

# food

Official publication of AIFST LTD

# australia

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APRIL/MAY 2015

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CONFUSION BETWEEN RAW MILK AND RAW MILK CHEESE  
HIGH-PRESSURE PROCESSING IMPROVING FOOD SAFETY**

# ON THE COVER

## Cleaners and *Listeria*

### What is *Listeria*?

*Listeria* has made headlines recently, with several products being recalled in Australia. As a facultative anaerobic, non-spore forming bacilli, the *Listeria* species' major human pathogen in the *Listeria* genus is *L. monocytogenes*. It is usually the causative agent of the relatively rare bacterial disease, Listeriosis, a serious infection caused by eating food contaminated with the bacteria.

The World Health Organization found *L. monocytogenes* to be an environmental contaminant, whose primary means of transmission to humans is through food contaminated during production and processing. It has the ability to form biofilms, creating problems for its control in sanitation programs, and the organism can also survive and be spread in aerosols and on workers' hands. (Peter S. Sutherland, 2003)

*L. monocytogenes* adapts well to cold and wet areas often found in food processing areas. The temperature range for growth of *L. monocytogenes* is between -1.5 and 45°C. As *L. monocytogenes* can grow at temperatures as low as 0°C, it has the potential to grow, albeit slowly, in food during refrigerated storage. *L. monocytogenes* will grow in a broad pH range of 4.0–9.6.

### Root Cause

Microbiological testing is used to identify the presence of organisms of *L. monocytogenes*. Currently rapid

testing is not available and there can be a delay in results of 48 to 72 hours. Keeping the production areas dry during production and post-cleaning is critical to minimising and eliminating *Listeria* proliferation.

#### Known Niches

- Conveyor systems
- Rubber seals (chiller doors)
- Slicers/peelers
- Gutting lines for seafood
- Trimming / filleting lines
- Rinse water
- Spin chillers
- Defeathering equipment
- Drains
- Trolley wheels
- FDC (air-conditioners)
- Incoming raw product

### Biofilm

*L. monocytogenes* is known to adhere to surfaces within the food production environment by forming biofilms found on surfaces. Biofilms form on stainless steel, rubber, glass, polypropylene, Teflon and nylon – all surfaces found in a food processing plant and equipment.

### Cleaning – Education – Training

The cleaning team need to be briefed on this pathogen, when swabs are positive, probable niche areas and the plan of action.



Cleaners should be acquainted with **Known Niches** – and shown where within a processing plant and equipment *Listeria* may be present.

The focus must be to rinse, foam and scrub any visible soiling on these and all surfaces, then rinse thoroughly to remove residual soiling to the drains.

Visual inspections at the end of the cleaning process must be carried out diligently, as build-up of protein on surfaces can cause Biofilms.

### Cross Contamination

Floors and drains are the common culprits. Sanitising after cleaning thoroughly, then keeping floors dry and drains unblocked, is key to tackling the *Listeria* challenge.

### Cleaning Chemicals

Cleaning sanitisers should be rotated as a best practice. Acid washing on a set frequency has dual purpose in the descaling of metal surfaces of minerals and a pH shock to the immediate environment.

### Surveillance

ATP testing can be used as a rapid indicator of possible bacterial contamination. Cleaners can be trained to test and then re-clean immediately to the acceptable limits.

Microbiological testing is then used to confirm the absence or presence of *L. monocytogenes*. 📍



"Cleaning has a New Benchmark"

**CONTACT:**  
**T: 1800 808 727**  
**E: sales@ecowize.com.au**  
**www.ecowize.com.au**

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# food australia

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**Editorial:** Bite Custom Publishing

**Contributors:** Dr Geoffrey Annison, Dr Marc Barnes, Dr Dieuwerke Bolhuis, Dr Barbara Butow, Divya Eratte, Bronwyn Graham, Dr Ramon Hall, Dr Marion Healy, Dr Russell Keast, Dr Gie Liem, Rhoda Ndanuko, Bruce Nelan, Peter Schutz, Anita Sikes, Dr Lisa Szabo, Dr Megan Thornton and Cinthya Wibisono

**Advertising:** Mel Malloch

**Production:** Bite Custom Publishing

**Subscriptions:** Vicki Wallace

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**Editorial enquiries should be addressed to:**

foodaust@bitecom.com.au

*food australia*

Bite Custom Publishing  
Suite 7, Level 1, 22 Darley Road  
Manly NSW 2095

**Tel:** 02 9977 8195

**Web:** www.foodaust.com.au

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**AIFST Board**

Dr Anne Astin (Chair)

Dr Michele Allan

Jo Davey

Tom Debney

Stewart Eddie

Fiona Fleming

Dr Tom Lewis

Adam Hyland (Company Secretary)



**AIFST National Office**

Box 6, Shop 3 The Village

3 Julius Avenue

North Ryde NSW 2113

**Tel:** (02) 9870 8688

**Email:** aifst@aifst.com.au

**Web:** www.aifst.com.au

## FROM THE AIFST BOARD

Welcome to the April/May 2015 issue of *food australia*.

In this edition, we look at the impact supply chains can have on the food industry and the essentiality of having an effective supply chain management system.

On page 35, Marc Barnes, BSI global director of food, and managing director of BSI Group Australia, discusses the risk to companies that don't invest in supply chain protection and explores ways in which companies can audit and secure their supply chains, particularly as they become more and more global.

We also have a fascinating piece on research from Meat & Livestock Australia and the team at CSIRO Food and Nutrition about high-pressure processing technology and its use to improve the safety and eating quality of lower quality red-meat cuts.

Closer to home, AIFST is excited to welcome our new chief executive officer, Georgie Aley, who joins AIFST this month as the Institute's first CEO. I would like to welcome Georgie to the team and I know everyone here at AIFST is excited and looking forward to working with her.

Finally, registrations are now open for the 48th Annual AIFST Convention that will be held from August 11-13 at Sydney's Luna Park. This year's event will be held alongside the 15th Australian Food Microbiology Conference and registrations are available at [www.aifst.asn.au/registration.htm](http://www.aifst.asn.au/registration.htm).

I hope you enjoy this issue of *food australia* and look forward to seeing your registrations come through for the convention in Sydney, which is set to be our biggest yet.

**Dr Anne Astin**

AIFST Board Chair





## AUSSIE NUTRIENT INTAKE

In a joint first between the Australian Bureau of Statistics (ABS) and Food Standards Australia New Zealand (FSANZ), the *Australian Health Survey: Usual Nutrient Intakes* analyses whether Australians are consuming the required amount of nutrients.

As the largest and most comprehensive health survey conducted in Australia, the survey examined the dietary intakes of vitamins, minerals, protein, fat and carbohydrates, as well as caffeine and alcohol in the Australian population.

Of the most significant results, the survey found that Australians aren't getting enough calcium from their food.

Calcium is a mineral required for strong healthy bones with low calcium intake being linked to osteoporosis, a low bone density condition.

"The results have found that only one in four females and one in two males met their calcium requirements from food," said Wendy Davis from the ABS.

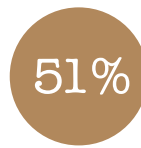
"Iron is another important nutrient for which females have higher requirements in many age groups.

"One in four females had inadequate iron intakes compared to only one in thirty males."

Insufficient iron intake can lead to fatigue, tiredness and decreased immunity.

In other findings, the survey showed males and females exceeded the recommended upper level of intake for sodium, not including sodium added at the table or during cooking.

The findings were derived from over 12,000 Australians based on the foods, drinks and dietary supplements they consumed in the 24 hours prior to the interview.



*73% of females and 51% of all males aged two years and over do not meet their calcium requirements based on their intakes from food.*



or more  
Australians met their nutritional needs for protein, vitamin C, vitamin B12, phosphorus and selenium.

*One in four women do not meet their requirements for iron.*



*of people usually had at least 100 grams of total sugars per day.*

47% of males and 30% of females aged 51-70 years consumed more than 5% of their total energy from alcohol.



*espresso shots – the daily median intake of caffeine consumed by Australians*

*Approximately 9% of adult females and 2% of adult males did not meet their requirements for folate, found in foods such as green leafy vegetables, fruits and grains*



*Females aged 71 years and over were less likely than younger females to meet the required amount of protein, riboflavin and vitamin B6.*



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## CLIMATE CHANGING FACE OF PRIMARY PRODUCE

New research from the *Appetite for Change* study by the University of Melbourne has revealed the impact that shifting rainfall patterns, extreme weather, warming oceans and other climate-related impacts will have on the production, quality and cost of Australia's food in the future.

Author of the report, director of the Primary Industries Climate Challenges Centre Professor Richard Eckard, said the effects of global warming will impact various Australian produce such as wheat, seafood, dairy products, poultry, meat, grains, fruit and vegetables.

"Australia is the most climatic variable continent in the world. Global warming continues to increase the frequency and intensity of heatwaves and bushfires affecting farms across southern and eastern Australia," said Prof Eckard.

"There are limits to the temperatures and extreme weather events to which farmers will be able to adapt. Some industries have already relocated to new regions that are more suited to their production. It's definitely a wake-up call when you hear the toast and raspberry jam you have for breakfast, for example, might not be as readily available in 50 years' time."

The study suggests that northern Australia could expect hotter temperatures, putting crops like bananas, mangoes and avocados at risk from less frequent, but more intense cyclones.

Southern states can expect more heatwaves, a reduction in winter rainfall and warmer than average temperatures.



A number of key findings were developed from the study such as it not being cold enough in winter to signal fruit development, increased acidity in the ocean affecting seafood and rainfall and temperature changes affecting the growth of wheat, chicken, livestock, carrots and honey bees.

Prof Eckard said that agricultural research is needed to start focusing on new options for farmers under changing climatic conditions.

"We need an emphasis on research and managing and coping with the variable environment we live in. So it's about sending that signal that there are things that can be done that continue to make us profitable in agriculture, and rolling out the extension and education we already know we can be adopted."

The *Appetite for Change* study can be downloaded from: [www.sustainable.unimelb.edu.au/appetite-change-new-mssi-report](http://www.sustainable.unimelb.edu.au/appetite-change-new-mssi-report).

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## MEAT MARKET INQUIRY

A Senate inquiry into practices in the red meat processing industry is underway following pressure from National party Senators John Williams (NSW), Bridget McKenzie (Victoria) and Barry O'Sullivan and Matthew Canavan (Queensland) in the wake of the controversial Primo takeover by Brazilian food giant JBS.

The inquiry by the Senate Rural and Regional Affairs and Transport References Committee will look at the potential misuse of market power through buyer collusion and the resultant impact on producer returns; the impact of the red meat processor consolidation on market competition, creation of regional monopolies and returns to farm gate; the existing selling structures and processes at saleyards, particularly pre- and post-sale weighing, as well as direct sales and online auctions and their relevance; and the regulatory environment covering livestock, agents, buyers and meat processors.

Senator Williams said the Nationals are responding to calls from farmers and their organisations to thoroughly examine the meat processing sector to see whether there is misuse of market power, whether the current selling system is still pertinent and what role livestock agents, producers and meat processors are playing.

The Victorian Farmers Federation livestock president Ian Feldtman says the inquiry is a big win for Australian farmers.

"The past 15 years has seen consistent increases in the retail price of red meat while farm gate prices have remained stagnant. It's time this changed," said Mr Feldtman.

Submissions are now open and the committee is due to report by 12 August.

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## GOOD EGGS FOR ANIMAL WELFARE

Australian family-run food manufacturer, The Food Company, has been awarded a Good Egg Award from the RSPCA for its decision to switch to cage-free eggs in its products.

The Good Egg Award acknowledges organisations that are committed to improving layer hen welfare, and follows the RSPCA's ongoing work to improve hen welfare through the Set a Sister Free campaign.

The Food Company, which supplies quality condiments to wholesale and food service sectors, made the switch to source only cage-free eggs in its products after being the first company approached as part of the Set a Sister Free campaign.

RSPCA chief executive officer Heather Neil said The Food Company is listening to its customers by making the switch to cage-free eggs.

"This shows clear leadership and drive to stay ahead of the pack and we are thrilled to publicly award them for making this important commitment," said Ms Neil.

"Half of all eggs produced in Australia end up in manufacturing and the food service industry, most of which are produced by hens confined to cages, so commitments like this from The Food Company is an important step."



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## GOODMAN FIELDER TAKEOVER APPROVED

After a lengthy approval process, the Chinese takeover of Australian food giant, Goodman Fielder foods (GFF) has been approved.

The takeover will see Singapore-based agricultural and food processing firm Wilmar International join Hong Kong investment fund First Pacific, which initially flagged its bid in April 2014.

An overwhelming 99 per cent of shareholders voted in favour of the takeover as an attractive value outcome for shareholders and the company's employees, customers, suppliers and consumers.

Steve Gregg, chair of GFF, said the decision to recommend the takeover to shareholders was not taken lightly.

"We are very mindful of the iconic status of Goodman Fielder across Australia and New Zealand and the rich history it enjoys across this region," said Mr Gregg.

"While in one respect, it will be sad to see the company change from public shareholding to private ownership,

I also think it's important to recognise the significant opportunity that can come from this change."

The initial joint bid of 65 cents a share was knocked back by GFF in April 2014 and it was agreed at 67.5 cents a share in July after four weeks of due diligence revealed the need for significant capital investment and asset write-downs.

The Australian Competition and Consumer Commission announced in September 2014 that they would not oppose the acquisition leading the Overseas Investment Office (OIO) in New Zealand and the Chinese regulator Anti-Monopoly Bureau of the Ministry of Commerce of the People's Republic of China (MOFCOM) to also approve the sale in February 2015.

The company believes that Wilmar's scale and distribution networks together with First Pacific's experience, as well as both parties' financial resources, will allow the company to grow its presence further in the Asia Pacific region.



# ONEGRAIN® – TO REDUCE SODIUM THE EASY WAY

Good news for lovers and producers of flavoursome food

Finding the perfect low-sodium salt alternative has long been the holy grail of the food industry. Now a product has come along that has both the industry and even the most sceptical chefs and Michelin-star restaurateurs purring with excitement. It's called OneGrain, a mineral salt with great taste, produced by AkzoNobel, a company with an unsurpassed pedigree as a salt supplier.

We all want to lead healthier lifestyles, which means cutting the dawn of history. And since salt is the largest contributor to sodium, the race has been on to find a credible alternative. It's a challenge that AkzoNobel, with all its experience and in-depth understanding of the use of salt in food, has worked tirelessly to find a solution to. Now it has. The result is a new mineral salt grain that does the job without compromising the taste and quality of our favourite foods.

## Tasty and healthy

**OneGrain** mineral salt ticks all the boxes for a food industry looking for a credible easy-to-use low-sodium alternative to our favourite condiment as well as meeting the demands of an increasingly health-aware public looking to reduce salt levels. It's also a product producers will love because recipes and production processes won't have to change.

The new salt grain can be used in exactly the same way as regular salt, except it has 50 per cent less sodium. A producer can substitute regular salt with **OneGrain**. This pure simplicity also allows for quick and easy product development and enables products to be brought swiftly to market. The upshot is a saving in time and cost while meeting new requirements for healthier products.

What makes **OneGrain** truly stand out from the competition is that it addresses the key challenges facing the food industry – and that is to reduce salt levels without compromising taste and quality. **OneGrain** can become your trusted solution for sodium reduction. Applicable in your full portfolio of recipes, you can have one solution for all your products. It also ensures a rapid response to changing market needs. And don't forget the benefits for product development and production!

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## DAIRY STEADY AMID UNCERTAINTY

The Australian dairy market remains steady in the face of international market volatility, with seasonal milk production of 5.33 billion litres up 2.6 per cent in a comparison to the same period last year.

In the latest Situation and Outlook Report, Dairy Australia predicts a further increase in dairy production for the 2014-15 season in light of a hotter and drier summer.

Norman Repacholi, commercial research analysis manager at Dairy Australia, said that despite ongoing volatility in global dairy markets, growing interest of investors in Australia's dairy industry maintains the prospect of profitable long-term returns.

"Consolidation in the Australian market has continued with Parmalat buying Longwarry Food Park as well as plans for a potential large-scale green field investment in the Wide Bay region of Queensland progressing," he said.

"Favourable international trade deals, such as the China Free Trade Agreement at the end of last year, have added to dairy's appeal as an attractive investment opportunity."

Australian farmgate dairy prices have remained steady despite a decline in other dairy prices across parts of the world. Analysts partly attribute this to local processors who are eager to maintain confidence in the farm sector to encourage growth in milk production.

Other factors such as the Australian domestic decline of the Australian dollar and fall in oil prices are helping to further insulate the sector.

"Despite the drop in global commodity markets, the general pattern of steady milk products is being well received by most Australian dairy farmers," said Mr Repacholi.

"The competition for farmgate milk supply in Australia should not be underestimated as a major driver of future pricing decisions."

The Report also outlines that future dairy prices may also be impacted by the ongoing uncertainty around Chinese purchasing volumes, the impact of drought in New Zealand and the potential of the global economic environment to change quickly.



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## AUSTRALIAN MILK A SUCCESS IN CHINA



Freedom Foods Group has made its first move into the Chinese market with the launch of the baby milk, Australia's Own Kid's Milk, capitalising on China's appetite for quality Australian dairy products.

It is the group's first branded retail product available to the Chinese market.

Produced by Pactum Dairy Group, the milk will be available in both China and Australia, and is one of the first Australian products to be specifically marketed to the post-infant toddler market.

The product is being marketed by Shenzhen JiaLiLe Food Company, the group behind one of the largest ready-to-drink beverages in China and is the first product launch between the two companies.

Brent Moore, Australia's Trade Commissioner in Shanghai, said China is increasingly becoming a focal point for Australian dairy producers.

"Chinese consumers rate Australian dairy products very highly for quality and safety. This is particularly important

for dairy products, given their role in baby and toddler nutrition," Mr Moore said.

Chinese consumer and trade interests in Australian food, beverage and consumer products are at record levels. According to statistics released by the Department of Foreign Affairs and Trade in 2014, total food exports from Australia to China grew by more than 50 per cent.

Freedom Foods managing director, Rory Macleod said Australia is receiving an increase in demand from markets in China and South-east Asia.

"Australia has a unique advantage in the supply and manufacture of high-quality premium agriculture-based foods. Through Australian companies such as Freedom Foods and Perich Group, we are well placed to play an important role in supplying a high-quality and value-added product," Mr Macleod said.

The Shenzhen JLL and Freedom Foods agreement follows a Memorandum of Understanding (MoU) between Freedom Foods, Australia's Perich Group and China's New Hope Group. The MoU marked the formal signing of the Declaration of Intent to work towards bringing the China-Australia Free Trade Agreement into force.

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## A2 MILK PUSH INTO US MARKET

Despite a net profit decline of 81 per cent, New Zealand dairy specialist A2 Milk Company is due to launch in the US this April.

As a producer of milk rich in the A2 beta-casein protein, A2 Milk Company made its name in Australia and New Zealand by tapping into the market of people looking for milk alternatives.

Although it recorded significant losses for the first half of the 2014-15 financial year thanks to a series of one-off costs associated with expansion, the company will push ahead into the US this month as part of its wider growth plans.

"At this stage of the company's development, the focus is on revenue growth and market building. We are comfortable with performance being on or ahead of plan against these measures at present," said A2 Milk Company managing director Geoffrey Babidge.

With a 9.3 per cent value share of the fluid market, A2 milk is the fastest growing milk brand in Australia, and has recently been approved to be listed on the Australian Stock Exchange.

In 2007 it trialled its product to an American market in California but instead chose to focus on its Australian

operations. Now investing \$20 million over three years to fund its US market entry, the company is confident it will find its niche in a market where it claims a quarter of consumers experience digestive issues after consuming milk.

The company will initially focus its selling activities in the US in the West Coast region and achieving agreed milestones in this region, before extending distribution.

A2 Milk Company believes the A1 casein protein is responsible for the abdominal discomfort some people experience from dairy, and has developed a genetic test to identify and use the milk from cows that only produce A2 milk. The company currently operates in Australia, New Zealand, China and the UK.



## REVOLUTION HEADED FOR AUSTRALIAN RECYCLING

From bottles and lids to caps and cartons, understanding what makes a piece of packaging recyclable can be as confusing for packaging manufacturers and brand owners as it is for consumers.

Now a joint project from Planet Ark and GreenChip aims to minimise the confusion by developing the innovative Packaging Recyclability Evaluation Portal (PREP), a new online tool to help you determine the recyclability of your packaging.

In the absence of a clear and validated recycling education resource for the packaging industry, previously companies have been left unsure about the specific packaging formats that are recyclable in Australia and how various combinations of materials are likely to act throughout the recovery and recycling process.

Planet Ark PREP recycling programs manager Shaun Scallan says up until now, there has not been a single authoritative opinion on whether consumer packaging can be recyclable for domestic kerbside pick up, as information was formerly collected from one or two recyclers and not representative of the broader Australian recycling context.

“Businesses are often reluctant to make claims about recyclable items thanks to a lack of credible knowledge, which leaves brand owners as well as consumers confused about whether an item is recyclable,” said Mr Scallan.

“PREP provides an assessment framework that aims to increase the recovery and recycling of used packaging and decrease contamination in Australia,” he said.

The joint program, which was originally scoped and commissioned by the Australian Packaging Covenant is based on two key criteria that could form the basis of a recyclability-labelling scheme for packaging manufacturers in the future.

PREP was tested thoroughly with the help of some 16 brand owners as well as other stakeholders in the packaging supply chain during 2013-14 prior to release.

During the development stages of a new packaging item, or as part of the refreshment of an existing design, the packaging specifications are entered into the web-based PREP software, which initially assesses whether the item is technically recyclable.

This information is based on the capacity of the recycling infrastructure, including the technology needed to adequately separate the different materials to meet the quality requirements of recycling buyers.



Secondly, in partnership with local councils, it is established how much of the population has access to a kerbside recycling service for the item which is compiled on the [RecyclingNearYou.com.au](http://RecyclingNearYou.com.au) website.

A report is then automatically generated that outlines whether or not the combination of items can be classified as recyclable.

Nestlé has signed up as the first company in Australia to use PREP and will use the online tool as a means to evaluate the recyclability of their existing and future packaging formats.

With a number of recycling initiatives already underway, Nestlé will utilise the PREP tool as a method to assess any potential impacts of different packaging material combinations on the recycling stream early in the design phases of projects.

Outputs from the tool will also assist as inputs to eco-design tools to evaluate full life-cycle performance of packaging formats, and will also be used to develop on-pack packaging disposal communication to consumers.

Jacky Nordsvan, Nestlé packaging specialist, said that she is glad to be involved in bringing the company on board with the PREP initiative.



Jacky Nordsvan, Nestlé.

“It has been my pleasure to be involved in an initiative that will help give clear guidance around recovery and recycling. This has been missing from the industry for a number of years,” Ms Nordsvan said.

Planned for a release later this year, standardised recyclability labels will appear on partnered brands products, which will allow for brand owners to place a meaningful label on packaging to guide recycling behaviour in Australia.

Standardised labelling for recyclability has already been adopted in the US and the UK, and has proved successful in these respective countries, with recycling rates continuing to increase as a result of better service provision and consumer awareness of recycling.

Particularly in the United Kingdom, the scheme has helped expand the infrastructure for recycling thanks to industry associations seeking to have packaging materials certified as ‘widely recycled’.

Packaging supply chain participants will have a greater awareness of the packaging materials that are not currently recyclable, and will have the opportunity to develop targeted programs to address them.

Over time, it is expected that design changes and improved clarity in recyclability instructions will lead to an increased rate of recycling and a reduced environmental impact of packaging and reliance on landfill. 13

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PEOPLE



Launa Inman

**Bellamy's appoints new non-executive director**

Australian baby food manufacturer Bellamy's has announced the appointment of the new non-executive director, Launa Inman.

Ms Inman's appointment has been in response to the business's growth plans and strong demand for its baby foods in Asia.

Ms Inman commenced with the board of directors last February, and brings with her extensive experience in retailing, marketing, finance and logistics.

Prior to her appointment at Bellamy's, Ms Inman was CEO at Billabong as well as managing director at Target and Officeworks. She is also currently a director at the Commonwealth Bank of Australia.

Rob Woolley, chair of the board of directors, welcomed Ms Inman to Bellamy's and said her skills will diversify and complement the range of experience and skills available to the Board.

Bellamy's Australia reported a 141 per cent jump in revenue earnings to \$58.3 million for the six months ended December 31, and forecast a net profit of \$4.5 million for the full financial year.



Paul Slaughter

**New CEO for iconic pie-maker**

Mrs Mac's pies, one of Australia's largest family-owned bakeries, has announced the appointment of Paul Slaughter as its new chief executive officer.

Mr Slaughter is an experienced senior executive within food and fast moving consumer goods and has extensive experience

in corporate and small business both domestically and internationally.

His most recent role was general manager of the Metcash Food & Grocery (IGA) business in Western Australia where he led the wholesale, manufacturing and distribution business. He was also director manager of the Metcash Transformation project in Sydney, as well as general manager for P&G leading the Coles Customer team and national business manager for Campbell Arnott's leading the Woolworths Customer Team.

"Paul brings an additional level of professionalism and experience to the Mrs Mac's team and will position the company for growth and expansion domestically and internationally," said Peter Fallon, chair of the Mrs Mac's board of director managers.

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*Dr Alice Hayward*

### Avocado lover gets two top awards

Dr Alice Hayward, scientist at the University of Queensland (UQ), has won both the Minister's Award and the Horticulture Innovation Australia Award at the 2015 Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry.

The grants, presented by Agriculture Minister Barnaby Joyce, awarded 11 of Australia's best researchers, innovators and scientists to progress research that will help increase productivity in farms and across rural industries.

Dr Hayward was granted both prestigious awards, along with a funding boost of \$40,000, for her research project to develop the world's only publicly available draft genome for the popular Hass avocado.

Dr Hayward said the project would find genes that improve avocados' resilience to diseases and drought tolerance.

The research feeds into a wider study program at UQ's Queensland Alliance for Agriculture and Food Innovation, and will open the door for the next generation of crop improvement.

"The project will work on various avocado crop improvements including clonal propagation and disease resistance, particularly for the root-rot phytophthora which costs the Australian industry up to \$40 million in lost production.

"It's the biggest killer of avocado globally. It actually means 'plant destroyer' in Greek," said Dr Hayward.



*Michael Finucan*

### MLA staff and board moves

Meat & Livestock Australia (MLA) has announced several changes to its executive and management team in both its domestic and international areas.

Most notably, board director Dr Greg Harper has resigned due to his new commitments as executive director of Agriculture Research & Development with

the Victorian Department of Economic Development, Jobs, Transport and Resources.

Dr Harper has been a director of MLA since 2009 following a career at CSIRO. MLA chair Dr Michele Allan says that his contribution to the organisation has been invaluable.

"We have been very fortunate to have Greg as a director manager. He has brought wonderful insights and a global perspective to our discussions particularly around research and development," Dr Allan said.

At management level, regional manager of Korea, Michael Finucan has been promoted to a broader role as general manager of MLA's International Business Unit. Mr Finucan's appointment comes as part of a restructure of MLA's international market operations and will see him expand his portfolio to include China, Korea and Taiwan.

MLA managing director Richard Norton said Mr Finucan will oversee the ongoing work of the International Markets team to drive the reputation and positioning of Australian beef and lamb overseas.

### Australia Dairy Farmers CEO resigns

After six years as chief executive officer (CEO) at Australia Dairy Farmers (ADF), Natalie Collard will step down from her role with the company in April.

In her time as CEO, Ms Collard has led the ADF through the modernisation of its government structure and fought hard on issues such as \$1 per litre milk, the China-Australia Free Trade Agreement, as well as the implementation of imperative dairy policies.

Recognising her outstanding leadership role, Ms Collard was awarded an Australian Dairy Farmers' President's Commendation in December 2014, as well as the 2013 Victorian Telstra Business Woman of the Year for service to community and government.

ADF president Noel Campbell paid homage to Ms Collard's extraordinary leadership and tireless dedication to Australian dairy.

"Natalie's record speaks for itself. She is always striving for new ways to improve the profitability and sustainability of dairy and her proactive, innovative and considered approach has improved the quality and effectiveness of our organisation," said Mr Campbell.



*Ms Natalie Collard*

ADF has appointed Dr Clive Noble from the Victorian Department of Primary Industries as interim CEO until the appointment of a full-time CEO is announced. 📍



AIFST

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# SUMMER SCHOOL 2015

Words by Divya Eratte, Federation University Australia, and Bronwyn Graham

The AIFST Food Science Summer School is a travelling annual educational event for postgraduate research students and early career researchers. The brainchild of the University of Queensland's Professor Mike Gidley, the AIFST Summer School is now in its fifth year and was most recently held at RMIT University, Melbourne.

With more than 70 of Australia's higher research students in attendance, this year's Summer School demonstrated the incredible depth of Australian food science research, with many presentations from the country's leading food scientists and professionals, as well as many student researchers presenting their research work.

Opened by AIFST president Dr Anne Astin, and RMIT University Pro-Vice Chancellor of Science, Engineering and Health, Professor Peter Coloe, both food science leaders spoke of their experiences in the food industry and lessons learnt before introducing keynote speaker Professor John Ashton, from Sanitarium Development and Innovation NSW.

Professor Ashton spoke about the work Sanitarium is currently doing on the future of cereal-based foods and changing consumer wants and needs. Professor Ashton emphasised the importance of companies understanding consumer wants but also recognising and capitalising on the current trends in the food industry.

The cereal industry is currently particularly affected by changes in Australian consumer habits, with the consumer demand for gluten-free products based on increased health and nutrition awareness, as well as the negative health commentary associated with high carbohydrate foods impacting the sector's future product



development. He then addressed how Sanitarium is working to understand and meet these consumer needs by developing new products such as gluten-free Weet-Bix and low-GI foods as well as several other products currently under development.

Victoria University's Professor Todor Vasiljevic addressed students on the research he and his team are undertaking in the area of dairy proteins, which are an important group of food proteins with diverse application and great potential for further research. Professor Vasiljevic discussed stabilisation or controlled destabilisation by numerous physical and chemical means. He also explained that due to various interactions during conformational changes, our understanding and thus process control of dairy proteins is rather limited. Greater understanding of these phenomena may lead to redesigning current manufacturing practices and sustainable use of food resources.

University of Auckland's Associate-Professor Yacine Hemar presented on the structural and bio-functionality of polysaccharide extracted from New

Zealand mushroom and its use in chemotherapeutic drugs.

Dr Peter Torley from Charles Sturt University presented on the processing of starchy materials and the development of new, more efficient techniques. Dr Torley discussed his research into cryomilling, which is milling rice with chilled liquid nitrogen as opposed to higher temperatures.

Summer School founder Professor Mike Gidley of the University of Queensland delivered insights into the physical properties and health implications of plant cell wall polysaccharides in the digestive tract. Professor Gidley shared epidemiological research on what people eat and the health outcomes from these choices. He highlighted the consistency across different cultures of recommendations for high consumption of plant foods.

Professor Gidley then presented research on the properties of nuts and how the cell walls of many nuts retain lipids and are not digestible. He challenged that this could have two implications – that kilojoules from these nuts will not affect overall energy consumption, and that our



understanding of consumption cannot be based on purely what we eat. He says looking at what people eat does not necessarily reflect their energy intake as components of the foods in fat content, carbohydrate content and protein content are digested differently.

Ian Powell from Dairy Innovation Australia gave a history of the dairy industry and shared his insights regarding its current and future trends. He spoke about the raw milk debate and how farmhouse cheese producers are utilising selected strains of bacteria found in raw milk, in addition to pasteurised milk, to produce more

farmhouse types of flavours in the final products, which is seen as a safer way to gain these desirable flavours.

RMIT's Associate-Professor Benu Adhikari illustrated the huge potential for food science in the future by discussing research into starch-based packaging, which harnesses super hydrophobicity to utilise complex coacervation of protein-polysaccharide.

Professor Russell Keast of Deakin University also touched on the future direction of food science by providing an alternative and very effective way to showcase his sensory research via a taste testing opportunity. The audience

was instructed on how to taste olive oil by drinking and not swallowing, which allows stringency to develop at the back of the throat.

Jayashree Arcot, Associate-Professor of Nutrition, Food Science and Technology at University of New South Wales, discussed her 20 years of folate research, as well as an insight into the world of an academic, before AIFST Continuing Professional Development coordinator Bronwyn Graham gave an inspiring speech on career development and presentation skills to conclude the 2015 AIFST Summer School.

## 48TH ANNUAL CONVENTION

Sydney's iconic Luna Park will play host to the biggest food industry event in the Asia-Pacific this August – the 48th Annual AIFST Convention and 15th Australian Food Microbiology Conference.

Over three days, local and international experts and professionals from all areas of the food industry will provide insight into new research and hot topics facing the industry today.

This year's theme, *Food for All*, will cover the big ideas and latest thinking

on Australia's role in catering for the world's growing population.

Presentations not to miss include:

- **The changing food industry**  
Population growth, chronic disease, climate change, social inequality and environmental sustainability are all issues now forcing the food industry to rethink the way it does business. Join the discussion on the big picture moving forward with Ann Bray (Department of Industry, Canberra), Dr Ingrid Appelqvist (Food R&D policy leader, CSIRO), Kim Leighton (director of Strategic Policy & Partnerships, NSW Food Authority) and Karen Stein (Deloitte).

- **Kicking food safety goals**  
In light of recent contamination events in Australia, keynote speaker Linda Harris from the University of California's Department of Food Science and Technology will delve into global food safety, providing some insight into how to avoid disease outbreaks.

- **Food retailing – push or pull?**  
Some of Australia's supermarket giants will give their insights into where the power and responsibility sits in the world of food retailing – with major food producers or the consumers.

To register for this year's convention please visit [www.aifst.asn.au/registration.htm](http://www.aifst.asn.au/registration.htm).

## CPD UPDATE

The AIFST Continuing Professional Development (CPD) program provides food industry professionals the opportunity to continue their professional development by learning new information and skills, and keeping up to date with the latest advancements and ways of thinking within our rapidly changing food industry.

For many professionals, the CPD program is also an opportunity to showcase to both current and future employers a commitment to the industry or profession of choice.

All CPD program events provide participants with certificates of attendance which record their CPD hours. In 2014, the then AIFST Council recommended all AIFST members remain current in the industry by accumulating a minimum of 20 hours of CPD within every three-year period.

The new CPD events proposed for 2015 include *Food Packaging*, *'Who's Responsible?'*, *Risk Management in the Food Industry*, the annual *Innovations Masterclass* and several food ingredients workshops.

For all CPD events, see the AIFST website, [www.aifst.asn.au/events](http://www.aifst.asn.au/events)





AIFST

## VALE ELAINE CONROY 1935 – 2015



AIFST has lost one of its most loyal foundation members and stalwarts with the passing of Elaine Conroy, who died recently after a short illness in Melbourne.

Elaine worked in Sydney for many years, first at WD&HO Will / Amatil in the 1970s on the lines, before one of the senior management recognised her potential and transferred her into the laboratory. From there Elaine moved into the sales arena at Polak Frutal Works, a Dutch flavour company, before moving on to Felton Flavours and later to Naarden.

At this time in the 1970s, she was one of the first women in technical sales in the Australian food and flavour industry. It was from this beginning that her networking skills were developed and then later honed when she joined Bush Boake Allen

(BBA) in 1983 as a marketing/business development manager.

Focused on savoury flavours, Elaine was instrumental in introducing a number of new technologies to BBA in the 1990s. She contributed heavily to the success of BBA during her time there. When International Flavors & Fragrances (IFF) took over BBA in 2000, she continued to work as a consultant on special projects, developing new business and liaisons with major customers. After 25 years, Elaine finally 'retired' in 2009. Retirement was not a concept that came easily to her. She was always prepared to try something new, to innovate as evidenced by her foray into people placement.

Her passion and love was the food industry and its associated industry and professional bodies such as CAFTA, FTAA and AIFST respectively. Her service to AIFST is legendary, as both convention chair for the Silver Jubilee Convention in Shepparton, and on Convention committees for all of the subsequent Melbourne Conventions. She plotted one of the most remarkable after-dinner speakers for the 1987 Albury Convention, the renowned speaker/comedian Campbell McComas who fooled everyone into believing he was vice-president of BBA until at the end when his wig was removed and the real speaker revealed.

Elaine Conroy was first and foremost a people person. She understood the value of people in the workplace, the value of networking, and the importance of individuals within the total life context. Hers was a spirit of

generosity, a spirit of giving without recompense, and a bubbly personality. She worked tirelessly to ensure that the legacy of the founding fathers of AIFST was carried on while still initiating, accepting and embracing change.

She was passionate about young people joining the Institute and took great pleasure in mentoring young people at the start of and throughout their professional careers. She instilled in so many a sense of self-worth and self-belief and respected those whose knowledge and experience was different from her own.

She advocated long and hard with many employers to include membership of the AIFST as part of salary packages. However, for her it wasn't a one-way street. If an employer paid your membership, then you had reciprocal responsibilities – attendance at a minimum of two technical and one social function per year. She was an early advocate for Continuing Professional Development. In 2001, she received the President's Award for services to the AIFST at Branch and Council level.

We mourn Elaine's passing, we celebrate her life, her achievements, her love of life, of work and her ability to play and socialise. A pillar has been lost from the food industry, but she would hope that those who are left will become pillars for the food technologists of the future.

*From contributions of Martin Eagle, Alan Mortimer, Kirsten Adamson, Peter Simpson, Geoff Cadwallader, Tony Zipper, Jenny Robertson.*



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### AIFST MEMBERSHIP

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## GEORGIE ALEY APPOINTED FIRST AIFST CEO



AIFST is thrilled to announce that well-known food industry leader Georgie Aley has been appointed as our first chief executive officer.

Ms Aley started in her newly created role on 1 April, where she

will strategically drive the Institute's promotion and support of Australian food industry professionals, and their contribution to both the local and global markets.

AIFST chair Dr Anne Astin says Ms Aley's appointment will see the continued growth of the AIFST's membership base and role within the Australian food industry.

"AIFST is the leading voice in Australia for professionals working in the food industry and Georgie brings with her extensive market insights, strong networks and sharp business acumen," said Dr Astin.

"She has a strong passion for the Australian food and agribusiness sector and a commitment to ensuring a world-class, innovative and engaged industry."

Ms Aley has been the managing director of the Grains & Legumes Nutrition Council (GLNC) since 2012, and is also non-executive director of Pulse Australia Limited, Future Farmers

Network Limited and Workforce Consulting Pty Ltd.

In 2014, she was named in the *Australian Financial Review* and Westpac's 100 Women of Influence, and was also honoured in the Women in Australian Agribusiness 100 list. She was also appointed to a global leadership role to create awareness as part of the United Nations 2016 International Year of the Pulses.

Ms Aley says she is honoured to join AIFST and continue to build and promote the role food professionals play in ensuring safe, nutritious and innovative products are available to Australians and our international trade partners.

"It's an exciting time for the Australian food and agribusiness sector. It is a key economic pillar for Australia and, with a growing community interest in food, we have a terrific opportunity to drive real outcomes for our industry," Ms Aley said.

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AFGC

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# FOOD SAFETY – BACK ON THE AGENDA

*Currently, food safety is front of mind for many Australians. Revamping Country of Origin labelling is no substitute for risk-based food safety assurance systems.*

Words by Dr Geoffrey Annison



Last year I wrote that 2014 began with the industry firmly in the cross-hairs of the anti-sugar lobby as the World Health Organization (WHO) commenced its consultation on the proposal to reduce the guideline to reduce dietary intake of free sugars to less than five per cent of energy. A year later WHO has conceded that not enough evidence exists to support the proposal, so the guideline will remain advising free sugars contribute no more than 10 per cent of dietary energy.

This year, 2015, began with the industry again in the cross-hairs, but this time on food safety issues. A hepatitis A outbreak linked to frozen berries, scromboid cases caused by tinned tuna consumption, and high lead levels found

in tinned fruit have caused a public outcry, a great deal of media attention, and calls for changes to country of origin labelling (CoOL). Although the details of the cases are still being investigated (at time of writing), food safety will remain a high profile issue for some time, and indeed it should. The most recent annual report<sup>1</sup> (for 2010) of foodborne and suspected foodborne outbreaks reported 2146 persons affected, including 157 hospitalisations. Fifteen deaths occurred during these outbreaks. *Salmonella* was the most common aetiological agent identified in foodborne outbreaks and restaurants were the most frequently reported food preparation setting. The commercial food industry was responsible for less than one per cent

of outbreaks and three per cent of cases.

These levels of food poisoning are clearly too high and it is incumbent on all who work in the food industry to promote continually the message of safe food handling when meals are being prepared. And food manufacturing companies must remain diligent in their focus on food safety across all aspects of their operations. But I'll return to this in a moment.

The criticisms of both CoOL and the inspection regimes for imported food which accompanied the media coverage of the hepatitis A outbreak demonstrates how little understanding there is in the wider community regarding food safety, food labelling and food regulatory systems. It cannot be denied that these

are complex issues but it belies the facts that Australia's food supply is very safe, CoOL has nothing to do with food safety, and our regulatory system is highly sophisticated, risk-based and effective at providing appropriate levels of protection. On top of that, food companies employ preventive food safety programs such as hazard analysis and critical control points (HACCP), which when implemented properly, reduce the risks of hazards in food to very low levels.

In the case of CoOL, we certainly do not want such labels to become *de facto* food safety warning statements on food products, and it would be misleading to consumers to suggest they can fulfil that function. Furthermore, if we go down that path, the Australian food industry risks retaliatory action from overseas countries potentially disadvantaging the push into export markets which has been heralded as a significant opportunity for industry, and the broader economy.

We should also be pushing back on suggestions that the level of food inspection for imported foods should be increased. It must remain a risk-based system where the best science coupled with established practices of taking into account good compliance records lead to a cost-effective surveillance program. Simply upping the level of inspection is no guarantee of better food safety outcomes.

Returning to food manufacturing companies... If a breakdown in product integrity does occur resulting in a food poisoning outbreak, the damage can be substantial. Apart from the cost of recall, and loss of sales, brand equity can suffer enormously, requiring large investments to regain consumer trust and market share. Clearly, therefore, food safety and quality assurance should be front of mind of all senior management and boards of food companies. Good governance requires product safety to be a priority item on the company's risk register.

Last year the AFGC in partnership with the AIFST presented a one-day seminar with a program focused on food safety. Speakers from the Australian Institute of Company Directors, the CSIRO, regulatory agencies (Vic Health and the Australian Competition and Consumer Commission), the insurance industry, and a public relations agency gave chapter and verse accounts of why product safety management is a critical business issue, rather than just a technical matter. Promotion of the event directly targeted company senior management right up to Board level. Both the AFGC and the AIFST were disappointed, however, at the very low turnout for the event. But organisations were delighted by feedback from those who did register, complimenting the very high value of the seminar program.

We are considering holding a similar program later this year, and given the recent turn of events, we are hoping to see higher numbers. 🍷

## References

1. "Monitoring the incidence and causes of diseases potentially transmitted by food in Australia: Annual Report", *ozfoodnet Network*, 2010. CDI Vol 36 No 3 2012.

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



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## QUESTIONS & ANSWERS

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### Peter Schutz

*Respected food industry leader Peter Schutz has recently been announced as chair of the new Industry Growth Centre for Food and Agribusiness by the Federal Minister for Industry and Science, Honourable Ian Macfarlane. Mr Schutz's chairmanship is one of the latest developments in a \$188.5 million initiative to boost Australia's competitiveness and productivity, through five new Industry Growth Centres. Food and agribusiness is one of the identified areas of growth for the country.*

*With 43 years' experience in the food industry, Mr Schutz brings to the role a strong combination of commercial experience, innovation and leadership in industry, government and research sectors. He is currently the chair of industry-led, government-funded Food Innovation Australia Limited (FIAL). In his formative years, he was on a farm in southwest New South Wales before training as a biochemist at the University of Sydney, and as a wine scientist at Charles Sturt University.*

*For 10 years, Mr Schutz was head of commercialisation and innovation at George Weston Foods and for eight years was a member of the CSIRO's Food Futures Flagship Advisory Committee. He holds board and advisory positions on the Grains & Legumes Nutrition Council, Lupin Foods Australia, CSIRO Food and Nutrition Advisory Committee, the Victorian Centre for Sustainable Chemical Manufacture and chairs the Food Safety Advisory Committee at the Tasmanian Institute of Agriculture.*

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#### **Q** What do you think the Australian food industry needs in order to stay ahead?

**A** We need to put Australia in a stronger position to maximise investment in science and research, and to commercialise ideas that will increase our productivity and competitiveness in global markets. My vision is for the Food and Agribusiness Growth Centre to continue many of FIAL's pilot initiatives in order to achieve this outcome.

With industry advice and participation, we can capitalise on the strengths of food and agribusiness and focus research spending to stimulate innovation and entrepreneurship so that Australia is able to adapt quickly to changing economic conditions and seize new opportunities.

#### **Q** What are you looking forward to the most about your new role?

**A** The Industry Growth Centre for Food and Agribusiness will be the catalyst that transforms the industry in areas of comparative and competitive advantage, such as growing the skills base and aligning activities to deliver value across the supply chain. I believe the Federal Government's vote

of confidence in food and agribusiness through the new Centre recognises the work we have already done together through FIAL, and I'm looking forward to another round of consultations with industry nationally to build on the strengths of what we've already put in place.

We will appoint a small industry-led board to the Growth Centre and we expect to begin national consultations shortly to seek input to set the priorities for the new Centre.

#### **Q** How will your current role prepare you to lead the Industry Growth Centre for Food and Agribusiness?

**A** Over the past 18 months at FIAL, we have worked to bring the food and beverage industry together to share knowledge, enhance market skills and connect businesses to opportunities in Australia and Asia. The insights gleaned on the challenges facing industry and initiatives piloted by FIAL will play a critical precursor to the success of the new Industry Growth Centre for Food and Agribusiness. What we've been able to achieve through FIAL in a very short time has shown us that the food and agribusiness industry is well placed to leverage the enormous wealth of intellectual

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and technical capital, and agricultural resources to generate economic benefit for Australia.

**Q Over your 43-year career, what are some of the most valuable things you've learnt about affecting large-scale change?**

**A** The first would be to encourage the development of and investment in your people. At the core of any company or organisation are the people, and their development and success leads to the growth and success of a company or organisation.

Secondly would be to always challenge the status quo, whether it is in systems, processes or markets, to find better ways to achieve an outcome. As an example, by introducing innovative printed egg carton advertising as a means of promoting egg nutrition in Australia, we reversed a 30-year decline in egg sales.

Thirdly, it is important to remember there is enormous power in collaboration. When George Weston Foods (GWF), CSIRO and Clover Corporation joined forces to create the first successful bread in the world containing omega-3 fish oils, it led to the creation of a new category in the bread space. Being a part of that collaboration was particularly significant for me.

Finally, be a risk taker. Research which I initiated and championed at GWF over 10 years ago lead to lupin kernels transitioning from a commodity animal feed to a valuable ingredient for human health and nutrition. This is research that continues today at Lupin Foods Australia.

**Q You've dedicated your life to the food industry. What makes you so passionate?**

**A** Growing up on farms, I gained an understanding of many of the issues facing our food producers. Then, in my various food manufacturing roles, I worked across a range of areas including sales, marketing, operations and general management. This gave me a full understanding of big business food production and the importance of innovation and collaboration to stay competitive. I then put all that knowledge to good use in my time at the CSIRO Food Futures Flagship Advisory Committee, where our aim was to transform the Australian agrifood sector and develop innovative processing technologies to help generate increased prosperity and sustainability. And that is where my passion now lies – in the future prosperity of food production in Australia. ☺

For more information on the Industry Growth Centres, to make contact and participate in the process, go to the following website link: [www.business.gov.au/advice-and-support/IndustryGrowthCentres/Pages/default.aspx](http://www.business.gov.au/advice-and-support/IndustryGrowthCentres/Pages/default.aspx)



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# CHEMICAL MIGRATION FROM PACKAGING TO FOOD

*A new FSANZ proposal aims to increase understanding of how packaging is used in food production and highlights possible risks resulting from chemicals migrating into food.*

Words by Drs Marion Healy and Barbara Butow



Modern packaging allows food to be transported more easily, prevents microbial contamination and can dramatically increase a product's shelf life. But as packaging materials become increasingly complex in design and composition, thought needs to be given to the chemicals involved in producing packaging and any possible effects on human health and safety from the migration of chemicals into food.

Of the many chemicals involved in manufacturing packaging, some have the potential to migrate into food. Some of these chemicals also have the potential to lead to harmful effects. Food Standards Australia New

Zealand (FSANZ) is currently working on a proposal that aims to increase our understanding of how packaging is used in food production and the nature of possible risks resulting from chemicals migrating from packaging into food. The proposal further seeks to determine whether current risk mitigation measures are sufficient to address any risks associated with chemical migration from packaging to food or whether other measures might be needed.

The focus of the proposal is food offered for retail sale, including food sold for catering purposes. While the proposal will investigate chemicals found in packaging and any safety

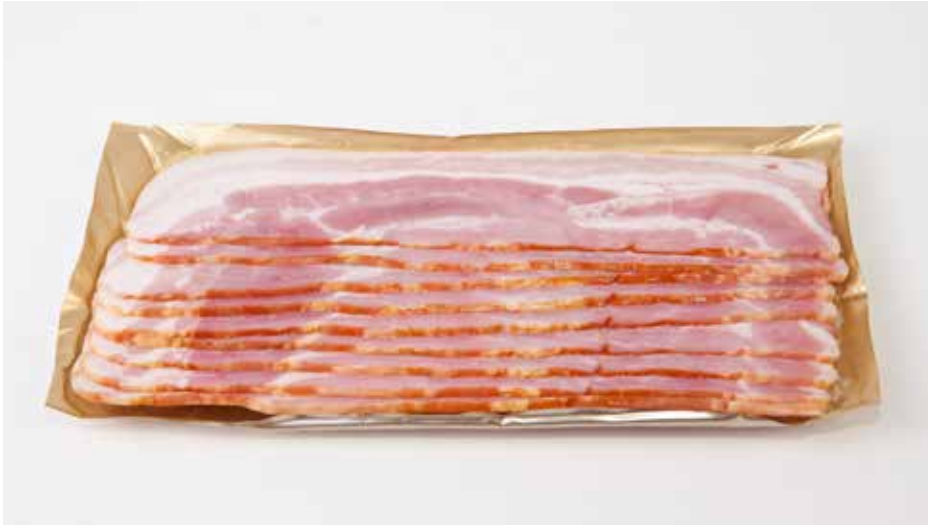
risks from the presence of those chemicals in food, it will not cover the packaging per se. Any issues relating to packaging safety, composition and utility are outside of FSANZ's remit and are covered by the Australian Competition and Consumer Commission (ACCC).

Current legislative requirements in Australia and New Zealand, including State and Territory Food Acts, aim to keep food safe and suitable. State and Territory Food Acts and the New Zealand Food Act contain general provisions for packaging, which make it an offence to sell food packaging or handling materials that are unsafe or will make food unsafe. In addition, food businesses must comply with the FSANZ Code (the Code), which includes requirements for several specific packaging-related contaminants that have maximum allowable levels. For all other packaging-related chemicals, the responsibility for the safety of packaging materials rests with manufacturers and retailers.

As part of its proposal development, FSANZ is investigating whether current legislative requirements in Australia and New Zealand give enough certainty and clarity for industry to manage the potential food safety risks that can arise from food packaging materials.

To answer this, FSANZ has called on industry, consumers and other stakeholders across all jurisdictions





for feedback to firstly gauge the size of the packaging market, as well as the general practices that are used. Established at the start of this work, the Trans-Tasman Industry Advisory Group (IAG) on food packaging provided valuable insight and advice on regulatory issues faced by industry and the approaches implemented to ensure that food-packaging risks are managed. A broader advisory group, the Packaging Advisory Group (PAG), has since been set up to include industry peak bodies, representatives from small to medium-size enterprises, consumers and government groups, and will be consulted throughout the remainder of the project.

FSANZ is also looking at the results of analytical surveys for the presence of packaging chemicals in food, analysing the results of more recent survey work undertaken in the second phase of the 24th Australian Total Diet Study, analysing evidence and information from other regulatory

bodies around the world and in scientific literature, and looking at existing regulations and industry control measures.

### How does chemical migration occur?

In general, food that has been contaminated by packaging chemicals has been in direct contact with the packaging in question. However, there have been cases where contamination has occurred from secondary or tertiary packaging. Contamination can even occur at different stages of the production cycle, for example, through contact with printing inks used on labels, packing and even storing of products.

The type of packaging largely determines the potential for chemical migration from packaging to food. Chemical migration is more likely to occur from materials such as plastics, elastomers, paper and board. For apparently inert materials such as stainless steel, ceramic or glass,

chemicals lining the inner surface and in direct contact with the food could lead to contamination, and migration may still occur from closures or sealants containing plasticisers. The type of food can also have an effect on the level and speed of chemical migration from packaging to food. For example, foods with high levels of fat are more susceptible as many packaging chemicals dissolve in fat faster and more easily.

A number of food packaging materials and substances have recently received international attention due to their potential to cause adverse health effects. FSANZ's proposal aims to look at these chemicals in an Australian and New Zealand context.

FSANZ's proposal also aims to find out if regulations and industry standards have developed at the same speed as packaging styles and production technology. While the period for comment has closed on the most recent consultation paper, FSANZ is continuing to consult with a broader range of stakeholders and through advisory bodies set up to help inform the project.

FSANZ will assess all submissions received on the consultation paper and is preparing advice for the FSANZ Board on any risks not being managed in the current system. A decision on any further work on the proposal is expected to be made in the coming months.

You can find all the proposal documents on the FSANZ website at [www.foodstandards.gov.au](http://www.foodstandards.gov.au). 

*Dr Marion Healy and Dr Barbara Butow are both leading scientists at FSANZ.*



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# RAW MILK VS RAW MILK CHEESE

*Recent events have confirmed that raw milk can be harmful if consumed, but does this also apply to raw milk cheeses?*

Words by Bruce Nelan and Dr Lisa Szabo



The tragic death of a young child and four other illnesses in Victoria linked to the consumption of raw 'bath milk' made headlines across Australia in December 2014. In January this year, the Ministerial Forum on Food Regulation, which comprises Australian and New Zealand ministers responsible for food regulation, asked that a national policy be prepared with the aim of preventing the consumption of bath and cosmetic milk. At the same meeting, Forum members approved changes to the Food Standards Code (Standard 4.2.4 – Primary Production and Processing for Dairy) that permitted the sale of a range of raw milk cheeses.

Those two seemingly contrasting positions are under-pinned by risk analysis undertaken by Food Standards Australia New Zealand (FSANZ). In 2012 FSANZ reported the findings of four years of research and analysis on raw milk and raw milk products. On the one hand, it found that the level of risk for products such as raw drinking milk cannot be sufficiently reduced and as such, these products presented a high level of public health and safety risk. Yet it also found that for certain cheeses, specific production and processing controls when combined can provide a product with an acceptable level of public health risk.

For many years an anomaly in the Food Standards Code meant that European Gruyère, Sbrinz, Emmental and Roquefort raw milk cheeses could be sold in Australia

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while near-identical local products remained illegal. FSANZ addressed the problem by amending references to Swiss ordinances for production of Swiss cheeses to generic requirements for cooked-curd cheeses. Then in February this year, it further amended Standard 4.2.4 to allow for the manufacture of cheeses where the finished product does not allow pathogenic bacteria to grow, and where following fermentation and maturation there is no increase in numbers of pathogenic bacteria.

### What does this mean for Australian cheese makers?

The amendment to Standard 4.2.4 requires that (i) the finished product does not allow pathogenic bacteria to grow and (ii) following fermentation and maturation, there is no increase in numbers of pathogenic bacteria. This amendment allows local cheese makers to compete with imported raw milk products. However, compliance with the amended Standard 4.2.4 around pathogenic bacteria will not be easy.

The products that comply with requirements will mostly be semi-hard to hard or blue vein cheeses. In general, many Camembert and Brie style cheeses are permissive to the growth of *Listeria monocytogenes* due to high moisture content, relatively low salt and pH approaching neutral after ripening. A product with these characteristics means it does not comply with Standard 4.2.4.

Once a cheese maker has identified a source of good quality raw milk, the next challenge is to develop a cheese that does not support the growth of pathogenic bacteria. This stage of the project might be based on an existing pasteurised milk cheese or there may be benefits in doing initial trials with pasteurised milk. *Listeria monocytogenes* is typically the target pathogen and cheese makers must aim to create an environment within the cheese that is hostile to its growth. Many factors are likely to influence the environment but low pH, low water activity (or high salt-in-moisture which is a slightly less accurate measure) and high lactic acid concentration are important.

Once product development is settled, results of testing pH, water



activity and lactic acid are used to appraise the potential for growth of *Listeria monocytogenes* in the cheese. Initially, this can be measured against default criteria developed by the Codex Alimentarius Commission (Codex) and used by FSANZ in Standard 1.6.1 – *Microbiological limits in food*. However these criteria are quite conservative and many cheeses that appear to support the growth of *Listeria monocytogenes* may, in fact, not.

Instead, FSANZ believes the Augustin model is more applicable to cheese. It divides cheeses into three categories:

1. growth will definitely occur
2. growth definitely will not occur
3. a grey zone where the outcome is uncertain.

Unfortunately a considerable number of cheeses end up in the grey zone and many have subsequently been found not to support growth. The Food Safety and Spoilage Predictor has an additional layer of complexity and it appears to be a superior tool but, lactic acid concentration in the cheese is required to make the most of the model.

If modelling doesn't provide a clear answer, cheese makers have the option to reformulate or opt for a challenge trial. If they go down the path of a challenge trial, the inoculated product test includes introducing pathogenic bacteria into the milk prior to fermentation and then tracking their numbers through fermentation and

maturation. To be successful, bacterial numbers should decrease rather than increase during maturation. These tests must be done in a laboratory situation and the laboratory must be able to prepare cheese that mimics the commercial product.

A challenge trial can also assess if numbers of pathogenic bacteria increase following the completion of fermentation and maturation. This type of study has the potential to be expensive and it should only be done when modelling suggests there is likely to be success.

Models are available to estimate pathogen growth during fermentation but to be meaningful, the cheese maker must measure pH and lactic acid at intervals during fermentation. Modelling of lag time is difficult and this part of the process is best left to an experienced modeller.

Thermal and non-thermal inactivation models are also available. Non-thermal models can estimate inactivation during maturation. It is useful to know the physico-chemical properties of the cheese at the beginning and end of maturation. Modelled inactivation can then be compared to modelled growth. If an increase in pathogen numbers appears to be likely then a decision might be made to redevelop the product.

Non-thermal inactivation of pathogens is a slow process in cheese. It is important to minimise the amount of growth that pathogens make during



the early stages of cheese making. Fermentations that use an active starter culture better limit increases in pathogen numbers. Inoculation with larger volumes of starter is better than using smaller volume. Also, temperatures that favour the starter more than the pathogen should be used. Lower pH, lower water activity and higher maturation temperatures favour pathogen inactivation. If the characteristics of the cheese tolerate higher maturation temperatures, then 12°C or 15°C will provide more effective inactivation than 10°C.

The final stages of product development will use raw milk. Cheese makers should demonstrate that their manufacturing process is reproducible and finished batches of cheese are uniform. Careful monitoring of five production runs should provide evidence of a robust and reliable process as well as assurance regarding pathogen growth.

It is an imperfect trial because if pathogens are not present in the milk

then there is no natural challenge. However, surveys of bulk raw milk usually report a moderate prevalence of *E. coli*, *Listeria* species and *Staphylococcus aureus*, leading one to presume that five cheese vats of milk are likely to provide results of interest. If the models and the tests on product suggest the potential for increasing pathogen numbers is low then a challenge test can be approached with increased confidence.

### What does this mean for dairy farmers?

Dairy farmers intending to supply milk for raw milk cheese will have to be among the best in the business. As you might expect, the health of the dairy herd is a critical issue and udder health, including mastitis control, is a key requirement.

Udder health is reflected by low somatic cell counts in milk. Individual animal counts or sometimes counts on each quarter of a cow's udder may be gold standard. However, cell counts

on bulk milk from the farm vat can also provide an excellent measure of quality. Generally, target counts are difficult to achieve day after day for all but top strata herds.

To consistently meet standard plate count requirements, good milking hygiene is crucial. Just as with udder health, achieving standard plate count targets is a whole-of-farm issue and includes teat preparation, milking machine maintenance and cleaning and sanitation of milk handling equipment. Even then, if the laneways that cows take to milking are boggy in wet weather, plate counts are likely to exceed targets.

In the event that farms fail to meet standards, alternative uses for milk, such as pasteurised products or cooked-curd cheese, can be put in place. Only dairy farms that routinely receive premium prices under milk quality payment schemes can supply milk for raw milk cheese. Farms that miss out on premium payment more than a few times a year must address udder health and milking hygiene problems before considering that market.

Provided the measures outlined in this article are used in the production of approved raw milk cheeses, the protection of public health is equivalent to products prepared from pasteurised milk.

Yet, raw drinking milk interventions remain limited to animal health and testing requirements, which provide a much lower level of public health protection. To prevent more tragedies like those across Victoria late last year, more needs to be done to better regulate the sale of bath and cosmetic raw milks.

Further information is available on the following websites:

[www.foodstandards.gov.au](http://www.foodstandards.gov.au)

[www.fssp.food.dtu.dk](http://www.fssp.food.dtu.dk)

*Bruce Nelan and Dr Lisa Szabo are from the NSW Food Authority, helping to provide NSW with an integrated food regulation system.*



# QUALITY BENEFITS OF HIGH-PRESSURE MEAT PROCESSING

*Reporting on research for the modification of textural and functional properties of food products, Anita Sikes shares key findings on how this technique can benefit the Australian meat industry.*

**Words by** Anita Sikes

High-pressure processing (HPP) is now an established processing technology in the food industry for the shelf-life extension of many products, including fruit juices, sauces, guacamole and dips, meal kits, seafood in their shells, and ready-to-eat meat products.

In the US and Europe, HPP has been applied successfully to ready-to-eat products such as sliced ham and salami for the extension of shelf life and the destruction of pathogenic microorganisms without the use of further heat or preservatives. HPP for cold pasteurisation applications involves pressures of up to 600 MPa at ambient temperature for a few minutes. This eliminates spoilage microorganisms and pathogens by damaging cell components while maintaining the flavour, nutritional

profiles and fresh-like characteristics of the product.

With more than 260 commercial units installed worldwide for refrigerated products, current research and development is focused on food functionality and combinations of high pressure and temperature to produce high-quality shelf-stable products.

## **Tenderisation**

In addition to food safety benefits, HPP has the potential to improve the eating quality attributes and yield of red meat and meat products. The team at CSIRO Food and Nutrition Flagship is investigating opportunities to improve the tenderness of lower value whole meat primal cuts. Tender primal meat cuts comprise only about 30 per cent by weight of the beef carcass. The

remaining cuts generally have higher connective tissue content and are usually tougher and require different cooking and ageing protocols. The CSIRO Food and Nutrition team believe there is an opportunity to improve the eating quality and add value to these lower valued cuts.

In recent research funded by Meat & Livestock Australia (MLA), CSIRO has demonstrated a large improvement in the tenderness of beef neck muscle, a high connective tissue content muscle, using pressures of 200 MPa in combination with a temperature of 60°C (Sikes *et al.*, 2010). A range of other commercially available cuts, representing tougher to more tender cuts such as topside, eye round and striploin, showed similar improvements in tenderness. This combination of





pressure and heat treatment followed by cooking at 80°C showed a reduction of approximately 40-65 per cent in the Warner-Bratzler shear force, a measure of tenderness, for each of these muscles (Figure 1).

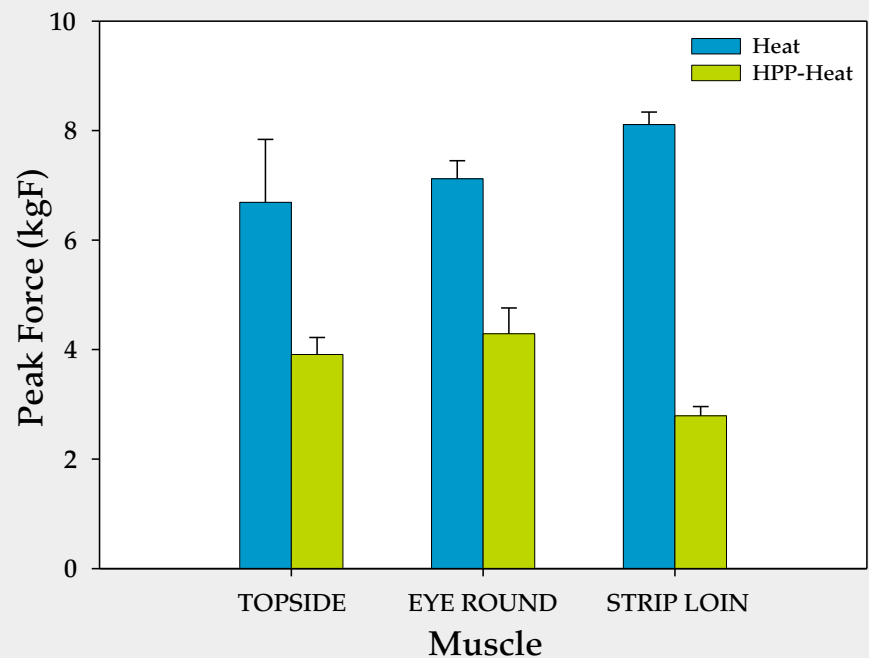
Further studies funded by MLA show that meat tenderness and overall yield of beef topside steaks are improved using a single-step combined high-pressure heat process of 200 MPa applied at 60-76°C, with no need for further cooking (Sikes and Tume, 2014). This single-step, combined pressure-heat process resulted in a 50 per cent reduction in shear force value compared to heat only, particularly at 72°C and 76°C (Figure 2). Further, there were substantial differences in weight loss between the two treatments, with approximately eight per cent weight loss in the combined pressure-heat treated meat compared to 30 per cent for the 76°C heat alone treatment (Figure 2). These results clearly show that a combined high-pressure heat process for steak-size meat portions improves the eating quality of lower value cuts and has important yield benefits for the red meat industry.

One limiting attribute of this high-pressure heat process is the impact on fresh meat colour, as the application of high pressure results in the denaturation of the muscle proteins giving the meat a cooked-like appearance. However, numerous opportunities exist to produce convenient, ready-to-eat meal alternatives. Concept products including lamb tagine, goat curry, beef short rib and beef chuck soft taco were recently developed and prepared using HPP-treated meat and showcased in an industry workshop on HPP hosted by CSIRO and Meat & Livestock Australia.

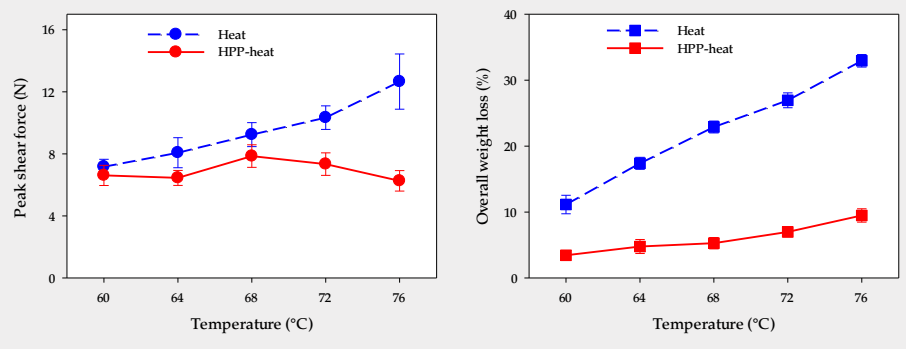
### Improved binding of meat emulsion products

Recent evidence has highlighted the substantial public health gains from reducing dietary salt intake. Consequently, there is increasing pressure on the food industry to reformulate and manufacture salt-reduced products. For the meat

**Figure 1:** Comparison of the effect of combined high pressure and heat versus heat on the texture of beef muscle cuts by Warner-Bratzler shear force.



**Figure 2:** The effect of combined high pressure and heat versus heat on the texture (peak shear force) and yield (overall weight loss) of beef topside steaks (Sikes and Tume, 2014 with permission from Elsevier).



industry, emulsified muscle food products such as sausages and luncheon meats in particular are perceived as being high in fat and salt, and generally less healthy.

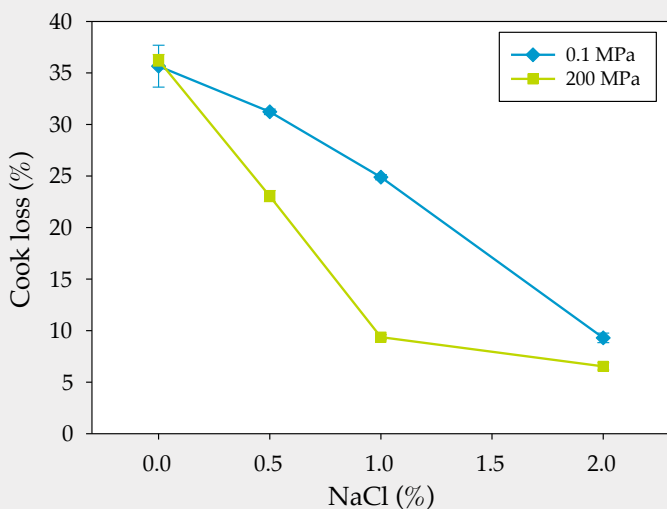
In general, emulsified meat products contain 1.8-2 per cent salt as it is required for extraction of the salt-soluble proteins to achieve binding of muscle components upon cooking. The resulting poor texture of lower salt meat products has been one of the downfalls in their commercialisation.

CSIRO has shown that at 10°C and 200 MPa, beef sausage products containing 0.5-1 per cent salt had

excellent functional properties in terms of bind strength, with high cooking yields compared with non-pressure treated sausages (Sikes *et al.*, 2009). Sausages containing one per cent salt and treated at 200 MPa had a cook loss (the amount of moisture lost during cooking) of only 9.3 per cent compared to 24.9 per cent for the unpressurised sample. HPP sausages containing one per cent salt had similar yields to untreated sausages containing two per cent salt (Figure 3).

Importantly, HPP resulted in no changes in the colour attributes in either the cooked or uncooked

**Figure 3:** Comparison of the effect of high pressure and sodium chloride content on cook loss in sausage products (Sikes et al., 2009 with permission from Elsevier).



sausages. Overall, the sausages were found to have a greater acceptability in both appearance and texture compared with untreated control samples following assessment by a consumer sensory panel. The same HPP technology may be applicable to other meat species such as pork, lamb, chicken or fish.

### Opportunities

Research at CSIRO has shown the effectiveness of HPP, not only for the shelf-life extension of meat products, but also for the modification of textural and functional properties of whole meat cuts and emulsion-type sausage products.

Improvements in the tenderness and yield for low-value meat cuts and salt reduction in emulsion type products provide opportunities for the red meat industry. Consumers will benefit from healthy, convenient and economical meat products of consistent quality and excellent functional properties.

There are an increasing number of HPP units in Australia available for contract processing of meat which will reduce the cost of market entry for meat processors and brand owners. 🍖

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*Anita Sikes is part of the team of meat scientists at CSIRO's Food and Nutrition Flagship.*



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## NUTRITION WATCH

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

Words by *Dr Ramon Hall*



### **Cocoa flavanols may help with cognition during ageing**

In a study conducted at the Department of Life, Health and Environmental Sciences at the University of L'Aquila in Italy, researchers have investigated the effect of flavanol consumption on cognitive performance in a group of cognitively intact elderly participants (Mastroiacovo *et al.*, 2015).

Using a double-blinded controlled parallel study design, a total of 90 elderly participants without clinical evidence of cognitive dysfunction were randomly assigned to one of three different experimental dietary groups.

The three test groups (each with 30 participants) were given drinks for eight weeks containing different levels of flavanols: group 1 (high flavanol = 993 mg); group 2 (intermediate level of flavanols = 520mg) or group 3 (low flavanol = 48mg).

All participants were assessed for

cognitive functioning measurements before the start of the experimental period, including Mini-Mental State Examination, Trail Making Test A and B and Verbal Fluency Test, and again after eight weeks of the respective treatment protocols.

The results revealed that although there was no significant difference between the three treatments in relation to the Mini-Mental State Examination, there was a positive change on specific aspects of cognitive function.

In particular, the time taken for participants to complete the Trail Making Test A and B was significantly improved for both the high flavanol and intermediate flavanol drink groups compared to low flavanol group.

Additionally, the Verbal Fluency Test score was significantly improved in all treatment groups, but the effect size of improvement was significantly greater in the high flavanol drink group compared to the intermediate

and low flavanol drink groups.

There were also beneficial significant changes observed in the two higher flavanol treatment groups compared to the low flavanol group in insulin resistance, blood pressure and lipid peroxidation.

The authors concluded that "the dietary intervention study provides evidence that regular cocoa flavanol consumption can reduce some measures of age-related cognitive dysfunction, possibly through an improvement in insulin sensitivity. The data suggests that the habitual intake of flavanols can support healthy cognitive function with age."

In a related editorial, Professor Miguel Alonso-Alonso (2015), points out that the optimal intakes of flavanols for brain and cognitive health is still to be determined and that it may be difficult when other sources, apart from cocoa, provide sources of these phytochemicals (eg. red wine, fruit or tea).



He also highlighted the challenge of finding ways to enhance the levels of flavanols in cocoa and chocolate while balancing energy contribution to the diet.

The results of this recent study should be of interest to developers of elderly nutrition products and for products aimed at enhancing cognitive functioning.

Mastroiacovo *et al.* (2015) "Cocoa flavanol consumption improves cognitive function, blood pressure control, and metabolic profile in elderly subjects: the Cocoa, Cognition, and Aging (CoCoA) Study—a randomized controlled trial." *American Journal of Clinical Nutrition*, 101, 538-48, (doi: 10.3945/ajcn.114.092189).

Alonso-Alonso (2015) "Cocoa flavanols and cognition: regaining chocolate in old age?" *American Journal of Clinical Nutrition*, 101, 423-4, (doi: 10.3945/ajcn.114.106146).

### Strength gains greater for dairy compared to soy in older adults

Researchers at the University of South Australia and CSIRO in Adelaide, South Australia, have conducted a study to determine whether dairy or soy protein intake combined with resistance training would enhance strength gains in older adults (Thomson *et al.*, 2015).

In a randomised controlled parallel design trial, 179 healthy older adults with a mean age of  $61.5 \pm 7.4$  years undertook a diet and resistance exercise program for 12 weeks. The participants were allocated to one of three different

dietary treatment groups containing the same amount of calories, but they differed in protein level and protein type. All participants were required to undertake three resistance-training sessions per week.

The three different dietary treatment groups were:

1. High dairy protein, containing  $> 1.2\text{g}$  of protein/kg body weight/day ( $\sim 27\text{g}$  dairy protein per day)
2. High soy protein, containing  $> 1.2\text{g}$  of protein/kg body weight/day ( $\sim 27\text{g}$  soy protein per day)
3. Usual protein intake, containing  $< 1.2\text{g}$  of protein/kg body weight/day.

All participants were assessed before the beginning of the study and at the end of the 12-week period for muscle strength, body composition, physical function and quality of life.

The study results indicate protein intake was higher on the high dairy and soy diets ( $1.41 \pm 0.14\text{g/kg/day}$  and  $1.42 \pm 0.61\text{g/kg/day}$  respectively), compared to the usual protein diet ( $1.10 \pm 0.10\text{g/kg/day}$ ). Strength gain in the dairy (92.1 per cent) and usual protein (92.3 per cent) diet treatments were significantly higher than the soy protein diet (63.0 per cent).

In general, there were significant improvements in measurements of lean mass, physical function and mental health scores and a reduction in fat mass across the three groups, but there was

no significant difference for any of these measures between treatment groups.

The authors conclude that, "increased soy protein intake attenuated gains in muscle strength during resistance training in older adults compared with increased intake of dairy protein or usual protein intake."

The authors propose that the attenuated strength gains seen with the consumption of soy foods may be mediated by soy isoflavones that could reduce post-exercise increases in serum testosterone, but highlight that further studies are required to confirm this effect of soy foods.

This study should be of interest to manufacturers of foods products for the older population and products aimed at muscle and strength development.

Thomson *et al.*, (2015) "Muscle strength gains during resistance exercise training are attenuated with soy compared with dairy or usual protein intake in older adults: A randomized controlled trial". *Clinical Nutrition*, published online ahead of print, (doi: 10.1016/j.clnu.2015.01.018).

### L-cysteine reduces appetite and suppresses satiety hormone (ghrelin)

A study team from the Imperial College London, UK, has investigated the effects of different amino acids on food intake in both rodents and humans, based on the known link between high-protein diets and weight loss (McGavigan *et al.*, 2015).

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In a series of studies initially involving rodents, a number of amino acids were analysed to determine any differences in food intake. These results highlighted candidate amino acids that require further study on their effect on food intake patterns, behaviour and energy expenditure.

Further animal studies were also undertaken to investigate neuron activation in the hypothalamus and brainstem and to also look at gastric emptying and gut hormone release. Finally, effects of candidate amino acids were studied in humans to investigate appetite scores and gut hormone release.

Initial results in the rodents showed that L-cysteine had the largest impact on food intake compared to other amino acids. L-cysteine was shown to produce a dose-dependent decrease in food intake in both rats and mice following oral gavage, which was not considered as a result of secondary behavioural or an aversive side effect. It was also shown to increase neuronal activation in the brain stem and delayed gastric emptying and repeated administration decreased food intake in rats and obese mice.

In the human study, a beverage containing L-cysteine (200mL containing 0.07g/kg L-cysteine) was compared to a beverage containing glycine (200mL containing 0.07g/kg glycine) and a placebo beverage (plain beverage, no amino acids). The beverage containing L-cysteine significantly reduced hunger and ghrelin levels compared to the other treatment groups.

The authors conclude that “our studies identify L-cysteine as an amino acid with potent acute anorectic effects. Further work is required to investigate whether the mechanisms responsible for these effects can be exploited therapeutically.”

These preliminary results highlight that there may be special activity on appetite and related hormones with the consumption of L-cysteine. Further human trials need to be conducted to confirm both acute and longer-term efficacy.

These results may be of interest to manufacturers of weight management products, health practitioners and researchers interested in potential mechanisms underpinning protein and satiety related weight management effects.

McGavigan *et al.*, (2015) “L-cysteine suppresses ghrelin and reduces appetite in rodents and humans”. *International Journal of Obesity*, 39, 447-55 (doi: 10.1038/ijo.2014.172).

### **Fatty foods consumption and incident type 2 diabetes**

Researchers from the European InterAct Consortium Study led by the German Institute of Human Nutrition Potsdam-Rehbrücke, Nuthetal, Germany, have investigated whether the intake of vegetable oil, butter, margarine, nuts and seeds and cakes and cookies is related to incident type 2 diabetes (Buijsse *et al.*, 2015).

This case-control study was conducted involving eight countries of the European Prospective Investigation into Cancer (EPIC), which included 12,403 incident type 2 diabetes cases, from an identified cohort of 340,234 people.

Diets were assessed using country specific questionnaires and country specific hazard ratios across four categories of fatty foods, non-consumers and tertiles among consumers were combined for analysis.


After adjustment not including body mass index, the results reveal that non-consumers of butter, nuts and seeds and cakes and cookies were at higher risk of type 2 diabetes compared with the middle tertile of consumption.

Among consumers, cakes and cookies were inversely related to type 2 diabetes, with hazard ratios reducing across the tertiles as consumption increased. All associations were attenuated (after adjustment for BMI), apart from the higher risk of non-consumers of cakes and cookies.

Higher consumption of margarine became positively associated with type 2 diabetes risk after adjustment of body mass index (hazard ratio across increasing tertiles: 0.93, 1.00 and 1.12; p-trend: 0.03).

When examining the consumer effects, there was no relationship between vegetable oil, butter and nuts and seeds and type 2 diabetes risk.

The authors concluded “consumption of vegetable oil and nuts and seeds is unlikely to modify type 2 diabetes risk under isocaloric conditions and independent from BMI according to our data. The exact reason for the higher type 2 diabetes risk among those with low intakes of cakes and cookies, in particular the non-consumers, as well as the apparent positive association between margarine consumption and type 2 diabetes risk in some countries, needs further understanding.”

As with all prospective cohort studies, we need to take caution when interpreting these results and any leads need to be investigated using randomised controlled trials to establish causality. These results certainly raise some interesting questions around established dietary guidance and as we understand more about the underpinning mechanisms related to the intricacies of fatty acid consumption and type 2 diabetes risk these may become clearer, such as the recent link between trans-palmitoleate (trans-16:1n-7) and reduced risk of type 2 diabetes. 

Buijsse *et al.*, (2015) “Consumption of fatty foods and incident type 2 diabetes in populations from eight European countries”. *European Journal of Clinical Nutrition*, published online ahead of print, (doi: 10.1038/ejcn.2014.249).

Mozaffarian *et al.*, (2013) “Trans-Palmitoleic acid, other dietary fat biomarkers, and incident diabetes: the Multi-Ethnic Study of Atherosclerosis (MESA). *American Journal of Clinical Nutrition* 97(4):854-61. doi: 10.3945/ajcn.112.045468.

*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.*



# RISK PROTECTION & THE SUPPLY CHAIN

*Assessing risk and securing your supply chain does more than just protect product and relationships. It is the backbone of successful business.*

Words by Marc Barnes

A globalised world is not a new concept or phenomenon. In fact international free trade agreements, the rapid progress and growing wealth of developing nations, and the development of revolutionary technologies such as the internet are all major influences on a continually globalised world and marketplace.

For companies to survive and thrive, particularly in the food industry, careful management of potential risks to the supply chain is integral. And yet it is an area in which many companies do not invest enough or accurately consider the consequences if there is disruption to the supply chain.

In a 2013 whitepaper by the American Productivity and Quality Center (APQC), 77 per cent of organisations indicated they had experienced at least one unexpected supply chain disruption over the previous two years, and yet only 65 per cent of respondents agreed that there was a need to identify and eliminate obstacles that undermine the ability to better manage supply chain risks.

Worryingly still, 47 per cent reported a lack of the resources required to assess risks properly and 64 per cent confessed to having poor visibility into risk factors among their tier 2 and tier 3 suppliers. In fact, the total number of organisations that experienced at least one supply chain disruption during the previous year said nearly half of these disruptions originated below the immediate tier 1 supplier.

But how does a company effectively monitor, manage and improve its supply chain?

A good supplier-auditing program is at the core of driving business improvements because it manages suppliers, which in return, manages risk. The first step for any company is mapping out the direct and indirect suppliers in the supply chain, which in a globalised supply chain can be particularly difficult and complex to navigate as suppliers are often geographically far from management hubs.

Top supply chain concerns to come from the APQC survey include high impact natural disasters such as floods, earthquakes and tsunamis (particularly disruptive for food and agribusiness industries); extreme weather such as severe heat waves or snowstorms; political turmoil in supplier nations; unplanned IT and telecommunications outages, data breaches and cyber attacks.

The larger and more diverse a company's supply chain, the more susceptible it is to these risk-averse events. Yet the size of the company does not necessarily dictate the extent and full scope of its potential loss, should it not sufficiently account for risk.

BSI's 2013 SCREEN Global Intelligence Report shows that risk to all companies' livelihoods and success is everywhere. The report found that political and labour unrest caused economic losses of at least \$100 billion

in Asia alone; there was a \$22.4 billion loss worldwide due to cargo theft and there were terrorist attacks on the supply chain in 15 different countries in 2013 including Colombia, Egypt, India and Thailand. Geopolitical events such as these must be considered when expanding a supply chain beyond Australian borders.

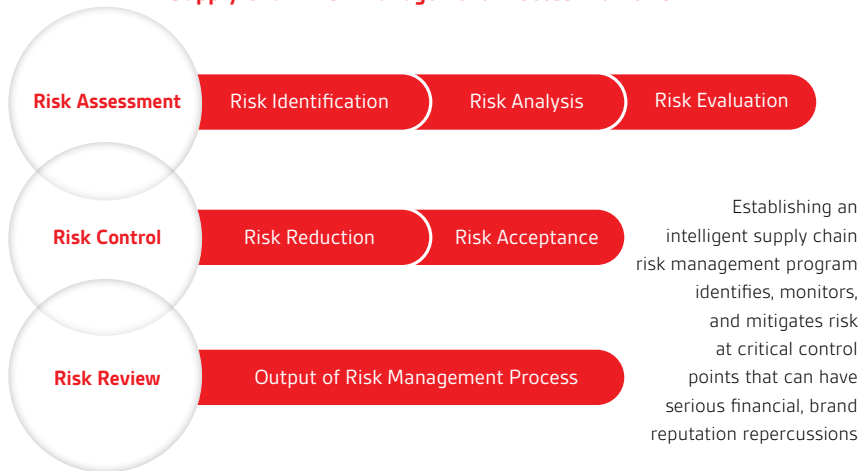
Events such as the horse meat scandal in the United Kingdom emphasise the potential risk in the Australian food industry – and the need for clarity in the food supply chain. As issues such as food terrorism becomes more of a reality, businesses need to be extra vigilant and confident that they have set up the basic practices on keeping their supply chains sabotage free.

## How to identify risk

The key to identifying and managing risk in the supply chain is intelligence, compliance tools and supplier verification audits. It is not uncommon that organisations have difficulty identifying all of their suppliers yet it is business intelligence to institute controls and leverage supply chain intelligence to not only ensure continued smooth production but also protect overall brand. Using a good supplier audit program will help identify the highest risk suppliers to focus on upfront.

There are several ways in which to conduct a supplier audit including supplier self-assessment, an onsite audit and supply chain verification

### Supply Chain Risk Management Process Framework



audits. A supplier self-assessment is an informal preliminary audit that involves each supplier completing a self-assessment that will help identify areas of weakness in the supply chain, and areas to focus on during the more extensive on-site audit process.

An on-site audit involves assessing everything from supplier performance and environmental conditions to controls in place around process and product quality and complaint handling. More specifically, manufacturers generally look for assurances from their supplier base that they are adhering to the requirements they have set forward.

These include:

- **Quality agreements** – providing quality assurance that products are produced and controlled consistently, and in the case of pharmaceutical and food, with no risk of cross contamination
- **Environmental compliance** – identify and manage the environmental impact of an organisation's products, and ensure environmental performance
- **Corporate social responsibility and human rights** – ensuring socially responsible, fair treatment of employees pertaining to health and safety, wages and underage workers
- **Bribery and corruption** – is your supply chain actually legal in the jurisdictions it trades in

- **Import compliance and trade security** – risk of unmanifested cargo, counterfeiting and theft
- **Business continuity** – assurances that in the event of business disruption, a supplier has a plan in place to quickly and effectively resume business operations
- **Behavioural compliance** – do your suppliers share you own company values?

In today's world, companies are under increasing pressure to establish effective programs around labour and environmental practices, responsible and ethical sourcing of materials, and efficiencies around energy, water and planning for a business disruption. A supply chain verification audit provides a bird's eye view of many aspects of a supply chain and allows manufacturers to determine the criticality of suppliers or strategic impact on the supply chain by determining who are the high risk and low risk suppliers; understanding the reasons why, and assessing the controls in place for suppliers.

#### Visibility

Having a secure supply chain provides a company with the visibility it needs to react and address any issue that may arise. It is reasonable therefore that the harm the potential disruptions pose to daily operations must be equalled by the allocation of sufficient resources to assess threats, take preventive

measures and mitigate the resulting damage. Failure to work with suppliers to mitigate threats, prepare and verify an effective response can lead to huge financial losses and in some cases, irreparable damage to an organisation.

Can your company confidently answer these seven supply chain questions?

1. How many suppliers do you have?
2. How many are direct versus indirect?
3. Do you actively verify the living profiles of your suppliers?
4. Have you conducted risk assessments of all your suppliers?
5. How many have you physically visited?
6. Does your supply chain adhere to your corporate values?
7. Can you tell your supply chain story?

*Marc Barnes is BSI's global director of food, and managing director of BSI Group Australia. BSI is a Royal Charter company with over 2800 Food and Agriculture standards in their portfolio, supporting the food industry and supply chain on issues including food safety, food scarcity, sustainability, land usage, energy, water and Corporate Social Responsibility. BSI pioneered the development of PAS 96, working with organisations such as McDonald's Europe and Tesco to create a standard that safeguards food and drink against malicious tampering by identifying and managing risks in supply chains. In Australia, BSI offers a range of integrated services including training, certification and verification, and business improvement tools, working with organisations across the entire supply chain to keep food safe, sustainable and socially responsible. For further information, please visit [bsigroup.com/en-au](http://bsigroup.com/en-au).*

# MAPPING THE COCOA SUPPLY CHAIN FROM BEAN TO BAR

*From the cocoa farms of West Africa, Asia and South America to the supermarket shelf, the supply chain of the humble chocolate bar is one of the most complex facing the food industry.*



Globalisation means supply chains are becoming more complex and companies face a number of risks, including compliance with social responsibility, sustainability, and health and safety.

The cocoa supply chain is a particularly challenging issue for international giants such as Hershey's, Mars and Nestlé. West African nations provide more than 70 per cent of the world's cocoa supply and reports have found significant issues with child labour throughout the region.

In response, companies are taking steps to improve the cocoa supply chain. Here, we look at Nestlé's initiatives to improve the living standards of cocoa-growing communities, change attitudes and perceptions, and improve access to education.

## Life on the cocoa farms

In 2009, the US State Department found that 24.1 per cent of children aged between five and 17 within cocoa growing regions in West Africa had worked on a cocoa farm in the past 12 months. Many of these children were involved in or exposed to hazardous conditions with the survey also reporting that 50 per cent of these children had been injured while working on the cocoa farms.

Farming cocoa, particularly in West Africa, is characterised by physically demanding work, and the use of hazardous cutting tools, travelling great distances, carrying heavy loads and pesticides and chemical exposure.

In an effort to end child labour from the supply chain, cocoa processors and the chocolate industry reached a voluntary agreement in late 2011. Named the

Harkin-Engel Protocol, the agreement was developed to set out time-bound steps to be taken so chocolate could be conscience-clear again.

But the protocol was deemed a flawed approach and nothing undertaken through the voluntary process assured consumers with an effective 'guarantee' that the cocoa did not involve any form of child labour in its production.

## Improving the supply chain

Nestlé is the largest producer of chocolate in the world, and prides itself on the flawless delivery of a diverse portfolio of local brands to local customers.

Amid concerns over child labour and slavery, Nestlé launched an internal initiative called the Nestlé Cocoa Plan in 2009, which brings together all past and future initiatives to improve the lives of cocoa farming communities and the quality of cocoa purchased by Nestlé.

This initiative was developed to enable farmers to run profitable farms, improve social conditions and source good quality, sustainable cocoa for the company's products.

Nestlé has proposed a number of steps and initiatives such as the International Cocoa Initiative (ICI) and the World Cocoa Foundation (WCF) to help eradicate these issues from its supply chain and understand the ramifications of sourcing decisions.

As a founding participant in the ICI, Nestlé and other industry players are improving access to education and

addressing all forms of exploitation of children in West Africa.

In addition to this, Nestlé is a founding member of the WCF to deal with issues such as ineffective farming techniques and poor environment management.

In order to further resolve claims surrounding the unethical cocoa supply chain Nestlé, partnered with the Fair Labor Association (FLA) to map the supply of its cocoa from West Africa to eliminate child labour by implementing sustainable and lasting methods.

Nestlé was the first food company to sign up with the FLA, to ensure efforts to address child labour are targeted where they needed the most.

In 2012, the FLA sent out a team of independent assessors to the Ivory Coast to map the cocoa supply chain for Nestlé. This was the first time a multinational chocolate producer had allowed its procurement system to be completely traced and assessed.

Companies that take a more proactive approach, including recognising the threats downstream or identifying alternate vendors if need be, are less likely to experience damage to their brands.

FLA investigators mapped the supply chain and tracked the journey of cocoa from the poorest and most remote villages to the exporters that sold directly to Nestlé.

The complexity of the cocoa supply chain illustrated that while Nestlé insisted its primary suppliers agreed to its code, it often went no further into the other stages, such as among the farmers and those working on the ground.

There are a number of supply chain issues that pose challenges for exporters and chocolate companies when they want to monitor adherence to labour standards in their supply chain.

For a chocolate company such as Nestlé, a large part of its supply chain may be shared with competitors, which makes cooperation – especially in the ‘unorganised’ sector with traders,



inevitable to eradicate child labour.

Following this assessment, FLA urged Nestlé to be more proactive in communicating its labour code to all involved in its supply chain, and encouraged the chocolate firm to conduct comprehensive internal monitoring.

Alongside FLA, which conducts annual audits in West Africa, Nestlé has implemented a number of additional schemes to eradicate child labour and deliver a more resilient supply chain in the process.

Nestlé has trained farmers to improve productivity and income and community liaisons have been introduced into villages to ensure children attend school and are educated about the dangers children face on farms.

Nestlé is also funding the system through direct payments to the farmers of a premium for good quality cocoa.

In 2013, Nestlé announced in an Australian first that all cocoa for its retail confectionery business would be sourced from certified and sustainable farms, with the aim to eliminate the use of child labour and ensure a sustainable supply of cocoa.

Nestlé Australia business executive manager confectionery and snacks, Martin Brown, said the 10-year Nestlé

Cocoa Plan will work first hand with West African cocoa farmers to address community issues.

“It is difficult to guarantee a sustainable supply of cocoa in the quantities we need in the challenging environment that exists in the Ivory Coast,” he said.

“Despite this, the Nestlé Cocoa Plan is starting to make significant progress in these areas which ultimately improves the social and economic conditions of farmers and their families.”

Nestlé purchased more than 90,000 tonnes of cocoa from the 67 co-operatives covered by the Nestlé Cocoa Plan in 2014, an increase of almost 50 per cent from 2013.

The chocolate company continues to monitor and remediate child labour among West African communities, with more than 12,500 farmers and almost 36,000 people in the communities receiving training and information to sensitise them to the risks of child labour last year.

A realistic strategy to eliminate child labour depends not only on improving the living standards of cocoa-growing communities, but also working with people across the supply chain to change attitudes and perceptions, and with national and local authorities to improve access to education. ●

# PHOSPHATES ON THE TABLE



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# NUTRITION UNDER THE MICROSCOPE

*A round up of insights from the latest ILSI SEAR Australasia seminar.*

Words by *Cinthya Wibisono and Rhoda Ndanuko*

International Life Sciences Institute (ILSI) Australasia president Kim Tikellis hosted the ILSI SEAR (Southeast Asia Region) Australasia seminar, *Mind the Gap – Nutrition Under the Microscope*, on Australian food consumption data in Sydney last month. With more than 70 attendees, the event featured presentations from across the different areas of the food industry and provided insight into the latest developments in nutrition research and trends.

## **Australian Health Survey**

Ms Janis Baines, manager, Food Data Analysis Section at Food Standards Australia and New Zealand (FSANZ) and Mr Paul Atyeo, assistant director, Health Section, Australia Bureau of Statistics (ABS), were the first to present on the findings of the 2011-13 Australian Health Survey (AHS). Designed to collect a range of information about health, socioeconomic, nutrition, physical activity and biomedical information, Mr Atyeo shared key population and nutrition findings. He explained how Aboriginal and Torres Strait Islander people are more likely to have chronic diet related diseases such as diabetes and chronic kidney disease, and how vitamin D deficiency rates were much higher in winter and spring for all populations.

Ms Baines then explained that FSANZ used the vitamin D intake data to estimate incremental increase in serum vitamin D from intake of fortified cereals using a dose-response relationship. They predicted that

adding vitamin D to breakfast cereals would decrease prevalence of low vitamin D status. Mr Atyeo presented food consumption data from the top 12 food groups and found that in comparison to the 1995 National Nutrition Survey, there was an increase in under-reporting. Ms Baines explained that use of usual intakes of nutrients gives a better estimate of consumption. Females had higher prevalence of inadequate consumption of calcium, iron, folate, thiamin and iodine compared to males. She noted that supplements and discretionary salt were not included in survey data, which may have influenced rates of nutrient inadequacy.

## **Implications for dietary guidelines**

Professor Linda Tapsell, Nutrition and Dietetics, Wollongong University, presented the implications for Dietary Guidelines. She described how nutrition surveys, nutrient reference values (NRVs) and the national dietary guidelines serve as interdependent tools for use in practice by academics, health professionals, and as a point of reference by the community. The underlying concept is a synergistic relationship between food, nutrients and dietary patterns. Professor Tapsell highlighted that Australians can have an unhealthy dietary pattern resulting from over-consumption of foods described as 'discretionary' in the Dietary Guidelines.

Categorising 'discretionary' foods has been a challenge. In the current Dietary Guidelines, 'discretionary'

foods are described via nutrients – for example, recommendations to limit intake of foods high in saturated fat. This is further complicated by varied patterns in discretionary food consumption, plus varied compositions of these foods. Professor Tapsell noted that discretionary foods are not necessary in foundation diets and that use of this term impedes populations from meeting NRVs needed for optimal health and protection against chronic disease.

She suggested that if Australians continue to have poor diet quality, micronutrient deficiencies are likely to manifest over time as a consequence. While this alludes to opportunities in improving nutrient densities of discretionary foods, the diet disparity must be addressed to steer Australians towards consuming more nutrient dense foods, and reducing intake of discretionary items.

## **Nutrient reference values**

Professor Samir Samman, Human Nutrition, Otago University, New Zealand, discussed the review of the 2006 Nutrient Reference Values (NRV). A scoping study to review the NRVs was undertaken in 2011, which determined a need for a review due to the release of new recommendations by the Institute of Medicine, new research findings, a need for greater methodological rigour and increasing fortification practices.

In 2013, the NRV Advisory Committee was convened to provide advice on the development of a Methodological Framework, and





to test the framework with pilot nutrients. The study identified 14 nutrients for review of which five were considered a high priority. Expert Working Groups were convened to apply the framework to sodium, iodine and fluoride. The selection of these nutrients was due to the link between sodium intake and increased blood pressure, the introduction of mandatory fortification for iodine, and prevention of dental caries for fluoride.

He noted that there is no new evidence to change the recommendations for iodine and the need to consider the upper limit for fluoride due to its link to dental caries and dental fluorosis. He concluded that the next steps will include a review of the pilot NRVs by content and process experts, submission to the office of the National Health and Medicinal Research Council (NHMRC), and then release for public consultation.

### Food nutrition and policy

Ms Holly Jones, acting director, Food and Nutrition Policy, Commonwealth Department of Health (DOH), discussed DOH implementation of food and nutrition policies. Data gathered via

review of the NRVs and Australian Health Survey (AHS), aligned with the Dietary Guidelines, is used to support development of consumer-based resources. DOH produced resources that support the updated 2013 Australian Dietary Guidelines, infant feeding guidelines and Australia's healthy weight guide. Food supply data also informs the national strategic frameworks for chronic conditions, such as the National Diabetes Strategy, due for public release in 2015. Ms Jones discussed the development and implementation of the food labelling Health Star Rating (HSR) system, aimed at empowering consumers to make informed healthy food choices. Currently, over 200 food labels include the HSR system, with an evaluation report due in June 2016. Ms Jones also discussed the government voluntary food reformulation program.

### The food environment

Professor Cliona Ni Mhurchu of the National Institute for Health Innovation, Auckland University, NZ, discussed dietary behaviour change and effective ways to promote healthy eating. She explained that many behaviour change

models are simplistic as they often fail to recognise the critical role of the food environment in determining consumer preferences. She noted that the food environment influences food choices and can be challenging for consumers to navigate. The issue is often framed as a dichotomy of individual responsibility versus government action. The evidence for effectiveness of individual approaches to changing dietary behaviour shows that there is a gap between dietary guidelines and consumer behaviour.

Evidence on food environment actions, nutrition labelling and economic instruments show that nutrition labelling can be applied across whole populations. Food taxes have the potential to reduce purchases of targeted food and drinks but the impact of subsidies on overall diet is unclear.

She concluded that improving population diets requires recognition of the reciprocal nature between the environment and the individual and ultimately requires collaborative action from all responsible parties such as governments, industry and civil society.

### Sodium reduction

Dr Elizabeth Dunford, Global Database manager and Research Fellow, The George Institute for Global Health, discussed how working with food industry to reduce sodium levels in foods can improve the food supply. Dr Dunford described how offering consumers healthier food alternatives effectively steers consumers away from unhealthy foods.

She outlined the role of the Global Food Monitoring Group (FMG) in collating nutrient information for processed foods, aiming to drive national and international food supply improvements. Currently, 31 countries are involved with FMG with 250,000+ branded food items collated in the database. Dr Dunford discussed the role of advocacy in improving the food environment, to drive changes to policy agenda and presented an example of salt reduction in fast food chain pizzas following the release of a study highlighting dangerously high salt content in these foods.



Advocacy has been important in establishing the Australian Food and Health Dialogue. She introduced the FoodSwitch smartphone application developed to empower consumers to make healthier food choices. The app collects nutrition data via crowd sourcing into a central data management system and suggests healthier food alternatives, supported by the Health Star Rating system. The FoodSwitch database currently contains 80,000+ products with plans to release variations of the app and expand it internationally.

### Regulatory drag

Dr Geoffrey Annison, deputy chief executive, Australian Food & Grocery Council, discussed how regulatory drag impedes food industry growth and profitability. He highlighted how profitable and competitive food industry can invest more research and development into creating a healthier food supply and emphasised the need for a more streamlined approval process within the regulatory framework to increase opportunities for product innovation.

Dr Annison says this would help overcome the current backlog of several food-health relationship claims currently for review under FSANZ claims standard 1.2.7. He pointed out that regulation cannot eliminate every risk, and discussed how early functional foods – for example, Milo as a ‘tonic’ for general wellbeing – was marketed in the absence of regulation with no evidence of harm to consumers.

Dr Annison highlighted that regulatory drag can be avoided if regulatory policies are appropriately applied. He cited the debate surrounding vitamin D fortification of breakfast cereal as an example.

### Industry innovation case studies

**Ms Cindy Code**, scientific and regulatory affairs manager, Mars Food Australia, presented a product reformulation program for sodium reduction across the MasterFoods®

brand. This involved developing flavour spider charts with CSIRO to ensure product safety, stability and flavour impact were retained while sodium, sugar, colours and artificial flavours were reduced. A main learning from the salt reduction program was the importance of striking a balance between nutrition and taste for consumers, to avoid poor product sales.

**Ms Leisa Ridges**, Scientific Affairs Manager, and **Ms Susan Kevoork**, Market Nutritionist Manager, Nestlé, presented case studies exemplifying Nestlé’s commitment to ongoing research and product development via 13 global nutrition commitments and Nestlé’s nutrition profiling system. Recent achievements include adoption of the Health Star Rating System and improving consumer nutrition intake through increasing the quantity of vegetables recommended on back-of-pack recipes. Nestlé also aims to provide portion guidance on confectionery packs in 2015.

**Dr Ingrid Appleqvist**, senior scientist and group leader for food structure, CSIRO Food & Nutrition Flagship, presented CSIRO’s food research to support food reformulation efforts by the food industry to deliver a healthy food supply. CSIRO’s research capability includes a customised Simultaneous Gustometer-Olfactometer which helps build predictive flavour models; taste control technologies; and Smoothed Particle Hydrodynamics to determine food texture integrity. Dr Appleqvist presented the CSIRO partnership with Goodman Fielder to design a microbial stability decision support system for better prediction of shelf stability in acidified sauces and dressings as a case study.

### Panel discussions

Finally, seminar participants discussed key issues affecting public health nutrition, including:

#### Food rating systems

Professor Linda Tapsell was careful to emphasise that while rating

systems can be tools that empower communities to make healthier food choices, the food environment is an evolving spectrum. Simple, community centred food-based messages, together with flexibility for these messages to change over time, are therefore needed.

To alleviate the risk of oversimplifying healthy eating messages and overshadowing naturally healthy foods in favour of processed ones, Dr Dunford clarified that a wider spectrum of nutrients and defined food categories will eventually be incorporated into the FoodSwitch system.

#### Product reformulation

Whether the best strategy for population health was continued investment in product reformulation to drive consumers towards choosing core food groups, Dr Annison stands by product reformulation as a means of placing healthier product choices within consumer reach. He suggests that such foods can continue to be included if consumed in moderation.

#### Industry research and innovation

A co-investment model with the government, akin to the one used in the Netherlands and Denmark, was proposed as the most cost-effective solution to encourage greater spend by industry on research and innovation.

#### Nutrition surveys

Alternative methods of capturing food intake – e.g. video – was needed to overcome the increasing trend of under-reporting food intake.

Future nutrition surveys should account for the high intake of supplements by Australians, particularly with dose frequency, as a factor impacting nutrition profiles.

*Cynthia Wibisono and Rhoda Ndanuko, PhD Candidates, School of Medicine, University of Wollongong, Australia.*



# 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

## Is fat a taste and why is it important?

Fat has always been associated with texture, flavour release, and thermal properties in foods, but not the sense of taste. Yet as the taste system has evolved to detect the nutrients or toxins in foods prior to ingestion, it makes sense that fats, an essential energy-dense macronutrient, would be detected through taste, as other macronutrients, namely carbohydrates and proteins, are detected through the tastes of sweet and umami.

For fat to be generally accepted as a taste it must meet five criteria:

1. there must be distinct class of stimuli which is the breakdown products of fats and fatty acids;
2. transduction mechanisms including receptors to change the chemical code of the fatty acids to electrical signals;
3. neurotransmission of the electrical signal to processing regions of the brain;
4. perceptual independence from other taste qualities; and
5. physiological effects after activation of taste bud cells.

The existence of a sixth taste elicited by the digestive products of fat (fatty acids) is yet to be confirmed, however a growing body of evidence from humans and other animal species provides support for this proposition. In support for a functional significance of fat taste, differences in taste sensitivity for fat appear to predict certain dietary behaviours. Decreased sensitivity to fat taste is associated with an increased consumption of fat and this has been



reported in both animal and human studies. Moreover, sensitivity to fat can be modulated by the diet.

Consumption of a high-fat diet appears to maximise the body's capacity for fat absorption, with no changes in appetite, which suggests that such changes may accompany, or encourage excess fat intake and obesity. These data propose a direct role of the taste system in the consumption and preference of high-fat foods, which may be linked to the development of obesity given that differences in BMI have also been linked to oral fatty acid sensitivity. The mechanism allowing for increased consumption of fat is proposed to be via satiety or fullness signals as associations in both the taste and digestive responses to fat have been reported.

The implications for the food industry are potentially enormous – the

development of a new category energy reduced products that have the ability to meet the biological needs the body has for high energy products.

Keast R and Costanzo A (2015) "Is fat the sixth taste primary. Evidence and implications." *Flavour Journal* 4(5). [www.flavourjournal.com/content/4/1/5](http://www.flavourjournal.com/content/4/1/5) Free download

## Drinking alcohol before a meal stimulates intake of high-fat savoury foods

Drinking wine or beer is often accompanied with snacks like cheese, crisps or nuts. Many people will reckon that alcohol increases appetite, which is also confirmed in scientific research, but it is not yet known how alcohol stimulates food intake and if this is true for all kinds of food.

Researchers from Wageningen University, the Netherlands, investigated moderate alcohol consumption before a meal on food reward and food consumption.



Participants were offered an orange juice with and without vodka, on separate days. After the drink, food reward was measured in terms of subjective ratings of liking for sweet, savoury, low-fat and high-fat foods. Participants liked savoury foods more after alcohol consumption compared to the alcohol-free drink. Liking for sweet foods was not influenced by alcohol consumption.

In addition, reaction time was measured by a task where two snack products were shown and participants had to select their most wanted foods. Reaction time was shorter for savoury foods and longer for sweet foods after alcohol consumption compared to no alcohol consumption. Shorter reaction time for savoury foods means an increased desire for savoury foods.

After the reward task, participants were exposed to a lunch that consisted of several sweet, savoury, low-fat and high-fat foods. Alcohol before the meal increased subsequent energy intake at lunch by 11 per cent, mainly caused by increased intake of high fat-savoury foods. Intake of sweet foods (either low- or high-fat) were not affected by alcohol.

The authors concluded that moderate alcohol consumption increased subsequent intake of high-

fat savoury foods, which was related to a higher food reward experienced for savoury food. In Western societies, alcohol consumption is often combined with savoury foods, so it could be a learned association. It is also possible that alcohol changes taste perception to saltiness, or that the bitter taste of alcohol stimulates preference for saltiness.

Schrieks, I *et al* (2015) "Moderate alcohol consumption stimulates food intake and food reward of savoury foods." *Appetite* 89 Pages 77-83

### Can you describe what cola tastes like?

Researchers in Thailand and the US have worked together to analyse the most potent odorants in three types of cola beverages (Coca-Cola, Pepsi and RC), using Gas Chromatography-Olfactory (GC-O) analysis, GC-Mass Spectrometry and sensory descriptive analysis.

The method used for GC-O was Aroma Extract Dilution Analysis (AEDA). Using sequentially diluted extracts, each sample is:  
1) separated into its individual components through the GC column  
2) sniffed by a human assessor who will record a descriptor when they smell something

3) each smell is identified based on both how long it takes to pass through the column and GC-MS analysis.

The aromas which can be detected in the most dilute samples are regarded as key aroma compounds. This is more reliable than simply measuring the concentration of the volatile components, as it takes into consideration the fact that we cannot smell some compounds below a certain concentration (or its odour detection threshold).

AEDA revealed 58 odorants in the three colas, which differed in their presence and relative potency across the three cola beverages. Eugenol (spicy, cloves), coumarin (sweet, herbs), guaiacol (smoky), and linalool (floral, sweet) were the most potent aroma compounds, although could be smelt at very different dilution levels in each cola type. Limonene (you guessed it, it smells like lemon) was found in high concentration in the colas, but was not detected by assessors in the more dilute samples due to these concentrations being below limonene's odour detection threshold. It was also noted by the authors that AEDA is not entirely reliable, as the effect of the food matrix is not taken into account.

Ten panellists were then selected to detect and describe differences in the three cola aromas, following 15 hours of training. Descriptors including lemon-lime, brown spice, caramel, vanilla and cooling were used. As would be expected, the three colas were found to have similar aroma profiles across these descriptors, with the main difference that Pepsi was found to exhibit less 'lemon-lime' intensity than Coca-Cola and RC.

Lorjaroenphon Y & Cadwallader KR (2015). "Characterization of Typical Potent Odorants in Cola-Flavored Carbonated Beverages by Aroma Extract Dilution." *Journal of Agricultural and Food Chemistry* 63: 769-775

### Labelling influences consumers

Since the marketing of 'health' as a product, rather than a state of wellbeing, consumers are bombarded with a wide variety of health and ingredient claims on an even greater variety of products. 'High in antioxidants', 'contains probiotics', 'low in sugar', 'reduced in fat' and 'reduced salt' are common messages on food packaging, which, as has been shown in a number of studies, impact consumers' expected taste preferences. Some studies even showed that these claims really influence consumers' taste perception when they taste the product.

The influence of these claims greatly depends on consumers' familiarity with these claims. In some cases, consumers are clearly misled by health or ingredient claims, especially if they do not quite understand what the claim means. For example, a consumer may not understand the real value of antioxidants in foods, but still prefers the food over those without the antioxidant claim, simply because the consumer assumes that antioxidants sound good for you. For these consumers, the health claim may trick them into buying foods that are actually high in fat, sugar and/or salt.

In order to investigate how consumers make choices based on health claims (i.e. this product supports the metabolism of fat) and ingredient information (i.e. this product contains 16 grams of sugar per 100 gram product), Miklavec



and colleagues conducted a conjoint study in Slovenia. In a conjoint study, consumers are presented with a number of choices of the product. For each product, the label information (e.g. health claim and ingredient information) is systematically changed. In general it was found that consumers' choice was more influenced by ingredient information such as sugar and fat content, than by health claims. In general, consumers preferred the high fat content of yoghurt, suggesting that taste seemed to be more valued than potential health benefits.

Interestingly, these results are rather culture specific. As mentioned earlier, it depends on consumers' familiarity with health and ingredient claims. With the increase of food exports to China, there is an increased need for labelling studies, such as the above-described research, in China. The expectation that, for example, consumers in Beijing respond in the

same way to health and ingredient labels as, for example, Australian consumers can lead to costly mistakes. The best way to avoid those mistakes is to understand the consumers you are targeting. <sup>5</sup>

Miklavec K, Pravst I, Grunert KG, Klopčič M, Pohar J. "The influence of health claims and nutritional composition on consumers' yoghurt preferences." *Food Quality and Preference*, 43 (2015) 26-33

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



FINAL WORD

# ORGANIC CHICKENS RULE THE ROOST

*Organic produce seems to be taking over the supermarket, but could a gap in the supply chain make it harder and more expensive for consumers?*

While the age-old question of which came first, the chicken or the egg, remains a head-scratcher for many, for one Queensland family, the order of events from egg to organic chicken is vital to their livelihoods.

In 2013, Queensland farmer Andrew Youngberry took over Inglewood Farms, an organic chicken farm in southern Queensland. As one of the flagship enterprises within the R.M. Williams agriculture group, the farm fell into receivership in 2013 and creditors turned to Mr Youngberry, a local farmer who ran an organic feed mill.

"I've never lost so much money so quickly as I did in the first couple of months. It was staggering," said Mr Youngberry. "But we turned it around and by the third month we'd made a trading profit. That's continued pretty well since then."

Securing an assured supply chain is the crucial ingredient to ensuring the company's success and future opportunities to grow. The industry is flourishing thanks to the heightened consumer interest in animal welfare and food production.

For organic chickens, this means organic feed and for Mr Youngberry, this is sourced from daughter Katrina Hobbs, who heads up the family's Country Heritage Feeds.

To be organically certified, Mr Youngberry's chickens must be fed solely organic grain. The organic system allows a vaccination spray to protect them from the deadly Newcastle disease, but apart from that the birds are not given antibiotics nor do they get their beaks trimmed as they would in the conventional system.

Ms Hobbs says the organic chicken producer is the mill's biggest buyer, although with a current shortage of grain, the mill has recently turned to human-grade consumption grain with high prices to keep the mill operating.

The chicken farm goes through 150-200 tonne of grain per week and at around \$1000 a tonne, it's a substantial input cost. Ultimately, the high cost down the supply chain is reflected in the retail price being double that of conventionally grown chickens.

"I believe there is a whole demographic of people in Australia who really do want to eat organic. But they need to see the price point a little more affordable," said Ms Hobbs.

Drought in grain districts produces smaller organic crops. Some farmers view organic farming as too difficult or sell their water rights, meaning there is a severe undersupply in organic milling and stock feed.

"At the moment, if we wanted to double our production – which I want to do – we would struggle to find the grain. We do use quite a lot of grain here and that is a limiting factor," said Mr Youngberry.

In Australia, demand for organic foods has seen a gradual increase to 150,000 tonnes, which is five times what is currently available.

The market has reached a point where demand is massively outstripping supply and Ms Hobbs says the supply chain needs to support this growth in the organic market. She would like to see more grain growers planting organic crops to supply the burgeoning demand for organic feed and produce, and eventually push down the costs.

"So far we haven't had to turn away any customers, but we have had customers that are not running to the scale they normally would because of the cost of the grains and uncertainty of the supply," she said.

Chair of Australian Organic, Andrew Monk, says there is a shortage of all organic produce across the board, but the grain shortage is probably the most serious.

"Australian Certified Organic as well as six organic certification bodies have joined forces to make it a little easier for growers to become organic," said Mr Monk.

"We've also seen an update to the National Standard for Organic and Biodynamic Produce to reduce the length of time it takes farmers to convert to conventional growing."

Hopefully, it all ends up being a winner, winner (organic) chicken dinner. 🐔



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## AUSTRALIA & NEW ZEALAND 2015

**May 1-3** **The Food Show.** Horncastle Arena, Christchurch, New Zealand. [www.foodshow.co.nz](http://www.foodshow.co.nz)

**May 2-3** **Fifth Science of Nutrition in Medicine and Healthcare Conference.** *Nutrition in Medicine.* Melbourne, Victoria. [www.nutritionmedicine.org.au](http://www.nutritionmedicine.org.au)

**May 12-14** **PMA Fresh Connections 2015.** Melbourne Convention & Exhibition Centre, Melbourne, Victoria. [www.pmafreshconnections.com.au](http://www.pmafreshconnections.com.au)

**May 13** **ConTech 2015.** Australasia's Confectionery and Food Industry Technical Conference. Melbourne Cricket Ground (MCG), East Melbourne, Victoria. [www.contech.aigroup.com.au](http://www.contech.aigroup.com.au)

**May 13-16** **Dietitians Association of Australia 32nd National Conference,** *Dietitians Driving Change,* Crown Perth Conference Centre, Perth, WA. [www.daa.asn.au](http://www.daa.asn.au)

**May 31-June 2** **Foodservice Australia 2015.** The Royal Exhibition Building, Melbourne, Victoria. [www.foodserviceaustralia.com.au](http://www.foodserviceaustralia.com.au)

**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 and 15th Australian Food Microbiology Conference.** *Food For All.* Luna Park, Sydney, NSW. [www.aifst.asn.au](http://www.aifst.asn.au)

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

**October 28-30** **3rd International Conference on Food Structures, Digestion and Health.** InterContinental Wellington, Wellington, New Zealand. [www.fsdh2015.org](http://www.fsdh2015.org)

## INTERNATIONAL 2015

**April 27-29** **Food Ingredients Russia.** Moscow, Russia. [www.figlobal.com/russia](http://www.figlobal.com/russia)

**May 12** **Save Food Meeting 2015.** Vevey, Switzerland. [www.save-food.org](http://www.save-food.org)

**June 11-13** **Food Tech.** *Fifth international F&B machinery, packaging & service solution exhibition.* Kuala Lumpur Convention Centre, Kuala Lumpur, Malaysia. [www.foodtech.merebo.com](http://www.foodtech.merebo.com)

**July 11-14** **Institute of Food Technologists Annual Conference.** *Where science feeds innovations.* Chicago, USA. [www.am-fe.ift.org](http://www.am-fe.ift.org)

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

**September 11-15** **drinktec 2015.** New Munich Trade Fair Centre, Munich, Germany. [www.drinktec.com](http://www.drinktec.com)

**September 20-24** **IDF World Dairy Summit.** *Closing the Nutritional Gap with Sustainable Dairy.* Lithuanian Exhibition and Congress Centre LITEXPO, Vilnius, Lithuania. [www.idfwds2015.com](http://www.idfwds2015.com)

**September 24-25** **Lunch!** *Industry event for the food-to-go market.* Business Design Centre, London, United Kingdom. [www.lunchshow.co.uk](http://www.lunchshow.co.uk)

**October 10-14** **Anuga.** *Taste The Future.* Koelnmesse trade fair and exhibition centre, Cologne, Germany. [www.anuga.com](http://www.anuga.com)

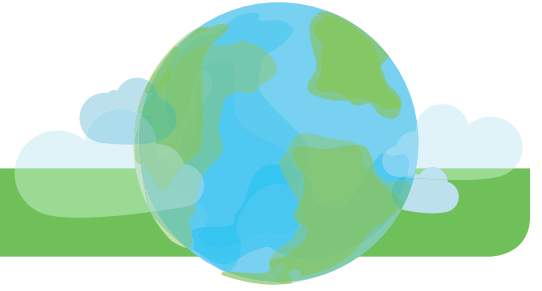
**October 11-14** **2nd International Conference on Global Food Security.** Cornell University, Ithaca, New York, USA. [www.globalfoodsecurityconference.com](http://www.globalfoodsecurityconference.com)

**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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