

food australia

Official publication of AIFST Ltd

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FEBRUARY/MARCH 2016

SHAPING THE FUTURE OF FOOD



Also Inside

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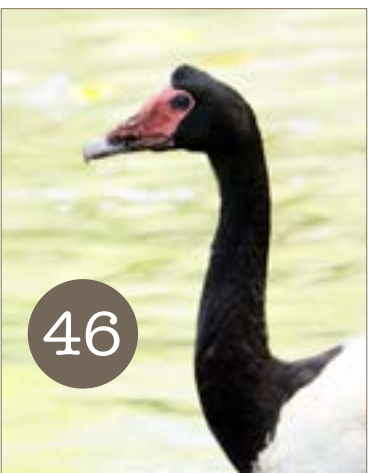


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FROM THE MANAGING EDITOR

Welcome to the February / March 2016 issue of *food australia*.

In this issue we explore agribusiness, ingredients, food processing and take an in-depth look at sensory.

Climate change is a prevalent issue for future food production. The 2015 Australian Young Farmer of the Year, Anika Molesworth, shares her thoughts on farmers embracing renewable energy on page 20.

Cricket-chip cookies, Bee-LT sandwiches and grasshopper kebabs may sound like strange orders for a cafe, but as sustainable sources of protein, they are spreading in popularity. On page 26, find out about patenting considerations when manufacturing with critters.

Over on page 30, we take a look at an Australian food processor that has managed to exponentially grow its business operations through the installation of a single piece of new equipment.

In this issue, we also have a look at some of the latest research from CSIRO, including the effectiveness of airborne ultrasound to enhance convective drying, as well as food preferences among Western and Asian consumers, and the role sensory plays when exporting Australian food products into Asia.

Finally, Final Word focuses on magpie geese, showing how native foods are becoming a regular on menus across the country.

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

Elizabeth Newport

Communications Manager – AIFST





AUSTRALIA'S DOMESTIC VEGIE PRICE DOWN IN 2014-15



A recent report from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) has revealed that Australia's domestic wholesale vegetable prices were six per cent lower on average in 2014-15 than the previous year.

The *Australian vegetable growing farm businesses, an economic survey, 2013-14 and 2014-15* report, also found that while prices dropped during this period, production costs jumped an average of four per cent.

Despite being the fourth highest value agricultural industry in Australia, the average cost of running a vegetable farm in Australia in 2015 was AU\$640,000, an increase from AU\$425,910 in the previous year.

AUSVEG deputy chief executive officer Andrew White said the findings reflected the number of closures of small Australian vegetable farms.

"The effect of these financial difficulties is likely to have been a factor in the 24 per cent drop in the number of small vegetable farms within Australia in 2014-15.

"Small business confidence [in the vegetable growing sector] is also much lower, with 21 per cent of existing small vegetable growers indicating that they are likely to exit the market completely next year," said Mr White.

Clay Mifsud and Haydn Valle. Australian vegetable growing farm business: An economic survey, 2013-14 and 2014-15. Research by the Australian Bureau of Agricultural and Resource Economics and Sciences December 2015

http://data.daff.gov.au/data/warehouse/9aab/9aabf/2015/avfesd9absf20151208/AustVegGrwFrmEcoSurvey20151208_v1.0.0.pdf

\$640K

The average cash cost per vegetable growing farm for vegetable production.

\$2M

Average total cash receipts of top performing vegetable growing farms, compared with \$153,000 for bottom performers.

21%

Of vegetable growers in the bottom performing farms said they intended to leave agricultural production.

6%

The decline in Australia's domestic wholesale vegetable prices in 2014-15, due to changes in supply, rather than demand.

The Australian vegetable growing industry contributed \$3.8 billion (7%) to the gross value of agricultural production in 2014-15.

7%

35

Number of individual vegetable commodities contributing to the industry. The most common varieties include potatoes, tomatoes and mushrooms.

Vegetable growing farms in Victoria generated the highest farm cash income in 2014-15.

\$317K

805

Number of small farms that plant less than 5 hectares of vegetables recorded in 2013-14, a decrease of 25 per cent from 2012-13.

22 per cent of farms increased debt in 2013-14, mostly for the purpose of purchasing land.

22%



AUSTRALIAN FARMERS GET DIGITAL TRANSFORMATION



The National Farmers' Federation has launched a digital innovation strategy that will drive agriculture to double its value, likely to generate \$1.2 trillion between now and 2030.

The strategy, which was launched by Prime Minister Malcolm Turnbull on a farm west of Sydney, aims to facilitate disruption while helping farmers seize the benefits of connectivity.

NFF's strategy has three initiatives, including a Digital Agriculture Service to be established in collaboration with consultancy firm Accenture. The initiative will allow farmers to harness major innovation trends through access to market tools, such as drones and robots, to leverage complex data.

Additionally, Sprout, a new initiative in co-ordination with business advisors Crowe Horwath, will identify, foster and promote the best new ideas in the food and agribusiness arena. Applications for the first round of projects will be open in early 2016.

With the NBN rollout approaching, Australian farms will be better connected than ever, with NFF fostering this to create a new online platform that will bring together members of the industry in an engaging online home.

Vodafone has partnered with the NFF as the telecommunications partner, with Vodafone chief strategy officer and corporate affairs director Dan Lloyd, saying Australian farmers will benefit from improved regional telecommunications services.

"There are six million Australians living and working in regional areas, including over 100,000 farmers, and for too long they have been disadvantaged by a lack of mobile competition and choice of provider.

"This agreement supports our advocacy of a better deal for regional Australians and builds on our commitment, which includes rolling out 70 new regional mobile sites under the Federal Government's Mobile Black Spot Programme," Mr Lloyd said.

The NFF said a consolidated online presence, in addition to the other initiatives under the strategy, is a major step for Australian agriculture in terms of entrepreneurialism and innovation.

HEART FOUNDATION GIVES THE TICK THE FLICK

The National Heart Foundation has announced plans to retire its red and white tick in light of the adoption of the Health Star Rating System on food packaging.

The Tick, which was introduced in 1989, was designed to help consumers compare similar foods to choose the healthier option. The Tick helped to identify foods that are lower in saturated fat, trans fat, salt and kilojoules, as well as containing nutrients and ingredients such as fibre, calcium, whole grains and vegetables.

National Heart Foundation chief executive officer Mary Barry said the tick had commenced at a time when there was little to guide consumer choice of healthy food.

"Over the past few years, the Heart Foundation has worked with the Federal Government and other stakeholders to develop the Health Star Rating System, which was launched in December 2014.

"The HSR system has been well received by food manufacturers and is becoming sufficiently well established, and understood by shoppers. We feel we can now safely begin to retire the Tick," Ms Barry said.

Despite criticism, the foundation claimed the Tick program encouraged the food industry to reduce trans fats, with all margarine spreads with the Tick virtually trans fat free by 2005.

Ms Barry said the foundation gives thanks to all the shoppers who have supported and trusted the Tick over the years.

"We also send our thanks to all the food manufacturers who have strived to earn the Tick on their products for over a quarter of a century," she said.

It is expected the program will be fully retired over the next 12 to 24 months. The foundation will continue to work with manufacturers who currently have the Tick on their products.

ACCC TAKES ACTION AGAINST WOOLWORTHS

The Australian Competition & Consumer Commission (ACCC) has initiated proceedings in the Federal Court against Woolworths over allegations the supermarket engaged in unconscionable conduct in dealings with a large number of its suppliers.

The ACCC alleges that the supermarket chain infringed the Australian Consumer Law in December 2014, when senior management developed a strategy aimed at reducing half-year gross profit shortfall by 31 December 2014.

It is alleged that under a strategy called 'Mind the Gap', Woolworths systematically sought to obtain payments from a group of 821 mid-tier food and grocery suppliers to support the supermarket, with an initial target for \$60 million in extra payments.

Further allegations from the ACCC state that these requests were made in circumstances where Woolworths was in a substantially stronger bargaining position than suppliers.

ACCC chair Rod Sims said it is alleged that the 'Mind the Gap' strategy captured over \$18 million from suppliers.

"Woolworths' conduct in requesting the 'Mind the Gap' payments was unconscionable in all the circumstances.

"A common concern raised by suppliers relates to arbitrary claims for payments outside of trading terms by major supermarket retailers. It is difficult for suppliers to plan and budget for the operation of their businesses if they are subject to such ad hoc requests," said Mr Sims.

It is alleged Woolworths engaged in this conduct at the same time as Coles was dragged before courts to face similar allegations from the regulator. However, the ACCC said the allegations against Woolworths are separate from the Coles case.

The ACCC is seeking injunctions, including an order requiring the full refund of the amounts paid by suppliers under the 'Mind the Gap' scheme, a pecuniary penalty, a declaration and costs.

These proceedings follow broader investigations by the ACCC into allegations that major supermarket chains have treated suppliers inappropriately. The first hearing was held on 1 February, 2016.

AUSTRALIAN DAIRY FARMS TO ACQUIRE CAMPERDOWN DAIRY COMPANY

Milk producer Australian Dairy Farms will pay \$11 million to acquire the Victorian-based Camperdown Dairy Company from food delivery company, Aussie Farmers Direct.

Camperdown Dairy Company's factory in south-west Victoria, which has the capacity to process 36 million litres of raw milk a year, provides milk to Woolworths and is certified for the rapid clearance of fresh milk exports into China.

Australian Dairy Farms, which operates six other dairy farms in the area, said the acquisition would deliver significant value and earnings accretion, providing key synergies and profit margin expansion opportunities.

The acquisition will allow Australian Dairy Farms to create the only ASX-listed, vertically integrated dairy company



with fully owned and controlled paddock-to-plate and supermarket shelf operations.

The acquisition is set to be funded through a combination of cash reserves and additional bank debt and the company is expecting the deal to more than double the anticipated earnings in the 2017 financial year.

TASSAL TAKES TOP SPOT

Tasmanian company Tassal has been benchmarked as the world's top seafood company in the 2015 International Seafood Intelligence report on sustainability and transparency practices.

Tassal is the only Australian company listed in the report, achieving a Corporate, Social and Environmental Responsibility rating excellence, only one of four companies in the top 100 to achieve this level.

Tassal chair Allan McCallum said the company's global number one ranking in the report was a significant achievement.

"Being benchmarked as the world's top seafood company against strong international competition underlines the commitment of our employees and the excellent work that has been achieved in this important space," he said.

"There is no question that our sustainability program has delivered better outcomes for all our stakeholders and the business more broadly."

The Seafood Intelligence report provides stakeholders, retailers, buyers, analysts and investors with a snapshot of the 2014 and 2015 global seafood industry, available data and trends.

FUNDING BOOST FOR SA PORK CRC

The South Australian Government has granted \$2 million of funding across four SA-headquartered Cooperative Research Centres (CRCs), including \$500,000 in funding for the CRC for High Integrity Australian Pork based in Roseworthy, SA.

Pork CRC chief executive officer Dr Roger Campbell welcomed the funding, saying the money was a boost to its existing successful Industry Placement Program (IPP).

“Our IPP, where we place Pork CRC supported graduates, in particular with our participants, is a partnership where funding and training is shared.

“Young people get a start in industry, and industry benefits from their enthusiasm and injection of fresh ideas and knowledge, which is often cutting-edge science.

“It’s been a win-win for everyone concerned and we’re very appreciative of the SA state government for recognising this and stepping in now to further advance the initiative,” Dr Campbell said.

Gail Gago, SA’s Science and Information Economy Minister, said it would build local capability, leverage private investment and help create more jobs.

FONTERRA SELLS AUSTRALIAN YOGHURT AND DAIRY DESSERT BUSINESS

Fonterra Co-operative Group Limited will sell its Australian yoghurt and dairy dessert business to rival Parmalat Australia, in order to focus the business more on cheese, whey and nutritionals.

Parmalat will take over Fonterra’s Australian manufacturing sites at Tamar Valley and Echuca, as well as its Australian yoghurt and dairy dessert brands including Tamar Valley, SKI and Calcium Yum.

The decision is unlikely to have a profound impact on employees, with all staff at Fonterra’s Tamar Valley and Echuca factories receiving offers of employment from Parmalat.

Fonterra chief executive officer Theo Spierings said the sale is part of a comprehensive plan to return the company to a strong and sustainable position.

“We are focusing on areas where we can win in a highly competitive market, and that means optimising our product mix and streamlining operations to match, and investing in higher value-add products that will deliver the best returns for our farmer shareholders.



Dr David Lines (right), a current Pork CRC IPP with SunPork Farms in South Australia, presented at the lactation and welfare session at the November 2015 Australasian Pig Science Association biennial conference, along with other Pork CRC supported presenters Diana Turpin, Kate Plush, Julia Sophia Huser, Charles Rikard-Bell (session chair), Cameron Ralph and Rebecca Morrison.

For Pork CRC it would expand into what she described as “a very successful industry placement program that helps employ graduate or postgraduates in pork production.”

“Each CRC has indicated between \$250,00 and \$1.25 million in new cash funding could be forthcoming from CRC participants or other industry partners,” Ms Gago said.



“Our Australian markets have particular ingredient strengths in cheese, whey and nutritionals, complemented by our strong consumer and food service businesses,” Mr Spierings said.

Fonterra’s managing director for Oceania, Judith Swales, also welcomed the sale.

“Divesting the yoghurt and dairy desserts business will allow us to focus on what we do best.

“We can continue delivering a competitive milk price to our suppliers, benefits to our customers, innovative dairy foods to our consumers as well as improved returns to our farmer shareholders and unit holders,” she said.



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INGREDIENTS



2016 KEEPING AUSTRALIA ON THE PULSE

The United Nation's International Year of Pulses 2016 (IYP) officially kicked off from 1 January 2016.

With more than 800 million people suffering globally from acute or chronic undernourishment and a rising tide of health problems linked to poor diets, the International Year of Pulses aims to demonstrate the integral role these nutrient-dense foods have in global food security and nutrition.

Georgie Aley, chief executive officer of AIFST and Australia's IYP national committee chair, said pulses, including beans, peas, lentils and lupins, have been recognised for centuries as a cornerstone of a healthy diet in many cultures. However, research is only just starting to look at their role in a range of conditions, from gut health to cognitive decline.

"International Year of Pulses represents a significant opportunity to showcase Australia as a key supplier of pulses globally while raising their overall awareness as a versatile, nutritious food," said Ms Aley.

The 2016 IYP On the Pulse Symposium is being run by the Grains & Legumes Nutrition Council (GLNC) and supported by CSIRO and the International Life Sciences Institute



Southeast Asia. It will be held on Monday, 2 May 2016 at the SAHMRI Institute, Adelaide.

The one-day symposium will see leading researchers examine the latest information on the health effects of pulses, highlighting the research gaps and introducing intriguing new innovations being used to incorporate pulses into the diets.

For more information, visit www.glnc.org.au/iyp.

LEADING AUSTRALIAN RED MEAT PROCESSOR SET TO EXPAND AND UPGRADE

International food facilities designer, Wiley, is working with livestock processing company Northern Co-operative Meat Company (NCMC) to design and build a state-of-the-art beef processing facility in Casino, NSW.

The facility will be designed to meet international standards of animal welfare and will service all major global markets including Australia, the USA, China, Japan, Korea, the European Union, and halal and organic markets.

NCMC chief executive officer Simon Stahl said the project will provide efficient facilities using a highly trained workforce to help feed the world as the global demand for premium Australian meat skyrockets.

"We chose Wiley to undertake the design and construction of our latest projects because we are confident in their specialist knowledge of the demanding standards of animal welfare, and this design compiled with design principles created by US animal welfare expert Dr Temple Grandin.

Wiley's senior project manager Barry Murphy said the projects would take around one year to complete.



"Our multidisciplinary team has drawn upon nearly a century of food industry experience to design and deliver highly innovative and best practice solutions in line with NCMC's budget and timeframes," he said.

The design aims to improve carton management, increases storage capacity on-site and improves load-out capabilities, ultimately reducing manual handling, forklift movements and creating a safer environment for all workers.

An automated sortation and retrieval system (ARS) will also be installed, which will be the first of its kind used in a frozen environment in Australia and only second in the world. This system provides NCMC with the ability to better manage product flow and traceability.



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Fiona Simson

New board members elected to Australian Made Campaign

Fiona Simson, vice-president of the National Farmers' Federation, and Richard Holyman, CEO of Australian natural medicine manufacturer Martin & Pleasance, have been elected to the Australian Made Campaign board.

The new appointments will replace Robert Gerard, executive chair of the Gerard Corporation, and Alf Cristaudo, former chair of the Australian Canegrowers Council, who both stepped down from the board in November 2015.

Australian Made Campaign CEO Ian Harrison extended a special thanks to Mr Cristaudo and Mr Gerard for their contributions during their time served as directors.

"The Australian Made Campaign is particularly grateful to Robert Gerard, who has volunteered his time for more than a decade, driving the establishment of critical policies and providing invaluable insights over the year," Mr Harrison said.



Ed Fagan

NSW Farmer of the Year announced

Mixed farmer Ed Fagan has been named the NSW Government's Farmer of the Year for 2015.

The award recognises the best farmer in NSW for their agricultural management skills, use of innovation, profitability, environmental sustainability and community involvement.

Mr Fagan operates the 1600 hectare Mulyan Farm in Cowra, NSW, trading cattle, breeding and trading fat lambs and growing wheat, canola, popcorn, oats, beetroot, asparagus, onions and baby spinach.

Minister for Primary Industries, Niall Blair presented Mr Fagan with the award, and praised his achievements.

"Mr Fagan's commitment to protect natural resources by improving soil nutrition, weed control and innovative research and development are incredibly impressive.

"Right across the state we are seeing farmers embracing new and innovative ways to do business that are leading the world, and the finalists in this year's Farmer of the Year Awards are testament to that," said Mr Blair.

Mr Fagan has won a cash prize of \$10,000, while \$2000 was awarded to the other two finalists.

The award is an initiative of the NSW Farmers Association and NSW Department of Primary Industries.



Nick Cork

ALS Limited appoints new food consultant

Global food testing company, ALS Limited, has appointed Nick Cork as a food consultant in Australia. He brings 25 years of experience in the food industry, incorporating a wealth of knowledge and expertise across the food and beverage supply chain.

Mr Cork's role will see him assisting Australian food and beverage companies with a range of services including audit support for HACCP/Food Safety Management Systems, investigating and resolving Out of Specification issues and helping with the design, management and evaluation of bespoke projects.



Robin Donohue

Patties Foods appoints CFO

Patties Foods has appointed Robin Donohue as chief financial officer (CFO), following the resignation of Michael Knapp in September 2015.

Mr Donohue joined the company in 2008 as financial control and has been acting CFO since Mr Knapp's departure from the company.

The news follows Patties Foods plans to exit the frozen food category after selling its Creative Gourmet business.

Patties Foods now intends to focus on its core business, savoury and sweet pastry business, which makes up around 90 per cent of the company's sales and pre-tax earnings.



Belinda Turner

New director for QRAA

Minister for Agriculture and Fisheries Leanne Donaldson has welcomed the appointment of the chief financial officer of Queensland's biggest grain exporter to the Queensland Rural Adjustment Authority (QRAA) board.

Toowoomba-based Belinda Turner is currently the chief financial officer of Nidera Australia and brings with her strong agribusiness know-how and a passion for primary producers.

"QRAA is also gaining the expertise of someone who has worked to encourage more young people and women into agriculture, through her previous roles with the Future Farmers Network and the Queensland Rural, Regional & Remote Women's Network," said Minister Donaldson. 🍷



FROM THE CEO



What a flying start to the year! I hope you are all feeling refreshed following the Christmas and New Year break.

We are certainly excited to be hitting the ground running following the approval of the 2016-2018 Strategic Plan by the AIFST Board in December.

The plan provides a clear direction for the Institute to allow us to provide greater value and support

for our members as we deliver on the vision of advancing Australia's position as a sustainable, world-leading food industry. The AIFST Board identified five strategic priority areas for AIFST based on feedback received from members and stakeholders via our engagement survey in September 2015. Our strategic priority areas include: membership services; industry services; advocacy; skills and capability building; and communications, with the focus for 2016 firmly on further developing and enhancing our membership model. This includes services and engagement, and commercial services.

To support the implementation of the strategic plan, we welcome Emily Rundle to the team as Membership Services and Events Coordinator. Emily brings with her an extensive background in communications and more recently membership organisations, and will be a great asset to the team.

We are busy working on our events calendar and CPD program and have a few important dates for you to mark in your diaries:

- **17-18 March 2016: Asia Australia Food Innovations 2016** in Perth. I encourage you to join us for this two-day

AIFST conference focusing on the insights and business strategies needed to capitalise on growing Asian export opportunities. We have a great line-up of speakers, including Bonnie Shek from the Hong Kong Trade Development Council.

- **19 May 2016: AIFST Annual General Meeting** to be held at the AIFST office, 40 Mount Street, North Sydney, from 10am (registrations from 9.30am).
- **27-28 June 2016: AIFST 49th Annual AIFST Convention: The Pulse of the Industry.** This year we are celebrating the United Nations-declared International Year of the Pulses (IYP), with the theme 'The Pulse of the Industry'. The extensive program will explore new technologies, market trends, innovations, the industry landscape, as well as future challenges and opportunities for the Australian food industry. The event is being held in conjunction with FoodTech Queensland.

Finally, I am donning an apron to represent the role our members play in the Australian food industry by joining over 150 other chief executive officers as part of OzHarvest's CEO CookOff on Monday 7 March. The initiative is to raise much-needed funds for the charity and highlight the crucial issues of hunger, homelessness and food waste. I would love you to join me in supporting this cause! My goal is to raise \$10,000, which helps OzHarvest deliver the equivalent of 20,000 meals to Australians in need.

To donate, simply go to my fundraising page at www.ceocookoff.com.au/fundraisers/GeorgieAley and click 'sponsor me'.

Thanks for your support and I look forward to working with all of you over the next year to see the exciting implementation of the AIFST strategic plan. If you have any questions or feedback, do not hesitate to get in touch at georgie.aley@aifst.com.au or 02 9394 8650.

Georgie Aley



47th Annual AIFST Convention.



2016-2018 AIFST STRATEGIC REVIEW

AIFST has undergone a significant positive change over the past 18 months and following extensive consultation, AIFST's 2016-18 Strategic Plan was approved by the Board in December 2015. The plan represents an exciting next phase for the Institute by delivering on the vision of advancing Australia's position as a sustainable, world-leading food industry.

As Australia's only national independent network and voice for food industry professionals, AIFST plays a crucial role in supporting and underpinning its members' contribution to the food industry. To ensure this, the AIFST Board agreed five strategic priority areas that will drive the focus over the next three years. These include:

- 1. Membership Services:** We will develop enhanced services that enable our members to expand their knowledge and networks with likeminded people who are passionate about the future of the Australian food industry, as well as keeping up to date on the latest industry developments that support members to operate within the global industry.
- 2. Industry Services:** We will be proactively engaging with key industry stakeholders to provide the Australian food industry timely and relevant information to support their business needs, including actively monitoring current and emerging industry trends, tracking insights into the latest innovations and providing project management services on behalf of the Australian food industry.
- 3. Skill and Capability Building:** We will take a leadership role in the skill and capability building of Australia's food industry professionals with the aim of enhancing the ability of Australia's food industry to meet future demand.
- 4. Advocacy:** We will actively advocate the important role

food industry professionals play in ensuring sustainable, safe and world-leading food to Australia and the world. We will actively respond to industry issues that negatively impact or seek to undermine the credibility and professional standing of our members through the provision of transparent, evidence-based information.

- 5. Communications:** We will proactively communicate and engage with our members and stakeholders to ensure they are kept up to date and informed on relevant news and opportunities. Our communications will also be focused on building the credibility and trust of our brand within the industry.

As we look to the implementation of the three-year strategy, our focus for 2016 will be on membership services and skill and capability building, including updating our systems to ensure we provide members with a better platform for interaction and access to industry news, research and events as well as a broader industry skill and capability strategy to better support our members ongoing career development. From 2017, we will commence the wider rollout of our industry services offering advocacy activities to ensure we build a sustainable future for the Institute moving forward.

The AIFST Board and chief executive officer would like to thank those who provided their input to the development of this plan and we look forward to working with all our members and stakeholders as we commence the implementation of the AIFST strategic plan.

If you have any questions or feedback, do not hesitate to contact AIFST CEO, Ms Georgie Aley, at georgie.aley@aifst.com.au or 02 9394 8650.

49TH ANNUAL AIFST CONVENTION

REGISTER
NOW!



The 2016 AIFST Convention will represent the 49th edition of this well-established and well-regarded Australian food industry event.

This year, the Convention will be co-located with FoodTech Queensland, the new trade event for the food and beverage manufacturing industry in

Queensland, at the Brisbane Convention & Exhibition Centre from 27-28 June 2016.

The 49th Annual AIFST Convention's theme, 'The Pulse of the Industry', will explore new technologies, key trends, innovations, industry landscape, future challenges and opportunities for the Australian food industry and recognise the UN-declared International Year of Pulses.

A world-class line-up of speakers will highlight emerging trends and insights in the food industry, the latest technologies including new plant breeding, 3D printing

and nanotechnology, successful innovation in the food industry and how to keep it progressing, pulse-based functional food opportunities, plus much more!

Everyone's favourite Cheese and Wine Night is back on 27 June. A popular social function of the AIFST Convention, join us at the matching cheese and wine night to taste the best in Queensland produce and network with more than 500 Convention attendees and FoodTech exhibitors.

Take advantage of our early-bird prices, available until 2 May 2016 and register now at www.aifst.asn.au for Australia's premier food science and technology event.

Submit your abstract today! If you are involved in research related to cutting-edge technologies, innovations or science in the food industry and would like to submit an abstract to present at the Convention, please contact AIFST via aifst@aifst.com.au for further information. **Abstracts are due by March 31 2016.**

INNOVATION CONFERENCE NOT TO BE MISSED

ASIA AUSTRALIA FOOD INNOVATIONS 2016

Innovation can be a daunting prospect for any company but a simple shift in thought can reposition it as exciting and affordable, according to a leading Australian food innovation expert.

Dr Barry McGookin, general manager of innovation, capabilities and skills at Food Innovation Australia (FIAL), said Australian food companies are increasingly looking at innovation as a way to address the growing pressure of supplying Australian and Asian markets, but are reluctant to invest in new products.

Dr McGookin said while new product development and new processes may spring to mind when thinking about how to innovate, companies can see increased profits simply by innovating existing products and processes.

Set to speak at AIFST's upcoming Asia Australia Food Innovations Conference (AAFIC) in Perth, 17-18 March, Dr McGookin said innovating a product's marketing strategy and packaging, effectively utilising consumer insights, and streamlining back-end processes such as financial systems can be more beneficial to a company's bottom line than investing time and money into developing a new product. He said companies should consider

these types of innovation just as much as a new product.

"Australian food companies are often not great risk takers. We tend to look at imitations or line extensions of an existing product rather than launching something more novel. And this reflects consumer sentiment – Australians tend to not take risks in their supermarket choices," he said.

"I'll be presenting the potential benefits a company can gain from collaborating with external resources for a complete approach to innovation and opening themselves up to more market opportunities.

"Companies tend to be hesitant about collaborating with those similar who are often competitors, but in some sectors, there is a lot that can be gained."

Dr McGookin will give advice on how to innovate and collaborate effectively at AAFIC alongside some of the best innovative thinkers in the Australian food industry.

"Innovation is the new business mantra. It's a driving force in many businesses but many don't know how to approach innovation in a way that is right for them. AAFIC is a great opportunity to learn from the best," said AAFIC chair and general manager of health, safety, environment, quality and risk at Compass Group, Dr Justin Whitley.

For the full list of speakers and to register for AAFIC held on 17-18 March 2016, visit www.aafic.net.

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CPD EVENTS DIARY

AIFST's Continuing Professional Development (CPD) program offers members opportunities that support ongoing skill and capability building. These events will be held in 2016:

17 February. Construct a Compliant Food Label. Melbourne (*Podcast available*)

3 March. Australian Food Regulatory System Workshop. Sydney.

3 March. Food Labelling 101. Sydney.

4 March. Food Recalls Workshop. Sydney.

7 March. Food Safety and Quality Standard Workshop. Melbourne

10 March. Food Recalls Workshop. Brisbane.

18 April. Food Recalls Workshop. Adelaide.

20 April. Food Recalls Workshop. Perth.

26 April. Food Ingredients Series – Food Colours. Melbourne.

5 May. Australian Food Regulatory System Workshop. Melbourne.

5 May. Food Labelling 101. Melbourne.

6 May. Food Recalls Workshop. Melbourne.

10 May. Food Ingredients Series – Gelling Stabilisers. *This is the launch of the Food Ingredients Series podcasts. Available online.*

12 May. Australian Food Regulatory System Workshop. Sydney (*Podcast available*)

31 May. Food for Specific Populations – Infant Nutrition. Sydney

12 June. Chemical Migration in Packaging Seminar. Melbourne

27–28 June. AIFST Student Product Development Competition. Brisbane.

13 July. The Food Supply Chain Risks and Rewards. Sydney. Melbourne.

1 August. Food Microbiology – What you need to know to operate effectively in the food industry. Melbourne

8 September. Food Processing New Technologies. CSIRO Food Innovation Centre, Werribee, Victoria

11 October. Foods for Specific Populations: Healthy Ageing – meeting the food and nutrient needs of this population. Melbourne

20 October. Innovations Seminar. Sydney

In 2016, AIFST CPD Program will be offering downloadable podcast versions of some of the courses, available for purchase after the event. For more information visit www.aifst.asn.au



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AIFST 2016 AWARDS

Hurry! Nominations close on 11 March for the 2016 AIFST Awards, which will be presented at the 49th Annual AIFST Convention. Nominate yourself or a colleague for one of the following prestigious industry awards. For more information, visit aifst.asn.au.

Food Industry Innovation Award

This award recognises a significant new development in a process, product ingredient, equipment or packaging in food safety or logistics, which has achieved successful commercial application in the Australian food industry over the past five years.

Keith Farrer Award of Merit

This is awarded for achievements in food science and technology in the fields of research, industry and education, and helps further the aims and objectives of the Institute.

President's Award

This award acknowledges and acclaims outstanding contributions to the Institute and profession by an individual or organisation.

Sensory Solutions Tony Williams Sensory Award

This new award recognises an undergraduate AIFST student member studying an aspect of Sensory who demonstrates academic achievement, interest, enthusiasm and integrity in Sensory Research. The award is named in honour of Tony Williams, one of the pioneers of Sensory Research in the United Kingdom and supported by Sensory Solutions.

Jack Kefford Award

This award recognises an exemplary food, science and technology paper published in a peer-reviewed journal by an AIFST member in the previous year.

Malcolm Bird Commemorative Award

This award recognises members under the age of 30 who demonstrate academic achievement, leadership and integrity in their profession. Selection is based on a 1000-word technical abstract and oral presentation on an aspect of food science, which is given at the Annual AIFST Convention.

Student Product Development Competition

This competition provides students with an opportunity to develop and present an innovative new product. The 2016 award is open to undergraduate and, for the first time, post-graduate AIFST members. The 2016 competition will celebrate the United Nations International Year of Pulses and the product development brief will focus on pulse-based foods.

Bruce Chandler Book Prize

The late Bruce Chandler bequeathed funds to establish a prize for a book that has been published in the past five years and makes a great contribution to food science and technology.



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FOOD SAFETY AUDITING – UPDATE ON A KEY INDUSTRY PROJECT

Co-ordinating with other members in the food industry, the AFGC is working towards streamlining and adding value to food safety auditing of food businesses.

Words by Dr Geoffrey Annison

Almost two years ago in this column, I described the rising concerns within the food manufacturing sector regarding the burden of food safety auditing, as well as the work the Australian Food & Grocery Council (AFGC) had commenced in partnership with other major stakeholders to address it. In essence, the concerns were with the proliferation of proprietary and private standards with which suppliers were required to comply by their customers, and the number of audits that were required to demonstrate compliance.

Concerns focused on the overlap between audits – that is, individual companies may be audited multiple times over short time periods on behalf of different customers. A substantial commonality of elements between audits, particularly for food safety matters and a lack of cross-recognition of audit reports represents a significant, and in some cases unnecessary, cost burden on the companies, which in aggregate across the supply chain is substantial, running to many millions of dollars.

To address this issue, the AFGC and a number of companies from the manufacturing, retailer, food service, quick service restaurant and certification sectors have been working together to explore options for alleviating some of the burden. The initial discussions indicated that there were opportunities to reduce the burden of audits by:

1. Identifying the critical food safety elements of regulatory requirements and industry standards and gaining agreement on these



2. Mutual recognition of standards and audit reports
3. Establishing principles and agreements for mutual recognition of food safety elements of audits
4. Promoting consistency and confidence in audit outcomes through reviewing audit and auditor competency standards and skill sets appropriate for harmonised and aligned product categories.

Notwithstanding this, the true scope of the problem was not quantified, which prompted the AFGC with generous support from Food Innovation Australia Ltd (FIAL) and AusIndustry, to conduct an industry-wide survey of food safety auditing practices. A copy of the survey report

can be found online at www.fial.com.au/food-safety-auditing-report.

It should be noted that the reach of the survey was unprecedented. By combining the email lists of many organisations, more than 6000 technical contacts were identified across the food industry sector. The key findings make interesting reading and include:

- The number of food safety audits conducted is higher than necessary to provide for safe foods
- There is duplication of food safety requirements across these audits imposing unnecessary costs on food companies
- The level of prescriptive requirements in standards is increasing counter to the established principle of

standards being outcomes-based, as the best means of assuring food safety

- Auditor availability and competencies across all food categories is creating difficulties for companies trying to schedule audits
- The overall cost of food safety audits on businesses is increasing

Of the respondents, 74 per cent considered food safety audits to be an integral part of managing food safety, while 71 per cent viewed food safety audits as a cost of doing business and 55 per cent thought that food safety audits add value to their business. There are a number of further important findings, which can be viewed in the full report.

With the issues around auditing practices confirmed, the AFGC and partnering organisations are now considering further work in this area. Specifically, the objective is to streamline and harmonise the food industry's management of food safety audits and reporting. This has the potential to lead to a nationwide common, industry agreed approach to assuring and demonstrating safe food manufacture and regulatory compliance. The AFGC will continue to work in partnership with the industry to establish a truly cross-sectoral, whole-of-industry approach towards a structure of food safety management that is more time and cost effective.

While the current focus of the project will be on food safety issues, food defence is coming to greater prominence as a threat to the integrity of food products. Food adulteration is not always a food safety issue, but it does always result in consumer deception. When discovered, this can be equally as damaging to brands as food safety issues.

As global supply chains become more complex and consumer value propositions embodied in food products become more diverse and sophisticated and encompass aspects of product production and processes, food defence will become even more critical. It is also likely to become of greater interest to regulatory agencies with responsibility for food standards and consumer law. The regulators will be looking to the industry to demonstrate leadership in protecting the integrity of the supply chain and its products to ensure consumers are delivered the value they expect. The partnerships and framework for cooperation that the AFGC has established through the food safety auditing project can provide the vehicle for future industry collaboration in food defence.

I look forward to providing further updates on the food safety auditing project in coming issues of *food australia*. ^A

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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ADAPTING TO A CHANGING LANDSCAPE

The environment in which we live and work is changing, and so must we if we are to meet the production demands of the future, as well as look after the environment and our communities.

Words by *Anika Molesworth*

As a farmer of the arid inland, I know poignantly the impacts of climate change. To the untrained eye, this land looks deserted and lifeless. But for those who have witnessed the migration of a thousand emerald budgies, a snowfield of white paper daisies, or the magic of a rock wallaby's first stumbling hops, it is undeniable that this land breathes and evolves as the seasons change. But this ecosystem is fragile and as the climate challenges facing inland Australia rise, the protection of these delicate lands is paramount.

The hardened salt-of-the-earth farmers who occupy this land may not first appear appropriate for this vital task however it is these custodians of the land who are charged with the responsibility to protect the balance. From their hands they produce food and fibre that feed our nation and those across the seas. They nurture the native flora and fauna, which has adapted to these unique environments, and protect the timeless landscapes.

Farming sustainably requires good information, adaptability, support networks, and a fire in the belly to strive forward even when the odds are not in one's favour. Holistic management is operating with a bird's-eye perspective. In extensive grazing systems this means working with, not against, the resources within the property boundaries and beyond. It is about not only maintaining natural assets, but enhancing them – the notion that these fragile inland environs can produce quality food and fibre without exhaustion or degradation when carefully managed.

Livestock that graze upon the arid lands are generally managed in a low-

intensity, low-stress environment. The resources on which they depend, such as nutrients and water, are cherished by the farmer. Soil cover from vegetation keeps precious nutrients and organic matter on the ground, reducing the chance of wind and water erosion. The vegetation takes up these nutrients, which are then utilised by the livestock to sustain them. Rainfall is caught in large in-ground dams, and distributed across country through pipe networks, to feed distant troughs and the dependent livestock. Looking after nutrient and water reserves now means greater security for the future and the continued ability to raise livestock here.

The effects of climate change

Much of this hot, dry inland environment is projected to become hotter and drier. Never before have the effects of climate change been so keenly felt around the world and never before has the consensus been so great that something must be done. Conference of Parties (CoP21), held in Paris in December 2015, raised a sense of shared purpose and responsibility in meeting the new climate and development goals. Its outcome was the landmark Paris Agreement on climate change.

Change will occur inevitability in rural communities and the surrounding environment, but what will differ is the acceptance to change, the ease of transition, and the direction of change. The Paris Agreement opens the door to further work on agriculture between today and 2020, when the agreement takes hold. It is now important that we



Anika Molesworth. © Corey Stenhouse.

move beyond mere sentiment and have the courage to make the appropriate change necessary.

Embracing renewable energy

One of the most exciting changes that we will see is the explosion of renewable energy technology and uptake. While the Paris Agreement heralds the end of fossil fuels and ushers in a new age of renewable energy, an important question to ask is – how does the Agreement set the stage for agriculture to facilitate a global energy transition of the scale and speed required to hit the 1.5°C target?

Agriculture contributes 10-12 per cent¹ of global anthropogenic greenhouse gas emissions, through the release of carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). However, much of this is



© Anika Molesworth

recaptured through the sequestering of carbon in biomass, dead organic matter and soils. Reducing emissions from agriculture will be imperative, as it will be impossible to stay within either a 1.5 or 2°C target if agriculture does not contribute to emissions reductions. Luckily, there is significant potential in agriculture for reducing these biogenic sources of greenhouse gases, and reducing the fossil fuels used in the production system is one important way to do so.

The importance of renewable energy is well understood by farmers and has been used in food production systems for centuries. Using the sun to dry crops and grain is one of the oldest applications of solar energy, windmills have drawn water from depth, while harnessing the power of flowing water with waterwheels was a game-changer for early civilisations to advance.

Although there is an extensive history of renewable energies used on farms, they still mainly play only a localised and modest role in energy production. For large-scale implementation of renewable energies, countries need to devise strategies to improve availability and affordability of suitable technologies – developed for local contexts and holding opportunity for scaling-up.

What does this mean for Australia?

For Australian farmers, the three renewable energies that currently hold most promise for widespread adoption are – solar, wind and bioenergy.

Australia has the highest average solar radiation per square metre of any continent in the world. Solar energy is created from sunlight captured by solar photovoltaic cells, or heat converted in solar thermal plants. Research, development and deployment in on-grid and off-grid applications is progressing rapidly in Australia, and a range of other solar energy technology innovations are currently being explored – for example photosynthetic-based solar energy technologies and solar enhanced fuels.

Wine making is an industry that is striding ahead in solar uptake, realising the technology is ideally suited to the sector's energy needs. The McLaren Vale winery d'Arenberg has reduced its greenhouse gas emissions by 30 per cent – or more than 181 tonnes of carbon dioxide a year. This is due to the fact that the most productive time of the year for solar energy coincides with the busiest time of the year for wineries — the vintage over summer and autumn.

Just as Australian farmers are already commonly using small-scale

solar systems to recharge their tractor batteries, maintain electric fences, or power water bore pumps, I foresee a not-too-distant time when much agricultural equipment will be electrical and recharged with solar power, thereby reducing reliance on diesel.

Wind energy in Australia is the fastest growing renewable energy for the electricity generation. Currently, it is also the cheapest source of large-scale renewable energy. Australia has some of the world's best wind resources along its south-western, southern and south-eastern margins, as well as isolated areas of the eastern margin. This energy source has been used in rural Australia to pump water since the time of European settlers. However, to see real scale to wind power adoption, it is groups such as the Australian Wind Alliance that are bringing together communities, businesses and individuals to partner and build capacity. Farmers within the group proudly state they are no longer only livestock or crop farmers – but also innovative and forward-thinking wind farmers!

Bioenergy is derived from woody biomass, oilseeds, algae, and agricultural wastes and residues. Bagasse, the fibrous matter remaining after sugarcane is crushed, currently



provides the majority of Australia's installed bioenergy. There are competitive advantages in Australia for the expansion of bioenergy, including land suitable for crops and animals, farmer expertise, industry infrastructure as well as world-class scientists and technology developers. One example of bioenergy adoption in agriculture is the Leongatha dairy manufacturing facility. Local milk is used to produce dairy products such as butter, cheese, and milk powder and the waste from the manufacturing process is put into an anaerobic biomass digester, which creates biogas. The biogas runs two engines that can produce 760 kilowatts of electric power per year.

There are other renewable energy sources that have the potential to provide power in the future – but are currently more limited due to natural resource constraints and early-stage infrastructure. For example, local water availability is a key constraint on future growth in hydroelectricity generation in Australia, and most major hydropower opportunities have already been realised. However, in the future there may be some growth in use of 'mini-hydro' schemes, which can run off small water streams and

irrigation canals for household or small community power.

Another example is geothermal energy. Primarily from hot sedimentary aquifer resources, it holds promise of being a renewable energy source that can operate 24 hours a day, providing critical large-scale baseload power for Australian homes and industries. The outback Queensland town of Birdsville has been tapping the hot waters of the Great Artesian Basin to produce geothermal energy since the 1990s. However, this energy source, which can be used for all electrical needs, is still in its formative stages in Australia and awaits sufficient venture capital from either the private or public sectors. The massive uptake of geothermal heat pumps across California demonstrates the promise for Australia.

The great prospects for renewable energy to be embraced by agriculture are out there, and as a farmer, I am truly excited to see the expansion of clean, green production systems.

Standing in the paddock of my family's sheep station, looking across the timeless landscape with the sun on my face and the breeze rustling the Acacia trees, I see the huge potential. The vast horizons, open skies and

brilliant minds found in this country offer farmers the opportunity to capture and champion boundless natural, renewable power.

Anika Molesworth was the 2015 Australian Young Farmer of the Year and represented young farmers at the COP21 climate conference. She helps manage her family's sheep station near Broken Hill and is a strong advocate for greater adoption of renewable energies in agriculture. She runs the blog 'Climate Wise Agriculture' to promote climate change adaptation and mitigation strategies.

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SINGAPORE FOOD INNOVATION HUB & THE ROLE OF INTELLECTUAL PROPERTY

Australia and New Zealand are poised to partner with neighbouring Singapore to create a food technology innovation hub. Understanding the value of intellectual property is critical to its success.

Words by Drs John Hughes and Mathew Lucas

Singapore imports up to 90 per cent of its food from multiple countries to avoid reliance on any one country or region. But while its focus may be on importing produce, this island of innovation also has the potential to value add and develop high-end food products.

The market potential for countries such as Singapore is huge – the ASEAN (Association of Southeast Asian Nations) region is home to approximately 625 million people and with China and India included, the potential market extends to over 3.1 billion people.

While local Singapore food technology innovators may not have the capacity to supply such a huge market, forming partnerships with companies from around the world, in particular with companies from neighbouring Australia and New Zealand, could achieve this.

However, this is not possible without innovation. Innovation, in turn, requires intellectual property. Careful protection and management of intellectual property can give food technology innovators the market security they need to invest.

Marketing expansion

ASEAN represents an exciting economic region and is experiencing a flurry of interest from a global perspective. Free trade agreements in place between Australia and Singapore, Malaysia, and Thailand, as well as the ASEAN-Australia-New Zealand Free Trade Agreement (AANZFTA) have given businesses the chance to grow, and expand into the ASEAN region, and created an

innovation dynamism that has led to the development of functional foods to address physiological issues of obesity, heart disease, diabetes and many other conditions influenced or exacerbated by particular food choices.

According to a publication by the Australian Department of Foreign Affairs and Trade (DFAT) and Austrade, *Why ASEAN and why now? Insights for Australian Business, August 2015*, the combined gross domestic product (GDP) of the ASEAN region rose three-fold from 2001 to 2014 to US\$2.5 trillion. This highlights the economic power of ASEAN and with Singapore as a financial powerhouse; the entire region is set for unprecedented financial and economic development and prosperity.

In order to maximise this innovation, an effective intellectual property protection and management strategy is required.

Why the ASEAN market

The actual and potential economic prospects for the ASEAN region are strong. There are many factors which contribute to this positive economic outlook, including the demographic potential of a growing population providing a strong and steady work force, expanding affluence with a developing middle class and a broadening tax base enabling governments to promote urbanisation and infrastructure growth. Such affluence is allowing choices to be made on diet and the selection of nutritional formulations.

While market success is clearly a common goal, a principal functional theme should also be identifying

and protecting intellectual property around food innovation to generate high-end value food products and add substantial value to a food innovation company's bottom line.

Governments are also recognising the potential for the ASEAN region. While there is much more that can be done to facilitate intellectual property protection on a regional basis, on a country-by-country basis there is a growing interest in the value of intellectual property and a healthy respect of the laws governing the protection of intellectual property. These laws are well developed in Singapore, Australia and New Zealand, and include the ASEAN Patent Examination Cooperation (ASPEC), a regional patent work-sharing arrangement between Singapore, Brunei Darussalam, Cambodia, Indonesia, LaoPDR, Malaysia, the Philippines, Thailand and Vietnam.

Role of intellectual property and food innovation

New ingredients, improved production processes and apparatus, new or improved recipes, new product development, packaging, labelling and branding all require protection through intellectual property.

For intellectual property to be an effective commercial tool, it needs to be effectively managed. The innovation needs to be identified and then assessed as to whether it is worth protecting and why it needs to be protected. A useful question to consider is whether a company fully understands its intellectual property position and how to use it strategically to grow business opportunities and create market security.



A critical factor often overlooked when dealing with intellectual property is whether there is freedom to manufacture, use, import or sell the product. That is, is there infringement of any third-party patents, trademarks or designs? Furthermore, is the intellectual property protection that a business has carved out for itself sufficient to keep competitors well clear?

The key is to be aware of intellectual property rights and their potential to assist in market exclusivity or competitive advantage, while managing the associated risks as far as a food innovation business is concerned.

The various risks associated with launching a new food product include regulatory hurdles, legal and financial risks. If the supply chains, licences and approvals are not in place, brand dilution and potentially reputational risks, if the product is not readily adopted by the marketplace, are generally well managed by the industry. What may be overlooked is managing the intellectual property, its value to

a business, and its role in developing market penetration in the food industry.

A culture of intellectual property recognition – due diligence

It is important to have a culture of recognising intellectual property and harvesting it. Whether it is branding, patentable technology, design of packaging, a trademark or overall business appearance, once a food innovator is aware of any intellectual property generated, it needs to align with business needs and goals. For instance, is the new food product part of core technology or a core product line for that business, or is it rather an experiment in ‘branching out’? This can determine a level of risk from the business perspective.

It is then necessary to ensure that one has freedom to use the intellectual property generated. Freedom to operate is determined by searching the patent office databases in markets of interest, using an independent searching company or through an intellectual property advisor.

Next steps in protecting IP for food innovation

Once intellectual property has been identified and aligns with business goals, the various components of the intellectual property can be ranked in order of importance in terms of giving a business a competitive advantage. If it is protectable intellectual property, it also needs to be of a type that enables a company to detect potential infringers or copiers in the marketplace.

As a business grows, it can then develop strategies to build a stronger and more expansive intellectual property portfolio so that ultimately, a strong wall is built surrounding your product lines and business interests. The aim should be to generate a ‘picket fence’ around a market niche to create impediments to third-party market entry, or to at least restrict competition.

Food technology and product development

From a practical perspective, whether a business is new, a small- and medium-sized enterprises, or a

well-established larger company, the adage to create, protect and exploit in relation to intellectual property can give the business a welcomed competitive advantage.

Singapore has the capacity to further develop a vibrant food technology industry. Businesses need to consider intellectual property as a metric of financial and innovative performance, as well as a tool to benchmark competitors, such as tracking new product entries into the market place, monitoring innovation in manufacturing or food technology, and assessing consumer acceptance. Forward-thinking business owners will ensure, with proper management, that intellectual property is used to enhance business development rather than hinder it.

The need for functional healthy food products to meet an increasingly well-informed populace will create business opportunities, particularly across ASEAN and other regions, such as China and India.

Singapore, a financial powerhouse of the ASEAN region, has the scientific and commercial expertise and capacity



to attract local and international food innovators to supply a potentially enormous market. Countries with well-developed food manufacturing companies, such as Australia and New Zealand, could benefit from partnering with Singaporean entrepreneurialism to develop high-end value food products.

Innovation leads to new intellectual property, which in turn adds value to a food company's bottom line.

The next decade will be an exciting time for food innovation in Singapore and will provide opportunities for partnerships with Australian and New Zealand companies. 📍

Drs John Hughes and Mathew Lucas are Partners at Davies Collison Cave LLP.

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DOES THIS BUG YOU? WHEN YOUR FOOD CRAWLS...

In many countries, the consumption of insects is widely accepted. However in the Western world, edible insects are not a popular feature on many people's menus or shopping lists – yet.

Words by Milena Dryza

Cricket-chip cookies, Bee-LT sandwiches and grasshopper kebabs. As weird as these delicacies sound, there is no denying that there has been a spike of interest in enjoying insects for dinner. But what patenting implications do food businesses have to consider?

According to the Food and Agriculture Organization of the United Nations (FAO), "Trends towards 2050 predict a steady population increase to nine billion people."¹ Not surprisingly, predictions have been made that our environment and agricultural resources, such as water, land, forests, and fisheries, will not cope with this increase in demand.

In many developing and tropical countries, the practice of consuming insects, more formally known as 'entomophagy', is widely accepted.² However, in the Western world, the reaction to insect consumption typically ranges from mild disgust to absolute horror.

Why insects?

While there is a lot of variability between different insect species in relation to their nutritive value, many edible insects provide satisfactory amounts of energy and protein, meet amino acid requirements for humans, are high in monounsaturated and/or polyunsaturated fatty acids, and are rich in micronutrients, such as pantothenic acid, biotin and many more.³

Insects are also an efficient, environmentally friendly source of nutrition. For instance, crickets need six times less feed than cattle, four times less than sheep, and half the feed required by pigs and broiler chickens, to produce the same amount of protein while producing



less greenhouse gases and ammonia than conventional livestock.¹ In addition, insects can be grown on organic waste, making them a biodynamic food source.

There are more than 1900 edible insect species. The most common ones include *Coleoptera* (beetles), *Lepidoptera* (butterfly and moths), *Hymenoptera* (bees, wasps and ants), *Orthoptera* (grasshoppers and crickets), *Isoptera* (termites), and *Homoptera* (cicadas).⁴

A developing area – patenting activity

The past five years in particular have seen a shift in the way food production from insects is viewed. The idea has permeated the Zeitgeist due to celebrity chefs such as David George Gordon, Curtis Stone and Heston Blumenthal, as well as the popular media.

This growing interest is also demonstrated by the fact that a number of patent applications have been filed in this area, indicating that the food industry is investing in, and developing, new ways of working with insects to produce edible products.

For the purposes of this article, we have focused our review of the patent landscape on the use of insects, or products of their processing, for human consumption.⁵ The majority of patent applicants in this area are from China, followed by the US, with some from Japan, France, the Netherlands and Russia.

Wageningen University in the Netherlands also appears to have a focus on research into the area of edible insects. While individuals own most patent applications, Protix (based in the Netherlands) is one of the few companies that have a number of patent families in the area of edible insects more generally, including a number of patent applications directed to systems for breeding insects.

Inventions relating to the use of insects for human consumption, including products of their processing, involve either converting insects into nutrient-rich extracts, or using live insects as food sources, particularly as part of a self-sustaining food production system. The patent

applications in the former category include those that cover: processes for obtaining fat-, protein- and fibre-containing fractions from insects; methods of obtaining pre-seasoned and fried insect larvae to be added to food as a fortifier; pre-prepared cicada-derived food additives to boost the nutritional content of, and to impart certain medicinal properties to, food; and a production method for a milk substitute (which does not contain lactose) derived from insect larvae.

When using live insects as food sources, there are patent applications directed towards self-sustaining food production systems (where food waste is converted into animal food by feeding it to insects followed by processing the insects into animal feed), as well as cultivating insects that have particular health benefits, such as anti-microbial activity and the ability to improve immune function in the animals to which they are fed.

One common thread that ties all of these applications together is the understanding that insects themselves, as well as the products of their processing, have high nutritional value. A number of applications also

discuss medicinal properties. Insects also have the potential to be used as an alternative food source for people who are sensitive to particular components, such as gluten and lactose.

A competitive advantage

Patenting insects as food tends to focus on processes, such as those used to obtain insect-derived products, or processes by which insects can be treated to make them suitable for use in food.

However, there may be ways to obtain patents directed to insect-derived food products themselves. Aside from including claims in your patents to products obtained by a particular process, broader protection could be achieved by claiming extracts that have one or more components (for instance a protein or fat) at a particular level of purity, extracts that are enriched in particular compounds, or extracts that exclude particular components.

Claiming a product provides broader protection as a competitor will infringe the claims regardless of how their product is produced. In addition, it can be quite difficult to work out what production process a competitor is using to determine if there is any infringement.

Australia's proximity to Asia, and the fact that many Asian cultures are already familiar with consuming insects, provides Australian food producers with some unique opportunities. The initial 'eek' factor is not a significant hurdle when it comes to promoting insect-derived or -containing foods in Asian markets.

In addition, Australia has the right climate for cultivating many of the insects on the 'edible' list. The high regard with which Asian consumers view food products produced in Australia, which has been recently illustrated in the demand for baby formula, may also provide Australian food producers with an advantage over their Asian-based competitors.

Milena Dryza is a senior associate at Freehills Patent Attorneys.

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OMEGA-3 COW'S MILK

A Tasmanian company has substantially improved the technology of producing feed supplements to increase the level of nutritionally important Omega-3 fatty acids in milk.

Words by *Dr Suresh Kumar Gulati, Geoff Cox and Dr Trevor William Scott*

Omega-3 cows milk containing 60+ mg per serve (250ml) of $C_{20:5}$ (EPA) Eicosapentaenoic acid and $C_{22:6}$ (DHA) Docosahexaenoic acid "which is a good source of Omega-3" as defined by Australian New Zealand Food Authority¹, can be produced by feeding bypass (protected) fat supplements. This milk has been found to be very acceptable in organoleptic, sensory and shelf-life tests by retailers and consumers.

Milk is considered to be one of the most important foods for human consumption and provides essential nutrients including protein, fat, easily digestible calcium, other minerals and, fat soluble vitamins A, D and E.

It is now recognised that omega-3 fatty acids (FAs) are essential for normal growth, and are important for brain development, vision and immunity in infants. These FAs may also play a vital role in the prevention and treatment of cardiovascular disease and in human health.²

However, the amount of these fatty acids that are present in milk and other ruminant-derived foods is very low, due to the bio-hydrogenation of dietary n-3 fatty acids (linolenic $C_{18:3}$) in the rumen. Although small quantities escape bio-hydrogenation and can be converted to $C_{20:5}$ (EPA) Eicosapentaenoic acid and $C_{22:6}$ (DHA) Docosahexaenoic acid in ruminant tissues, there are negligible proportions of these fatty acids in milk.

Attempts to increase these C20 fatty acids by feeding fish oils to cows have been unsuccessful, because they cause deleterious effects in reducing feed intake, milk and fat yield.

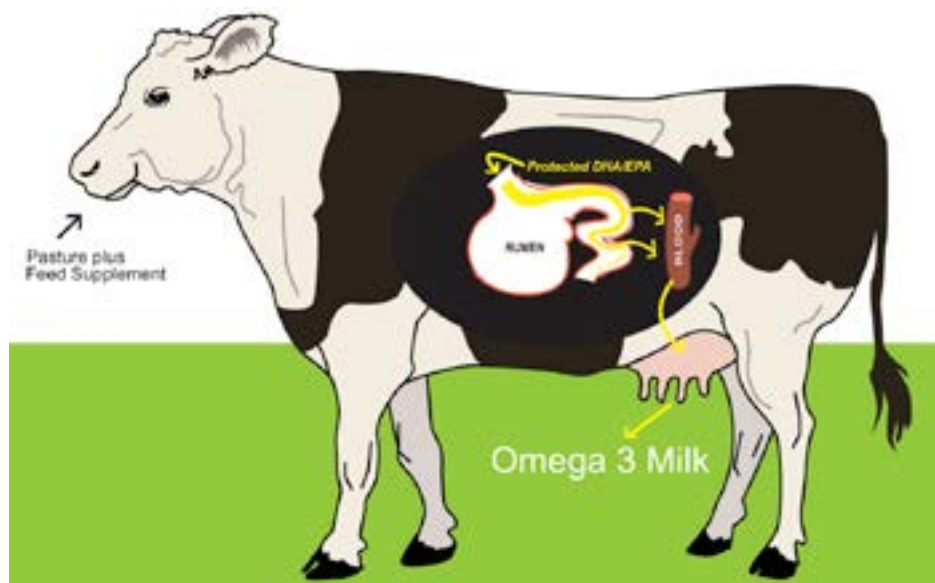


Figure 1: Feed supplements containing EPA/DHA bypass the rumen, are digested in the small intestine and absorbed into the blood stream. The constituents EPA/DHA fatty acids are transported to the mammary gland and re-synthesised into glycerides prior to secretion as fat globules in the milk.

Omega-3 fat encapsulation

To avoid the deleterious effects mentioned previously, there is a need to embed the Omega-3 containing oils in a matrix of protein that is resistant to rumen microbial degradation.

The technology to produce Omega-3 bypass (protected) fat was pioneered by the CSIRO,³ and has recently been substantially improved by Naturale (Aust) Pty Ltd in Tasmania. Methylglyoxal, a naturally occurring flavouring agent that is commonly found in many foods, including Manuka honey, cheddar cheese, soft drinks and food containing high fructose corn syrup, is used in the production of a rumen inert fish oil and soybean protein matrix that is resistant to microbial degradation.

Feeding the protected feed supplement to cows enables the

encapsulated oils to bypass the rumen, to be digested in the small intestine and absorbed into the blood stream. The constituents EPA and DHA fatty acids are transported to the mammary gland and re-synthesised into glycerides prior to secretion as fat globules in the milk (Figure 1). The protected protein component will provide greater quantities of the essential and rate limiting amino acids, which are necessary to sustain milk production.

Rumen bypass fat supplements

The total amount of EPA and DHA per serve is determined by the milk yield, the percentage of milk fat, quantity of bypass fatty acids fed and the proportion transferred into milk. For example, to achieve in excess of 60mg of EPA+DHA per serve (250ml)

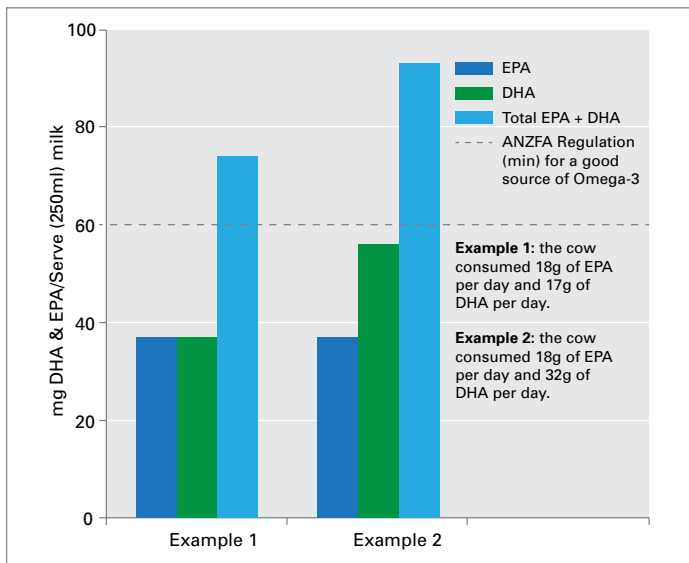


Figure 2: Omega-3 (DHA & EPA) levels in milk are influenced by intake of bypass (protected) feed supplements.

of milk, a cow producing 25 Litres of milk/day needs to secrete more than six grams of these fatty acids per day.

The proportion of EPA and DHA that is transferred from the supplement into milk is in the range of 16-20 per cent. Therefore, 30 grams of a combined EPA and DHA protected feed supplement needs to be fed per day to achieve the required level in milk (Figure 2).

Omega-3 cow's milk containing EPA and DHA has been assessed by independent consumer panels and retailers and found to be very acceptable from a shelf life, sensory and organoleptic perspective. There were no 'off flavours' or 'fishy smells', which have characterised many foodstuffs where fish oils are added directly into the food.⁴

Therefore, it is now practical and economical to produce milk naturally from cows containing 60mg of EPA/DHA per serve (250ml). This is the minimum level required for food to be labelled as a "good source of Omega-3 fatty acids" as defined by the Australian New Zealand Food Authority.¹

This milk will provide the consumer a dietary means to increase the level of nutritionally important Omega-3 fatty acids. ●

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TECHNOLOGY BRINGS TO LIFE GROWTH

For an Australian food processor, a shift in core business from retail to high volume manufacturing resulted in rapid growth due in large part to equipment versatility.

Words by Ali Marjan

For any start-up enterprise, the goal is to hit the ground running and succeed beyond all expectations but the path to get there is often not smooth nor with typically fast results. However, for Australian food processing company Wanniasa Wheeler Food, a complete shift in its core business through a single piece of economical, yet highly efficient and flexible cooking equipment, has resulted in exponential growth.

Based in Sydney's south west, Wanniasa Wheeler's products supply its Ali Baba quick service restaurant outlets, which sell Lebanese cuisine such as chicken kebabs, kofta fingers, salads and other items aimed at the casual dining sector.

Four years ago Wanniasa Wheeler decided to make dramatic changes to its business strategy. It wanted to shift from being a low-volume supplier for its local franchise food chain to becoming a high-volume food processor with the ability to provide a variety of culinary and convenience foods to global wholesalers, retailers and other food processors.

The new strategy was to cook protein products including chicken, lamb, beef and turkey, in the high volumes needed to satisfy supermarkets and big box outlets such as Costco, while still offering quality products ranging from restaurant to gourmet level.

This would be a tall order for most companies, but Wanniasa Wheeler had a vision to reconfigure its 5500 square metre facility with the proper equipment to help create a diversified line of cooked protein products while still continuing to supply its 47-store Ali Baba chain.



Spiralling to success

Wanniasa Wheeler's first action was to investigate the productivity of its cooking equipment and its ovens, which were limited to combination and walk-ins.

Following a review of a range of models, Wanniasa Wheeler purchased the Micro Spiral Oven[®] developed by Unitherm Food Systems, which features a self-basting capability.

The spiral oven offered a minimal footprint, increased yield, and product consistency, and had been adopted as the continuous cooking system of choice among many ready-to-eat frozen and chilled food processors. It allows the versatility to roast, steam, bake, broil or even pasteurise ready-meals through a single piece of equipment. Examples of the products range from baked quiches, meatballs and chicken

wings to oven-roasted vegetables and steamed chicken breast.

Because the products travel upward on the belt from the bottom of the spiral oven, the products cook through the juices that result from the cooking and start basting downward onto the products below. The result is some additional yield, although the oven adds a lot of flavour to the product.

In addition to protein products, Wanniasa Wheeler expanded to now roast vegetables in its Micro Spiral Oven, including eggplants, peppers, potatoes and items that are used in Ali Baba dips.

Even though the Micro Spiral Oven was capable of cooking up to 280kg per hour depending on the product, the company's growth rate was so rapid that after just two-and-a-half years, we were looking to add capacity.

At that point, we decided to add

a Unitherm Mini Spiral Oven to operations in order to increase the cooking capacity to approximately 680kg per hour, while addressing the growing demand for alternate uses including the ability to provide customers with an in-house test cooking facility.

In-cook food safety

Another important benefit of the spiral oven is food safety provided by 'in-cook' pasteurisation.

As a straight cook-chill business, one of the important features of the spiral oven is its 'high-steam' process.

Generally, a combination convention and oven steamer with the same functions will normally remain at 99-100°C, whereas the micro and mini spiral ovens have the capability to steam up to 130°C.

A steam separation system allows this high steam to contact products at the beginning of the process, and then they go through a slow process, perhaps another two or three minutes, depending on the product. This process results in 'in-cook pasteurisation', which kills pathogens that could

survive in a typical cook-chill process. Therefore, as long as the product is chilled quickly enough, a high level of food safety can be maintained.

Opening sales channels

The installation of the micro spiral oven allowed Wanniasa Wheeler to increase its production speed quickly, and turn around quick and successful results in the retail segment, including an opportunity to expand into authentic flame-grilled products.

Traditionally, the company's products were sliced protein products, so having a flame grill allowed us to work with even more meat goods, such as 120g breast fillet that are flame grilled, as well as the same with beefsteak products and lamb products. The flame grill gives the product colour, while also caramelising it to a certain degree.

The micro spiral oven connected directly to the flame grill and easily expanded the production line, which opened up further sales channels. Supermarkets started to work with the company to develop a line of flame grilled chicken tenders, breasts and

wings, and Wanniasa Wheeler was able to enter the burger patty market for the first time with a high-end line of wagyu beef burger patties, which commands a high price like Angus beef products, as well as regular beef burger patties.

It was the implementation of these two spiral ovens that were largely responsible for our rapid growth. Investing in the right technology to suit your company's business goals is critical, not only to its initial success but its capacity and capability to grow. Not only did this equipment enable Wanniasa Wheeler to exceed its goals quickly, it also facilitated the addition of the flame grill in an in-line configuration, which allowed expansion into additional products and markets rapidly.

Ali Marjan is the manager of strategic business development for Wanniasa Wheeler Foods.



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AIRBORNE ULTRASOUND FOR ENHANCED DRYING OF FOOD

Recent CSIRO research demonstrates the effectiveness of the application of airborne ultrasound to enhance the convective drying process of food materials.

Words by Dr Henry Sabarez

Drying (or dehydration) is an important unit operation in food manufacturing, which aims to reduce the amount of moisture in food products to levels that will slow or inhibit microbial growth and enzymatic activity for the preservation of product quality.¹ Drying also minimises packaging requirements and reduces transport weights and costs.

There are numerous food products that are routinely preserved by drying, including grains, seafood products, meat products and dairy products, as well as fruits and vegetables.² There are many different methods of drying for food materials, each with their own advantages and disadvantages for particular applications. The majority of dryers used in the food industry are convective dryers, where hot air is used to supply heat for the evaporation of water and to remove the evaporated moisture from the product. While convective air drying has a reasonably low capital cost and is relatively simple to operate, it consumes large amounts of energy and imparts significant alteration to product quality attributes due to exposure to longer drying times or higher temperatures.

Application of ultrasound for drying intensification

The use of innovative technologies has been explored in the development of new and novel drying concepts to overcome the limitations of conventional drying technologies. In particular, the application of ultrasonic

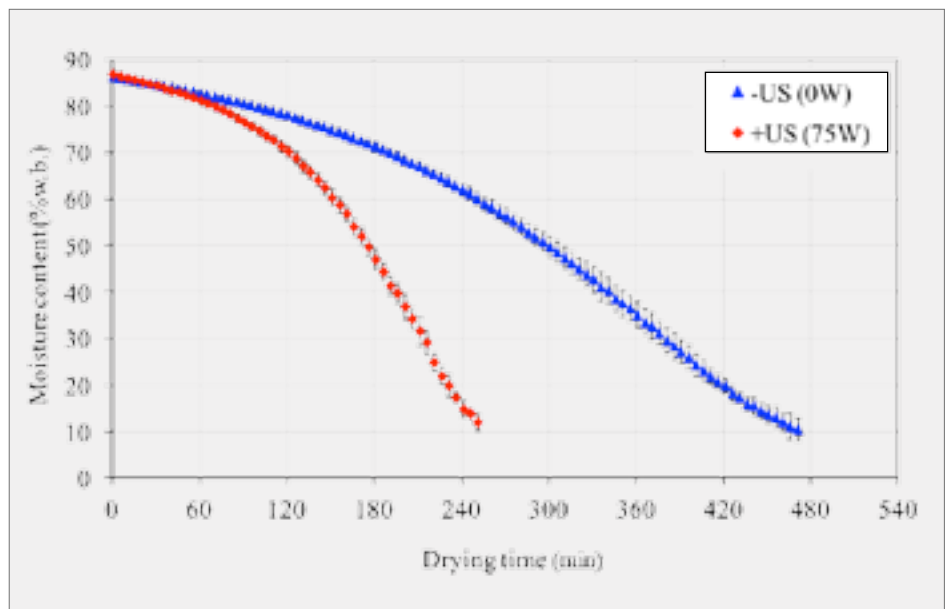


Figure 1: Drying kinetics of apple slices with and without ultrasound (Temperature = 40°C; Relative humidity = 25%; velocity (v) = 1.0 m/s; 5 mm thickness).

energy has been investigated for its non-thermal processing and processing efficiency potential.³

A promising approach for the application of ultrasound to assist in convective drying of food materials was developed by CSIRO Food and Nutrition in Werribee, Victoria, in collaboration with the Power Ultrasonics Group of the Higher Council for Scientific Research (CSIC) based in Madrid, Spain.

The purpose-built ultrasonic test drying facility enables the study and simulation of drying process conditions typical in industrial scale operations. The unit incorporates

fully programmable cyclic control of process conditions such as temperature, humidity, and airflow, as well as a dedicated weighing system, and an ultrasonic unit.

Process efficiency

Figure 1 shows an example of the drying kinetics using the experimental drying set-up during the convective air drying of 5mm apple samples at 40°C with and without ultrasound at 75 W acoustic power. These experiments were conducted with drying air velocity and relative humidity maintained at about 1.0 m/s and 25 per cent, respectively. The application of ultrasound in

combination with convective air drying had a significant effect in reducing the overall drying time, depending on the power level applied.

In terms of the total drying time to reach 10 per cent final moisture content (wet basis), analysis of the curves revealed that it took about 468 minutes to dry the apple samples without ultrasound, 252 minutes with ultrasound at 75 W, a reduction in drying time of about 46 per cent. In addition, the results from this work indicate a further significant reduction in drying time (up to 57 per cent) with the simultaneous application of ultrasound at higher power level (90 W) on the convective drying of apple slices.⁶ This corresponds to a reduction of energy consumption by up to 54 per cent with the ultrasound-assisted convective drying process.

The results indicate that the drying rate increased with increased ultrasonic power level, consistent with the results obtained from other studies. Similarly, Garcia-Perez *et al* (2010) found a significant reduction in drying time (up to 70 per cent at acoustic power of 90 W) with the application of power ultrasound for convective drying of eggplant cylinders and Ortuno *et al* (2010) observed an average reduction in drying time of over 45 per cent with energy saving close to 30 per cent for the drying of orange peel with ultrasonic application. In addition, other processing variables (i.e., drying temperature, product thickness, ultrasonic power level) were observed to substantially influence the magnitude of the effect of ultrasonic energy in enhancing the drying process, indicating the necessity to establish the optimum drying conditions for specific product and ultrasonic applications.⁶

Quality attributes

The transformation of food into a stable product can also affect quality attributes such as texture, flavour, colour and the nutritional value of the resulting product. In plant-based material, macrostructural changes, such as shrinkage, colour and textural modifications, are most likely linked to alterations in plant tissue on a

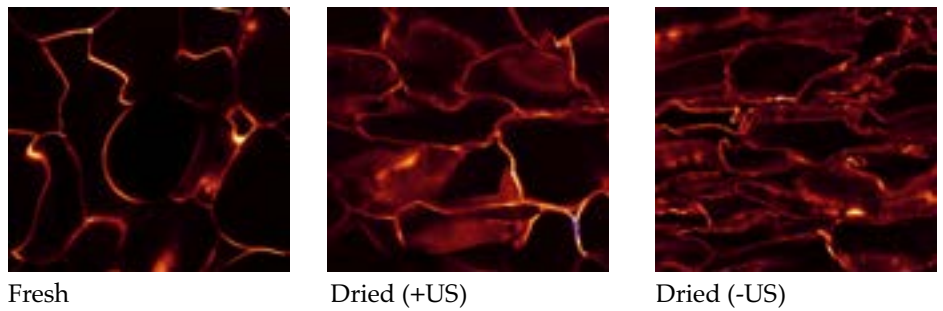


Figure 2. Confocal laser scanning microscopy micrographs of apple tissue taken from the centre of fresh samples and samples dried with and without ultrasound (Temperature = 40°C; Relative humidity = 25%; velocity (v) = 1.0m/s; 10mm thickness; ultrasound power = 75W).

microscopic level. It is important to understand the impact of ultrasound on the changes in the microstructural properties of the food materials as this may affect the product quality.

Figure 2 shows an example of the changes in the microstructure of the product induced by the application of ultrasound during convective drying of apple samples. The confocal laser scanning microscopy (CLSM) micrographs of fresh apple tissue and apple samples dried at a drying temperature of 40°C with and without ultrasound, showed that drying leads to deformation and twisting of the cells. This is a result of a high degree of cellular collapse, together with the elongation and thinning of cell walls and enlargement of intercellular spaces⁶, which is consistent with the macroscopic shrinkage that can be observed visually. Under the investigated conditions, samples dried without ultrasound showed more noticeable cell deformation and structural collapse in comparison to samples dried using ultrasound. A comparison of the microstructure of the dried apple samples suggests that ultrasound treatment resulted in a better preserved microstructure, likely to be due to a sponge effect with the application of airborne ultrasound that can create and stabilise micro channels and prevent them from collapsing.^{7,8}

Challenges

The process of drying food materials is complex, involving coupled transient mechanisms of heat, mass and

momentum transfer processes accompanied by physical, chemical, and phase change transformations.^{9,11} A major challenge in food drying is the removal of water from material in an efficient way to produce premium product quality with minimal impact on the environment at the lowest capital and operating costs of the process.

A further challenge arises from the fact that many food materials have very diverse physical and chemical properties that need to be dried at different scales of production, and with very different product quality specifications.¹⁰ This gives rise to the ongoing challenge of selecting the appropriate dryer and optimal drying conditions for the development of new products. The application of ultrasonics in food drying will continue to evolve due to some technological challenges in achieving an efficient transmission of acoustic energy and the practical difficulties in adapting and scaling up of the technology at an industrial scale.

Opportunities

The drying processes currently employed in the food industry will continue to play a significant role in food manufacturing.¹ However, further re-engineering and optimisation of these existing drying technologies are crucial to meet needs to be more sustainable. On the other hand, significant efforts to develop new drying concepts will continue to be at the forefront of future innovations, to meet the continually emerging challenges and new opportunities

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beyond the limits of current drying technologies. This will lead to significant efforts in the development of new, innovative and novel drying technologies (e.g. ultrasound drying) for efficient processing, safe operation and improved product quality.

Hence, there is still considerable scope for significant improvements in bringing the application of ultrasound technology closer to industrial drying operations. Together with future advancements in ultrasonic designs, further research efforts in understanding the fundamental mechanisms for effective ultrasound application will provide the basis to build upon the development of this technology for adoption in industrial drying practices. 

Dr Henry Sabarez is a principal research scientist at CSIRO Food and Nutrition.

CSIRO and FoodStream will be holding a Food Drying Technology Short Course in Werribee, Victoria, on 2-3 March 2016. For more information, visit <https://events.csiro.au/Events/Food-drying-technology-short-course>.

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SENSORY SCIENCE IN AUSTRALIA

Sensory and consumer sciences are vital for the success of the food industry. To ensure its success, food industry and sensory providers need to work closely together.

Words by Dr Gie Liem and Jodie Hill

Advanced sensory and consumer science cannot simply be replaced by a group of employees who taste the products. Large multinationals often invest extensively in their sensory and consumer capacity by both training and maintaining strong in-house sensory and consumer specialists, and collaborating with universities. Additionally, AIFST Victoria and New South Wales run special interest groups in sensory science, with the latest annual AIFST meeting emphasising the importance of sensory science in the Australian food industry.

The Australian Governments' recent announcement to invest an additional \$127 million to enhance the collaboration between industry and universities means it is rather timely to investigate the status quo of sophisticated sensory and consumer science in Australia.

Providers of sensory science

The food industry has two main external providers of sensory science (i.e. academia/government and research agencies). Academia and some government institutions, such as CSIRO, are involved in developing new efficient predictive methods that aid in gaining a sophisticated understanding of consumers and sensory perception. Academia also plays an important role in training future sensory scientists.

Research agencies use existing methodologies to run small-to-large consumer and sensory tests. Consultancies tend to provide reactions to specific products or ideas in order to assist product developers and marketers directly. Research agencies have the capacity to respond quickly and with great flexibilities in their approaches to the issues at hand.

To understand how sensory science in Australia compares to the world, we

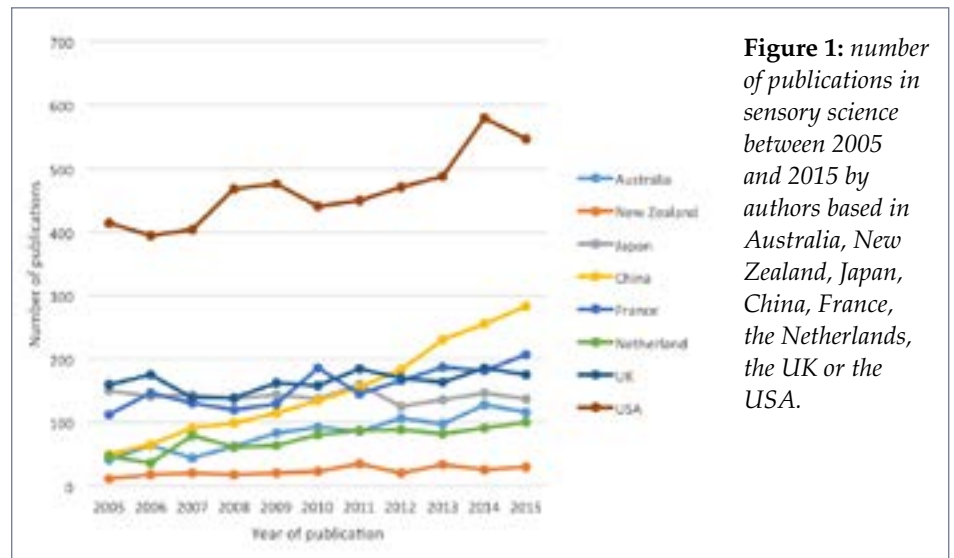


Figure 1: number of publications in sensory science between 2005 and 2015 by authors based in Australia, New Zealand, Japan, China, France, the Netherlands, the UK or the USA.

have looked into three sources of data. The first source is Science Direct, a large scientific data base containing Elsevier publications in major journals in sensory and consumer science. Journals include *Food Quality and Preference*, *Physiology and Behaviour* and *Food Science and Technology*.

We also investigated scientist attendance at two major sensory and consumer science conferences – the worldwide conference Pangborn, and SenseAsia. Additionally, we conducted a small survey with AIFST members to ascertain whether they would like to attend a locally organised workshop about sensory science.

Peer reviewed publications

Peer reviewed publications are an important vehicle of knowledge. A search on Science Direct for peer reviewed publications between 2005 and 2015 generated 26,031 unique hits relevant to the area of human taste and smell research. This did not include publications on vision, auditory, touch, autism, motor development or cellular

biology. Although Science Direct does not reflect all publications in sensory science, it does provide trends in sensory science. The title and abstract of every publication was investigated for relevance to the area of human taste and smell research and sorted by region and countries of the authors. If authors were from different countries, the publication was counted for all countries involved.

In a comparison between Europe, the USA and Asia Pacific, the USA based authors were the main providers (Figure 1). Due to population discrepancies, per capita data reveals New Zealand, the Netherlands and Australia are the most productive countries in publishing sensory science.

Sensory science within Australia

In Australia, universities provide the majority of publications (65 per cent), followed by government institutions (23 per cent), food industry (seven per cent) and research agencies (five per cent). Both Deakin University's Centre for Advanced Sensory Science (CASS) and CSIRO are responsible for 28 per cent

of the total number of sensory science publications in the past decade.

Attendance at sensory science conferences

Across the past three Pangborn Symposiums, the majority of participants (22.8 per cent) were from the USA. In Asia Pacific, most participants were from Japan (three per cent) followed by Australia (two per cent). Interestingly, the majority of the Australian participants were from academia (37 per cent) and the minority resided in food industry (16 per cent). This is the exact opposite for other regions as represented by data from the USA (27 per cent academia, 55 per cent food industry) and the Netherlands (45 per cent academia, 49 per cent food industry). During the first SenseAsia meeting, most participants were from the hosting country, Singapore (16 per cent), followed by Japan (14 per cent) and China (13 per cent). Only two per cent of participants were from Australia.

The analysis shows that the Australian food industry is not well represented

at sensory conferences in comparison with other regions of the world. This may represent the lack of sensory expertise and/or priority in the Australian food industry, which needs to be addressed if the Australian food industry wants to expand growth into Asia. Understanding the consumer is fundamental, and sensory science is the best tool in order to do so.

Local sensory science workshops

A survey conducted with AIFST members indicated the majority of the industry would be interested in a locally organised sensory science workshop. Of the 66 responses, the important needs identified in the food industry were faster and cheaper sensory and consumer science methods (39 per cent) and an improved connection between academia and food industry (27 per cent).

Conclusion

Sensory science in Australia is continuing to emerge, although

Australian-based companies seem less involved in new developments in sensory science, whereas counterparts in the USA and Europe seem heavily involved. In order to advance sensory science in the Australian food industry, an efficient connection between food industry and sensory research providers is needed. Innovation and new method developments should be the key in future directions in sensory science. In order to maintain a high level of sensory science within Australia, more training opportunities need to be created.

Acknowledgement

We would like to thank Prof Russell Keast for his input in the manuscript. Sam Roythorne and Dr Sara Jaeger kindly provided the (blinded) participants data of the Pangborn and SenseAsia meetings.

Dr Gie Liem is a senior lecturer at the Centre for Advanced Sensory Science at Deakin University and Jodie Hill is the research director of Sensory Solutions.



Famous recipe

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INGREDIENTS

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Rice	Ausfine Foods
Beans	R. Anguey Pty Ltd
Potatoes	Costa Farms
Capsicum	Woolworths
Eggplant	Costco
Tomatoes	d'Vine Ripe
Spices	Ward McKenzie
Cream	Fonterra Australia
Vegetable oil	Cargill Refined Oils

METHOD

Packaging	Sealed Air
Pest Control	Exopest
Maintenance	Clemtech
Protective gear	Hepworth Industrial Gear
Labelling	Fantastick

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SENSORY AND CONSUMER RESEARCH UPDATE

What's new? Recent highlights in sensory research.

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

Consumption of garlic positively affects body odour

Garlic is an integral part of European and Asian cuisines. It is appreciated for its flavour, and the consumption of garlic is associated with a wide range of health benefits throughout history. For instance, records from Ancient Egypt suggest that pyramid builders were fed garlic to acquire extra power. In the Roman Empire, garlic was used to treat gastrointestinal disorders, asthma, madness, tumours and worms.

Nowadays, garlic is well known for antioxidant activity, stimulation of immune responses and antibacterial effects. However, the downside is we all know consumption of garlic leads to unpleasant breath odour, due to sulphur containing gases. It was not known whether garlic consumption also led to unpleasant axillary odour, therefore researchers of Charles University in the Czech Republic have investigated this issue.

In the study, 42 males were allocated to 'garlic' or 'non-garlic' condition in randomised order and wore cotton pads on both armpits for 12 hours to collect body odour. In the 'garlic' condition, a part of the males consumed 12g raw garlic and the other part of the males consumed capsules containing 1000mg of garlic extract. The used cotton pads were used as odour samples and were then judged for pleasantness, attractiveness, masculinity and intensity by 82 women.

The odour of males after the raw garlic and the capsules were judged as more pleasant, more attractive, but less intense. This means that in contrast to oral odour, garlic positively affects body odour. It could be that the beneficial health effects of garlic are responsible



for the positive effects on odour, due to antioxidant or antibacterial actions. Or from an evolutionary perspective, preferences for diet-related body odours has been shown to be used to select mates in good physical condition, but only with mouths closed in the case of garlic. However, the positive associated of garlic consumption with axillary body odour remains speculative.

Fialová, J., *et al.* (2016) Consumption of garlic positively affects hedonic perception of axillary. *Appetite* 97:8-15.

Fat taste and weight loss

Our lab has been working on the link between fat taste sensitivity and development of obesity for a number of years. Individuals with obesity may be less sensitive to the taste of fat, and we hypothesised that this is due to excess dietary fat intake. Our latest study published in the journal, *Obesity*, assessed the effect of a six-week low-fat or portion control diet matched for

weight loss on fat taste thresholds, fat perception and preference in people overweight or obese.

Despite findings in the 1980s that showed low-sodium diet resulted in enhanced perception of saltiness and also increased preference for lower salt foods, there have been very little other findings of links between a dietary nutrient and taste sensitivity. In our dietary study, we showed that consumption of a low-fat diet and portion control diet reduced participant's weight ($P < 0.001$), with no significant differences between groups.

Both diets resulted in a decrease in fat taste thresholds (increased sensitivity to fat), and the effect was stronger in the low-fat diet vs the portion control diet. The ability to perceive different fat concentrations in foods was increased after the low-fat diet only, but food preference did not change on either diet. We conclude that this novel

finding may be an important factor to help develop sustainable weight loss programs for the obese.

Newman *et al.* (2016) Dietary fat restriction increases fat taste sensitivity in people with obesity. *Obesity* DOI:10.1002/oby.21357 (free download).

Electronic tongue to help with olive oil origin authentication

Can the electronic tongue (E-tongue) aid with extra virgin olive oil (EVOO) origin authentication? A recent research study set out to answer this question. With an increase in worldwide production and consumption of EVOO, a need for the development of appropriate, cost-effective methods for testing and guaranteeing commercial olive oil origin is timely. In the study, eight Spanish EVOO varieties were investigated, and were subject to E-tongue and organoleptic assessment via a trained sensory panel.

The results demonstrated that both methods could independently make an assessment on EVOO origin, but these discriminations were deemed less than ideal. Therefore, the simultaneous use of both human and artificial assessments was further explored. For this, a fusion approach was employed where the signals obtained from the E-tongue assessment were merged with the sensory attributes evaluated by the trained panel.

In conclusion, E-tongue assessment is best used in combination with sensory analysis by a trained panel with regards to the classification of EVOO origin. The use of these methods combined may aid in the correct classification and labelling of EVOO, helping to reduce the incidence of fraudulent claims regarding this high-valued product.

Luis G. Dias *et al.* (2015) Monovarietal extra-virgin olive oil classification: a fusion of human sensory attributes and an electronic tongue. *European Food Research & Technology*, DOI 10.1007/s00217-015-2537-4.

Bitter tastes linked with antisocial personalities

Our sense of taste has been instrumental to our survival. We are born with a high preference for sweet foods and an innate aversion for bitter tasting foods, which are potentially toxic. It is not uncommon in many languages to combine 'taste' with certain personality traits or feelings – that he is a 'sweet' person, or that he

feels 'bitter' about the situation. Could actual taste preferences for these tastes be related to real personality traits? Would those who like bitter taste be as toxic in their behaviour as some bitter tasting foods can be?

These were the main questions for a recent paper in the journal, *Appetite*. In two online studies, close to 1000 participants filled out questionnaires about taste preferences and their personality. Some of these questions were focused on undesirable traits like Machiavellianism (e.g., "I tend to manipulate others to get my way."), psychopathy (e.g., "I tend to be callous or insensitive."), and narcissism (e.g., "I tend to want others to pay attention to me.").

Both studies found that a liking for bitter foods was positively correlated with psychopathy and everyday sadism. The authors argue that those who like bitter taste might like foods that are risky and potentially harmful. This is then reflected in their psychopathic and sadistic behaviour.

Experimental evidence is now needed to further investigate the link between liking of bitter taste and behaviour. For the time being, next time you see somebody next to you ordering a small black, just be careful.

Sagioglou C, Greitemeyer. Individual differences in bitter taste preferences are associated with antisocial personality traits. *Appetite*, 96, 2016, pp. 299-308

PEF produces safer-but-less-aromatic peach nectar

Pulsed electric field (PEF) is being explored as an alternative to heat treatment for microbial inactivation. This method utilises high voltage pulses, and is regarded as more beneficial than heat treatments as the lack of heat results in less changes to the sensory and physical properties of the food. However, PEF can change the chemical components within a food, particularly those involved in aroma, as researchers from Turkey discovered when looking at peach nectar.

Different PEF treatment times (0µs as a control at 10 °C, 66µs at 13 °C, 131µs at 17 °C, and 210µs at 23 °C) were applied to peach nectar samples, at constant flow rate, pulse duration and frequency. The samples were evaluated by a sensory



panel, using a nine point hedonic scale for eight sensory properties, including flavour, taste, colour, aftertaste and overall acceptance. Physical properties including pH, °Brix, and electrical conductivity (EC) were measured, and the samples were also analysed for the presence and concentration of 28 active aroma compounds, including gamma-decalactone (peach), stearic acid (fatty), and butanoic acid (cheese).

A correlation matrix was performed among the 28 aroma active compounds, and physical properties and sensory descriptors. Aroma compound concentrations were found to be negatively correlated with increased treatment time, temperature, aftertaste and consistency, and positively correlated with colour, flavour and taste.

It was also found that increased treatment time significantly decreased the concentration of 24 out of the 28 aroma active compounds, while two others increased with increased time, and the remaining two increased significantly until the 131µs treatment time. Stearic acid was found to be the aroma compound most significantly associated with the descriptors of aftertaste, flavour, sweetness and overall acceptance.

Evrendilek GA, *et al.* (2016). Modelling stochastic variability and uncertainty in aroma active compounds of PEF-treated peach nectar as a function of physical and sensory properties, and treatment time. *Food Chemistry* 190: 634-64

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



CONSUMER SENSORY PREFERENCES IN ASIAN POPULATIONS

Growing demand for Australian food products in Asian markets raises questions about consumer preferences that need to be considered to ensure success.

Words by Jess Heffernan and Astrid Poelman

Food preference is a key driver for food choice. Therefore, it is important to understand how food preferences are formed. We are born with few innate likes and dislikes – notably, a liking for sweet taste and a dislike for bitter taste.¹ However, most of our food preferences are learned, particularly early on in life when our food preferences are the most malleable. There are three main factors that aid in determining our food preferences including: our environment, our exposures, and who we are as a person.^{2,3}

In addition to understanding how food preferences affect our eating habits on an individual scale, understanding the food preferences of different cultural groups can afford valuable insights into the development of new products or how existing products might be received in new markets.³

Do Asian and Western consumers' perceptions differ?

Sensory perception relates to the objective perception of the sensory properties of foods – that is, their taste and mouthfeel. To date, cross-cultural studies relating to sensory perception have primarily focused on comparisons of the basic tastes among individuals or cultural groups. The vast majority of these studies find no differences in the perception of basic tastes in solution between Asian and Western cultures.^{4,5,6,7} Additionally, the perception of small differences in the intensity ratings for various basic taste levels in foods or beverages also showed no differences in discrimination between both Caucasian-Australians and Asians.^{6,8}

Cross-cultural studies in odour perception show that there are also

perceptual similarities between Westerners and Japanese subjects. For example, Distel *et al* (1999) found no statistically significant differences between Japanese, German and Mexican subjects in their perception of everyday odours.⁹ These results suggest that differences in familiarity across cultural groups were often accompanied by corresponding differences in intensity when comparing certain odorants.

Further to this, Chrea *et al* (2004) found that while differences in the perception of everyday odours among American, French and Vietnamese subjects were apparent, they were largely attributed to cultural differences and that the lack of discrimination was largely due to lack of familiarity.¹⁰

What about food acceptance or preference?

Food acceptance relates to the appreciation, or the hedonic value, of foods. As previously mentioned, food preference is largely driven by factors involving, but not limited to, our food exposure and our environment. Given that these factors are often culturally dependent, it stands to reason that food preferences do, at least in part, differ between cultures.^{8,11}

The literature supports the evidence for differences between cultures in their ratings for taste intensity liking and dictates that differences are largely dependent upon the context or food studied.^{7,11} In demonstrating this, Prescott and Bell (1995) found that while the perception of sweetness and saltiness between Japanese and Australian panels was similar, the lack of agreement between the two panels for preference was likely to



reflect the notion of familiarity, as each culture gave higher sweetness or saltiness ratings to products from their own culture.¹¹ Laing *et al* (1993) also conducted a study with Japanese and Australian panels and found that the results demonstrate that preference by each panel was attributed to the product most common to their country.⁶

A key theme within the literature on food preference is that of familiarity, where familiarity with a certain sensory attribute or the overall product contributes positively to acceptance.^{6,11,12} An example of this can be found in a study by Wills and Coogan who compared the liking of different concentrations of the major flavour constituent in white radish (4-methylthio-3-trans-butenyl isothiocyanate (MTBITC)) between Australian, Japanese and Korean panels. The results show that the Australian and Korean panels disliked the presence of MTBITC, even at the

Case study: Consumer preferences for a horticultural product

To demonstrate the ways in which trained panel profiling can be coupled with consumer acceptance testing, a case study is presented on research undertaken by CSIRO for a client wishing to optimise the sensory properties of their horticultural product for several key Asian and European countries. The product had a number of different varieties that also differed in composition and quality grades. The client was interested in understanding the relationship between the sensory properties of the product and its consumer acceptance in market, and whether there were any perceivable taste segmentations within each market.

Descriptive sensory profiling with CSIRO's trained sensory panel was undertaken and instrumental measurements were obtained for specific product properties, both of which took place in Sydney. These results determined and quantified the key perceivable sensory properties of the products.

Concurrently, the product was sent into each of the four markets where consumer acceptance tests were conducted with 160 consumers in each market. These results detailed the key sensory attributes for liking of the product.

The results showed that taste segmentation was observed in most markets and that differences existed between both Asian markets, as well as both European markets (Figure 1). It also showed similarities in taste preferences from consumers in different markets, as the preferences of one of the segments (Segment A) was common across all markets.

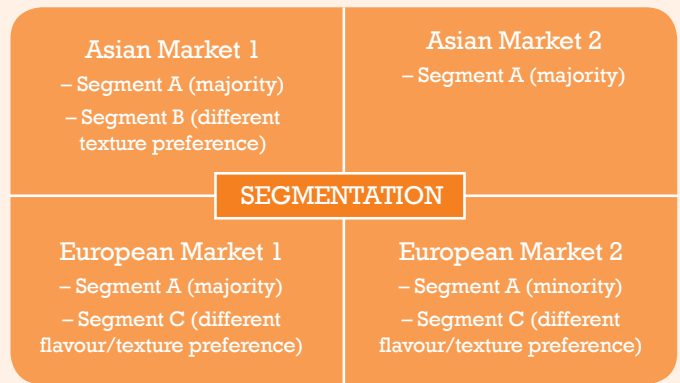


Figure 1: Taste segmentation results for consumer acceptance study of a horticultural product in two Asian and two European markets

This demonstrates that differences in consumer preferences do exist cross-culturally and that one Asian market, for example, cannot necessarily be considered the same as another. This notion further reinforces the importance of using representative consumer groups when undertaking consumer testing.

The results of this study provided the client with the sensory attributes responsible for consumer liking, and also, cross-cultural differences in product acceptance, meaning that they could then target each market specifically.

lowest concentration, but there was no significant difference in liking between the highest and the lowest concentration for the Japanese panel.¹³ The results from the Australian panel were expected, due to the unfamiliarity of the Australian panel with the pungent taste sensation of MTBITC. Further to this, Prescott *et al* (1997) have suggested that an individual's familiarity with a particular food is likely to dictate their preference for certain tastant levels in that food.¹⁴

While Murray *et al* (2001) overcame the potential effect of familiarity in their study by using a 'novel' snack food, they found no significant differences between European-origin and Chinese-origin Australians in their preference for texture. The authors suggest a possible explanation for this similarity in texture preference is that the Chinese-origin consumers had been residents in Australia for an average of five years and thus, their texture preferences had assimilated towards the Europeans, who had been residents in Australia since birth. Interestingly, the authors found that age did significantly influence texture preference for three of the six samples.¹⁵

How can we investigate preferences of Asian consumers?

With considerable cross-cultural differences found in acceptance but not in sensory perception, what do these findings mean for Australian food companies that want to develop new food products for Asian markets, or determine whether existing products would be successful in Asian markets? It is clear that consumer acceptance needs to be investigated using a representative group of consumers. Finding a representative sample of consumers should be done by testing consumers who reside in the country or market of interest. However, as Murray *et al* (2001) demonstrate, it is also possible to find a representative consumer group outside of the country or market of interest. This is of particular ease with Chinese consumers as they are more likely to retain their cultural beliefs and practices long after leaving China.^{7,15} That said, the potential for acculturation cannot be overlooked, and it would be best to conduct such research with relatively recent immigrants.

From a methodological perspective, there are two approaches that can be

taken to underpin consumer acceptance. The simplest approach is to conduct a consumer acceptance study, whereby consumers rate a few simple sensory attributes that are easily understood and not confusing to interpret. Examples of such attributes are sweetness, saltiness and hardness. Here, consumers are usually asked a series of questions about the sensory properties of the product that typically follow hedonic measurements and/or preference questions. In addition to consumer acceptance insights for the product, this study will give an indication of the sensory attributes related to consumer liking, as well as on the product profile as consumers perceive it. However, when formulating products for new markets, this type of information alone has the potential to be misleading. For example, a consumer giving a low crunchy rating as this attribute may be interpreted differently from one consumer to the next, and as consumers are not trained or accustomed to rating sensory attributes, it may not be correctly understood.

To overcome this, collecting insights on consumer acceptance can be



separated from collecting insights on objective sensory product properties by using a trained sensory panel. A trained panel can be used to develop an elaborate sensory profile of a product, that allows the determination of detailed objective insights into the product profile and a comprehensive assessment on the key sensory drivers for liking. The panel is trained to consistently understand and rate attributes, such as crunchiness, as relevant to the product category, and how it may differ from similar attributes such as hardness and crispiness. This will allow for precise information that product developers can use to optimise their products.

Conclusion

There is substantial evidence to suggest that differences in sensory perception between Asian and Western consumers appear broadly similar, and differences in food preferences are largely related to dietary habits and familiarity with the food product. As differences in perception are largely negligible between cultures, trained sensory panels located in Australia, or other non-Asian countries, can be

used to measure the objective sensory properties of products, regardless of the intended consumer market. However, in order to measure consumer preferences, a representative group of Asian consumers should be used.

Jess Heffernan is a sensory project officer and Astrid Poelman is the team leader of the Sensory, Flavour & Consumer Science team at CSIRO Food and Nutrition.

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NUTRITION WATCH

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

Words by Dr Ramon Hall

Walnuts provide lower energy than predicted by Atwater factors

In a study undertaken by the USDA, Agricultural Research Service, Human Nutrition Research Centre, Beltsville, USA, researchers have investigated the metabolisable energy (ME) content (energy available to the body) of walnuts, as some earlier studies have revealed that some nut can differ in energy provided compare to those predicted by Atwater factors (Baer *et al.*, 2016).

The study utilised a randomised crossover study design in 18 healthy adults (mean age: = 53.1 years and body mass index = 28.8 kg/m²). The study was conducted with two treatment periods of three weeks, each in a fully controlled dietary feeding intervention, where a base diet was fed during both intervention periods. One diet was unsupplemented, whereas the other diet contained 42 grams of walnuts per day for a three-week period. The base diets were reduced in the walnut treatment arm in equal proportion to achieve an isocaloric food intake during the two treatments.

On each diet, subjects underwent a nine-day acclimation period and then went on to collect all urine and faeces for one week, which was analysed for energy content using bomb calorimetry and subsequently used to calculate metabolisable energy for walnuts.

The results revealed that a 28 gram serving of walnuts contained 146 kcal (611 kJ) or (5.22 kcal/gram (21.85 kJ/gram)), which is 39 kcal (163 kJ)/serving less than the calculated value of 185 kcal (775 kJ)/serving or (6.61 kcal/gram (27.67 kJ/gram)). Therefore, the metabolisable energy was 21 per

cent less ($P < 0.05$) than predicted by the Atwater factors.

The authors concluded that, "Consistent with other tree nuts, Atwater factors overestimate the metabolisable energy value of walnuts. These results could help explain the observations that consumers of nuts do not gain excessive weight and could improve the accuracy of food labelling."

This data is consistent with other studies which have shown lower metabolisable energy compared to Atwater values in nuts (almonds and pistachio) and in protein rich foods. It does suggest that further studies are needed in other foods to help verify that labelling and dietary advice regarding whole foods or complex food matrices do align with simplistic estimated values. Although nuts are encouraged to be consumed as part of the Australian Dietary Guidelines, their estimated energy content (largely to do with their high lipid component) can discourage weight conscious consumers from including these as part of a healthy dietary pattern.

The results of this study should be of interest to manufacturers using nuts and for practitioners recommending inclusion of nuts in the diet.

Baer *et al.* (2016) Walnuts Consumed by Healthy Adults Provide Less Available Energy than Predicted by the Atwater Factors. *Journal of Nutrition*, 146: 9-13 (doi:10.3945/jn.115.217372).

Milk benefits hydration in new beverage hydration index

Researchers from Loughborough University, Bangor University and University of Stirling, UK, have undertaken a study to develop a beverage hydration index method and then to test 13 different popular



beverages using this method (Maughan *et al.*, 2016). The testing was based on changes in urine output and fluid balance when beverages are ingested in a euhydrated state. Thereby, the beverage hydration index (BHI) is a measure of the volume of urine produced after drinking expressed relative to a standard treatment (still water) for each beverage. In a randomised controlled trial design, the study involved 72 male euhydrated subjects whom consumed one litre of still water, or up to three other commercially available beverages over a period of 30 minutes (maximum of four samples per subject). Urine output was then measured for a four-hour period. The BHI was corrected for the water content of drinks and was calculated as the amount of water retained at two hours after ingestion relative to that observed after the ingestion of still water. The following products were consumed, still water and three of the following drinks in a randomised, counter-balanced order: sparkling water, cola, diet cola, sports drink, oral rehydration solution, orange juice, Lager beer, hot black coffee, hot black tea, cold black tea, full-fat milk (3.6 per cent fat) or skimmed milk (0.1 per cent fat).



The results revealed that there was a significantly smaller urine mass following full fat milk (1052 ± 267 g), skim milk (1049 ± 334 g) and oral recovery solution (1038 ± 333 g), compared to the still water control (1337 ± 330 g). The other beverages included did not differ over four-hour urine output compared to still water. The mean BHI at two hours for oral rehydration solution was 1.54 ± 0.74 , 1.50 ± 0.58 for full fat milk, and 1.58 ± 0.60 for skimmed milk.

The authors concluded, "BHI may be a useful measure to identify the short term hydration potential of different beverages when ingested in a euhydrated state." They also highlighted that, "An appreciation of the BHI has relevance for individuals for whom long-term maintenance of fluid balance is important, such as in professions in which fluid availability is limited, as well as in older or incapacitated patients. There is also a clear application to industry, where this tool could be employed to label products to indicate the hydration potential of beverages."

This study should be of interest to manufacturers of products looking at improving hydration, as well as researchers and practitioners with an interest in hydration.

Maughan *et al.* (2016) A randomized trial to assess the potential of different beverages to affect hydration status: development of a beverage hydration index. *American Journal of Clinical Nutrition* Published online ahead of print, (doi: 10.3945/ajcn.115.114769).



Metabolic benefits of a traditional Mexican diet

In a study conducted at the Fred Hutchinson Cancer Research Center, Seattle, WA, USA, in collaboration with the University of San Diego, USA, researchers investigated whether adhering to a traditional Mexican diet or adopting a US diet contributes to metabolic changes associated with future risk of type 2 diabetes and other chronic diseases in women of Mexican descent (Santiago-Torres *et al*, 2016). Using 53 healthy first and second generation women of Mexican descent, a randomised design cross-over trial was undertaken, whereby subjects consumed each diet for twenty-four days (traditional Mexican or standardised US diet) with a 28-day washout period in-between dietary treatments. The diets were isocaloric and had similar overall macronutrient compositions, but differed in the foods and meal patterns provided. The metabolic responses to each diet were assessed at the beginning and end of each diet by measuring the following biomarkers (cardiovascular disease; diabetes and inflammation): fasting serum concentrations of glucose, insulin, insulin-like growth factor 1 (IGF-1), insulin-like growth factor binding protein 3 (IGFBP-3), adiponectin, C-reactive protein (CRP), and interleukin 6 (IL-6), as well as the homeostasis model assessment of insulin resistance (HOMA-IR).

The study indicated that the Mexican diet provided a significant beneficial reduction (14 per cent) in blood insulin and calculated insulin resistance (HOMA-IR) (15 per cent) compared to the US diet ($P < 0.05$). Additionally, the Mexican diet provided beneficial reductions (six per cent) in IGFBP-3 ($P < 0.05$) and a trend towards a reduced (three per cent) level of IGF-1 ($P = 0.06$).

The authors concluded that, "Compared with the commonly consumed US diet, the traditional Mexican diet improved insulin sensitivity, reduced circulating concentrations of IGFBP-3, and tended to reduce circulating concentrations of IGF-1 under conditions of weight stability.

A novel contribution of this study is a better understanding of the effect of this particular dietary pattern that may be retained or adopted by Mexican immigrants as they acculturate to the US lifestyle. Our findings can inform future dietary interventions in women of Mexican descent who would benefit from maintaining their traditional Mexican diets."

The authors also explained that "The traditional Mexican diet differed in many ways from the commonly consumed US diet, which may explain the differential effect on insulin sensitivity. These include 1) carbohydrate quality (glycemic load, fibre content and type of fibre, and added sugar content); 2) dietary sources of protein (predominantly plant compared with animal); 3) fatty acid composition (full-fat dairy and lard compared with low-fat milk and vegetable oil); and 4) micronutrient density. The traditional Mexican diet was higher in dietary fibre and lower in added sugars and glycemic index, all factors that previous trials suggest could affect insulin sensitivity."

There has been significant recent focus put onto the beneficial health aspects of the traditional Mediterranean diet and I think this study reminds us that other dietary patterns may also be beneficial potentially through similar or possibly other mechanisms. The end goal may be to capture some

of the positive aspects of various dietary pattern and to incorporate these into a feasible approach that aligns with established dietary guidelines.

This study should be of interested to manufacturers of Mexican foods and practitioners looking for alternative foods and patterns to help with patient compliance.

Santiago-Torres *et al.* (2015), Metabolic responses to a traditional Mexican diet compared with a commonly consumed US diet in women of Mexican descent: a randomized crossover feeding trial. *American Journal of Clinical Nutrition*, 102; 987-988, (doi: 10.3945/ajcn.115.122598).

Moderate energy restriction can help sleep apnoea patients

Researchers from the Discipline of Clinical and Experimental Pathophysiology, Rio de Janeiro State University, Brazil, have undertaken a study to investigate the impact of a nutritional intervention for weight loss on obstructive sleep apnoea (OSA) in overweight and obese patients (Fernandes *et al.*, 2015).

The study aimed to evaluate the effects of moderate energy restriction on OSA severity and CVD risk factors in obese patients with OSA. A 16-week randomised clinical trial was undertaken using 21 obese subjects aged 20–55 years, who were diagnosed with sleep apnoea (presenting an apnoea/hypopnoea index (AHI) ≥ 5 events/h). The participants were randomised into two groups: the energy restriction group and the control group. The energy restricted group were prescribed an energy restricted diet (-3347.2 kJ/d) and the control group were advised not to change their food intake.

At the beginning and at the end of the study, participants underwent evaluation of the following parameters: OSA (Watch-PAT200[®]), nutritional diet analysis, blood pressure, sympathetic activity, inflammatory biomarkers, metabolic profile and endothelial function.

The study revealed that energy restriction group compared to the control group had significantly greater reduction in body weight, in AHI (apnoea/hypopnoea index) and in plasma concentrations of adrenaline, as well as a significantly greater increase in minimum blood oxygen saturation. There were no significant changes in other cardiovascular-related risk factors between the two groups (potentially related to the small sample size that was determined for primary endpoints related to OSA).

The authors concluded that, “The findings of this study suggest that in obese patients with OSA moderate energy restriction is able to reduce OSA severity and sympathetic nervous system activity, but not other CVD risk factors.”

This study should be of interest to manufacturers of diabetic products and for products to help people with a range of medical issues associated with overweight and obesity, as well as practitioners looking for additional rationale to help guide sensible eating practices amongst patients. ^{NI}

Fernandes *et al.* (2015) “The effects of moderate energy restriction on apnoea severity and CVD risk factors in obese patients with obstructive sleep apnoea” *British Journal of Nutrition*, 114, 2022-2031, (doi:10.1017/S0007114515004018).

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AUSTRALIA & NEW ZEALAND 2016

February 16-18 The Australian Dairy Conference. Shepparton, Vic. www.australiandairyconference.com.au

22-24 February. 10th Annual Australia/New Zealand Sensory and Consumer Science Symposium. YMCA Sydney Olympic Park, Sydney, New South Wales. www.aifst.asn.au/10th-annual-new-zealandaustralia-sensory-a-consumer-science-symposium.htm

March 2-3 Food Drying Technology Short Course. Werribee, Vic. events.csiro.au

March 4-13 Melbourne Food & Wine Festival. Melbourne, Vic. www.melbournefoodandwine.com.au

March 17-18 2nd Asia Australia Food Innovations Conference. Parmelia Hilton Hotel, Perth, WA. www.aafic.net

April 8-10 The Food Show. Horncastle Arena, Christchurch, New Zealand. www.foodshow.co.nz

April 30-May 16th International Conference on the Science of Nutrition in Medicine and Healthcare. Sofitel Sydney Wentworth, Sydney, NSW. www.nutritionmedicine.org.au

May 19 AIFST AGM. AIFST office. For more information, visit www.aifst.asn.au

May 22-24 Foodservice Australia 2016. The Royal Hall of Industries, Sydney, NSW. www.foodserviceaustralia.com.au

June 27-28 49th Annual AIFST Convention. Brisbane Convention & Exhibition Centre, Brisbane, Qld. www.aifst.asn.au. Co-located with FoodTech Qld. www.foodtechqld.com.au

September 14-16 66th Australasian Grain Science Conference. Quality Hotel Powerhouse, Tamworth, NSW. www.ausgrainscience.org.au

INTERNATIONAL 2016

February 22-23 Canadian Institute of Food Science & Technology 2016 National Conference. Burnaby, British Columbia, Canada. www.cifst.ca

February 29-March 3 The Consumer Goods Forum – Global Food Safety Conference. Berlin, Germany. www.tcgffoodsafety.com

March 2-4 Food Vision. Cannes, France. www.foodvisionevent.com

May 31-June 2 2nd International Conference on Food Properties. Bangkok, Thailand. www.icfp-food.org

July 5-7 Global Food Security and Sustainability Conference. Beijing, China. Foodsecurity.conferenceseries.com

July 16-19 Institute of Food Technologists Annual Meeting. Chicago, Illinois, USA. www.ift.org



NATIVE FOODS AN UNTAPPED RESOURCE

From the flood plains of the Northern Territory to the dinner plates of high-end diners, the consumption of native magpie geese is on the rise.

The distinctive black-and-white water bird is found in droves in the Northern Territory, with the population estimated at around two million birds living across floodplain and swamp areas.

The birds have been a staple source of food for local indigenous populations for thousands of years, thanks to their size and ample amount of red meat and now, the native goose is making its way south.

Former AFL footballer and Territory local Daniel Motlop, has teamed up with local meat supplier Richard Gunner to supply magpie geese to the likes of Neil Perry and acclaimed chef René Redzepi of Michelin-star restaurant Noma, as well as a host of other restaurants.

With the help of Larrakia Nation, an organisation that represents the Larrakia people of Darwin, Motlop slaughters, plucks and guts anywhere between 200 and 300 geese a week, and has been so successful, the group is now looking at bringing to market other popular indigenous food sources including a native green ant that tastes like lime, and paper bark used to smoke food.

Motlop and the work of Larrakia Nation is just one example of indigenous communities bringing native flora and fauna to wider Australian's kitchens.

Native food is a relatively untapped industry that not only includes native meats such as the magpie goose or kangaroo, emu and crocodile, but many bush fruits, herbs and spices such as bush tomatoes or Akudjura, the Davidson, Illawarra and Kakadu plums, lemon myrtle, and mountain pepper.

According to Michael Clarke, author of the Australian Government's Native Foods R&D Priorities and Strategies 2013-2018 report, which focuses on plant-based products, the 'farmgate' value of the industry has grown from \$15-25 million in 2010 to \$30-35 million in 2015, with lemon myrtle the industry giant.


Clarke said that the industry must overcome its barriers around consistent supply if it is to take advantage of the opportunities on offer and move beyond a niche market.

"Positive market developments for the industry include increased awareness and demand for health giving properties of native foods and the willingness of mainstream consumers to pay for these attributes," he said.

"For most native food species, production tends toward oversupply for current niche markets, but undersupplied for potential scale-based opportunities. There are large scale markets for constantly supplied low-cost native foods that are not being developed. Failure to develop these markets is a function of both missing technology and the 'lifestyle' orientation of many current industry participants."

In 2010, the industry employed between 500-1000 people, with half of these individuals indigenous people living in remote communities.

"The involvement of Indigenous people in the native foods industry is strongest in the wild harvest species – wattleseed, bush tomato and Kakadu plum," Mr Clarke said.

"Care is needed to ensure that this involvement is not displaced as species move from wild harvest to cultivation. This is a concern to the broader industry that feels indigenous participation brings authenticity and integrity to Australian native foods." 



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