

# food australia

Official publication of AIFST Inc

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APRIL/MAY 2014



## Formulating nutritional & functional benefits

FOR THE FOOD  
INDUSTRY

### *Also Inside*

MOISTURE SORPTION ISOTHERMS

CONSUMER ACCEPTANCE OF NEW FOOD TECHNOLOGIES

IMPACT OF FOOD STRUCTURES ON NUTRIENT BIOAVAILABILITY

vita  
blend

# ON THE COVER

## Vitablend – formulating nutritional and functional benefits for the food industry

Vitablend is a globally operating Dutch company, formulating and developing custom fortification and functional solutions in dry or liquid premixes and blends, adding nutritional and stabilisation benefits to food and beverage products. Vitablend is committed to developing and incorporating safe, effective and innovative ingredients in its products to help consumers around the world lead more healthy and convenient lives.

According to Kees Schepers, managing director of Vitablend: “We enjoy working very closely with our customers to find the sweet spot of delivering the nutritional and functional benefits our customers are looking for in their products. Our highly skilled, dedicated teams in the anti-oxidant and fortification businesses are at the forefront of market trends and ingredient innovation, offering our customers unrivalled support for the entire product cycle. Extensive development and testing of our formulations into specific food applications ensures product efficacy and safety. These parameters are critical to us,” he explains.

### Vitamin, nucleotide, amino acid and mineral premixes

Marc Duchene, Vitablend’s General Manager Asia Pacific, explains: “Typically, our premixes are designed for infant and clinical nutrition, sports

nutrition and nutritional drinks. Our customers are constantly looking for innovations to incorporate in their end products while supporting specific health claims. Vitablend offers its customers the right balance in vitamins, minerals, nucleotides, amino acids and nutraceuticals, to be able to make the health claims consumers are looking for.

“Whether our customer is looking for a sports nutrition solution which maintains a sensitive balance of organoleptic aspects and nutritional benefits or an infant formula solution which offers high homogeneity of trace minerals, the Vitablend team has the expertise and state-of-the-art capability to deliver.”

### Anti-oxidant systems

Stability of packaged food products is vital in today’s society with increasing attention on sustainable products. Prolonging the shelf life means less waste for manufacturers, retailers and consumers. Marc Duchene explains: “Vitablend offers natural and synthetic antioxidants in different formulations to take advantage of synergistic interactions. Our anti-oxidant specialists are very knowledgeable on the specific interactions in our application areas, so they are able to formulate exactly what our customers want, and how they want it.”

Kees Schepers says: “We see a very clear trend towards the use of natural



anti-oxidants in food products and have developed a wide range of economic natural and vitamin based anti-oxidant systems. For instance, natural mixed tocopherols, rosemary extracts and combinations with fat soluble vitamin C can often realise cost-effective options compared to more traditional synthetic anti-oxidants.”

### Quality assurance & worldwide presence

Food Safety is the number one priority for any food manufacturer and especially for Vitablend. Here, the sourcing, development and production process is developed to incorporate only those ingredients that offer the best advantages of nutrients and anti-oxidants to our customers.

With global sales teams in place, Vitablend supplies customers all over the world from its two state-of-the-art production facilities in the Netherlands and Singapore. Vitablend is part of the Barentz group with a group turnover in 2012 of 850 million Euro and offices in 60 countries in the world.

For more information, please contact Marc Duchene of Vitablend in Singapore: [Duchene@vitablend.com.sg](mailto:Duchene@vitablend.com.sg) or visit [www.vitablend.nl](http://www.vitablend.nl)



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April/May 2014

Volume 66 Issue 2

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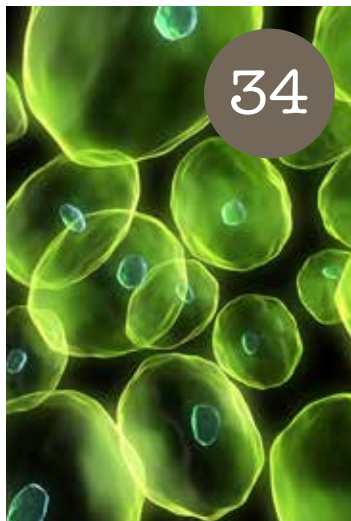
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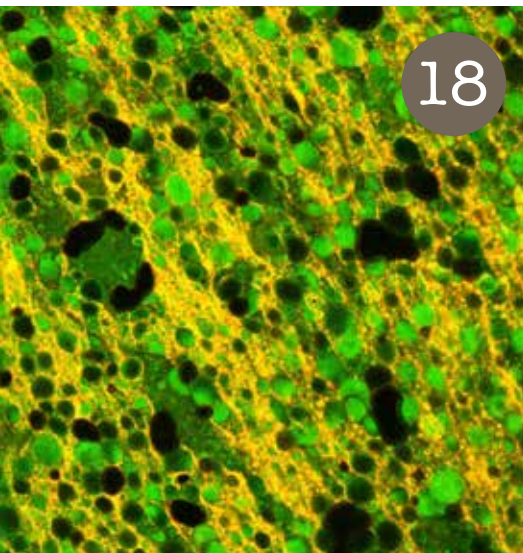


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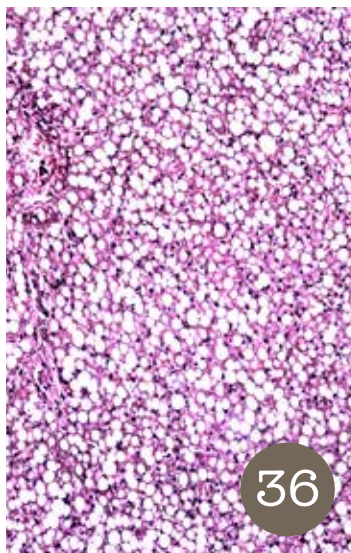


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Published by Australian Institute of Food Science and Technology Incorporated.

**Editorial:** Bite Custom Publishing

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**Advertising:** Stefan Worsley

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**Subscriptions:** Vicki Wallace

**Subscription Rates:** Australia \$110; overseas (airmail) \$175; single copies \$11; overseas \$17.50

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*food australia* is the official journal of the Australian Institute of Food Science and Technology Incorporated (AIFST). Statements and opinions presented in the publication do not necessarily reflect the policies of AIFST nor does AIFST accept responsibility for the accuracy of such statement and opinion.

Editorial contributions are invited; guidelines are available on the publication's website. We no longer accept research papers.

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## FROM THE PRESIDENT

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

The beginning of 2014 has been busy at AIFST. We are pleased to announce two ventures we are implementing in partnership with the Institute of Food Technology (IFT) – the Lead 360 Program, now in its second year, and the Certified Food Scientist credential. Both initiatives are designed to strengthen the position and relevance of Australian food scientists on the world stage. You can read more on pages 15 and 16.

Our Continuing Professional Development (CPD) program has got off to a strong start, with Summer School and a series of workshops on the Australian Food and Grocery Council's Product Information Form (PIF). The PIF workshops were so popular there are more planned for later in the year. Make sure you stay up to date on upcoming events by subscribing to BiteSize or following us on Facebook.

For many of us, working in the food industry involves understanding and navigating complex issues. In this issue of *food australia* we look at some of the current challenges – from the declining diversity of the global food supply through to fascinating research on consumer acceptance of food technologies, comparing nanotechnology to genetic modification.

This is also a theme that will be discussed and debated at this year's Annual Convention. Please see the exciting advance program and registration brochure included with this journal. I encourage everyone to register now and take advantage of the early-bird rates. I look forward to seeing you there.

Until then, happy reading.

**Dr Anne Astin**  
AIFST President





## BY THE NUMBERS

# AGRICULTURAL PRODUCTIVITY GROWTH

The future growth in global food demand – in particular that from Asia – provides a significant opportunity for Australia’s agricultural sector.

According to a new report released by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), our ability to make the most of the opportunities presented by this future growth will depend on maintaining competitiveness through productivity improvements.

The report, *Australian agricultural productivity growth: Past reforms future opportunities*, acknowledges the importance of past reforms that made decision-making in Australian agriculture more responsive to market forces by removing price distortions and increasing exposure to competition. However, the research indicates that these reforms have now largely run their course and that further effort in this area is likely to yield minimal productivity gains.

Instead, future opportunities to promote agricultural productivity growth are likely to come from reducing regulatory burdens, improving the efficiency of the rural research, development and extension system, and building human capital through improving labour availability and skills.

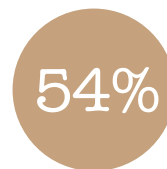
Here are a few key findings from the report.

**30%** In 2010-11, irrigated agriculture used less than 1% of agricultural land in Australia but made up nearly 30% of the gross value of agricultural production.



Government support of agriculture in Australia is the second lowest in the OECD.

*Broadacre farms contribute 54% of the gross value of agricultural production in Australia.*

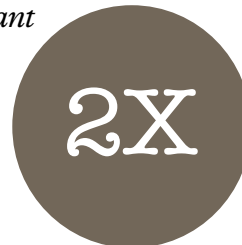


*High value horticultural industries accounted for 16% of the gross value of agricultural production in 2011-12, only 15% of which was exported.*



While typically around 60% of the gross value of farm production is exported, the figure rose to 75% in 2011-12. Of that, around 60% went to Asia.

*Australia is a significant net exporter of food; however, over the last 25 years, our imports have grown at nearly twice the rate of our exports.*



At around 20%, Australia imports more food products from New Zealand than any other country. Our next biggest source of imports is the United States at 10%.



*Over half of Australia’s land is managed by farmers.*



According to the World Economic Forum (2013) rankings of the burden of agricultural policy costs, Australia’s scores have declined since 2009, suggesting a growing burden on farmers relative to competitors.



*Productivity growth across all broadacre agriculture in Australia has grown at an average of 1% every year for the past 30 years. However, despite decades of growth, there are signs that it is slowing.*

ABARES. *Australian agricultural productivity growth: Past reforms future opportunities*. Canberra. February, 2014. Available at [daff.gov.au/abares/publications](http://daff.gov.au/abares/publications)



## LOSS OF DIVERSITY IN GLOBAL DIET

New research published in *Proceedings of the National Academy of Sciences* quantifies for the first time the reduction in the diversity of the global food and gives further support for the development of food and nutrition development policies aimed at bolstering food security.

Researchers assessed trends of the past 50 years in the richness, abundance and composition of crop species in national food supplies worldwide and found that national food supplies globally have become increasingly similar in composition, with an average reduction of diversity of 36 per cent.

Lead author of the report, Colin Khoury, a scientist at the Colombia-based International Center for Tropical Agriculture (CIAT) said that more people are consuming more calories, protein and fat, and they rely increasingly on a short list of major food crops, like wheat, maize and soybean, along with meat and dairy products, for most of their food.

“These foods are critical for combating world hunger, but relying on a global diet of such limited diversity obligates us to bolster the nutritional quality of the major crops, as consumption of other nutritious grains and vegetables declines,” said Khoury.

The new study also suggests that growing reliance on a few food crops may also be accelerating the worldwide rise in obesity, heart disease and diabetes, and calls for urgent efforts to better inform consumers about diet-related diseases and to promote healthier, more diverse food alternatives.

“Another danger of a more homogeneous global food basket is that it makes agriculture more vulnerable to major threats like drought, insect pests and diseases, which are likely to



become worse in many parts of the world as a result of climate change,” said Luigi Guarino, a study co-author and senior scientist at the Global Crop Diversity Trust.

“As the global population rises and the pressure increases on our global food system, so does our dependence on the global crops and production systems that feed us. The price of failure of any of these crops will become very high,” said Guarino.

Andy Jarvis, director of policy research at CIAT, noted that while international agencies have hammered home the message that agriculture must produce more food for over nine billion people by 2050, the message that we need a more diverse global food system is just as important.

“Diversity is the best way, not only to combat hunger, malnutrition and over-nutrition, but also to protect global food supplies against the impacts of global climate change,” said Jarvis.

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Coliform	24 hours	14 hours	6 - 10 hours
E.coli	24 hours	20 hours	6 - 10 hours
Yeast & Mould	5 days	2 days	14 - 24 hours
Lactic Acid Bacteria	3 to 5 days	2 days	30 - 35 hours

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## ALGAE ENHANCES OMEGA 3 IN LAMBS

New research has shown that improved consumer health benefits can be gained from grain-fed lamb by adding marine algae to their diets.

NSW Department of Primary Industries Senior Principal Research Scientist, Dr David Hopkins, said levels of health claimable omega-3 fatty acids in lamb meat increased by almost 300 per cent in a recent study of a natural algae supplement.

“The health benefits from food sources containing omega-3, such as fish, have long been recognised and previous research has showed that pasture-fed lambs produce high levels of beneficial omega-3,” said Hopkins.

“In this study we’ve ramped up the research and found we could enhance the health benefits of meat produced from lambs on grain, silage and hay rations with an algae supplement. The supplement is produced from naturally occurring golden algae and contains high levels of docosahexaenoic (DHA) and eicosapentaenoic (EPA) long chain omega-3 fatty acids.”

The study confirmed that lambs fed the supplement could reliably provide a good source of omega-3.

The study also explored the effect of the algae supplement on meat quality and production factors which are important to lamb producers and consumers.



“The algae didn’t compromise lamb growth rates and carcass outcomes, and the meat had good colour stability, which is a significant factor in meeting marketing requirements as consumers prefer to purchase meat which retains its bright, light-red colour,” said Hopkins.

While current results have shown the potential of the algae, further research is needed to explore how to best manage its use on farms.

Future studies to work out how long a feeding period is needed to produce lamb with optimum levels of omega-3 fatty acids and investigations of other supplements that could achieve a similar health benefit have been proposed.

Hopkins and his team are based at the Cowra Agricultural Research and Advisory Station’s Centre for Red Meat and Sheep Development.

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## FIAL COLLABORATING TO DRIVE INDUSTRY SUCCESS

Food Innovation Australia Limited (FIAL) is an industry-led, government-supported initiative to accelerate commercially driven collaboration and innovation in the Australian food and beverage industry.

FIAL's role is to be the catalyst for innovation and growth for the \$22.8 billion (2013) Australian industry, making connections across the country between agribusinesses, food manufacturers, associations, research organisations, educational institutions and government support programs.

Headed by industry leaders Peter Schutz as Chairman, and Dr Mirjana Prica as Managing Director, FIAL has consulted extensively with stakeholders and incorporated their feedback into multiple initiatives since commencing in June 2013.

According to Dr Prica, the Australian food and beverage industry is already leveraging Australia's enormous diversity of agricultural outputs and natural resources with significant potential to extend this into value-added products and services.

"Australia is responding to market demand and is producing globally attractive food and beverages, which are safe and of the highest quality.

"With our advanced technology, scientific capability, extensive manufacturing footprint and close proximity to Asia, we are well-positioned to capitalise on all the opportunities in Asia, particularly with the rise of the middle-class and their changing food preferences for more Western-style diets.

"Our role at FIAL is to encourage collaboration by providing access to skills, information and connections to strengthen an already vibrant and capable sector. Our vision is to support

Australia's innovation and manufacturing capability and capacity to position the country as a global leader in food and beverage production," said Prica.

Key initiatives underway include:

- the creation of collaborative clusters of stakeholders with a united interest to share and develop tangible solutions to specific challenges and/or opportunities;
- the development of a national resource of information and intelligence for the industry;
- the building of technical platforms and collaborations to discover new ideas and products that will meet evolving consumer needs and expectations throughout Australasia;
- the development of tools and training modules in partnership with the Export Council of Australia and Austrade to help guide companies at different stages of export development;
- the facilitation of trade shows, inbound and outbound trade missions where a national coordinated approach is required, and support of existing government export programs.



*Dr Mirjana Prica.*

*For more information visit [fial.com.au](http://fial.com.au) or email [info@fial.com.au](mailto:info@fial.com.au)*

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## EUROPE ANNOUNCES WHOLEGRAIN DEFINITION

Europe's Healthgrain Forum Association has agreed on the world's most comprehensive definition of what constitutes a wholegrain, with a permitted list of grains that includes 'pseudo' grains, such as quinoa and amaranth, and processing guidelines that take into account current milling practices.

Australia's Grains & Legumes Nutrition Council (GLNC) has welcomed the definition, saying that while it is consistent with the FSANZ Food Standards Code definition and guidance by the US Food and Drug Administration, it is pleasing to see the inclusion of pseudo grains.

"The European definition includes additional clarification on permitted grains and pseudo grains, which goes a long way to creating international harmonisation on the definition of a whole grain," said GLNC Managing Director, Georgie Aley.

While a clear definition of what constitutes a whole grain ingredient is welcomed by GLNC, Aley believes the next

important piece of clarification required for the industry is a detailed definition for what constitutes a whole grain food, an issue the group has been addressing in Australia and New Zealand with its own Code of Practice for Whole Grain Ingredient Content Claims.

"The GLNC Code of Practice sets a new minimum level of eight grams of whole grain per serve to allow a food to be labelled as 'contains whole grain'. This provides a consistent message to consumers and gives clarity on current labelling of whole grain foods in Australia and New Zealand," explained Aley.





# MOVE OVER COCONUT WATER, HERE'S MAPLE AND BIRCH

According to New Nutrition Business, the success of coconut water, which surged from zero in 2006 to an almost US\$1 billion business in North America and Europe by 2013, is just the first step in a massive emerging trend: healthy, natural, low-kilojoule waters taken directly from plants.

The latest plant waters to hit the market are maple and birch, thanks to extraction and packaging innovations that prolong shelf life.

Julian Mellentin, Director of New Nutrition Business, predicts these new waters will be a \$2 billion business by 2025 with the right marketing and distribution strategies.

"Like coconut water, maple and birch waters offer benefits that make them perfect options for health-conscious consumers."

"Maple water has an inherently sweet taste, although the sugar content, which is primarily sucrose, is only two to three per cent."

Traditionally, the sap of the maple tree has been processed into syrup because the water (or sap) spoils after just one day. However, developments in aseptic packaging combined with same day processing, mean water can now be made commercially available.

Three Canadian brands, Oviva, Seva and Maple 3, are leading the development of the maple water market.

Mellentin believes that maple water has the potential to reach the same market size as coconut water over the next five to



seven years, provided that the brands apply the same lessons as coconut water, focusing initially on single-serve packs (250-330ml) and upscale distribution and pricing.

Birch sap is produced by birch trees every year in early spring and is harvested as a health drink in countries including Japan, Korea, Scandinavia and Eastern Europe, and brands include Finland's Nordic Koivu and Denmark's Sealand Birk.

The sap is completely clear and slightly sweet, containing just one to 1.5 per cent sugars – primarily fructose, but it also contains xylitol.

As with maple water, advances in packaging and processing technology now allow companies to bring birch water to market in its all-natural, no-added-sugar form.

While coconut water is widely available in Australia, maple and birch waters are yet to take hold.



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## US FOOD LABELLING

The Food and Drug Administration (FDA) is proposing to update the Nutrition Facts label found on most food packages in the United States to reflect the latest public health and scientific information, including evidence on nutrition, obesity and chronic disease.

As part of the proposed updates, serving size requirements would be updated to reflect the amounts of food people are eating and drinking now as opposed to 20 years ago when the Nutrition Facts label was first introduced. In addition, the format of the label would be refreshed, with key parts of the label such as calories, serving sizes, and per cent daily value more prominent.

The plan, launched by US First Lady Michelle Obama, also has the support of the Grocery Manufacturers Association (GMA).

According to GMA President and CEO Pamela G. Bailey, the Nutrition Facts panel has been an invaluable tool to help consumers build more healthful diets for themselves and their families, but the time is right for an update.

“Just as food and beverage manufacturers have responded by creating more than 20,000 healthier product choices since 2002, and through providing tools like Facts Up Front front-of-pack labels, the FDA is responding with a thoughtful review of the Nutrition Facts panel,” said Bailey.

The FDA anticipates the proposed label will encourage manufacturers to reformulate existing products and offer

### PROPOSED LABEL / WHAT'S DIFFERENT

Servings: larger, bolder type

Updated Daily Values

% DV comes first

New: added sugars

Change of nutrients required

Nutrition Facts	
8 servings per container	
Serving size	2/3 cup (55g)
Amount per 2/3 cup	
<b>Calories</b>	<b>230</b>
% DV*	
12%	Total Fat 8g
5%	Saturated Fat 1g
	Trans Fat 0g
0%	Cholesterol 0mg
7%	Sodium 160mg
12%	Total Carbs 37g
14%	Dietary Fiber 4g
	Sugars 1g
	Added Sugars 0g
	Protein 3g
10%	Vitamin D 2mcg
20%	Calcium 260mg
45%	Iron 8mg
5%	Potassium 235mg

\* Footnote on Daily Values (DV) and calories reference to be inserted here.

Serving sizes updated  
Calories: larger type

Actual amounts declared  
New footnote to come



new products with a healthier nutrition profile, citing the example of trans fats and the significant decrease achieved in the trans fat content of food products following the requirement that they be declared on the label in 2006.

The proposed changes are published in the Federal Register and are open for comment for until June 2014.

## FOOD ALLERGY WEEK 2014

Support charity Allergy & Anaphylaxis Australia will once again be running a campaign for Food Allergy Week to raise awareness of food allergies among all Australians.

Running from 12 to 18 May, the 2014 campaign centres on the theme *Be Aware. Show You Care* designed to highlight the important role the community plays in protecting people with food allergy.

According to Allergy & Anaphylaxis Australia President Maria Said, Australia has one of the highest incidences of food allergy in the world.

“One in 10 babies born today will develop a food allergy. Food allergy is serious – and potentially life threatening. There have been two deaths as a result of anaphylactic reactions to food products in Australia in the past six months.

“People with allergy and those around them need good information to keep them safe. This includes clear and accurate labelling on food products and best practice allergy management guidelines for individuals, workplaces, schools and community groups.

“The more aware the community is, the safer people with allergy will be,” concluded Said.

This year Australians are being asked to ‘show they care’ by adopting an allergy for a day to gain a better understanding of the challenges someone with a food allergy faces on a daily basis. People can raise funds for the charity by being sponsored through an Everyday Hero fundraising page or by holding school or office events.

Campaign partners include Coles, Nestlé and Alphapharm. [www.foodallergyaware.com.au](http://www.foodallergyaware.com.au) for more information.



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## PEOPLE

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### Food Safety expert joins PMA



Food safety expert Richard Bennett has been appointed as Produce Marketing Association's (PMA) new technology manager, strengthening the group's commitment initiatives to build member value in the areas of food safety, traceability and technology.

In addition to his role in building member value, Bennett

will be working closely with the University of Sydney's Faculty of Agriculture and Environment, and industry stakeholders on the establishment of the Fresh Produce Safety Centre for Australia and New Zealand.

Previously with Horticulture Australia Limited (HAL), Bennett has extensive experience in fresh produce research and development and food safety. He has qualifications in orchard management, applied science, agribusiness and food safety.

### Heart Foundation appoints new CEO

The National Heart Foundation of Australia has appointed former Victorian SES Chief Mary Barry as the charity's new National Chief Executive Officer, taking over from Dr Lyn Roberts AM who retired from the Heart Foundation at the end of 2013 after 12 years at the helm.

Born in Ireland and immigrating to Australia in 1986, Barry forged a successful career in the Aged Care sector including six years as the founding CEO of the Victorian Association of Health and Extended Care. More recently, she has been credited with transforming the Victorian SES.

### New voice for Australian business

Kate Carnell AO has been announced as new Chief Executive Officer of the Australian Chamber of Commerce and Industry (ACCI). For the past two years Carnell has served as CEO of beyondblue and prior to that she spent four years as CEO of the Australian Food and Grocery Council.

Commenting on the appointment, ACCI Executive Chairman Peter Hood said Carnell's deep government experience and knowledge of the cabinet decision-making process will assist in ACCI's advocacy on behalf of members.

"Kate's first-hand small-business background, top-level political leadership and industry association skills will be instrumental to ACCI's role as the voice of Australian business," said Hood.

Carnell will take up the Canberra-based appointment in May.

### DAFWA researcher wins Seed of Light award



The winner of the 2014 Grains Research and Development Corporation (GRDC) western region Seed of Light award is Department of Agriculture and Food (DAFWA) Research Officer Ben Biddulph. The award is presented annually to someone who makes a significant contribution to communicating the outcomes of grains research.

In his role as research officer with DAFWA, Dr Biddulph has achieved important results with research into abiotic crop stresses including frost, drought and pre-harvest sprouting, as well as phenological adaptation of wheat. He helped to develop crucial 'frost phenotyping' methodology, which allows researchers to accurately measure and quantify the effect of frost on varieties in the field, regardless of environmental conditions.

Dr Biddulph is co-leading the Australian National Frost Program (ANFP), which is developing sensitivity ratings for wheat and barley varieties and identifying frost-tolerant barley and wheat germplasm for use in breeding programs.

### Jason Strong to lead Australian Agricultural Company

Jason Strong has been appointed Managing Director and Chief Executive Officer (CEO) of the Australian Agricultural Company Limited, promoted from his role as the company's General Manager Marketing.

An experienced executive with a lifelong commitment to improvement of the Australian beef industry, Strong has had responsibility for AACo's Branded Beef Group since 2012, driving significant profit growth through improved efficiency. Strong has spearheaded a range of marketing and supply chain initiatives, and has been responsible for developing strategies for selling the offtake of the company's Darwin abattoir, which is scheduled to commence production in the second half of 2014.

AACo's Chief Financial Officer, Craig White, had been serving as interim CEO prior to Strong's appointment. 📍



AIFST

# 2014 AIFST SUMMER SCHOOL

*The fourth AIFST Summer School was held in February 2014 at The University of Queensland, Brisbane. This event attracted over 50 participants from industry, research and higher education.*

Words by Anton Pluschke

The focus of Summer School is the role food science, research and development and agricultural innovation needs to play in the future of food security and food quality not only in Australia, but also to address a projected world population of nine billion by 2050.

The sessions, held over three days, were designed to provide participants with an in-depth understanding of higher degree research and continuing professional development (CPD) and careers in the food science industry. The sessions provided the framework of wider discussion on food quality and preservation, their dependence on food structure and processing and finally how these impact flavour and nutrition.

Higher research degree students presented a wide variety of topics ranging from the influence of genetics in hyper and hypo-tasters for the bitter taste (Asya Nasir Ali, The University of Queensland, Qld) to the micro-encapsulation of omega-3 fatty acids by using a whey protein isolate



gum arabic complex (Divya Eratte, University of Ballarat, Vic). Food safety applications on Near Infrared Spectroscopy for aflatoxin detection in maize was presented (Titilayo Falade, The University of Queensland, Qld) followed by the effects of bread making process factors on the physical quality of Australian sweet lupin bread (Casiana

Villarino, Curtin University, WA). The effects of addition and removal of carbon dioxide on the physicochemical properties of skim milk concentrates were presented (Edmund Lee, The University of Queensland, Qld) and the physicochemical properties and sensory analysis of micronutrients fortified rice was highlighted (Nishaanthini



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AIFST



FIAL Chair Peter Schutz with Stewart Eddie, Dr Leif Lundin, Professor Mike Gidley and Dr Ian Brown.

Thiruselvam, University of New South Wales, NSW).

Additionally, the AIFST Summer School served as a great networking opportunity for higher research degree students to discuss ideas and future employment opportunities with prominent industry leaders and food industry specialist recruiters.

AIFST Qld Vice Chair Stewart Eddie addressed and welcomed the attendees and expressed his gratitude to the convenor, Prof Mike Gidley, Director of the Centre for Nutrition and Food Sciences. Eddie strongly emphasised the importance and responsibility for those who study the science of food.

The Chair of Food Innovation Australia Ltd (FIAL), Peter Schutz, delivered an inspiring but realistic speech on the prospects for the future of the Australian food industry and the importance of innovation and collaboration between industry and research institutes.

CSIRO's Dr Leif Lundin delivered an up-to-date perspective on foods for health and wellbeing and Dr Ian

Brown, CEO and Managing Director of Clover Corporation, presented his experience linking research on starch and health, and brought to attention the importance of collaboration to successfully commercialise a product. The importance of collaboration was again brought to the forefront from Food Stream's Gordon Young, Director and Engineer. Young presented one of Food Stream's previous projects of a design for a belt drying system for root ginger and how to be successful, saying 'it all has to work together'.

ARC's Agents of Change Industry Transformation Training Centre program was introduced by Prof Melissa Fitzgerald, along with other node leaders, Assoc Prof Jayashree Arcot and Dr Alice Lee, both from University of New South Wales, Prof Paul Haynes from University of Adelaide and Prof Vladimir Jiranek from Macquarie University. The training centre aims to foster opportunities for research candidates and postdoctoral fellows to pursue higher degrees in combination with industry training



“ 2014 AIFST Summer School was a fantastic opportunity to present our work in an open and friendly environment with potential researchers from all over Australia. I found the three days to be truly inspiring and it definitely helped to give context to a career in food science. I have returned from the AIFST Summer School 2014 with new inspiration and hope to attend this annual event again. ”

**Divya Eratte, PhD student (Food & Nutritional Science), Federation University Australia**

by creating opportunities for research collaborations between universities and the food industry.

All in all, the three days were filled with lively discussion and debate, not only during the interactive presentations and poster sessions, but also during meal times.

On behalf of all the higher research degree students and attendees, I would like to thank the AIFST and The University of Queensland in hosting this year's Food Science Summer School and St Leo's College for organising the delicious cuisine.

*Anton Pluschke is a PhD Candidate at the ARC Centre of Excellence in Plant Cell Walls, Queensland Alliance for Agriculture and Food Innovation, Centre for Nutrition and Food Science, The University of Queensland.*

“

*All in all, the three days were filled with lively discussion and debate...*

”

# CFS CERTIFICATION NOW AVAILABLE

AIFST has entered into an agreement with the Institute of Food Technologists to endorse and promote the Certified Food Scientist (CFS) accreditation to food professionals in Australia.

The CFS program is a first-of-its-kind certification for food professionals worldwide and is designed to meet the International Standards Organization (ISO) 17024 standard for personnel certification programs.

The CFS program is overseen by the International Food Science Certification Commission (IFSCC) and Bronwyn Graham has been announced as the AIFST representative on the group.

The purpose of the Certified Food Scientist credential is to:

- assess the applied knowledge and skills of food scientists;
- assure consumers that food scientists have demonstrated the knowledge essential to their job role/function;
- help employers, practitioners and the public identify individuals with certain knowledge and skills;
- raise the visibility and credibility of the food science profession through a certification program; and

- promote lifelong learning related to the food science profession.

According to AIFST President Anne Astin, there are already nearly 1,500 Certified Food Scientists from 54 countries around the world and it is exciting to enable Australians to join this group of industry leaders.

"These CFS credential holders play important roles in food science, industry, academia and government, among other areas. As the leading institute supporting the Australian industry, we are very keen to see more of our members join this group.

"For professionals working in the food science field, the CFS credential enables them to demonstrate their application of fundamental science knowledge to the food sector," said Astin.

Food professionals with degrees in food science and related fields are eligible to apply for the exam. Earning the CFS requires meeting certain educational and work history requirements, and passing a rigorous exam at any of the nearly 5,000 testing centres worldwide, 45 of which are located in Australia.



Bronwyn Graham, AIFST representative on the IFSCC.

"This partnership underscores the global nature and importance of the Certified Food Science credential to the food science profession," said Kurt Buckman, CFS, who currently serves as the International Food Science Certification Commission Chair.

"We look forward to working with AIFST and the exceptional food scientists in Australia as the program continues to grow worldwide."

For more information, please contact Bronwyn Graham at [bronwyn@aifst.com.au](mailto:bronwyn@aifst.com.au) or visit [aifst.asn.au](http://aifst.asn.au)



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## LEAD 360: GLOBAL LEADERSHIP PROGRAM

AIFST is thrilled to announce we are working with the Institute of Food Technology (IFT) again this year on LEAD 360 – a global leadership development program designed for emerging food science professionals.

The program seeks to develop the next generation of international leaders within the industry, academia and government. More than 20 food science organisations from around the world and 20 multinational companies and universities have been invited to participate.

Nominations for the 2014 program have now closed and the winner will be announced in mid-April. The program will be held in New Orleans, Louisiana, from 21-23 June 2014, running alongside



*Jeremy Betros, Head of Technical at Flavour Creations.*

the IFT Annual Meeting and Food Expo.

Commenting on the program, last year's AIFST recipient Jeremy Betros, Head of Technical at Flavour Creations, said that it was a truly exceptional opportunity with access to the insights of global leaders in food science.

"The generosity of time given to LEAD 360 by the board members and Fellows of IFT led to a tremendous learning environment. The program was global in focus and dense in leadership, scientific and technical information. I was inspired by the scope and power of a leadership role in food science.

"Through my involvement in LEAD 360 I have established relationships with industry leaders all around the world, and was actually asked back to be a host for this year's program.

"Representing Australia at LEAD 360 in 2013 was definitely an opportunity that will reap long-term career benefits and I look forward to working closely with this year's winner to advance the program into the future," said Betros.

AIFST is grateful for the support of the Australian Food and Grocery Council (AFGC) for this initiative.

## PIF WORKSHOPS

In March 2014, AIFST teamed with the Australian Food and Grocery Council (AFGC) to deliver workshops on the use and functionality of the innovative Product Information Form (PIF).

The PIF is designed to assist food companies collate the information they need to meet their obligations under regulatory requirements and industry codes, in a consistent and standardised way.

A single, nationally implemented food and ingredient questionnaire, the PIF was developed by the AFGC in consultation with industry, and has the acceptance of both food companies and their suppliers.

The PIF offers efficiency and productivity advantages to companies by combining into one form the information, validation and verification requirements across a range of areas, including: allergen statements; labelling compliance; claims about nutrition, dietary suitability or sustainability; quarantine risks; product durability; the presence of dangerous or hazardous substances; and packaging materials. The PIF is applicable to ingredients or processed retail-ready goods.



*Participants at the Melbourne PIF workshop.*

In order to support industry in the application of the PIF, the workshops covered:

- responsibilities as a supplier or recipient of the PIF;
- tips and tricks that simplify use;
- navigating the inbuilt relationships with ease and understanding;
- common pitfalls;
- effectively completing the form;
- techniques for reviewing and validating the content to improve the quality and accuracy of the information supplied; and
- making the most of the PIF User Guide.

Practical exercises provided an opportunity for participants to discuss issues with using the PIF and share experiences.

If you missed out on the workshops, don't worry. They were oversubscribed in both Sydney and Melbourne and as a result, there are plans for additional workshops during 2014.

In the meantime, learn more by referring to the PIF and the PIF User Guide on the AFGC website.

And if you are already a PIF user, make sure you sign up to the PIF email list by sending a request to PIF@afgc.org.au. This will ensure you keep up to date on relevant issues, including updates and developments.

The AFGC is planning a review of the PIF in the second half of 2014 and will be calling for submissions as part of the review process.



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# SUGAR – HERE WE GO AGAIN

*The anti-sugar campaign comes in waves but has science uncovered any evidence that it actually causes adverse health outcomes?*

Words by *Geoffrey Annison*

The advent of the year 2014 was accompanied by a renewed flurry of activity in the popular press and the scientific literature raising concerns about the role of sugars in the diet. The World Health Organization has released a draft guideline recommending dietary energy from free sugars be reduced from 10% to five%; a new anti-sugar activist group has been convened in the UK and closer to home in New Zealand, a two day conference was held on the topic of sugar with the main speakers being drawn from a well-established cadre of anti-sugar commentators.

This is all grist to the mill for the mainstream media but looking past its entertainment value for those of us close to debate, it does have a dark side. Not only does it threaten to divert attention away from nutrition and health issues of much greater import, but it also undermines the confidence of consumers in food, and the food manufacturing sector. Most concerning is the pejorative nature of the language used with terms such as “big food” being compared to “big tobacco”.

The fundamental question, of course, is whether there is any evidence that sugar – or to be more precise, sucrose – is uniquely *causally* associated with adverse health outcomes compared to other carbohydrates when consumed at moderate levels in the diet. Over the years propositions have been made that sugar is a significant, substantial dietary risk factor for many health problems including dental caries, obesity, diabetes and cardiovascular disease. Moreover, some claim sugar is as addictive as cocaine while others suggest that added sugars in particular are processed differently by the body compared to endogenous sugars, particularly when consumed as beverages.

It is beyond the scope of this article

to provide a comprehensive review of the scientific evidence which either supports or counters these propositions. Some salient points can, however, be made.

Firstly, when efforts are made to provide a summary of the current science and distil the key elements into a fact-base for solid dietary recommendations, the concepts of levels evidence and statistical confidence are often lost.

An example of this occurred during the preparation of *2010 Dietary Guidelines for Americans*<sup>1</sup>, which advised limiting the intake of added sugars and consuming less of foods containing added sugars, including sugar-sweetened beverages. The driving intent behind this advice is calorie reduction so it is consistent with the age-old maxim “consume in moderation”. It has, however, been misinterpreted as indicating a link between added sugars and the foods they contain with obesity. In a descriptive review of the approach to gathering the evidence for the *2010 Dietary Guidelines for Americans*, Slavin, who assisted in preparing the Guidelines as Chair of the carbohydrate and protein committee and also served on the energy balance and nutrient adequacy committee, wrote:<sup>2</sup>

*“In prospective cohort studies there are little data to indicate that intake of sugar-sweetened beverages is linked to higher energy intake or body weight in adults.”*

More recently it has been confirmed, yet again, that dietary sugars are no more, and no less, obesogenic than other carbohydrates in the diet. Following a comprehensive meta-analysis, Morenga *et al* (2013)<sup>3</sup> stated:

*“The change in body fatness that occurs with modifying intakes seems to be mediated via changes in energy intakes, since iso-energetic exchange of sugars with*

*other carbohydrates was not associated with weight change.”*

The anti-sugar bandwagon of academics and public health commentators, which now appears to be gaining pace is, however, not without its critics, even from within academia. With regard to the singling out of sugar sweetened beverages and obesity, Allison<sup>4</sup> points out:

*“The topic as become controversial to say the least, and there is substantial evidence that the strength of the supporting data has often been exaggerated and distorted.”*

There is no doubt that sugars contribute energy to the diet, and moderate consumption is appropriate. The demonising of this major class of foods and food ingredients should be condemned. The Australian Food and Grocery Council will continue to inject facts, rather than conjecture, into the debate.

It is interesting that the anti-sugar campaign comes in waves. I personally recall one of those waves as a boy in the United Kingdom in the 1970s when sugar was described as “white death”. It’s amazing to think that after 40 years of trying by the anti-sugar brigade, nutritional science still fails to provide strong evidence, which firmly implicates sugar uniquely as a major risk factor or causative agent of a diet-related non-communicable disease.

Perhaps sugar is simply another carbohydrate. ●

*Geoffrey Annison is Deputy Chief Executive and Director, Health, Nutrition and Scientific Affairs at Australian Food and Grocery Council.*

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\*NSBs – nutritiously sweetened beverages



# FOOD STRUCTURE AND ITS IMPACT ON NUTRIENT BIOAVAILABILITY

*Research is showing that a food's structure can have a significant impact on the bioavailability of nutrients.*

Words by Li Day

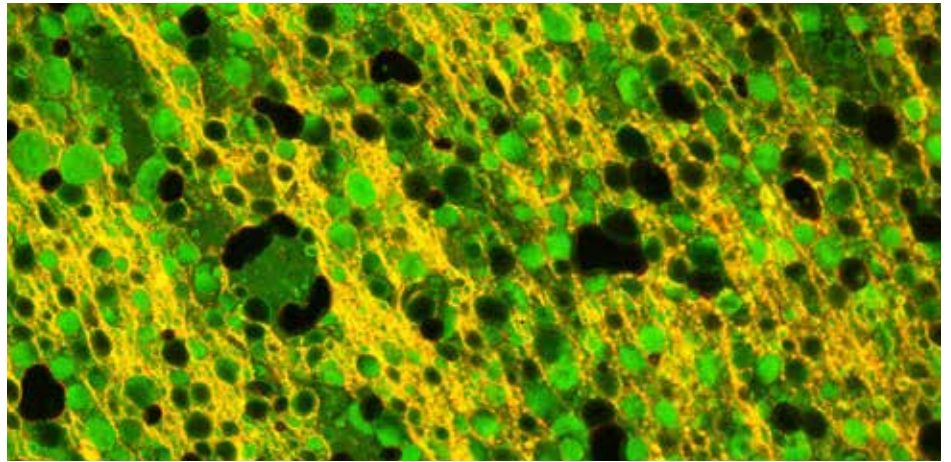
Our scientific knowledge about food, how it is digested and the effect it has on the body has reached a point where the evidence appears to show that it's a food's microstructure – not just its nutritional content – that influences the availability of nutrients to the body.

So, does this mean that the model that underpins our dietary guidance advice in Australia is outdated?

The latest Australian Dietary Guidelines were launched in 2013 after years in development. Unlike the previous iteration, there is a stronger emphasis on foods, which is a positive development. However, the databases that underpin the recommendations are largely based on the food's delivery of energy and composition of protein, fat, vitamins, minerals and other specific nutrients present in that food item. The values are normally determined by standard chemical analyses and in the case of complex foods or a diet, sometimes the values of the individual ingredients are simply added up to describe the total nutrient content.

## The impact of food structure

There is considerable research interest in the impact of food structure. We know that heat – including processing and home cooking – changes a food's structure right down to the nano scale. And it is becoming clear that food structure impacts many properties that are key to a food's nutritional value, processability, sensory qualities, safety and ability to assist in weight management.



*Dough's foam structure is full of air. Image CSIRO.*

Food structures, including foam, gel, colloid, emulsion and solution, are linked, interconnected networks, that all behave differently to each other.

The interactions between food components at the molecular level and subsequent reassemblies of the structures influence the texture of a food. They also have an effect on the rate and extent of food digestion, nutrient uptake and bioavailability.

The release and bioavailability of minerals, vitamins and polyphenols is affected by through the molecular interaction of these micronutrients with the macro components – proteins, polysaccharides, starch, fats and the like. The process of how the structures break down in our digestive system also affects a food's ability to release or retain these small molecules.

The colloidal stability of emulsions in the human gut can be controlled

by careful selection of proteins and/or surfactants to affect the extent of emulsion droplet coalescence under the acidic conditions in the human stomach. Coalescence reduces the surface area of the emulsion's oil droplets, which slows down the rate of fat digestion by the body. In addition, this could impact the absorption of fat and the release of satiety-associated hormones further down the GI tract.<sup>1,2</sup> While the composition and appearance of a food product is the same, through the selection of emulsifier type, the digestion of the product can be controlled. This understanding should lead to opportunities for new food products for satiety management.

In addition, the different biopolymer networks in common food systems including gelatine gels (e.g. jelly), colloidal casein networks (e.g. yoghurt) and concentrated starch particulate

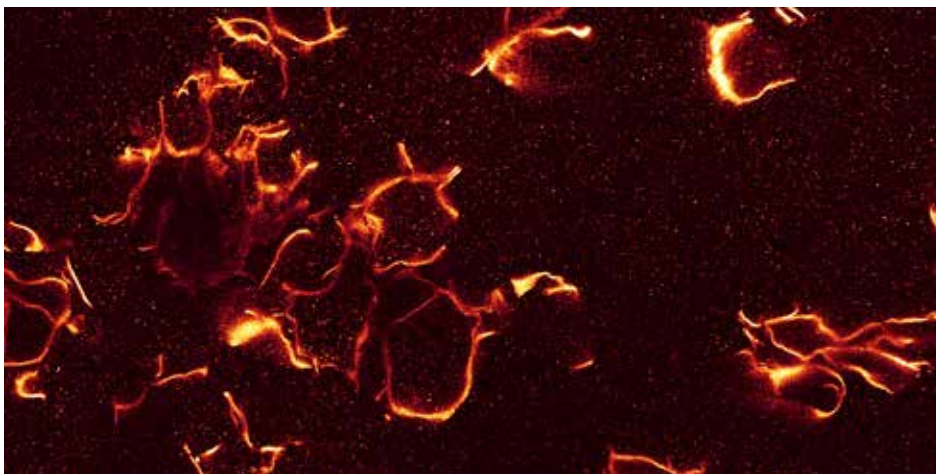
dispersions (e.g. custard) could dramatically influence the digestion of emulsified fat owing to the different physical chemical properties of these food structures.<sup>3</sup>

Food structure can also have an impact on the kinetics of protein hydrolysis and subsequently on amino acid absorption. Proteins adsorbed at emulsion interfaces, or in aggregated forms, digest differently compared with their native structures in solution.<sup>4,5</sup> The viscosity of a food could also influence protein digestion and amino acid and peptide release in plasma.

For example, milk protein in the colloidal form of yoghurt is retained in the stomach longer than liquid milk, allowing for steadier absorption of milk proteins.<sup>6,7</sup> Clinical research also shows that alteration in protein structures without changing the nutritional composition of the food was more effective in stimulating GI hormone release and suppressing fullness than the type of dietary proteins in that food.<sup>8</sup>

The bioavailability of carotenoids in fruit and vegetables depends on how the fruit or vegetable is processed and whether they are prepared and consumed with oil owing to the low water solubility of carotenoids.<sup>9</sup>

For instance, the integrity of the cellular matrix is intact in whole fruit or vegetables, but can limit the bioavailability of the inherent nutrients



Carrot soup. Image CSIRO.

because the structure encapsulates the micronutrients within the cell (a case of in one end and out the other).<sup>10,11</sup> In contrast, food processing and preparation methods such as homogenisation and heat disrupt the cell wall structure, thus enhancing nutrient bioavailability.<sup>12</sup> The size of cell wall particles also make a difference – particles smaller than an individual cell have been shown to result in a significant increase in the bioaccessibility of carotenoids.<sup>13</sup>

In addition to its impact on the bioavailability of nutrients, structure has a strong effect on texture, taste and stability of food materials. A food's structure affects the way we chew and how the food breaks down in our mouths such that it influences the

way we perceive a food's textures and flavours. The porous structure of bread, for example, with its large air cells gives the soft chewy texture, whereas breakfast flakes with their condensed, gelatinised starch gives them their crunchy and crisp texture.

Other specific examples include:

- minced beef has been shown to be more rapidly digested and absorbed by the body, resulting in greater protein retention after a meal, than an intact beef steak.<sup>14</sup>
- heat treating milk and milk products (unlike pasteurising) makes protein accessible to the body faster than the protein in non-heat treated milk.<sup>6</sup>
- the bioavailability of lycopene and  $\beta$ -carotene from tomato paste is higher than that from fresh tomatoes.<sup>12</sup>

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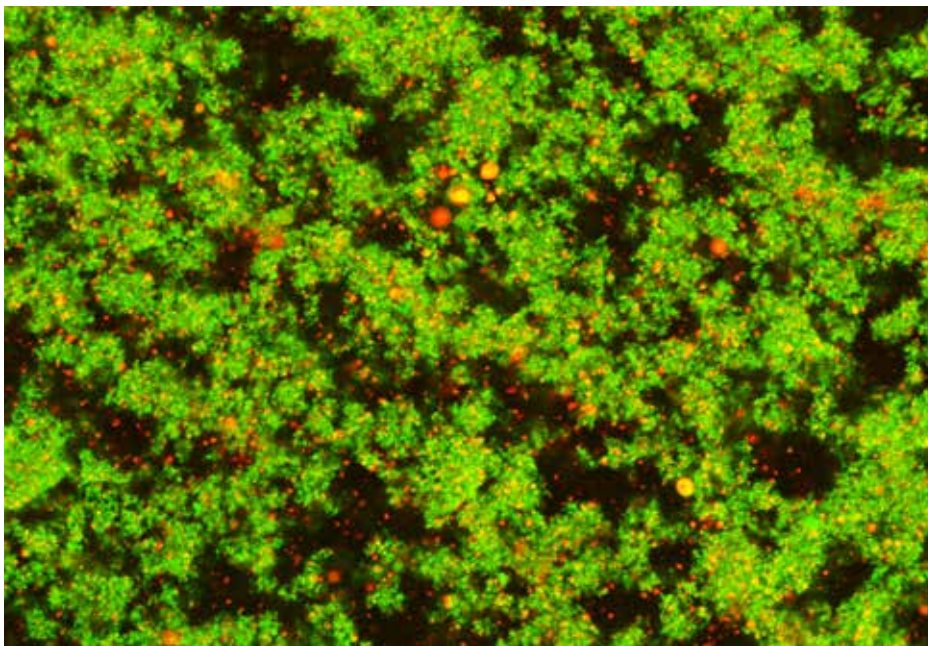
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Yoghurt is a colloidal casein network. Image CSIRO.

In all these examples, the composition of the food has not changed, but their structures have, owing to the various processing treatments.

### A healthier food supply

Consumer demand for enhanced nutritional quality, sensory characteristics, safety and ability to assist in weight management is driving food manufacturers to optimise their products and processes with respect to food structure. Understanding the relationship between food textural perception, bioavailability of macro- and micro-nutrients and food structure could help food companies to produce food products not only desired by consumers but also with improved nutritional properties.

Food structures are thus increasingly being recognised as important in technology innovation for the development of a healthier food supply.

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*Dr Li Day is a Food Material Scientist with CSIRO Animal, Food and Health Sciences.*



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# CONSUMER ATTITUDES TO NEW AND EMERGING FOOD TECHNOLOGIES

*Consumer acceptance of new technologies will be key to feeding a growing population.*

Words by Hannah Arnold

Advances in science and technology help to drive innovation in food production, processing and new product development and can deliver significant benefits for both consumers and the environment.

While consumers generally accept the need for progress, some technologies can appear quite alien in concept. This may become increasingly emotive as recent advances in genomics, synthetic biology, nanotechnology and other technologies are applied to food production.

So that effort is not wasted on products rejected by consumers, food businesses increasingly need ways to engage consumers to help them determine the acceptability of the new technologies.

In order to help food businesses do this, IGD engages in a range of research including a survey of 1,054 British adult consumers, conducted in March 2013.

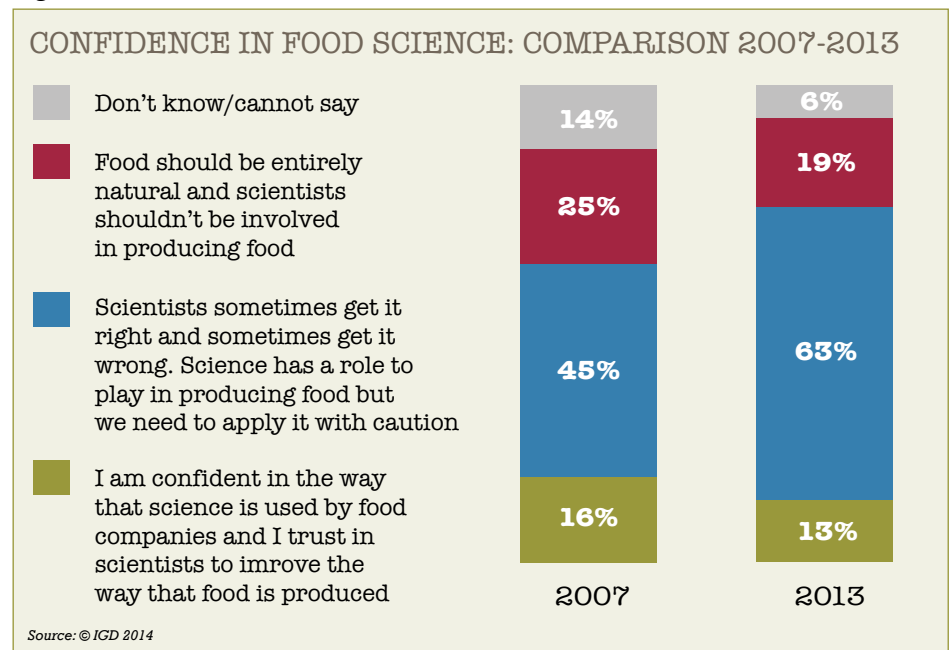
The aim of the research was to explore consumer interest and engagement in how science is applied to foods and to investigate consumer reaction when technologies are applied to foods to deliver a health benefit.

## Confidence in food science

To determine current attitudes and how they may have changed in recent times, IGD repeated this question from 2007:

*“Some argue we need to keep advancing the science of food production if we are to feed a fast growing world population. Others say this is too risky and believe we should concentrate on tried and trusted methods. With this debate in mind, which do you agree with most?”*

Figure 1.



We found that British consumers are now more accepting of food science than they were in 2007, but that confidence and trust in scientists to improve food production has decreased slightly (see Figure 1).

Despite this, there is considerable interest in the use of science in food production. The majority of consumers wanted to know how science is used in food (74% slightly or strongly agreed) although a significant minority (18%) claimed to have no interest in the science used in food. This lack of interest was higher among younger consumers, with over a third (34%) saying they had no interest at all (see Figure 2).

When asked whose responsibility it is to determine how science is used in our

foods, most respondents agreed it was the government's responsibility (63%) and that the general public should have a say (63%). Nearly half (46%) believed it was the responsibility of food manufacturers.

Interestingly, 61% of consumers claim they'd welcome the opportunity to personally contribute to decisions on the use of science in foods. When asked to think about the amount of information available to consumers over half (52%) would like to have more.

## Information sources

Consumers claim to look to a variety of sources when seeking information about food science used in food production, though not surprisingly



over half (58%) use internet searches such as Google and just over a third of British consumers (35%) use the Food Standard's Agency's website.

Other English government organisations such as the Department of Health and the Department for Environment, Food and Rural Affairs (DEFRA), are used less frequently, as are food manufacturers and relevant magazines.

### Food labels

When asked, "What information, if any, do you tend to look for on a food label when buying a product for the first time?", nutrition and health information featured prominently across all consumer groups. But once prompted, date coding was the top answer. The only other non-nutrition and health information shoppers ranked in the top 10 was country of origin and animal welfare.

Notable information shoppers looked for outside the top 10, were non-genetically modified (GM) (15%), suitable for vegetarians (10%) and allergy information (9%).

It is interesting that despite so much debate about technologies like GM, they are not front-of-mind at point of sale.

### Genetically modified foods

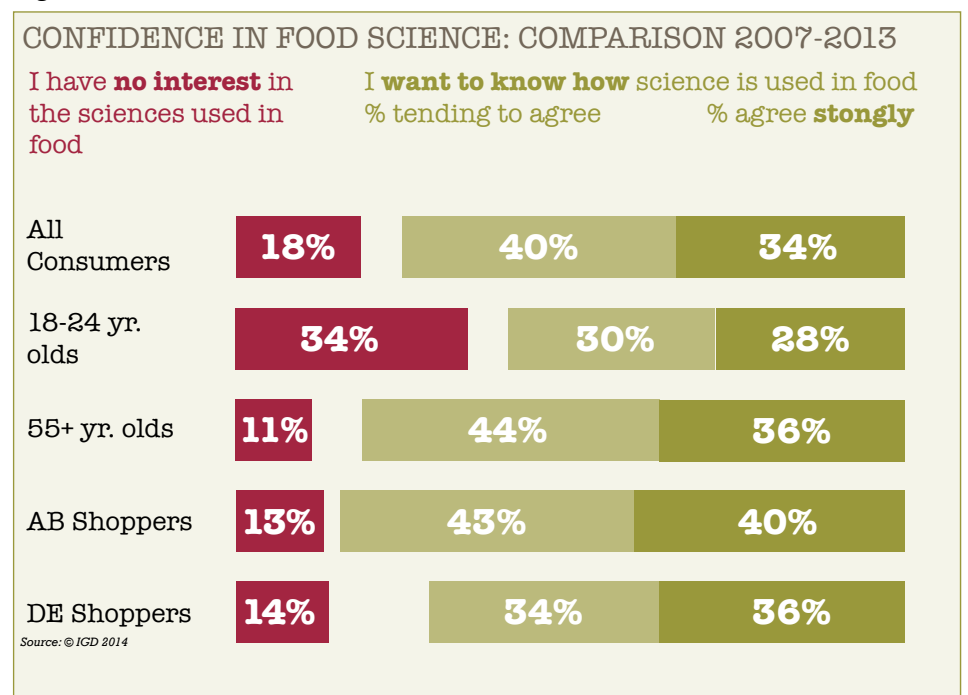
Drawing on previous research, we know that consumers have both a high awareness but a limited understanding of genetically modified foods. Twice as many consumers oppose GM food than support it (33% vs 16%) however around half (51%) have neither opinion.

Investigating consumer reactions to a GM product with health benefits, respondents were asked to: "Imagine a new version of the potato crisps you normally buy is also available when you are next shopping. Some information about these new crisps is shown here."

Respondents were asked "How much more or less likely would you be to buy this new version of crisps compared to other crisps available?"

Of all consumers, 37% stated they were more likely to buy the product due to the health benefit, 33% were neither more or less likely to buy the new crisps

Figure 2.



and 30% of consumers were less likely to buy the product due to concerns about GM. Consumers more likely to buy the crisps were 18-24 year olds and ABC1 families and those less likely to buy the product was highest among consumers claiming to have a good understanding of GM.

### Nanotechnology

IGD's research found that consumer awareness of nanotechnology is very low although many deduce it is a micro level science and many consider it with some caution. Consumers appear more positive towards the use of nanotechnology in food than of GM.

Investigating the consumer response to products utilising nanotechnology, respondents were asked to consider crisps with nano salt as an ingredient and answer the question: "How much more or less likely would you be to buy this new version of crisps compared to the ones you normally buy?" (See Figure 2).

Of all consumers, 42% are more likely to buy the new crisps. The main reasons for this were because they are attracted to the low salt message (57%), they think it will be healthier or better for them (19%) or they are actively trying to

reduce their salt intake (14%).

This compares to 14% of consumers who are less likely to buy the new crisps, because of reasons such as they don't know what nano salt is and require more information (26%) or because they like salt and therefore were not interested in low salt (26%).

### Research implications

While it is disappointing that confidence and trust in scientists to improve food production has slightly decreased since 2007, there is an opportunity to increase consumer confidence through open and transparent communication relaying the benefits of science in food production.

The research shows that while many consumers claim to be interested in information on food technologies, few will actively search for it, suggesting that key messages and information must be easy and convenient for consumers to access.

While over half of consumers claim to want more information, companies should be aware that this could have a polarising effect. And given the internet is the main source of knowledge, there is a danger shoppers could receive misleading and conflicting information.

**Table 1: Consumer reactions to GM Soya and Nano Salt products.**

	GM SOYA VERSION	NANO SALT VERSION
PROPENSITY TO BUY (% more likely - % less likely to buy new one =)	+7	+32
CONSUMER PROFILE (Those more likely to buy the new version made with ingredients using technology)	ABC1 FAMILIES 18-24 year olds	C2DE FAMILIES Londoners. Those who feel they understand it.
INTERESTED IN THE BENEFIT (Very / quite interested in low sat. fat/salt)	71%	69%
INTERESTED IN THE TECHNOLOGY (Very / quite interested in GM plant/nano salt)	52%	65%
UNDERSTAND THE TECHNOLOGY (Rate own understanding as good/very good)	50%	23%
WANT MORE INFORMATION ABOUT THE TECHNOLOGY	44%	66%

Source: © IGD 2014

### Effective consumer communication

New technology can provide improvements in food production that have significant benefits in feeding a growing world population. In order to overcome the challenge of effectively communicating the benefits of these technologies to consumers, consider the following recommendations.

**CONSULT:** Engage with a sample of consumers and opinion formers at an early stage to understand likely

perceptions. Listen to views and seek to address any concerns.

**TRANSPARENCY:** Make information about the technology used in food readily available to consumers – for example, on-pack, online, in the media.

**CONSUMER BENEFITS:** Explain the benefit of the technology using simple language – provide consumers with the reasons to buy.

**DO THE RIGHT THING:** Recognise that providing more information may sometimes polarise consumer response,

but they still want/ought to know.

**ALIGN MESSAGES:** To avoid confusion and controversy, work with other companies and organisations to align consumer facing messages and language when explaining science.

To read the full report, please visit [www.igd.com/foodtechnologies](http://www.igd.com/foodtechnologies)

*Hannah Arnold is Nutrition and Scientific Affairs Manager at IGD – a UK food and consumer goods research and training charity.*



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# CARE FOR THE CARDIOVASCULAR SYSTEM

Ruedi Duss, Global Marketing Manager, DSM Nutritional Products

The heart is a powerful and vital organ, which will beat more than three billion times over an average lifetime. However, it is susceptible to a number of threats, including coronary heart disease, arterial disease and hypertension, all of which can be referred to as cardiovascular disease (CVD). As the cause of more than 23 per cent of deaths across the world and costing over \$500 billion globally, CVD is a prevalent health problem, which has risen to the forefront of consumer concerns in recent years.

## The art of a healthy heart

Consumers worldwide increasingly understand that it is essential to maintain a healthy heart to reduce the risk of developing cardiovascular disease. As well as taking regular exercise and eating a varied and nutritious diet, consumers are now looking to supplement their diets with vitamins and functional foods and beverages to support their heart health.

These developments in consumer behaviour are indicative of the emergence of a more holistic and health-focused approach to lifestyle and diet. Indeed, the global heart health market is expanding, with \$15.2 billion worldwide sales forecasted to be reached by 2018. Regionally speaking, market development in North America and Europe is continuing to grow exponentially. Asia-Pacific is now also a promising market, with a compound annual growth rate (CAGR) of approximately 15 per cent through to 2018 expected.

Functional foods and dietary supplements are constantly being developed and launched to meet rising consumer demand for heart health benefit solutions. With the global market for heart health positioned products growing each year, ingredients suppliers such as DSM are continuing to invest in ingredient innovation to help their customers differentiate their offering in the market.

## Heart health: oat so serious

Among the most innovative of recent developments is oat beta-glucan. A natural component found in oats, oat beta-glucan has been proven to provide benefits for the heart, as well as blood sugar management and the digestive system.

Multiple clinical studies have reported that the 3g recommended daily consumption of beta-glucan can reduce CVD risk by up to 20 per cent, as it prevents the stomach and intestines from absorbing cholesterol from food. In support of this claim, the European Food Safety Authority (EFSA) issued a positive opinion substantiating the link between beta-glucan intake and reduced blood cholesterol levels. The European Commission then converted this opinion into a fully substantiated health claim.

EFSA has also issued a positive opinion on a claim linking beta-glucan intake to the maintenance of healthy blood glucose. If unmanaged, blood sugar levels can lead to serious forms of diabetes and the associated cardiovascular risks. When oat beta-glucan in the soluble dietary fibres of the oats is digested, it creates a gel which helps the contents of the stomach and the small intestine become more viscous. As a result, the rate at which food is digested and the carbohydrates being absorbed into the bloodstream slows down, which prevents sudden fluctuations in blood sugar levels.

A recent addition to DSM's 'Guard your heart' heart health portfolio, DSM's OatWell® oat beta-glucan provides a range of benefits to both manufacturers and consumers. A natural ingredient, OatWell® is also highly versatile and can be used in a wide variety of applications, including foods, beverages and dietary supplements. This allows manufacturers to position themselves flexibly in the market to the ever more health conscious consumer.

## Clearing a path for healthy circulation

Another notable innovation within the heart health market is DSM's Fruitflow®. The scientifically substantiated and award-winning product Fruitflow® is a naturally-derived technology, which helps maintain healthy circulation. This is a key factor for good heart health, as it deters from a range of cardiovascular events including blood clots and heart attacks. Fruitflow® does this by combating blood platelet aggregation, to in effect help the blood flow more smoothly. The first ingredient to be approved by EFSA with an Article 13.5 health claim, Fruitflow® has also received regulatory approval in the





US, where it has GRAS status. Indeed, clinical studies have shown that Fruitflow® reduces platelet aggregation in up to 97 per cent of individuals within 1.5 hours of consumption.

Licensed exclusively to DSM, Fruitflow® is now present in a number of successful dietary supplement products, such as Flyhydrate™, a unique beverage system focusing on the three principle stresses and effects of long-distance flying: dehydration, radiation, exposure and poor circulation. Available at Auckland International terminals.

### Fishing for heart health solutions

Omega-3s are also an important solution for supporting the cardiovascular system, among other health benefits. As a result, production and sales of omega-3 products have been high and it has been estimated that, in 2013, global production of omega-3s was at 2.49 million metric tons and valued at \$4.5 billion.

The science behind omega-3s is substantial and a number of randomised and observational clinical trials show omega-3 consumption lessens the development of cardiovascular illnesses. Omega-3s are considered as an effective treatment for reducing the blood pressure of hypertensive patients and helping to avoid the risk of sudden cardiac death. The most common omega-3 fatty acids are: DHA (docosahexaenoic acid) – thought to be the most beneficial to health – EPA (eicosapentaenoic acid) and ALA (alpha-linolenic acid). The American Health Association (AHA) now recommends a daily intake of 0.5-1g per day of EPA and DHA to lower elevated triglyceride levels in patients.

DSM's portfolio of omega-3s includes life'sOMEGA™, a vegetarian form of DHA and EPA, life'sDHA™, a vegetarian form of DHA derived purely from algae and MEG-3® EPA/DHA, that delivers all the health benefits with a neutral taste. Omega-3s can be applied to a wide range of products in the food, beverage and dietary supplements market, such as fruit-based drinks, cereal bars, dairy and dairy-free products. Rich and wholesome product, Vaalia® from Parmalat, is a product for toddlers that is filled with all the goodness of life'sDHA™. Another product powered by life'sDHA™ BioCeuticals™ Ultra Clean Algal DHA and Omega 7.

### Suppliers support manufacturers with the right ingredients

With consumer demand for heart health product solutions on the rise, it is an exciting and expanding area for the food, beverage and dietary supplement market as a whole. Ingredient suppliers, such as DSM, can help manufacturers to meet consumer needs and get their products to market easily and efficiently. This is achieved by creating ingredients that will differentiate products and stand out to consumers as an effective way to increase their daily consumption of the right nutrients.

DSM's 'Guard your heart' health benefit platform contains a number of innovative cardiovascular ingredients, such as OatWell® and Fruitflow® with proven science, as well as a complete portfolio of omega-3s. Combined with DSM's consumer insights, market knowledge and application expertise, the broad portfolio of nutritional solutions helps manufacturers to attract more consumers to their heart health positioned products. DSM also offers vitamins, minerals and other functional ingredients for cardiovascular wellbeing.

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DAIRY

# IMPROVING RETURNS BY UTILISING WHEY WASTE

*A collaboration led by CSIRO is investigating new ways to utilise whey waste to reduce poverty in South America and the project will also have benefits for the Australian dairy industry.*

**Words by** *Rodolfo García-Flores, Pablo Juliano, Maryann Augustin and Phil Clarke*

In Australia, the value of total dairy production amounts to AUD \$3.43 billion, of which AUD \$2.44 billion are exports.<sup>1</sup> Yet only half of the whey produced is converted into saleable products, while the remainder is waste – potentially contributing to environmental problems rather than maximising returns.<sup>2</sup>

This is a common challenge for dairy industries around the world and CSIRO is currently leading a project aimed at achieving better utilisation of the whey produced by small cheese makers in disadvantaged communities in Argentina, Brazil, Colombia and Uruguay.

This is an international aid project funded by the Department of Foreign Affairs and Trade (DFAT), through the Australian Agency for International Development (AusAID), and CSIRO's role is to transfer technical knowledge to the public sector of the countries involved through extension and assistance programmes.

The ultimate aim is to reduce poverty in these countries through transforming the dairy communities, including the creation of jobs and enabling the access of affordable nutrition to the local population.

Currently, small manufacturers in these countries do not have the capacity to preserve whey waste to consistent quality levels. To a large extent, this is due to the small size of the cheese manufacturing companies, many of which are family enterprises. This is in contrast to Australia, where small, independent



cheese-makers, produce less than 10 per cent of cheese manufactured.

An environmental and economic analysis of the problems caused by whey disposal in Brazil<sup>3</sup> found that the industry is very fragmented and whey disposal methods have a significant impact on the environment. They noted that 50,000 litres of whey waste is comparable to the effluent of a settlement of 25,000 people. They also found that whey treatment can significantly reduce costs, from 5.59 per

cent of the total operational costs to 3.98 per cent, which represents a relative reduction of 29 per cent.

Dr Pablo Juliano from CSIRO Animal, Food and Health Sciences (CAFHS) is leading a project that's assessing the economics of whey supply chain development in these regions, with a view to establishing whey-based product manufacturing.

In order to efficiently process the whey, Dr Rodolfo Garcia-Flores from CSIRO Computational Informatics

(CCI), is leading another aspect of the project to assess the viability of establishing shared processing facilities. This involves developing decision-making tools based on high-tech logistic and socioeconomic models.

### The logistics of whey re-utilisation

The central issues for each country mostly relate to the logistics of whey re-utilisation. For instance, knowing the alternative products that can be obtained from whey, the best combination of processing equipment, and the most convenient location for a shared processing facility for different clusters of cheese-makers, all while considering all the nuances of specific local situations.

CSIRO's mathematical model answers these questions by solving the problem of simultaneously optimising transportation, facility location and technology selection for the supply chains under study by using the information gathered on the ground by the teams in the individual countries.

This information, collected through surveys, not only produced all the necessary input data for the model,



*Cheese manufacturing plant in Buenos Aires.*

but also was used to build up a new information repository about communities and small enterprises in poor rural areas. This new repository represents by itself an important

achievement, as they also serve the local research institutions to better understand the specific needs of each community as well as to assess the environmental damage caused by whey disposal.

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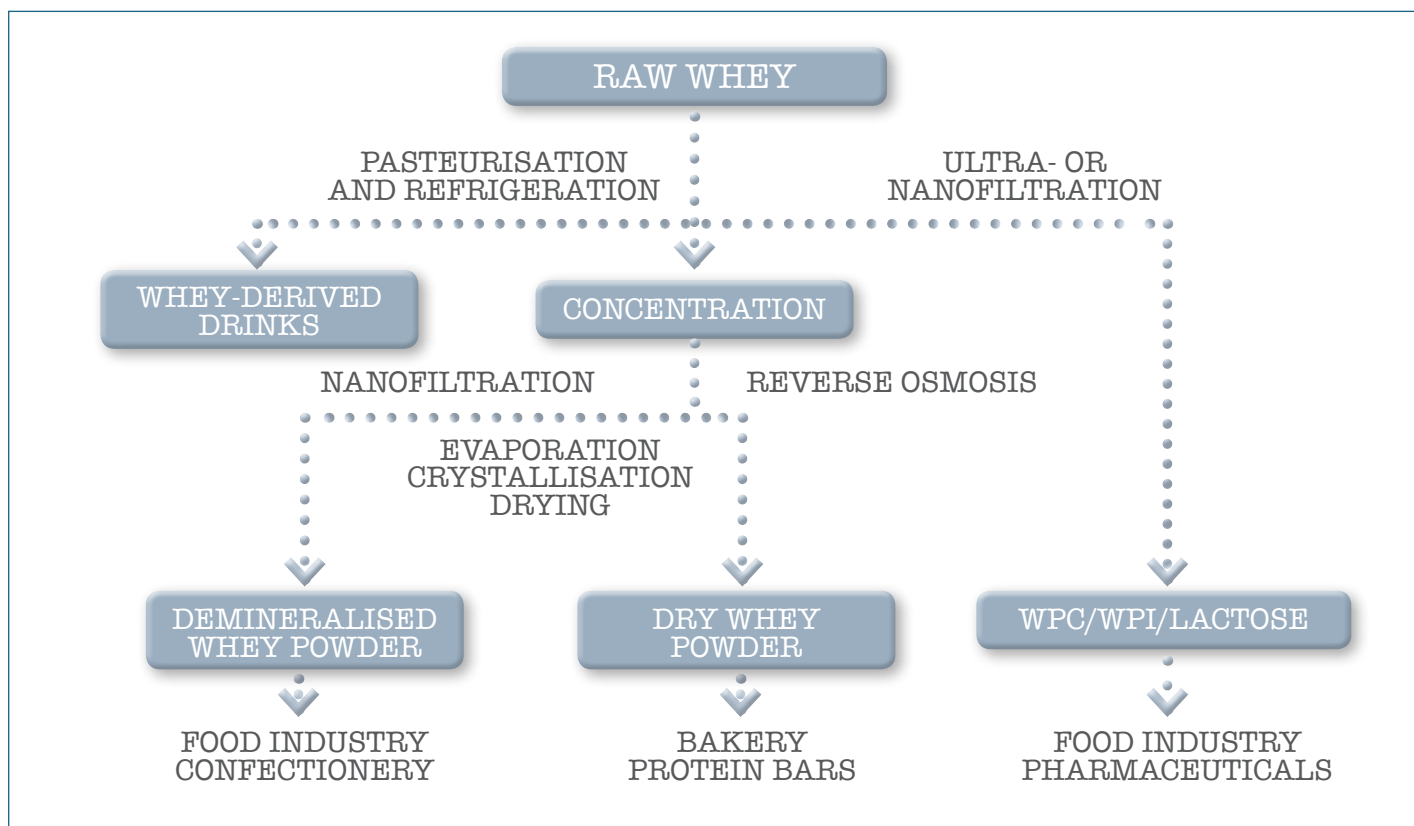
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Source: Martins, R., de Souza Filho, O.V., da Silva Lobo, D., 2013.

### Benefits to Australia

The mathematical modelling will provide benefits beyond the disadvantaged communities the project is aimed at, by establishing a process that the Australian dairy industry can utilise to improve efficiencies.

The world is continually facing food crises and challenges, such as the recent drought in the United States and the increasing demand for dairy in Asia.<sup>4</sup> Often, the most cost-effective way to address these challenges is to increase the efficiency of supply chains, and commercial dairy operations in Australia share many features with the South American industries.

For instance, the Australian producers also have to transport their products for long distances, the acquisition of imported or new equipment can be very expensive, and the sites where this equipment should be installed should be selected carefully.

Logistics and optimisation models – like that CSIRO has developed for South America – would help

Australian food companies to maximise their profits, reduce waste, identify bottlenecks and inefficiencies, and make decisions on technology investment easier.

### Project teams

The CSIRO project is organised around four teams, dedicated to:

- the logistics of whey re-use;
- the feasibility of producing biofuels;
- possible food products and ingredients from whey; and
- process technology requirements.

On each of the teams, CSIRO contributes with expertise and knowledge of the Australian dairy industry.

In dairy logistics, for example, the Operations Research group of CCI produced the optimisation model based on its past experience in food and mineral supply chains. The team members are currently preparing data about locations, the amount of whey produced, and the road network and

availability in each of the countries.

The team working on food products and ingredients developed an analysis of the preferences (by country) of the food products that could be obtained from whey, focused on the particular needs of each country. These include sauces for ice-cream, WPC35, fermented drinks and bio-fuels.

For instance, Dr Ilba Burbano, from Universidad Libre Seccional Barranquilla in Colombia, noted that there is a lack of iron in the Colombian diet, so the team suggested a protein drink with fruit, fortified with iron, for this country. Dr Burbano's university has already carried out tests of a drink that will deliver up to 10 per cent of the daily iron requirements.

Working with CSIRO's Dr Maryann Augustin, the team has also been addressing technical product development issues associated with developing and stabilising whey-based products, for example ensuring the stability of pulps and additives, and achieving an extended shelf life.

Finally, the technology team counts with the expertise of senior researchers in CSIRO, as well as the extensive expertise of South American consultants.

### Next steps

The CSIRO project is due for completion in 2015. Between now and then the team will be preparing the final economic viability assessment for the investment partnerships and the final costing and selection of the processing equipment for each country.


The final outcomes of this project will improve Australia's standing in the international community, and are already producing important research outputs in CSIRO in close collaboration with South American universities.

The CSIRO project is being carried out in collaboration with a number of key government collaborators, including the National Institute of Industrial Technology (INTI) in Argentina, the National University of Colombia, the Colombian National Dairy Centre, the Colombian Corporation for Agricultural Research (Corpoica), the Brazilian Enterprise for Agricultural Research (EMBRAPA, Brazil) and the Uruguayan Food Technology and Innovation Unit; the team has also received technical advice from staff of Dairy Australia, the National Centre for Dairy Education and Dairy Innovation Australia Ltd.



Whey processing facility in Argentina.

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*Rodolfo García-Flores is a Research Scientist at CSIRO Computational Informatics. Pablo Juliano is a Senior Research Scientist at CSIRO Animal Food and Health Sciences Division. Maryann Augustin is Leader of the Food Science Research Program at CSIRO Food and Nutritional Sciences. Phil Clarke is Deputy Chief (Operations) of CSIRO Animal, Food and Health Sciences.*



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# APPLYING SORPTION ISOTHERMS

*While traditional static methods for measuring moisture sorption isotherms have now been largely automated, the new dynamic method is significantly faster and opens new applications.*

Words by Brady Carter

An understanding of water relations in a food product is essential to managing food quality and safety. Water activity measurements help to establish an understanding of nutritional, texture and microbial activity in foods, and controlling activity will help to maintain stability of a food product.

Moisture sorption isotherms are an effective way of understanding water relations and improving product quality. They are used to describe the complex relationship between water activity and moisture content at a constant temperature. The nature of this relationship depends on the interaction between water and other ingredients.

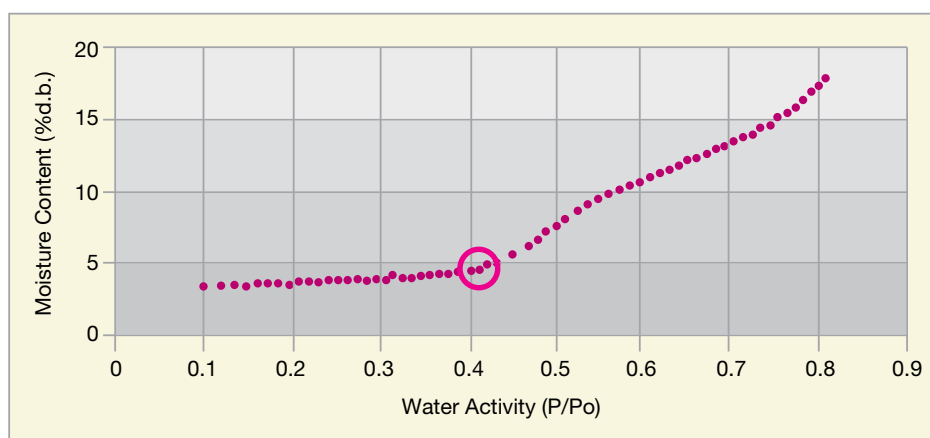
The amount of water vapour that can be absorbed by a product depends on its chemical composition, physical-chemical state, and physical structure. Consequently, the isotherm shape is unique to each product type due to differences in capillary, surface and colligative effects. They are not able to be determined mathematically and must be recorded experimentally for each product.

## Measuring moisture sorption isotherms

Constructing an isotherm consists of collecting water activity and moisture content values over a range of water activities. The range of water activities used depends on the situation, but normally is 0.10 aw up to 0.90 aw.

### Static Method

In the traditional isotherm method, each point on the isotherm is determined by equilibrating a sample to a known



**Figure 1.** Moisture sorption isotherm for spray dried milk powder at 25°C showing a phase change occurring at a critical water activity of 0.43.

water activity and then determining its equilibrium moisture content by weight. Typically, the sample is placed in a sealed chamber over an excess of saturated salt slurry. Different water activity levels are achieved by using different salts.

This traditional method has been automated by instruments programmed to automatically change the water activity of a sample in a stepwise progression. These instruments, often referred to as controlled atmosphere balances, utilise the 'static' method. The instrument holds the sample at one water activity level until the sample weight stops changing, measures the water content by weight, and then moves to the next water activity set-point.

Automatic isotherm generators are much faster and less labour intensive than traditional desiccator methods. They also make it possible to conduct

sorption kinetic studies. However, like traditional desiccator methods, static instruments equilibrate the sample to a known water activity level. Since true equilibration between the sample and the vapour source requires an infinitely long period of time, they measure apparent equilibrium at the point when the change in sample weight is negligibly small.

### Dynamic Method

The Dynamic Dewpoint Isotherm (DDI) method directly measures water activity while gravimetrically tracking weight, so there is no dependence on equilibration to known water activity levels to determine water activity. Since the sample does not have to wait for equilibration to a specific water activity, this method is faster without sacrificing accuracy. It is simultaneously able to produce an unmatched number of data points.

## Uses for moisture sorption isotherms

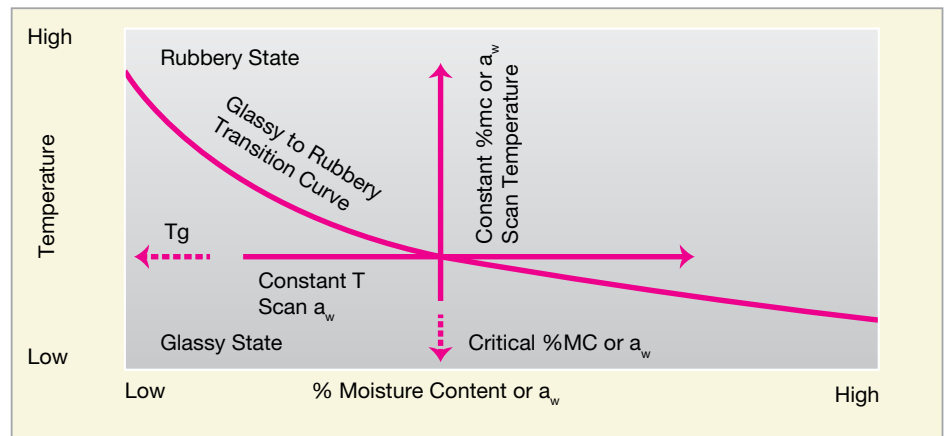
Moisture sorption isotherms are an important tool when formulating food to achieve specific qualities and attributes.<sup>1</sup> Despite their value, traditional isotherms have been limited by their low resolution. The high-resolution DDI method has opened up new and powerful possibilities as high-resolution isotherms can reveal phase transition points – water activities at which products cake and clump, deliquesce, or go through glass transition.

High-resolution dynamic isotherms can also be very helpful in:

- making shelf life calculations
- developing mixing models
- modelling temperature abuse
- determining the integrity of a protective coating or layer
- determining monolayer values
- making accurate packaging calculations.

## Phase changes and critical water activities

When high-resolution isotherms are available, such as those produced using the DDI method, the shape of the



**Figure 2.** Strategies used to determine glassy to rubbery phase transitions in amorphous material.

isotherm provides critical information about water activities and phase transitions.

Sharp inflection points in the isotherm indicate phase transitions (equivalent to a glass transition) and can provide information about maintaining textural properties and preventing caking and clumping (See Figure 1). The exact inflection point in the curve, which is the critical water activity, can be determined using second derivative curve smoothing strategies.

If the water activity of a product moves above the critical water activity

for phase transition, the stability of the product will decrease as time-dependent processes such as caking and crystallisation speed up significantly. Keep in mind, however, that if data resolution of the isotherm is low, these inflection points cannot be identified.

Increasing temperature will cause the critical water activity to go down and can also result in loss of stability with no change in water activity. Determining phase transitions using isotherms is similar to determining glass transition temperature ( $T_g$ ) with Differential Scanning Calorimetry (DSC), except instead of holding



## From Concept to Market

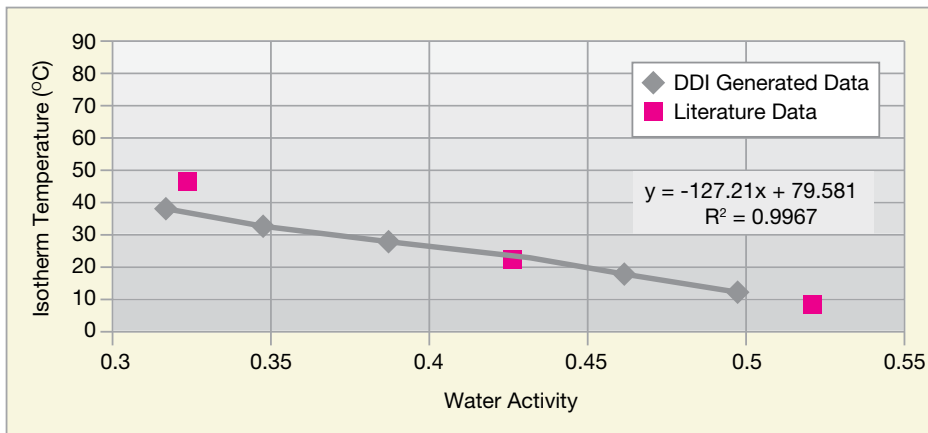
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**Figure 3.** Water activity vs. isotherm temperature for spray dried milk powder showing a good linear relationship. Tg data taken from Shrestha et al., 2007 shows good agreement to the isotherm data.<sup>2</sup>

water activity constant and scanning temperature, the isotherm analysis holds temperature constant and scans water activity (Figure 2). Consequently, the temperature of the isotherm when the critical water activity is determined should be similar to the Tg, determined using DSC analysis for a sample at the critical water activity.

Graphing isotherm temperature and critical water activity for spray dried milk powder gives a good linear relationship (see Figure 3). This indicates that determining critical phase transitions using isotherm analysis is equivalent to determining them with DSC analysis. The linear relationship between isotherm temperature and water activity also makes it possible to predict the glass transition temperature at any water activity.

The moisture sorption isotherm can also illustrate differences between

amorphous and crystalline material and provide information about the level of each in a product.

Amorphous material is much more hygroscopic initially and then undergoes a phase transition, clearly visible with a DDI isotherm. In contrast, crystalline material has a very flat isotherm with large changes in water activity vs. moisture content until the deliquescence point is reached and the curve changes to vertical while waters of hydration are added. The deliquescence point, represented by a sharp inflection in the isotherm curve from horizontal to vertical, is easily identified with isotherms of high resolution without requiring visual inspection of the sample.

### Conclusion

Moisture sorption isotherms serve as a blueprint for moisture relations

in products and modern instrumentation has made it possible for anyone to analyse the moisture relations of their product.

The efficacy of isotherms in food engineering depends on being able to achieve high data resolution without drastically increasing isotherm test time.

New methods such as DDI make it possible to achieve the necessary resolution in a much shorter test time – days instead of weeks. These high-resolution moisture sorption isotherms make it possible to model and engineer food products in ways not previously possible, maximising safety, quality, and profitability.

This article is part of a larger report available at [www.aqualab.com](http://www.aqualab.com)

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# INNOVATIVE DETECTION METHODS FOR FOODBORNE PATHOGENS

Foodborne illness is on the rise around the world and between October 2011 and September 2012, there were over 32,000 reported cases in Australia alone.<sup>1</sup> Not only does this impact on people's health and wellbeing, it also causes economic losses in the form of lost productivity and healthcare costs.

As a result, there is increasing pressure on microbiology labs to provide accurate and timely results across a broader range of pathogens, often with fewer resources.

Another factor is that traditional agar methods are often unable to provide the type of information required by modern regulations or specifications.

In response to these challenges, the Food Safety department of the global innovation company 3M has developed a new platform that innovatively combines two technologies.

## Combining DNA detection with bioluminescence

The **3M™ Molecular Detection System** uses isothermal DNA amplification to amplify the specific DNA sequences of target organisms and uniquely combines this with bioluminescence to provide real-time positive results.

Designed with simplicity in mind, the system uses a single sample preparation protocol across all assays and the unique colour coding of the software and reagent tubes facilitates an easier set-up, reducing the chance of operator error.

According to Niki Montgomery, Global Business Manager 3M Food Safety, the system offers significant bottom-line benefits to businesses through faster processing time, less staff training, and reduced risk of human error.

"Because bioluminescence provides real-time detection, positive results can



be available in as little as 15 minutes. And the system is very accurate. DNA is amplified continuously, which limits the possible interference of the template or DNA polymerase by food sample inhibitors."

Isothermal DNA amplification proceeds at a constant temperature – which removes the need for complicated instrumentation. In fact, the instrumentation, which can process up to 96 tests in a single run, has a smaller footprint than a standard notebook computer. The instrument is also portable and robust, with no need for recalibration after transport and minimal maintenance requirements.

"Numerous organisms can be tested in a single run, and it was designed to help our customers perform fewer repeat tests and make critical decisions faster," said Montgomery.

Another feature is that all kits come with ready-to-use and pre-dispensed reagents that require no measuring, mixing or aliquoting, freeing up valuable laboratory staff to focus on more important tasks.

The system is intended for use in all laboratories performing pathogen testing on food and beverage samples and has been verified across multiple

food segments, including meat, poultry, fresh produce, dairy, seafood, water and processed foods.

Within a year of launch, 3M received third party certifications against reference methods on all assays. These include AOAC PTM Certification and AFNOR Certification. The Salmonella assay has subsequently gained AOAC OMA status.

*3M is a leader in innovative solutions that help the food and beverage industries optimise the quality and safety of their products to enable consumer protection. At every step, 3M Food Safety provides solutions that help mitigate risk, improve operational efficiencies and impact the bottom line.*

For more information, visit [www.3M.com.au/foodsafety](http://www.3M.com.au/foodsafety) or follow @3MNews on Twitter.

## Reference

1. OzFoodNet Quarterly Reports, 1 Oct 2011 – 30 Sept 2012





## FUNCTIONAL FOODS ROUNDUP

*The physiological impact of food ingredients on human body cells and the rise and rise of protein fortification are some of the new developments in functional foods.*

Words by Ranjan Sharma

### Nestlé to test effects of health foods on human body cells

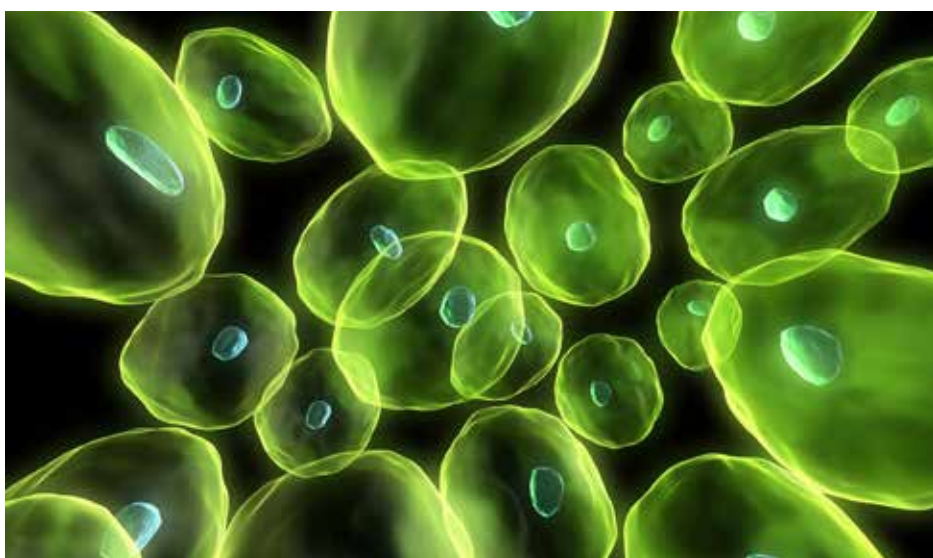
The worldwide market for health foods and beverages is forecast to grow by 22 per cent from US\$772 billion in 2013 to US\$944 billion in 2018,<sup>1</sup> partly driven by the rising incidence of obesity, heart diseases, cancers and other lifestyle-related disease.

Food companies around the world are hoping to capture a share of this market but the world's largest food and beverage company, Nestlé, is going one step further – to develop an understanding of the physiological functions of health foods and ingredients on human body cells.

In a partnership forged with Wisconsin-based Cellular Dynamics International (CDI) announced in January 2014, Nestlé will obtain human brain and liver cells and study how nutrients found in foods affect them.

According to the CDI's website, its iCell® product line includes cardiomyocytes, neurons, hepatocytes, and endothelial cells, with numerous other cell types under development. The company's MyCell® Products are cell products manufactured from donor samples using iPSC technology to make stem cells or differentiated cells from any individual, including those with diseases of interest.

Although its customers include most of the major pharmaceutical companies, Nestlé is the first food-oriented company interested in its products. According to the Nestlé website, CDI cell products are obtained using a pioneering method using adult human cells that have been "reverse-engineered" to behave like human stem cells. Nestlé has clarified



that it does not do any research using human embryonic stem cells.

Nestlé's research will provide the scientific basis for new nutritional solutions that could play an important role in helping to prevent or slow the onset of certain serious human health conditions, including obesity, diabetes and cognitive disorders.

According to reports, Nestlé scientists have begun investigating the interaction effects of fatty acids found in avocados and olive oil with neurons, with the aim of finding applications for ageing consumers.

Nestlé aims to use the insights from this research to develop nutritionally superior food products that it can market as having health benefits, ultimately hoping to find possible applications to assist in managing lifestyle diseases such as diabetes, obesity and Alzheimer's.

Although Nestlé competitors like Danone and Unilever have also been

investing in nutrition or medically enhanced products through clinical trials using healthy food products, Nestlé is the first company so far to announce it is investigating the direct effect of nutrients on human body cells. No doubt sceptics will question the commercial benefits as they may not be realisable for several years.

### Protein fortification

The global protein market for fortification can be divided into two often-competing categories: those derived from animals and those from plants. Due to the current high demand for protein claims, both markets are forecast to grow in the range of 5-6 per cent over the next five years.

According to Frost & Sullivan,<sup>2</sup> the global animal protein market in 2012 was 2.3 million tonnes, dominated by dairy-based ingredients, which represented nearly 50% of the global share of the animal protein segment.

Markets for dairy proteins are well established and dominated by sports and nutritional products.

The recent increase in the demand for milk-protein-based dairy ingredients such as whey protein concentrate (WPC), whey protein isolate (WPI), milk protein concentrates (MPC), milk protein isolates (MPI), and micellar casein concentrate (MCC), has pushed the ingredient prices to record levels.

Following dairy proteins, egg proteins make up the second largest ingredient in this market segment, which had a 40 per cent volume market share in 2012, due to its wider functionality in processed foods.

Another dominant protein in this segment is gelatin, which accounts for nearly 11 per cent of the global volume market share. Gelatine is predominantly used in dairy and confectionery products.

According to Frost & Sullivan, the global market for plant protein ingredients was approximately 1.7 million tonnes, dominated by soy-derived proteins with a market share of over 56 per cent.

Other major plant proteins include wheat and pea, where wheat protein is struggling to capture a market share due to the strong demand for soy protein.

Pea protein on the other hand is witnessing a healthy volume growth of nearly 10 per cent.

Other emerging plant-based protein ingredients include canola, potato, corn, rice and chia, which are likely to show a growth of more than five per cent in the next five years.

Although the market currently is dominated by animal proteins, recent price spikes may fuel the growth of cheaper plant proteins. However, it will

be important to work on the sensory properties of plant proteins for them to be a successful replacement of animal proteins in foods and beverages.

It seems not only the more traditional products such as sports and nutritional products with protein claims have increased in number, the range of products that are now making protein claims has also increased. These now include frozen yoghurt, artisanal ice cream, soups, snacks, cereal bars and breakfast cereals.

### New product launches

A notable recent launch is a snack product called Portable Protein Pack, P3 snack from Kraft Foods, which interestingly has presented three forms of high protein products. According to Kraft, the three-compartment snack pack delivers 13 grams of protein through Oscar Mayer Selects meat, Kraft Natural cheese, and Planters nuts.

Even Philadelphia cream cheese from Kraft has been given a protein revamp. Kraft recently introduced a Philadelphia 2x Protein Cream Cheese Spread, which will contain twice as much protein, at 4g per serving, as the regular variety of cream cheese.

Closer to home Sanitarium has recently launched a new higher protein Weet-Bix, claiming 11 grams of protein a serve, with the protein derived from soy.

### Protein claims

In Australia, Standard 1.2.7 sets out new rules to regulate nutrition content claims and health claims on food labels and in advertisements. It replaces the existing transitional Health Claims Standard (Standard 1.1A.2) and brings together in one place the requirements for making nutrition content claims, health claims and related endorsements on food.



Food businesses now have less than two years (to January 2016) to make changes to ensure they are following the new rules. Under the Standard 1.2.7, if protein claim is made, the food needs to contain at least 5g protein per serving, and if a claim is made for good source of protein the food must contain at least 10g protein per serving. 🍌

### References

1. <http://business.time.com/2014/01/08/nestle-will-test-health-foods-on-human-brain-cells/>
2. <http://www.naturalproductsinsider.com/articles/2013/07/the-global-protein-ingredients-market.aspx>

*Ranjan Sharma compiles market intelligence newsletter "Functional Foods Weekly" ([www.functionalfoods.biz](http://www.functionalfoods.biz)).*



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# NUTRITION WATCH

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

Words by Dr Ramon Hall

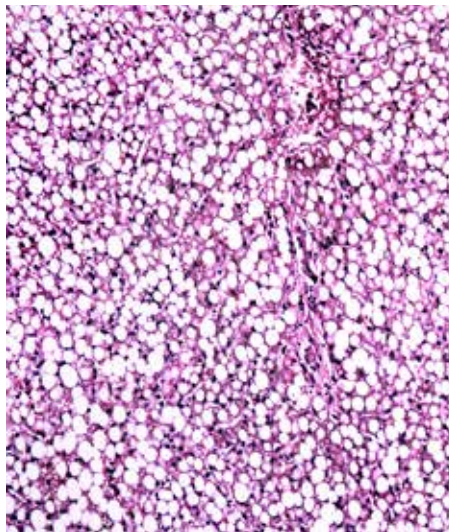
## Fructose and non-alcoholic fatty liver disease

Researchers from the University of Toronto in Canada have undertaken a systematic review and meta-analysis of controlled feeding trials to establish whether there is a link between fructose consumption in the diet on markers of non-alcoholic fatty liver disease (NAFLD) (Chui *et al.*, 2014).

The authors note that the increased prevalence of NAFLD is closely linked to the increasing prevalence of obesity and type 2 diabetes and that it has been associated with increased cardiovascular morbidity and mortality. Dietary factors such as fructose have been purported as potentially contributing to NAFLD.

The study included 13 eligible trials, which involved 260 healthy participants and included at least seven days of follow-up. The studies included seven isocaloric trials (where fructose was exchanged energy balanced with other carbohydrates) and six hypercaloric trials (where the diets were supplemented with excess energy (+21-35% energy) mainly from fructose (+104-220g/day) compared to control diets). The study measured both intrahepatocellular lipids (IHCL) and alanine aminotransferase (ALT), which are considered biomarkers associated with NAFLD.

The meta-analysis revealed no significant effect of fructose on the biomarker of NAFLD (IHCL or ALT) in dietary protocols that were controlled for calories. In the trials where fructose was included in a hypercaloric design (+21-35% energy), there were increases in the NAFLD biomarkers (IHCL and ALT), however, the researchers suggest that these results need to take into



*Fatty hepatosis of human liver cells.*

account that they are confounded by the additional energy content of these diets.

The authors conclude that "Isocaloric exchange of fructose for other carbohydrates does not induce NAFLD changes in healthy participants. Fructose providing excess energy at extreme doses, however, does raise IHCL and ALT, an effect that may be more attributable to excess energy than fructose. Larger, longer and higher-quality trials of the effect of fructose on histopathological NAFLD changes are required."

Although this systematic review does not provide absolute clarity on the matter of the role of fructose in contributing to NAFLD, it does highlight opportunities and potential future trials that are necessary to reach a firmer conclusion on this matter.

Chiu *et al.*, (2014) "Effect of fructose on markers of non-alcoholic fatty liver disease (NAFLD): a systematic review and meta-analysis of controlled feeding trials". *European Journal of Clinical Nutrition*, Published online ahead of print (doi:10.1038/ejcn.2014.8).

## Protein enhances lean body tissue and strength in elderly women

A research team from Deakin University in Melbourne has recently completed a study that investigated the effects of a protein-enriched diet using lean red meat in combination with progressive resistance training on measures of lean tissue mass, muscle size, strength and function in a group of elderly women (Daly *et al.*, 2014).

This four-month-long randomised controlled trial involved 100 women (60-90 years old) who were living in retirement villages in Melbourne. Participants were allocated to two different treatment groups; either a progressive resistance training plus ~160g cooked lean red meat six days per week or a control group which received progressive resistance training and received one serving of pasta or rice per day. All participants undertook two sessions of progressive resistance training a week and received supplementation of vitamin D.

The lean red meat diet significantly increased the average protein intake to ~1.3 g protein/kg body weight/d compared to the control group who received ~1.1 g protein/kg body weight/d. Compared to the control group, the women who undertook the lean red meat treatment significantly increased total body lean tissue mass, leg lean tissue mass and muscle strength. Compared to the control group, the lean red meat diet group also had higher levels of insulin like growth factor that are important for helping with maintenance of healthy muscles. There was also a favourable reduction in the levels of the proinflammatory marker interleukin-6 in the red lean



meat group after four months compared to the control group.

These findings provide further support of the important role of high quality protein sources like lean red meat play in diet of older individuals who may require higher levels of protein (due to anabolic resistance) to maintain strong healthy muscles, and to help them remain active.

Daly *et al.* (2014) "Protein-enriched diet, with the use of lean red meat, combined with progressive resistance training enhances lean tissue mass and muscle strength and reduces circulating IL-6 concentrations in elderly women: a cluster randomized controlled trial". *American Journal of Clinical Nutrition*, Published online ahead of print (doi: 10.3945/ajcn.113.064154).

### Decreased consumption of dairy associated with increased risk of AMD

A study led by researchers from the Centre of Vision Research at the University of Sydney has investigated the link between changes in dairy food consumption (both regular fat and low / reduced fat) and incidence of age-related macular degeneration (AMD) (Gopinath *et al.*, 2014).

Using prospective data from the Blue Mountains Eye Study, 2037 participants aged 49 years or over at baseline were followed up at five year intervals over 15 years. Age-related macular degeneration was assessed using retinal photographs. Dietary data was collected using semi-quantitative food frequency questionnaires and servings of dairy serves were calculated. Over 15 years of follow-ups there were 352 case of any AMD; 268 cases of early AMD and 84 cases of late AMD.

After adjusting for confounding factors (such as: age; sex; smoking, white cell count and fish consumption), a significant linear trend was observed with decreasing consumption of total dairy foods (comparing lowest and highest quintiles) and the 15-year incidence of late AMD.

Additionally, over the 15-year period, decreased consumption of reduced fat dairy foods (lowest to highest quintiles) was associated with a significantly increased risk of incident late AMD. Also, decreasing calcium intake over the 15-year period was associated with increased risk of developing incident late AMD.

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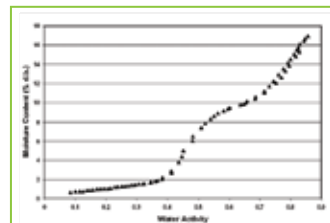


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The authors concluded that: “A lower consumption of dairy products (regular and low fat) and calcium was independently associated with a higher risk of developing incident late AMD in the long term. Additional cohort studies are needed to confirm these findings.

Gopinath *et al.* (2014) “Consumption of dairy products and the 15-year incidence of age-related macular degeneration”. *British Journal of Nutrition*, Published online ahead of print (doi:10.1017/S000711451300408X).

### High intensity exercise may help suppress food intake

Researchers from the University of Western Australia have provided some initial evidence to suggest that high intensity exercise may modify appetite (Sim *et al.*, 2014). The aim of

the experiment was to investigate the effects of high intensity intermittent exercise on energy intake, perception of appetite and appetite-related hormones in sedentary overweight men.

The study was a randomised counter-balanced design involving 17 overweight men who undertook four different 30-minute experimental conditions including: resting control (CON); continuous moderate-intensity exercise (60%  $VO_{2\text{peak}}$ )(MC); high intensity intermittent exercise (alternating 60s at 100%  $VO_{2\text{peak}}$  and 240s at 50%  $VO_{2\text{peak}}$ )(HI); and very high intensity intermittent exercise (alternating 15s at 170%  $VO_{2\text{peak}}$  and 60s at 32%  $VO_{2\text{peak}}$ )(VHI). Standard isocaloric meals were consumed following exercise/CON and after an

additional 70 minutes an *ad libitum* meal was consumed. Capillary blood and perceived appetite ratings were measured at regular intervals on the days of testing and free-living energy intake and exercise was monitored the day before and the day after the session.

*Ad libitum* energy intake was significantly lower on the days of VHI and HI treatments compared to the control treatment and the VHI treatment was also significantly lower than the MC treatment. It was also noted that free-living energy intake was lower for the VHI group compared to the control and MC groups over the day following the exercise sessions. Also of interest, the VHI group had lower ghrelin levels (appetite stimulating hormone), higher blood lactate levels and higher glucose levels following exercise compared with the other treatment groups. The research indicates that there could be a link between these changed blood parameters and the lower *ad libitum* food intake.

Although, these are preliminary findings, it is interesting that the intensity of exercise can potentially impact subsequent food intake. These results should be of interest to manufacturers of weight loss and weight management food products, as they are often coupled with recommendations around exercise programs.

Sim *et al.* (2014) “High-intensity intermittent exercise attenuates *ad-libitum* energy intake”. *International Journal of Obesity*, 38, 417-422, (doi: 10.1038/ijo.2013.102).

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## Dietary protein meal distribution pattern impacts muscle synthesis


In a study conducted at the University of Texas, Galveston, researchers have provided initial data showing that consumption of protein balanced across the day may have benefits to muscle health Mamerow *et al.*, 2014). The authors make the comment that although protein consumption in many countries exceeds the RDA, the consumption pattern is often skewed towards the evening meal, whereas breakfast is typically carbohydrate rich and low in protein.

This randomised controlled crossover trial was conducted in eight healthy men and women, involving a seven day feeding period and a 30-day washout period between treatments. Twenty-four-hour muscle protein synthesis was measured in response to isoenergetic and isonitrogenous diets with protein at breakfast, lunch and dinner distributed evenly (Evenly spread: ~31g protein at breakfast; ~30g protein at lunch and 33g protein at dinner) or skewed (Skew diet: ~11g protein at breakfast; ~16g protein at lunch and 63g protein at dinner). Over a 24-hour period on day 1 and 7, venous blood samples and muscle biopsy samples were collected during a constant infusion of labelled phenylalanine.

The results showed that the 24 hour mixed muscle protein fractional synthesis rate (a measure of muscle protein synthesis) was significantly higher (increased 25%) on the evenly spread protein diet compared to the skewed protein diet. This finding was consistent at both day one and day seven of the seven-day eating programme.

The authors conclude that “the consumption of a moderate amount of high quality protein three times a day provides a more effective means of stimulating 24-hour muscle protein synthesis than the common practice of skewing protein intake toward the evening meal. We recommend a moderate, meal-driven approach to daily protein consumption that is mindful of the interplay of issues such as protein anabolism, cost and daily energy consumption.”

These findings have potential implications for the food industry and health professionals in that food options and dietary patterns with sufficient protein at breakfast and lunch need to be developed to ensure protein foods are most effectively utilised, particularly for older individuals.

Mamerow *et al.* (2014) “Dietary protein distribution positively influences 24-h muscle protein synthesis in healthy adults”. *Journal of Nutrition*, Published online ahead of print (DOI 10.3945/jn.113.185280). 

*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.*



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# GM CROP SCIENCE

*The Agricultural Biotechnology Council of Australia has launched a new report designed to drive science-based debate on agricultural technologies.*

A new report has been launched to drive science-based debate about agricultural technologies and genetically modified (GM) crops.

*“The Official Australian Reference Guide to Agricultural Biotechnology and GM Crops”* was produced by the Agricultural Biotechnology Council of Australia (ABCA).

In launching the report, the ABCA highlighted that agricultural biotechnology was increasingly seen as a part of the solution to some of the world’s biggest challenges – a rapidly growing world population, a changing climate and growing pressure on natural resources such as water and arable land.

Since GM crops were commercialised almost two decades ago, a total of 2,833 regulatory approvals involving 27 GM crops have been issued in 36 countries (35 + EU -27) - 1,321 for food use, 918 for feed use and 599 for planting or release into the environment.

In 2013, more than 18 million farmers in 27 countries planted GM crops across 175 million hectares.

The report provides an overview of agricultural biotechnology, local and international adoption, regulation, safety, answers common questions about GM crops and provides information on managing coexistence in farming between GM and non-GM crops.

It outlines the key benefits delivered by GM crops since 1996 as increasing the value of crop production by US \$116.9 billion, reducing pesticide usage by 497 million kilograms, and attributes higher productivity to saving 123 million hectares of land from being cleared.

## CURRENT FIELD TRIAL SITES

CROP	TRAIT	LOCATION	STAGE
Banana	Human nutrition, disease resistant	Qld, NT	Current site, Post-harvest monitoring
Barley	Human nutrition, yield, abiotic stress tolerance	ACT, WA, SA	Current site, Post-harvest monitoring
Canola	Herbicide tolerance, yield	Vic, NSW, WA	Current site, Post-harvest monitoring
Cotton	Insect resistance, herbicide tolerance, enhanced fibre yield	Qld, NSW, WA	Current site, Post-harvest monitoring
Indian Mustard	Herbicide tolerance	Vic	Post-harvest monitoring
Maize	Selectable markers - antibiotic and herbicide	ACT	Post-harvest monitoring
Perennial Ryegrass	Animal nutrition	Vic	Current site
Safflower	Altered oil profile	ACT	Current site
Sugarcane	Abiotic stress tolerance, yield, herbicide tolerance	Qld	Current site, Post-harvest monitoring
Wheat	Human nutrition, yield, abiotic stress tolerance, disease resistance	ACT, NSW, WA, SA	Current site, Post-harvest monitoring
White Clover	Disease, resistance, viral disease resistance, antibiotic resistance	Vic, NSW	Post-harvest monitoring

Other benefits identified include reducing CO<sub>2</sub> emissions, improved soil health and increasing incomes for small-scale farms – 90 per cent of farmers growing GM crops are risk-averse, poor farmers from developing countries.

*The Official Australian Reference Guide to Agricultural Biotechnology and GM Crops* outlines positions from leading global authorities regarding the safety

of GM crops from the World Health Organization to Food Standards Australia New Zealand. It states “every legitimate scientific and regulatory body that has examined the evidence has arrived at the conclusion that GM crops and the food they produce are as safe as their conventional counterparts”.

In Australia, the Commonwealth Gene Technology Act 2000 and



corresponding state and territory legislation were enacted to protect the health and safety of people and the environment by identifying risks posed by gene technology. GM products also are regulated the Gene Technology Regulator and Office, Therapeutic Goods Administration, Food Standards Australia New Zealand, the Australian Pesticides and Veterinary Medicines Authority, the National Industrial Chemicals Notification and Assessment Scheme.

Research by the Australian Department of Industry conducted in 2012 found 60 per cent of Australians were willing to eat most food containing GM ingredients.

To enable consumers to make informed choices, foods containing more than one per cent of GM ingredients must be clearly labelled. There are some exemptions including if the final food has negligible level of genetically modified DNA or protein such as highly refined sugars and oils.

The report also looks at local production and crop trials. The first GM crop grown in Australia was cotton. GM cottons that are insect resistant, herbicide tolerant or a combination of both now comprise more than 99 per cent of all cotton grown in Australia. The report outlines growing GM cotton has reduced pesticide use by around 85 per cent compared to previously grown conventional varieties.

Other GM crops grown around the nation include herbicide tolerant canola (8.2 per cent of total canola plantings in 2012-13) and GM carnations with flowers that range in colour from almost black, to blue-purple to light violet. GM carnations are the first and, to date, the only GM organism to be registered on the Australia's Gene Technology Regulator and Office 'GM Register', which means they can be sold to home gardeners.

Currently GM crops being trialed include primarily food crops such as bananas, sugarcane, wheat and barley (see table 1). The 'second generation' of GM crops has a stronger focus on increasing the nutritional traits with the view to creating functional foods. It's also the trend observed globally with overseas trials including:

- rice enriched with iron, vitamins A and E, and lysine,
- potatoes with higher starch content, and inulin,
- maize, banana and potatoes containing edible vaccines,
- maize varieties with low phytic acid and increased essential amino acids,
- soybean and canola with healthier oils, and
- allergen-free nuts.

International trials are also continuing on improved agronomic traits for corn, soybeans, cotton, rice and canola crops.

In the foreword to the report, ABCA Chairman Ken Matthews writes: "Although the potential of agricultural biotechnology is widely recognised, public discussion and debate has not always based on clear, factual and accessible information. It is vital for our future that decisions on agricultural biotechnology be based on credible, science-based information."

A full copy of the report can be downloaded at [www.abca.com.au/materials/booklets](http://www.abca.com.au/materials/booklets) 

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## THREADS OF GOLD

*While around 90 per cent of the world's saffron is grown in Iran, Australia has a budding commercial industry.*

Saffron or 'red gold' is the world's most expensive spice fetching up to \$35,000 a kilogram and \$14.00 for just 100 milligrams once it's on the supermarket shelf. Extracted from the pistils of the crocus flower, it takes up to 250,000 flowers to make just one kilogram of dried saffron.

At the centre of the purple flower is one red stigma. The stigma has three crimson trumpeted filaments that are carefully hand harvested and then dried creating the spice saffron. It is the combination of this labour-intensive process and the high number of flowers required, which accounts for saffron's high price.

As a high priced commodity, saffron can be a victim of fraud. Low quality saffron is often traded on international markets and specifications for pure saffron are not always respected. The International Standardization Organization (ISO) has established a number of strict criteria to help fight against fraud and rightfully recognise high quality saffron producers.

This includes specific tests for each category of dried saffron including powder, filaments and cut filaments. These tests analyse the strength of the spice's flavour, aroma, colour and also help laboratories to detect if the saffron is pure. Fraud is more likely to occur with powdered saffron as less expensive spices can be added to increase the mass.

Around 90 per cent of the world's saffron is grown in Iran. Australia has a budding commercial industry with a network of around 50 growers.

The first successful commercial saffron growers in Australia were Terry and Nicky Noonan who started growing the spice in 1990 on their property in the Huon Valley, Tasmania. Their yearning for a sea-change saw them farewell corporate jobs in Sydney and investigate options in Tasmania from owning a cherry orchard to a vineyard.

The idea to grow saffron was borne one night with friends at a dinner party when they couldn't find locally grown saffron for their paella. Not only was saffron difficult to source in Tasmania, what they could find was imported. With a little research, they also discovered they had the perfect saffron growing conditions on their property.

"We started with a wheel barrow, shovel and \$10,000," said Nicky Noonan.

"My husband bought the first 5000 crocus bulbs into the southern hemisphere and

then worked for three years propagating and acclimatising the plants before we could harvest.

"It all started on a very small scale selling at farmers' markets, but now we supply 3000 supermarkets and 500 gourmet outlets around Australia."

The Noonans' business, Tas-Saff, has a network of more than 50 growers in Australia and 30 growers in New Zealand. They produce only grade-one saffron supplying up to 20 kilograms to the local market, which has a farmgate value of \$600,000.

"We can't compete with cheaper imports so we focus on growing the best possible produce – high quality, organic and sustainable," said Nicky.

"One tenth of a gram of our saffron can provide the same flavours and benefits of up to a gram of some imported saffron."

As the only significant commercial grower in Australia, Tas-Saff received a Rural Industries Research and Development Corporation (RIRDC) grant to work with the University of Tasmania to perfect drying techniques that increase the aroma of the spice.

Tas-Saff is now supplying saffron for research projects investigating the spice's potential health benefits in relation to macular degeneration and cancer.

"It's an exciting industry and one we are truly passionate about," said Nicky.

"There is enormous potential. As a nation we currently import 3000 kilograms of saffron a year and we are only producing 20 kilograms.

"We look forward to seeing the local market grow and capitalise on providing high quality saffron, the most expensive supermarket item per weight in the world." <sup>F</sup>





## DIARY

### AUSTRALIA & NEW ZEALAND 2014

**April 30. ConTech 2014 Australasia's Confectionery and Food Industry Technical Conference.** Pullman Melbourne Albert Park (formerly The Sebel), Melbourne, Vic. [www.contech.aigroup.com.au](http://www.contech.aigroup.com.au)

**May 2-3. 8th Congress of International Society of Nutrigenetics/Nutrigenomics.** Gold Coast, Qld. [www.isnn2014.org/invitation/](http://www.isnn2014.org/invitation/)

**May 15-17. Dietitians Association of Australia 31st National Conference, Brisbane, Qld.** [daa.asn.au](http://daa.asn.au)

**June 22-25. 47th Annual AIFST Convention. Food - the final frontier. Challenges and Opportunities in the 21st Century.** Melbourne Convention & Exhibition Centre, Melbourne, Vic. <http://www.aifst.asn.au> held in conjunction with **Foodpro 2014.** [www.foodproexh.com](http://www.foodproexh.com)

**August 17-22. 29th International Horticultural Congress. Sustaining Lives, Livelihoods and Landscapes.** Brisbane Convention & Exhibition Centre. [www.ihc2014.org](http://www.ihc2014.org)

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

### INTERNATIONAL 2014

**June 21-24. Institute of Food Technologists (IFT) Annual Meeting & Food Expo.** New Orleans Morial Convention Center, New Orleans, USA. [www.ift.org](http://www.ift.org)

**August 17-21. IUFOST 17th World Congress of Food Science and Technology & Expo. Research That Resonates.** Montreal, Canada. [www.iufost2014.org](http://www.iufost2014.org)

**November 9-11. Sweets & Snacks Middle East.** Dubai International Convention and Exhibition Centre, Dubai, U.A.E. [www.sweetsmiddleeast.com](http://www.sweetsmiddleeast.com)

**November 18-20. Food Matters Live.** ExCeL Exhibition and Convention Centre, London, United Kingdom. [www.foodmattersglobal.com](http://www.foodmattersglobal.com)

**November 26-28. Sweets & Snacks China.** China National Convention Center, Beijing, China. [www.sweets-snackschina.com](http://www.sweets-snackschina.com)

**May 8-14. Interpack 2014.** Duesseldorf, Germany. [www.interpack.com](http://www.interpack.com)

**June 12-13. Top Class Protein Nutrition. Bridge2Food.** Amsterdam, The Netherlands. [www.bridge2food.com](http://www.bridge2food.com)

**September 3-4. Vitafoods Asia. AsiaWorld Expo.** Hong Kong. [www.vitafoodsasia.com](http://www.vitafoodsasia.com)

**October 27-31. IDF World Dairy Summit.** Tel Aviv, Israel. [www.idfwds2014.com](http://www.idfwds2014.com)



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# WA'S UNIQUE APPROACH TO FOOD TESTING

*The integrity of food ingredients has never been more in the spotlight. We take a look at a unique and highly coordinated system running in Western Australia.*

Words by Susanna Morely-Wong

While the media has moved on from the fake food scandals in Europe, the heat is still on to verify and assess the origins and purity of food ingredients behind the scenes. In Australia, this responsibility almost always falls on Local Governments Authorities (LGAs) but just how does a local authority divide its time and resources across the thousands of food items for sale in its area?

To ensure the integrity of the food supply LGAs are usually responsible for responding to high-risk foods and issues of compliance, but choosing the right targets across the range of foods available across a whole state can be a hit and miss process. While all states and territories in Australia carry out surveys of food samples and keep databases of their compliance accuracy and level of risk to public health, Western Australia has a uniquely coordinated approach.

The Local Health Authorities Analytical Committee (LHAAC) was established under the 1911 Health Act for the purpose of providing analytical services to Western Australian local governments. For the past five decades LHAAC has offered a subscription-based service that ensures a broad range of food products and food premises across the state are tested regularly. Its remit is to regularly liaise with local governments, the Department of Health, the appointed analyst and other stakeholders in the public health and food industries on matters pertaining to food hygiene and safety.

In short, WA's LHAAC is on the case of fake foods and misleading nutritional information panels for sale in all 2.5 million square kilometres of the state.

According to executive officer and coordinator for LHAAC, Trevor Chapman, this coordinated system

avoids duplicate testing and spreads the cost of chemical testing of food products between the LGAs using a population based formula.

"No other state or territory in Australia runs a coordinated scheme on the same scale. LGAs elsewhere often do not cover all their bases each year when it comes to food testing," he said.

Food sampling schemes are certainly run in other states. For instance, NSW runs a voluntary scheme where testing is funded by the state. However, the beauty of the LHAAC scheme is the fairness of its administration and the spreading of the costs.

"A council with a high number of food premises but a low population may not have the resources to carry out significant testing and may unwittingly double-up on simpler testing procedures with other LGAs.

"Our system directs sampling targets and gathers data from a wide range of samples and we do the leg work when it comes to sorting out who tests what and who pays for those tests," said Chapman.

The LHAAC sampling program runs annually from July to June and is responsive to needs within the local government, trends in the industry and evidence of risk or non-compliance.

In 2012, LHAAC conducted a survey to compare compliance levels of local goods to imported foods. LHAAC directed twenty-seven LGAs to sample a total of 355 local food products including noodles, sauces and dried products.

The survey assessed the accuracy and compliance of the NIP, including font size, legibility and a full nutritional analysis. The results showed that 51.5% of imported goods were found to be non-compliant compared to 30.4% of local goods. The largest areas of

non-compliance in local goods related to inaccurate declarations of fat and sodium.

"This project was huge success," said Chapman. "Firstly, Environmental Health Officers saw value in the coordinated sampling project and secondly, they were given sufficient guidance by LHAAC in terms of the products they should be selecting for analysis."

According to Joe Zappavigna, Senior Environmental Health Officer for the city of Fremantle and LHAAC committee member, the system works well with the state's legal framework around how it looks after food.

"The LHAAC scheme is an all-in approach and has a 100% level of participation, even in the smallest of shires – like Murchison, with a population of just 200.

"The feedback from each LGA gives confidence about the safety of the system across the state. The funding is allocated based on population rates but each LGA still has access to all sampling results and to sampling procedures for complaints regarding food as well as other forms of legal sampling," said Zappavigna.

In fact, the sampling data from WA is considered to be so broad and so efficient that Trevor Chapman believes it could be of great value to national health agencies such as the Cancer Council and the Heart Foundation, who up to now have had to rely on the manufacturer's claims on NIP panels.

"We are considering a national benchmarking scheme for special claims by food manufacturers, for instance a low GI or gluten-free claim. Health agencies have no budget to verify these claims," said Chapman.

LHAAC continues to put pressure

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on manufacturers to lift standards on a range of food items across the state. And thanks to LHAAC's statewide approach, you can be fairly sure that on your next WA road trip there will be a minimum of 25% meat content in your service station pie whether you stop in Albany or Zanthus.

All LHAAC sampling projects and their results can be downloaded from their website <http://www.lhaac.org.au/sampling-results/current-year>

Susanna Morely-Wong is a post-graduate in the department of Food Science and Technology at Curtin University's School of Public Health. She is a committee member of the AIFST and the editor of the WA Branch newsletter.