



Official publication of AIFST LTD

# australia

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JUNE/JULY 2015

## IMPROVING PUBLIC HEALTH

Announcing a  
fresh look for  
a familiar face



### *Also Inside*

- REVISED FOOD STANDARDS CODE
- NEW MODEL FOR PALM OIL PRODUCTION SYSTEM
- EFFICIENT AQUACULTURE NEEDED TO FEED THE WORLD

# ON THE COVER

## Silliker Australia to Mérieux NutriSciences Australia

Silliker Australia has recently rebranded to Mérieux NutriSciences to become a part of one of the world's most recognised and dedicated scientific services companies.

Mérieux NutriSciences works with clients as a trusted partner to promote public health through analysis, consulting, auditing, training, contract research and sensory analysis services.

An integral part of Institut Mérieux, Mérieux NutriSciences contributes to advancing science and addressing the concerns of manufacturers through a uniform approach of quality.

Food safety and nutrition are major public health challenges that are integrated in public health policies in many countries. More broadly, protecting health entails the security of products that could, in their daily use, risk the health of consumers.

To address those challenges, Institut Mérieux developed Mérieux

NutriSciences. With 45 years of experience in food safety and quality, through Silliker, a company created in 1967 and acquired in 1997, Mérieux NutriSciences has won the confidence of the food industry with the mission of providing safety and quality services, as well as solutions for food, environment, agrochemicals, pharmaceuticals, cosmetics and consumer goods globally.

"With historical roots back to the prodigious Louis Pasteur, the Mérieux name is universally recognised for its significant work on the development of life-saving vaccines, to its present research on the human microbiome.

"Under the leadership of chief executive officer Philippe Sans, the company has grown to over 75 locations in 18 countries, and we are excited to be part of this vibrant and growing organisation," said managing director of Mérieux NutriSciences Australia, Daryl Bird said.




Today, Institut Mérieux employs more than 13,000 people throughout the world and generates sales in excess of two billion euros.

### So what does this branding evolution mean for our customers?

On a daily basis, you will continue to work with the same dedicated professionals who are committed to you and your brand. Standing squarely behind them is an incomparable team of Mérieux NutriSciences scientists ready to help you succeed on the local and international stage.

Despite the change of the flagship brand, the company will still be legally trading as Silliker Australia Pty Ltd. This reference will only be apparent to you when receiving official documentation such as invoices and laboratory test results; no change will be required on an operational or commercial level.

Customers can be assured that the excellent service, quality and support of your food safety programs enjoyed from Silliker Australia, will continue with accurate results, delivered on time, with professional service that adds value to our clients' businesses.

"In closing, it is my pleasure to welcome you to Mérieux NutriSciences; we're privileged to have you as a valued customer," said Mr Bird. 

*Contact us because you care about consumers' health.*

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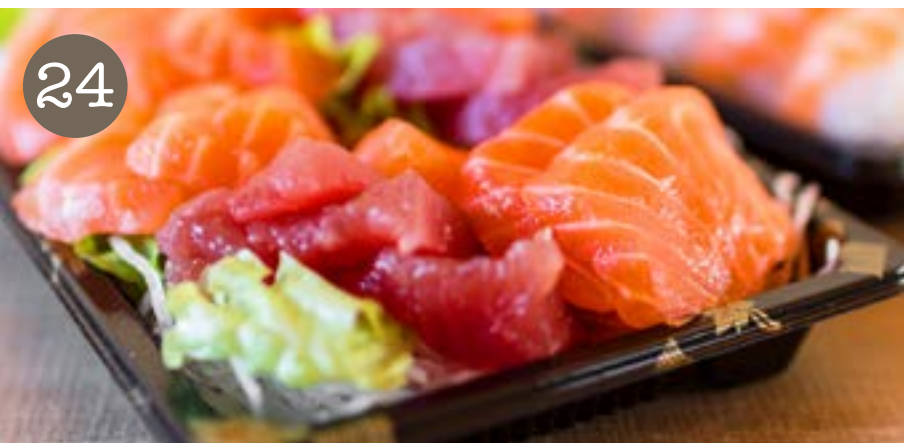


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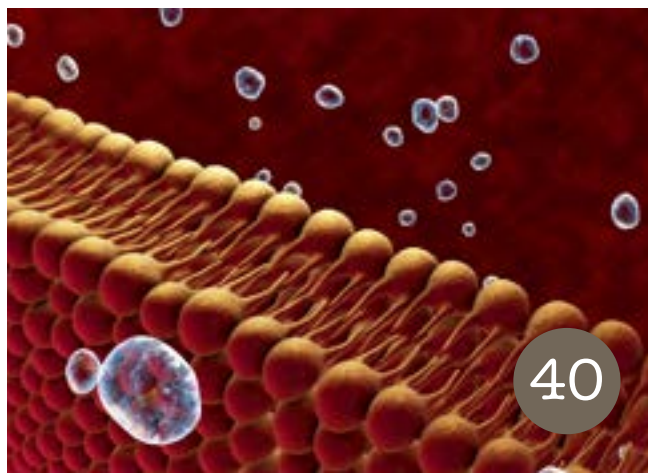


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## FROM THE CHAIR

Welcome to the June/July 2015 issue of *food australia*.

Our feature topics in this issue include seafood, fats and oils and nutrition.

On page 18, CSIRO's Pennie Taylor and Dr Natalie Luscombe-Marsh from the Food and Nutrition Flagship look at how the food industry is delivering nutritionally dense meals for the increasingly ageing population.

As the world's love affair with seafood continues, we have a great feature on the need for highly efficient processing facilities on page 22 and a contribution from Dr John Sumner on the safety considerations for raw fish consumption on page 24.

This issue also provides plenty of science updates, from fats and oils on page 32, nutrition on page 40 and sensory and consumer research on page 43.

Closer to home, I know that the team at AIFST is very excited as we hit the home stretch to our 48th Annual Convention and Exhibition, which we are holding in conjunction with the 15th Australian Food Microbiology Conference at Luna Park in Sydney, from 11-15 August, 2015.

The advance program and registration form for the Convention is now available at [www.aifst.asn.au/convention](http://www.aifst.asn.au/convention). I do hope you will be able to join us for three days of knowledge building and networking.

And until then, happy reading.

**Dr Anne Astin**

AIFST Board Chair





## BY THE NUMBERS

# FOOD ALLERGY IN AUSTRALIA

Australia has one of the highest reported incidences of food allergy in the world, and the numbers are growing rapidly.

As part of its campaign to raise community awareness, Allergy & Anaphylaxis Australia recently undertook consumer research to understand the knowledge and attitudes of Australians toward food allergy.

Despite a growing trend toward food avoidance, the research showed that Australians do not have a good understanding of food allergy. While most Australians are aware that peanut (80%), shellfish (64%) and seafood (51%) can be life-threatening, few realised that reactions to other triggers, such as, soy (8%), wheat (12%), milk (12%), sesame (13%), egg (29%), and tree nuts (35%), could also be fatal. It is these nine foods that cause 90 per cent of all allergic reactions in Australia.

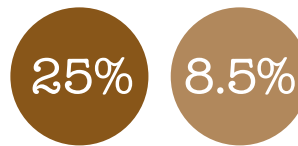
Maria Said, president of Allergy & Anaphylaxis Australia said, "Unfortunately, more than half of all Australians (56%) believe that people with food allergy are over-cautious. While food allergy is manageable, sufferers need to always know what is in what they eat and drink. It is essential that the community understand the importance of taking food allergy seriously."

We take a look at some of the relevant numbers on food allergy.

**56%** The majority of Australians who believe sufferers of food allergies are over-cautious when it comes to the food they eat.

**69%** The number of Australians who do not know what to do in an emergency should a severe food allergy occur.

**Sources:** Allergy & Anaphylaxis Australia. Australian Society of Clinical Immunology and Allergy (ASCIA). Galaxy Research and commissioned by Allergy & Anaphylaxis Australia. Conducted 5-7 May 2015 among 1,050 respondents aged 18+ years across Australia.



25% of US new product launches in 2014 made an allergen claim (such as dairy free or soy free) compared to 8.5% in 2009.



The amount of hospital admissions for anaphylaxis in Australia due to food allergy in children aged 0-4 years in the past decade.

Approximately 10 people die from anaphylactic reactions each year in Australia, some of these are triggered by food.



Hospital admissions for severe allergic reaction have doubled over the past decade in Australia, USA and the UK.

Food allergy affects 10% of babies under the age of 1, 6-10% of 1-to-5 year olds, up to 6% of school-aged kids and 2% of adults.



**9** Nine common foods cause 90% of all reactions – egg, cow's milk, peanuts, tree nuts, shellfish, seafood, sesame, soy and wheat.

One in five Australians do not believe there is a difference between a food allergy and food intolerance.



**86%** 86% of Australians cannot identify the signs and symptoms of a severe allergic reaction.

98% of Australians do not know that allergy to any food can be life-threatening.



**60%** The majority of Australians, who would like to have a better understanding of food allergy.



## AUSTRALIAN WINE MAKERS TO BENEFIT FROM CHINA

A new study projects that China will dominate Asian growth in wine imports over the next three years, with Australia set to benefit greatly from the opportunity.

Economists at University of Adelaide’s Wine Economics Research Centre, who conducted the study, project China’s wine consumption to grow between 40 and 60 per cent between 2011 and 2018.

Wine Economics Research Centre executive director Professor Kym Anderson said that China’s burgeoning population size of 1.1 billion is set to change global markets dramatically.

“While rice wine has traditionally been the most common in Asia, income growth in China and a preference towards grape wine has changed the consumption situation dramatically.

“China is now the world’s fifth largest producer of grape wine, yet its expansion in domestic production has not been able to keep up with its consumption, which is growing twice as fast as its area under vines,” said Professor Anderson.

The signing of several recent bilateral free trade agreements with Australia, Chile and New Zealand could increase China’s net imports of wine between 330 and 790 million litres over five years to 2018 as it continues to be the most dominant player in the Asian market.

Three pertinent Free Trade Agreements involve the gradual lowering of tariffs on China’s wine imports, with Australian tariffs set to be zero by 2016 for bottled wine and by 2018 for bulk wine exports.

“Exporting firms willing to invest sufficiently in building relationships with their Chinese importer may well enjoy long-



term benefits from such investments, just as others have done and continue to do for many other products besides wine,” Professor Anderson says.

Australia’s projected volume growth is an extra 21 megalitres of wine per year being exported to China during 2011 and 2018, which is predicted to be manageable as it is the same rate of increase in Australia’s sales to the US earlier this century.

The study identified that even the Chinese government’s recent austerity drive that was introduced in 2013 is not influencing the growing demand for wine.

The austerity drive has dampened the growth in ultra-premium and iconic wine sales in China, but since that represents just a small share of total sales, the research projects its impact on the overall volumes of wine imports to be minor.

## HORTICULTURE INNOVATION AUSTRALIA OFFICIAL RDC

Minister for Agriculture Barnaby Joyce has officially welcomed Horticulture Innovation Australia (HIA) as the new grower-owned Research and Development Corporation for Australia’s \$9.5 billion horticulture sector.

Mr Joyce said this was an exciting time for horticulture growers who can now have a direct say on how their levy money is spent.

“For the first time, the growers are the owners of their RDC. Alongside HIA, the government is committed to driving greater farmgate returns for our growers and improving global competitiveness,” said Mr Joyce.

Chief executive officer John Lloyd said HIA is well on track to being fully established by the end of 2015.

“The transition to a grower-owned RDC is the beginning of a new era for Australian horticulture. We are taking all necessary steps to implementing a new and improved investment model, with appropriate consultation mechanisms, which will be outcomes driven for our growers.

“The entire horticulture value chain now has the opportunity to have their say and let us know what they think should be the investment priorities for HIA, and help us address and solve critical issues in the horticulture industry,” said Mr Lloyd.

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## AUSTRALIAN OLIVES RANKED AMONG WORLD'S BEST

Australian olive oils are quickly closing the gap on international competitors with two Australian brands beating out the world's most prestigious olive oils from Italy, Spain and the United States at this year's New York International Olive Oil Competition (NYIOOC).

Australian brands Cobram Estate and New South Wales' artisan olive producer Alto Olives collectively took home four Best in Class trophies out of a possible 18 at the international awards. Italy, long renowned for its olive oils, was the only other country to win more Best in Class medals.

Now in its third year, the NYIOOC is recognised as the world's pre-eminent olive oil competition, fielding approximately 700 entries from all over the world.

Curtis Cord, president of NYIOOC, said the judging was undertaken by a panel of leading international experts, who tasted over 630 extra virgin olive oils from around the world.

"The winners are the true stars of the food world, and they need to be recognised and rewarded for their talent, dedication and the extraordinary product they provide," said Mr Cord.

Alto Olives, based near Crookwell in southern NSW, entered two oils in this year's competition and won Best in



Class in both the blended extra virgin olive oil and single varietal extra virgin olive oil categories.

"The New York International Olive Oil Competition is regarded as the Oscars of the international olive world," said Alto Olives managing director Robert Armstrong. "So, to win two Best of Class citations is an unexpected but very gratifying achievement.

"Even more significant is the fact these trophies for our Alto flagship Vividus and Robust extra virgin oils were for the 2014 harvest. These oils were competing against fresh 2015 northern hemisphere oils."

Cobram Estate's Australian Grown extra virgin olive oils also won a total of seven awards.

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## NEW EGG PRODUCTS COMING BACK SUNNY-SIDE UP

A new range of ready-to-serve egg products is set to revolutionise the egg market, according to Sunny Queen Australia. The company has launched a range of gourmet omelettes, scrambled egg mixtures, egg bakes and poached eggs, designed for the catering industry.

Sunny Queen Australia managing director John O'Hara said the products would revolutionise the egg market, making eggs as easy as possible to prepare and deliver.

"We've gone to great lengths to ensure all Sunny Queen Meal Solution products are made with high-quality ingredients, taste great and are safe.

The company has invested \$23 million in a world-class plant in Queensland, which has a production capacity of 1100 tonnes a year. It currently produces around 20 per cent of Australia's yearly 4.8 billion eggs, and is using this venture to double its revenue from the pre-prepared meal business within the next two years.

Owned by two Australian families, Sunny Queen was formed in the 1930s following the Queensland



government's deregulation of the egg board. In 2000, the two families started buying up other shareholders and by 2004, they took full control.

Today, Sunny Queen has revenues of more than \$275 million and supplies eggs to some of the biggest food service companies in Australia, including McDonald's.

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## KELLOGG'S INCLUDES HEALTH STAR RATINGS

Breakfast cereal manufacturer Kellogg's has announced its commitment to implement the voluntary Health Star Ratings on all of its cereals across Australia and New Zealand from June 2015.

According to the company, more than two-thirds of its breakfast cereals have a rating between four and five Health Stars, with the total range spanning from one to five stars.

Kellogg's senior nutrition and regulatory affairs manager, Dr Michelle Celander, said the Company had been working on the implementation of the Health Star Ratings since last year.

"We are pleased to be adding Health Stars as another way to help shoppers make informed choices for themselves and their families, alongside other important nutritional information on packs such as serving size and nutrients per serve," Ms Celander said.

The move by Kellogg's to include Health Stars on its products has been welcomed by consumer group Choice, as well as the Australian National Heart Foundation.



Assistant Minister for Health, Fiona Nash, also welcomed the news that the vast majority of breakfast cereals are soon to display the Health Star system on their packaging.

"I'm pleased the system is being adopted by more and more companies and appearing on more and more products.

"With Kellogg's joining the Health Star Rating, most of the cereal packets on the shelves now display the Health Stars," Ms Nash said.

Kellogg's began to roll out the Health Star Ratings in early June, with all cereal products with the Rating by the end of 2015.

## GRAINCORP AND WILEY PARTNERSHIP ANNOUNCED

Australasian food manufacturing specialist Wiley has secured a new deal to upgrade GrainCorp Food's existing operations in West Footscray, Victoria.

The upgrade will deliver a world-class processing plant featuring extra capability including retail spreads, bakery fats and shortenings.

Part of a wider initiative by GrainCorp Oils to integrate its edible oils and spreads manufacturing operations, the project aims to reduce carbon emissions by 25,000 tonnes per year and reduce transportation of the final product by 550,000 kilometres.

The project will involve relocating GrainCorp Foods' processing and packing operation in Murrarie, Queensland, to its existing operation in West Footscray, which will be extended and upgraded to accommodate for additional capacity.

Wiley business operations director Simon Spittle said the company was looking forward to work alongside GrainCorp again.

"Based on GrainCorp's brief, we created a design for the West Footscray upgrade to align with the company's wider integration objectives.



"A major outcome of the project will be improving environmental performance, thanks to the disuse of coal-fired equipment currently used to generate steam at the Murrarie plant," said Mr Spittle.

GrainCorp Oils group general manager Sam Tainsh said that the project would deliver a logical and more efficient focal point for the locally produced oils and food ingredients.

The project is set for completion in September 2015.



## FOOD AND AGRIBUSINESS INDUSTRY GROWTH CENTRE

Australia's new Food and Agribusiness Growth Centre has kicked off the development of its proposal for innovation and competitiveness for the Australian food industry with a series of stakeholder consultations around the country.

Held during April and May, the workshops were facilitated by Mr Peter Schutz, chair of the Food and Agribusiness Growth Centre, and Dr Mirjana Prica, managing director of Food Innovation Australia Ltd.

The sessions discussed the key areas of focus for the centre, including new product innovation, workforce skills, regulatory burdens and engaging international markets and global supply chains. Feedback and ideas gathered from stakeholders will help to shape the Food and Agribusiness Growth Centre proposal to Industry Minister Ian Macfarlane.

One of five key sectors of competitive advantage as identified by the government in their Industry Innovation and Competitiveness Agenda, the Food and Agribusiness Growth Centre's aim is to stimulate growth for the Australian food industry by boosting productivity, reducing regulatory burden and creating jobs. It plans to leverage the experience and expertise across the sector by catalysing collaborative partnerships between industry, research and government.

For further information, visit [www.fial.com.au](http://www.fial.com.au).

## AUSTRALIAN SEAFOOD PERFORMING SWIMMINGLY

The outlook for the seafood industry is bright, with continued growth in seafood consumption both in Australia and overseas providing new markets and opportunities for Australian producers, according to ABARES Fisheries economics director Robert Curtotti.

"Both here and abroad, the conditions for Australian seafood producers are ideal for growth, with a falling Australian dollar, easing labour market pressures, rising demand, lower fuel costs and a number of free trade agreements coming into force," Mr Curtotti said.

"Seafood consumption is rising worldwide and production is growing to meet that demand. Global production of seafood is around 160 million tonnes and rising.

Almost all of the global growth in consumption is being met by aquaculture, and Australia is matching this trend. Aquaculture's share in gross value of production has increased by 12 per cent since 2003 to represent 43 per cent of production and \$1.1 billion. Wild-catch fisheries production value also increased to \$1.5 billion in 2013-14 following a significant decline in 2012-13 to \$1.4 billion.

"Being an export-focused industry, all these factors combine to make Australian seafood products very competitive in an international market," Mr Curtotti said.

## DO YOU KNOW THE VALUE OF YOUR IP?

Every business has intellectual property (IP) – in its brand, products, processes and innovations. When it has commercial value, it's a business asset worth protecting.

We can help you find the value in your IP by providing straight forward, tailored advice and protection strategies in Australasia.

Our Agribusiness and food technology team has the qualifications and experience in patents, trade marks, designs and commercial law to protect and enforce IP in all aspects of food processing technology, functional foods and high end value food products, Plant Breeder's Rights, animal health, branding and packaging.

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## LETTER TO THE EDITOR

I am a 27-year-old farmer from Coffs Harbour, on the NSW mid-north coast. My family has been growing bananas, avocados and greenhouse cucumbers for 25 years. I have been a full-time farmer for almost a decade.

In recent years, the farm sector has become a favourite punching bag for the media. More often than not, farmers are portrayed as environmental vandals, barbaric killers of animals and now exploiters of foreign workers.

Recently, *Four Corners* aired 'Slaving Away: The Dirty Secrets behind Australia's Fresh Food'. It revealed how foreign workers on 417 visas were being exploited by labour hire contractors in the meat and horticultural industries.

Relevant authorities should act immediately in such instances and prosecute the offending parties. Nevertheless, the program was deliberately inflammatory and misleading. It attempted to tar the entire industry by citing a few rotten apples.

The program also demonstrated a complete and utter disregard for reputable industry bodies, such as the National Farmers' Federation. Such organisations were not contacted for comment while the Australian Workers' Union featured prominently during the 45-minute feature.

During the show, one union official made the claim: "Almost every fresh product ... will have passed through the hands of workers who have been fundamentally exploited."

What is the basis of this claim? What facts suggest this to be true? None were presented.

As someone who has worked all their life in this industry, I can say these claims are absolutely ridiculous. Australian farm workers are among the best paid, protected and valued anywhere in the world. All industries have cowboys. But these fragments do not represent the entire sector.

I am concerned this report will lead to an overreaction from the public and authorities. More regulation and red tape is not needed. Rogue operators have little regard for them.

This program had the opportunity to highlight the real issues facing our sector. Why is it that we are so reliant on foreign workers despite having double-digit unemployment in our regional communities? Why must millions of dollars worth of edible produce simply rot on the trees because there weren't enough hands to help harvest?

I urge the public to support Australian farmers. We produce some of the finest produce. Don't let a few rogues ruin it.

*Paul Shoker is a member of the NSW Farmers association horticultural committee. The views expressed here are his own.*



PEOPLE



Jacqueline Chow

**Management changes at Fonterra Co-operative Group**

Australian baby food Fonterra Co-operative Group announced managing director global brands and nutrition, Jacqueline Chow, is stepping into the newly created role of chief operating officer Velocity.

Effective from 1 June, the role will see Ms Chow work alongside

the management team to accelerate performance across Fonterra Co-operative.

Chief executive Theo Spierings said the new role would lead the next stage in Fonterra’s evolution.

“In her new role, Jacqueline will work across the entire Co-operative to push forward the Velocity of our V3 strategy and deliver the best possible performance,” said Mr Spierings.



Quinton Hildebrand

**Mackay Sugar CEO resigns**

Chief executive officer of Mackay Sugar – Australia’s second largest sugar manufacturer – Quinton Hildebrand has announced his resignation after seven years with the company.

Since commencing with Mackay Sugar in May 2008, Mr Hildebrand has been instrumental in the growth of the company’s

income base, and chair Andrew Cappello expressed his regret at Mr Hildebrand’s announcement.

“Quinton has been an exceptional leader at Mackay Sugar and should feel proud of his contribution to the growth of the company,” Mr Cappello said.



Albert Moncau

**Murray Goulburn appoints new dairy foods manager**

Australia’s largest dairy foods company, Devondale Murray Goulburn, has announced the appointment of Albert Moncau to the role of executive general manager – dairy foods, reporting to Gary Helou, managing director.

Mr Moncau commenced in April, with accountability for marketing and innovation,

domestic sales and the international business, and brings with him extensive commercial and leadership experience from a broad range of global industries.

Prior to joining Devondale Murray Goulburn, Mr Moncau spent eight years as managing director of HJ Heinz in Southern Europe, China and most recently, Australia and New Zealand.



Martin Eagle

**Halcyon Proteins appoints new business manager**

Halcyon Proteins, Australia’s premier manufacturers of natural ingredients for food, has recently appointed Martin Eagle as the new business manager, overseeing the sales area.

The role will see Mr Eagle oversee the sales area of the business, developing existing and new business for local and export markets.

Mr Eagle has extensive experience in business management, having previously held roles at Hawkins Watts and DuPont/Danisco. He is actively involved with the AIFST Victoria branch and the Food Technology Association of Australia.



Reg Weine

**CCA appoints new managing director of SPC**

Coca-Cola Amatil (CCA) has appointed former Bulla Dairy Foods chief executive officer Reg Weine as the managing director of SPC Ardmona, replacing Peter Kelly, who departed CCA earlier this year.

CCA’s managing director Alison Watkins said she was

delighted to welcome Mr Weine to lead the company’s subsidiary, SPC.

“Reg is a seasoned managing director and his very relevant consumer goods experience, particularly in marketing, sales and innovation, will add huge value to SPC during this period of transformation and return to growth,” said Ms Watkins.

Prior to his appointment, Mr Weine was the chief executive officer of Bulla Dairy Foods for four years, as well as director of sales and international with Blackmores Limited. He is also a director of the Australian Food & Grocery Council.



AIFST

## FROM THE CEO



The last month has been a busy and exciting one as I settle in to the role of chief executive officer at AIFST. The team has really hit the ground running, working

to finalise an operating plan for the next six months and commencing the process of developing the 2016 - 2018 strategic plan for the Institute.

The main focus of the remainder of 2015 is to ensure we deliver our core services efficiently and effectively – in a way that continues to support the growth and advancement of the profession – while taking the time to review our current practices and ensure we are operating under best practice.

We have recently secured new, shared office space in North Sydney, which will mean a reduction in overheads and greater technical infrastructure and support for the business. We will be moving on Friday 19 June, so the office will be closed for the day, reopening on Monday 22 June in our new home. Our new address details are listed below right. Please update your contact details.

The team has also been busy working with the organising committee for

the 48th Annual AIFST Convention, being held in conjunction with the 15th Australian Food Microbiology Conference, to finalise the program and coordinate the event logistics.

As we commence the development of the 2016 – 2018 strategic plan, the first phase will involve extensive consultation with members and stakeholders to gather feedback and input into the services and offerings they are seeking from AIFST. I encourage you to have your say – this is a significant opportunity to shape the future of your Institute. We will issue a survey during August, but I also encourage you to contact me directly at [georgie.aley@aifst.com.au](mailto:georgie.aley@aifst.com.au) or on 02 9394 8650 to share any feedback.

I am genuinely excited about the opportunity to work with you all on the future of AIFST. This is an extremely vibrant time for the Australian food industry. We have a strong government focus on innovation and growth, and AIFST's future strategy will ensure that we leverage these opportunities to deliver benefits that promote and support our members.

I look forward to talking with you as we commence our consultations and to meeting many of you at the Annual Convention in August.

**Georgie Aley**

## FAREWELL VICKI



It is with mixed feelings that we announce that Vicki Wallace, our finance and administration manager, will be retiring from AIFST on 11 July. After 17 years of service, she will be sorely missed, but we also can't help but be happy for her as she moves onto an exciting new phase of her life.

On behalf of the Board and the management team, we are sincerely grateful for Vicki's commitment to AIFST. She has worked tirelessly to keep the finances in line and in all her 17 years she has not had one sick day!

Vicki's last day will be 11 July. Please join us in wishing her all the best for a happy retirement.

## AIFST MEMBERSHIP

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## NEW HOME FOR AIFST

AIFST is moving to new shared offices in North Sydney on 22 June 2015. Please update your contact details.

Address: Level 1, 40 Mount Street, North Sydney

Postal: PO Box 1961, North Sydney NSW 2059

Office number: 02 9394 8650.

E: [aifst@aifst.com.au](mailto:aifst@aifst.com.au)

# CONVENTION UPDATE



The advance program and registration form for *Food for All* – the 48th Annual AIFST Convention and 15th Australian Food Microbiology Conference – are now available. Visit [www.aifst.asn.au/convention](http://www.aifst.asn.au/convention) to register now.

This year's Convention is being held at Sydney's iconic Luna Park from 11-13 August, and is set to be one of the biggest food industry events in Asia Pacific with over 120 local and international speakers and more than 600 delegates joining us over three days. We acknowledge the NSW Food Authority as major sponsor and we will list all sponsors in the August/September 2015 issue.

This program includes sessions covering:

- The changing global food industry
- Innovating for success
- Demand drivers in food retailing
- Exciting applications for omics technology, including the genomics of taste
- Future directions for vulnerable populations
- Food safety – global considerations, practical applications, managing risk and shelf-life
- Dairy innovation
- Value-added grains
- Identifying the black holes in your supply chain.

The program also includes a one-day Food Entrepreneur Business Essentials Workshop on 12 August – the first day of the Convention. It's a jam-packed program on what it takes to get food to market, including IP protection, legal requirements, food safety and insights on benefits available for SMEs, including grants, finance and tax incentives.

Overall, *Food for All* is set to be a fantastic event. We hope you can join us to hear the latest in food science, research trends and innovations and to expand your food industry networks.

## SAVE THE DATE

The **AIFST Annual General Meeting (AGM)** will be held on Wednesday 12 August, from 5pm to 6pm, at the Plenary Room, Crystal Palace at Luna Park, as part of the 48th AIFST Annual Convention and 15th Australian Food Microbiology Conference. Every year the AGM is held as part of the Convention to give as many members as possible the opportunity to attend. Please mark it in your diaries so you can join us.

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## CONFERENCE EXHIBITOR LISTINGS

The 48th Annual AIFST Convention and 15th Australian Food Microbiology Conference has had a great response, with all exhibition booths fully booked. Please find a complete list of exhibitors below. Make sure you come and visit!





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# BENDING WATER

*With the strong track record which the food industry has in making foods safer, why does there continue to be public mistrust in the industry?*

Words by Dr Geoffrey Annison

Bending water is an experiment you can do at home. Simply turn on a tap so a thin stream of water is running. Draw a comb through your hair and then move the comb slowly towards the stream of water. The stream will bend towards the comb. It's not magic, although it looks as if it might be. This is, of course, a demonstration of a static electricity charge on the comb inducing alignment, and attraction of water molecule dipoles.

More importantly, it's a fundamental demonstration of a piece of evidence that supports our scientific understanding of the natural world. And most of us trust that scientific understanding to keep us safe in our everyday lives.

However, when it comes to food, or more specifically processed food, the trust in science seems to be eroding. This lack of trust has resulted in some very disturbing outcomes in recent months.

Last year, a child died in Victoria from drinking contaminated unpasteurised milk. This tragedy highlighted that despite the regulatory prohibition, retail businesses were offering unpasteurised milk for sale in dairy cabinets in a manner which failed to communicate that the product was not safe for human consumption. Victorian regulations now require a gag-inducing ingredient to be added to raw milk for retail sale.

More recently, the food industry and public health sector became alarmed at reports that a recipe book, including a do-it-yourself recipe for a paleo infant formula, was about to be published by celebrity chef Pete Evans.

Mr Evans has been promoting

the paleo diet to adults as a dietary regime to maintain good health, and through this book extended his views to homemade broths as an alternative to commercial infant formula.

After a flurry of activity and pressure from the health authorities and organisations, such as the Public Health Association of Australia and the Dietitians Association of Australia, the publishers agreed not to proceed. The authorities and professional associations were extremely concerned that the paleo infant formula was nutritionally imbalanced and would likely to lead to nutritional deficiencies, and possibly fatal outcomes for infants. Mr Evans subsequently stated his intention to self-publish the book electronically.

The common link between these two events is the way science and regulation, which guides safe production of milk and infant formula, was cast aside so determinedly in favour of distinctly risky practices.

As food technologists working in a very sophisticated, technically based food manufacturing sector, we should be asking ourselves the question, "Why are large numbers of consumers seeking foods outside mainstream food manufacturing supply chains, even to the extent of risking their health?"

The simple answer may be one of trust. Despite evidence that Australians enjoy a wide variety of nutritious, safe, accessible and affordable food that is produced by a technically sophisticated food system and overseen by a world-class regulatory system, levels of trust in our foods appear to be low.

For years the mainstream food industry has been the target of criticism – largely unwarranted, mostly ill-informed and frequently as a publicity seeking exercise – across a range of issues. Our products are accused of being artificial, unnatural and full of risk-associated nutrients.

We are accused of deliberately misleading consumers through obscure labelling and aggressive advertising practices. The attacks come laced with pejorative language (think 'Big Food', 'hidden salt'<sup>1</sup>), with the individuals and organisations perpetuating these attacks often cloaking them in altruism claiming a public good objective.

Self-interest, however, is readily found associated with these attacks and comes in many forms, but core to all is seeking coverage in the popular press. This can bolster celebrity status, boost magazine sales, confer authority within academia, and promote the profile or public funding bids of non-governmental organisations. It's all founded on criticising the food industry generally, and frequently specific companies, particularly large multinationals with strong brands.

The critics ignore the facts, and they refuse to recognise the strong track record the food industry has in making our products safer, and in responding to advances in nutritional science. For example, this February, the National Heart Foundation (NHF) chief executive officer Ms Mary Barry, sent a media release<sup>2</sup> calling for the mandatory labelling of trans-fats. Although conceding that dietary intake of trans-fat in Australia are well below World Health





Organization targets of one per cent of dietary energy, the media release did not recognise that the Australian food industry leads the world in the removal of trans-fats from food products.

Rather the NHF states that “trans-fats are often found in cheap foods and there is concern that particular groups of the population may be consuming more than this average, such as those from a low socioeconomic background”. No evidence for this statement was proffered, and none has been provided to the Australian Food & Grocery Council, despite requests put to the NHF.

From a public health point of view, trans-fats are a non-issue in Australia. This does not, however, prevent it being wheeled out from time to time as a mechanism to attack the integrity of the food industry and food labelling regulatory regime under which it operates, and to get a headline. Consumers are the big losers as yet another worry (albeit false) is put into their minds regarding the safety of the foods they, and their families, consume.

The groups that spoke out on the paleo infant formula issue should be applauded for their rapid and ongoing response on this matter. But they should also realise that they have helped create an environment where any food fad, even a dangerous one, can get equal standing to established nutritional science.

NGOs should consider more carefully the implications of their criticisms of the food industry when highlighting other public health issues. Evidence-based public health advocacy, which is their common mantra, is cast aside all too often for hyperbole and rhetoric at the food industry’s expense. They risk fuelling unnecessary community distrust of the food industry, creating fertile ground for those peddling extreme fad diets and food philosophies, which are often contrary to accepted scientific wisdom and may be downright dangerous.

More broadly, we need to remind consumers that they can trust the science which underpins the modern food industry and its products, and the nutritional science which informs our dietary guidelines. It’s not as simple as bending water, but it’s just as impressive when the story is told. 🍷

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

# PROTEIN: AN AGED CHALLENGE

*A unique collaborative partnership between industry and research has resulted in the development and delivery of nutritionally dense meals for the ageing population.*

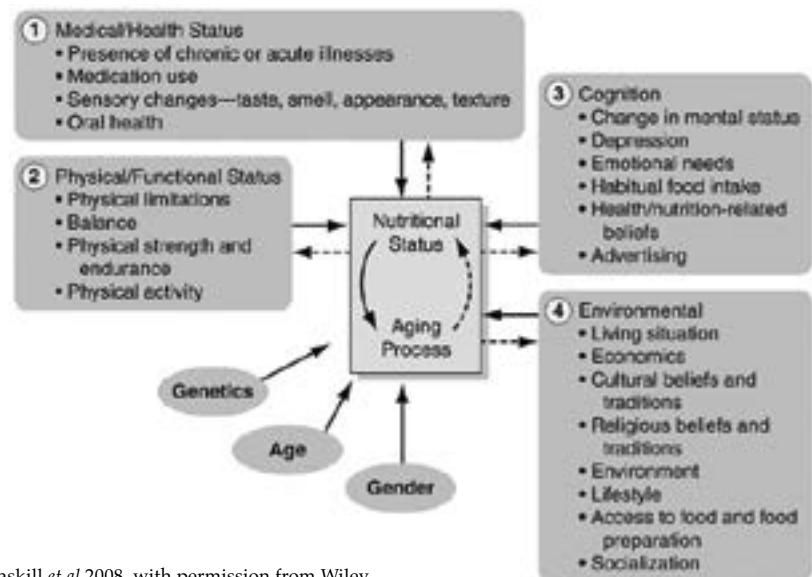
Words by Pennie Taylor and Dr Natalie Luscombe-Marsh

Ageing populations are a global phenomenon presenting new challenges and opportunities for industry and government. In 2013, 14 per cent of the Australian population (3.3 million people) were aged 65 plus years and 1.9 per cent (<0.5 million people) were aged 85 plus years. By 2053, it is predicted that 21 per cent of the population (8.3 million people) will be aged 65 and over and 4.2 per cent (1.6 million people) will be aged 85 and over<sup>1</sup>.

Advancing age is commonly associated with changes in physiological, psychological and environmental factors that impact on nutritional status (Figure 1)<sup>2</sup>. Physiological changes that contribute to poor nutritional status include increased wasting (cachexia), loss of muscle mass and weakness (sarcopaenia), as well as a decline in appetite. A reduction in appetite reduces energy intake and food variety, often increasing food wastage. In turn, this reduction in energy intake frequently results in protein and micronutrient deficiencies in the elderly<sup>2,3</sup>.

The rates of malnutrition in older adults have been reported as five per cent in the community and 16 to 70 per cent in residential care, depending on the assessment tool used and level of dependence of the population measured<sup>4,6-8</sup>. While Meals on Wheels menus are designed to provide one-third of energy and half of daily protein requirements, a pilot study found that clients were falling short of this, consuming only 17 per cent of energy and 21 per cent of target protein requirements<sup>4,5</sup>.

Figure 1: The determinants of nutritional status and the ageing process\*



\* Gaskill *et al* 2008, with permission from Wiley.

## A collaborative partnership

With this in mind, Community Chef, CSIRO Food and Nutrition Flagship and Food Innovation Australia (FIAL) through their SME Solution Centre, collaborated to improve the nutritional density of Community Chef meals in order to bridge the nutritional gap, with a particular focus on protein.

## Creating food solutions

### The strategy

CSIRO nutritionally analysed and compared a range of Community Chef’s most popular menu items against the current guidelines supporting the aged care environment. These include the Victorian Home and Community Care (HACC) guidelines for delivered and centre-based meals, which influence the essential meal components and

minimum portions sizes to be provided, as well as the Australian Dietary Guidelines (ADG) and the Nutrient Reference Values (NRVs) currently under review, which consider the specific nutrient needs across the lifespan.

Particular attention was given to nutrients of importance for older adults, where there is a common nutrient deficiency or a reduced intake of these nutrients, with a particular focus on protein<sup>10</sup>.

The analysis revealed that all meals met the energy criteria of one-third of the recommended dietary intakes (RDI) for energy as per the HACC guidelines. However, in meeting these guidelines, only meat and fish dishes achieved the protein targets, with vegetarian dishes being inadequate in protein. This result was not surprising and is an issue



that affects all suppliers of meals for delivered meals programs, given that a typical vegetarian dish requires 325 grams (in excess of two cups) of legumes to achieve the same protein provided by a 75g serve of meat.

#### **The process**

When investigating opportunities to fortify meals for protein and energy, a benchmark defining high energy and protein levels was developed for each meal and meal component. The utilisation of whole food ingredients was considered important both from an economic perspective, to maintain the affordable price point of Community Chef's meals, as well as ensuring the taste and flavour of the home-style meals that Community Chef prepares.

Simple fortification strategies were employed to enhance nutrient density, including use of dairy products such as milk powder, beans and lentils for protein, iron and zinc, and healthy fats and oils to boost energy density without increasing volume.

On-site trials with CSIRO and the Community Chef team enabled the modified recipes to be tested for reproducibility in the commercial kitchen environment and consideration to alterations in taste, texture, viscosity and mouth-feel with the recipe modification.

One limiting attribute of utilising whole food solutions to fortify meals was that the mean reduction in volume was modest, at around 14 per cent of total volume. This indicates that further fortification strategies, such as modular components or novel food solutions, may be necessary to achieve further nutrient density and greater volume reduction, especially for protein requirements.

#### **Challenges**

The current intake of dietary protein in older Australians is below recommendations and although it was identified that the nutritional density and compliance to the HACCC guidelines were met by Community Chef, the use of whole foods to enhance the protein meant the ability to reduce meal volumes substantially was limited.

Given consumer preference for provision of smaller, nutrient-dense meals to meet the requirements of the ageing population, meal services guidelines, such as HACCC, need to be revised to allow providers such as Community Chef to produce smaller, more nutrient-dense meals to meet the needs of their clients.

#### **Opportunities**

Fundamentally, a gap exists for the development of cost effective blended protein ingredients, which allow for

increasing nutrient density without adding volume.

Within the confines of a relatively limited number of studies in the target older adult (>65 years) population, it is suggested that development of foods for this population should consider using rapidly digestible protein sources with high leucine content for optimising postprandial muscle protein synthesis.

The literature indicates that whey protein is currently the best option for this application, over casein or soy protein. However, mixed protein sources including grains (rice protein), potato and pea (vegetable protein) should also be considered for cost effectiveness and sustainability. The ideal target for protein intake for elderly people is 25-30g of protein per meal two-three times per day. Where this is not possible, additional protein requirements could be met by the provision of between meal snacks containing 10-20g protein.

Food fortification using whole food solutions has the potential to optimise nutritional density of meals and improve the eating experience and health of the aged community. Teams from the CSIRO Food and Nutrition Flagship are investigating food blends to optimise the protein density of meals and snacks as well as the effects of protein fortification on viscosity, taste and shelf life.

## Protein intake of the older Australian



The recommended dietary intakes (RDIs) for protein (Table 1) reflect the amount of protein required for maintenance of nitrogen balance to avoid deficiency, rather than the amount required for optimal function, which remains the subject of debate.

These values are derived from data from younger adult males, with adjustments made for the >70 year age group, based on research which indicated higher requirements for this population. However, it is acknowledged that the data supporting this is limited<sup>9</sup>.

The common areas of agreement are that the anabolic response of muscle to protein is blunted with age. Consequently, higher protein intakes are needed for older adults to elicit the same muscle synthesis that is achieved by younger, healthy adults.

The PROT-AGE study group of leading researchers recommends the average daily intake of at least 1.0-1.2g protein per kilogram of body weight per day to help adults aged 65 years and over maintain, and possibly regain, lean body mass and function. Older adults who have acute or chronic diseases need even more dietary protein; 1.2-1.5g/kg body weight/day<sup>10</sup>. This broadly translates to a target of 25-30g of protein per meal, for optimal protein synthesis.

The most recent Australian Health Survey conducted in 2011-12 by the Australian Bureau of Statistics<sup>11</sup>, showed a reduced dietary protein intake with increasing age in both males and females, mainly due to a reduction in total food intake (Table 2). Dietary protein intake

was approximately 0.91g/kg of bodyweight per day for all persons aged 65 years and over, which is below the target of 1.0-1.5g/kg.

### Protein digestibility and quality

Key considerations for increasing protein consumption in an older population are the source and quality of the protein. Current evidence indicates the body's ability to digest and absorb protein probably does not significantly change with age<sup>12</sup>.

Similarly, amino acid needs are the same for young and older adults. The essential amino acids for humans are leucine, phenylalanine, valine, threonine, tryptophan, methionine, isoleucine, lysine and histidine.

### Digestibility, timing and delivery

It has been recognised that the rate and extent of protein digestion and absorption are important factors that influence subsequent muscle synthesis<sup>13,14</sup>. Dietary proteins with fast digestion and absorption elicit greater muscle synthesis, compared with slower proteins. A high quality protein contains all the essential amino acids and has a rapid rate of digestion and absorption to maximise muscle accretion.

Milk proteins (whey and casein) have been shown to be beneficial over soy protein<sup>15</sup>, indicating a possible superiority of animal protein sources

*Pennie Taylor is a senior research dietitian and Dr Natalie Luscombe-Marsh is a research scientist within CSIRO's Food and Nutrition Flagship.*

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**Table 1: Recommended daily intakes (RDIs) for protein in adults aged 51 and over** (Source: NHMRC, 2006)

	51-70 YEARS		> 70 YEARS	
	MALES	FEMALES	MALES	FEMALES
Protein (g/kg of bodyweight)	0.84g/kg	0.75g/kg	1.07g/kg	0.94g/kg

**Table 2: Dietary protein intake of older Australians** (Source: Australian Health Survey, 2011-12, Australian Bureau of Statistics)

	51-70 YEARS		> 70 YEARS	
	MALES	FEMALES	MALES	FEMALES
Total energy derived from dietary protein (%)	18	19	17	19
Mean total energy (kJ)	9345	7268	8174	6570
Amount of dietary protein consumed (g/day) (imputed*)	101	81	82	73

\*Imputed by calculating the number of kilojoules consumed as dietary protein, and dividing this value by 17, which is the number of kilojoules in 1 gram of protein.

compared to plant proteins. For milk proteins, 'fast' protein sources, such as whey, have been shown to be beneficial over 'slow proteins, such as casein, for muscle accretion. This is due to their faster digestion, absorption and possibly higher leucine content<sup>10,14</sup>. Attention is given to the role of leucine, an amino acid abundant in protein foods such as meats, dairy and soy, which directly signals muscle protein synthesis.

Research has shown that splanchnic extraction (uptake by the gut and liver) of leucine from food sources was twice as high in elderly men compared to younger men<sup>14</sup>. Consequently, the amount of leucine remaining in circulation was much lower. This

limits the availability of this essential amino acid for muscle synthesis. A number of studies have investigated dietary supplementation with leucine for improving muscle synthesis in elderly people. However, no specific recommendations for the amounts of leucine were provided.

There is an increasing evidence that an improved 24-hour muscle protein synthesis rate is achieved when dietary protein is spread evenly across all daily meals, rather than an uneven distribution that is loaded into one meal<sup>16</sup>. It is reported that the human body has limited capacity to store excess protein from a single large meal and use it to stimulate muscle anabolism later<sup>10,17</sup>.

The literature indicates that approximately 20-30g of protein per meal may be the optimal amount to stimulate skeletal muscle protein synthesis, adding strength to the emerging concept of a 'protein threshold' at any single meal.

In addition, it is recommended that older individuals with chronic disease also consume small snacks containing approximately 10-15g of protein between meals to ensure they meet their daily protein requirements of around 1.2-1.5 g/kg/body weight. This supports the rationale for developing protein enriched snack foods or products to facilitate consuming protein requirements throughout the day. <sup>N</sup>

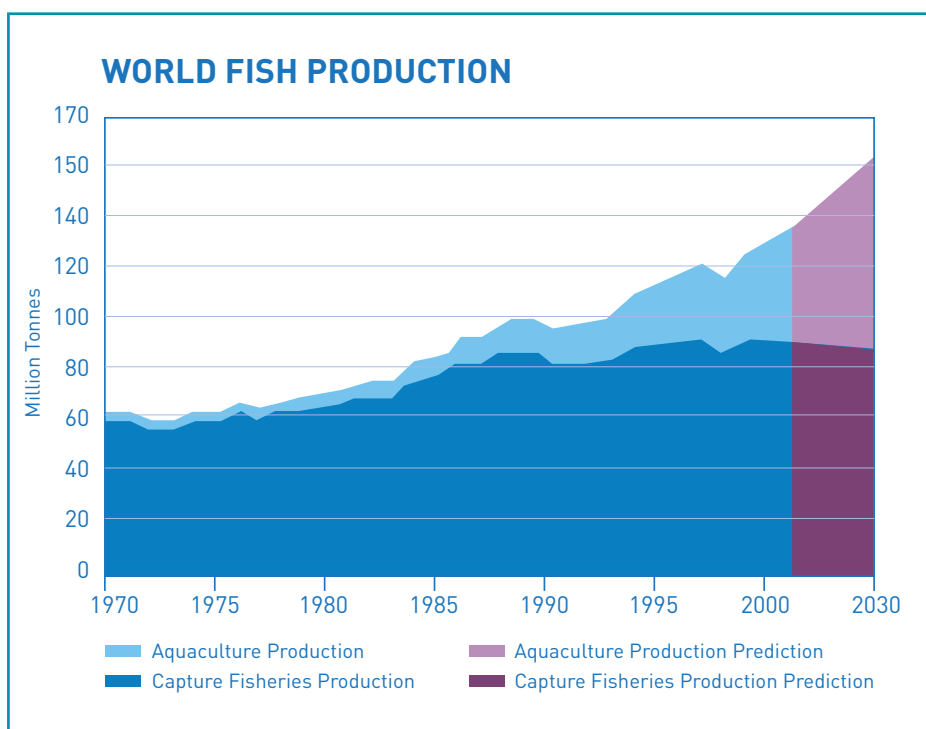
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# HIGHLY EFFICIENT AQUACULTURE FACILITIES NEEDED TO FEED THE WORLD

*Australia needs highly efficient processing facilities to ensure the seafood industry is positioned to take advantage of the world's rapidly growing appetite for fish delights.*

Words by Peter Bullock



While Australia is well placed to contribute to the increasing domestic and global demand for seafood, the stringent quality standards from export authorities, supermarkets and overseas food service destinations will mean that processing facilities will have to be of the highest standard.

## Efficiencies needed

**Labour:** High labour costs in Australia (sixth highest in the world) means that facilities and processes will need to be extremely efficient to ensure that Australian companies are competitive and able to take advantage of this growing market.

**Facilities:** To achieve optimum efficiency, facilities need to be expandable and adaptable to ensure they can meet changes in the market place. Economies of scale should be achieved, where possible, through consolidation of multiple sites and mergers and acquisitions. Consolidated facilities will need to be strategically located and designed to accommodate multiple product lines; therefore, access to site selection expertise will be critical.

**Plant efficiency:** Improving overall plant efficiency is often the largest contributor to lowering the cost of production. Solutions are readily available to improve efficiency around energy consumption, refrigeration, and wastewater management.

Bio gas recovery projects and cogeneration can provide a useful

Global seafood consumption has increased by 26 per cent over the past 15 years, with expectations that this level of growth will be sustained for the next 10 years at least. While beef and lamb are the proteins of choice for many barbecuing Australians, seafood is in fact the most consumed animal protein in the world.

By 2030, it is expected that up to 40 million tonnes of additional seafood products will be required to meet the demands of growing populations.

With global demand for seafood likely to be 150-160 million tonnes by 2030 and wild catch only 80-100

million tonnes, a shortfall of 50-80 million tonnes will need to be fulfilled through aquaculture. At an average annual growth of nine per cent a year since 1970, aquaculture globally has already seen the largest growth of any food production system across all food groups and this growth rate will have to increase significantly to meet consumer demand in 2030.

The Australian seafood industry is highly regulated with a reputation for producing world-class seafood products. For this reason, overseas markets will look to Australia to satisfy their requirements.



source of energy to either fuel boilers, by creating steam and hot water, or generating electricity. Often, federal government initiatives are available that will financially contribute to such projects. Increased efficiency can be achieved through process optimisation by creating linear and continuous process flow, eradicating double handling and in doing so, improving product quality.

Production space is where the most value is added to products and where processors can maximise their margins, and must be optimised to allow for new products and market growth. Non-productive spaces, such as corridors, are expensive real estate with little return on investment and should be minimised. Product should flow from one production space to another without the need for corridors.

Where possible, automation in process and packing can reduce labour costs. The latest development in collaborative robotics means that cost-effective robotic units will be accessible to even smaller processors as well as be relocatable to different parts of the process when required and programmable for multiple tasks in different locations.

Waste removal automation is already available and should be considered in more cases, removing the need for waste bins in the production space and reducing the labour required in transporting them around.

**Process design:** Process design should be centred on improving yield, quality and productivity and managed using manufacturing execution systems. By adopting this approach, waste should be minimised although additional value can be created through by-product processing, if the volumes and market prices support it.

To meet the increasingly stringent quality and hygiene requirements, process segregation will be of paramount importance to achieve complete separation between processes, such as raw / cooked, fresh / smoked and allergen / non-allergen, with corresponding segregation of waste streams. This will include the need for separate staff entry and design considerations such as walkways that allow visitors to view all production areas without having to go through multiple staff entry changing regimes. These design elements will best align processors with the latest international requirements of important customers.

**Standards:** To be competitive in the global market, processors will need to conform to the standards of supermarket quality audit procedures and industry recognised bodies such as AQIS, BRC, etc. The design process for facilities and processes is critical in successfully accommodating these standards.

Australian processors who embrace change and the need for efficiency will be on the front foot in rising to the challenge of this growing market. Creating efficiency in food facilities and processes requires specialist knowledge and experience to ensure that improvements meet market demands, return-on-investment criteria and help future proof their business. 

*Peter Bullock is a business development manager and seafood processing specialist at Wiley. He has worked in the seafood industry for over 25 years in both Australia and the UK as well as exclusively on salmon and aquaculture processing in Europe.*

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# RAW FISH CONSUMPTION IN AUSTRALIA: HOW SAFE IS IT?

*The first reported case of anisakidosis prompted an evaluation of the risks of sushi and sashimi consumption in Australia.*

Words by Dr John Sumner, Sutasinee Antananawat, Drs Andreas Kiermeier, Catherine McLeod and Shokoofeh Shamsi

Consumption of sushi and sashimi in Australia has increased greatly over recent decades with BIS Shrapnel estimating sushi and sashimi consumption at 115.6 million servings per annum (Anon., 2011). Sushi typically comprises rice combined with other ingredients such as seafood (often raw) and vegetables, while sashimi is entirely raw fish.

A downside of raw fish consumption is the possibility of consuming anisakid worms or their larvae (cysts), and contracting Anisakidosis. Documented by Shamsi & Butcher (2011), Australia's first recorded case of anisakidosis was after a 41-year old woman of Tongan descent consumed raw mackerel.

Her symptoms included vomiting, diarrhoea and right-side pain, which developed 10 days later into a sore throat, rhinorrhoea, nasal congestion, cough with yellow sputum, myalgia, fevers, chills and sweats. After courses of unsuccessful drug treatment, she recovered in hospital, where she passed a threadlike worm about two centimetres long.

Over 90 per cent of global cases of anisakidosis are reported from Japan, with most of the remainder from Spain, the Netherlands and Germany (Audicana & Kennedy, 2008). As well as gastrointestinal symptoms, anisakidosis may also cause dermatitis and other allergic reactions.

Genetic factors are an important predisposing factor with an unusually

high incidence among the Basque population in northern Spain (Audicana & Kennedy, 2008).

As in other countries, a range of Australian marine fish are infested with anisakid nematodes, sometimes at high prevalence and concentration (see Antananawat *et al.* 2012 for a full review).

The upsurge in raw fish consumption, coupled with the first reported anisakidosis, prompted us to evaluate the exposure of Australian consumers to worms or larvae in Australian finfish used for sushi or sashimi.

## Data collection

We calculated volumes of species used for sushi and sashimi by interrogating the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) database for 2007-2010.

Australian Tuna Association and the Sydney Fish Market provided information on proportions of species likely to be consumed raw, as well as rates of detection of worms and larvae during processing in the wholesale, retail and food service sectors.

A brief survey was undertaken of sushi and sashimi operations in Adelaide to determine typical serving sizes.

## Prevalence of anisakids in Australian fish used for sushi and sashimi

A literature review on the distribution and concentration of anisakid larvae in fish caught in Australian waters

(Northern Territory, Queensland, Western Australia, South Australia and Victoria) shows that three genera of the family Anisakidae – Anisakis, Terranova and Contracaecum – occur in Australian fishes commonly used for sushi and sashimi production. Some have high prevalence and concentration of anisakids in their viscera and/or body cavity. For instance, Spanish mackerel has been shown to have Anisakis and Terranova larvae at 100 per cent prevalence and 'high' (>20 cysts/fish) concentration (Moore *et al.*, 2003).

The apparent lack of anisakids in farmed versus wild-caught fish has been demonstrated in Australia. Kingfish, a popular fish used for sushi and sashimi, is farmed in South Australia and fed with commercial pellets. It did not contain anisakids, (Shamsi *et al.*, 2011) while wild-caught Kingfish did (Hutson *et al.*, 2007).

## Volumes of fish likely to be consumed as sushi and sashimi

In Australia, sushi and sashimi are based predominantly on salmon and tuna, with other high-value species such as kingfish, snappers and reef fish comprising a small proportion. Since all salmon in Australia are farmed and raised on pelletised feed, they will not contain anisakid worms or larvae and therefore are not considered in this assessment.

As shown in Table 1, approximately 5927t of finfish species associated in the literature with presence of anisakids are





potentially available for consumption as sushi and sashimi. Based on industry information from the Australian Tuna Association and the Sydney Fish Market, the proportion of each species likely to enter the sushi/sashimi trade is estimated in Table 1 and ranges from five per cent for mackerel to 85 per cent for tuna.

We estimated the edible mass available for each species using the data of Kane (1994). Thus, for the present study, an edible portion from the production weight of 70 per cent for tuna and 40 per cent for other species was assumed, yielding around 2937t (assumed edible mass) for potential consumption as sushi and sashimi, of which 1259t is estimated to be actually consumed in this form (Table 1).

### Consumption of sashimi and sushi in Australia

The total mass of potentially infested fish consumed raw is 1259t/ annum, and if the average mass of fish in a serving is assumed to be 50g, around 25 million servings a year are available for consumption. If it is further assumed that two per cent (as estimated by Ruello, 2005) of Australia's adult population of 16 million (320,000) regularly eat sushi, each will consume 79 servings a year, which is about two servings every 10 days.

We acknowledge the simplistic nature

of this assumption, and that some consumers may eat sushi several times a week while others may consume only rarely, with obvious impact on their exposure to ingesting parasites.

We also emphasise that, while sushi and sashimi based on salmon and prawns will comprise a large proportion of seafood eaten raw, we are concerned solely with consumption of at-risk species identified in Table 1.

### Exposure mitigation

There are several stages in the catching-processing-marketing-retail continuum for reduction of infestation.

Firstly, primary processing (gilling, gutting and filleting) may reveal cysts in the viscera, gut cavity or flesh, leading to exclusion from the human food chain.

Secondly, in Australia, it is customary for tuna to be sold via auction, a stage where inspection may reveal the presence of cysts in the gut cavity.

Thirdly, presence of cysts in the flesh may be detected during further processing.


Based on information from Sydney Fish Market's risk and compliance manager Mark Boulter, approximately 0.5 per cent of tuna bodies are found to have some infestation when they are further processed in the sushi and sashimi trade. These bodies are returned for compensation and

are diverted to the non-human consumption stream. Finally, in preparation by the chef, fish is sliced into thin portions (3-10mm), which increases the likelihood that worms or cysts will be detected, as the slivers of fish are examined and arranged closely by the chef during presentation on the bed of rice.

### Conclusions

The present study indicates that Australian consumers of sushi and sashimi are exposed on at least 25 million occasions annually to fish, which may contain anisakid worms or cysts at high prevalence and concentration. Despite this, there has been only one recorded case of anisakidosis in Australia.

Is the apparent lack of anisakidosis due to elimination of the hazard during processing and preparation? Or are there other factors in play, such as: underreporting and/or misdiagnosis because most infections are not severe, or the fact that there is no skin prick test for *A. simplex* available in Australia for allergic reactions, which results in confusion with fish allergies in general?

It is tempting to favour the former conclusion given the level of exposure via sushi and sashimi over a number of years, coupled with the fact that the only case to date involved whole fish consumed raw in a home setting. 



**Table 1. Mass of finfish potentially used for sushi and sashimi consumption in Australia**

	Production (t)	Assumed edible mass (t) (~70% tuna, 40% other species)	Proportion (%) consumed raw	Mass (t) consumed raw
<b>Bream</b>	1143	457	10	46
<b>Coral trout</b>	1076	430	10	43
<b>Mackerels</b>	1286	514	5	26
<b>Orange roughy</b>	534	214	10	21
<b>Tuna</b>	1888	1322	85	1123
<b>Totals</b>	<b>5927</b>	<b>2936</b>		<b>1259</b>

*Dr John Sumner (FAIFST) is an Adjunct Professor in the Tasmanian Institute of Agriculture at University of Tasmania; Ms Sutasinee Anantanawat, Dr Andreas Kiermeier and Dr Catherine McLeod undertook this work while research officer and program leaders, respectively, at SARDI Food Safety; Dr Shokoofeh Shamsi is senior*

*lecturer in Veterinary Parasitology in the School of Animal & Veterinary Sciences, Charles Sturt University, Wagga Wagga.*

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## GNT AND INVITA GROWING COLOURS TOGETHER

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# REVISED FOOD STANDARDS CODE

*On 1 March 2016, a revised Australia New Zealand Food Standards Code will come into place. What will change and what does it mean to you?*

Words by Peter May

The revised Australia New Zealand Food Standards Code (the Code) will replace the existing set of food standards that food businesses are required to comply with under state and territory laws.

The last revision of the Code was in 2001, when the joint Australia-New Zealand food regulatory system was established, and it made significant changes to the regulation of food in both countries. In contrast, the current revision does not change regulatory requirements, but provides a more accessible and effective set of standards by removing uncertainties that exist in the current Code.

The origins of the 2016 revision are in a New South Wales court case, in which a food business was prosecuted for failing to comply with requirements in the Code, relating to the labelling and composition of a food. In 2009, the Supreme Court of New South Wales delivered a judgement, in which the presiding judge commented on the legal effectiveness of the Code. In response, Food Standards Australia New Zealand (FSANZ) commissioned a review to identify areas in which the Code could be improved to ensure its effectiveness as a legal instrument.

Proposal 1025 (P1025) was initiated by FSANZ after extensive consultation with stakeholders in state and territory enforcement agencies and relevant Commonwealth departments in both Australia and New Zealand. The proposal process involved wide consultation with industry and regulatory bodies to ensure that any changes that were made to the Code were not only necessary, but also valuable.

## THE FOOD STANDARDS CODE

The Australia New Zealand Food Standards Code (the Code) is developed and administered by FSANZ and regulates the use of ingredients, processing aids, colourings, additives, vitamins and minerals. It also covers the composition of some foods, such as dairy, meat and beverages, as well as standards developed by new technologies, such as genetically modified foods.

Additionally, the Code is responsible for some labelling requirements for packaged and unpackaged food, such as specific mandatory warnings or advisory labels. The Code protects consumers through its food safety requirements, as well as through the restrictions it places on claims that can be made about the health benefits of food (health claims).

The Code is enforced in Australia by state and territory authorities, the Commonwealth Department of Agriculture for imported food and the Ministry for Primary Industries in New Zealand. One of the reasons for revising the Code, and a key goal for P1025, was to ensure it was more closely aligned with the food laws of the Australian and New Zealand governments and Australian states and territories, which rely on requirements to be clearly stated so they can be enforced effectively. The changes aimed to reduce uncertainty when it came to code enforcement issues and ensure that the Code remained a suitable and effective resource of food regulation.

While P1025 aimed to modernise the Code, it sought to do this without changing its intent and without causing major disruption for industry and other key stakeholders. So, while there was no transition period for the revised Code, stakeholders should not be concerned as the revisions have not changed the intent of the Code—which is to protect public health and safety and ensure that Australia and New Zealand have a safe food supply. In addition, much of the Code's overall structure has been retained.

The bulk of the changes to the Code are confined to chapters one and two, which provide both general and specific standards for food for sale. The food safety and primary production and processing standards have not been

revised. During consultation with industry, a strong preference was made clear that current standard numbers should be retained and in response, much of the current Code's structure has also been kept.

The changes that have been made include updating the wording to clarify key areas such as:

- Who needs to comply with the Code's requirements
  - Provisions relating to food additives, processing aids and nutritive substances
  - Food composition requirements (i.e. you can't call something jam if it has less than 400 grams of fruit per kilogram of the final product).
- Work on P1025 has also resulted in a comprehensive dictionary of

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defined terms being included for the first time, to help users navigate the Code more easily.

FSANZ approved the proposed Code revisions in December 2014. Shortly after, the ministers that make up the Australia and New Zealand Ministerial Forum on Food Regulation (the Forum) were notified of FSANZ's decision and early in February 2015, FSANZ was informed that ministers did not seek a review.

As a result, the revised Code was gazetted and published on 10 April 2015 and is available to view on FSANZ's website ([www.foodstandards.gov.au](http://www.foodstandards.gov.au)). In addition to publishing

the Code, FSANZ has provided tools to help current users of the Code identify how the current provisions are translated to the revised Code.

The new Code will be revised during 2015 to incorporate variations to the current Code made during the proposal process and which continue to be made (until the new Code comes into effect), and to correct minor errors. The purpose of these revisions is to ensure the revised Code accurately reflects the current code when it commences in 2016.

It is hoped that industry, other key stakeholders or anyone with an interest in the Code will take the time to not

only review the revised Code, but also use the resources produced by FSANZ, which aim to make the transition as easy as possible. It is also hoped that everyone who uses the Code will benefit from a clearer, easier-to-follow, and in-turn, easier-to-enforce Food Standards Code.

For more information on the Code, visit [www.foodstandards.gov.au/code/code-revision](http://www.foodstandards.gov.au/code/code-revision)

*Peter May is general manager of Legal and Regulatory Affairs at Food Standards Australia New Zealand.*

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## SERVING SIZE AND PACKAGING CUES: MIXED MESSAGES?

*Serving size is one of the last areas of food labelling where the food business can exercise some discretion under the Food Standards Code, but is this discretion being exercised wisely?*

**Words by** *Carla Degenhardt*

Food labelling in Australia is subject to extensive regulation. The intricate requirements set out in the Australia New Zealand Food Standards Code and the Trade Measurements Act, reflect the political interest and involvement in food regulation and policy.

The constraints of prescriptive regulation do not, however, lessen the overarching obligation on manufacturers to ensure that their packaging and labelling complies with the Australian Consumer Law and are not false, misleading or deceptive.

The Food Standards Code requires that nutrition information panels be included on the labels of packaged goods, with few exceptions. The formatting and content of the panel are described in detail, including the requirement that it includes the number of servings of the food in the package, and the nutrition profile on a 'per serving' basis, as well as per 100ml (for liquids) or 100g (for solid or semi-solid food).

The standard allows for the substitution of the word 'serving' with 'slice, pack or package' or 'metric cup/metric tablespoon' or other appropriate word or words expressing a unit or common measure.

The Code is otherwise silent as to how 'a serving' is to be determined, leaving that as a discretionary measure for manufacturers. This article will examine some examples of how sample size is being applied and whether consumers are getting useful information or mixed messages.

### **Serving suggestion and serving size**

Attractive depiction of a packaged food product served and ready to eat has long been a part of food packaging, as has the ubiquitous disclaimer 'serving suggestion'. However, the 'serving' depicted is sometimes vastly different to the 'per serving' stated quantity on the nutrition information panel.

The risk for manufacturers is ensuring that there is no inappropriate suggestion to consumers that a full bowl (as pictured) has an energy and nutrition profile 'per serve' (as listed). It is debatable whether such conduct could ever rise to the level of misleading or deceptive conduct under the Australian Consumer Law, though consistent variation between the depiction of a serve and a stated serve might invite regulatory attention or intervention.

### **Physical product and serving size?**

It is not too difficult to find items on supermarket shelves that cite 'fractional' servings, a consequence of nominating a serving size that is not a factor of the total product weight or volume – for example, a 120g packet of sweets with a nominated serving size of 25g (4.8 servings per pack), or a 420g pouch of soup with a nominated serving size of 250g (1.7 servings per pack).

Having a serving size that is incompatible with the presentation of the product may pose reputational risk. Consider Toblerone, the recipient of a *Choice* magazine “Shonky” award in 2012 for an incompatible serving size and product configuration. Toblerone packaging provides information for a 25g serving size across its product range. The distinctive ‘mountain’ portions of a Toblerone chocolate bar are, however, largely not factors of 25g. A 400g Toblerone chocolate bar is stated to contain 16 servings, although it has 15 segments. As a consequence, the nutritional profile of the nominated ‘serve’ is around seven per cent lower than each piece of chocolate in the bar. While the reporting of this situation was lighthearted, it invites unflattering commentary which a manufacturer might wish to avoid.

### Physical packaging and serving size

Soft drink manufacturers often adopt fluctuating serving sizes which reflects the way the product is most likely to be consumed – i.e. whether the product is presented for a single person or multiple person consumption. For instance, a serve may be 375ml for a can or 600ml for a single serve bottle, or multiple 250ml serves in larger format bottles. Adapting the serving size in this way is providing more meaningful information to a consumer than maintaining a single set serving size across different volume products.

### Serving size and other product claims

Serving size has long been relevant to certain claims about a product. For example, a particular serving size might be selected to enable a claim to be made such as “half your daily iron requirements in one serve”.

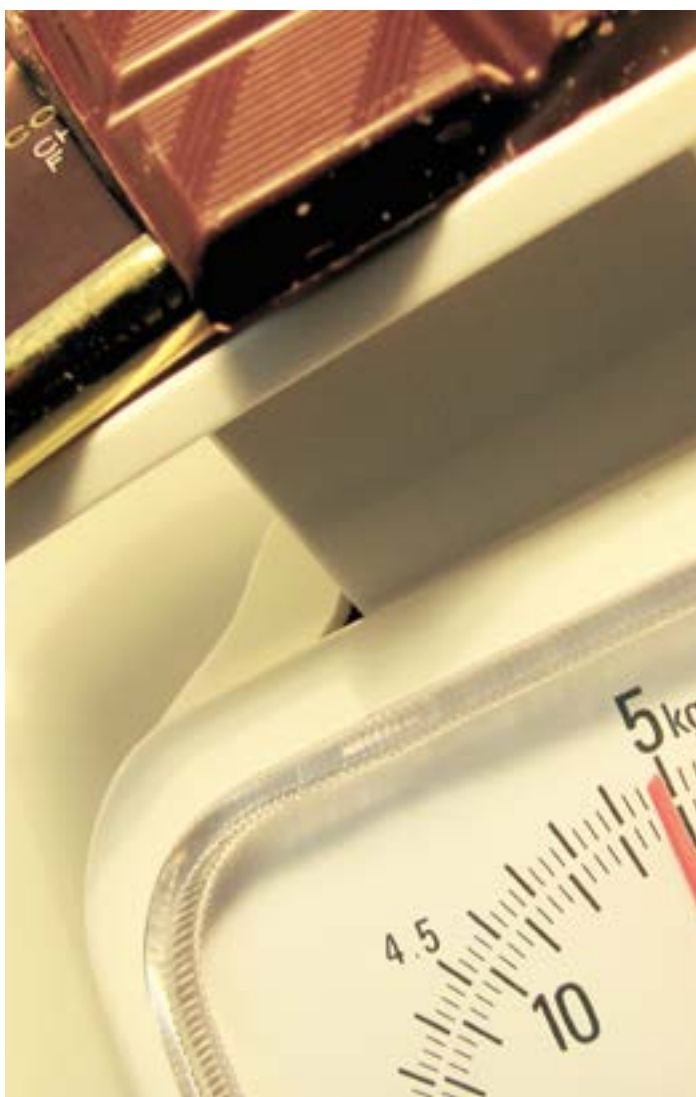
With increasing recent focus on promoting the recommended five daily serves of vegetables, some products have claims regarding the vegetable content such as “x serves of vegetables per pack”. The challenge in making ‘per pack’ claims is where the nutrition information panel indicates that the pack has more than one serving. Making ‘per pack’ claims when otherwise claiming multiple serves per pack could be confusing and open to criticism.

### Serving size parity

What about setting a serving size that favourably compares to a competing product on a ‘per serving’ basis?

Consider two competing snack foods that are identically shaped and sized (one private brand, one home brand) which each adopt front-of-pack nutritional information on a per serve basis. The private brand snack food is less calorific than the home brand product, but the private brand nominates each pack to have 25g servings compared to the home brand’s 20g servings. However, in reality, the private brand product is, say, five per cent less calorific; the different serving sizes on the front-of-pack information suggests that the private brand is 120 per cent more calorific. A consumer making a quick visual comparison of the products may be influenced to select the home brand product as it appears, from the front of the pack at least, to be less energy dense despite that not being the case.

This is likely best addressed by manufacturers on a case-by-case basis, depending on the nature of the competitive forces at




play between different products. That is, how great a risk the competing product is perceived to be, and whether adapting consistent serving sizes (in this scenario, by the private brand) would have any material impact on sales.

### Best practice

Looking at these scenarios, it is not hard to see that consumers might sometimes be baffled by ‘serving size’ and consequentially make poor choices. A consistent focus on providing meaningful and clear information to consumers about how much of a particular food should be consumed will result in best practice. This could be as simple as going beyond the basic regulatory requirements to provide context as well as weight or volume to describe a serving size – for example, 15g (two biscuits) or 30g (half a cup).

Otherwise, it will be interesting to see whether these sorts of challenges regarding serving size nomination continue, or change if the Health Star Rating is broadly adopted.

Regardless, in the current political and regulatory environment, it is in the interest of food manufacturers to ensure serving sizes are contextually appropriate to avoid legal, reputational or commercial challenges at a product level, or even more regulation at an industry level. 

*Carla Degenhardt is special counsel at Watermark Intellectual Asset Management.*

## MARKET DEVELOPMENT MANAGER

Food Innovation Australia Limited (FIAL) is seeking a Manager to lead and facilitate connectivity and collaboration between businesses, food supply chain participants and government service providers in the food and agribusiness industry to take advantage of market opportunities in local and overseas markets.

FIAL is an industry-led, government-funded initiative to accelerate commercially driven collaboration and innovation in the Australian food and agribusiness industry. FIAL is helping to establish the Food and Agribusiness Growth Centre in partnership with Mr Peter Schutz, Chairman of the new Growth Centre. The Industry Growth Centre initiative is a \$188.5 million Australian Government investment and is part of the Industry Innovation and Competitiveness Agenda. This initiative aims to lift competitiveness and productivity by focusing on five areas of competitive strength of which food and agribusiness is one. Further details can be obtained about the initiative from the following link.

[www.business.gov.au/advice-and-support/IndustryGrowthCentres/Pages/default.aspx](http://www.business.gov.au/advice-and-support/IndustryGrowthCentres/Pages/default.aspx)

Reporting to the General Manager Market Development, the successful candidate will identify, develop and lead collaborative projects between businesses and other important stakeholders like government service providers in the food and agribusiness industry to enable businesses to take advantage of market opportunities in local or overseas markets. The ideal candidate is someone who has held a national sales or key account management role in the food and agribusiness industry, and fully understands the supply chain and particularly supplier-buyer behaviour in Australia.

The position is a full-time role for 4 years, based in Melbourne and the candidate must be able to travel as this role has a national focus.

Manager Market Development will be an proven and upcoming commercial leader in the food and agribusiness industry who has:

- Successfully demonstrated commercial and sustainable results for a business;
- Strong business development experience in local markets;
- Thorough understanding of Australian food and agribusiness markets, particularly retail and foodservice;
- Experience developing and applying consumer insights to improve access to markets;
- Strong understanding of the food and agribusiness processing supply chains;
- Working understanding of and established professional networks with businesses (SMEs/MNEs) and government; and
- 5+ years commercial experience working in either SMEs or MNEs

Candidate will have a passion for business innovation and are solution providers. They must have excellent project management skills; strong presentation and written communication skills encompassing PC skills. Proven ability to bring parties together to work on projects of common interest like a trade event or workshops is mandatory. They must be a team player as well as be able to work independently with limited resources. A background in food, agribusiness or a related discipline would be advantageous, and ideally they will have a degree in business, commerce or marketing.

**For further information on the role please call 03 9479 6043 or forward any queries or questions with ATTN: FIAL Managing Director to: [info@fial.com.au](mailto:info@fial.com.au).**

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## INNOVATION MANAGER

Food Innovation Australia Limited (FIAL) is seeking a Manager to lead innovation projects that assist food and agribusinesses and researchers to collaborate; share knowledge; deploy new technology; and create products or services that take advantage of market opportunities in local and overseas markets.

FIAL is an industry-led, government-funded initiative to accelerate commercially driven collaboration and innovation in the Australian food and agribusiness industry. FIAL is helping to establish the Food and Agribusiness Growth Centre in partnership with Mr Peter Schutz, Chairman of the new Industry Growth Centre. The Industry Growth Centre initiative is a \$188.5 million Australian Government investment and is part of the Industry Innovation and Competitiveness Agenda. This initiative aims to lift competitiveness and productivity by focusing on five areas of competitive strength of which food and agribusiness is one. Further details can be obtained about the initiative from the following link.

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Reporting to the General Manager Innovation, Capabilities and Skills, the successful candidate will identify, develop and lead collaborative projects between businesses and other important stakeholders like researchers and government service providers in the food and agribusiness industry to enable businesses to take advantage of market opportunities in local or overseas markets. The ideal candidate is someone who has held an innovation role within a business and thrives on creative solutions to complex challenges but has excellent attention to detail to complete projects on time and of highest quality.

The position is a full-time role for 4 years, based in Melbourne and the candidate must be able to travel as this role has a national focus.

**For further information on the role please call 03 9479 6043 or forward any queries or questions with ATTN: FIAL Managing Director to: [info@fial.com.au](mailto:info@fial.com.au).**

**To apply for the position, please send a covering letter outlining your suitability and resume to the following email address: [info@fial.com.au](mailto:info@fial.com.au)**

Manager Innovation will be a proven and upcoming innovation leader in the food and agribusiness industry who has:

- Skilfully translated science into commercial benefit for a business
- Experience in open-innovation and continuous improvement in businesses
- Exposure to developing and applying consumer insights to improve products or services to access markets
- Delivered innovation projects in a research organisation, university or business
- Demonstrated experience in designing collaborative projects, courses or training
- A working understanding of food and/or agribusinesses and food research institutions
- Established professional networks with business (SMEs/MNEs), researchers, educational institutions and government; and
- Training and skills development and/or training package experience in either VET or Tertiary education is a bonus
- 7-10 years working experience as a scientist and/or manager ideally in a business

Candidate will have a passion for business innovation and are solution providers. They must have excellent project management skills; strong presentation and written communication skills encompassing PC skills. Proven ability to bring parties together to work on projects of common interest like a trade event or workshops is mandatory. They must be a team player as well as be able to work independently with limited resources. They must have a PhD degree in food, agriculture or related discipline as a minimum. Other qualifications like a MBA would be beneficial.



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## PALM OIL PRODUCTION SYSTEMS

*A new model for oil palm cultivation has been developed in an effort to help growers maximise yields, while minimising detrimental environmental impacts.*



The worldwide demand for palm oil has been growing over the past few decades at a rate of over seven per cent per annum. Palm oil's versatility has made it one of the top 17 fats and oils sources in the world, and it is now cultivated on more than 16 million hectares of land.<sup>1,2</sup>

While industry demand for palm oil grows, there is increasing concern about the environmental impacts of production and many buyers want certified sustainable oil.

In order to help growers maximise productivity while minimising detrimental environmental impacts,

CSIRO, in partnership with PNG Oil Palm Research Association and James Cook University, has developed a research-based management model. The model, which was recently published in the journal, *Environmental Modelling & Software*, uses the internationally recognised APSIM (Agricultural Production Systems sIMulator) framework.<sup>1</sup>

While agricultural systems models are regularly used in sustainable crop management, until the development of the APSIM Oil Palm System, none had been available for palm oil systems.

The APSIM framework is designed to simulate biophysical process in farming systems where there is interest in the economic and environmental outcomes of management practice in the face of chronic risk, climate change or changes in policy. Models are available for over 30 crop, pasture and tree species.

According to Dr Paul Nelson, a senior lecturer in the College of Science, Technology and Engineering at James Cook University in Cairns, APSIM is the gold standard for simulating crop systems.

"APSIM enables the simulation of systems that cover a range of plant,



animal, soil, climate and management interactions. APSIM is undergoing continual development and it's underpinned by rigorous science and software engineering standards.

"By applying APSIM Oil Palm, producers will be able to evaluate effects of their soil type, climate and management on their water balance, nutrient balance, soil organic matter and greenhouse gas emissions."

The APSIM Oil Palm was developed to calculate growth, development, resource use and organic matter flows for the plant, and to communicate this information to the other models within the simulation.

"APSIM Oil Palm can be used in on-farm decision making and in assessing risk, yield forecasts and government policy, as well as providing a guide to research and education," said Dr Nelson. "It's a valuable tool which was not previously available to oil palm growers.

"Like any computer modelling exercise, the outcome depends on good

quality data, which has previously been a problem for many oil palm growing areas. For this study we used large data bases on soil and climate from three sites in Papua New Guinea.

"We plan to test its applicability in other areas as more localised information becomes available," Dr Nelson said. "This is a highly detailed model which involved simulating the growth of oil palm fronds, stems, roots and fruit bunches, and accounting for variations in soil, light, rainfall and temperature."

The main finding from the work was that model coding and development are not a major limitation for developing farming systems models for new production systems. Agricultural models can be developed and tested in new production systems and developing countries. The researchers suggest that further collation and testing of climate data, and gathering of soil information is required.

It is hoped that the participants (12 from Indonesia, three from France,

two from Colombia and one each from Liberia, Malaysia and Netherlands) will use and further develop the model to help improve sustainable production of this important crop. 📧

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# GRAINS & LEGUMES CONSUMPTION SYMPOSIUM

*Research has found that many Australians are not adopting public health advice about the importance of eating grains and legumes as part of a healthy diet.*

Words by *Chris Cashman*

Last April, the Grains & Legumes Nutrition Council (GLNC) hosted a symposium that explored the latest research on Australians' consumption of grain foods and legumes and insights into the drivers behind recent trends.

Delegates from the food industry, academia, public health, practising health professionals and the media were presented findings from three recent national studies. Each study demonstrated that Australians, particularly young women, are falling short of their Australian Dietary Guidelines recommended intakes of core grain foods and legumes.

## 2014 Grains and Legumes Consumption and Attitudinal Study

Michelle Broom, general manager of GLNC, presented findings from the 2014 Australian Grains & Legumes Consumption & Attitudinal Study<sup>1</sup>, a nationally representative survey commissioned by GLNC to track consumption and to understand Australians' attitudes towards grain foods and legumes, dietary recommendations and the barriers to meeting dietary recommendations.

This is the third national survey conducted by GLNC and consumption data from over 3000 Australians aged two to 70 years was collected, based on a two-day food diary and an online survey.

Attitude and awareness responses

## Average Intakes of Core Grain Foods Compared to Recommendations.

	Recommended serves	Males	Females
2-8 years	4	3.1	3.1
9-13 years	4-6	4.0	4.0
14-18 years	7	3.8	4.4
19-30 years	6	10.7	4.1
31-50 years	6	5.8	2.4
51-70 years	4 (women) 6 (men)	5.4	3.0

were also collected for over 2200 Australians aged 15-70 years. Data was post stratified and weighted by age, gender and location by the Australian Census data to ensure the study was representative.

The key findings from the 2014 Australian Grains & Legumes Consumption & Attitudinal Study included:

1. The proportion of people eating core grain foods\* has remained constant
2. The amount of core grain foods people are eating has reduced with a drop in average daily serves by almost one-third (29 per cent) between 2011 and 2014
3. Many Australians are not meeting the Australian Dietary Guidelines minimum recommendations for daily core grain serves

4. Lower consumption of grains appears to be driven by widespread misconceptions and a lack of understanding about the health benefits of core grain foods
5. Common reasons provided by survey respondents for grain avoidance were to assist with weight loss and a perceived link between grain foods and bloating
6. Over the past five years, Australians have become more confused about quality grain food choices, with fewer people able to identify whole grain and high-fibre grain foods
7. Young women (aged 19-30 years) are a key group in Australia who are actively limiting core grain food consumption with little awareness of the health impacts of their behaviours

\*Core grain foods include breads, breakfast cereals, crispbreads, rice, pasta and noodles and excludes discretionary grain food choices such as cakes, biscuits, pastries and bars which are higher in added salt, sugar or fat.

## ONE SERVE EQUALS



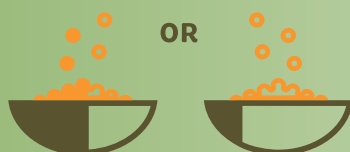
1 slice of whole grain bread or  
½ a whole grain / wholemeal  
roll or ½ a flat bread (40g)



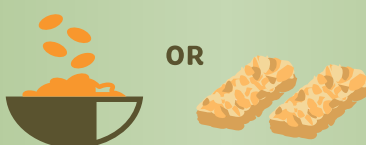
½ cup of cooked whole grain  
i.e. brown rice, rye, bulgur, millet,  
barley, oats, buckwheat or quinoa.



½ cup of cooked wholemeal  
pasta, noodles or  
whole grain couscous



½ cup of cooked porridge  
or ¼ cup muesli



⅔ cup (30g) whole grain and  
high fibre breakfast cereal  
or 2 whole grain breakfast  
biscuits (30g)



3 whole grain  
or high fibre  
crispbreads  
(35g)



30g popcorn  
(plain)

8. Discretionary grain food consumption remains an issue with 81 per cent of people eating discretionary grain foods on either or both days of the survey – an increase from 76 per cent in 2011.
9. More than two-thirds (70 per cent) of adults are not meeting the Australian Dietary Guidelines recommendation of consuming mostly whole grain, and 55 per cent are not meeting the whole grain Daily Target Intake of 48 grams, increasing their risk of chronic disease
10. Most survey respondents (64 per cent) did not think to regularly include legumes in their meals
11. 35 per cent of Australians reported eating legumes at least two to three times per week, meaning many Australians may be missing out on the essential nutrients and other health benefits of legumes

Overall, the 2014 Australian Grains & Legumes Consumption & Attitudinal Study suggests that Australians are not adopting public health advice about the importance of consuming grains and legumes as part of a balanced diet.

### 2011-12 National Nutrition and Physical Activity Survey

Chris Cashman, nutrition project officer of the GLNC, presented findings from

the 2011-12 National Nutrition and Physical Activity Survey (NNPAS) on the links between consumption of grains and legumes and nutrient intakes as well as weight measures.

The NNPAS is the first national nutrition survey conducted by the Australian Bureau of Statistics (ABS) since 1995. Between 2011 and 2012, over 12,000 Australians participated in the survey providing information on dietary intake (24-hour recall), weight measures, food avoidance, selected medical conditions and physical activity levels. In addition, 7700 (63.6 per cent) of these people were followed and provided a second day of dietary intake data.

Findings published by the ABS demonstrate the important nutrient contribution grain foods make within the Australian diet as grain foods were the primary contributors of fibre, folate, thiamine, iron, magnesium, iodine and carbohydrates. Notably, grain foods delivered 44.5 per cent of Australians' total daily fibre, compared with 18.8 per cent and 15 per cent from vegetables and fruit respectively.<sup>2</sup>

When it came to discretionary choices, on average these foods contributed 35.4 per cent of the daily energy intake of Australians. More specifically, 28.6 per cent of the

energy from total grain foods was from discretionary grain choices. This highlights that on average Australians are following recommendations to limit discretionary choices.<sup>2</sup>

Results of a secondary analysis of the NNPAS commissioned by GLNC were also presented, which profiled the nutrient intake and weight measures of Australians based on their core grain and legume food intakes.<sup>3</sup> While core grain foods were eaten by 94.8 per cent of Australians on the day before the survey, this survey is consistent with the findings that on average Australians were falling short of the Australian Dietary Guidelines minimum recommended daily core grain serves, in every age and gender group (except for women over 70 years).

Moreover, this study again highlights that young women (19-50 years) are at higher risk of not meeting core grain recommendations, each falling under 2 ½ serves (equivalent to 2 ½ slices of bread) of the Australian Dietary Guidelines recommended daily serves of core grain foods.

Just as the majority of Australians are falling short of core grain recommendation, Australians are also missing out on the potential nutrition and health benefits of legumes, with only 7.9 per cent of Australians



reporting eating legume foods on either day of the survey.

Higher core grain serves and legume consumption were linked with higher intakes of all nutrients as well as dietary fibre and energy. Despite higher reported energy intakes, on average Australian consumers eating six or more daily core grain serves and legumes, had smaller waist circumferences compared with lower core grain consumers and non-consumers of legumes respectively.

Further analysis is needed to adjust for potential confounders; however, trends observed from the NNPAS re-support the important contribution core grain foods make towards diet quality and health measures, reiterating that Australians are not meeting dietary recommendations for core grain foods and legumes.<sup>2,3</sup>

### Australian Longitudinal Study on Women's Health

Danielle Schoenaker, PhD candidate from the University of Queensland, presented findings from the Australian Longitudinal Study on Women's Health, an ongoing population-based study that commenced in 1996. Dietary intake obtained from a food frequency questionnaire was used to evaluate adherence to the Australian Dietary Guidelines for grains and legumes, as well as investigate factors associated with the adherence in young Australian women aged 25-30 years.<sup>4</sup>

Dietary intake from over 7200 women and 1700 pregnant women, suggests that only 11.2 per cent of women 25-30 years attained their recommended six serves of core grain foods, whereas the higher recommended intake of 8½ serves was only reached by 3.1 per cent of pregnant women.

While this study did not specifically assess legumes intake, less than two per cent of young and pregnant women attained the guideline of five daily serves for vegetables (includes legumes). This highlights the opportunity for young women to boost their vegetable intake by aiming to enjoy legumes more often.

It was identified that feeling rushed and busy was a leading factor contributing towards low adherence to the Australian Dietary Guidelines core grain serve recommendations (only eight per cent of those who felt rushed and busy met grain food recommendation compared with 14 per cent who did not feel rushed and busy) and vegetable (includes legumes) serve recommendations (one per cent versus two per cent). Lower education (nine per cent vs 15 per cent) and living with a partner and children (eight per cent vs 13 per cent), were also identified as factors associated with low adherence to dietary recommendations.

This study corresponds with findings from GLNC's 2014 Australian Grains & Legumes Consumption & Attitudinal Study and the 2011-12 NNPAS which demonstrates young women are falling well short of core grain food recommendations. These findings emphasise that targeted dissemination of dietary guidelines is needed to encourage young women to transform their diet to meet recommendations for grains, vegetables and other food groups. Such dietary messages should be accompanied by advice to limit consumption of discretionary choices in preference of core foods to maintain energy balance.

### What's driving consumption patterns in Australian women?

Sarah Hyland, research director at Colmar Brunton, utilised findings from GLNC's 2014 Australian Grains & Legumes Attitudinal Study as well as a wealth of consumer insights from her background in food and beverages market research, to explore young women's attitudes towards grain foods and legumes, their health concerns and the nature of the influences and messaging that shape their attitudes towards food and nutrition.

Attitudinal responses from the study<sup>1</sup> reiterate consumption data and indicate more women than men actively limit total grain consumption, with women aged 18-30 being among those most likely to report limiting their grain

intakes. The most common reasons women avoided grains included to prevent bloating (54 per cent), to assist with weight loss (46 per cent) and a lack of understanding of the health benefits (12 per cent); as well as concerns about preservatives/additives (27 per cent) and genetic modification (17 per cent).

The avoidance of total grains is closely linked with many young women avoiding certain food types (i.e. bread or wheat) or nutrients (i.e. carbohydrates or gluten), in order to achieve perceived weight loss benefits and improved health.

In 2014, 11 per cent of Australians aged two to 70 years avoided wheat; however, this proportion was 15 per cent in young women 19-30 years. In the group of women avoiding wheat, the majority (61 per cent) were also avoiding gluten. Educated young women who reported experiencing digestive symptoms were most likely to report wheat and gluten avoidance.

The heightened awareness of key foods or nutrients and avoidance of grains is likely a reflection of the barrage of messages being targeted at young women in the media. Citing numerous examples from mainstream media as well as social media, Ms Hyland highlighted the mixed dietary messages young women are exposed to in health magazines, such as new 'fad' diet books, celebrity endorsed diets and non-nutritionist diet bloggers or 'food activists'.

With over 15 years' experience in insights, Ms Hyland is now observing a blurring of what Australians, particularly young women, consider 'healthy foods'. Consumers have become increasingly confused about what constitutes a sound, healthy and sustainable diet and exactly which grains, fruits and vegetables they should eat. This confusion is being driven by the range of unsubstantiated and often contradictory views of food and nutrition in the media.

Today, Australians exposed to such mixed messages are questioning key tenants of healthy eating, including evidence-based dietary guidelines that

support the important nutrition and health benefits of grains (mostly whole grain and high fibre) and legumes.

To educated misinformed Australians and maintain an educated mainstream, Ms Hyland emphasised that simple evidenced-based messages are essential. She reinforced the need for continued clear and consistent food labelling and encouraged mainstream media to seek credible evidenced based sources of nutrition information.

### Sanitarium case study: food product development in response to changing consumer needs

Alex Garas, Weet-Bix senior brand manager, closed the symposium by outlining the story of how Sanitarium developed Gluten Free Weet-Bix in response to changes in Australians' consumption and attitudes at the breakfast meal occasion.

Gluten Free Weet-Bix is a significant innovation that represents Sanitarium's ongoing commitment to offering a variety of nutritious breakfast options that meet the needs of consumers and their dietary requirements. It was designed in response to a growing need for gluten-free core grain foods.

Gluten Free Weet-Bix has been developed for people with coeliac disease and people who have been advised by a health professional to avoid gluten or wheat can enjoy a great-tasting, nutritious whole grain breakfast.

Gluten Free Weet-Bix is made with Australian-grown sorghum grains, which are naturally gluten-free, and has a 96 per cent whole grain content. It is a good source of iron, high in folate and vitamins B1, B2 and B3 as well as being a source of dietary fibre.

The challenge was to produce a Weet-Bix product that tastes very similar to Weet-Bix Original, and like Weet-Bix Original, is also low in sugar. To do this, Sanitarium recommissioned an entire Perth-based Weet-Bix factory into a dedicated gluten-free manufacturing site. 🍷

*Chris Cashman is an accredited practising dietitian and the nutrition project officer at the Grains & Legumes Nutrition Council.*

### References:

1. GLNC. "2014 Australian Grains and Legumes Consumption and Attitudinal Report." Unpublished: 2014.
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3. GLNC. "Secondary Analysis of the National Nutrition and Physical Activity Survey 2011-2012." Unpublished: 2014.
4. Mishra GD, Schoenaker DA, Mihrshahi S, Dobson AJ. "How do women's diets compare with the new Australian dietary guidelines?" Public health nutrition. 2015;18 (02):218-25.

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# INVESTMENT IN AUSTRALIAN AGRIBUSINESS

*Australia's \$2 trillion in superannuation savings represent a significant investment force. So, how much of this is being invested in Australian agribusiness?*

Words by David Krause

## The agriculture sector

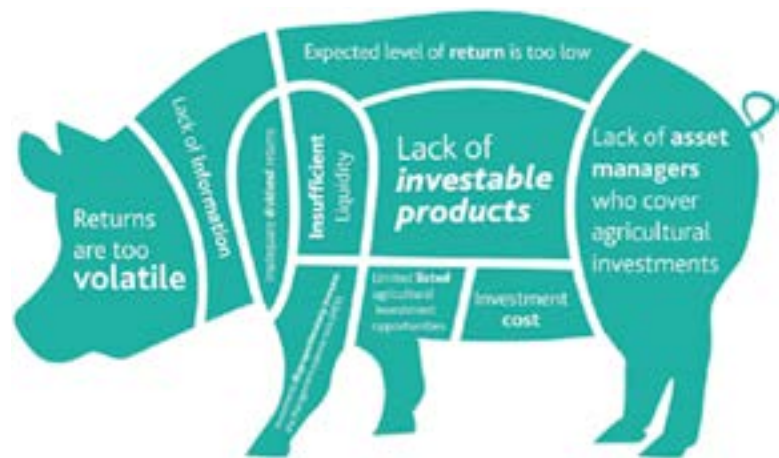
Agriculture plays a major role in the success of our economy and very importantly, our growth as a nation. The industry represents approximately 12 per cent of Australia's gross domestic product, generating over A\$145 billion annually and A\$32 billion in exports. This is a significant figure and will only continue to grow as world demand for agricultural products continues to increase. To ensure the industry is well placed to meet this growing demand, Australian agriculture requires active investment at both a domestic and international level.

## Superannuation investment

In Australia, superannuation funds represent a significant investment force, with total asset value amounting to \$1.93 trillion as of 31 December 2014, according to official figures from the Australian Prudential Regulation Authority.

Although the past few years have seen a growth in institutional investment in Australian agriculture in general as institutions look to increase their allocation to alternative assets, superannuation funds have not been a significant component of this trend.

In the first survey of its kind, BDO, in conjunction with the University of Queensland, assessed exactly how much capital is being invested in agricultural products. The 2014-15 study, *An Analysis: Australian Superannuation Funds Investment in Agriculture*, revealed that less than 0.3 per cent of MySuper assets are in the agribusiness sector as of 30



June 2014. MySuper offerings already constitute about one-third (30 per cent) of Australian Prudential Regulation Authority regulated superannuation capital and this proportion is expected to increase over the next few years, given the government's support for this investment strategy.

For that reason, it's telling that so few MySuper investments are focused on the agribusiness sector. The MySuper funds with the greatest exposure to Australian agriculture had only one per cent of their assets put toward these products. These funds were slightly more likely to invest in overseas agribusiness – if only marginally more – with 0.35 per cent put toward these foreign investments.

For Choice funds, the numbers weren't much different. The average amount invested in Australian agriculture in 2014 was 0.37 per cent, with 0.4 per cent put toward foreign agribusiness opportunities.

What's going on? The average target

allocation for agriculture investment was slightly higher than the actual activity, but still extremely low. For MySuper funds, the survey respondents had a goal of investing around 1.27 per cent of their assets in this industry, with the maximum target levelling out at a meagre two per cent. As such, the data indicated a general lack of interest or desire to put funds toward these types of investments.

## Reasons for bias

Our survey respondents gave us some great insight into the reluctance superannuation funds have towards investing in Australian agriculture. Although the sector is promising and could provide an attractive option to fund managers, there are a number of reasons why investment levels remain low.

The most important reasons noted are the lack of investable products and the lack of asset managers. Rates of return, cost of investment and volatility are also very relevant, although secondary to the investment opportunities provided by

the Australian agriculture.

One of the key challenges is the lack of institutional offerings or products available that allow a ready investment for fund managers. Because funds have limited budgets in their active management, the cost of exploring agricultural investments would often exceed these budgets.

Given that the funds do not conduct industry research on the sector, it is not surprising that the perception of agricultural investments is that they are illiquid, volatile and do not provide the required risk return. However, this is exactly where the opportunity may be. According to one survey respondent, "The agricultural sector is a highly inefficient, mostly fragmented market with low liquidity and a need for active management. These conditions have historically presented the best opportunities to extract value add."

### Comparing foreign and domestic interest in agribusiness

Despite this low level of activity from superannuation funds, this is not to say the industry doesn't hold high potential for investors. Foreign fund managers have demonstrated more interest in Australian agribusiness opportunities than their domestic counterparts, and both land value and stocks have performed well over time.

With globalisation breaking down national and economic borders and free trade agreements that promote more activity between countries,

foreign investors are increasingly likely to look into Australian investment opportunities. The frequent yields they can enjoy in Australian markets are often better than the prospects they have at home. Companies from China, for instance, might also be drawn to Australia because they can actually own land here.

For those reasons, we're seeing more investment in agribusiness from entities abroad. This foreign direct investment (FDI) should be encouraged, where the terms are beneficial for all parties, but we need to think about why Australian institutions aren't seeking the same promising opportunities in agriculture. Overseas entities are diversifying their portfolios by doing so, but Australian superfunds tend to be risk averse and disinterested in the sector.

As a whole, Australian agribusinesses require investment of all forms to operate on a global scale, grow their business and stay competitive. On the flip side, Australian superfunds will need to consider their allocations over the coming years to remain competitive and sustainable in the future, especially as foreign funds enter the market.

### Delivering value

The Australian agriculture sector is dynamic and constantly evolving. It provides an exciting investment opportunity for superannuation fund investment if companies deliver proven value. For agricultural companies to successfully invite potential superannuation fund investment, careful

and robust strategic plans must be designed, implemented and executed. Demonstrating value to superannuation fund managers is vital and each company must assess how these exciting opportunities fit within their own business strategy.

### Changing perceptions

To raise capital, particularly from domestic sources, agricultural enterprises need to focus on ways to make their companies more visible and appealing to fund managers. This can be done in a number of ways:

- Every enterprise is different. Companies should work with food and agribusiness advisors to develop tailored investment proposals.
- Companies could evaluate other strategies to attract interest – for instance, listing on the Australian Stock Exchange. This may prove ideal for some enterprises as fund managers identified the lack of listed assets as a primary reason for not investing in agriculture.

BDO's superannuation research illustrated just how big the gap is when it comes to super funds investing in agribusiness. It's time for both the agriculture industry and fund managers to take a look at why this activity isn't taking place, and to consider ways to capitalise on the opportunities they may have.

*David Krause is national leader of food and agribusiness at global audit, tax and advisory firm, BDO.*

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# NUTRITION WATCH

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

Words by Dr Ramon Hall



## Flaxseed may help reduce blood pressure

In a study conducted at Griffith University in Queensland, researchers have investigated the effect of flaxseed consumption on blood pressure (Khalesi *et al.*, 2015). The research team undertook a systematic review and meta-analysis of controlled trial, with the aim of better understanding whether flaxseed consumption impacts on blood pressure and to determine if there is any influence of baseline blood pressure with the type of flaxseed consumed or the duration of flaxseed supplementation.

The systematic review included a total of 11 studies which contained 14 trials where humans were supplemented their normal diets with flaxseed or its extracts such as lignans, oil or fibre for a duration over two weeks. A random-effects meta-analysis was conducted using the mean difference in blood pressure.

The results of the meta-analysis revealed that flaxseed supplementation

significantly reduced both systolic and diastolic blood pressure on average by -1.77mm Hg and -1.58mm Hg respectively. Categorisation of participants with higher blood pressure ( $\geq 130$  mm Hg) did not suggest a greater effect in these individuals.

Further subgroup analysis did reveal that there was greater improvement in reductions in diastolic blood pressure with the consumption of whole flaxseeds (-1.93 mm Hg) and also when flaxseeds were consumed for greater than 12 weeks (-2.17 mm Hg). Given the large variety of form and doses of flaxseed provided across the studies, a dose-dependency analysis of the effect of flaxseed on blood pressure was not conducted.

The authors concluded that “overall this meta-analysis suggests that consumption of flaxseed for a duration of 3-48 week may reduce BP. The magnitude of improvement is greater if flaxseed is consumed as a whole seed

for  $\geq 12$  wk”. The authors also suggested that future research is necessary to understand more about the effects of different sources and doses of flaxseeds and the duration of consumption required to achieve results in different populations. Although the authors acknowledge that the reductions in blood pressure are small, they suggest that important public health and cardiovascular benefits can result from small reductions in blood pressure.

The results of this study may be of interest to developers of health foods and supplements aimed at health-conscious consumers looking for blood pressure benefits.

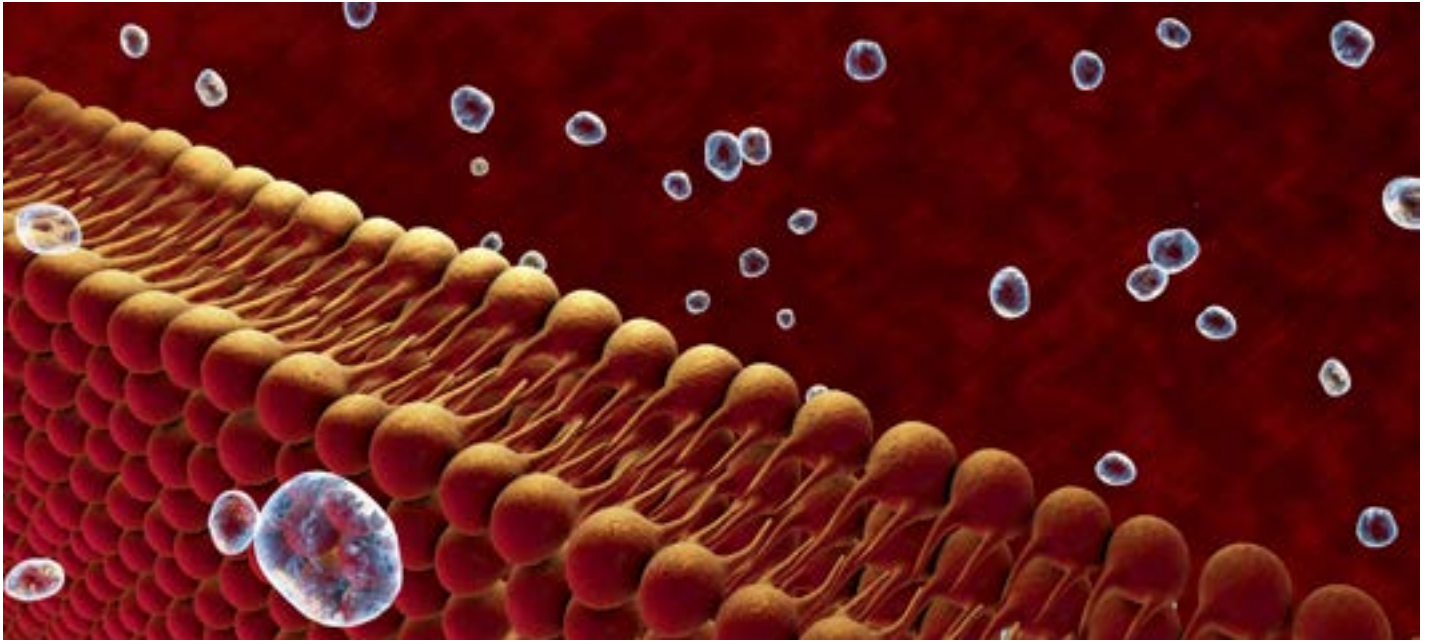
Khalesi *et al.* (2015) “Flaxseed Consumption May Reduce Blood Pressure: A Systematic Review and Meta-Analysis of Controlled Trials.” *The Journal of Nutrition*, 145, 758-65, (doi:10.3945/jn.114.205302).

## Effect on gastrointestinal functioning with lipid emulsions

Researchers from the Division of Gastroenterology and Hepatology at the University Hospital Zurich, Switzerland, have undertaken a study to visualise and influence the intragastric stability of fat emulsions related to gastric processing and structuring, as well as the influence on gastrointestinal motor and secretory functions (Steingoetter *et al.*, 2015).

In a double-blind randomised controlled crossover design trial, 18 healthy subjects were studied on four separate occasions. Four different fat emulsions were consumed and studied using magnetic resonance imaging (MRI) of the gastrointestinal tract and blood triglycerides were measured before and for four hours postprandially. The four distinct lipid emulsions were: lipid emulsion 1 (LE1; acid stable,  $0.33 \mu\text{m}$ ); lipid emulsion 2





(LE2; acid stable, 52  $\mu\text{m}$ ); lipid emulsion 3 (LE3; acid unstable, solid fat, 32  $\mu\text{m}$ ) and lipid emulsion 4 (LE4; acid unstable, liquid fat, 38  $\mu\text{m}$ ).

The study results indicate that intragastric emulsion instability is associated with changes in gastric emptying, with the two acid unstable emulsions showing a faster emptying profile than the two acid stable emulsions. It was also observed that the two acid unstable emulsions exhibited a biphasic emptying profile. Comparing the two acid stable emulsions, a difference in droplet size between LE1 (0.33  $\mu\text{m}$ ) and LE2 (52  $\mu\text{m}$ ), resulted in a delayed gastric emptying of 38 minutes. Also, both acid stable (LE1 and LE2) and the dispersible (LE4 liquid fat) emulsions all resulted in a constant rise in blood triglycerides but this was not observed for LE3 (acid unstable, solid fat) emulsion. The MRI scans were able to confirm that the LE3 (acid unstable, solid fat) emulsion generates large fat particles during gastric processing which progress to the small intestine.

The authors conclude that “semi-quantitative MRI allowed the *in vivo* fate of lipid emulsions to be followed in detail in both the stomach and intestine by using water and fat-selective MR imaging. This technique not only revealed information of the complexity of food structural transformation as a result of iteration within the digestive tract, but also gave insight into the mechanical breakdown and

re-emulsification of lipid droplets via trituration and peristaltic activity”.

It is of interest how each of the different lipid emulsion preparation had its unique behavioural pattern during gastric processing. The learnings from these model emulsions can potentially be applied to lipid containing emulsion based foods and a potential new offering could be developed, taking on features of these model emulsions for physiological benefits (i.e. enhanced satiety, reduced gastric emptying and nutrient delivery systems).

This study should be of interest to manufacturers of lipids containing foods products and for new product developments that require altered lipid delivery.

Steingoetter *et al.*, (2015) Imaging gastric structuring of lipid emulsions and its effect on gastrointestinal function: a randomized trial in healthy subjects. *American Journal of Clinical Nutrition*, 101; 714-24, (doi: 10.3945/ajcn.114.100263).

### **Cheese ripening may impact on markers of insulin sensitivity**

A study team from both University of Copenhagen and Aarhus University, Denmark, have investigated the effects of cheddar cheese ripening on risk markers of type 2 diabetes and metabolic syndrome in the growing pig model (Thorning *et al.*, 2015).

Earlier meta-analyses of observational studies have found that cheese consumption is inversely associated with risk of type 2 diabetes and metabolic syndrome, and therefore the research team was interested in understanding

whether some of the bioactive components produced during cheese ripening may be involved.

Using a parallel design randomised controlled study design, 36 Landrace X Yorkshire X Duroc crossedbred three-month-old female pigs were used in this study. All pigs were given a 21-day butter rich run in diet (143g of butter per kg diet), followed by a 14-day intervention involving three different arms: Arm 1: four-month-old ripened cheddar cheese diet; Arm 2: 14-month-old ripened cheese diet; or Arm 3: 24-month-old ripened cheese diet. Each of the diets contained 350g of cheese per/kg diet. Blood measures of serum cholesterol, triglycerides, HDL cholesterol, LDL cholesterol, insulin, plasma nonesterified fatty acids (NEFA) and glucose were taken before and after the intervention, and fecal fat and body weight were also measured.

Interestingly, the plasma NEFA levels were significantly lower after the 24-month-old ripened cheese diet ( $201 \pm 26 \mu\text{Eq/L}$ ) and the 14-month-old ripened cheese diet ( $171 \pm 19 \mu\text{Eq/L}$ ) compared to the 4-month-old ripened cheese diet ( $260 \pm 27 \mu\text{Eq/L}$ ).

Serum insulin was also significantly lower after the 24-month-old ripened cheese diet ( $1.04 \pm 0.09 \text{ mmol/L}$ ) compared to the four-month-old ripened cheese diet ( $1.44 \pm 0.14 \text{ mmol/L}$ ), but the 14-month-old ripened cheese diet did not differ from the other two groups.

Similarly, the homeostasis model



assessment of insulin resistance (HOMA) was significantly lower after the 24-month-old ripened cheese diet ( $0.030 \pm 0.003$ ) compared to the four-month-old ripened cheese diet ( $0.041 \pm 0.005$ ), but again the 14-month-old ripened cheese diet did not differ from the other two groups.

The authors conclude that “intake of long-term ripened cheddar improved indicators of insulin sensitivity in growing pigs compared with short-term ripened cheddar. This may also be important for human health”.

These interesting results suggest some potential benefits of consuming cheese products with longer maturation time. The authors of this study suggest that further studies in humans are conducted, investigating the underlying mechanism behind the lower plasma NEFA and improved insulin sensitivity after consumption of long-term ripened cheese.

Thorning *et al.*, (2015) “Cheddar Cheese Ripening Affects Plasma Nonesterified Fatty Acids and Serum Insulin Concentrations in Growing Pigs.” *The Journal of Nutrition*, published online ahead of print, (doi:10.3945/jn.115.210716).

### Combined effects of sodium and potassium on vascular and endothelial function

Researchers from the School of Pharmacy and Medical Sciences, University of South Australia, have investigated the effect of high-potassium and high-sodium supplementation on measures of vascular and endothelial function (Blanch *et al.*, 2015).

Increased potassium and reduced sodium are known to improve postprandial endothelial function, but the effect of increasing potassium in the presence of high-sodium is unknown. The research team undertook a study involving 39 healthy normotensive participants.

In a randomised crossover design study, participants received three different meals on separate days, including different levels of sodium and potassium including: Meal 1 (low potassium, high-sodium meal): 3 mmol potassium, 65 mmol sodium; Meal 2 (high potassium, high sodium): 38 mmol potassium and 65 mmol sodium and Meal 3 (control, low potassium,

low sodium): 3 mmol potassium and 6 mmol sodium.

Endothelial function was assessed using brachial artery flow-mediated dilatation (FMD), arterial compliance was assessed using carotid-femoral pulse wave velocity (PWV) and central augmentation index (Aix). FMD, PWV, Aix and blood pressure (BP) were measured while subjects were fasting and again at regular intervals for two hours after the meals.

The results reveal compared to the low-potassium high-sodium meal, the addition of potassium (high-potassium, high-sodium meal) significantly attenuated the postmeal decrease in FMD. Additionally, Aix decreased similarly after all test meals and there were no other significant differences in Aix, PWV or BP between any of the treatments.

The authors concluded, “The study showed that the amount of potassium presented in three servings of fruit can significantly attenuate reductions in endothelial function induced by a high-sodium (65 mmol) meal. A transient increase in serum potassium is a plausible mechanism for this response; however, increased potassium does not appear to affect other measures of vascular function.”

The authors suggest that this finding may be helpful in populations where reducing sodium intake may be difficult, whereby increasing potassium intake may reduce CVD risk. They also suggest that this provides additional evidence that increases in dietary potassium should be encouraged, particularly in the presence of a high-sodium westernised diet.

Blanch *et al.*, (2015) “Effect of sodium and potassium supplementation on vascular and endothelial function: a randomized control trial. *American Journal of Clinical Nutrition*, published online ahead of print, (doi: 10.3945/ajcn.114.105197).

*Dr Ramon Hall is manager of the Dairy Health and Nutrition Consortium at Dairy Innovation Australia and is an Honorary Research Fellow at the School of Exercise & Nutrition Sciences, Deakin University, Victoria.*



# SENSORY AND CONSUMER RESEARCH UPDATE

*What's new? Recent highlights in sensory research.*

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

## Eating with our ears

Sound is a less thought-about flavour sense; taste, smell, texture and even vision have a higher profile. But is sound an important flavour sense, or is the lack of research in the area a reflection that sound has limited importance?

Depending on the type of food, sound may play an extremely important part of the multisensory experience. However, with other foods, it has no role (think puréed soup). Charles Spence from the Crossmodal Research Lab at Oxford University in Britain provides a comprehensive review on why sound is important.

As you would expect, the body of work provides support for sound as an important flavour sense within noisy foods such as those that are crisp, crunchy and carbonated, and the results are conclusive that the sound plays an important role on the perception of both food and drink. Spence also states that silent foods sometimes make a distinctive sound if you listen carefully enough – for example, the subtle auditory cues that your brain picks up as your dessert spoon cuts through a beautifully prepared mousse.

Other studies have been conducted that enhance or attenuate the actual sounds of food consumption, which have resulted in some profound perceptual changes.

The one clear point from the review is that there are multiple opportunities for the food industry to exploit our forgotten flavour sense to enhance the eating experience. One example given

by Spence is the ageing population, and increasing the 'crunch' in our food in order to make it more interesting for those who are starting to lose their ability to smell and taste food. Note that increasing the 'crunch' is related to the sound emitted; it wouldn't be a good idea to increase the hardness of a food for the ageing population.

Spence, C. (2015). "Eating with our ears: assessing the importance of the sounds of consumption on our perception and enjoyment of multisensory flavour experiences." *Flavour Journal*. Free download: [www.flavourjournal.com/content/4/1/3](http://www.flavourjournal.com/content/4/1/3)

## Smells a little fishy...

Researchers in Thailand and the US have identified the major contributors to the aroma of Thai fish sauce. Thai fish sauce, which is made of two to three parts anchovy to one part solar salt, is fermented over a 12-18 month period before two to 12 weeks of ripening. With such high levels of salt, this protein-based sauce is used mainly as a condiment, and many of the aromas come from the degradation of amino acids, oxidation of lipids and enzyme-based reactions.

The researchers analysed two leading brands of fish sauce, using Aroma Extract Dilution Analysis (AEDA) Gas Chromatography-Olfactory (GC-O), whereby a person 'sniffs' the aroma components separated by GC. Those aromas that can be detected in dilute samples are associated with more importance in the overall flavour.

In both fish sauces, 38 components were identified, with butanoic acid (cheesy), 2- and 3-methylbutanoic acid (cheesy, sweaty), furaoneol (burnt sugar),



3-methylbutanal (dark chocolate) and methional (cooked potato) identified as being major contributors to the aroma.

Through the quantification of these aroma compounds, Odour Activity Values (OAVs) were calculated, where the concentration is divided by the minimum concentration at which the component can be detected by the human nose.

It was found that of the 21 components quantified, methanethiol and dimethyltrisulfide (rotten, sulphur, cabbage), 3-methylbutanal, butanoic acid, and methional exhibited the highest OAVs.

Following this, 11 panellists conducted a sensory analysis. They found that the descriptors cheesy, sulphur, malty, fishy/briny, brothy/meaty and potatoey, were all distinctive notes for the fish sauces.



The authors then carried out omission studies, in which model aroma mixtures are made based on the identified components and their concentrations. In each mixture, a particular group of compounds (such as aldehydes, acids, sulphur compounds, or those with low OAVs) are omitted, and panellists compare the true aroma to these models. Omission of low OAV components did not significantly alter the aroma, but removal of aldehydes or acids or sulphur compounds produced aroma mixtures that smelt significantly different when compared to the true fish sauce aroma.

Lapsongphon, N., Yongsawatdigul, J. & Cadwallader, KR (2015). "Identification and Characterisation of the Aroma-Impact Components of Thai Fish Sauce." *Journal of Agricultural and Food Chemistry* 63: 2628-2638

### **Insects as food: A cross-cultural comparison**

Entomophagy, or the eating of insects, is an important dietary behaviour in many parts of the world including Africa, Latin America and Asia. Not so much in Western society, but interest in alternative protein sources of high nutritional value (such as edible insects) has increased in recent years.



In an internet-based survey, 502 German and 443 Chinese respondents completed the questionnaires, which included a Food Neophobia Scale. The results of this study indicate that country, food neophobia and previous insect consumption significantly predicted the willingness to eat processed and unprocessed insects.

As expected by the researchers, the Chinese respondents indicated a higher willingness to eat all insect-based foods compared to the German respondents. Even though eating insects is not a common food practice in China anymore, the vast majority of the Chinese respondents reported that they had consumed insects in the past. The highest willingness-to-eat rating in the Chinese sample was observed as a silkworm drink that promised an additional health benefit.

The authors conclude that attempts to establish insects as a nutritive source and meat substitute in Western cultures face the obstacle of widespread internalised aversions and negative attitudes toward insects. That might be difficult to overcome!

Hartmann *et al* (2015) The psychology of eating insects: A cross-cultural comparison between China and Germany. *Food Quality and Preference* doi:10.1016/j.foodqual.2015.04.013

### **Maternal control over feeding in infancy**

Research into obesity prevention is increasingly focusing on the earliest stages of life. Concern has been

expressed that parents are feeding in ways that increase their child's risk of weight gain. Pressuring a child to eat, or restricting food, are two of the feeding behaviours that have attracted most attention. They both may undermine the child's ability to self-regulate food intake and increase the risk of weight gain.

Parents' perceptions of their child being underweight or overweight may play a role in these feeding behaviours. Earlier research in pre-school or school-aged children showed that parents exert more pressure when a child is underweight, and be more restrictive in an overweight child.

A recent study executed by University College London in the UK investigated if maternal control is associated with infants' appetite and weight. Differences in breast- or bottle-feeding were also investigated.

A large population of 1920 mothers and infants was used for data collection. Mothers completed measures of 'pressure' and 'restriction' during the first three months. Pressure and restriction were qualified as manipulating the frequency or quantity of milk feeds in either breast- or bottle-feeding. Mothers were less likely to use pressure in breast- or bottle-feeding if their infant had a heartier appetite or a higher birth weight. Mothers were restrictive when infants had a higher appetite, but only when bottle-feeding. This is one of the first studies that

shows maternal control of feeding depends on weight status and appetite of their infants.

Fildes, A. *et al.* (2015) Parental control over feeding in infancy: Influence of infant weight, appetite and feeding method. *Appetite* 91: 101-106

### Do you know your milks?

On average, Australians drink 105 litres of milk per person per year. Ninety per cent of this milk is fresh pasteurised milk, of which 68 per cent is full fat, 28 per cent is reduced fat and four per cent is fat free milk.

Many consumers drink reduced fat milk because it contains less calories than full fat milk, and once you are used to reduced fat milk, you may no longer like the sensory profile of the full fat version. But, if it were the calories that consumers are worried about, why would more consumers not select the fat-free option? Supposedly this, again, is related to the difference in sensory profile...or is it just consumers' expectations that fat-free milk will be too watery and has little flavour?

A recent study in the *Public Health Nutrition* journal has put this to the test and asked 444 consumers in Philadelphia to identify whole, reduced

and fat free milk through tasting different samples of milk.

Only 6.9 per cent of consumers were able to identify all milks correctly and 44 per cent of consumers identified two per cent fat milk as being full fat milk. The authors go on to state, "The present study shows that the majority of shoppers are unable to decipher between different types of milk (skimmed, 1% fat, 2% fat and whole)."


It's a surprising result – would consumers not be able to taste the difference between full fat and reduced fat milk? Here, a closer look at the sensory methodology is needed and why good sensory methods are essential.

Consumers in this study were asked to distinguish between whole, two per cent, one per cent and skim milk by placing the different milks in different groups (whole milk, two per cent milk, one per cent milk or skim milk). However, consumers were only given two per cent, one per cent and skim milk to taste. Without a direct comparison between whole fat and reduced fat milk in their sensory test it would be incorrect to conclude that consumers cannot taste the difference between whole and reduced fat milk.

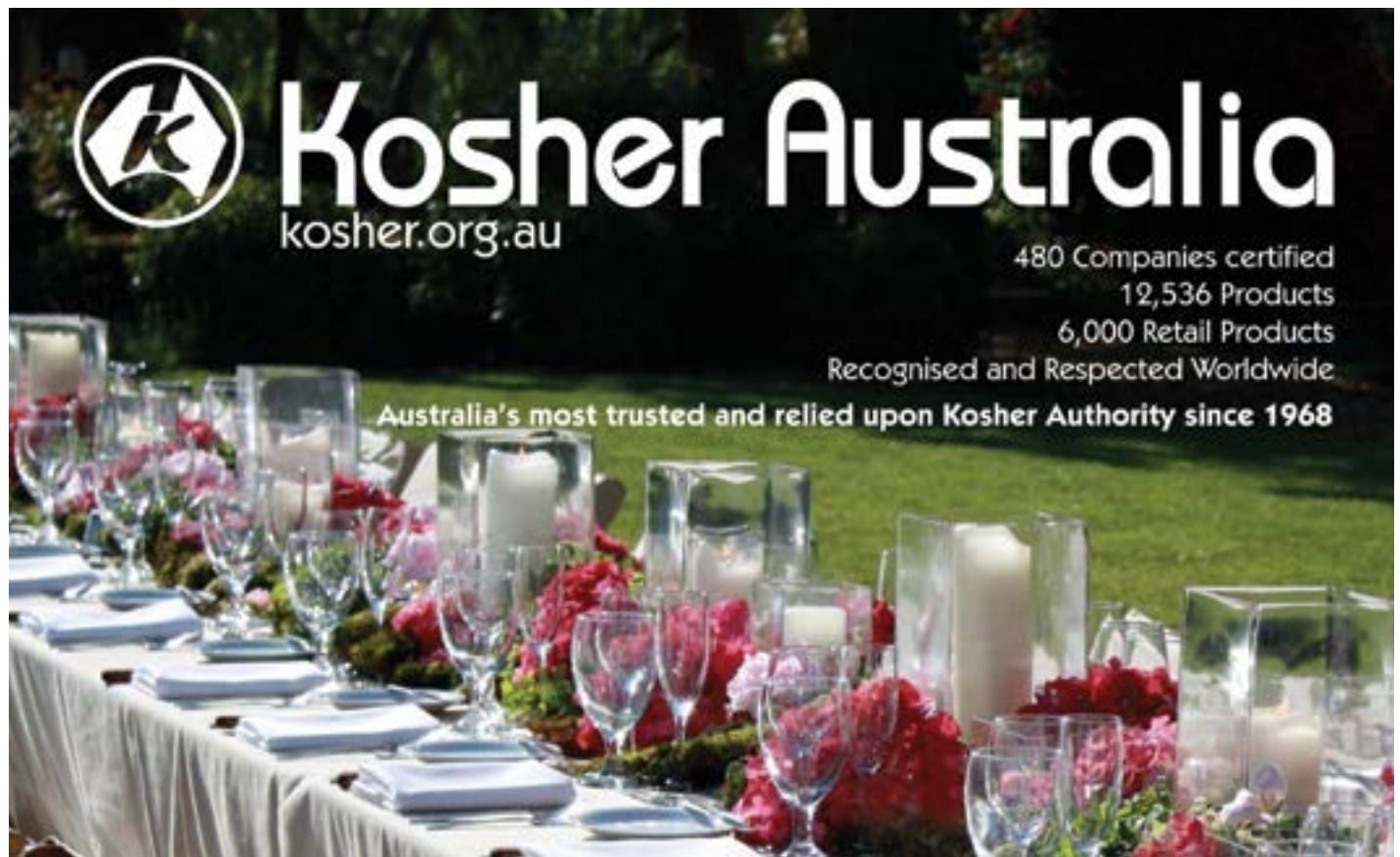
It was interesting to read that about 70 per cent of consumers who usually consumed whole fat milk considered switching to reduced fat milk after they were told about the results of the sensory test. Supposedly they thought the taste of reduced fat milk was not that bad.


Consumers have particular expectations about low-fat products, and it may just be that these expectations negatively influence their taste experiences. This knowledge can be used to counteract these negative expectations by providing messages and cues front of pack and through commercials.

At the Centre for Advanced Sensory Science, we are currently investigating the influence of labelling on milk liking of Chinese and Australian consumers. The results of this study will be of importance to milk manufacturers who aim to expand their business in China. Stay tuned....

Weiss, S. *et al.* (2015) Consumer taste tests and milk preferences in low-income, urban supermarkets. *Public Health Nutrition*, 18, 8, 1419-1422. 

*Drs Russell Keast, Gie Liem, Megan Thornton and Dieuwerke Bolhuis are members of the Centre of Advances Sensory Science (CASS) at Deakin*



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## IS IT A BIRD, IS IT A PLANE? NO, IT'S A SUPER PLUM!

*Queensland plums join the latest in a long list of 'super foods' taking the supermarkets by storm.*

Kale, quinoa, chia seeds, cacao, spirulina – produce marketed as 'super foods' are popping up in every aisle of the supermarket. To the surprise of many, however, one of the latest foods tagged with the 'super' prefix is none other than the humble plum.

Mind you, this isn't any ordinary plum.

Accidentally bred by Queensland Government scientists a decade ago, the Queen Garnet plum (QGP) has been gaining worldwide recognition following trials that showed the antioxidant-rich fruit reversed obesity-related health problems in rats.

The University of Southern Queensland's Biomedical Sciences Professor Lindsay Brown and his team first fed the rats a high-carbohydrate and fat diet, not so dissimilar from the standard Western diet, literally fattening the rats until they became ill.

The result was a bunch of rats with excessive abdominal fat and a number of health problems including high blood pressure, fatty liver and blood-sugar issues.

"We then included the purple plum juice from the QGP into their diet, which began to reduce these problems," Professor Brown said.

"What it could mean is that we have a very simple way of intervening the diet that would, over the long term, decrease the problems with obesity."

Three universities are now looking into the plum and have begun human trials to gauge the effect the plum has on humans. If they respond as well to the plum as the rats, we could very well be looking at the 'next best thing' in health foods and products.

What differentiates the QGP from its other plummy friends is the impressive levels of the antioxidant anthocyanin, which is five times higher than those found in ordinary plums. In comparison to other fruits high in anthocyanins, such as blueberries, the QGP is sweet and much cheaper.

Scientist Kent Fanning from the Queensland Department of Agriculture has worked on the plum since the early days and is excited by its potential health benefits.

"Research tells us that anthocyanins can help improve cardiovascular health and may reduce the inflammation that is the underlying cause of cancers, heart disease and neurological disorders," said Mr Fanning.

He also believes that the anthocyanins present in QGP may benefit digestive and bone health, while helping to reduce obesity and diabetes.

A couple of Queensland farmers have seen the potential for this 'super food' in the market, and have already bought the rights to commercialise the plum.

Funded by the Goodrich and Smith families, a plum production operation, running under their brand 'Nutrafruit', is leading the charge in monopolising on the stone fruit globally.

While QGP is available for sale as fresh fruit when it is in season, Nutrafruit processes the plum into powders and fresh juices to add value take the product internationally.

The QGPs are currently being harvested at an orchard at Warroo, west of Stanthorpe in Queensland.

Minister for the Department of Agriculture, Fisheries and Forestry John McVeigh said that the 75,000 QGP tree orchard was expected to yield 200 tonnes of the super plum for its first commercial harvest.

"The Southern Downs produces some of the best fruit and vegetables in the world," said Mr McVeigh. "With the health food market growing, we are well positioned to take advantage of these opportunities and develop new products that will benefit us all." 🍷





DIARY

### AUSTRALIA & NEW ZEALAND 2015

**June 25-27** AUSVEG National Convention, Trade Show and Awards for Excellence. Jupiters, Gold Coast, Queensland. [www.ausveg.com.au](http://www.ausveg.com.au)

**August 11-13** 48th Annual AIFST Convention & 15th Australian Food Microbiology Conference. Food For All. Luna Park, Sydney, NSW. [www.aifst.asn.au](http://www.aifst.asn.au)

**August 17-18** The Drinks Industry Show. Sydney Exhibition Centre @ Glebe Island, NSW. [www.foodanddrinkbusiness.com.au](http://www.foodanddrinkbusiness.com.au)

**August 26-28** 21st Australian HACCP Conference. Doltone House, Sydney, NSW. [www.haccptown.com.au](http://www.haccptown.com.au)

**September 12-13** Real Food Festival. Maleny Showgrounds, Sunshine Coast, Queensland. [www.realfoodfestivals.com.au](http://www.realfoodfestivals.com.au)

**September 20-23** Fine Food Australia. Sydney Showground, Sydney Olympic Park, Sydney, NSW. [www.finefoodaustralia.com.au](http://www.finefoodaustralia.com.au)

### INTERNATIONAL 2015

**September 2-3** Vitafoods Asia. Asia World Expo. Hong Kong. [www.vitafoodsasia.com](http://www.vitafoodsasia.com)

**September 20-24** IDF World Dairy Summit. Closing the Nutritional Gap with Sustainable Dairy. Lithuanian Exhibition and Congress Centre LITEXPO, Vilnius, Lithuania. [www.idfwd2015.com](http://www.idfwd2015.com)

**September 27-30** 13th Euro Fed Lipid Congress. Florence, Italy. [www.eurofedlipid.org](http://www.eurofedlipid.org)

**October 11-14** 2nd International Conference on Global Food Security. Cornell University, Ithaca, New York, USA. [www.globalfoodsecurityconference.com](http://www.globalfoodsecurityconference.com)

**October 18-21** AACCI 2015 Centennial Meeting. Minneapolis, Minnesota, USA. [www.aaccnet.org](http://www.aaccnet.org)

**October 27-29** Sweets & Snacks Middle East. Dubai Convention and Exhibition Centre, Dubai, UAE. [www.sweetsmiddleeast.com](http://www.sweetsmiddleeast.com)

**November 17-19** Food Matters Live. ExCeL Exhibition and Convention Centre, London, United Kingdom. [www.foodmattersglobal.com](http://www.foodmattersglobal.com)

**November 18-20** Sweets & Snacks China. China National Convention Center, Beijing, China. [www.sweets-snackschina.com](http://www.sweets-snackschina.com)



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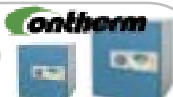
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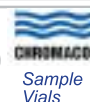


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