food australia
Official publication of AIFST Ltd
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OCTOBER/NOVEMBER 2015

DELIVERING FOOD SECURITY
Anytime, anywhere

Also Inside

MINDFUL SNACKING ON THE INCREASE
IMPROVING STABILITY OF BIOACTIVE INGREDIENTS
SUSTAINABILITY, GENETICS AND NEW TECHNOLOGIES

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VOLUME 67 • ISSUE 5

ON THE COVER

A trusted partner in quality for over 60 years

Dairy Technical Services Limited was founded in 1954, to provide microbiological and chemical test results for export products. This business has grown and prospered for over 60 years becoming DTS Food Laboratories. From the first laboratory to the extensive capabilities across multiple locations today, DTS has always provided accurate and prompt testing for the food, dairy and beverage industries. The most recent addition is our new state-of-the-art Microbiology Laboratory in Sydney, servicing our partners in this region and supported further by our other strong service platforms nationally.

We are proud to be part of the future of food security ensuring safe food for consumers.

DTS is dedicated to quality, service, performance and customer focus. These values are the driving force behind this successful Australian business. DTS are the only Food Testing Laboratory's Australian owned by members of the Food Industry, having been NATA accredited continuously since 1961. DTS is passionate about understanding the needs and requirements of its clients, therefore becoming an integral part of their businesses by providing assurance services.

As Australia's largest independent food testing laboratory offering the most comprehensive range of analytical services, DTS Food Laboratories is expanding its analytical capabilities to address current and future industry needs which all contribute to the delivery of accurate and timely results, from raw materials to finished products.

Microbiological testing – Melbourne, Sydney, Brisbane

Using state-of-the-art automated microbiology platforms and staffed with highly experienced professionals, DTS offers a choice of either cultural techniques or rapid methods relating to General Microbiology and Pathogens. Complementing our services are the identification of bacteria and enumeration of spoilage organisms affecting product quality.

Physical testing for food products – Melbourne

Sensory evaluations for taints, storage trials, head space analysis, photo microscopy, particle/mesh size, viscosity measurements, product functionality tests and foreign body identification, are all offered by DTS.

Food Allergen Control, Training and Analysis (FACTA) – Melbourne, Brisbane

DTS FACTA Test for food allergens in raw materials, environmental swabs, material in production and finished products. DTS can also provide customised training, risk profiling and consulting to your business and across your supply chain, giving your team the knowledge and tools to manage food allergens in your production environment.

GMO testing – Melbourne

Using real time PCR technology, DTS can detect the presence of genetically modified material at very low levels and provide qualitative and quantitative GMO testing in raw materials and/or processed foodstuffs for the Australasian and South East Asian regions. DTS's GMO services can test for all commercialised GMO plants in the world.

Chemistry and nutrition testing – Melbourne

A major global trend driving innovation across the food industry is the relationship between health, wellness and nutrition. DTS recognises this trend and has designed facilities to meet the needs and expectations of both industry and retailers alike. Brand protection through compliance and safety is of equal concern to the industry and DTS can partner in this process through its range of contaminant and additive analysis services.

Why not make DTS your trusted partner in quality?

DTS FOOD LABORATORIES

CONTACT:
sales@dtsfoodlabs.com.au
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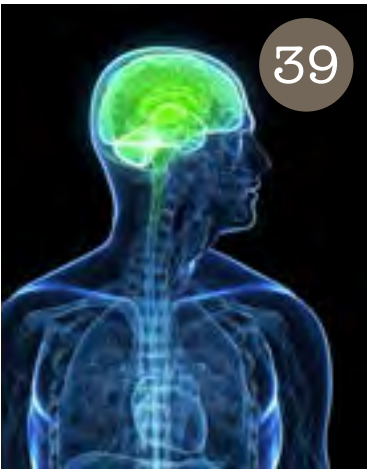

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FROM THE CHAIR

Welcome to the October / November 2015 issue of *food australia*.

Firstly, I would like to welcome Peter Schutz and Marc Barnett to the AIFST Board, following the retirement of Jo Davey and Michele Allan. I would like to warmly welcome Peter and Marc to the Board and thank Jo and Michele for their tireless contribution to AIFST over the years. AIFST wishes you well on your future endeavours.

In this issue, we are thrilled to include the JR Vickery Address from CSIRO's CEO, Dr Larry Marshall, which he presented at the 48th Annual AIFST Convention and 15th Australian Food Microbiology Conference. In his address, Dr Marshall highlighted the need for Australia's scientists to foster innovation so we can stand out in the increasingly global marketplace. I encourage you to read his contribution on page 16.

Later this month, AIFST will be holding its fourth annual Innovation Masterclass. On page 20, chair of the masterclass organising committee, Russel Rankin, gives a great overview of the state of innovation in Australia and how important it is for food businesses to foster innovation to survive and thrive.

Looking at ingredients, CSIRO has shared new research on the effectiveness of microencapsulation technology for challenging bioactive food ingredients.

I always enjoy reading about the exciting work going on in the Australian food industry as we continue to play a bigger role in the global industry.

I do hope you enjoy reading this issue of *food australia*.

Dr Anne Astin
AIFST Chair & President

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AUSTRALIAN SUGAR EXPORTS LOOKING PRETTY SWEET

While sugar consumption in Australia remains flat, more than 80 per cent of all sugar produced is exported, making the country the third-largest exporter of raw sugar in the world. Sugar is our seventh largest agricultural export. In recent years, Asia has become a major focus with key export markets including South Korea, Indonesia, Japan and Malaysia.

According to a *BCC Research* report published in September 2015, the global market for sugars and non-sugar sweeteners combined grew 2.7 per cent in 2014, with sugar growing at 2.3 per cent and sugar substitutes growing at 4.3 per cent over the same period.

The combined market is worth nearly $106.9 billion globally and is expected to grow at a five-year compound annual growth rate of 2.8 per cent from 2014 to 2019, reaching $122.8 billion in 2019.

Of that, the sugar market represented $92.1 billion, predicted to continue to rise at a compound annual growth rate of 2.6 per cent to reach nearly $104.7 billion by 2019. The growth in the market for sugars is largely driven by Europe and parts of Asia, in particular India and China.

While the sugar market is one of the oldest in the world, shifting consumer attitudes in many western markets are driving significant growth in sugar substitutes, with the global market anticipated to grow by nearly 30 per cent over the next five years.

3RD

Australia is the world's third-largest exporter of sugar, with 80 per cent of Australian sugar exported.

$2B

The value of sugar to the Australian economy.

$104.7B

The sugar market will total $104.7 billion in 2019, up from $92.1 billion in 2014.

Anticipated growth of the global sugar substitutes market over the next five years. **30%**

$18.2B

The anticipated worth of the global non-sugar sweeteners market by 2019.

4.3%

The estimated compound annual growth rate of the non-sugar sweetener market from 2015 – 2019

Proportion of the global market for sugar and non-sugar sweeteners made up of white sugar in 2013. **30%**

2.5%

Raizen, the largest sugarcane milling group in Brazil, accounts for only about 2.5% of global sugarcane.

Sources: *BCC Research, September 2015. Global Markets for Sugar and Sweeteners in Processed Foods and Beverages. Center on Globalization, Governance & Competitiveness, Duke University. September, 2015. Power Asymmetries in Global Value Chains. Queensland Cane Growers Organisation Ltd. www.canegrowers.com.au*

FONTERRA EXPANDS INTO INDONESIA

Leading dairy company Fonterra has opened its first manufacturing facility in Indonesia.

Fonterra Chairman John Wilson said the plant is Fonterra's largest investment in the ASEAN region in the last decade and will support the growth of the company's brands in Indonesia.

"Fonterra has been supplying high-quality dairy nutrition to Indonesia for more than 30 years and today it is one of our most important global markets. The opening of the plant is an exciting step forward in our relationship with the country and local dairy industry," said Mr Wilson.

The plant cost NZD $37 million and took 11 months and close to one million man-hours of construction to complete. It was built using Fonterra's world-class manufacturing design standards and technology.

Fonterra's Managing Director Asia, Middle East and Africa (AsiaMEA) John Priem, said the facility strategically positions Fonterra to help meet Indonesia's continuous growing demand for dairy nutrition.

"The country's large and increasingly affluent population is looking for highly nutritious food for all ages. This is fuelling dairy demand growth, which is expected to increase by five per cent every year to 2020.

"Our new plant has the capacity to pack around 16,000 MT of dairy ingredients a year – that's a pack of Anlene Anmum and Anchor Boneeto every second, or 87,000 packs every day, which will go a long way in helping meet this growing demand for dairy," Mr Priem said.

The plant is expected to have a positive impact on the local community, employing more than 160 local Indonesians.

AUSTRALIA'S WORLD-FIRST VIRTUAL SUPERMARKET

An Australian-made iPad app featuring high-resolution images of a virtual store could transform how consumers shop online for food and groceries.

Developed by Aussie Farmers Direct, the AisleOne app allows consumers to stroll through grocery aisles in a virtual experience and click on items they would like to purchase, just as they would in real-life.

Aussie Farmers Direct CEO Keith Louie said the app is not typical of similar online shopping sites.

"We wanted to make an app that completely reimagined the online shopping experience, but to do so, we had to throw out all of the standard e-commerce conventions and start from scratch.

"AisleOne is the result. It's a true virtual shop optimised for touch screens that makes customers feel like they're physically standing in a supermarket," Mr Louie said.

Mr Louie, the former general manager of Coles Online, said the app has been designed so that someone with little or no computer experience will still find it user friendly.

"Browsing through each aisle is as easy as swiping left or right across the screen. You can tap on any item to reveal detailed product information and adding items to the shopping cart is as simple as dragging it down into the shopping trolley.

"AisleOne is the first online shopping platform to take the best aspects of physical retailing and recreate them digitally."

The launch of AisleOne also marks Aussie Farmers Direct's first entry into the digital marketing space, with talks of the company opening up to new revenue channels outside of the online food delivery business.

SA BATTLES TO SAVE BEES

South Australian hobby beekeepers are an integral part of the National Bee Pest Surveillance Program (NSPSP), boosting the effectiveness of efforts to detect bee pests such as Varroa mite far beyond what government funding can achieve alone.

NSPSP facilitator, Sam Malfroy of Plant Health Australia (PHA), says the partnership is essential in keeping Australian bees and food healthy with hobby beekeepers taking a frontline role in surveillance to keep the honeybee and pollination industry safe and protect food production.

The Varroa mite is only the size of a pinhead, but it is the most serious threat to the viability of the Australian honey bee industry.

The mite is part of the syndrome leading to honey bee declines in many places around the world, but Australia is currently one of the last remaining regions in the world still free of Varroa - although it is closer than ever having recently reached Indonesia and New Zealand.

It is believed that Varroa was present in New Zealand for years before it was first discovered, making it too late for industry and government to try eradicate the pest.

To ensure this does not happen in Australia, Mr Malfroy said biosecurity was everyone's responsibility, including government, agricultural industries and the community.

USING TECHNOLOGY TO CUT FOOD WASTE

Queensland University of Technology (QUT) has developed and tested the use of new technology to change consumer behaviour and reduce domestic food waste.

Dr Geremy Farr-Wharton from the Urban Informatics Research Lab in the QUT School of Design undertook a research study to determine why people throw out food and how technology could be designed to influence these behaviours and reduce food waste. He found there are generally three main reasons why household food ends up in the bin.

"People throw out food because of a lack of food supply knowledge (what's in my kitchen), food location knowledge (what's in my fridge and pantry) and level of food literacy (how to use it and judge its edibility)."

After identifying these factors, Dr Farr-Wharton conducted a series of in-home experiments to test three design interventions aimed at reducing food waste through improving food supply, location knowledge and food literacy.

The first intervention was the Colour Code Project, which used different colour mats inside the fridge to organise food types and a chart on the door to indicate where food was located.

The second intervention, FridgeCam, targeted food supply knowledge by providing people with a camera positioned within the fridge that took photos of their fridge interior and uploaded them to a website, working as a fridge inventory.

EatChaFood, the third intervention, was a mobile app prototype that provided an interior view of the fridge, as well as a record of the food inside and offered meal solutions based on food supply and expiry.

Dr Farr-Wharton said the outcomes of the interventions revealed improving food supply and location knowledge, as well as educating people in how to use their food to judge its edibility, helped to reduce domestic food waste.

Food waste costs Australians more than $6 billion a year and accounts for about 20 per cent of landfill capacity.

STRENGTHENING INDONESIA-AUSTRALIA PARTNERSHIP

The Australian and Indonesian governments have announced the agreement to invest over $12 million to the Indonesia-Australia Partnership on Food Security in the Red Meat and Cattle Sector.

Announced by Minister for Agriculture, Barnaby Joyce and Chairman of the Indonesia Investment Coordinating Board (BKPM), Franciscus M.A Sibarani, the projects from the partnership are set to deliver benefits for both Australia and Indonesia.

Minister Joyce said the partnership was a great opportunity for both nations as neighbours to work together and forge stronger relations in agricultural investment and skills.

"The $12 million will be used to promote sustainable commercial-scale beef cattle breeding in Indonesia, the continuation of the Indonesian Skills Development Programme for 2016 and 2017 and further beef processing training," said Minister Joyce.

Established in 2013 as a 10-year $60 million investment by the Australian Government to enhance engagement between Australia and Indonesia, the partnership aims to capitalise on opportunities within the sector.

Minister Joyce said Indonesia's long-term plan to improve food security is one such opportunity.

"Australian beef cattle producers have a vital role to play in assisting Indonesia to achieve food security as suppliers of

high-quality cattle in the years ahead," Minister Joyce said.

"Two-way trade with Indonesia was worth more than $3.8 billion in 2014. Agriculture is important to our bilateral relationship, to our economies and to the livelihoods of farmers in both nations."

The investment follows Indonesia issuing import permits for another 50,000 Australian cattle after initially cutting the export trade earlier in 2015.


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*International Food Information Council, 2013
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RIRDC AND CSIRO RELEASE AGRICULTURE MEGATRENDS

The Rural Industries Research and Development Corporation (RIRDC) and CSIRO have released five key megatrends that will significantly impact Australian agriculture over the next 15 to 20 years.

Through its National Rural Issues program, RIRDC, in partnership with CSIRO, undertook 'big picture' research to help Australia's agricultural sector anticipate and proactively plan for change. It detailed the following megatrends, opportunities and challenges for Australian farmers:

1. **More people.** By 2050, there will be 2.3 -2.4 billion more people, requiring 60-70 per cent more food.
2. **More wealth.** Developing economies with increasing wealth are driving demand for more diverse foods. In Asia, more than one billion people are expected to move out of poverty, as average incomes rise from US$12,000 to US$44,000 a person, by 2060. With this, beef consumption is predicted to rise 120 per cent, and dairy consumption is set to double.
3. **More knowledge.** Consumers of 2050 will be empowered by information and will expect food to be nothing less than healthy, nutritional, green, clean and ethically produced.
4. **More technology.** Advanced digital, genetic and materials science technologies will enable farmers to improve how they produce food, while innovative sensory systems and data analytics will create highly integrated 'farm to food' supply chains. Farmers will be better able to make decisions and manage risk, while consumers will have greater access to trace the origins of their food.
5. **Changing risks.** Australian rural industries can expect a changed risk profile, calling for new and deeper levels of resilience to withstand shocks associated with climate change, environmental change and globalisation.

RIRDC's Managing Director, Craig Burns, said foresight research is critical to ensure the Australian agricultural sector maintains and grows its sustainability and competiveness.

"While the projected increases in global demand for food could be perceived as an insurmountable challenge, our farmers, who supply 93 per cent of our domestic food needs and are highly export-oriented, are renowned for their capacity to adapt, innovate, achieve productivity gains despite declining terms of trade and respond strongly to risks. They are well-placed to capitalise on these megatrends."

Co-leader of the research Stefan Hajkowicz, Principal Scientist in Strategy and Foresight at CSIRO, agreed the insights pointed to a bright future for Australian agriculture.

"Overall conditions are set for strong demand growth in food and fibre products across Asia, along with opportunities for diversification as diets with in the region become increasingly westernised.

"The 'where did my food come from?' factor will be a big deal for future food consumers. Establishing provenance, quality and safety will allow us to fetch market premiums. There's nothing low-tech about Australian agriculture. It is high-tech and well placed to go super high-tech."

BAN ON AUSSIE VEGETABLES

The Papua New Guinean government has instituted a ban on the import of selected Australian fruits and vegetables effective from 11 August 2015.

According to the Department of Agriculture, the ban is based on Papua New Guinea's drive to support domestic producers of vegetables.

Industry body AUSVEG said Australian fresh vegetable exports to the PNG market were worth $3.8 million to the Australia vegetable industry in 2014-15.

"Australian vegetables have been exported to PNG without major issue for years and it has been a stable market in recent times. This is concerning, given the unexpected nature and timing of the announcement," said AUSVEG National Manager – Export Development, Michael Coote.

AUSVEG is currently working with all relevant parties in an effort to resolve issues posed by the sudden announcement.


Michael Parker

Former Telstra Executive to chair CSIRO board

Former Telstra CEO David Thodey has been appointed the new Chair of the Board of CSIRO, commencing in November 2015.

Former Minister for Industry and Science, Mr Ian Macfarlane said Mr Thodey's appointment to work alongside our nation's most respected scientists at CSIRO will enhance Australia's record on collaboration and commercialisation.

"Mr Thodey is one of Australia's most well-known and respected businessmen. He will bring a wealth of industry acumen to Australia's peak science agency as it plays an increasingly central role in maximising our economic opportunities and industry growth," Mr Macfarlane said.

The Australian Government has set out a clear pathway to ensure the nation's best researchers and most productive industries can work to mutual advantage and efficiently utilise the $9.7 billion investment into science and research. "Mr Thodey's experience in building business networks will be valuable to CSIRO as it implements its new 2020 Strategy."

Mr Thodey said it was an honour to be asked to contribute to the future of CSIRO.

"Consistent with the new CSIRO vision, I hope that the CSIRO can be a catalyst for innovation across key focus industries and the wider community. We must make sure that Australia remains a global leader in the areas of science, research and industry innovation."

Mr Thodey was the CEO of Telstra from May 2009 to April 2015. Before joining Telstra, he had a 22-year career with ISM working in senior marketing and sales positions, including CEO of IBM Australia/New Zealand.


Tim Plenderleith

Aurecon appoints new manufacturing director

Manufacturing company Aurecon has announced the appointment of Tim Plenderleith as global market director.

With almost 20 years experience in the manufacturing industry in Australia, New Zealand, Asia and Africa, Plenderleith will focus on the development and achievement of the company's overall business plans.


Michael Parker

New senior territory manager for cell biosciences

Australian supplier of Quality Microbiology and Research Products, Cell Biosciences, has appointed Michael Parker as Senior Territory Manager to oversee sales and support to QA microtesting labs, both factory and external, across Victoria, South Australia, Tasmania and Western Australia.

Mr Parker brings a wealth of knowledge to further Cell Biosciences' growth in providing microbiological testing equipment and consumables to the food industry.

Mr Parker comes to Cell Biosciences with 30 years industry experience. He has previously held positions with CSL and bioMérieux and for the past 19 years, Mr Parker has supplied and supported microbiological testing of pathogens and quality indicators in the food industry.

He has been a member of AIFST for 16 years and is the immediate past chair of the Victorian branch of AIFST's Food Microbiology Group.


Anne Lockwood

BDO announces national leader for food and agribusiness

Accounting firm BDO Australia has announced the appointment of Melbourne-based BDO Partner Anne Lockwood as the firm's new national leader for food and agribusiness.

Ms Lockwood will lead BDO's team of agribusiness specialists, providing audit, tax and advisory services to clients across the country.

"Anne has a wealth of experience, deep technical skill and understanding of the current challenges and opportunities facing the agricultural, food and wine sectors," said BDO National Chairman, Helen Argiris.

"BDO believes Anne will be a wonderful asset to the leadership team and will continue to deliver the exceptional level of service our clients have come to expect."

Ms Lockwood's appointment follows the departure of David Krause, who has taken up the role as chief financial officer with Queensland agricultural company, Kalfresh.

FROM THE CEO

Well the last two months have certainly been busy ones at AIFST! We held our annual Convention, our first annual general meeting (AGM) under the new company structure, added three new members to the team and issued our comprehensive member survey to get feedback from you on your priorities for the Institute.

During the Convention, we held our first Annual General Meeting (AGM) under the new Limited by Guarantee structure. Members voted in favour of three resolutions, including amendments to the Constitution and the first election of non-executive directors of the Institute.

AIFST fellows Peter Schutz and Marc Barnett join the board, replacing retired directors Jo Davey and Michele Allan. I would like to warmly welcome Peter and Marc and sincerely thank Jo and Michele for their tireless contribution to AIFST over the years.

We have also appointed three new members to the team to further enhance our capacity to deliver member services. Julie Palmer has joined us in the newly created position of membership officer, Elizabeth Newport has joined as communications manager and Maria Sapuppo has joined as financial manager to look after the financial operations of the Institute and fill the role left by Vicki Wallace. Please join me in welcoming Julie, Elizabeth and Maria to the team.

Looking toward the remainder of 2015, I will be working closely with the team and the board to develop the Institute's strategic plan for 2016 and beyond. The first step in this process is the member survey we have just issued. If you haven't already, I encourage you to complete it and have your say. I am keen to get feedback on the performance of the Institute and your priorities as a member. This will then form the basis of our strategic objectives to ensure that we are delivering against your priorities moving forward.

If you have any questions, please contact me directly at georgie.aley@aifst.com.au or 02 9394 8650.

Georgie Aley

Julie Palmer

Elizabeth Newport

Maria Sapuppo

GLOBAL RECOGNITION FOR AUSTRALIA'S FOOD SCIENTISTS

AIFST members can apply for the Global Certified Food Scientist (CFS) credential as part of the AIFST Continuing Professional Development (CPD) Program.

The CFS credential is the only global certification for food science professionals and it meets the International Standards Organization (ISO) regulation for personnel certification programs.

"The credential offers global recognition for skills, which is increasingly important as our industry continues to open up to global markets. It also offers recipients the opportunity to learn and network with food professionals globally, through workshops, training courses and online discussions," said Bronwyn Graham, AIFST's CPD Coordinator.

Earning the CFS involves meeting education and work history requirements, as well as passing an exam.

For more information, download a copy of the CFS Candidates Handbook at aifst.asn.au.

"I acquired the CFS Credential in November 2014, and as a result, I have had many opportunities to collaborate with industry and academic professionals, both locally and globally.

Gaining the CFS Credential has enabled me to network with a wide array of people through workshops, training courses and online discussions. Through this I have been able to connect with leaders in food science, growing my networks from which I can seek advice or ask for assistance.

These industry interactions have given me a lot of great ideas for future product development projects. Aside from networking, these experiences have allowed me to continuously improve my leadership skills and technical knowledge.

Overall, my participation in CFS has been a valuable opportunity that has accelerated my career in food science and has benefited me both personally and professionally."

Aldez Alvarez, CFS, MAIFST
Essential Flavours & Ingredients

IT'S A WRAP: 48TH ANNUAL AIFST CONVENTION AND 15TH AUSTRALIAN FOOD MICROBIOLOGY CONFERENCE

Dr Linda Harris

Photos: Phill Martin/AIFST

This year's annual Convention was an enormous success, with more than 500 delegates from all sectors of the Australian food industry joining us to hear from more than 90 expert local and international speakers who shared their insights and research into Australia's role in feeding the world's population.

Held at Sydney's iconic Luna Park, the 48th Annual AIFST Convention and 15th Australian Food Microbiology Conference ran from August 11–13, 2015 and was supported by more than 70 sponsors and exhibitors, including the NSW Food Authority, CSIRO, Hawkins Watts, Manildra and Chr Hansen.

The level of support we had for the Convention is testimony to the industry's commitment to succeeding at a global level and drawing on leading expertise to overcome challenges faced by the industry.

A key theme was food safety – from our plenary sessions through to several concurrent sessions with local experts. While Australia boasts an excellent reputation for food safety, it is an area of vital importance as the food supply becomes increasingly global.

The consensus from the Convention was that the industry needed to work together to continue minimising food safety risks and to ensure we share and adopt learnings from past incidents.

Another key topic at the Convention was innovation, with several leading speakers calling on Australian food producers to take a leap beyond raw materials, stop renovating products and start innovating.

In his JR Vickery Address CSIRO CEO Dr Larry Marshall, said Australia was entering a unique time when billions of well-informed and discerning customers want our high quality products and are willing to pay well for them.

"Innovation thrives when customers focus on quality, not price, and this is where Australia performs best. The Agrifood industry can become a shining example of Australia exporting unique end products rather than just raw materials."

Along with a fantastic three days of informative and inspiring presentations and workshops, delegates enjoyed building industry relationships and networks at the social events, including our always popular Wine and Cheese night and of course our Convention Dinner, where the dance floor is always a highlight.

So for another year, that's a wrap. A massive thank you to the Convention organising comittee, Allison Vella and Nai Tran-Dinh for pulling together such a great event. We hope to see you at our 2016 Convention in Brisbane at the Brisbane Convention & Exhibition Centre from June 27–28, 2016.

AIFST AWARDS FOR 2015

Our annual AIFST awards are an opportunity to recognise the world-leading work Australia's food scientists are doing to advance the Australian food industry. Presented at 48th Annual AIFST Convention and 15th Australian Food Microbiology Conference, this year's awards recognise the outstanding contributions of the following industry members.

- **Keith Farrer Award of Merit** acknowledging achievement in food science and technology in the wide areas of research, industry and education, as well as contributions to further the aims and objectives of AIFST, was awarded to **Peter Schutz**, Food Innovation Australia (FIAL).
- **AIFST Food Industry Innovation Award** recognising a significant new development in a process, product, ingredient, equipment or packaging, which has achieved successful application in the Australian food industry was awarded to the world's first water harvested from fruit and vegetables, **AquaBotanical Beverages (Australia) Pty Ltd**.
- **The AIFST's President Award** recognises outstanding contribution to the Institute, which was awarded to the **CSIRO Food and Nutrition Flagship** and **Ailsa Hocking**, an Honorary Research Fellow at CSIRO.
- The **Jack Kefford Award** for the best food science and technology paper published in a peer-reviewed journal, presented to **Dr Ying Zhu**, University of Adelaide.
- **Bruce Chandler Book Prize** for published contribution to food science and technology was awarded to **Prof Bhesh Bhandari**, recognising his publication *Food Materials Science and Engineering*.
- The **Malcolm Bird Award**, recognising young members who demonstrate academic achievement, leadership and integrity, was presented to **Divya Eratte** from Federation University. The runner-up was **Anton Plushcke** from Queensland University.
- The **Student Product Development Competition** for the proposal of a new product was awarded to **William Angliss Institute of TAFE** students, **Terry Waldron**, **Theoni Binos** and **Laura Vougas**. Runners-up of the Competition were students from the **University of Newcastle**, **Ryan Tyrrell, Lisa Hayden** and **Olivia Duffin.**

- **Poster Competition** was awarded to **Divya Eratte** and runner-up was **Chuyen Van Hoang**.
- **Young Professionals in Science** was presented to **Hilal Varinili** and runners-up were **Divya Eratte** and **Svenia Beck**.
- The **John Christian Young Food Microbiologist Award** was presented to **Hasinika Gamagem**, with the runner-up **David Haslet**.

Congratulations to all of this year's award recipients. To find out more about the awards and the entry criteria, please visit aifst.asn.au/awards/. The 2016 awards will open in December 2015.

TRANSFORMATION THROUGH INNOVATION

This paper is based on the JR Vickery Address presented by CEO of CSIRO, Dr Larry Marshall, at the 48th Annual AIFST Convention and 15th Australian Food Microbiology Conference.

Words by *Dr Larry Marshall*

James Richard Vickery was born in Ballarat in 1902 and studied biochemistry at the University of Melbourne, as well as gaining a PhD from Cambridge University.

Vickery's tenure with CSIRO began in 1931, when he was appointed Officer in Charge of the Food Preservation and Transport Division of CSIRO with a lab in the Brisbane Abattoirs.

The primary objective of the abattoir was to export chilled beef to Britain following the outbreak of World War II, where there was a pressing need to meet the demands of the armed forces. JR Vickery advised government departments and the industry on wartime food supply problems that needed to be addressed.

James Vickery is not remembered as a scientist, but remembered for the impact he had. Without his work we would not have our meat export industry.

Australia's innovation dilemma

Currently, Australia is struggling to translate our strong innovation inputs to innovation outcomes, such as patents, new commercial products, services and impact.

In fact, according to the *Global Innovation Index*, Australia is currently ranked 10th in the world for innovation inputs and 22nd for innovation outcomes. We lag behind considerably in innovation efficiency and productivity, ranking just 81st globally for our innovation efforts.

Countries such as Marititus, Myanmar and Latvia are doing better in the innovation sphere than Australia.

Our food and agribusiness sector is a great illustration of this dilemma. Australia is located next door to the world's largest fastest growing market in terms of demand for trusted, premium food products. We also have a competitive production base across Asia, particularly in our commodities such as grains, meat and dairy.

Food is Australia's largest manufacturing industry. The industry performs well in Australia, employing over 226,000 people and providing 20 per cent of gross value added by all manufacturing.

In saying this, the majority of our food exports are only minimally transformed enough to stablise the commodity for transportation. Despite repeated efforts to add value with elaborately processed foods, the proportion of packaged consumer food exported is tiny and imports to Australia have tripled since 1990.

It is absolutely crucial we innovate and stop being in the commodity business, doing enough for food just so it can be transported. Unlocking the innovation dilemma in the context of food and agribusiness could represent a huge opportunity to the future prosperity of Australia, also contributing significantly to the global issues of food security, health, food safety and biosecurity.

Innovation megatrends

Based on megatrends studies conducted by CSIRO Futures in conjunction with the Rural Industries Research and Development Corporation (RIRDC), a massive opportunity exists to introduce greater innovation into the production, processing and delivering of food.

We predict population growth will be driving global demand for food and fibre, although equally, this demand will be driven by a much larger middle class across Asia with changing dietary preferences and desires. This class will know more about food, enjoy choosing food and demand a high standard and a wide variety.

Couple this demand with the 'transformative technologies' we are already working on and the external risks causing uncertainty in production due to climate change and geo-political factors, and we have the perfect situation for an acceleration of innovation in this sector. This will bring new techniques and technologies to the market that can

smooth out the impacts of globalisation, climate and environmental change.

State of innovation

We are not starting from ground zero. Already we have examples of breakthroughs that are only at the beginning of their impact curve.

Last year, China surpassed the United States to become the world's largest economy in terms of purchasing power parity. The powerhouses of the new world economy are China and India, who will bolster the building of new export markets, trade relations, business models and cultural ties for Australia, showing a massive opportunity.

CSIRO is thinking about how Australia can become not just a mere supplier of calories to the world based on our vast acreage and production abilities, but using innovation to take that step further.

One example of this is the development of the next generation of ready-to-eat chilled foods from CSIRO. With extended shelf life being key to export markets, the meals do not compromise flavour or freshness and are modelled using the CSIRO Total Wellbeing Diet, so nutrition is not compromised.

Products such as BarleyMAX, DHA Canola and barley with low-levels of gluten acceptable for people with coeliac disease, are just a few further examples of how CSIRO is bolstering innovation for food and agribusiness.

To ensure we are making the most of these opportunities, we need to incentivise and de-risk research investment by allowing investors to engage with research within the sector.

Turning innovatiON ON

For success, we must foster innovation at all points in the value chain. This innovation will drive down costs and lift productivity, while creating a differentiated higher value, higher quality and safer product that emerging markets demand.

To further kickstart entrepreneurship and innovation, CSIRO has launched the "ON" Program. The program is a large scale, systematic approach with an ideas marketplace, innovation accelerator, entrepreneur-in-residence program, new venture funding, staff incentive models, innovation spaces and international linkages with Australia and global hubs.

The prime objective of the program is to bring the world's best practice innovation culture to Australia's doorstep. The program will aim to move the whole Australian ecosystem forward through collaboration, create new waves of Australian technology companies with the potential to invent and re-invent industries and find creative ways of delivering environmental and social benefit.

In closing, my goal as CEO of CSIRO is to extend the great JR Vickery's innovation legacy so that we are prepared to face what we know is coming at us. Who better than the people in the Australian food and agribusiness industry to deliver to that?

Dr Larry Marshall is Chief Executive Officer of CSIRO, Australia's national science agency. Dr Larry Marshall gave the JR Vickery Address at the 48th Annual AIFST Convention and 15th Australian Food Microbiology Conference.

FOOD SAFETY ON THE INTERNATIONAL STAGE

A number of food regulatory agencies across Asia Pacific are working together to ensure strong food safety standards and regulatory harmonisation in the APEC region.

Words by *Dr Geoffrey Annison*

Food safety became a political hot topic earlier this year following the Hepatitis A outbreak associated with imported frozen berries. Unfortunately the political attention quickly morphed into a general debate about the safety of imported food and country of origin labelling.

Despite what has been reported in the media, imported food has to meet the same high standards of food safety as domestically produced food under the ANZ Food Standards Code[1]. Compliance is monitored at the border under the Imported Food Inspection Scheme as implemented by the Commonwealth Department of Agriculture. The system works well and there is no indication that food safety incidences are any higher for imported foods compared with domestically produced foods.

International trade and export opportunities for Australian food manufacturers have also had increased media attention recently, with the finalisation of free trade agreements (FTAs). While the FTAs may also provide more opportunities for imported products in Australia, trade in both directions can only be enhanced if technical barriers to trade are eliminated, or at least minimised.

Minimising barriers to trade

Interestingly, work has been going on in this area for the last 10 years under the auspices of the *APEC*[2] *Food Safety Cooperation Forum* [3] (APEC-FSCF). First convening in 2007, the APEC-FSCF is a forum of food regulatory agencies from

APEC economies. It is co-chaired by China and Australia, with Food Standards Australia New Zealand (FSANZ) representing Australia.

The purpose of the forum is to strengthen food safety standards and practices in the APEC region, using scientific risk-based approaches and without creating unnecessary impediments to trade. The primary goal is to ensure increased capacity building to improve technical competencies and a better understanding of food safety management among stakeholders in the supply chain, including regulators. Regulatory harmonisation, or equivalence, has also been one of the stated objectives.

Industry partnerships

Recognising the value of including food safety experts from academia and industry, the APEC-FSCF convened the *Partnership Training Institute Network* (PTIN) early in its operation as one of the key mechanisms for the carriage of APEC-FSCF activities.

The Australian Food and Grocery Council (AFGC) is on the PTIN Steering Group and last month we participated in a three-day meeting of the APEC-FSCF held in the Philippines. This was the fourth meeting the AFGC had attended and it was interesting to note the increasingly greater contribution the industry has been making to meeting agendas and work programs.

Indeed, at the recent meeting a dedicated workshop was held on the theme "*Towards a Future of Prevention and Partnership: Roundtable on Effective Industry/Regulator Cooperation*". Presentations from industry representatives emphasised the importance of regulators consulting with industry during regulation development and highlighted the role and value of industry associations in presenting the collective views of industry to regulators. Regulators recognised the value of consultation and its importance as an input into regulatory impact assessments as part of best-practice regulation. This was music to the ears of the AFGC, which has long advocated the need for efficient and effective food regulatory arrangements as a critical underpinning of industry competiveness in global markets.

APEC Wine Regulatory Forum

Another example of industry leading activities of the APEC-FSCF is a project on export certification led by the *APEC Wine Regulatory Forum*. The aim is to develop a 'one size fits all' export certificate template, which all of the APEC economies agree to use. While wine is a relatively low-risk product from a food safety point of view, there is high value associated with authenticity (i.e. grape variety and provenance), an area where export certification can provide regulators greater confidence in the integrity of imported product. The template has potential value for other products where product integrity (i.e. quality aspects) requires higher levels of assurance for regulators.

Maximum Residue Limits

Another project of potentially high value to industry is in the area of pesticide maximum residue levels (MRLs). Discrepancies in MRLs, and lack of recognition of MRLs around the world, has been an ongoing issue for the Australian agrifood sector. FSANZ is leading a project on the harmonisation of pesticide MRLs for imported foods in APEC economies. This promises greater alignment in regulatory agency processes to determine MRLs for their commodities and foods, which in turn paves the way for greater recognition of MRLs across the region.

Not withstanding the importance of harmonisation for MRLs and other compositional standards, there's no value in this if laboratories around the APEC region get different results when testing foods. Implementation must be backed by robust systems to assess compliance. In order to achieve this, the APEC-FSCF has devoted substantial resources to laboratory and analytical capacity building. This should lead to greater confidence in analytical testing when used for compliance testing purposes.

The activities mentioned above are a very small part of APEC-FSCF agenda. For a more comprehensive description visit fscf-ptin.apec.org

It is good to know that as opportunities of exports from Australia's agriculture and food manufacturing sector are on the increase, substantial effort is being put into ensuring food regulatory technical barriers to trade, are being addressed. It's also good to know that as the levels of trade increase, the regulatory arrangements in overseas economies are becoming more sophisticated.

Credit for the FSFC achievements to date goes in large part to solid working relationship between FSANZ and their counterparts in the Chinese regulatory agency, the *General Administration of Quality Supervision, Inspection and Quarantine* (AQSIQ), and the personal rapport established between Mr Steve McCutcheon of FSANZ and Dr. Lin Wei of AQSIQ who have co-chaired the FSCF since it commenced.

Dr Geoffrey Annison, PhD, is deputy chief executive and Director of Health Nutrition and Scientific Affairs at the Australian Food & Grocery Council.

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Russel Rankin *Food Innovation Partners Pty Ltd*

With over 29 years experience in the food industry, Russel has a thorough understanding of commercial business strategies and drivers. With an industry network built from experience at various senior commercial and research positions, Russel has an inherent ability to connect companies, research organisations and government.

As founding director of Food Innovation Partners Pty Ltd, Russel has a strong understanding on how to manage the innovation process and commercialise research. Prior to this, he was General Manager – Innovation for the National Food Industry Strategy.

Russel is chair of the organising committee for AIFST's annual Innovation Masterclass: Innovate or Evaporate! The fourth in its series, the Masterclass will explore how food businesses can drive innovation in the highly competitive food industry. The Masterclass will be held at the William Angliss Institute in Melbourne, Tuesday, October 20, 2015.

Q What would be the best way to describe the current state of innovation in the Australian food industry?

A Stagnate! There are some pockets of really exciting innovation occurring in Australia's food industry, but overall there has been a steady decline in innovation activity and new product development over a number of years. Largely, this is as a result of cost pressures associated with food production and manufacturing in Australia, together with a highly competitive retail environment. The cost of input materials, labour and logistics, combined with slim margins, make it difficult for companies to invest in innovations.

Q What are the main areas of improvement the Australian food industry need to address in order to boost innovation?

A Australia's innovation system consists of all the necessary elements to enable effective innovation processes, including commercial companies, innovation providers (Universities, CSIRO, state governments, private providers and so on), educational institutions, government agencies, financial providers and marketing. What is missing is the structure and processes to connect these elements together in a cohesive way to drive innovation at a business level.

The Federal Government, as part of its Industry Innovation and Competitiveness Agenda, has put in place the Food and Agribusiness Growth Centre. This initiative is being delivered by the not-for-profit company, Food Innovation Australia Ltd (FIAL). FIAL's role is to boost the competitiveness and productivity of Australia's food and agribusiness sector by identifying opportunities to reduce regulatory burden, increase collaboration and commercialisation, improve capabilities to engage with international markets and global supply chains and enhance management and workforce skills.

This initiative, along with others that have been established, will not be enough to reverse Australia's declining innovation scorecard. What is required is for each of the players within the food innovation system to act as facilitators – trusted intermediaries connecting with other required players to develop and commercialise innovation that is driven by deep market/consumer insights. It is important to remember that innovation is only a success when a product is sold to a consumer.

Q How can smaller companies in the food industry foster innovation?

A SMEs can be innovative, as has been demonstrated by businesses such as AvoFresh and five:am yoghurt. Both of these companies were start-ups that have grown into significant businesses. On the back of its success in the retail market, five:am yoghurt was purchased by PZ Cussons last year.

In the case of AvoFresh, the innovation is the application of high pressure processing (HPP) to provide an extended chilled shelf life to a minimally processed product without affecting flavour, colour, taste and micronutrients. It is also the use of packaging, tubes and tubs that deliver avocado in a convenient, ready to use format.

For five:am yoghurt, the product was underpinned with innovations such as Australian organic yogurt, convenient packaging format, unique flavours such as coffee flavoured yogurt, combined with great branding and marketing. The company value grew from zero to $80 million in just five years.

The elements that made them both succeed include a deep understanding of the consumer and market they operate in, together with innovation that provides a competitive advantage.

Q Where do you see innovation taking the food industry in the next five years?

A The greatest competitive advantage for Australia's food industry is our clean, traceable and authenticity assured production and manufacturing environment. Food products sold in Asia that are made in Australia, containing Australian ingredients will be able to command a price premium. Technological innovations in Australia's food industry need to focus on assisting Australian food producers to deliver food products to export markets that deliver on food safety, provenance, shelf life, traceability, and integrity, allowing them to capture a price premium.

Innovations are likely to come in the form of packaging technologies, such as 'smart packaging', that can measure and control conditions to maximise shelf life and eating quality and new processing technologies such as HPP, that extend chilled shelf life while maintaining quality attributes, as well as new business models that allow value to be captured from different supply chain designs.

Q How do we foster a culture of innovation in our own company?

A This is what we will be exploring at AIFST's annual *Innovation Masterclass: Innovate or Evaporate*. The fourth in the series, the Masterclass will explore many of these issues, providing insights and learnings to ensure companies consider new ways of fostering innovation. Topics this year include new models to drive innovation in Australia's horticulture industry, market and consumer insights to drive food value chain innovation and growth, crowd funding of innovation, a market place for intellectual property, bringing robotics to agriculture production and many more.

Join us at the William Angliss Institute of TAFE in Melbourne on Tuesday, October 20, 2015. For more details and how to register to attend, visit aifst.asn.au

MINDFUL SNACKING ON THE INCREASE

As the popularity of snacking in the diet continues to increase, what consumer trends are driving snack choices?

Words by *Jessica Lamisere*

Consumers are snacking more than ever. In the US, nearly two-thirds (64 per cent) of adults often snack between meals, while in the UK, 97 per cent of adults say they regularly snack between meals. Recent research from AUSVEG has found Australians are snacking four times as much as a decade ago.

While snacking between meals is increasing, the snacks that people are choosing are changing, driven by some key consumer trends.

According to the AUSVEG research, consumers are enjoying vegetables as snacks and of those 37 per cent choose to snack on cucumber and 35 per cent choose celery.

Ironically, as more consumers seek to eat more natural, unprocessed sweeteners, the backlash against sugar in all its forms has had a detrimental impact one of the most natural and healthy categories – fruit.

Fruit juice has received its fair share of bad press in recent years, with concerns about the high sugar content and process of reconstituting juice in the spotlight for all the wrong reasons. According to Fruit Juice Australia, this has led to consumption in Australia falling three per cent year on year.

As the rhetoric around sugar consumption increases, there is increased interest in sugar alternatives. However, the backlash against traditional sweetener alternatives, such as aspartame, has been almost as significant as the movement against sugar itself.

Instead, consumers are looking to sweeteners seen as more natural, including stevia, coconut palm sugar and jaggery. Luo Han Guo, or 'monk fruit', which has been consumed in China for generations for its health and 'longevity' benefits, has also been used more recently in ready-to-drink beverages.

Clever manufacturers are highlighting the ancestral roots of these types of sweeteners, a strategy which has proven effective in the grains category, with products including chia, quinoa and others that have been cleverly marketed as 'ancient grains.'

This 'back-to-basics' approach to eating is one that is permeating all food and drink categories, with consumers becoming disillusioned with major food companies and even governing bodies as a result of increasing scrutiny and often misinformation about ingredients or processes used in food production.

Best-selling author and food critic, Michael Pollan's mantra of 'Eat Food. Not too much. Mostly plants', resonated with consumers when he shared it years ago.

The paleo diet or 'lifestyle' has attracted a lot of positive media attention as well as its fair share of criticism, primarily as a result of the exclusion of entire food groups, such as grains. Indeed, according to The Grains and Legumes Nutrition Council (GLNC), Australia's consumption of core grains, such as cereals and bread, has decreased 30 per cent in the last three years.

As consumers move away from grains, there is more focus than ever on protein and when and how to consume it. Once the domain of gym junkies, discussion about protein is increasing throughout the masses, whether for the satiety, post-exercise or health benefits.

With an increased focus on protein, there have also been changes to the types of protein consumers are seeking out. While the idea of eating insects is long established in Asian markets especially, this concept has only recently made its way into Western markets.

Over a quarter of consumers in the US and the UK (27 per cent and 26 per cent respectively) are interested in trying products with insect sourced protein, such as cricket flour. And fascinatingly, five per cent of US consumers said it would be their ideal source of protein in an energy or snack bar. Furthermore, 10 per cent of US consumers said a marine-sourced protein, such as spirulina, would be their ideal protein snack.

With increased concern about environmental and ethical impacts driving food choices for some demographics, crickets and other bugs can be appealing protein alternatives.

Along with concern about the environment, animal welfare is also a driving factor behind veganism becoming increasingly mainstream, with consumers avoiding all animal products and by-products.

While the number of people identifying as full time vegans or vegetarians is difficult to gauge, there is still an ever-increasing market for vegan snack products.

Similar to gluten free foods, vegan products are seen as being a healthier alternative to mainstream options. Their success is not necessarily indicative of the number of people who are coeliac or vegan, but rather, the number of people who are putting more thought than ever into the snacks they're consuming.

At the other end of the spectrum are collagen snacks for beauty benefits, which are quickly making their way into Western markets. Collagen has long

Australia's consumption of core grains, such as cereals and bread, has decreased 30 per cent in the last three years.

been consumed in Asian markets, via vitamins and infused water and foods, as it is believed to assist in maintaining the collagen in the skin, keeping the consumer looking younger.

Markets including Russia, Canada and South Africa are taking their cues from Asian markets and adding collagen into snack products including sweets and chocolates, turning indulgent treats into functional ones.

Whether it's natural sugar alternatives, grain-free, environmentally friendly, natural or beauty-enhancing benefits consumers are looking for, one thing is certain – people are putting more thought than ever before into what they're snacking on and how it contributes to their overall lifestyle.

Jessica Lamisere is Trend and Innovations Consultant Australia & NZ at Mintel. Mintel is the world's leading market intelligence agency. For over 40 years, Mintel's expert analysis of the highest quality data and market research has directly impacted on client success. For more information on Mintel, please visit mintel.com

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PRODUCT SHAPES AND THEIR ABILITY TO FUNCTION AS TRADE MARKS

How a product is shaped can often be a defining element of its branding. Although there can be often be some confusion around whether this is, in fact, registrable.

Words by *Michelle Cooper*

Shape marks of products are useful trade marks to have. They transcend language barriers and persist even after packaging has been removed, in the case of confectionery, right up to the moment the product is eaten. Trade mark registration is the one registration right in the array of intellectual property monopolies that can be maintained indefinitely. Trade mark registration of a product shape can be an exceptionally effective right.

This article looks at the types of product shapes that may be registered and considers, in particular, whether the functionality of a product's shape should necessarily preclude it from functioning as a trade mark and being registered.

A recent ruling from the European Court of Justice in respect of a trade mark matter in the United Kingdom indicated that, at least within the European Union, where a product shape is fully functional, this may be a bar to the product shape *ever* being registered as a trade mark. This is not the position in Australia, where the shapes of products, including the one in issue before the United Kingdom courts, are among a number of registered shape marks.

The product at issue is the Kit Kat chocolate bar, in particular, its original line of four finger chocolate coated wafer biscuits. This is a notable example as this is a product where its shape predates its name. The product was launched in 1935 under the name 'Rowntree's Chocolate Crisp'. Only afterwards was the term Kit Kat applied. The shape of this product, however, has largely remained the same since its introduction to the market 80 years ago.

Back then it was not possible to register the shape of a product as a trade mark, even if it came to successfully perform the role of a good trade mark. By definition, trade marks did not extend to shapes. This changed some time ago with the introduction of the TRIPS Agreement (*The Agreement on Trade-Related Aspects of Intellectual Property Rights*).

Following this, the trade mark laws of signatory countries, including Australia and those of Europe, were amended to allow for a broader meaning of what should be considered registrable as a 'trade mark'. In Australia, the definition of a registrable trade mark is open-ended and limited only by the imagination of marketers and the receptiveness of consumers. Shapes are just one of many kinds of signs that may function and be registered as a trade mark.

Some of the earliest shape marks to be registered in Australia are the product shapes of the Freddo Frog, Toblerone and Caramello Koala chocolates, as well as the Kit Kat chocolate bar. A requirement for registration is that a trade mark be distinctive. Some product shapes have been considered by the Australian Trade Marks Office to be so arbitrary that they were regarded as being inherently, or immediately, distinctive trade marks. Others have required evidence of use in the marketplace, sometimes over a considerable time, in order to show that the trade marks have acquired distinctiveness by building up a reputation with consumers. This was the case with the Kit Kat chocolate bar.

A major issue for consideration to the registration of the shape of the Kit Kat chocolate bar, both in Australia and overseas, has been the functionality of its shape. An important selling point for this product is its ability to have its constituent fingers broken apart and shared, which is identified in the product slogan, 'Have a break, have a Kit Kat'. The shape of the product provides for a technical result, namely the breaking of the bar easily into parts through the grooves running along the length of the bar on its slab base.

In Europe, it appears that this function could preclude this product shape from being registered. The recent ruling provides that registration of a sign that consists exclusively of a shape necessary to obtain a technical result

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with regard to the manner in which a product functions must be precluded. The rationale for this position is to prevent trade mark protection from granting its proprietor a monopoly on technical solutions or functional characteristics of a product, which a user is likely to seek in the products of competitors or, more broadly, to prevent the exclusive and permanent right that a trade mark confers from serving to extend indefinitely the life of other rights in which the European Union legislature has sought to make subject to limited periods.

In Australia, the position is that regardless of the functionality of a product shape, if it also functions as a badge of origin so as to indicate that the product comes from a particular trade source, then it may be registered as a trade mark.

People multitask all the time, as can products. Just because a product's shape functions to perform a particular utility, this does not mean that it cannot also function as a trade mark. If it is performing the job of a trade mark, this quality trumps all of its other functions and is the overriding determining factor as to whether or not a product shape is registrable.

Notwithstanding any functionality, if the purpose and nature of a product shape also serves to indicate the source of the product it is a registrable trade mark and registration may well be worth pursuing.

Michelle Cooper is a Senior Associate at Watermark Intellectual Asset Management.

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FOOD TECHNOLOGY INNOVATION: EFFECTIVELY MANAGING YOUR INTELLECTUAL PROPERTY

Role of Intellectual Property
In an increasingly competitive marketplace, innovation is key to a business' ability to develop and maintain an advantage. Although, in order to maximise innovation, an effective intellectual property (IP) protection and management strategy is required.

In the food industry, no one facet of a business on its own is sufficient for the business to succeed and thrive. There needs to be a common theme binding the components of the business together. While market success is clearly the common goal, a principal functional theme should also be identifying and protecting IP. There are a variety of IP rights available to protect food innovations, including patents, trade marks, industrial designs, copyright and plant breeders' rights.

Intellectual Property as a Commercial Tool
For intellectual property to be an effective commercial tool it needs to be effectively managed. The key is to be aware of IP rights and their potential to assist market exclusivity or competitive advantage while managing the associated risks as far as your business is concerned.

A Culture of Intellectual Property Recognition
Once you are aware of the intellectual property you possess, it is important that it aligns with your business needs and goals. To ensure you have the freedom to operate the IP, as well as be aware of any pitfalls of the IP, it is important to seek advice and strategically consider all elements of the IP.

The Next Steps
Once you have identified what intellectual property you have, ensuring it aligns to your business goals, the various components of the IP can be ranked in order of importance in terms of giving your business the most competitive advantage. If you have protectable intellectual property, it must also enable you to detect potential infringers or copiers in the marketplace.

As your business grows, you can then begin to develop strategies to build a stronger and more expansive IP portfolio so that ultimately, you have a strong wall surrounding your product lines and business interests to restrict competition.

As a proprietor, it is important to ensure you have clear title to any IP you possess. For instance, you may need to have a designer or formulator, execute an assignment, or ensure your employee contracts specifically obligate employees to assign their rights to the business for any innovation.

Time to Act: Create, Protect, Exploit
Intellectual property is an important consideration in product development and gaining a competitive edge in a dynamic and fast moving marketplace. It is a legal means to help ensure the reputation of a new product or of your business or brand is not diminished through market failure, and to give your business a competitive edge.

Businesses need to consider IP as a metric of financial and cultural performance. It can also be used as a tool to benchmark your competitors. Forward-thinking business owners will ensure, with proper management, that intellectual property can be used to enhance business development rather than hinder it.

Gavin Recchia is a Partner, Davies Collison Cave, Australia and John Hughes is a Partner at Davies Collison Cave, Singapore.

REAL FRUIT INGREDIENTS HOLD THE KEY TO UNLOCKING HEALTHY SNACKING SUCCESS

More and more Australians are taking control of their health, embracing lifestyle choices such as 'free-from' and a return to whole foods as they seek to enhance their wellbeing through good diet. It's not just about what they eat, but just as much about what they don't eat, too. In particular, sugar has been demonised by nutritionists and the media, prompting many consumers to avoid it and vote with their wallets by putting healthier choices in their baskets.

This consumer behaviour is clear to see in Australia's snack market. According to market analysts IBISWorld[1], annual growth in sales of healthy snacks is outstripping growth in sales of the whole snacks market by a ratio greater than 2:1 (3.0 per cent versus 1.4 per cent).

For snack manufacturers and brands, this market climate presents a challenge. Increasing numbers of consumers are now averse to buying products containing large amounts of added sugar, but at the same time they still expect their snacks to taste good. They want healthy indulgence, a concept that appears to be a contradiction in terms. Or is it? In fact, there's a great way to unlock the door to success in the healthy snacking market: with real fruit ingredients.

Fruit contains naturally occurring sugars, which are just as sweet and tasty as the processed sugars added to many products, but altogether healthier. It's the obvious winning solution. However, it's not feasible to add fresh fruit to packaged snacks, due to moisture transfer. But that doesn't mean it's impossible for companies to bring the colour, flavour and goodness of real fruit to their products. In fact, there's an easy way to do it – with URC® real fruit ingredients from Taura Natural Ingredients (Taura).

URC® (Ultra Rapid Concentration) is a unique process of concentrating the taste, texture and natural goodness of fruit into pieces, flakes and pastes for use in applications such as snack bars, baked goods, cereal, confectionery and chocolate. With no added sugar, URC® real fruit ingredients taste fantastic and are clean label, sulphite-free, gluten-free and low GI[2] – making them an attractive alternative to refined sugar.

With more than 30 years expertise in fruit, and a large global R&D and Technical Sales network, Taura provides unrivalled technical and product development support. Taura is committed to supporting its partners to drive new category growth – taking fruit to where it has never been before!

Recent new developments include Mini's, tiny pieces of fruit the size of a grain of quinoa, which are believed to be the world's smallest fruit pieces. Taura's experts have also combined fruit with ancient grains and seeds such as chia and amaranth, as well as on-trend inclusions such as cacao nibs to create healthy, gluten-free fruit pieces with a delicious, crispy texture. Encapsulated in fruit, these small particulates will not fall to the bottom of the packet in breakfast cereals and snack mixes. New flavour innovation has seen berries combined with beetroot and kiwifruit with kale, which offer another healthy dimension to consumers.

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For more information, please contact:
Richard Clarke, Ingredient Communications
l: +44 7766 256176
E: richard@ingredientcommunications.com

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TAURA
NATURAL INGREDIENTS

GROWING AND PROCESSING COCOA IN AUSTRALIA

Many years of research have gone into producing Australia's first fully homegrown chocolate product, so how does it compare to the rest of the world from 'plantation-to-plate'?

Words by *Tim Davies and Barry Kitchen*

You could be forgiven for thinking that all chocolate marketed as Australian chocolate is made with cocoa grown in Australia. In fact, until 2011, all Australian chocolate was made with cocoa beans grown overseas.

The Australian cocoa industry is minuscule, particularly when compared to the global cocoa industry built around West Africa, Indonesia and Central and Southern America, where over 70 per cent of the world's cocoa is grown by more than 4 million cocoa farmers.

Global state of the cocoa industry

It is forecast that global cocoa bean production will soon reach around 4 million metric tons annually with a value of US$10 billion, while the annual value of chocolate produced will be around US$130 billion. The Australian chocolate industry is approaching AUD$6 billion in sales revenue annually.

Growth in chocolate sales globally is expected to be driven by increasing demand from emerging markets, with greater growth in organic, dark, and premium product segments that address the interest in unique flavours, and functional and healthy products.

There is a global concern that demand for cocoa beans and chocolate may outstrip supply in the near future, due to pests, diseases, climate change, old and poor performing cocoa trees and lack of fertilisers, herbicides and fungicides, particularly in the principal cocoa growing countries. A number of collaborative research efforts are being instigated to address these emerging threats.

Considering the high cost of labour and logistics in Australia, the commercial sustainability of the local cocoa industry relies heavily on efficiency, product and processing innovation, delivering high pod yields per hectare, excellence in plantation horticultural practices, as well as developing and improving the genetic make-up of our planting material.

Furthermore, with only 10 per cent of the pod weight being converted into fermented dry beans for chocolate making, every part of the cocoa tree, including the pods, seeds and beans, must be utilised to maximise returns to stakeholders. Innovative ways of value adding at every step of the supply chain is essential.

This approach is now occurring in many agricultural and food processing industries, both in Australia and globally, with many by-products being converted into functional ingredients and bioactive nutraceuticals, with values far beyond that of the primary product that a crop was grown for. Examples of this trend include grapes, olives, sugarcane, cereals, rice and many fruits.

Northern Australia Cocoa Industry

15 years ago, the Northern Australia Cocoa Development Alliance (NACDA) was established to assess the feasibility of growing cocoa commercially in Australia for the first time. Studies revealed conditions in Tropical Far North Queensland along the coast were ideal for growing cocoa, even though they highlighted likely commercial challenges.

Compelled by the NACDA trials and results, Daintree Cocoa Pty Ltd was formed in 2009 by a consortium of entrepreneurs experienced in cocoa growing, cocoa processing, chocolate making, as well as the marketing and selling of confectionery and food products. A key strategic alliance involved a partnership with a group of Far North Queensland cocoa growers.

Two years later in November 2011, the company launched their first Australian Origin chocolate products under the Daintree Estates brand. These signature products were a 70 per cent Dark and a 45 per cent Milk Chocolate, which were the world's first commercially produced chocolate made from cocoa grown in Australia. Daintree Cocoa Pty Ltd is one of an elite few 'Plantation-to-Plate' chocolate businesses in the world.

The successful launch of an Australian Single Origin chocolate was the culmination of over 10 years' preliminary research into both the horticultural and post-harvest processing aspects of the total cocoa and chocolate supply chain.

The company's business model encompasses the entire supply chain, from seedling nursery, cocoa plantations and post-harvest pod processing through to the marketing, distribution and selling of the final products to consumers. Contracted cocoa growers not only supply freshly harvested cocoa pods to Daintree Cocoa Pty Ltd's central processing operation, but are also shareholders in the company and share in the profits from the full value chain and other innovative value-adding activities. The company's philosophy is to ensure that the world's best practices are employed in all stages of the supply chain to address sustainability and environmental issues in this new Australian industry.

Daintree Cocoa Pty Ltd is a founding member of the Queensland Cocoa Industry Development Association Inc (QCIDA), which was formed to:

- Represent the interests of Queensland based cocoa growers and processors to government, media and industry organisations.
- Attract funding and support for cocoa industry research and development initiatives that improve the efficiency and viability of pre and post-harvest production of Queensland grown cocoa.
- Share insights and research findings with the Queensland Cocoa Industry that empowers growers and processors to maximise returns by implementing optimal plantation husbandry practices to improve cocoa pod yields per hectare while addressing the high labour costs of local production.
- Collaborate and engage with similar cocoa industry bodies and experts locally and globally for the betterment of the Queensland Cocoa Industry.
- Encourage and support eco-friendly and leading edge environmental practices to ensure that the Queensland Cocoa Industry is a leader in agricultural sustainability.

Although the Australian cocoa industry is in its early stages, we are fortunate that our industry has been built on a solid scientific platform. Daintree Cocoa Pty Ltd is building on this by sponsoring research on pollination vectors, developing automatic cocoa pod splitters, undertaking controlled fermentation trials by adding a range of microorganisms to improve flavour, as well as examining a number of pre- and post-harvest byproducts for valuable bioactive nutraceuticals.

Tim Davies is the Director of Daintree Cocoa Pty Ltd and Barry Kitchen is the Chairman of Daintree Cocoa Pty Ltd.

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IMPROVING STABILITY OF BIOACTIVE INGREDIENTS

Recent CSIRO research demonstrates the effectiveness of microencapsulation technology for stabilising challenging bioactive food ingredients, including probiotics, carotenoids and omega-3 fatty acids.

Words by *Danyang Ying, Luz Sanguansri and Mary Ann Augustin*

Bioactive ingredients are physiologically active components of plant or animal origin that offer benefits beyond basic nutrition. When incorporated into foods, bioactives can drive a price premium and can be targeted to the specific health concerns of consumers.

The challenge for food scientists is to ensure the stability of bioactive ingredients to maximise their efficacy in the final food product. As many bioactives are unstable when removed from their natural food source, they need to be stabilised both in the ingredient form and in the final food product used for their delivery. For example, bioactives such as probiotics, polyunsaturated fatty acids, carotenoids and polyphenols are susceptible to degradation when exposed to the environment and to processing stress encountered during food manufacture, also when they are within the food product during its shelf life.

Tailoring solutions

Different bioactives require different strategies to minimise degradation and to optimise efficacy after ingestion. The development of strategies for the successful delivery of bioactives into food needs to take into account the inherent stability of the bioactive, its susceptibility to degradation on exposure to the environment and conditions during food processing, the interactions of the bioactives with components in the food matrix for delivery to the target site in the gastrointestinal tract.

Stabilising probiotics: A significant scientific and technical challenge

Interest in the consumption of foods that contain probiotics is increasing. Probiotics are live bacteria that are often promoted as good for your health, especially your digestive system. Common strains include *Lactobacillus spp.* and *Bifidobacterium spp.* Typically, probiotic foods should contain a viable bacterial cell number of at least 10 million per gram (Ishibashi and Shimamura, 1993). The susceptibility of probiotic cells to excessive heat, exposure to oxygen and low pH environments presents a significant scientific and technical challenge for maintenance of their viability during manufacture, storage and delivery to the target site in the gastrointestinal tract to exert a health benefit.

Strategies to consider in the production of stable probiotics for functional food applications include:

1) Selection of robust probiotics strains that have inherent resistance to heat, oxygen and acid;
2) Application of a pre-treatment during fermentation to produce probiotics that are more resistant to heat, oxygen and acid during subsequent processing, storage and gastrointestinal transit; and/or
3) Use of microencapsulation technology.

Microencapsulation technology can be utilised to apply a protective matrix and barrier coating to protect the bacterial cells from direct exposure to heat, oxygen or acids. The matrix materials surrounding the probiotic cells may also reduce the dehydration stress for the bacterial cells during drying to enhance survival. The addition of sugars have been commonly used to stabilise bacteria, as they ease the dehydration stress during drying. A well designed matrix may also enhance the survival of the bacteria cells during storage by supressing the water mobility and supressing the deteriorative chemical reactions (Hoobin et al, 2013).

CSIRO microencapsulation technology uses materials that are selected from food grade components (e.g. protein, carbohydrates, lipids) to create the encapsulant and embed the bacterial cells to make shelf stable probiotic powders or granules for dry or wet food applications.

The survival of the microencapsulated probiotics during storage (Figure 1-left) and in gastro-intestinal fluid (Figure 1-bottom right) is significantly enhanced compared to non-encapsulated probiotics. The probiotic cells are protected by the encapsulant matrix during spray

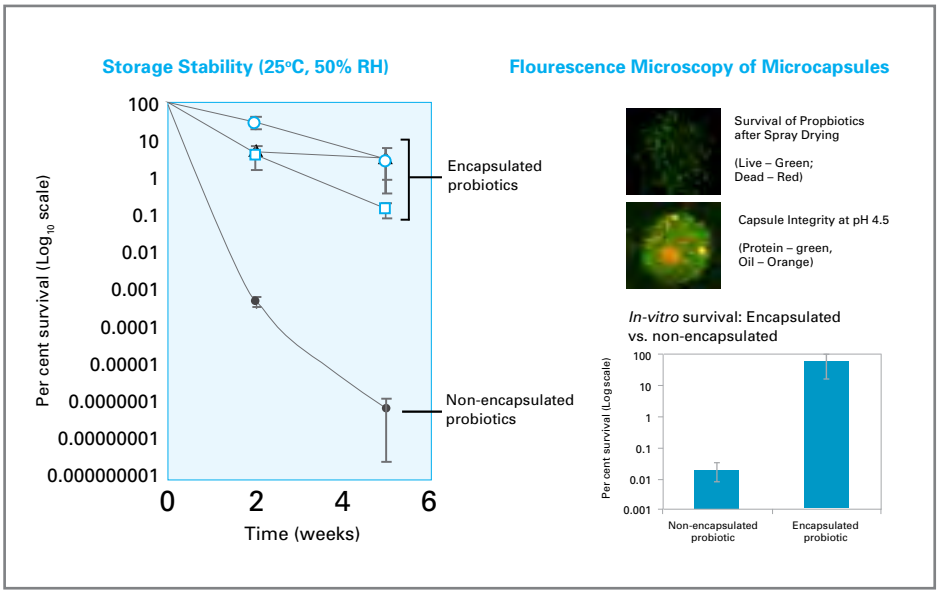

Figure 1. Left: Enhanced storage stability of probiotics by microencapsulation; Top right: Fluorescence microscopy of microcapsules of spray dried microcapsule and capsule integrity in pH4.5 environment; Bottom right: In-vitro survival of encapsulated and non-encapsulated probiotics. Adapted from Crittenden et al (2006).

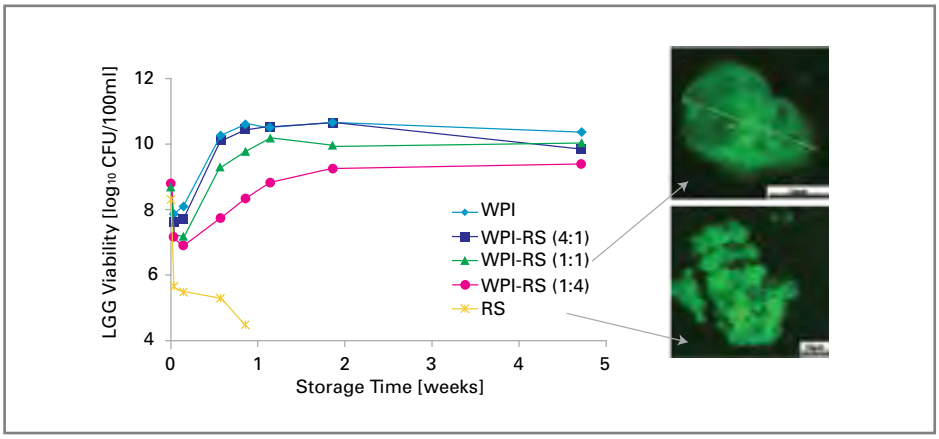

Figure 2. Survival of microencapsulated probiotic Lactobacillus rhamnosus GG in apple juice. WPI (whey protein isolate), RS (resistant starch). Adapted from Ying et al (2013a).

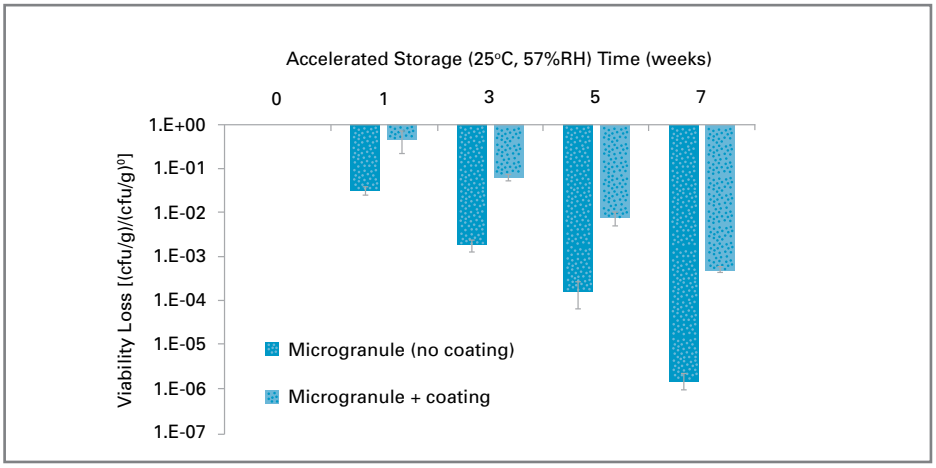

Figure 3. Viability loss of probiotics (LGG) in cold extruded micro-granules with and without extra coating. Extra coating enhanced survival of probiotics during accelerated storage (25°C, 57%RH).

drying and the microcapsule remains intact in low pH beverage (Figure 1-top right).

The formulation of the encapsulant matrix is critical to the protection of probiotics. For example, a matrix containing whey protein isolate protects probiotics in apple juice (Ying et al, 2013a), but there is little protection in a matrix of resistant starch alone (Figure 2).

Different methods can be used to apply barrier coatings to microencapsulated probiotics. For example, a fluid bed was utilised to apply a barrier coating to probiotic microcapsules or micro-granules (Ying et al, 2013b; Hilton et al, 2013). The extra coating further enhances the survival of probiotics during storage of *Lactobacillus rhamnosus* GG (LGG) at 25°C in intermediate to high moisture environments (Figure 3).

Improving retention of beta-carotene in extruded snacks

Extrusion cooking is an economical and versatile food processing technology. It combines multiple unit operations (e.g. mixing, cooking, shaping, cutting and expansion, etc.) into a single process and can produce a wide range of food ingredients and products. Among them, ready-to-eat snacks are very popular. However, the ready-to-eat snacks produced by the extrusion process are often starch-based with limited nutritional value. It is a significant challenge to incorporate sensitive bioactive components into extruded products because of the high temperature and high mechanical shear nature of the extrusion cooking process.

The incorporation of beta-carotene has been trialled in a ready-to-eat extruded product as a possible way to alleviate vitamin A deficiency in some populations. The retention of beta-carotene in extruded product is low (~30 per cent) without consideration to treatment conditions (Lee et al, 1978; Ying et al, 2015). The major cause of degradation of carotenoids is due to its interaction with oxygen-active species, hydroxyradicals, and transition metals (Biacs et al, 1992; Britton, 1995). Recent CSIRO research has demonstrated that the addition of beta-carotene into

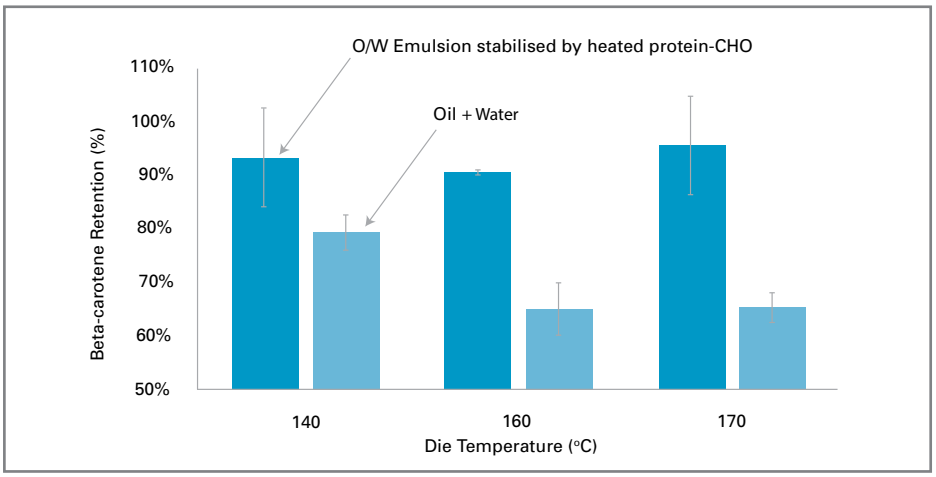

Figure 4. Enhanced retention of beta-carotene in extruded products by protection of beta-carotene in encapsulant (heated protein-carbohydrate) during extrusion. Adapted from Ying et al (2015a).

the extruder as an emulsion stabilised by heated protein-carbohydrate encapsulant has significantly enhanced beta-carotene retention in extruded products (Figure 4), compared to the addition of beta-carotene without protection (Ying et al, 2015a).

Improved stability of polyunsaturated oils

Polyunsaturated omega-3 oils including fish oil rich in eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), have been associated with potential health benefits (National Institute of Health, 2005). Polyunsaturated oils are susceptible to oxidation during processing and storage, as the unsaturated double bonds are very unstable. Oxidation makes food unacceptable and can result in the development of rancidity and fishy odour and other deleterious byproducts. Therefore, polyunsaturated oils need to be protected from oxidation. Microencapsulation is an effective strategy developed for fish oil and other lipophilic bioactives.

CSIRO research has demonstrated the enhanced oxidation stability of a model of polyunsaturated oil in extruded products (Ying et al, 2015b). Results have shown that incorporating microencapsulated oil powder with the dry feed during extrusion improved the oxidation stability of the extruded products, compared to direct addition of the oil only or oil and encapsulant separately without microencapsulation.

Next steps

Bioactives have the potential to offer additional health benefits and when added to foods, may add value to promote them into premium functional food categories. However, extra care is required to protect the bioactive components from degradation during processing and storage. Over the past two decades, CSIRO has developed a technology platform for stabilisation of bioactives that enable the production of superior bioactive ingredients and functional foods.

Danyang Ying is a Senior Research Scientist, Luz Sanguansri is a Research Team Leader and Mary Ann Augustin is a Research Group Leader at CSIRO Food and Nutrition.

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High GI	Med GI	Low GI
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Phytolin™ and High Antioxidants

- The natural polyphenols in Phytolin™ provide its antioxidant capability
- Phytolin™ is very rich in antioxidants. It has a higher level of antioxidants than other known food.
- Phytolin™ can be added as an ingredient to raise the antioxidant levels of foods, beverages and pharmaceutical products

Products	Total ORAC umol /100g	TP mg/100g
Phytolin™	160,000*	1,500
Blueberies,raw	4,669	311
Tea, green, brewed	1,253	191

Source: USDA Database for the Oxygen Radical Absorbance Capacity (ORAC) of Selected Foods, Release 2, 2010. http://www.ars.usda.gov/nutrientdata/orac

* Brunswick Laboratories ORAC 5.0 measures all 5 common free radicals

SUSTAINABILITY, GENETICS, AND NEW TECHNOLOGIES

Food industry experts gathered in Victoria earlier this year to discuss the sustainability, genetics and new technologies in the production and handling of cereals. What were the main takings?

Words by *Richard Browne*

In an environment where consumers are increasingly concerned about where their food is coming from, increasingly new technologies are being constantly introduced and supply chains are becoming more difficult to manage, how can the food industry ensure the sustainability of grains and cereals?

In an attempt to tackle these issues, the International Life Sciences Institute (ILSI) SEA Region Australasia, in cooperation with the American Association for Cereal Chemists International (AACCI) and supported by CropLife Australia, recently held a one day symposium in Melbourne to discuss sustainability, genetics, and new technologies pertaining to the production and handling of cereals in Australia. Approximately 50 people representing the research, industry and regulatory sectors met and listened to speakers discuss a range of topics, before a group panel discussed some of the future challenges in the area of cereal development.

A number of leading experts investigated new technologies and their impact on plant breeding, plant protection and biosecurity.

Professor Geoffrey Fincher, director of the Australian Research Council (ARC) Centre of Excellence in Plant Cell Walls, explained some of the recent advances in his research on the regulation of plant cell wall synthesis. These advances, thanks to high throughput sequencing technologies like RNAseq, are symptomatic of advances being seen in other plant research fields.

Dr Kim Plummer, President Elect of the Australasian Plant Pathology Society and Head of the molecular plant pathology group at La Trobe's University's AgriBio, highlighted advances in the field of omics: genomics, transcriptomics, proteomics, and metabolomics. These fields of research rely on collecting vast amounts of data, which allow for the identification and study of large groups of genes and proteins. Prof Fincher stated that despite these advances, traditional cytological and molecular techniques like transgenic analyses still have a strong role to play in molecular plant research. This was highlighted in the example of his own work studying the regulation of the development of the barley endosperm.

Both speakers discussed the challenges facing the industry in regards to plant pathogens. Over $900 million is lost every year in Australia due to crop losses related to pathogens such as stripe rust and yellow spot. However, these losses would be far greater, exceeding $3 billion annually, if we did not have our current control measures available to use.

Fortunately for the crop industry, the various omics-based technologies are giving researchers access to more data than was previously available. This allows researchers to scan for differences between genetic resistance factors to pathogens to identify what exactly is giving pathogens their virulence.

Tony May, the Technology Development Lead at Monsanto and Sue Cross, the Head of the Crop Protection Development Department for Bayer CropScience Australia, spoke on some of the technological advancements being made in the agricultural biotechnology sector.

Both speakers gave an overview of the research currently being undertaken by their organisations in developing new crop varieties and agri-chemicals to reduce the effect of pathogens on crops, also touching on efficiencies being made in agronomic practices.

There is a strong need for global food production to increase, with estimates saying production will have to double by 2050 to feed a growing global population. Despite this, only three per cent of the earth's surface is suitable for farming. Ms Cross suggested reducing losses in yield due to pests, weeds and diseases could account for a large amount of these estimated increases.

Speakers from GrainCorp Ltd., Mars Asia-Pacific and Food Standards Australia and New Zealand, explained the processes and challenges of moving cereals from the farm to the consumers, as well as the logistical, safety and regulatory difficulties faced by the industry.

It is crucial that businesses understand the importance of the ability to trace back shipment of products at any stage of its origin, from initial production to its end use, as well as the importance of following the multitude of regulations along the supply chain. The use of certifications such as Halal and European Sustainable are often sought to improve marketing and facilitate shipment to other regions of the world.

Dr Jane Gorst from Food Standards Australia and New Zealand (FSANZ), discussed the immense challenges facing the regulatory body, specifically when regulating the range of New Breeding Technologies. In 1999, FSANZ developed a broad regulatory code for GM. Subsequently new GM technologies have been developed, ranging from targeted mutagenesis processes like CRISPR, to transient expression techniques. There is uncertainty as to whether the current code adequately covers these new breeding techniques.

A panel, chaired by Professor Les Copeland from the University of Sydney, explored a variety of issues related to GM crops. Comprised of Dr Geoffrey Annison from the Australian Food and Grocery Council (AFGC), Dr Heidi Mitchell from the Office of the Gene Technology Regulator (OGTR) and Dr Phil Reeves from the Australian Pesticides and Veterinary Medicines Authority, the conversation focused on the risk, or perceived risk, of GM foods amongst consumers.

The panellists agreed that some consumers view GM quite negatively, which could be due to poor communication of the safety of GMOs by scientists and industry, while others argued that marketing of products as 'organic' or 'non-GM' has created a negative impression of GM. The panel raised that science and industry groups have been debating the best way to explain the safety of GM food to the wider community for decades, with little or no change in public perceptions.

Regulating GM foods was also discussed, with the OGTR preparing for a review of the Act covering the regulation of GM plants released into the Australian environment. Dr Mitchell said the review would be a potential chance to harmonise the regulatory standards of the OGTR and FSANZ, and bring Australia's regulations into harmony with the global community. Other regulatory issues discussed included regulating the marketing of food products as either 'GM' or 'non-GM'.

Dr Annison said research showed that the public does not view GM as an important community issue relative to other issues like job security or education. Despite this, supermarkets and other retailers were constantly trying to offer a perceived benefit in order to ensure customer loyalty, which may include marketing food items as 'non-GM' or 'pesticide free'.

Richard Browne is a PhD candidate at the Dept. of Animal, Plant, and Soil Sciences, AgriBio, at La Trobe University.

SENSORY AND CONSUMER RESEARCH UPDATE

What's new? Recent highlights in sensory research.

Words by *Drs Russell Keast, Gie Liem, Megan Thornton and Dieuwerke Bolhuis*

A quick and easy way to gain consumer understanding

To develop new foods or to improve existing products, it is necessary to understand how consumers perceive innovative foods, what their expectations are, which packaging they find most attractive as well as what information positively affects the purchasing decision and the acceptability of present or potential consumers.

Sensory characteristics alone are not enough to meet consumer requirements in today's highly competitive and fast-moving markets. There are also several non-sensory factors, such as packaging, brand and price, which play a very important role in determining consumer purchase decisions. Packaging especially is a source of product recognition, as it serves as an extrinsic quality cue and provides consumers' information about brand image and lifestyle.

For this research, 203 Spanish consumers completed an online survey, which included a word association task and a completion task (i.e. finish a sentence) regarding cheese packages. Online data collection provides numerous advantages for the researchers, such as quick collection of responses and data recording and reduced cost when compared to other types of surveys. However, the use of this methodology limits the representativeness of the sample.

The results obtained from both methodologies suggest that handiness to open, resealability, packaging size and packaging material transparency are among the features most appreciated by consumers.

The authors conclude that the two methodologies used in this study proved to be appropriate to gain an insight into consumer perceptions of cheese packaging and its influence on purchase decisions. Additionally, as the tasks were delivered to the participants via Internet, these methodologies may be used with a large amount of people and data can be collected very rapidly.

Eldesouky et al (2015) The Role of Packaging and Presentation Format in Consumers' Preferences for Food: An Application of Projective Techniques. Journal of sensory Studies DOI: 10.1111/joss.12162

Who to test? The problem of convenience sampling

For food companies or university researchers undertaking consumer testing, it is often easiest to recruit participants for the studies from the workplace. This is called convenience sampling. However, sensory evaluation textbooks state 'participants in consumer acceptance tests should be users of the product category and usually people who also actually like the product.' This is a guiding principle of consumer testing and Cardinal et al conducted a study to investigate if any differences occur between a sample of consumers and a convenience sample.

The products used for the study were reconstituted powdered juices with the following flavours: apple, cherry, grape, grapefruit, orange and pear. Children (n=150) and women (n=200) were considered the target consumers, while food science students and staff (n=200) who were non-rejecters, were the convenience sample. The study was run at four sites in three countries (Spain, Argentina and the USA).

To briefly summarise the results, there were differences between consumers and the convenience sample, leading the authors to conclude that development projects based on acceptability results from convenience consumer samples comprised of "people with specialised knowledge", could lead to erroneous development directions.

Cardinal et al. (2015) Convenience Sampling for Acceptability and CATA Measurements May Provide Inaccurate Results: …. Journal of sensory Studies DOI: 10.1111/joss.12158

Unhealthy snacking habits in adolescence

The steep rise in the prevalence of overweight and obesity among children and adolescents is concerning, with many adolescents engaging in unhealthy snacking behaviour. It is

suggested that 25-35 per cent of the total daily energy intake of adolescents results from snacking.

Habits are formed when people repeatedly engage in the same behaviour in the same context. For example, when someone regularly eats chocolate while watching a movie, this behaviour can become a habit. Dietary behaviour strongly depends on habits as meals and snacks are often consumed at the same place and time every day. In adults, is has been shown that habit strength is strongly associated with unhealthy snacking and once habits are made these are difficult to break. It is important to know whether these unhealthy snacking habits have already been formed in adolescence and what strategy may overrule these habits.

A total of 11,392 adolescents aged 10-17 years, from nine European countries, completed a cross-sectional survey about healthy eating intention, snacking habit strength (i.e. frequency and automaticity), eating self-regulation strategies (temptation control, avoidance of temptations, distraction, suppression, goal setting and goal deliberation) and daily intake of unhealthy snacks. These adolescents consumed on average almost two unhealthy snacks per day. Like in adults, there was a strong relationship between habit strength and unhealthy snack intake. Habit strength increases with age.

Despite good intentions for healthy eating, habits led to the unwanted performance of behaviour, just like in adults. Adolescents that regularly used self-regulation strategies to deal with the food environment directly, such as not buying chocolate in large quantities before watching a movie, consumed less snacks. However, strategies that address the goal to eat healthily did not affect snack consumption.

Habits are hard to change, so it is worrisome that snacking has become habitual at such a young age. Perhaps self-regulation strategies are easier taught than unwanted habits are broken. Snacking patterns that are formed during childhood continue into adulthood, therefore, it is important to establish healthy eating patterns early in life.

De Vet E., Stok F.M., De Wit J.B.F, De Ridder D.T.D. (2015) The habitual nature of unhealthy snacking: How powerful are habits in adolescence? Appetite 95: 182-187

Fruity, floral and fermented by fungi

In order to create a non-alcoholic, cereal-based beverage with increased nutritional value and sensory properties, scientists are looking at the benefits of fermentation by basidiomycetes (fungi), which are also associated with traditional medicine and disease-preventing qualities.

Researchers in Germany have analysed the aroma and safety of a cereal-based beverage fermented using Trametes versicolour. The beverage was noted to have an overall fruity, floral and fresh aroma.

To identify the individual chemical components contributing to the overall aroma, analysis of the liquid-liquid extraction (LLE) and headspace solid phase microextraction (HS-SPME) volatiles of the beverage was performed, using Aroma Extract Dilution Analysis (AEDA) with a gas chromatography system with a tandem mass spectrometer and olfactory detection port (GC-MS/MS-O). LLE Analysis revealed 17 odour active regions, while HS-SPME showed 24, including seven odour active regions that were identified by both methods.

Of these combined 34 odour active regions, 27 compounds were identified. Those identified in the most dilute samples included methional (boiled potato), 2-methylbutanoic acid (cheese, stinky), ß-damascenone (fruity, like pear), 2-phenylethanol (rose) and 2-phenylacetic acid (toasted, pungent, sweet).

Odour Activity Values (OAVs) were also calculated, where the concentration found in the sample is divided by the lowest concentration of that compound perceivable to the human nose. This analysis found 2-phenylacetaldehyde (floral), ethyl 2-methylpropanoate (fruity), 2,3-butanedione (buttery) and methional (boiled potato) had the highest values, contributing to the overall 'floral, fruity' description given to the beverage.

Toxicological studies were also performed on the beverage, and indicated no cytotoxicity and mutagenicity activity.

Zhang Y, Fraatz MA, Müller J, Schmitz H-J, Birk F, Schrenk D & Zorn H (2015). Aroma Characterization and Safety Assessment of a Beverage Fermented by Trametes verisicolor. J Agric. Food Chem. DOI: 10.1021/acs.jafc.5b02167

Front of pack labelling

The days that the majority of foods came in brown paper bags that were bought at the local grocer, whom you knew and trusted, are long gone. Our perception of the quality of food is now guided by the information that can be found on pack.

In order to assist consumers to make healthier choices, a variety of healthy choice logos are placed front of pack. The functionality of these systems have always been questioned. Well-known initiatives such as the traffic light labelling in the UK (i.e. Green is healthy food, Red is sometimes food), the Percentage Daily Amount and the Australian Health Star Rating (HSR) system may actually be more misleading for consumers than helpful in making healthier choices. In a recent article on the *Conversation*, Professor Mark Lawrence of Deakin University argues, in a recent article on the Conversation, that the HSR system relates to the balance between individual nutrients, rather than foods (Lawrence & Pollard 2015). The voluntary Health Star Rating system allows the food industry to either use or not use it on their processed foods, which makes it a great marketing tool for reformulated discretionary foods. This can lead to strange situations in which reformulated fries (less salt, less fat) receive a 4 star rating, whereas fresh potatoes do not carry any star. Is this telling the consumer that it is healthier to eat fries than fresh potatoes?

The issues with 'health' ratings that are placed front of pack on processed foods have also been highlighted in the August 2015 issue of the journal *Public Health Nutrition* (Hamlin et al 2015). In this experimental study 250 New Zealand students were provided with two types of front of pack labelling (i.e. Traffic Light and the Percentage Daily Intake) on healthy and less healthy products. Participants simply had to indicate which products they would like to buy.

The study showed that products with either the Traffic Light label or the Percentage Daily Intake were more likely to be bought, rather than the same products without these labels. However, the nutrient composition and the health messages communicated by these labels did not influence participants' purchase decisions. In other words, the participants decided to buy products simply because it carried either the traffic light symbol or the Percentage Daily Intake, without understanding what these labels actually meant.

The study suggests that the tested health labels do not meet their aim of helping consumers make a healthier choice and viable alternatives are needed. Lawrence (Lawrence & Pollard, 2015) suggests that a health rating based on foods and food groups, would be much more useful for consumers. Industry involvement might be needed in the development of these labels, but public health professionals should never forget the main aim of their existence, which is "to help consumers make a healthy choice".

Hamlin RP. Mc Neill LS. & Moore L. The impact of front-of-pack nutrition labels on consumer product evaluation and choice: an experimental study. Public Health Nutrition, 18, 12, 2015, pp. 2126-2134

Lawrence M. & Pollard C. A year on, Australia's health star food-rating system is showing cracks. https://theconversation.com/a-year-on-australias-health-star-food-rating-system-is-showing-cracks-42911. Accessed 4th of August 2015.

Drs Russell Keast, Gie Liem, Megan Thornton and Dieuwerke Bolhuis are members of he Centre for Advanced Sensory Science (CASS) at Deakin University, Victoria.

NUTRITION WATCH

What's new in nutrition? The following research has been recently published.

Words by *Dr Ramon Hall*

Can the types of food we eat affect brain size?

A joint study between Deakin University and the University of Melbourne has investigated the association between dietary patterns and hippocampal volume in humans, to assess whether diet was associated with different rates of hippocampal reductions over time (Jacka *et al*., 2015). The researchers were particularly interested in the hippocampus brain structures, as they are associated with learning and memory, mood regulation, and implicated in depression.

This longitudinal investigation used data from the Personality and Total Health Through (PATH) Life Study, which followed three narrow age cohorts from around Canberra, Australia. The current study focused on a subsample of the larger cohort involving 255 individuals aged 60-64 years. Dietary intake was assessed using a version of the validated CSIRO Food Frequency Questionnaire (FFQ).

Using the 188 distinct food items, two food patterns were identified, namely: 'prudent' (healthy) diet (consumption of fresh vegetables, salad, fruit and grilled fish) and 'Western' (unhealthy) diet (consumption of roast meat, sausages, hamburgers, steak, chips, crisps and soft drinks). Participants involved in this study had two magnetic resonance imaging (MRI) brain scans four years apart, to assess the association between dietary factors and left and right hippocampal volumes over time.

The results of the study revealed that increasing compliance with the healthy 'prudent' dietary pattern was associated with a significantly larger left hippocampal volume (45.7 ± 22.9 mm^3), whereas higher consumption of an unhealthy 'Western' dietary pattern was independently associated with a significantly smaller left hippocampal volume (52.6 ± 26.6 mm^3). These relationships were independent of covariates including age, gender, education, labour-force status, depressive symptoms and medication, physical activity, smoking, hypertension and diabetes.

The authors concluded, "lower intakes of nutrient-dense foods and higher intakes of unhealthy foods are each independently associated with smaller left hippocampal volume. To our knowledge, this is the first human study to demonstrate associations between diet and hippocampal volume concordant with data previously observed in animal models. These findings suggest the potential for dietary interventions to promote hippocampal health, decrease age related atrophy, and prevent negative health outcomes associated with hippocampal atrophy. They also support the extensive data from human observational and intervention studies showing that unhealthy dietary patterns are associated with increased prevalence or risk, and healthy dietary patterns with reduced risk, of depression and reinforce the imperative to improve dietary intakes at the population level and in clinical settings for better mental health outcomes."

The results of this study should be of interest to manufacturers of brain and related health products and researchers

and practitioners considering the impact of diet on brain related markers of health.

Jacka *et al*. (2015) "Western diet is associated with a smaller hippocampus: a longitudinal investigation". *BMC Medicine*, 13:215, (DOI 10.1186/s12916-015-0461-x).

Metabolic impact similar for honey, sucrose, and high-fructose corn syrup

Researchers from the USDA Agricultural Research Service, Grand Forks Human Nutrition Research Centre, Grand Forks, North Dakoda in the USA, have undertaken a study to compare the effects of chronic consumption of three nutritive sweeteners, honey, sucrose, and high-fructose corn syrup (all containing 55 per cent fructose) on blood glucose, insulin, lipids, inflammatory markers, body weight, as well as blood pressure, in individuals with normal glucose tolerance and impaired glucose tolerance (Raatz *et al*., 2015). In a randomised controlled crossover design trial, 28

glucose tolerant and 27 impaired glucose tolerant individuals, undertook three different two-week diets, with a two to four week washout period between each diet. During each dietary treatment, individuals were required to consume 50g of carbohydrate per day from one of the assigned sweeteners.

Body weight, blood pressure, blood inflammatory markers, blood lipids, fasting blood glucose, fasting blood insulin and oral glucose tolerance test measurements were undertaken before and after each treatment period.

As expected, the individuals with impaired glucose tolerance had significantly higher body weight and serum glucose, insulin, inflammatory markers and total and LDL-cholesterol concentrations, than the glucose tolerant individuals at the beginning of the trial. There was no treatment effect between any of the sweeteners on blood glucose, blood insulin, or calculated insulin resistance, or in response to oral glucose tolerance test for blood glucose or blood insulin. There were also no changes in body weight, HDL cholesterol, interleukin 6 (inflammatory marker) or systolic blood pressure. There was a significant reduction in diastolic blood pressure across all treatment periods, however there was no difference between any of the sweeteners. There was a significant increase observed in the inflammatory marker high-sensitivity C-reactive protein (hsCRP) only in the impaired glucose tolerant group, as well as a significant increase in blood triglyceride levels.

The authors concluded, "Our data demonstrates that two weeks of daily consumption of 50 g carbohydrate from sucrose, honey, and high fructose corn syrup exerted similar effects on measures of glycaemia, inflammation, and lipid status in glucose tolerant and impaired glucose tolerant individuals. Our data does not support the contention that the consumption of honey vs. high fructose corn syrup or sucrose provides an added health benefit for maintenance of glucose homeostasis and other cardio-metabolic outcomes because all three sugars evaluated exerted similar metabolic effects."

This study should be of interest to manufacturers of products containing nutritive sweeteners, researchers and practitioners.

Raatz *et al.*, (2015) Consumption of Honey, Sucrose, and High-Fructose Corn Syrup Produces Similar Metabolic Effects in Glucose-Tolerant and -Intolerant Individuals. The Journal of Nutrition, published online ahead of print, (doi: 10.3945/jn.115.218016).

Consuming herbs and spices can help reduce sodium intake

A study team at Johns Hopkins University, Baltimore in the USA, have investigated the effects of a behavioural intervention using herbs and spices to help maintain sodium intake at the US Dietary Guideline recommended intake of 1500 mg/d (Anderson *et al.*, 2015). The researchers indicated that a multifactorial approach is required to help reduce sodium intake, as only 10 per cent of the US population meet the recommendation for 2300 mg/d and two per cent of the population meeting the recommendation for 1500 mg/d.

This study was divided into two phases. The first phase involved 55 individuals consuming a low sodium diet for a four-week period, in which all foods, snacks and calorie-containing drinks were provided. Phase two involved randomly assigning 40 of the participants who completed phase one to a multifactorial behavioural intervention emphasising herbs and spices consumption to reduce sodium (20 participants) or a self-directed control group (20 participants). The primary study outcome was the change in mean 24-hour urinary sodium excretion during phase two.

The results of this study reveal that at the end of phase two, mean 24-hour urinary sodium excretion was significantly lower in the increased herbs and spices behavioural intervention compared to the self-directed group.

The authors conclude "a multifactorial behavioural intervention emphasising spices and herbs significantly reduced sodium intake. Because of the ubiquity of sodium in the US food supply, multilevel strategies addressing individual behaviours and the food supply are needed to improve adherence to recommendations."

The authors also make a suggestion for the food industry, indicating reformulations of lower sodium foods could consider maintaining flavour with herbs and spices.

These findings may be of interest to manufacturers reformulating food products with lower sodium content and practitioners prescribing interventions for hypertensive individuals.

Anderson *et al.*, (2015) "Effects of a behavioral intervention that emphasizes spices and herbs on adherence to recommended sodium intake: results of the SPICE randomized clinical trial". American Journal of Clinical Nutrition, 102:671–679, (doi: 10.3945/ajcn.114.100750).

Validation of food insulin index in healthy and type 2 diabetics

Researchers from the Boden Institute of Obesity, Nutrition, Exercise and Eating Disorders at the University of Sydney, Australia, have undertaken a study to validate the food insulin index using two nutrient matched diets predicted to have either high or low insulin demand in healthy controls and individuals with type 2 diabetes (Bell *et al*., 2015). The researchers describe the Food Insulin Index as a novel classification of single foods based on insulin responses in healthy subjects relative to an iso-caloric reference food. The study involved 20 adults (10 healthy adults and 10 adults with type 2 diabetes). On different days, the participants consumed two different diets consisting of breakfast, morning tea and lunch.

One of the diets was a predicted high food insulin index diet and the other was a low food insulin index diet. The diets were matched for macronutrients, fibre and glycemic index. However, based on the predicted food insulin index of the individual foods, the high food insulin index diet was predicted to produce a two-fold difference in insulin demand. Measurement of plasma glucose and insulin were taken after fasting and regularly over an eight-hour period.

Overall, there were no significant differences in glycemic responses between the low or high food insulin index diets, for either the healthy or type 2 diabetic individuals. There was a 53 per cent lower insulin response over the eight-hours for the lower food insulin index diet and a similar 41 per cent lower insulin response was observed in type 2 diabetes.

The authors concluded, "A low food insulin index diet produced predictably lower daylong insulin responses compared with a high food insulin index diet in both healthy adults and those with type 2 diabetes, even when the diets were matched for macronutrients, fibre, and glycemic index. The food insulin index algorithm may therefore be a useful dietary strategy for the prevention and treatment of type 2 diabetes, by reducing the postprandial insulin demand and thus potentially reducing insulin resistance and preserving beta-cell function."

This study should be of interest to manufacturers of diabetic products and

for products to help in the prevention of type 2 diabetes.

Bell *et al*., (2015) "Validation of the food insulin index in lean, young, healthy individuals, and type 2 diabetes in the context of mixed meals: an acute randomized crossover trial". American Journal of Clinical Nutrition, published online ahead of print, (doi: 10.3945/ajcn.115.112904).

Dr. Ramon Hall is Principal Scientist at NutraRegs – Nutrition and Regulatory Consulting and is an Honorary Senior Research Fellow at the School of Exercise & Nutrition Sciences, Deakin University.

REGULATING DAIRY FOOD SAFETY IN VICTORIA

Dairy Food Safety Victoria is ensuring the integrity of Victoria's dairy industry with the release of its Strategic Plan July 2015 to 2020.

Australia's dairy industry is a leading rural industry, valued at over $13 billion annually. This includes farm, manufacturing and export. Australian dairy products are renowned for their safety and quality. They include milks, butter, yoghurts, a wide variety of specialty cheeses, milk powders, as well as dairy dips and desserts.

Victoria dominates the industry, with 65 per cent of the nation's cows producing more than 65 per cent of Australia's milk. In 2013-14, Victorian dairy exports were valued at $2.29 billion and accounted for 85 per cent of the value of Australia's total dairy exports, with the largest market being China, Japan and Singapore.

Developed in conjunction with key stakeholders, Dairy Food Safety Victoria's 2015-2020 Strategic Plan takes into account the views of the dairy industry, as well as current food safety and health policy environments.

A robust regulatory system

As the statutory authority responsible for regulating the Victorian dairy industry, Dairy Food Safety Victoria (DFSV) aims to safeguard public health, implementing a robust regulatory framework that underpins market access and the growth of the dairy industry.

DFSV is accountable to the Victorian government through the Minister for Agriculture, for fulfilling its statutory responsibilities in line with government policy and within an appropriate governance framework.

Licensing all dairy businesses operating in Victoria, it is DFSV's responsibility to regulate dairy food safety, ensuring state legislation and nationally agreed standards are met across all dairy premises.

The operations rely on the basis of risk assessment and management, applying minimum effective regulation to achieve safe food outcomes and providing additional services to support the development of industry competence, as well as a continued supply of safe dairy food.

In light of food safety incidents within the dairy industry over the years, it is crucial that all stakeholders' work together to ensure any threat to public health is managed appropriately and efficiently.

Five-year strategy

DFSV's *Strategic Plan 2015 to 2020* commits to minimising the risk that any food borne illness outbreaks are attributed to Victorian dairy products, and in the instance they do, that the response is timely and proportionate to ensure public health.

From 2015 to 2020, DFSV will focus its operations on a number of key directions.

- Increasing the effectiveness of compliance activities on those businesses judged as medium to high food safety risk.
- Strengthening collaboration with regulatory partners at Victorian, interstate, national and international levels, to achieve product safety, integrity and maintain market access for Victoria's dairy industry.
- Minimising the regulatory burden on dairy businesses, without compromising public health.
- Investing in training and development of staff to increase the consistency and quality of work.
- Delegating more responsibility to its staff to enable them to make high-quality, quick decisions and contribute to greater operational efficiencies.
- Improving the way its procedures are communicated to industry and increasing the transparency of decisions.
- Understanding comprehensive testing of emergency procedures and protocols for managing food safety incidents.
- Maintaining organisation flexibility to respond to changes in the regulatory and dairy food industry context.
- Retaining an agreed level of earnings so DFSV can continue to operate with financial stability.

According to DFSV, the strategic plan will focus the organisation on delivering its regulatory obligations and continuing to produce quality and safe dairy products for Australia and the rest of the world.

References

1. Dairy Australia (2015) http://www.dairyaustralia.com.au/Industry-information/About-the-industry.aspx
2. Dairy Safety Victoria (2015), *Our dairy food safety system.* http://www.dairysafe.vic.gov.au/about-us/our-safety-system
3. Dairy Safety Victoria (2015), *Our strategic plan.* http://www.dairysafe.vic.gov.au/about-us/our-strategic-plan

COUNCIL OF RURAL RESEARCH AND DEVELOPMENT CORPORATIONS

Innovation is critical to the future of Australia's food and fibre industries. Everywhere you look there are constraints on our resources – from the available soils, water and suitable environmental and climate conditions, to our capacity to get ingredients and products from where there are produced to where they are consumed, to the people available and ready to undertake the work that needs to be done.

Meanwhile our competitors appear to be blessed with abundance and opportunities to expand. The global food race is well and truly on.

We are already very good at what we do and it is often noted that as a nation we produce enough to feed our own population three times over. We have strong and secure food safety, regulatory and quality assurance systems, which mean consumers can have trust in our products.

That doesn't mean that we can afford to sit back and wait for opportunity to come and find us. The world is moving quickly and pressures throughout our supply chains will only increase. Standing still means you are going backwards.

The *Australian Innovation System Report 2014* from the Department of Industry highlights the importance of innovation for competitiveness, making the point that improving the linkages between Australia's research expertise and industry will help us leverage research strength into industrial strength.

Often we look to overseas example for models of what others are doing, presumably to see what might translate into an Australian experience.

While it can be very useful to find out what else is happening and see what we can apply, Australia also has its own, home-grown and successful approach to driving engagement between industry and the research community. An approach through which all industry participants can be involved in setting the research agenda and prioritising efforts and not just those with the deepest pockets.

The Rural Research and Development Corporations are a partnership between the food and fibre production sector and the Commonwealth Government to plan, prioritise, execute, administer and evaluate investments in research, development, technology transfer and adoption and in some cases, market access, market development and promotion.

With an annual R&D investment portfolio of more than $500 million, the RDCs are collectively one of the largest funders of research services in Australia. They actively partner with public and private sector research providers to drive positive improvements for rural industries, communities and the environment.

Funding comes from levies on agricultural, fisheries and forestry production, which means industry is contributing to its own R&D needs and has a strong interest in how money is spent. There is a strong focus on delivering returns for farmers, but also a recognition of the importance of working across supply chains and with markets in order to create and capture value. Perhaps most importantly, the RDCs are working to grow the pie for the benefit of everyone.

Innovation systems are built upon activities, networks of people and an environment and culture that enables things to happen. The Rural RDCs provide a solid base for food and fibre innovation in Australia, supporting industry to maximise comparative and competitive advantages.

Find out more:

Australian Egg Corporation Limited, www.aecl.org

Australian Meat Processor Corporation, www.ampc.com.au

Australian Pork Limited, www.australianpork.com.au

Australian Wool Innovation, www.wool.com

Cotton Research and Development Corporation, www.crdc.com.au

Dairy Australia, www.dairyaustralia.com.au

Fisheries Research and Development Corporation, www.frdc.com.au

Forest and Wood Products Australia, www.fwpa.com.au

Grains Research and Development Corporation, www.grdc.com.au

Horticulture Innovation Australia Limited, www.horticulture.com.au

Livecorp, www.livecorp.com.au

Meat & Livestock Australia, www.mla.com.au

Rural Industries Research and Development Corporation, www.rirdc.gov.au

Sugar Research Australia, www.sugarresearch.com.au

Wine Australia, www.wineaustralia.com

Council of Rural Research and Development Corporations, www.ruralrdc.com.au

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- Fruit and Vegetable powders – including Acai, Mango, Strawberry, Beetroot, Asparagus
- Speciality powders - including Manuka Honey, Red wine, Worcester sauce and Vinegars.

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For more information, please contact your local account manager or call reception on:

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AUSTRALIA & NEW ZEALAND 2015

October 20 4th Innovation Masterclass – Innovate or Evaporate! William Angliss Institute of TAFE, Melbourne, Victoria. www.aifst.asn.au/innovate-or-evaporate

October 22 Beyond Nutrition – Eating and Ageing: Meal Solutions for Ageing Populations. CSIRO Auditorium, North Sydney, Sydney, NSW. events.csiro.au

October 28-30 3rd International Conference on Food Structures, Digestion and Health. Intercontinental Wellington, Wellington, New Zealand. www.fsdh2015.org

November 16-18 Tropical Agriculture Conference 2015. Brisbane Convention & Exhibition Centre, Brisbane, Queensland. www.tropagconference.com.au

November 18-19 22nd Australian HACCP Conference & Awards. Mercure Hotel Sydney, Sydney, NSW. www.australianhaccpconference.com.au

November 30 Symposium on Sugar in the Diet: Is There A Sweet Spot? Holiday Inn, Sydney Airport, Sydney, NSW. www.ilsi.org

December 2-4 16th Scientific Meeting of the Australasian Association for ChemoSensory Science (AACS). Canberra, Australia Capital Territory. www.aacss.org

AUSTRALIA & NEW ZEALAND 2016

June 27-28 49th Annual AIFST Convention. Brisbane Convention & Exhibition Centre, Brisbane, Queensland. www.aifst.asn.au/convention

INTERNATIONAL 2015

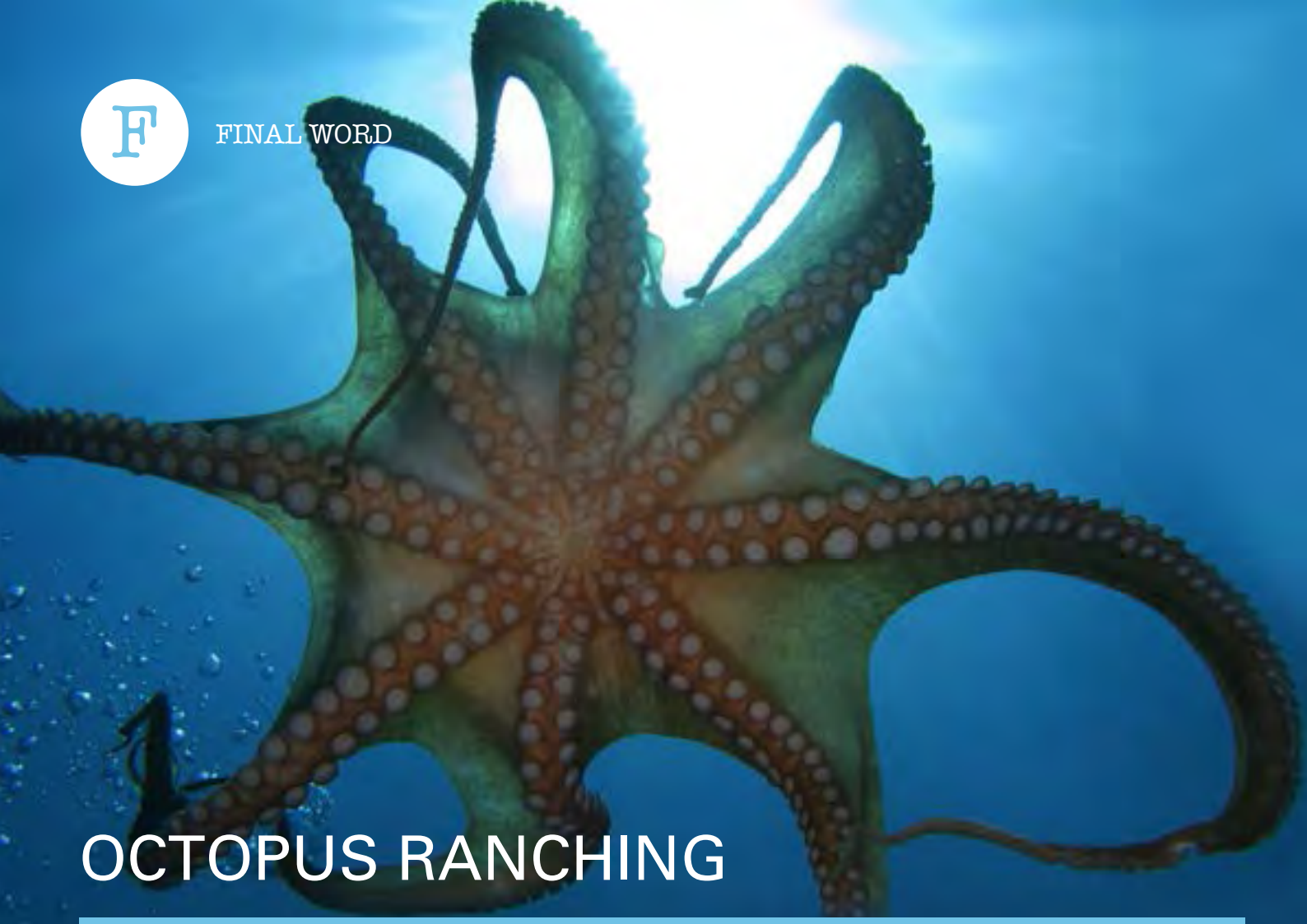
November 10-12 29th EFFoST International Conference. Food Science Research and Innovation: Delivering sustainable solutions to the global ecnomy and society. Athens, Greece.

November 17-19 Food Matters Live. ExCeL Exhibition and Convention Centre, London, United Kingdom. www.foodmattersglobal.

INTERNATIONAL 2016

January 7-8 18th International Conference on Global Food Security. River View Hotel, Singapore. www.waset.org

July 16-19 Institute for Food Technologists Annual Meeting. Chicago, Illinois, United States of America. www.ift.org



OCTOPUS RANCHING

The latest Australian research is spearheading new techniques to help meet the world's increasing demand for eating octopus.

Over the past decade, the octopus fishing industry in Western Australia has developed from being virtually non-existent to a thriving commercial manufacturing industry, with significant potential for further growth as demand outstrips supply. In that time, the market price for raw octopus has increased from around $4 to more than $12 per kilogram.

The recent release of the Fisheries Research and Development Corporation (FRDC), a four-year study to determine the ongoing potential of the industry, reveals some new systems and protocols that will help fill the shortfall in supply.

Octopus ranching is the on-growing of wild caught octopus onshore or in cages. Traditional methods of ranching, which are popular in Europe and Latin America, use PVC pipes to supply shelter to the octopus. However, these methods have limitations, in that they are difficult to clean and harvest and can cause problems with territorialism and cannibalism. Despite their popularity overseas, the techniques were not considered to be commercially viable for Australia.

Working with the FRDC, brothers Ross and Craig Cammilleri, founders of Fremantle Octopus Pty Ltd, have developed new and innovative systems and protocols for ranching the local *Octopus tetricus.*

In a world-first, the new systems include matching the octopus for size, which resulted in the switching of their behaviour from territorial and cannibalistic to behaving as a school. It also includes using a woven cloth to cover the tanks and prevent the octopus from hurling themselves out of the tanks. Past methods have used heavy steel mesh, which makes it more difficult to clean the tanks. The new cloth method is easy to remove for cleaning and feeding.

These new systems and protocols have meant that juvenile octopus are able to grow from as little as 50 grams up to 54 kilograms per cubic metre in the specially designed tanks, which is the highest biomass achieved anywhere in the world to date.

As a result of the project, the FRDC has established that developing octopus aquaculture based on octopus ranching will be possible in Australia and, despite the cost of staff and facilities, has the chance to be commercially viable.

An octopus ranching model suitable for use in developing countries was also a key outcome of the FRDC project.

The model has the potential to supply food and income to artesian fisherman in these developing countries, as well as their families in rural areas, without the need for a large investment.

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