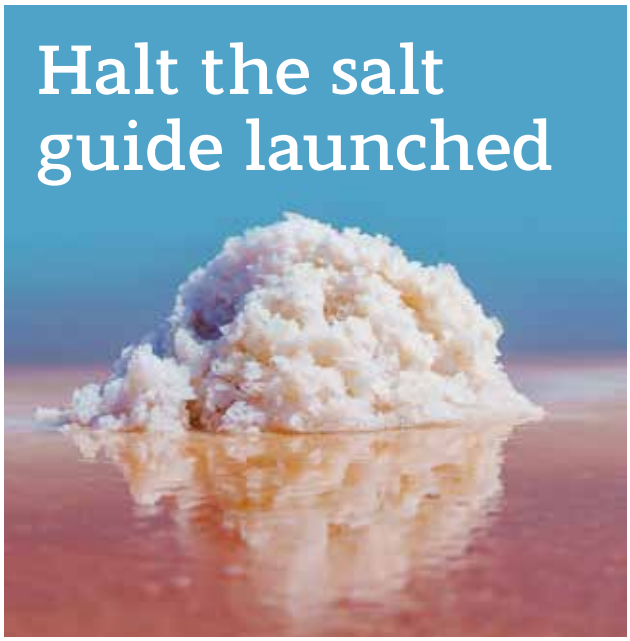
Solo dining is still primarily off-premises led by 'on the go' consumers. On premises holds 41 per cent traffic share and 70 per cent contribution to growth (CTG), with off-premises holding 59 per cent traffic share and 30 per cent CTG respectively.

"Solo dining is a very different occasion to group meals and should be approached differently. Those in the industry need to consider the solo diner across all elements of their food service offering in order to harness the growth of this market," Mr Jayasinghe said.

"Restaurant layout, individualised experiences and engagement, menu development, portion size, packaging and waiting times all play critical roles in meeting the demands of this area," he said.

NSW and Victoria have experienced the most growth in the solo dining space, with NSW taking 35 per cent traffic share and 42 per cent CTG, compared to Victoria with 31 per cent traffic share and 42 per cent CTG over a three-year period, demonstrating that solo dining occasions are concentrated in high population metro areas.

Halt the salt guide launched



Australia's first salt reformulation guide for food manufacturers has been launched jointly by the Heart Foundation and VicHealth.

The guide, *Reformulation Readiness: A best practice guide to salt reduction for Australian food manufacturers*, supports reduction of sodium in processed and packaged products.

It guides manufacturers through the reformulation process and includes information on checking nutritional composition, completing competitor benchmarking, establishing salt targets and timeframes, product improvement and testing.

Heart Foundation CEO, Victoria Kellie-Ann Jolly, said excess salt consumption can lead to high blood pressure, yet Australians are consuming nearly double the recommended daily salt intake of less than a teaspoon.

"One in three Australians suffer high blood pressure, which puts them at risk for heart attack, stroke and kidney disease. The biggest contributor of salt in our diets is through processed and packaged foods, so it's easy for people to consume too much salt without realising it," Ms Jolly said.

VicHealth acting CEO, Dr Lyn Roberts AO, said salt reformulation strategies are a 'best buy' for improving Australia's health.

"Australian manufacturers are making some progress with salt reduction but overall we are lagging," Dr Roberts said.

"The UK has one of the lowest salt intakes of any developed country and this has been achieved through a robust and effective reformulation program," Dr Roberts said.

The UK has seen a 15 per cent reduction in the average population salt intake across a decade, and estimates suggest this has prevented more than 9,000 premature deaths a year.

The full guide can be found at *unpackthesalt.com.au/salt-reformulation-in-australia*

Nexba breaks record for crowdfunding

Nexba, an Australian naturally sugar free beverage brand, completed its first significant round of venture capital financing through crowdfunding platform VentureCrowd, breaking records for Australia's largest non-tech crowdfunding raise.

The brand has launched into the UK after raising $6M in this first 'Series A Round' funding success. The crowd-funding element comprised almost $1.5M of the total $6M. The remaining $4.5M in funds came from a variety of private investors.

Nexba saw gross revenues up 148 per cent in the last financial year after launching new product ranges such as kombucha and probiotic water. The number of Australian households buying Nexba products has also increased to 460,000, a 202 per cent increase year on year.

Steve Maarbani, co-founder of VentureCrowd, said he was impressed with the level of interest and calibre of investors which ranged from business leaders to ordinary everyday investors.

"It shows the resonance Nexba has with the market and reinforces growing consumer demand for better-for-you food and beverage products," Mr Maarbani said.

Troy Douglas, Nexba co-founder and global CEO, said: "Our success has been achieved by staying true to our core purpose of combating the health risks caused by both sugar-laden and artificially-sweetened drinks."

The financing will support Nexba's global expansion plans, with a key focus in the UK. In 2018, Nexba inked a partnership with the UK's third largest retailer, Sainsbury's, as part of its 'future brands' initiative, which saw Nexba products rolled out to large-format stores nationwide.

Plant protein extraction moves into commercial production

Construction of Australia's first major commercial plant protein extraction facility commenced in July after securing investment from Melbourne-based food manufacturing business Scalzo Foods.

Australian Plant Proteins (APP) will begin the $20M fit-out of its plant at Horsham in Victoria's Wimmera region with commercial production due to commence in early 2020.

APP, formed by investment firm EAT Group in 2016, has developed a proprietary extraction process to create high-protein powders from pulses which can be used across a broad range of food and beverage categories.

The company already operates a small production and R&D facility in Werribee in Melbourne's west, but company director and co-founder, Brendan McKeegan, said this investment provided both the capital and distribution capabilities to meet APP's target of full commercial production in early 2020.

"APP's process yields an extract containing more than 85 per cent protein," Mr McKeegan said.

"This is far higher than many other alternative protein sources and, combined with favourable sensory and taste elements, has enabled APP to generate significant local and international demand for the product. It can be a key ingredient for a range of foods and beverages including meat alternatives, protein bars and shakes, snack foods and non-dairy beverages."

"APP's initial focus for commercial manufacturing will be fava beans, which are commonly used by grain growers as rotational crops to replenish nitrogen in the soil, making this a great story at both ends of the food supply chain," Mr McKeegan said.

Health Star Rating five year review

A five year review of the Health Star Rating (HSR) system has been completed, with the final review report being tabled at the meeting of the Australia and New Zealand Ministerial Forum on Food Regulation on 16 August 2019. The forum comprises all Australian and New Zealand Ministers responsible for food and the Australian Local Government Association, and is chaired by Senator the Hon Richard Colbeck.

The review considered if, and how well, the objectives of the HSR system have been met.

It found that the HSR system has been performing well, and while there is a broad range of stakeholders with diverse opinions, there is also strong support for the system to continue. It also identified several options for improvements to the system, including communication, monitoring, governance and system/calculator enhancements.

Key recommendations from the review report include:

- The HSR system continue as a voluntary system with the addition of some specific industry uptake targets and the Australian state and territory and New Zealand governments support the system with funding for a further four years
- Changes should be made to the way the HSR is calculated to better align with dietary guidelines, and fruit and vegetables included into the system
- Some minor changes should be made to the governance of the system, including transfer of the HSR calculator to Food Standards Australia New Zealand.

At the 16 August meeting, the forum also considered reduction of chronic disease related to overweight and obesity, fast food menu board labelling, fermented beverages and salmonella enteritidis, and announced a review to consider mandatory 'added sugar' labelling.

It's expected that the forum will respond to the HSR review report and its recommendations before the end of 2019.

Growth opportunities for Australian food and agribusiness

CSIRO's strategic advisory arm, CSIRO Futures, has valued the full range of opportunities identified in their Food and Agribusiness Roadmap released in July 2017.

The original roadmap was produced to support Australian food and agribusiness in its transition to a collaborative, growth oriented, high value-adding and differentiated sector. This new economic analysis updates the sector's opportunities and potential market size.

CSIRO estimates the opportunities identified by the Roadmap could be worth $25 billion by 2030. The goal to grow our share of emerging food markets complements the National Farmers' Federation strategic target to reach $100 billion in farm gate output by 2030, which similarly expects a growth rate of approximately four per cent per annum.

This growth will require investment in science and technology to create the next wave of products and services that will meet the needs of tomorrow's global customers. The opportunities identified are driven by growth in Asian-Pacific markets and consumer preferences for sustainable and natural foods.

One of the largest chunks of the $25 billion pie is fortified and functional foods. This opportunity includes foods and beverages that contain added health ingredients and nutrients for nutritional benefits. Examples include probiotics and omega-3 oils added to yoghurt and milk and antioxidant rich breads, cereals and beverages.

Alternative proteins, foods that are consumed as substitutes to meat, could see high growth with products such as plant proteins and emerging opportunities such as insect-based ingredients which are becoming more popular.

Convenience meals such as pre-prepared or frozen packaged meals sold by supermarkets, grocery stores and other home delivery ready meal services is likely to be another high growth sector.

Growth in the sector will require continued innovation and investment

by all players in the food industry. The 2017 Roadmap outlined five key growth enablers:

- Traceability and provenance
- Food safety and biosecurity
- Market intelligence and access
- Collaboration and knowledge sharing
- Skills

The full report is available for download from csiro.au/futures

New food brand dedicated to reducing Type 2 diabetes

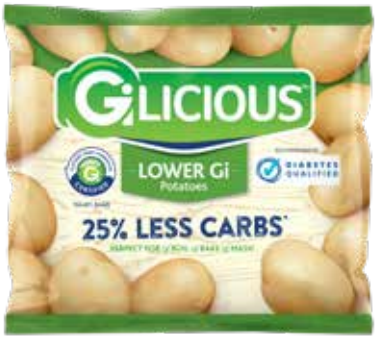
The Glycemic Index Foundation has launched the world's first profit-for-purpose food brand dedicated to preventing Type 2 diabetes and obesity, GiLICIOUS.

The new food brand aims to improve the health of Australians by not only putting a range of better carbs on supermarket shelves, but funding diabetes prevention and education programs from the profits.

The first product in the GiLICIOUS range is a lower GI potato. In addition to being certified lower GI, they have 25 per cent less carbs than regular potatoes and are suitable for people managing their blood sugars. The new lower GI potatoes are recommended by Diabetes Qualified, a wholly owned subsidiary of Diabetes NSW and ACT and the leading accredited training authority for healthcare professionals working in diabetes education and prevention.

Diabetes is a significant health issue in Australia with 1.1 million people currently diagnosed with Type 2 diabetes and an estimated 2 million at high risk, showing early signs of the condition.

The lower GI potatoes are grown by natural cross-breeding of select potato seeds and without the use of



biotechnology. They are lower GI due to their unique starch characteristics which makes them more slowly digested and absorbed, resulting in a lower and slower rise in blood glucose levels.

Australian Institute of Packaging leads new food packaging project

The Fight Food Waste Cooperative Research Centre has formally approved the Australian Institute of Packaging (AIP) Save Food Packaging project.

The AIP will be project leader on the Save Food Packaging criteria and framework 1.2.1 project and work closely with an extensive industry consortium to ensure the guidelines are practical for the industries they will serve.

The Save Food Packaging consortium consists of the AIP as project lead and RMIT as the research partner. Project contributors will be ZipForm Packaging, Sealed Air, Multivac and APCO, while Project Partners are Plantic Technologies, Result Group and Ulma Packaging.

An Extension Network will consist of the Australian Food Cold Chain Council (AFCCC), the Australian Packaging Covenant Organisation (APCO), the Australian Food and Grocery Council (AFGC) and the Australian Institute of Food Science and Technology (AIFST).

The Save Food Packaging design criteria and framework will integrate current research literature with industry knowledge regarding the functional properties and role of packaging in saving food being wasted.

Whilst the primary functions of packaging are to contain and protect the content, as well as providing information about the product, the role of packaging in reducing food waste needs to be better understood by food producers, manufacturers, brand owners, retailers and consumers.

From field to fork there are several possibilities for food loss and waste to occur. It is estimated that up to 30 per cent of the edible food produced does not reach the fork, and packaging's role in reducing food waste is the next challenge for packaging technologists, designers and engineers.

Using the combined industry networks of the AIP and all other organisations involved in the project, the outcome will be packaging design criteria and communication material leading to better packaging design, material selection and format selection to help retail, food service and consumers minimise food waste.

This current project will focus on Australia and New Zealand, however, future projects will look to other countries through the World Packaging Organisation.

Alternative seafood

Alternative meat has been on the food industry's radar for some time, but now two start ups have developed alternatives to traditional seafood to extend the meat replacement options available.

Overfishing, pollutants such as microplastics, and use of antibiotics in farmed fish are some of the reasons why seafood consumption poses environmental challenges.

In light of this, and with seafood being a main source of animal protein in many developing countries (providing over 50 per cent of the animal protein consumed in some regions) the search for alternatives is coming to the fore.

As with alternative meat with its cell or plant-based options, there are two main approaches to developing alternative seafood products. One approach uses plant materials to mimic the taste and structure of seafood, while the other works by brewing cells in a lab to grow seafood products.

Two companies, Prime Roots and Shiok Meats, have recently received funding to develop their alternative seafood products.

Previously known as Terramino Foods, California-based Prime Roots uses koji, a mold that's a key ingredient in soy sauce and miso, to culture its protein. The structure of the resulting protein replicates the texture of a seafood or meat product, while flavour and other nutrients come from added algae and plant-based ingredients. This approach has enabled the company to create salmon burgers, crab cakes and tuna chunks. Prime Roots plans to launch its products in early 2020.

Singapore-based Shiok Meats grows cell-based shrimp by taking shrimp stem cells, with their high regenerative capacity, and brewing them in a specific medium, growing them into meat. Shiok's initial products are shrimp, lobster, and crab meat. The company expects to move into mid-scale production (around 300 kg per month) by March 2020.

According to Nielsen, the alternative-meat market is currently still tiny at under 1 per cent of the overall retail meat market in the United States in 2018, with global market estimates coming in much lower. However, according to Barclays analysts, the market for alternative meat can reach $140 billion over the next decade. That rapid pace of growth implies the animal-free industry could capture about 10 per cent of the $1.4 trillion global meat industry by 2030.

Mark Barthel joins the fight on food waste

The Fight Food Waste Cooperative Research Centre has partnered with Woolworths and Food Innovation Australia Limited (FIAL) to bring international sustainable food systems expert Mark Barthel to Australia to help develop a solution to the growing problem of food waste.

Mr Barthel brings with him a 25 year track record of fighting food waste in the UK with brands including Tesco, Amazon, Walmart, Marks and Spencer and Nestle, and international organisations such as the Waste and Resources Action Programme (WRAP), the World Economic Forum and the Food and Agriculture Organisation of the United Nations (FAO).

According to the recently released Australian National Food Waste Baseline report, 7.3 million tonnes of food is wasted each year in Australia. Nearly half of this still ends up in landfill.

"Preventing food waste entering landfill in Australia would be the equivalent of taking over 1 million cars off the road in terms of its environmental impact," Mr Barthel said.

Mr Barthel will work on a roadmap for Woolworths that will see them engage with suppliers, customers and community partners to tackle the food waste issue. He will also work with FIAL to establish a voluntary agreement program with Australian businesses as part of the National Food Waste Strategy.

New chair for FIAL

Food Innovation Australia Limited (FIAL) has appointed Michele Allan as its new chair.

Ms Allan has served on the FIAL board since 2015 and is well equipped for the role. She has an academic background in biomedical science, management and law, and experience working in the food and agribusiness industry encompassing leadership roles in both private and public organisations such as Bonlac Foods, Meat and Livestock Australia and Charles Sturt University.

Ms Allan will work with FIAL's Managing Director, Mirjana Prica, in leading the organisation to the next phase of growth.

New focus on nutrition at Virbac Australia

Virbac Australia has appointed Australian livestock nutrition and production expert, Dr Paula Gonzalez-Rivas, to their team.

Dr Gonzalez-Rivas brings a wealth of experience in animal nutrition to the animal health company.

A veterinarian from Chile, she has a masters in animal studies from the University of Queensland and a PhD in agricultural sciences. Dr Gonzalez-Rivas also brings five years' experience in small and large animal practice in Chile and six years' experience in research applied to nutrition and heat stress in ruminants.

During her research career, Dr Gonzalez-Rivas conducted cutting edge research into the relationship between nutrition, the environment and livestock production. Her masters focussed on northern beef phosphorous deficiencies.

Her PhD focused on heat stress amelioration in ruminants using nutritional approaches, and her post-doctoral fellowship explored the effects of heat stress on meat quality in feedlot cattle.

As part of her new role with Virbac, Dr Gonzalez-Rivas plans to spearhead trials to investigate the benefits of multimin (nutrition supplement)

under Australian conditions. She will also investigate potential new benefits of Multimin in other areas of animal health and production, present seminars, and attend meetings and roadshows to share her knowledge with Australian producers, vets and other industry professionals.

With Australian producers continuously placing more importance on nutrition, Dr Gonzalez-Rivas's appointment is part of a goal to provide the industry with expert trace mineral advice and solutions for all stages of production, particularly during periods of high demand and in a constantly changing environment.

Nigel Barrett volunteers with Australian International

After a long career in R&D in the Australian food industry, Dr Nigel Barrett has taken up residence in Vietnam where he will work as a volunteer through the Australian Volunteers Program, part of the Australian Government's aid program.

Dr Barrett is working with Fargreen, a social enterprise which seeks to improve the lives of rural communities through building a sustainable new farming model.

Currently, millions of tonnes of rice straw is burnt across Asia, causing pollution and health issues. In Fargreen's model the straw is harvested and used to grow mushrooms. Dr Barrett will be helping Fargreen improve their quality systems and production processes.

Vale Peter Rutledge *words by Brigitte Cox*

Peter Rutledge was a great contributor to the AIFST. He enjoyed attending AIFST Conventions, was very active in the Food Engineering Group and also chaired the Convention Committee in 2002. Sadly, Peter passed away on 6 June, 2019.

After graduating with a Food Technology Degree at Sydney Technical College in the late 1950s, Peter joined the CSIRO Division of Food Preservation and Transport at the Homebush Laboratory. He worked with the then Food Canning Group carrying out a range of food processing projects.

Along with Bob Mitchell, Peter was influential in developing the Maturometer, a portable instrument that could predict the optimum time to harvest peas for the canning and frozen food industries without going through a tedious and slow wet method. He also worked with Dr Don Casimir to develop the flame steriliser, a gas-flame based continuous system that could be used to produce commercially sterile canned foods.

Peter was essential to the successful implementation of Peter Board's 'Approved Persons' course. Many food technologists were trained through this course which was responsible, in part, for the international high regard for Australian canned food.

Peter was a gifted teacher and demonstrator of the skills required to ensure canned food was processed safely. The adequacy of thermal processing is critically dependent on the correct positioning of thermocouples. Peter's expertise ensured that students of the Approved Persons course were not only familiar with the pitfalls of incorrect measurements but also able to correctly place the thermocouples. His practical demonstrations were well received by the students.

During his time in CSIRO, he assisted industry with many issues of thermal processing, either involving equipment operation or determining safe heat processing schedules for canned and pasteurised foods. However, his skills were not just limited to heat processing. Peter solved many processing issues for the Australian and international food industries.

In 1980 Peter won a CSIRO Overseas Study Award to Campden Food and Drink Research Association for six months to study the function of a research association. As a result, Peter produced two book chapters, Preparation Procedures in the book *Vegetable Processing* and Production of Non-Fermented Fruit Products in *Fruit Processing*, both edited by Dr D Arthey.

Ian Jenson takes on new role

Peter Schutz, Chair of the AIFST (left), with Ian Jenson.

Ian Jenson has been appointed chair of the International Food Protection Issues Professional Development Group which is part of the International Association for Food Protection (IAFP).

Professional Development Groups (PDGs) are special interest groups within the IAFP which are designed to provide a forum for discussion on issues of interest to the international food protection community.

In addition to sharing information amongst members, the PDGs contribute by encouraging international perspectives on topics discussed at annual meetings and organising annual meeting symposia on topics such as international trade, harmonisation of methods and equivalence of food safety systems.

Angeline Achariya joins Simplot Australia

Angeline Achariya has recently joined Simplot Australia as Executive Director for Innovation Growth. She will focus on the seed to plate path and support Simplot Australia in its future innovation and growth across its current brands and emerging opportunities in Australia, NZ and Asia.

Ms Achariya said she is excited to join Simplot Australia.

"It's a business I have watched from afar and one that truly aligns with my own personal core values and passion for food. I look forward to partnering and enabling our future growth," Ms Achariya said

Anita Lawrence moves from dairy to academia

Dr Anita Lawrence, former Dairy Australia program manager for nutrition research and science, has been appointed senior lecturer in human nutrition at the University of Melbourne.

Dr Lawrence will be part of a team developing and teaching the university's new bachelor of science and bachelor of biomedical science major in human nutrition.

As a member of staff within the School of Agriculture and Food, she will also be developing a program of nutrition research.

"There are some critical food-related problems that need addressing," Dr Lawrence said.

"Questions such as how to reduce escalating rates of non-communicable diseases, how to feed the growing global population in an environmentally sustainable way and how to optimise dietary intake for an ageing population," Dr Lawrence said.

"To tackle them effectively, researchers need to take a collaborative approach and being part of a strong research community working on food from so many different angles is very exciting," she said.

Dr Lawrence is a registered nutritionist and returns to academia after working as a nutrition scientist in a variety of senior roles for national dairy organisations in the UK and Australia for more than two decades.

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AIFST Awards

Once again, the outstanding achievements of our members and the contribution they have made to the Institute, as well as the Australian food industry, was recognised at the 2019 AIFST Convention awards ceremony. The AIFST team would like to congratulate all of our award winners and those who were nominated.

AIFST President's Award
Presented by Peter Schutz. Awarded to Dr Tom Lewis.

AIFST Keith Farrer Award of Merit
Presented by Peter Schutz. Awarded to Dr Martin Cole.

AIFST Foodbank Hunger Hero Award
Presented by Brianna Casey. Accepted on behalf of Simon Davidson, Saputo.

AIFST Allergen Bureau Julie Newlands Award
Presented by Jasmine Lacis-Lee. Awarded to Sarah Proctor, Lion Co.

Student Product Development Competition
Richard Hollands (Simplot), Shabron Vertigan, Hannah Summerhayes, Ashna Gobin and Leonardo Bohorquez (CauliPlus). Presented by Steven Lapidge.

AIFST Bruce Chandler Book Prize
Presented by Peter Schutz. Awarded to Michael Blakeney - Food Loss and Food Waste.

AIFST Research Poster Competition
Presented by Peter Schutz. Awarded to Maria Stephanie - Effects of milling method and composition on cooking and texture properties of sorghum-based gluten-free pasta.

AIFST Anthony Williams Sensory Award
Presented by Jodie Hill. Awarded to Shaoyang Wang (first place) and Pridhuvi Thavaraj (runner up).

AIFST Peter Seale Food Industry Innovation Award
Presented by Peter Schutz. Awarded to Trisco Foods Pty Ltd - Precise Thick-N Instant Liquid Thickening Concentrate.

AIFST 12 newly appointed fellows

At the AIFST convention in July twelve new Fellows were announced. The Institutes Fellows have given outstanding service in research and development, technology transfer and/or development of the food industry, in addition to a long-standing membership with AIFST. Congratulations to Jackie Baroni, Martin Cole, Christopher Downs, Stewart Eddie (absent), Fiona Fleming, Dr Ian Jenson, Deon Mahoney, Craig Miller, Allan Poynton, Annesley Watson, Dr Adel M Yousef and Kirsten Zadow.

AIFST 2019 Convention

The 2019 AIFST Convention, held in Sydney on 1 and 2 July, showcased over 60 leading food experts from Australia and internationally. This year's Convention addressed the theme of *Feeding the Future – challenges and opportunities*. AIFST welcomed over 400 delegates, exhibitors, partners, speakers and volunteers over the two-day event.

Jane Bennett, CEO & Managing Director, TasFoods Limited.

Maria Velissario, Chief Science and Technology Officer, IFT.

Dr Cathy Foley, Chief Scientist, CSIRO.

Hope Bertram, Humane Food Manager, RSPCA Australia.

Dan Purtell, Director of Innovation, British Standards Institution.

Denise Hamblin, National Sector Head, Colmar Brunton.

Ishan Galapathy, Anneline Padayachee, Sharon Natoli, Brianna Casey and Sarah Hyland at a panel session.

Delegates enjoying the wine and cheese night.

More delegates enjoying the wine and cheese night.

Delegates networking during the day.

Volunteers assisting with registration.

AIFST workshops – food recall and food regulation

Navigating the Food Regulation Maze was held in Brisbane on 30 July teaching attendees about the regulations that protect products and consumers.

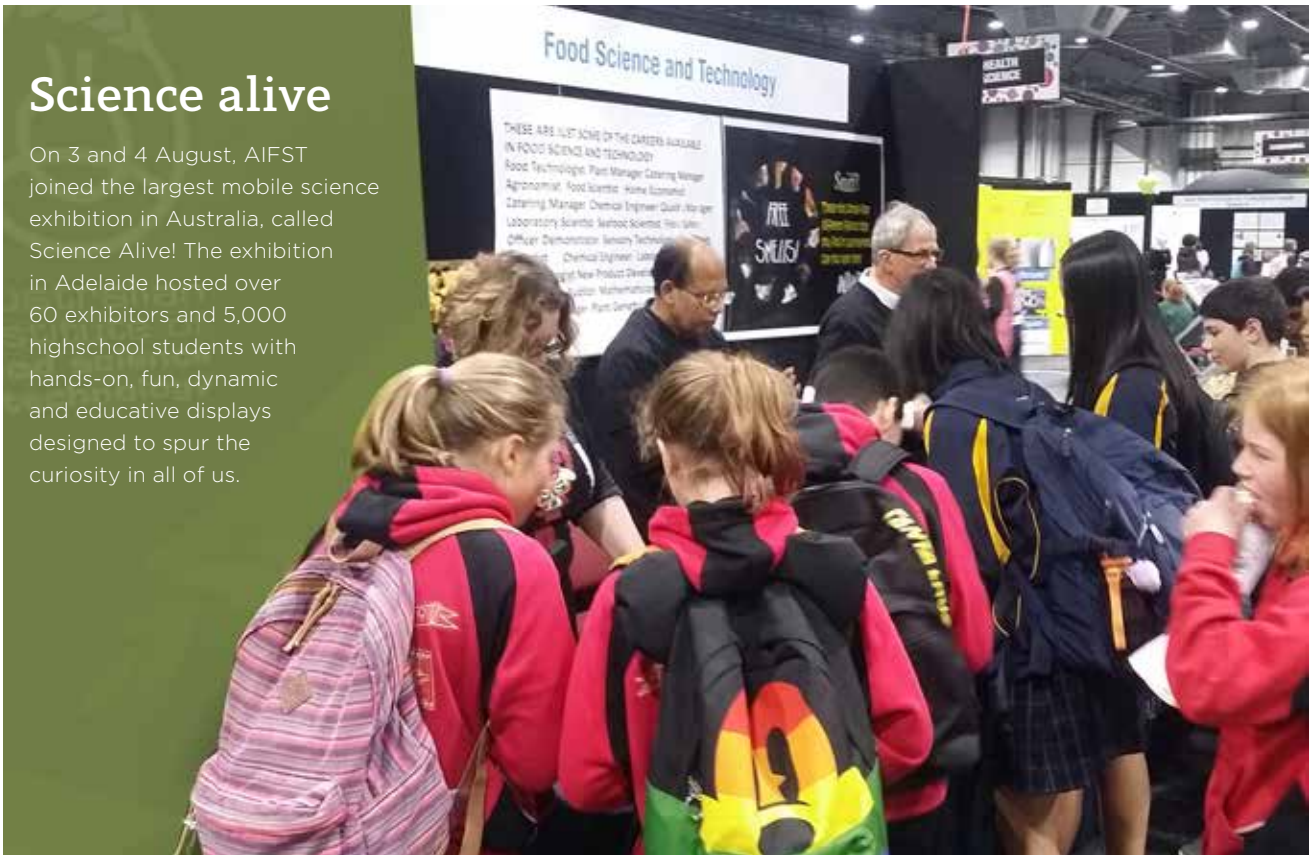
The second *Food Recall Workshop* event for 2019 was also held in Brisbane on the same date showing attendees how even the simplest oversights can derail an otherwise sound procedure.

Eurofins technologies event

AIFST and Eurofins Technologies hosted a joint networking and technical event at the new Eurofins laboratory in Melbourne on 1 August. Dr Saghar Motlagh from Eurofins GeneScan Technologies provided an informative presentation on new Norovirus and Hep A testing technology to a sold-out audience.

Science alive

On 3 and 4 August, AIFST joined the largest mobile science exhibition in Australia, called Science Alive! The exhibition in Adelaide hosted over 60 exhibitors and 5,000 highschool students with hands-on, fun, dynamic and educative displays designed to spur the curiosity in all of us.



WA 'food for thought' workshop

The WA Branch of the AIFST hosted another highly successful *Food for Thought Workshop* in Perth on 5 July. The event, attended by more than 60 people, provided the opportunity for attendees to hear from six highly engaging speakers.

Chris Preston, legal and regulatory specialist from ComplyANZ presented on when an ingredient, claim or presentation made food potentially a therapeutic good. Chris introduced The Food Medicine Interface Guidance Tool (FMIGT) which steps the user through questions to help identify if the food in question is a therapeutic good or not.

Mark Booth, Chief Executive Officer of Food Standards Australia New Zealand (FSANZ), discussed the increasing number of food recalls occurring within the food industry, with 100 reported in 2018. He presented on how the strawberry tampering crisis nearly wiped out an entire industry and the impact social media and the many voices had on the issue.

Professor Michelle Colgrave, from Agriculture and Food at CSIRO, covered the changing trends in diets in the view of social conscience and planetary health. Three areas of future growth were highlighted:

- products for health and wellbeing
- sustainable solutions
- premium products - high quality goods and products that are highly valued

Innovations with respect to proteins were reviewed, citing examples in alternative proteins from plant-based sources, insects and production from cellular agriculture.

David Fienberg, managing director of The Lupin Company, talked about lupin as a future source of plant-based proteins providing agriculture sustainability. He said the challenge is developing more consumer awareness on the significance of Australian Sweet Lupins as a prospective staple in the food diet without the need for significant change. David provided some lupin cookies and dip for the afternoon tea break which were very well received by the attendees.

Gary Kennedy, managing director of Correct Food Systems, referred to the large number of food recalls arising from incorrectly declared allergens. Gary also discussed the value of the VITAL risk assessment process for food manufacturers and how consumers with allergies can make more informed choices when this process and labelling outcomes are used together.

The last speaker of the day, Professor Simon McKirdy, pro vice chancellor at Murdoch University, emphasised the importance of biosecurity for the protection of the Australian food and agricultural sector. To reduce biosecurity risks, some agricultural products are treated with fumigants. His team at Murdoch University has been experimenting with an alternative fumigant, ethyl formate and nitrogen, which kills all insect life stages with no harmful chemicals or flavour impact on the food.

Following the presentations, attendees had the chance to network with a wide variety of national and local experts on food regulation, technology and innovation.

The organiser, Dr Justin Whitely (Compass Group) thanked his team - Patricia Elphinstone (Department of Primary Industry and Regional Development, DPIRD), Cheryl Hughes (Facts on Food) and Samantha Fewster (Quality Produce International) - for their work to make the workshop a success.

Dr Whitely also thanked the sponsors - DPIRD, the ARL Group, Merieux Nutrisciences, pmfresh and Vesco Foods - for supporting the event.

Back in time to read *food australia*

Words by Dr Martin Palmer

August 2019 marks the 70th anniversary of the establishment of the journal Food Technology in Australia, the forerunner of today's Food Australia.

The first edition was published in August 1949, under the auspices of the newly-formed Council of Australian Food Technology Associations (CAFTA). Dr Fritz Reuter, then Head of the Organic Chemistry Department at Sydney Technical College, was the founding Editor and driving force behind this initiative and continued as editor for the next 30 years.

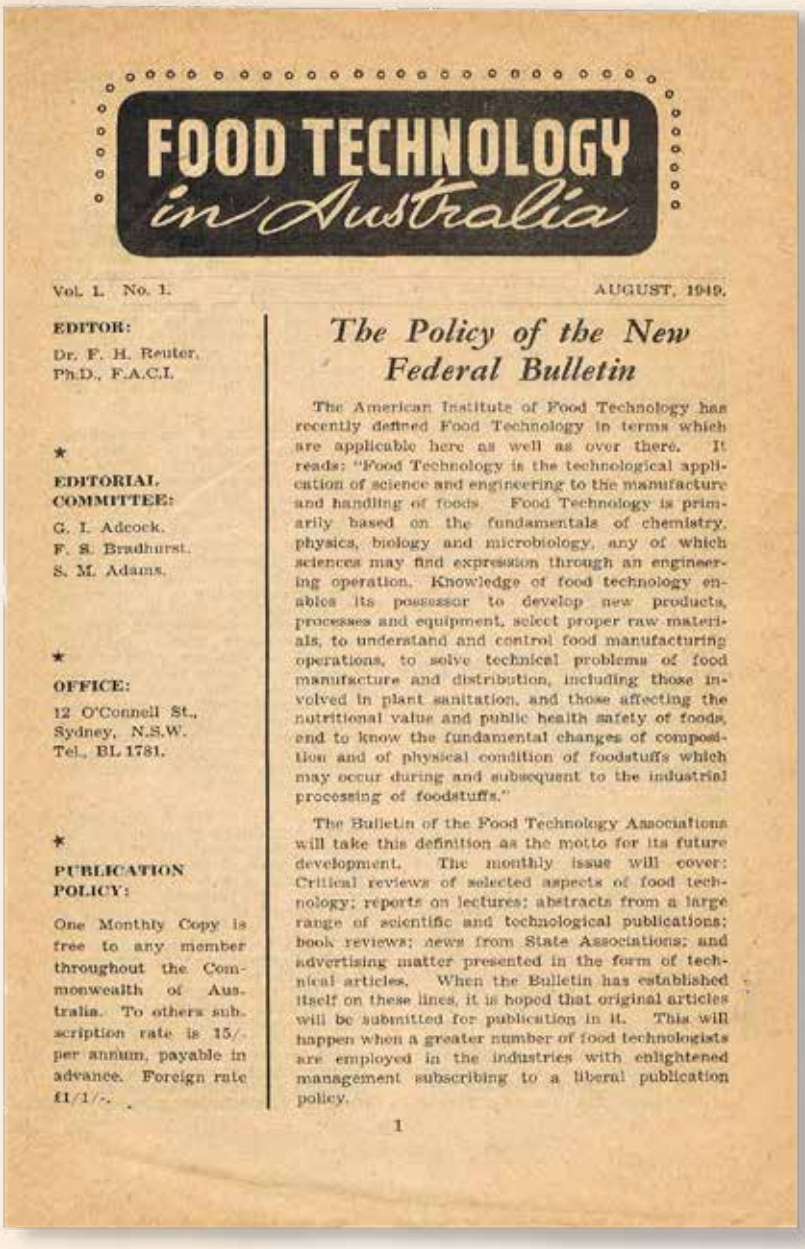
During this time AIFST was born (1967) and started to contribute to the management of the journal (from 1968). Its name was changed to Food Australia in 1988 and in 1989 it became an official joint publication of CAFTA and AIFST. For more detailed accounts of the evolution of our journal, readers are referred to excellent articles in earlier anniversary editions (Food Australia November 1999 and August 2009).

So what did our food technology landscape look like, back in 1949? The early post-war years saw some significant social and economic changes in Australia. In 1949, the Nationality and Citizenship Act was passed, the Australian Security Intelligence Organisation was established, indigenous Australians were first permitted to vote in federal elections, construction of the Snowy Mountains Hydro-Electric Scheme began and Dame Enid Lyons became Australia's first female cabinet minister.

Also in 1949, CSIR evolved into CSIRO and changed its research focus away from defence and towards a much wider industrial base, including food and agriculture (where knowledge gained from wartime research on food preservation would help drive future innovation in food dehydration, freezing, cold storage and thermal processing).

Food research, education and training had been quite fragmented up to this time, occurring mainly in state laboratories and departments of agriculture, as well as in some larger companies, such as Kraft, CSR and Unilever.

The 1940s saw some significant growth and consolidation of this effort, with early groups including the CSIR(O) Food Preservation and Transport Division (Sydney), the Dairy Research Laboratory and School of Dairy Technology at Werribee, the Agricultural Colleges at Hawkesbury and Roseworthy and Reuter's group at Sydney Technical College (which started offering a diploma course in food technology in 1947 - the first in Australia and the Commonwealth). The Bread Research Institute was established in Sydney in 1947 and the Sugar Research Institute in Mackay in 1949.



FOOD TECHNOLOGY in Australia

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The Policy of the New Federal Bulletin

The American Institute of Food Technology has recently defined Food Technology in terms which are applicable here as well as over there. It reads: "Food Technology is the technological application of science and engineering to the manufacture and handling of foods. Food Technology is primarily based on the fundamentals of chemistry, physics, biology and microbiology, any of which sciences may find expression through an engineering operation. Knowledge of food technology enables its possessor to develop new products, processes and equipment, select proper raw materials, to understand and control food manufacturing operations, to solve technical problems of food manufacture and distribution, including those involved in plant sanitation, and those affecting the nutritional value and public health safety of foods, and to know the fundamental changes of composition and of physical condition of foodstuffs which may occur during and subsequent to the industrial processing of foodstuffs."

The Bulletin of the Food Technology Associations will take this definition as the motto for its future development. The monthly issue will cover: Critical reviews of selected aspects of food technology; reports on lectures; abstracts from a large range of scientific and technological publications; book reviews; news from State Associations; and advertising matter presented in the form of technical articles. When the Bulletin has established itself on these lines, it is hoped that original articles will be submitted for publication in it. This will happen when a greater number of food technologists are employed in the industries with enlightened management subscribing to a liberal publication policy.

1

The first front cover of Food Technology in Australia, the forerunner to Food Australia, from August 1949. A stark contrast to the style of today's Food Australia journal.

This period also saw a burgeoning of the food processing industry in Australia, spurred on by a rapid economic recovery from wartime austerity, technical advances, renewed capital investment, population growth and the end of a severe ten-year agricultural drought (1937-47). Highlights include:

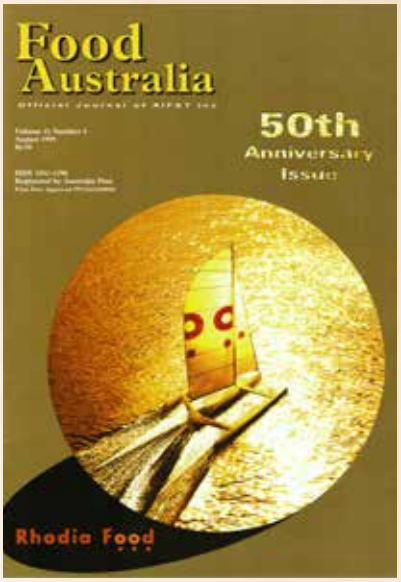
- Nestlé starts production of Nescafé instant coffee powder in Dennington, Vic (1947)
- Golden Circle Cannery opens, producing canned pineapple and other canned fruits, juices and cordials (Northgate, Qld, 1947)
- Four'n Twenty Pies established by Leslie McClure in Bendigo, Vic, (1947)
- Wizz Fizz sherbet and liquorice confection launched by Fyna Foods in Richmond, Vic (1947)
- Choc Wedge launched by Peters Ice Cream (various locations in Australia, 1949)
- First production of frozen vegetables in Australia, by Birds Eye, Batlow, NSW (1949)

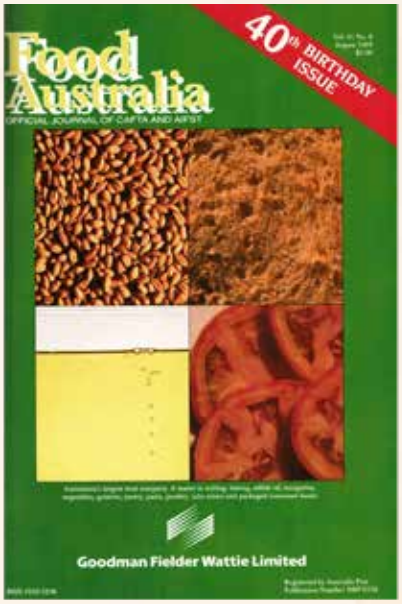
Many new opportunities for food scientists and technologists emerged with the growth of these industries, the increasing diversity of products, innovation in the supply chain and greater sophistication of processing methods.

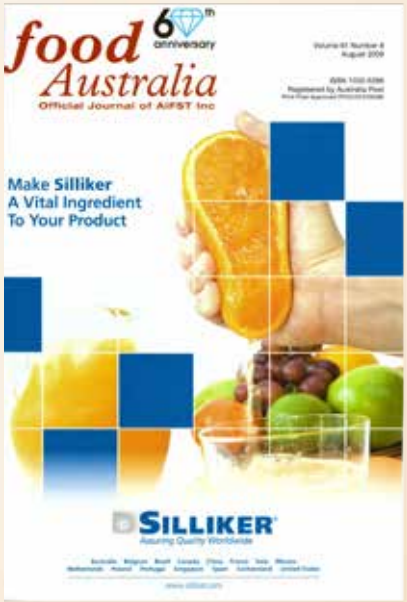
Alongside this was an increasing awareness by both industry and government of the need for more effective and relevant food compositional, quality and safety standards, for the protection of both domestic consumers and critical export industries. The need for specialist food chemists and microbiologists grew accordingly, although it would be another 40 years or so before any significant harmonisation of food standards and regulations across the States.

Browsing through the first editions of Food Technology in Australia (August - December 1949) provides some insight into the priorities and preoccupations of food technologists in 1949 and the environment in which they worked.

Front covers from each decade of Food Technology in Australia from August 1959, 1969 and 1979, followed by three decades of the re-named food australia journal in 1989, 1999 and 2009.







Topics included novel concentration processes for liquid foods and ingredient streams, understanding browning reactions in foods, controlling the quality of canned and frozen vegetables, the control of rat infestation and 'Science versus Starvation'; the latter being a lecture given in 1948 by C.S Miner dealing with the part to be played by the scientist in the future feeding of the world's growing population. Many of these issues are as topical now as they were in 1949, albeit with some contextual differences.

As we look to the future, it is interesting to revisit the past. In the first edition of the journal, the introduction starts:

"The American Institute of Food Technology has recently defined Food Technology in terms which are applicable here as well as over there. It read: 'Food Technology is the technological application of science and engineering to the manufacture and handling of foods. Food Technology is primarily based on the fundamentals of chemistry, physics, biology, microbiology and any of which sciences may find expression through an engineering operation. Knowledge of food technology enables its possessor to develop new products, processes and equipment, select proper raw materials, to understand and control food manufacturing operations, to solve technical problems of food manufacture and distribution, including those involved in plant sanitation, and those affecting the nutritional value and public health safety of foods and to know the fundamental changes of composition and of physical condition of foodstuffs which may occur during and subsequent to the industrial processing of foodstuffs."

This defined the scope of the journal in 1949 and would hold true today. The final words from Miner's ACS Perkin Medal address on 'Science versus Starvation' are as relevant now as they were in 1949:

An advertisement for Keith Harris & Co Ltd from the November 1950 edition.

"The contribution of science to the maintenance of adequate food supplies are substantial, directly and indirectly. Food Technology is one phase of it, called upon to do a big job towards a happy world where there is enough to eat for everyone."

Dr Martin Palmer is Enterprise Fellow, Food & Agribusiness, at The University of Melbourne.

Birds Eye revolutionises the Australian frozen food industry in 1949

Seventy years ago in 1949, the same year the first edition of Food Technology in Australia was published, frozen vegetables first appeared in Australian supermarkets. Together with the makers of today's Birds Eye frozen food products, Simplot, we prepared the following flashback to recap the history of this breakthrough technology.

Named after American inventor and pioneer Clarence 'Bob' Birdseye, the Birds Eye brand is synonymous with quality quick-frozen vegetables.

It was Bob Birdseye's 'Snap Freeze' technology which transformed the industry and saw consumers embrace this new innovation. They relished having what were once seasonal vegetables available all year round.

The history of the frozen food industry dates back to 1910 when, while studying biology in the arctic winter, Bob Birdseye noticed that freshly caught fish placed on the ice, froze solid almost immediately, yet still tasted fresh when thawed.

By the 1920's Birdseye had built on this insight, which led him to design and patent his Quick Freeze Machine, build the first frozen food laboratory and develop a full line of frozen foods designed for commercial sale.

He also developed super insulated railroad cars that enabled the safe transportation of frozen foods over long distances. Bob Birdseye was single-handedly responsible for major early breakthroughs in the development of methods and technology that made freezing a viable way of preserving food.

It wasn't until Birds Eye came onto the scene that the freezing of small retail packages commenced. In the 1930s the first products under the Birds Eye brand became available in stores in America and subsequently in Australia, in 1949. In an address to the Royal Australian Chemical Institute (RACI) in March 1950, Mr E J McCarthy, General Manager, Birds Eye Food (Australia) Pty Ltd noted:

"The prime reason for our Company entering the Australian market with quick frozen foods is the belief that the Australian public will accept them readily. Overseas experience has already proved that the housewife appreciates the value of frozen foods as giving her a high-quality article, already prepared, at reasonable and stable cost, and available all year round."

The first of these vegetables sold in Australia were specially grown in the Gundagai/Tumut/Batlow/Tumbarumba area of NSW and processed in Batlow for sale under the Birds Eye brand. Production later expanded to Tasmania, where most of the products are still produced today. Seventy years on and Birds Eye is still proudly supporting more than 200 Australian farmers and some families have been supplying to Birds Eye for over three generations.

Innovation, developing nutritious and convenient products, and continuing to delight consumers remain fundamentals of the Birds Eye brand to this very day. Today the Birds Eye range includes frozen vegetables, potatoes, fish and snack foods.

Simplot Australia, a company that strives to be a provider of quality, sustainable and nourishing food, owns the rights to the Birds Eye brand in Australia and New Zealand.

The Health Star Rating: Where to from here? [Part II]

Words by Greg Gambrill

In Part I we discussed the two key elements of the Health Star Rating (HSR) that determine choice for consumers, the profiling procedure and the scaling algorithm. We noted how both take cues from food data, namely nutrient content and category membership based on nutrient similarities.

Here we review how the HSR was developed historically, and from that suggest possible implications for the management of the system, and for future reviews.

Aiming to be an objective comparative tool by policy intent, the HSR development process itself was inherently objective, arising without pre-conceptions other than the nutrient-health relationships within the NPSC, itself based on a peer reviewed risk matrix:

1. Gather reliable data representative of Australian and New Zealand foods
2. Utilise and extend the reach of the food content risk ranking methodology of the ANZFSC NPSC to provide 95th percentile of nutrient content coverage, ensuring strong agreement between the two scoring systems
3. Allocate each food in the database to food groups described in the 'plate model' of the Australian Guide to Healthy Eating
4. Profile all foods using NPSC methods coupled with extended nutrient tables
5. Develop a scaling algorithm to convert the range of integer profiler scores for each food category into a real number continuum after establishing rules for rolling outliers into the highest or lowest ratings
6. Generate HSR ratings by dividing the range of 'clipped' profiler scores into 10 equal intervals, thereby creating discernment between foods
7. Decide by similarity of derivation and nutrient content which food groups should share common scaling parameters and which should use stand-alone scaling
8. Using the scaling system, centre the range of scores for each category at or about the HSR ratings that divide Five Food Group (FFG) foods from Discretionary Foods (DF) within the category. To the extent that the binary FFG/DF classification might agree with a continuum of relative risk, foods became comparable across categories based on the FFG system.

In hindsight step 7 above was somewhat overridden by a desire to have fewer categories, and discernment suffered as a result. For example, fruit, cereals, vegetables, protein foods and Discretionary Foods all use the same scaling parameters. In the HSR algorithm, discernment is derived from the range of profiler scores for any scaling group, the span of which is a function of similar nutrient parentage. When the span of profiler scores is broadened to cover a very diverse nutrient parentage discernment suffers.

The FFG/DF classification system of step 8 above was the best available 'centring' benchmark of the day. The FFG system makes no attempt at determining relative risk using a consistent range of nutrients, especially for Discretionary Foods, being focussed on simplification of dietary advice and to some extent nutrient adequacy.

Food choice is left to Food Group membership, leaving consumers confused about foods, particularly packaged foods, that contain components of more than one group. The Food Group concept also led to sector interests demanding that all FFG foods receive above par ratings regardless of nutritional content.

Arising from an objective process, the HSR algorithm itself is unaware of how a food is processed and its name has no meaning. It is also unaware of the degree of processing, who processes it, the origins of its nutrients, who eats the food or how much is consumed, where the food is sold and at what price, or the lifestyle of the consumer.

It is aware only of content-related risk, conditioned by the category-based expression thereof. The rest is maths, with the nutrient parentage determining the category to which it belongs. The content related risk is as determined by the risk-relativities of nutrition science, and the influence of category scaling is similar for foods of common nutrient parentage.

If the content-related risk is a matter of opinion, or unclear, then a thorough peer review by experts in the area of

food risk assessment is justified, free from bias, cognisant of but not guided by popular opinion, and encumbered only by the quality of evidence.

If the HSR is to be modified again at some point it is important that evidence exists confirming that:

1. New science corroborates that the relative risk of HSR nutrients has changed (presumably, as has that of the NPSC nutrients), across the span of HSR nutrient coverage, or
2. There is evidence of failures in the HSR assessment of relative risk based on the nutrient content of legitimate alternative choices, in that legitimate alternative choices for some reason have very different nutrient content at play, for example being from different parent foods, or
3. The HSR has failed to evaluate risk associated content in the context of the category, has over- or under-emphasised nutrients, or their proxies, that cause it to act erratically, or not objectively, or without explanation.

It is not correct to suggest that a food should rate as X when it rates as Y in the context of near-neighbour choices of similar nutrient composition and/or derivation. The same suite of nutrients is at play with the same nutrient tables, the same risk matrix, and the same category scaling. Under these circumstances there are very few examples of food ratings that cannot be explained.

Whether the explanation and rating are right or not lies in the perception of the beholder, the most important of which is surely the consumer correctly choosing an alternative of superior composition. The bigger question for any review is not 'Does this food rate as it should?' but rather 'When relative risk differs between alternative choices, is discernment available?'.

Under the HSR design philosophy it is risk relativity, embodied in the nutrient content and linked to the extended NPSC risk matrix by the scaling system, that determines what is above par, not absolute criteria such as content levels deemed unacceptable. By overriding relative risk with absolute risk, subjectively determined and somewhat distant from the food system itself, we risk a politicisation of food.

Subjectively driven adjustment of the HSR using traditional public policy review methods is not likely to foster greater confidence and uptake. Instead, a technical and scientific panel trusted by stakeholders might best manage the system.

In line with the original system objectives, this is best achieved by staying abreast of:

1. The science connecting nutrient intake with non-communicable disease, or more correctly how the risk-associated nutrients sit in relation to each other
2. Category drift in the food supply that may indicate the need for re-scaling to improve discernment.

Such a review could be undertaken more effectively if government underwrites regular Australian Health Survey-type surveys and identifies nutrient intake hotspots. The HSR algorithm itself should not be subject to the normal submissions-based review process, except as a means to identify new and specific anomalies resulting from innovation such as category misclassification, or fundamental shifts in the science of nutrient based risk. Experience suggests that public submissions are unlikely to provide useful guidance in how to manipulate the algorithm per se without unintended consequences.

The HSR algorithm should sit outside subjectivity, as intended. Key stakeholders may not understand the obligatory objective basis of a non-pejorative food rating system and how this can be successfully linked to the improvement of nutrient content in foods.

While HSR governance continues to foster public scrutiny of the algorithm itself, when that scrutiny does not fully understand its objectivity, it is appropriate that stakeholders strongly resist any attempt to 'weaponise' the HSR through proposed ad hoc adjustments without extensive modelling and trace-back to the science itself.

The best use of the HSR is to:

1. Track the content of foods through regular data collection as the food system responds to choice
2. Adjust the profiler tables according to changes in the risk relativities identified by science and dietary surveys
3. Adjust the scaling of categories should discernment be weakened by category innovation.

In this way the HSR will stay in touch with the science of food related risk, changing food content and intake trends.

The sector interest method of issue identification, whether by advocates or industry, and associated ad hoc adjustments to the algorithm, often of unknown collateral effect, are not ideal for a technically complex system dealing with a technically complex issue. Surely, for all stakeholders, objective triggers and methods of adjustment are of utmost importance for continued uptake as both the food system and the science of food related risk progress.

Greg Gambrill was involved with the development of the Health Star Rating from its inception, assisting with the collection of food data for the purpose, and the subsequent development of the HSR profiler and scaling algorithm. More recently he was a member of the Technical Advisory Group appointed by the Health Star Rating Advisory Committee to provide data analysis assistance to the Five Year Review process just completed.

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Measuring resilience in food businesses

Words by Richard Werran

Only resilient organisations survive and prosper over the long term. With this in mind, BSI has developed the Organizational Resilience Index—the world's first report and benchmarking tool that reveals how resilient an organisation is. When BSI launched the first organisational resilience index last year, we noted that it came at a time of intense and unrelenting business disruption, and that remains equally true of this year's index.

The past year has tested the resilience of businesses globally to both internal and external challenges, from information security through to supply chain risks. It is forecast that the 33-year average tenure of companies on the S&P 500 in 1964 will shrink to just 12 years by 2027[1], further highlighting the need for businesses to remain resilient. While such change has undoubtedly brought uncertainty and risk, it has also presented fresh opportunities.

At the heart of organisational resilience lies the ability to adapt - to continually innovate, learn and improve - in order to manage uncertainty and risk and seize new opportunities. With this goal in mind, the latest index reveals some encouraging trends:

- Business leaders identify higher levels of awareness of organisational resilience.
- They point to an increasing number of resilience specialists within their businesses, and
- They perceive performance to have improved overall across different areas of organisational resilience.

How the index works

The index is based on self-reported responses of senior executives from over 800 organisations in ten sectors across UK and Ireland, USA and Asia Pacific. The size of the organisations ranged from US$5 million to more than US$1 billion in annual revenue.

The business leaders' responses have enabled us to benchmark the resilience of their organisation through the importance they attach to – and the performance they perceive in – 16 core elements of their business, ranging from financial management to community engagement. These 16 elements can be further grouped into four broader categories: leadership, people, process and product.

We should note that this is a 'relative' study. Leaders may regard all 16 core elements as being important to their business. Indeed, most almost certainly do, but they don't see them as being of equal importance and have ranked them accordingly from 1 to 16. Similarly, they perceive variations in performance across the 16 elements, again resulting in a ranking.

Using the rankings, we can gauge organisations' resilience in two ways: first, and most obviously, by seeing in which core elements they perform relatively well or relatively poorly; second, and perhaps more significantly, by focusing on how well they perform in the elements that are most important to them.

Overall findings – it's 'back to basics'

This year, business leaders rank financial management first for both importance and performance, whereas last year they considered reputation to be the most critical core element for their long-term success.

The implication is that businesses, under pressure from forces such as global competition and political and economic uncertainty (yes, including the 'B' word), are acting cautiously, focusing on immediate concerns such as cash flow, debt levels and investment – perhaps at the expense of less tangible or longer-term issues.

Similarly, a 'back to basics' mindset may be why the core element demonstrating greatest improvement in performance is supplier management, leaping ten places up the list, in contrast to an equally steep fall for community engagement – no doubt seen as 'nice to have' rather than a top priority in tough times.

When asked to rate their own resilience, different sectors have widely differing perceptions of themselves which can be seen in the main report.

Focusing on food

On top of the 'macro' or pan-industry challenges mentioned above, the global food industry continues to experience huge sector-specific strategic change, much of it led by science and innovation.

The industry is grappling with a host of major challenges, from increasing sustainable production practices to moderating clean label claims on packaging. Striking a balance between the use of eco-friendly packaging, reducing the amount of material used in food packaging, maintaining an extended use by date and reducing food waste on top of market access changes can be increasingly demanding for the most established organisations. In such circumstances, many organisations in the sector can benefit from a deeper insight into just how resilient they are.

BSI's Organizational Resilience Index shows how food industry leaders rank the core business elements in terms of importance and performance.

A total of 62 of the 800 organisations surveyed identified their area of operations as in the food sector.

Looking purely at performance, food industry leaders feel their organisations are at their best in managing reputational risks, outperforming other sectors in this endeavour. No doubt learned from high-profile past crises, notably the spread of food-borne illnesses. They report they are also performing well in financial management, supplier management and leadership. So far, so reassuring.

Of more significance, however, is whether these high-performing core elements are also the most important. Here, the news is also good – reputational risk is relatively important, and food industry leaders are also performing well in the two most important elements, leadership and financial management. In addition, they are performing creditably (in the top half of the table) in other areas of high importance, namely awareness and training and resource management.

An area of opportunity for food businesses is adaptive capacity. Although sector leaders regard it as fairly important, food businesses collectively admit to bottom-quartile performance in this core element. My view is food businesses need to demonstrate greater proactivity in recognising and responding rapidly to emerging threats and, by the same token, opportunities.

Other areas where food businesses acknowledge relatively weak performance are information and knowledge management, business continuity and culture.

Of course, this begs the question of whether food industry leaders have set the right priorities. Should community engagement be higher on their agenda? Should alignment (staff pulling together in the same strategic direction) be a significantly higher priority to bring their own people with them? Would greater emphasis on innovation help to stay or get ahead of the competition? And is there a looming concern that complacency is supplanting horizon scanning, meaning a reduced awareness of issues coming towards the business resulting in, at best a setback or, at worst the potential to cause lasting damage.

Where are your strengths and weaknesses?

To discover your organisation's relative strengths and weaknesses – and how you compare with the organisations engaged with the BSI Organizational Resilience Index – complete the BSI organisational resilience benchmark tool, a simple questionnaire located online at www.bsigroup.com/en-au/our-services/Organizational-Resilience/

This tool presents your results in a spider diagram. It allows you to compare how you perceive your performance in leadership, people, processes and product, based on the 16 core elements, against the overall benchmark results.

About BSI Food

We believe the world should be supplied quality food that is both safe and sustainable. We're a leading food safety certification provider with extensive auditing for a wide range of food safety and business standards across the entire food and beverage supply chain, including Global Food Safety Initiative (GFSI) recognised standards.

To learn more visit: bsigroup.com/food-au

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Richard Werran is director of food at the British Standards Institution.

Insights into the sustainable future of food

Words by Sharon Natoli

Reinventing the supermarket shelf of the future was just one of the many challenges and solutions presented and discussed at the Seeds & Chips Global Food Innovation Summit held in Milan in May this year.

Convened as an initiative to drive change toward achievement of the UN Sustainable Development Goals (SDGs) by creating connections and partnerships in food and tech innovation, the annual Summit brought together key players from across the food system, including innovators, teenovators, entrepreneurs, leaders, investors and inventors.

The speakers and attendees included world leading thinkers who presented not only the challenges linked to the health of people and the planet, but also put forward their solutions. One of these was Mike Lee, co-founder and co-CEO from Alpha Food Labs and founder of The Future Market.

One of Alpha Food Lab's current projects is the creation of a more biodiverse supermarket shelf as one solution to the problem of dwindling biodiversity in the food system. Currently, 75 per cent of the world's food comes from just 12 plants and five animal species, meaning the food system is less resilient to threats from pests, diseases and climate change. It also means people are not exposed to thousands of different foods that provide a range of different nutrients, tastes and flavours and which support local and culturally adaptive diets.

Mr Lee outlined the tension that exists between driving change in the food system, in a way that helps achieve the UN SDGs, while making it easy for people to make the choices that support this aim.

As a leading thinker on the future of food, to tackle this he believes in challenging the business as usual approach to innovation which is usually taken by food companies.

In Mr Lee's view, the way many packaged goods companies tackle innovation is the opposite to the approach taken by chefs and perhaps we can learn something from this. When working locally, chefs will look at produce that's available at the time, and use this as the basis for making a recipe. This generally means preparing food from what's seasonal and available, in contrast to most packaged goods companies who approach things the other way around.

"With packaged goods, in a boardroom somewhere someone comes up with an idea and then you make the farmer grow that one thing over and over again", Mr Lee said.

"What we're trialling is going to the farmers without such a rigid agenda. We're looking to them to grow what's right for the soil and then we'll do the hard work," he said.

To realise this vision, the Biodiverse Supermarket Shelf on display at the Summit was presented to look like the supermarket shelves of today, but with a greater variety of packaged products made from grains such as teff, moringa, taro, millet and baobab. The key, according to Mr Lee, is to present foods in a familiar format but with a nudge that makes it easy for consumers to make more diverse food choices.

This project highlighted just one way food innovators and leading thinkers are tackling issues such as those associated with the reduction in food biodiversity that has occurred over recent decades.

The Summit also showcased:

- Urban and vertical farming systems which enable closer access to fresh food while reducing the use of natural resources and transportation requirements
- Food products developed from waste arising as a by-product of other food production systems
- New cereals and crackers developed using grains grown in a more biodiverse system
- Snacks made from mushrooms grown in recycled coffee grounds
- Foods dried naturally using airflow and solar energy

While many of these products are at the cutting edge of innovation, we already have evidence that indicates investment in sustainability as a concept is paying off. Chocolate and coffee brands making sustainable claims, for example, grew up to four times faster than the average for the category between March 2017-2019. Further, Unilever's sustainable living brands grew 46 per cent faster than the rest of the business while delivering 70 per cent of the company's turnover growth in 2017.

As we look to the future, considering 'healthy food' as a total system of inputs and outputs from production through to consumption is gaining momentum as a way forward for businesses looking for growth and relevance. Alignment of strategy with the SDGs also provides a robust blueprint for future food innovation.

Businesses looking to connect more closely with this area also gathered in Melbourne at Global Table when Seeds & Chips brought their event to Australia in September this year. The event was the largest agri-food-tech event in Australia in its first year, and is planned to run annually. Further details can be found at https://globaltable.com.au/

Sharon Natoli provides advisory services to the food and beverage sector, speaks at conferences and events about the future of food and is author of Food for a Better Future.

Ensuring the future of food is safe

Words by Deon Mahoney

Australia prides itself on having comprehensive food standards, strong food safety management systems and effective regulatory oversight — all intended to ensure consumers have access to a safe food supply. Despite this, foodborne illness continues to be a problem in this country with rising rates of illness related to Campylobacter and Salmonella.

In April 2017, the Australia and New Zealand Ministerial Forum on Food Regulation reaffirmed that the food regulation system was producing good food safety outcomes overall, but identified three priority areas for attention in 2017–2021. Actions to address these areas aim to further strengthen the system by:

- Reducing foodborne illness, particularly related to Campylobacter and Salmonella
- Supporting the public health objectives to reduce chronic disease related to overweight and obesity
- Maintaining a strong, robust and agile food regulation system

The way forward is described in the recently released *Australia's Foodborne Illness Reduction Strategy 2018-2021*.[1] The strategy was developed following consultation with stakeholders from the food industry, the public health sector and consumers. It focuses on food safety culture, sector-based initiatives (horticulture, poultry, eggs, and food service), consumer and industry information, research, monitoring and surveillance, and national engagement.

While food safety focused research is highlighted in the strategy, there is little in the way of guidance on specific areas and priorities for research investment. Looking to the future, research and innovation will be vital in supporting food production and system changes, underpinning the safety of disruptive technologies, and managing the challenges of food security.

Food safety priorities in Europe

The European Food Safety Authority (EFSA) recently published its own research priorities in food safety for the next five to 10 year.[2] The priorities were identified following consultations with members of EFSA's scientific committee and scientific panel as well as from their own scientific staff.

The outputs were listed under three main streams: safe food systems, innovation in risk assessment and holistic risk assessment.

Stream 1 focuses on the impact of innovation in food production systems on food safety, including:

- Development of tools to identify systems vulnerable to pests and pathogens
- The impact of new technologies
- Food risk analysis capability
- Food security
- The impact of social change and consumer trends

Stream 2 examines the impact new

knowledge and diagnostic tools may bring to risk assessment of food safety. This reflects the concern that current approaches are highly resource-intensive and raise issues of reproducibility.

The goal is to further explore the evolving integration of molecular data such as genomics, transcriptomics, proteomics and metabolomics in microbiological risk assessment, and the use of validated sequencing tools such as whole genome sequencing in risk assessment.

Stream 3 focuses on understanding the societal context in which science is being delivered and the engagement with society during risk assessment processes. Better understanding of consumer perceptions will facilitate better risk communication, and contribute to improved accountability and enhanced credibility of food regulatory agencies. This signals the reality that consumers are increasingly disconnected from food production.

Food safety priorities in the United States

In 2018, the Food Safety and Inspection Service (FSIS) developed a list of its top food safety research areas of interest.[3] These priorities were presented as suggestions for researchers (and funding agencies) interested in pursuing food safety objectives relevant to FSIS regulated products.

They included projects to investigate and/or develop emerging screening technologies for pathogens, assess the occurrence of potential emerging pathogens that may present a public health risk to US consumers and determine (or validate) the effectiveness of interventions used by industry to reduce levels of pathogens on FSIS regulated products.

Food safety priorities in Australia

Unfortunately, there is no overarching national policy guidance or direction on food safety research needs in Australia. The Foodborne Illness Reduction Strategy highlights the problems, but provides limited direction on where research funds should be invested.

Hence, the focus of research in food safety is often entrusted with the higher education sector, followed by other research providers (research institutes, CSIRO, and the private sector). Guidance on priority areas for research is influenced by access to funding from entities such as the research and development corporations that invest in research across 15 rural industry sectors.

Funding research and development in Australia

The Australian Government has a long-term commitment to rural research and development in partnership with industry.

Australia's Rural Research and Development Corporations (RDCs) are the principal means by which the Australian government and primary producers co-invest in research and development (R&D) for industry and community benefits. Much of this research is focused on our food-producing sectors including grains, seafood, meat, dairy, eggs, wine and horticulture.

Funding for the RDCs involves government-matching funding up to 0.5 per cent of gross value of production. These funds are then invested in research activities which improve primary production, enhance sustainability, address environmental issues, invest in people and support activities beyond the farm gate – including the issue of food safety.

The challenge is the nexus between investing in improved productivity in primary production versus getting a safe, finished product to market. The allocation of R&D funding to specific research projects focusing on food safety is a challenging task.

Meat and Livestock Australia is one RDC that actively invests in food safety R&D projects across the value chain through investment in three types of activities:

1. Use of scientific approaches to understand food safety risks associated with meat
2. Development of systems and new technologies to manage identified risks
3. Development and dissemination of information relating to risk management

The outputs from the research include resources, tools, and publications which support market access for the red meat industry by enhancing product integrity.

Likewise, the Fisheries Research and Development Corporation funds around 100 new projects each year, with investment spread across the entire value-chain of the commercial fishing and aquaculture industry.

Examples of current projects addressing food safety issues include research into biotoxins in seafood (paralytic and diarrhoetic shellfish toxins), microplastics in seafood, use of rapid tests kits and diagnostic detection of aquatic pathogens using real-time next generation sequencing.

In contrast, the investment in research supporting dairy food safety is limited. Dairy Australia includes food safety in its trusted dairy industry strategic program, which has the goal of maintaining the industry's long-term social license to operate.

Over the past three years a single project, managing supply chain, food safety and integrity issues, has attracted around 1 per cent of total research funding, with the focus primarily on reputation management. There remains a need for research that supports the marketing of safe and suitable dairy products, specifically in areas such as rapid diagnostic methods for screening of high-risk pathogens and compounds, validating the efficacy of interventions including new technologies, and managing pathogens such as Listeria monocytogenes and Bacillus cereus in dairy products.

R&D funding in Australia is derived from a range of sources. Overall expenditure on R&D is less than 2 per cent of gross domestic product, which is around the mid-range for OECD countries where average expenditure is 2.34 per cent.[4]

Setting food standards

Food Standards Australia is currently reviewing chapters three and four of the Australia New Zealand Food

Standards Code to ensure a consistent and current approach to through-chain food safety management in Australia.

As part of the review, they are considering:

- Requirements for food safety management in the food service sector and closely-related retail sector
- Potential development of a primary production and processing (PPP) standard for high-risk horticulture products to introduce requirements to manage food safety on-farm, including requirements for traceability
- New technologies that have developed since the original standards were established

The need for scientific data to inform the development of evidence-based standards in Chapter three and four has never been greater.

In the United States, the Food and Drug Administration has established water quality and testing provisions for water that directly contacts growing fresh horticultural produce (other than sprouts) under the Produce Safety Rule (Food Safety Modernisation Act, 2011)

The Philippine Risk Profiling Project (PRPP) has recently commenced in that country with the goal of establishing risk profiles for hazards in selected Philippine foods. The project has funding from the Department of Science and Technology, and the outputs will assist national risk managers in the development of a consistent, science-based food safety framework in the Philippines. Funding is supporting research to generate data and address information gaps.

Research has always played a vital role in supporting food safety and innovation along the Australian food supply chain, and there remains an ongoing requirement to identify priority food safety research areas. This will ensure finite funds are directed towards research activities with the greatest impact, and concomitantly support an active research community.

The outputs of this research will inform the development of relevant interventions, including drafting of evidence-based standards, leading to further enhancements in food safety. In the long term, robust research underpins the efficient production of safe food and supports market access.

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Ingredients – people & planet

Words by Geoffrey Annison, PhD

Continuous innovation is the hallmark of any successful industry and the ingredient sector of the wider food industry is no exception.

One of the greatest challenges for large food companies is to integrate new technology offerings from ingredient suppliers into the existing company product suite. The driver, of course, was to seek opportunities for product renovation and/or to develop completely new products.

Initial excitement over clever science was often quelled by more mundane issues which needed to be addressed if a commercial return was going to be realised.

All players in the R&D space will be familiar with the checklist which has to be satisfactorily completed early on in negotiations with ingredient suppliers proposing new ingredients:

- Can the ingredient use be readily incorporated into existing products with current manufacturing plant and processes, or is significant capital expenditure required?
- Are there any occupational health and safety risks to production staff associated with use of the ingredient?
- What products is the ingredient to be used in, and is there technical data and consumer acceptance data for each application?
- Is the intellectual property protected through appropriate patenting?
- What is the regulatory status and does it have or need regulatory approval (ie, is it a novel food)?
- Are there any food safety concerns such as allergen status?
- If there is a health benefit associated with the ingredient is there sufficient scientific evidence to support a health claim?

And then there are the important commercial considerations to be taken into account such as:

- Is exclusivity to the technology being offered and what are the terms of the license?
- What amounts of the ingredient are available particularly if the proposal is for application in a high volume national branded product?
- Are there any seasonal variations in the ingredient quality, availability or price?
- Will the ingredient be supported by its own 'sub-brand' to be included on pack labels and, if so, what brand support will the supplier be providing in the market place?

Finally, and perhaps most importantly to consider early on in the innovation process, is marketing. Excitement over technical innovation in R&D and new product development can run hard up against the wall of branding. Marketers are highly protective of their brands (and rightly so). They deal in concepts such as 'brand fit' and 'brand stretch'.

Whilst often looking for new ways to promote and market their products, they are acutely aware of consumer relationships with their favourite brands. Introducing a new technology which results in a change in the product which the consumer will detect is always a risk. Reformulation resulting in organoleptic changes (such as flavour or mouthfeel) are almost certainly going to be detected by consumers, and they may not be accepted. This is especially true for iconic brands.

But it goes even beyond that. For example, if the promotion of a product is focused heavily on 'indulgence', adding a health promoting technology or formulation may clash with the product branding. Consumers know they can't 'have their cake and eat it', and trying to tell them they can may fail dismally.

In recent years, consumer expectation of brands has been broadening in scope. The nature of products remains paramount, but gaining in importance are the origins of products and the processes involved in bringing them to market. Consumers are increasingly seeking the traditions, heritage, naturalness and authenticity of products. These are concepts which may sit awkwardly with innovation and new food products.

Against the backdrop of this longing for times past, the food industry is now experiencing an unprecedented

level of criticism targeting the very idea of 'food processing'. With little understanding of the importance of food processing in rendering foods edible, palatable and safe, the very level of processing is being held by some as a proxy measure for the healthiness of foods.

Indeed, the term 'ultra-processing', which first appeared in a polemic diatribe published in *The Lancet* in 2013 (Volume 382, Issue 9876, P670-679, February 23, 2013), has now caught on among the front-line critics of the industry. The on-going conflation of the challenge of diet-related diseases with product level food composition has yet to be founded in solid scientific evidence. And that scientific evidence is likely to continue to elude researchers as long as they make elementary mistakes in experimental design.

Following criticisms of their study, which claimed in its title that "Ultra-processed diets cause excess calorie intake and weight gain"[1] the authors of one study in Cell Metabolism chose to admit they "agree that there are many open questions regarding the mechanisms whereby ultra-processed foods affect energy intake, whether the large observed effects persist over time, and whether the results are reproducible and generalizable to populations beyond the subjects who participated in our study".[2]

The point of this excursion into the ultra-processing is debate simple. As ingredient suppliers develop new technologies aimed at better meeting the needs of food manufacturers and their consumers, the impact on perceptions of levels of processing may need to be considered.

More and more food ingredients with new or enhanced functional properties are being developed. The innovation drivers vary from seeking products which can better protect and promote good health – the classic functional foods – through to finding value in food production by-products and reducing food waste. The challenge for food manufacturers will be to balance the technology push from new processes and ingredients aimed at improving products, with the realities of branding and marketing constraints and the rising - albeit misplaced - consumer perceptions around food processing.

Of course, the trick will be to avoid the 'either/or' conundrum - foods don't have to be either 'natural' or 'processed'. They can be both. Advanced processing technologies coupled with, or resulting in, novel ingredients to be incorporated into food products can be portrayed as 'capturing natural goodness' which would otherwise be lost. And this is not just marketing hype, it's a reality.

We live in a resource constrained world and it's becoming even more constrained. The food processing technologies we have now, and are yet to develop, will be crucial in our efforts to meet the needs of future populations.

They allow us to use more efficiently and more completely our agriculture products, both plant and animal, traditional and new. And in doing so they help tick the boxes of assisting healthy diet construction, less impact on the environment and better returns on investment across the food value chain.

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FOOD FILES

Words by Drs Russell Keast, Georgie Russell and Gie Liem

What is Tribology?

Tribology is an area of great interest to the food processing industry – it is the study of interacting surfaces in relative motion and includes aspects of friction, wear, lubrication and design. It is also important in terms of sensory science, specifically texture perception.

When we consume a food or beverage, the first step in that process is chewing the food to form a cohesive mass called a 'bolus'. That chewing involves the movement of the tongue and associated friction with the food, teeth and other skin surfaces, along with the lubrication effect of saliva. From a sensory perspective, Tribology is part of oral food processing.

But how important is Tribology in terms of texture perception? We know there is a poor correlation between rheological instrument measurements (measuring the flow of food) and texture perception, so could Tribology be an area that helps form a better link between instrumental measures and perceptions that arise when a food is being eaten?

In new research, Shewan et al (2019) describe the principles of Tribology and provide a summary of various measurement equipment used in the area. The review uses examples of model foods such as gels or emulsions and notes that biological surfaces (such as those in the oral cavity) display highly complex friction behavior. Saliva-food interactions are covered and it is acknowledged that saliva is a complex fluid that influences friction coefficients and can lead to changes in perception.

Finally, the authors move on to 'creamy' and 'astringent' perceptions citing examples from previously published literature. The review is worth reading as the link between texture perception and instrumental measures is an area that requires substantial research to further our understanding.

Tribology may be one area that can help close a gap in knowledge and help the food industry produce appealing textures with decreased fat, salt and sugar.

Shewan et al (2019). Tribology and its growing use toward the study of food oral processing and sensory perception. Journal of Texture Studies https://doi-org./10.1111/jtxs.12452

VR and AR applications in sensory science

Although the act of eating is likely to remain unchanged, the enjoyment of eating might be heavily influenced by technological advances in the near future.

A recent review in the journal Innovative Food Science and Emerging Technologies explains the use of virtual reality and augmented reality in sensory science and where the future might lead us.

If is often said that we eat with our eyes. Although this is obviously not technically correct, the saying does emphasise that the visual representation of food and the surrounding environment play a key role in what we taste and how much we appreciate food.

To include these influences in traditional sensory and consumer testing would require tests in real life environments and tests with many different prototypes of foods and visual representation of these foods. This is both expensive and, in many cases, impractical.

Virtual reality (VR) allows the consumer to feel immersed in a world which is visually similar to a

real life environment. This allows the researcher to 'bring' the consumer to Paris, for example, whenever they want to without breaking the bank. Past research suggests consumers do feel immersed in virtual reality and that the way consumers perceive food and make food choices is similar to what they perceive and do in real life. However, rigorous external and ecological validation of the VR system is yet to be conducted.

Augmented reality (AR) is different from VR in that food and environments, which people actually see in real life, are slightly changed by superimposing a virtual image on real life objects. For example, the colour and size of foods can visually be manipulated. Pokémon Go is probably one of the best known examples of AR.

In the near future, it is expected that an increasing number of marketing firms will offer AR (and VR) approaches to marketing, in which consumers' mobile devices can be used to superimpose marketing messages or user instructions on products they see in real life. In the area of sensory science, rigorous external validation of both VR and AR are needed, but the future looks promising.

Crofton, E. C., Botinestean, C., Fenelon, M., & Gallagher, E. (2019). Potential applications for virtual and augmented reality technologies in sensory science. Innovative Food Science & Emerging Technologies, 102178.

The role of 'appetitive traits' in food choice

Appetitive traits are eating behaviours and attitudes that describe various approaches to food and eating.

Typically they are classified as being either associated with a food approach (such as being responsive to food cues in the environment or enjoying food and eating) or food avoidance tendencies (such as eating slowly or being fussy). Appetitive traits develop in childhood, but can affect dietary intakes and weight status throughout childhood and into

adolescence and adulthood.

Individuals vary on how predisposed they are to developing particular appetitive traits. Whether this biological risk or susceptibility is translated into an outcome (such as becoming a fussy eater, eating when emotional or eating in response to environmental food cues) depends on the experiences an individual has with food and eating.

This means a combination of biological, psychological and social factors are implicated in the development of the various appetitive traits. With regards to biological factors, direct contributions from genes along with indirect contributions from temperament are both important. Some aspects of temperament are directly related to appetitive traits (for example, inhibitory control is related to disinhibited eating and temperamental approach is associated with reduced fussiness), while others may be influenced by intermediary factors such as emotion regulation.

However, although there are biological foundations to appetitive traits, the life experiences individuals have with feeding and eating will impact the development of appetitive traits. For instance, although a child may be biologically predisposed to being wary of new foods (with a temperament high on negative affectivity) repeated and non-coercive exposure to a range of pleasant tasting food may help them learn to reduce this fear of new foods and become more accepting. In contrast, if this child is pressured into eating foods they are wary of, then their fussiness is likely to become even more pronounced over time.

There is still much to be learned about how and why appetitive traits develop in childhood, as well as how much of what is learned in childhood is carried forward into adolescence and adulthood. However, as our understanding of appetitive traits evolves, this leads to opportunities for both influencing their development and designing interventions to address their impact on eating and weight in adulthood.

Russell, C.G.; Russell, A. Biological and Psychosocial Processes in the Development of Children's Appetitive Traits: Insights from Developmental Theory and Research. Nutrients 2018, 10, 692.

Drs Russell Keast, Georgie Russell and Gie Liem are from The Centre for Advanced Sensory Science, School of Exercise and Nutrition Sciences at Deakin University.

FAST 5

Thomas King

Thomas is a social entrepreneur, international speaker and future food specialist who has been recognised as one of Australia's most accomplished young pioneers. Over the last decade, Thomas has driven food, environmental and poverty alleviation initiatives across five continents, leading to him being named Young Australian of the Year VIC in 2015.

Realising the limitations of industrial livestock production to sustainably feed the world's growing population, Thomas founded Food Frontier in April 2017 to accelerate alternative proteins and create a more diversified, sustainable and future-proof food system.

What is your personal motivation?

I've spent almost a decade focused on social and environmental issues, having helped lead projects in conservation, food, climate education and poverty alleviation across five continents. It didn't take long to recognise the detrimental contribution of industrial meat production to these fields and the limitations of our current food system to sustainability feed our growing global population.

After spending time overseas with companies pioneering plant-based and cell-based meats, I quickly realised the potential for Australia to leverage its strengths and diversify into these high-impact fields of food innovation. I established Food Frontier as a mechanism to support industry and government in championing this change.

What areas of the food industry do you routinely work with?

We engage and advise stakeholders across the entire value chain, from agricultural bodies, start-ups and manufacturers to retailers, foodservice groups and policy makers.

What's next for Food Frontier?

We have recently released a world-first economic report quantifying the current and future size of a plant-based meat sector on Australia's national economy. This research, in conjunction with Deloitte Access Economics, found the size of Australia's plant-based meat sector could be anywhere up to $7.5 billion by 2030, including manufacturing and consumer expenditure. This report now enables Food Frontier to have a range of conversations with government, business, investors and the food and agriculture sector about how best to capitalise on this opportunity.

What is the overriding goal of Food Frontier?

To create a more sustainable, efficient and future-proof food supply that is good for people, great for business and better for our planet. We believe that driving science-based solutions to the fast-growing need and demand for healthier and more sustainable protein sources is critical to achieving this and that Australia is well placed to play a leading role.

What are the main hurdles you encounter from consumers, and/or industry, to alternative proteins?

One hurdle facing plant-based meat products is the misperception that they are unhealthy or 'unnatural', particularly due to the processing involved. Most of these products are made from blends of legume or grain proteins, vegetable fats, gums, spices and seasonings.

Based on an analysis of the Australian retail market, the average plant-based meat product has greater protein and fibre, less saturated fat and sodium and no cholesterol compared to comparative pre-seasoned meat products. This emphasises an opportunity for better consumer education and messaging to demystify these products' nutritional value, ingredients and production methods.

Australia 2019

November 9-16 Australian Food Safety Week
foodsafety.asn.au

November 11-13 International Tropical Agriculture Conference *Brisbane Convention & Exhibition Centre, Brisbane. tropagconference.org*

November 20 The 2nd ChemLinked Food Regulatory Conference *Oceania 2019 Park Royal, Darling Harbour, Sydney. food.chemlinked.com*

Australia 2020

February 10-12 NZOZ Sensory and Consumer Science Symposium, *Melbourne. www.aifst.asn.au/2020-nzoz-sensory-and-consumer-science-symposium-0*

February 24–25 AIFST 2020 Summer School
RMIT University, Melbourne
www.aifst.asn.au/2020-aifst-summer-school

July 6-7 AIFST Convention 2020,
Melbourne Convention and Exhibition Centre.
www.aifst.asn.au/2020-aifst-convention

International 2019

October 24-27 WorldFood Moscow Russia
world-food.ru

October 30-31 29th World Conference on Food and Beverages *London, UK, foodandbeverages.*
foodtechconferences.com

November 21-22 6th Dairy Asia Pacific Summit 2019
One Farrer Hotel, Singapore
www.duxes-foodbeverage.com/dairy-ap/index.html

International 2020

February 25-28 Global Food Safety Initiative Conference *Seattle, USA*
www.theconsumergoodsforum.com/events/gfsi-conference

April 15-17 ANUFOOD China
Shenzhen World Exhibition & Conventions Centre, Shenzhen, China. www.anufoodchina.com

July 12-15 IFT Meeting and Food Expo *Chicago, USA*
10times.com/ift-food-expo

2-5 August 2020 International Association of Food Protection, *Cleveland, USA*
www.foodprotection.org/annualmeeting

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