

# food australia

Official publication of AIFST Inc

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AUGUST/SEPTEMBER 2013



## SWEET SENSATION

Delivering a taste advantage  
with lower sugar levels

*Also Inside*

**IS TOO LITTLE SALT AS BAD AS TOO MUCH?**

**3-D PRINTING OFFERS FOOD AT THE PUSH OF A BUTTON**

**STUDENT UNCOVERS A LINK BETWEEN PULSES AND OBESITY**





## ON THE COVER

### *Pushing the limits of sugar reduction with Stevia*

With demand for naturally positioned, reduced-sugar food and beverage products continuing to climb, Tate & Lyle, a global provider of ingredients and solutions to the food, beverage and other industries, is set to give the international food and beverage market a boost with the introduction of Tasteva Stevia Sweetener. Tasteva is a sweetener from natural origin that enables significant sugar reduction levels of 50 per cent or more\* while assuring products keep the same great taste.

Tasteva Stevia Sweetener is on average 200–300 times sweeter than sugar, provides zero-calorie sweetness and also overcomes one of the biggest hurdles encountered by food and beverage manufacturers seeking to reduce sugar levels with sweeteners from natural origin – taste.

Tate & Lyle conducted two-years of research analyzing more than 80 stevia-based extracts to determine the optimal steviol glycoside composition to deliver the best taste quality. This resulted in the creation of Tasteva Stevia Sweetener, which enables manufacturers to formulate products with a clean, sweet taste from a natural source.

In taste evaluations, Tasteva Stevia Sweetener performed significantly better than high purity Rebaudioside A extracts in several attributes, including aftertaste. Consumers who are sensitive to the bitter aftertaste prefer the taste of products made with Tasteva Stevia Sweetener.

“With the launch of Tasteva Stevia Sweetener, Tate & Lyle is adding another solution to its portfolio – giving food and beverage manufacturers more options and more opportunities to meet consumer health and wellness demands while delivering on taste”, sales director David Lynas said.

Product application testing for Tasteva Stevia Sweetener has occurred in many products, including yogurt, and the results were highly positive. Tasteva Stevia Sweetener joins other Tate & Lyle sweeteners and a host of innovative ingredients that are especially beneficial for dairy producers searching for the ideal combination of ingredients to satisfy consumer preferences for naturally positioned, great-tasting, reduced-sugar products.

“The vast ingredient and applications resources provided by Tate & Lyle make us unique in

providing a one-stop solution shop for food and beverage manufacturers,” said Lynas. “With our portfolio of sweeteners, texturants and wellness ingredients, and our unique expertise in designing sweetening solutions, manufacturers can depend on us to aid in overcoming their formulation challenges.”

Tasteva Stevia Sweetener is now available for food and beverage manufacturing applications in Australia and New Zealand, according to Lynas. Tasteva complies with the JECFA (Joint Expert Committee on Food Additives), EC (European Commission)/EFSA (European Food Safety Authority) specifications and the Australia New Zealand Food Standards Code for steviol glycosides.

“We look forward to working with food and beverage manufacturers to help them use innovative ingredients like Tasteva Stevia Sweetener, which push the limits, to exceed consumer expectations,” said Lynas.

\*Depending on application and subject to maximum levels permissible by local regulations. <sup>Ⓐ</sup>

# TATE & LYLE

**our** ingredients – **your** success

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# food australia

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## FROM THE EDITOR

Coeliacs and others suffering from gluten intolerance will be pleased to hear about new efforts to come up with better ways of measuring and monitoring gluten in beer and other products ("Beer Helps Shed Light on Gluten Tests", page 32).

Meanwhile, the significantly higher number of people who have lactose intolerance might be interested in the latest research about the health benefits of camel milk – which not only offers a highly nutritious substitute for cow's milk but may also help fight against cancer (page 40).

On a more controversial point, yogurt continues to stir the proverbial pot. As noted in "The Greek Paradox" (page 38), concerns about the by-products from Greek yogurt are now tainting the segment's healthy image. And while Chobani continues to defend its claim that the word "Greek" defines the process of making rather than the source of its yogurt (page 40), the company has reacted to a UK ruling and changed the name of its UK products.

Ongoing issues and confusion surrounding naming and explaining food prompted Jim Gruber to pen an article on the challenges of defining food (Spotlight, page 16). The current debate about naming yogurt is a good example of how things as simple as names can become rather complicated.

Lynn Elsey

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CIRCULATIONS  
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Average Net Distribution  
1 October 2011 -  
30 September 2012  
2764



BY THE NUMBERS

# AN AMBITIOUS AGENDA

The release of the government's long awaited National Food Plan has been received with plaudits and criticism, as duly expected.

The initiative encapsulates a number of ambitious initiatives – backed with promises of investment – designed to create new opportunities for Australia's food industry. Although some of the financial goodies are new, others relate to campaigns already promised or underway.

Regardless of interpretation, the themes, goals and initiatives found in the plan provide some interesting reading.

\$411 million will be spent this year to help improve global food security.



Commitments to the food industry include spending up to \$30.4 billion to rollout the National Broadband Network.



\$1.5 million is earmarked to teach students about food and agriculture.



The plan pledges that agriculture and food-related exports will increase by 45 per cent by 2025.



Australian households waste approximately 15 per cent of the food they buy.



Each Australian generates an estimated 361 kilos of food waste every year.

Australians spend over \$371 million on food and beverages per day.



\$30.5 billion – the value of our food exports



Aussie farmers and fishermen produce enough food to feed 60 million people per year.



The government plans to invest \$28.5 million in an Asian Food Markets Research Fund, \$2 million to develop a brand identity for Australian food and technology and \$9 billion to improve the food industry workforce.



\$19.2 billion; our food surplus in 2011–12



## PATHWAYS TO MARKET

University of Tasmania's sensory monitoring company Sense-T has received an additional \$2.5 million from the government for its five-year \$10 million "Pathways to Market" project.

The project involves collecting real-time data on how food is produced, processed, transported and sold. The resulting information will be available to consumers, producers and distributors to help verify and improve the quality of food products.

The project, which is led by Mark Tamplin of the Tasmanian Institute of Agriculture, will follow two products through domestic and Asian markets, providing opportunities for research on food stability, traceability, logistics and environmental impact. The project also aims to develop new commercial technologies, including tracking sensors that can be embedded in packaging, and provide consumer research

about the source and provenance of food. It will also include methodologies to measure the value of Nature and the development of apps for businesses and consumers.

"By 2050, there will be nine billion people in the world. How to feed those people is an increasingly urgent question. The Pathways to Market project will help drive environmental sustainability, safety and innovation in food supply chains," said Ros Harvey, director of Sense-T. Harvey said that the project is unique as it involves developing new techniques and technologies that measure the entire supply chain.

Sense-T is an economy-wide intelligent sensor network that combines advanced data analytics and modelling with real-time sensor data from across Tasmania. The program is a partnership between the University of Tasmania, the Tasmanian Government, CSIRO and IBM.

## EDIBLE INSECTS

In response to growing concerns about feeding the world, the UN Food And Agriculture Organisation (FAO) is now promoting a highly versatile, nutritious and environmentally sustainable source of food – insects.

The FAO, in collaboration with the entomology laboratory at Wageningen University in The Netherlands, has recently published a guide to the world of bugs for food and feed, titled *Edible insects: future prospects for food and feed security*. The 187-page book provides a backdrop to the organisation's quest to move insects into the spotlight as a viable way of meeting food and nutritional challenges for a growing world.

The publication includes a wide range of scientific research on insects and details the insect food and feed value chain. It points out that insects can be quite nutritious, with high levels of protein, fat, fibre and minerals. They can be eaten whole or ground into powder or paste and incorporated into other foods. However, overcoming the distaste for bugs may be a challenge in some societies.

The authors say that insects form part of the diet of at least two billion people, with beetles as the most

commonly consumed insect (31 per cent) followed by caterpillars (18 per cent) and bees, wasps and ants (14 per cent each). Even termites and dragonflies have a place at the table for 3 per cent of the world.

As innovations in the mass rearing of bugs increase, using insects for aquaculture and poultry feed is likely to show notable growth during the next decade, along with food development, according to the authors.



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## AFGC SUGGEST NEW GLUTEN RULES

The Australian Food and Grocery Council is recommending that the definition of “gluten free” be changed to fall in line with that used in the UK and Europe.

The AFGC wants FSANZ to allow food that contains up to 20 milligrams of gluten per kilo to still be classified as free of gluten.

Under the current standards, manufacturers must declare the presence of any gluten in products. And, if the label claims the product is “gluten free”, the food cannot contain any detectable gluten.

However, at present there is no regulation regarding the testing process for gluten.

Although a number of businesses and manufacturers have said that changing the definition would reduce manufacturing costs and make it easier to source overseas products, others are not as happy with the concept.

“This is not just about consumer honesty and the future of the Australian food manufacturing industry, it is also a health issue,” said Michael Bracka, the CEO of Freedom Foods and the former head of Kellogg Australia.

“The changes as put by the AFGC are plainly misleading to consumers.” Bracka also said that regulation changes could lead to a flood of cheap overseas imports and damage the Australian gluten free industry.

## AMAZON TARGETS FRESH FOOD

News that Amazon is making a major undertaking into the online grocery business, by selling and delivering fresh food, is creating waves across the global supermarket industry.

The online giant has been testing its AmazonFresh food line in its home base of Seattle for around five years, delivering fresh produce, including eggs, meat and fruit, with its own trucks.

The company is now planning on expanding the business, starting with Los Angeles and then the San Francisco Bay Area. According to reports, expansion plans include up to 20 additional urban areas in the US and other international locations. Sources say that the online retailer is planning to roll out warehouses with refrigerated areas for food and space to store up to a million general products.

“The fear is that grocery is a loss leader and Amazon will make a profit on sales of other products ordered online at the same time,” Bill Bishop, an analyst at retail technology consulting firm Brick Meets Click, told the *Chicago Tribune*. “That’s an awesomely scary prospect for the grocery business.”

A number of companies have entered the online food market in the US but most have struggled to make a profit. However, some business specialists have said that Amazon’s ability to combine its food service with its mainstream merchandising products provides scope for better results.

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## SURPRISING RESULTS ON COFFEE

New research from the University of Western Australia may dash the hopes on those who have been drinking coffee to control their weight.

The researchers were hoping to demonstrate improved cardiovascular function among coffee lovers; instead they found that drinking too much of the popular brew may actually be linked to a worsening of the metabolic syndrome.

The study involved feeding chlorogenic acid (CGA) – which has been associated with health benefits, including increasing insulin sensitivity, reducing blood pressure and the accumulation of food fat – to laboratory mice.

“Studies have shown that coffee consumption lowers the risk of developing type 2 diabetes,” Kevin Croft, UWA School of Medicine and Pharmacology, said. “This also included research on decaffeinated coffee, which suggested that the health benefits are from a compound in coffee apart from caffeine.”

However, the research on CGA, which is found in coffee, showed that consumption of more than five or six cups of coffee day not only resulted in weight gain but also greater glucose intolerance and increased insulin resistance. The researchers found that the equivalent dose of CGA fed to laboratory mice affected the utilisation of fat in the liver and caused abnormal retention of fat within cells.

However, the researchers noted that a moderate level of coffee provided health benefits.

“It seems that the health effects are dose-dependent. A moderate intake of coffee, up to three to four cups a day, still seems to decrease the risk of developing diseases such as cardiovascular disease and type 2 diabetes,” Vance Matthews, Western Australian Institute for Medical Research, said.

The results of the study have been published in the April issue of the *Journal of Agricultural and Food Chemistry* (DOI: 10.1021/jf400920x).



## HERSHEY EXPANDS IN CHINA

With an eye on China's rapidly growing candy market, Hershey has introduced a new candy in China – the company's first confectionery launch outside of the US.

The candy, called Lancaster in English and Yo-man in Chinese, signals the start of the confectionery giant's foray into the enormous Chinese marketplace. The condensed milk candy will be produced in China using imported milk and will be available in three flavours and sizes. Hershey, which estimates that the "milk candy" industry in China at US \$1.2 billion, will market the new candy with a multi-million-dollar campaign.

Hershey recently opened an Asia Innovation Center in Shanghai, which will serve as a hub for R&D and allow Hershey to quickly develop, test and customise new products for the Chinese market. The centre, which will be the company's second-largest research and development location, will also include a sensory area, packaging development and creativity centre.

Hershey has said it wants to increase sales in China by seven fold over the next five years, which would make China the company's second largest market after the US.



## GOLD DUST

A biosensor made with gold nanoparticles has been identified as a new way of detecting *listeria*. And, according to the scientists behind the innovation, it offers a quick acting and cost-effective way of testing.

Details of the innovation have been published in *Industrial Biotechnology* (February 2013) by a team of scientists from the Maine (US) and Taiwan.

The process works through a disposable biosensing strip, which detects the presence of *listeria* through AuNP (gold

## THE HYBRID CONSUMER

Focusing on products at either end of the cost spectrum is now a sensible business strategy according to a new market report.

Rabobank claims that the rise of the "hybrid" consumer is an important global trend, illustrated by increasing sales in premium and value food products, with decreasing interest in the middle of the market.

The company's research found an increasingly polarised market that reflected changes in demographics, retailer strategies and economics. Consumers are saving money by trading down on staple good but trading up on products and experiences that offer higher emotional tradeoffs including occasional fine dining and shopping in premium supermarkets such as Whole Foods.

"The implications of this market trend are profound and touch on areas such as product offerings, distribution channels, marketing and brand management," said Marc Kennis, a senior analyst in Rabobank's food and agribusiness section.

"Given the driving forces of hybrid consumption, i.e. women's increasing role in household spending and the growing importance of Millennials (generations Y and Z), we believe that hybrid consumption is a long lasting phenomenon. Therefore food processors, food retailers and food service companies alike will need to adapt or risk fading away."

Factors behind the trend include the increase in women's influence over household spending decisions and the impact of a younger generation who are more likely to make decisions based on product merit rather than brand loyalty.

The report also noted that the increase in discount supermarkets and rise of private label products, along with an increasing ease of comparison shopping due to the internet, had all impacted consumer purchasing decisions. It also found that the recent global recession had helped accelerate polarisation in the market.

nanoparticle) modified screen printed carbon electrodes. According to the researchers the gold nanoparticles strengthen detection signals, improve the electron transducer and increase detection sensitivity, which allow the strips to identify small amounts of *listeria* in products in just one hour.

The team say that the sensor could be easily commercialised for use in the food industry.



## AUSSIE FOOD APP IN TOP 100

An Australian food scanning app, FoodSwitch, has been named as one of the world's top 100 innovative initiatives.

The app, which was developed by Bupa and The George Institute for Global Health, is designed to provide consumers with fast, easy to understand nutritional information to lead to better food choices. It allows the user to scan the barcode of packaged food using their phone to access nutritional details on nearly 40,000 Australian food products.



The app was recognised as part of 2013 Sustainia100 campaign in London for its efforts to help Australians reduce their risk of heart attacks and stroke by making healthier food choices. The campaign includes 100 global solutions that offer the potential to transform companies, sectors and industries to a more sustainable future.

“We are thrilled to receive global recognition for improving Australian families’ diets and long-term health with a simple, practical tool,” said Stan Goldstein, Bupa’s head of clinical advisory.

## INNOVATION PORTAL OPEN FOR BUSINESS

A new source for people interested in food innovation and networking is now online. The Food Tech Innovation Portal ([www.foodtechportal.eu](http://www.foodtechportal.eu)) is a Wiki-styled resource for anyone interested in research, open innovation and development of food processing related technology.

The site, which was created as part of the EU-funded HighTech Europe campaign (an initiative involving European research organisations and enterprises), which is comprised of European and Australian companies.

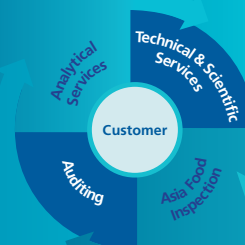
The portal was specifically designed to help SME enterprises without extensive R&D facilities explore and implement new technologies. It includes information about the latest technologies and research, companies and institutes involved in technology, links to open access infrastructure and a detailed innovation guide, from pre-feasibility to market launch.

It also provides an easy method of linking up with experts involved in new technology along with detailed descriptions of food processing technologies, including their working principles, processing parameters and applications.



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# A TAXING MATTER

*What works? When it comes to food choices, do financial incentives or disincentives have an impact?*

Words by Lynn Elsey

Rewarding consumers for making healthy food purchases, rather than taxing them for poor choices, may lead to better outcomes according to new research.

The Rand Corporation recently published a study that found a link between offering rebates for healthier grocery items with improvement in diets and reductions in the consumption of less nutritious foods.

The researchers examined a South African program, offered through a health insurance company, that provides its members with rebates of 10 or 25 per cent for the purchase of healthy food. The program encompasses more than 260,000 households who can select from a list of more than 6,000 foods that have been selected by nutritionists, physicians and behavioural scientists.

The eligible items, which include fruit and vegetables, whole grain products and nonfat dairy, and exclude products with added sugar or salt, are flagged at the supermarket. Using scanned data from the supermarket receipts and dietary information for around 350,000 individuals, the researchers found that a 25 per cent rebate prompted an increase in healthy food purchases by 9.3 per cent and decreased the purchase of less desirable food (including cookies, candy, chips and soft drinks) by 7.2 per cent. It also led to increases in fruit and vegetable purchases by 8.5 per cent. The researchers also found that the size of the rebate impacted food purchasing decisions.

"These findings offer good evidence that lowering the cost of nutritionally preferable foods can motivate people to significantly improve their diet," said Roland Sturm, a study coauthor and a senior economist at RAND.

“ These findings offer good evidence that lowering the cost of nutritionally preferable foods can motivate people to significantly improve their diet ”



The rebate program is run by Discovery Health, South Africa's largest health insurer. The free program provides members with a 10 per cent rebate on healthy purchases; members who complete an online health risk assessment questionnaire are then eligible for the higher 25 per cent rebate. Rebates are capped at 4,000 rands (around \$US 480) per month.

The study, which was published in the *American Journal of Health Behavior* (doi: 10.5993/AJHB.37.1.6), illustrates what Rand says is a growing interest in the use of food discounts to promote healthier diets.

## Taxing options

Taking a positive rather than punitive approach to alter food selection may be growing, as exemplified by Denmark's recent decision to drop its so-called "fat tax".

In late 2011 the Danish government enacted a surcharge on food containing more than 2.3 per cent saturated fat. But a year later, after concerns that the tax was leading to inflated food prices, putting Danish jobs at risk and causing people to head across the border to Germany to purchase "unhealthy" food items, the government repealed the unpopular tax. Additionally, it has also cancelled plans to introduce a new tax on sugar.

Nevertheless, Griffith University was recently awarded a government funded grant to measure the feasibility and consumer response to the concept of a tax on fast foods as a method of combating obesity. The three-year \$463,442 project from the Australian National Preventive Health Agency aims to consider "the cost-effectiveness and consumer acceptability of taxation strategies to reduce rates of overweight and obesity among children in Australia".

However, the federal health minister Tanya Plibersek has denied that the government is planning on introducing a "fat tax".



## PEOPLE

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### Schutz to lead Food Industry Board

The board of the new Food Industry Innovation Precinct has been named with Peter Schutz as chair. The members are Geoffrey Annison, AFGC; Dave Ashcroft, Petuna Aquaculture; Catherine Barnett, FoodSA; Kim Bryceson, University of Queensland; Charlie Donnelly, National Union of Workers; Margaret Haseltine, Agri-Food Skills Australia; Hermione Parsons, Victoria University; Christine Pitt, Meat and Livestock Australia; Alastair Robertson, CSIRO and Simon Talbot, Kraft Australia and NZ.

“The Food Precinct will support Australia’s food processing industry to become more strategic, increase collaboration and promote closer ties between the industry and researchers,” said Greg Combet, the minister for Climate Change, Industry and Innovation.

### New leader for consultancy

Andrew Buckley has been appointed as national leader – food and beverage for infrastructure consultancy pitt&sherry. Buckley, who had been serving as a senior project engineer for the food and beverage business unit, has 25 years experience in the manufacturing industry.

### New Wine Judge

Gwyneth Olsen was awarded Dux of the November 2012 Advanced Wine Assessment Course and has joined the judging panel at the Royal Queensland Wine Show. The Australian Wine Research Institute (AWRI) course involved an extensive four-day evaluation of more than 320 wines under simulated wine show conditions. Olsen is the senior winemaker at McWilliam’s Wines. She holds a BSc in biochemistry and a post-graduate degree in oenology from the University of Adelaide.

### Woolworths

Peter McConnell has been appointed as director of corporate affairs at Woolworths. McConnell previously served as chief of staff for NSW premier Barry O’Farrell.

### New chair and board members for Canegrowers

Paul Schembri, a canegrower from Mackay, has been elected as the new chairman of Canegrowers Queensland. Bundaberg grower Allan Dingle is the new senior vice-chairman and Herbert River grower Steve Guazzo will serve as vice-chairman. 🍷



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AIFST

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## NEWS & EVENTS

*An introduction to the next executive team, some award-winning news and a spotlight on our new webinar program.*

### Global leadership

Jeremy Betros, the head of technical and R&D manager at Brisbane-based Flavour Creations, has been selected as the inaugural Australian participant in a new global leadership initiative.

Betros will be representing Australia at Lead 360, a new initiative run by the US Institute of Food Technologists (IFT) to help develop a new generation of international food leaders to push the industry forward and establish lifelong international connections between industry, government and academia.

Betros, a professional member of AIFST, will be attending the program that will be held during the IFT annual meeting in Chicago in July 2013.

Betros is responsible for research and development at Flavour Creations, which includes leading a team of eight food technologists. During his tenure with the company it has expanded from a company that focused on manufacturing dysphagia (a medical condition associated with swallowing) related products to one that produces a range of nutritional products, including formulated meal replacements and infant food.

Betros, who holds a bachelor of food science and technology (honours) from the University at Queensland, was selected by AIFST and the AFGC to receive sponsorship to the Chicago meeting. Betros has been noted as an accomplished manager with strong technical skills and a good understanding of the interplay between industry, government and academia.

### New Leadership Team

AIFST is delighted to announce dairy expert and champion of leadership opportunities for women, Anne Astin, as our newly elected president.

Astin, who previously served as AIFST president-elect, replaces Jo Davey who will now serve as immediate past president.

"I'd like to take this opportunity to thank outgoing President Jo Davey for her tireless work, leadership, passion and insight in guiding the AIFST through a period of great change that has seen the organisation move to a place of greater relevance and engagement of members," Astin said.

Astin is the former CEO of Dairy Food Safety Victoria, a leading government dairy authority, and has more than 20 years experience at a senior executive and board level. She currently is a director of Dairy Farmers Ltd, chair of Wellsprings for Women (a not-for-profit supporting at risk women) and serves on the Energy Australia audit and risk committee and Innovation Australia's clean technology food and foundries investment committee.

A trained biochemist, Astin previously held directorships at Dairy Australia and was chair of the Victorian Minister's Women in Primary Industries Advisory Panel.

Astin's endeavours have not gone unnoticed. She has received the Public Service Medal (PSM) of the Queen's Birthday Honours for services to the dairy industry, national food regulation and rural women. She was inducted into the Victorian



Anne Astin

Women's Honour Roll for her work in biochemistry and as an advocate of women's leadership and was the first woman to receive the Australian Dairy Industry Council's Outstanding Service Award.

### New president-elect

The institute is also pleased to announce that Michele Allan has been elected as president-elect. The deputy chair of the Victoria branch and a fellow of AIFST, Allan has wide involvement across the food industry spectrum. She is chair of the William Angliss Institute and the Grains and Legumes Nutrition Council and a non-executive director of FSANZ, Meat and

Livestock Australia and Callaghan Innovation (NZ).

Allan has held executive roles with a number of food companies including Amcor, Kraft and Nestle. She has a bachelor of applied science from the University of Technology Sydney, a masters of management of technology from Melbourne University, a masters in commercial law from Deakin University and doctorate from RMIT. She is also a

fellow of the Australian Institute of Company Directors.

Please join us in welcoming the entire 2013-2014 executive team:

**Anne Astin** – President  
**Michele Allan** – President-elect  
**Tom Debney** – Hon gen treasurer  
**Jo Davey** – Immediate past president  
**David Cusack** – Executive councillor  
**Adam Hyland** – Public officer  
**Mel Malloch** – Executive manager



# WEBiNAR

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AIFST recently hosted our first webinar, “Global Trends in Food Packaging”, which was delivered in Melbourne by Roya Khalil, vice chair of the Australian Institute of Packaging-Victoria and senior packaging technologist at SPC Ardmona. The event, which covered topics about the evolving role of food packaging, global trends and hot topics such as “smart packaging” drew a wide audience across Australia and New Zealand. A recording of the session along with post event questions and answers meant that those who were not able to tune in at the event time could still get involved.

We are currently exploring the webinar format for a number of uses, including branch events and as part of the Continuing Professional Developing program.

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AIFST



Ian Brown

### Ian Brown receives Keith Farrer Award

In the run-up to the 2013 annual convention, Ian Brown was named as the recipient of one of the institute's highest awards.

The Keith Farrer Award of Merit, which acknowledges achievement in food science and technology, along with contribution to the institute's objectives, has been awarded to Ian Brown in response to his extensive and influential impact on the food science industry.

Brown, who has more than 30 years experience in the industry, has produced 60 scientific papers, is listed on 24 patents and has delivered more

than 35 keynote presentations at international conferences.

Brown is CEO of Clover Corporation, where he has helped grow the company's coffers from \$465,000 to \$4.4 million.

As the journal goes to press Brown will be presenting his address at the 2013 annual convention; we will be running his speech in the October / November issue of the journal.

### Antimicrobial Captures Innovation Award

A product from one of Australia's most prolific supporters of wild food, Herbal-Active, has received the AIFST Food Industry Innovation Award. Australian Functional Ingredients, spearheaded by Vic Cherkoff, developed the innovative natural antimicrobial. The product, a natural tasteless santiser made from essential oils and extract, can extend the shelf life of fresh products ten fold. Along with reducing the need for fungicides during production, the product can also be used as a wash for hands, surface and equipment.

"The Herbal-Active product has the ability to also assist with many food security goals by reducing food waste, improving efficiencies and increasing food safety – a great asset to our industry, Jo Davey, the president of AIFST, said.



Vic Cherkoff

The company's founder and visionary, Vic Cherkoff, is scheduled to accept the award during AIFST's annual convention. Cherkoff has been promoting and marketing Australian wild foods since the early 80s. 🍌



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# THE PERILS OF TALKING ABOUT FOOD

*Confusing language, myriad definitions and widespread access to the web mean that words used to describe food are often not what they seem.*

Words by *Jim Gruber*

Food scientists are familiar with simplification of terms used to describe food and food components, particularly in the media. The internet provides easy access to definitions from many sources and also differing opinions about possible health consequences – evidence freely available on the web supports both sides of such disagreements. This complexity can often be partially explained by the use of simplified language used for food.

At the launch of the National Food and Nutrition Research, Development and Technology Transfer Strategy, during the 2012 AIFST convention in Adelaide, Martin Cole cautioned that we would have to be careful with “language”. The language of food and nutrition science, and the definitions that we work with, will require consideration in developing the strategy. The language used is sometimes confusing and it can even be controversial.

## The least unacceptable options

Food is variable stuff. There are seasonal variations, country and area growing limitations and climatic influences on crops and livestock. In the science of food and nutrition we have to cope with compromises, alternatives and disagreements on definitions. We are not all speaking the same language, even if we limit the discussion to English.

Fruits, nuts and vegetables are not precisely defined. Corn means grain in some countries and maize (even frozen) is a cereal. An avocado is a fruit



*Simple definitions used for food are not universally accepted*



and cocoa is a pod. A cauliflower is a vegetable. A coconut is a drupe and we eat the “meat”. A soya bean is a legume, as are peas and peanuts. A garbanzo bean is a chickpea.

Simple definitions used for food are not universally accepted. Peanuts are called groundnuts and rockmelons are called cantaloupes in the US.

The Australia New Zealand Food Standards Code provides some definitions that form the legal basis for defining a number of foods in Australia; most of these also apply in New Zealand as well. The code is currently being reviewed, so there will probably be changes in the next two years.

During the circa 2000 review of the code, 18 different definitions for bread were proposed. The definition chosen was agreed by a group of the proponents to be the “least unacceptable”. It has however been amended since that time to allow for exemptions from fortification requirements for some “breads”, such as flatbreads and crispbreads.

The base definition for bread provided in Standard 2.1.1 is: “bread means the product made by baking a yeast-leavened dough prepared from one or more cereal flours or meals and water”.

However, when you delve deeper, the definitions can get a bit blurry. For example, an online dictionary

(*thefreedictionary.com*) offers the following definitions for gluten:

- The mixture of proteins, including gliadins and glutelins, found in wheat grains, which are not soluble in water and which give wheat dough its elastic texture.
- Any of the prolamins found in cereal grains, especially the prolamins in wheat, rye, barley, and possibly oats, that cause digestive disorders such as celiac disease.

The term gluten also conveys different meanings – to millers (in hard wheat), bakers (for strong flour) and for food intolerance sufferers (as they may also need to avoid triticale, rye, spelt, oats and barley).

The code defines gluten in Standard 1.2.7 as: “gluten means the main protein in wheat, rye, oats, barley, triticale and spelt relevant to the medical conditions coeliac disease and dermatitis herpetiformis”.

So gluten-free claims include consideration of cereals other than wheat, although some of the prolamins in barley are called hordein and those in oats can be called avinin.

When it comes to meat, Standard 2.2.1 offers the following definition: “meat means the whole or part of the carcass of any buffalo, camel, cattle,





deer, goat, hare, pig, poultry, rabbit or sheep, slaughtered other than in a wild state, but does not include –

- a) the whole or part of the carcass of any other animal unless permitted for human consumption under a law of a State, Territory or New Zealand;
- b) or avian eggs, or foetuses or part of foetuses”.

“Meat” does include fat and offal and this has ramifications for the definitions of other meat products such as meat pies and sausages. There is no mention of coconuts.

### Dietary Fibre

Dietary fibre or fiber has been a controversial topic since it first appeared. Kellogg’s launched “All Bran” as a high fibre food over 90 years ago.

Crude fibre is understood to be a mixture of largely undigestible substances of vegetable origin obtained as the residue of a precisely defined digestion procedure using acetic, nitric and trichloro-acetic acids ([www.icc.or.at/standard\\_methods/113](http://www.icc.or.at/standard_methods/113)). Crude fibre is the stuff that remains after severe chemical digestion of plant materials. Bran used to considered as chook food.

Dietary fibre is usually considered to be plant cell wall material. There was a debate about different analytical methods to determine “soluble” and “insoluble” dietary “fibres” using methods developed by Prosky and Englyst. (You can read about the history in a book on *Advanced*

*Dietary Fibre Technology* edited in 2001 by Barry Macleary and Leon Prosky.)

The US delegation to the Codex Committee on Nutrition and Foods for Special Dietary Uses proposed changing the Codex definition for dietary fibre in 2008. At the AIFST convention in 2012, three presentations used different definitions of dietary fibre. The following definition is from Standard 1.2.8:

“Dietary fibre means that fraction of the edible parts of plants or their extracts, or synthetic analogues, that are resistant to the digestion and absorption in the small intestine, usually with complete or partial fermentation in the large intestine. Dietary fibre includes polysaccharides, oligosaccharides (degree of polymerisation >2) and lignins, and promotes one or more of the following beneficial physiological effects: laxation, reduction in blood cholesterol and/or modulation of blood glucose.”

For the purposes of food labelling in nutrition information panels, the most practical definition might be provided by the accepted analytical methods, which allow for non-fibrous materials, fructo-oligosaccharides from chickory and even animal-derived galacto-oligosaccharides.

New Zealand recently proposed different adequate intake levels of dietary fibre for men, women, children and other groups. ([www.nrv.gov.au/nutrients/dietary%20fibre.htm](http://www.nrv.gov.au/nutrients/dietary%20fibre.htm).)

## Saturated Fat

Think of an example of a saturated fat. Perhaps you considered beef, butter or coconut oil?

Standard 1.2.8 of the Food Standards Code defines saturated fat as: “saturated fatty acids means the total of fatty acids containing no double bonds and declared as saturated fat”.

So for the purposes of labelling, “saturated fat” is declared as the total of saturated fatty acids.

Now, which of the previously mentioned foods has the most saturated total fat? For the answer we turn to the FSANZ nutritional panel calculator, to determine the saturated fatty acid percentages: separable beef fat 24 per cent, butter (milk fat plus water) 54 per cent, copha (coconut oil) 92 per cent.

The chemical definition of saturation relates to full hydrogenation of all C=C double bonds in a fatty acid. There would need to be three fully saturated fatty acids on a glycerol backbone to form a fully saturated triglyceride. Using this definition, from the literature I’ve seen, there are few, if any, naturally occurring saturated fats. All fats and oils, animal and vegetable, seem to contain mixtures of saturated and unsaturated fatty acids.

Lard (pork fat) can contain 40 per cent of monounsaturated oleic acid. Olive oil has about 50 per cent. In contrast, peanut oil can contain about 18 per cent of saturated fatty acids and coconut oil, as mentioned above, 92 per cent.

## Oils ain’t oils

Human breast milk contains both saturated fatty acids and trans fatty acids.

I contend that neither the level of saturation nor structural variations are as important as chain length when considering the properties of fats and oils. The simplest fatty acid, with two carbon atoms, is acetic acid (C2), which is the main acid in vinegar, Propionic acid (C3) is of course considered to be a food additive. Butyric acid (C4) is involved in the digestion of dietary fibre in the lower gut. Stearic acid (C18) is reported to be neutral with regard to influencing blood cholesterol

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*In the science of food and nutrition we have to cope with compromises, alternatives and disagreements on definitions*

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levels ([www.ncbi.nlm.nih.gov/pubmed/7733039](http://www.ncbi.nlm.nih.gov/pubmed/7733039)). Medium chain length fatty acids are reported to have different metabolic properties compared to those with more carbon atoms ([www.ncbi.nlm.nih.gov/pubmed/11880549](http://www.ncbi.nlm.nih.gov/pubmed/11880549)).

So not all saturated fatty acids appear to be “bad” and neither are all fats or oils. Just don’t eat too much of them.

## Cholesterol

The CSIRO website refers to cholesterol as a type of “fat”. Does the author of this statement think that cholesterol is a triglyceride?

Figure 1 is a schematic diagram of cholesterol. The *Encyclopaedia Britannica* defines it as: “A waxy substance that is present in blood plasma and in all animal tissues. It’s an animal sterol.”

Earwax is sometimes provided as an example of cholesterol, although the cholesterol content of earwax is apparently less than 10 per cent.

In contrast, Figure 2 includes structural representations of some of the plant (phyto)sterols.

We are animals. When herbivores and omnivores eat plant sterols they do not

digest most of them. Phytosterols can lower intestinal cholesterol absorption, but the complex dynamics of the lipid digestion process in the presence of phytosterol esters are reportedly not fully understood ([www.ncbi.nlm.nih.gov/pubmed/21482714](http://www.ncbi.nlm.nih.gov/pubmed/21482714)).

Do animals transform some of these different structures into a single animal form?

In other words, the word “cholesterol” seems to have many alternative definitions.

The Ontario Ministry of Health and Long Term Care provides seven types on their website:

“Cholesterol is a soft waxy substance. The word ‘cholesterol’ can refer to either blood cholesterol (cholesterol found in the body) or dietary cholesterol (cholesterol found in foods). Blood cholesterol, made by the liver, comprises about 80 per cent of the cholesterol in the body. The remaining 20 per cent comes from the foods we eat.

Cholesterol is transported in the blood by lipoproteins. There are two main types of cholesterol:

- Low-density lipoproteins (LDL)

Figure 1

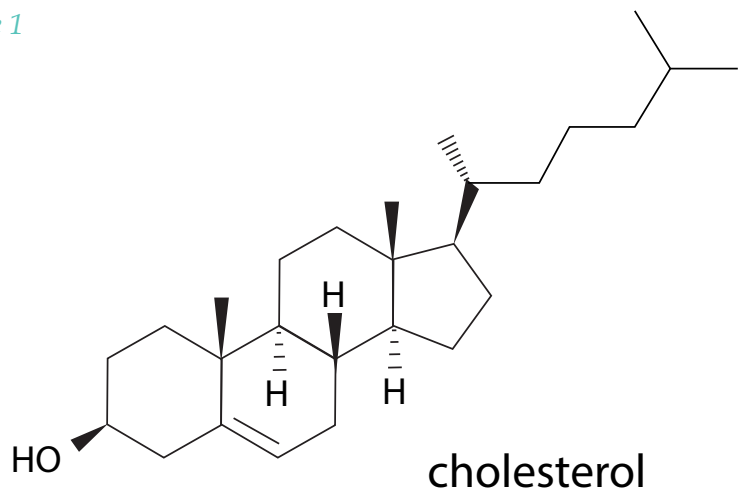
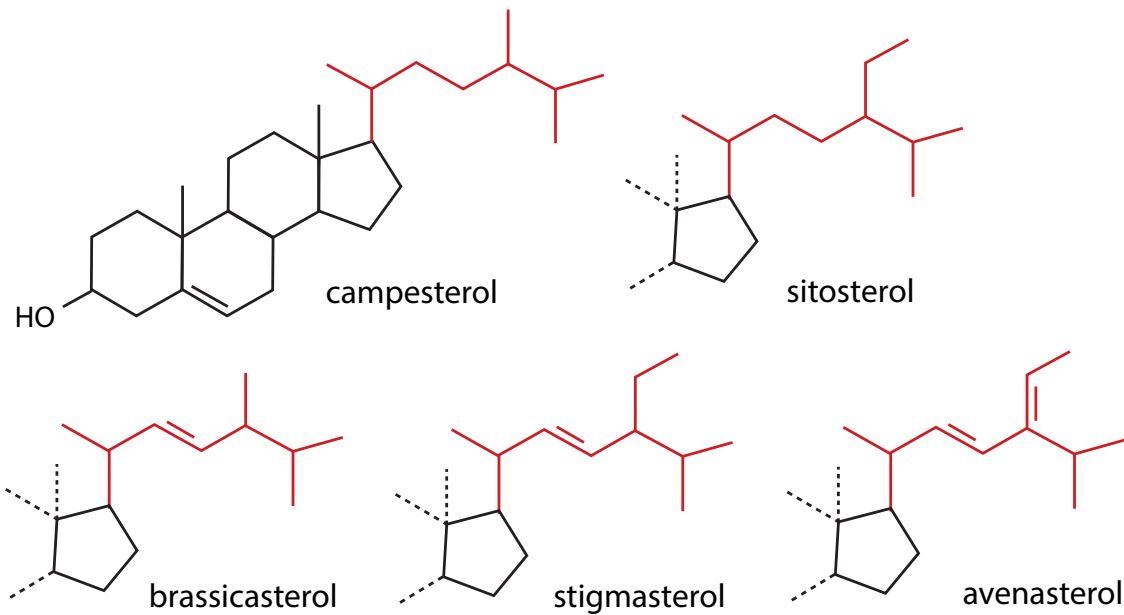


Figure 2



deliver cholesterol to the body. This type is often called “bad” cholesterol because too much LDL cholesterol can build up on artery walls.

- High-density lipoproteins (HDL) remove cholesterol from the body. HDL cholesterol is called “good” cholesterol because it helps carry LDL cholesterol away from artery walls.

Have you had a blood cholesterol test? Was it taken from a vein in your arm or from an artery? Most of your veins carry blood towards your heart.

Similarly, the American Heart Association says: “Cholesterol can’t dissolve in the blood. It has to be transported to and from the cells by carriers called lipoproteins. Low-density lipoprotein, or LDL, is known as “bad” cholesterol. High-density lipoprotein, or HDL, is known as “good” cholesterol. These two types of lipids, along with triglycerides and Lp(a) cholesterol, make up your total cholesterol count, which can be determined through a blood test.”

The terminology used may be clearer, but yet another type of cholesterol has been introduced.

The following is from a pathology report on blood from *Totalhealth* – “written by doctors”:

Pathology report on blood	
Glucose	6.3mmol/L (3.0 - 6.0)
Urate	0.34mmol/L (0.12 - 0.45)
Gamma GT	31U/L (1 - 55)
Cholesterol	6.9mmol/L (2.0 - 5.0)
HDL-Cholesterol	1.7mmol/L (1.1 - 2.2)
LDL-Cholesterol	4.6mmol/L (1.0 - 3.0)
Triglycerides	1.4mmol/L (0.5 - 2.0)
Cholesterol:HDL ratio	4.1 (2.0 - 5.0)

What was actually measured for this report? This is outside my area of expertise, but “total cholesterol” seems to be determined by HPLC on treated blood samples to obtain total fatty substances. Reagents are added and the high density lipoprotein / cholesterol moieties are separated by centrifugation. The LDL-C level is determined by subtracting the HDL-C result from the total cholesterol level. Note that this terminology also seems to apply a different definition to “low density” as used in the usual chemical sense (fats and oils float on water) – this definition apparently refers to low protein density.

A lot of blood testing data has been generated and this clinical data correlates to disease risk factors but “blood cholesterol” obviously isn’t actually a measurement of “dietary cholesterol”. The “cholesterol” content of total “blood cholesterol” is probably more like the concentration in earwax, less than 10 per cent.

### Conclusion

The language of food and nutrition science is complex. The media and politicians prefer to use simple language so as not to confuse the general public. However, the masses now have a very powerful tool called the internet, and as demonstrated above, there is a lot of information and misinformation out there. I doubt that many people consult the Code to check definitions of foods, even in Australia.

The problem in this situation is that the information is also transmitted to researchers and lobbyists. Published, poorly defined or out of context information also gets repeated and gains credibility. If you are going to write about food be careful with language. 🍷

*Jim Gruber is a consultant food technologist and the current chair of the AIFST’s National Food Policy and Regulations Group.*



## SALT ON THE FIRING LINE

*Although a new report questions the benefits of substantial reductions in sodium consumption, getting people to eat less salt is still on the agenda.*

Words by Lynn Elsey

A new report stating there is no rationale behind widespread recommendations to reduce sodium consumption levels to below 2,300mg a day has created a stir across the health community.

The report, "Sodium Intake in Populations: Assessment of Evidence" from the US Institute of Medicine, found no conclusive data to show that lowering salt intake below 2,300mg a day would decrease the often associated health risks, including heart disease, strokes or overall increased risk of death.

The findings conflict with some widely used guidelines for higher risk

The report also noted that recent studies suggest that dietary sodium has a broader systemic affect.

"These studies make clear that looking at sodium's effects on blood pressure is not enough to determine dietary sodium's ultimate impact on health," said Strom. "Changes in diet are more complex than simply changing a single mineral. More research is needed to understand these pathways."

The report, which was commissioned by the Institute of Medicine for the Centers for Disease Control and Prevention, did not include any optimal sodium recommendations.

*York Times*. "They have changed the paradigm of this issue."

Others have criticised the report, but as the authors have pointed out, the bigger issue is that most Americans still consume concerning levels of sodium – 3,400 mg or more of sodium a day on average.

### The bigger problem

Although the IOM report may raise issues regarding optimal amounts of sodium consumption, a majority of the world's population is still consuming concerning levels of salt.

According to Harvard School of Public Health researchers, 75 per cent of the world's population consumes 4,000mg of sodium a day (double of the amount they claim as a recommended level), which could be blamed for 2.3 million heart related deaths in 2010 (the research was based in survey data from 1990–2010 as a part of the 2010 Global Burden of Diseases Study).

In late January 2013, the WHO released new guidelines on sodium consumption, recommending that adults consume less than 2,000mg of sodium per day.

In the UK, the average adult consumes 8.1 grams of salt per day, which has prompted the government to announce voluntary salt reduction targets for the food industry, with a goal of reducing the average salt consumption by 25 per cent.

In the US, the average American consumes around 3,400mg a day (2010 figures), significantly more than the 2,300mg level per day recommended

“ Lowering sodium intake too much may actually increase a person's risk of some health problems ”

population groups, including those with diabetes and heart disease, that recommend a limit on salt consumption to 1,500mg day.

The report is based on a review of studies related to sodium consumption and health outcomes.

"These new studies support previous findings that reducing sodium from very high intake levels to moderate levels improves health," said committee chair Brian Strom, University of Pennsylvania Perelman School of Medicine. "But they also suggest that lowering sodium intake too much may actually increase a person's risk of some health problems."

It does recommend further research on the lower levels, between 1,500 to 2,300mg a day.

A number of nutritional experts have cheered the report, finding that it helps illustrate the complex role that sodium plays in physiology. Michael Alderman, a dietary sodium specialist at Albert Einstein College of Medicine (NY) said that when sodium levels decrease, triglyceride, insulin resistance and activity of the sympathetic nervous system all increase, which all can increase the risk of heart disease.

"What they have done is earth-shattering," Alderman said in *The New*

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by in the US Dietary Guidelines. The American Health Association has set a lower target, less than 1,500mg of sodium a day.

But in the salt sweepstakes, Australians are leading the way. According to the George Institute for Global Health, Australians are currently outdoing both the US and UK with an eyebrow raising average consumption of around 9 grams per day.

Along with already identified concerns related to heart disease and diabetes, over consumption of salt is now being implicated as a potential cause of autoimmune diseases, such as multiple sclerosis.

Three studies published in the 6 March 2013 issue of *Nature* (doi: 10.1038/nature.2013.12555), show a link between excessive salt consumption and autoimmune disease. The studies, which were undertaken by scientists at number of US research institutions including MIT, Harvard and Yale, focused on the TH17 cells. Some forms of autoimmune disease have been linked to an overproduction of these cells. The researchers found that mouse cells cultured in high-salt condition produced more TH17 cells than those grown in normal conditions, and also found similar results with human cells. The researchers noted that the evidence provided could not predict salt's effect on human autoimmunity.

Vijay Kuchroo, an immunologist at Brigham and Women's Hospital in Boston (US) and a co-author on one of the studies, said that the evidence was "building a very interesting hypothesis [that] salt may be one of the environmental triggers of autoimmunity".

### Market response

As the evidence against excessive dietary salt continues to mount, food manufacturers are responding with new products and ingredients.

For example, Chr Hansen is now offering a process it claims will allow cheese manufacturers to reduce sodium levels by up to 50 per cent without affecting taste and texture.

The process grew out of a PhD project by Kirsten Kastberg Moeller at the University of Copenhagen, Denmark. Moeller's research explored options for reducing sodium by modifying process parameters and extending the functionalities of added lactic acid bacteria and coagulant, resulting in a 50 per cent reduction in sodium while retaining an acceptable flavour and texture in Cheddar (Moeller is now employed as a development scientist at Chr Hansen).

Her research led to a new product, SaltLite, which contains only natural ingredients already used in the manufacture of cheese. It utilises a Chr. Hansen's DVS starter, adjunct cultures and a cheese coagulant to improve texture and reduce bitterness.

The company says that the new ingredient overcomes traditional challenges of salt reduction, including reduced salty notes, reduced umami flavour, increased perception of bitter flavours and formation of bitter peptides and shelf life concerns.

However, the company's enzyme marketing manager Timothy Wallace has admitted that the actual taste and texture of cheese made with the company's new ingredient will be slightly different than normal cheese. The ingredient has been designed for use with Cheddar and other Continental types of cheese such as Gouda and Edam, but the company is considering adapting it for other types of cheese.

### A desert grain

Swedish company Salinity has launched a new grain that it says allows a reduction in the sodium in all food products without affecting the taste or requiring a change in functionality.





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*Salt may be one of the environmental triggers of autoimmunity*

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The product, Saltwell, is sourced from 30 meters below the surface of Chile's Atacama Desert. The grain is 65 per cent sodium and 30 per cent potassium so along with having a similar performance to regular salt it also offers extra nutritional values from the potassium.

An export manager for the company, Thomas Hultman, said that because the crystals are naturally formed as a single grain, the sodium and potassium remain intact – as opposed to other blended products that result in separations that can lead to a bitter and metallic taste in products.

The ingredient can be used to replace salt on a one-to-one basis. The new product has been launched in Scandinavia, the US and UK and has obtained FDA approval as an “all-natural mineral” salt.

### Using yeast to reduce salt

DSM has launched five new yeast and process flavours designed to help manufacturers reduce salt by up to 50 per cent in savoury products. The ingredients can be added alone or

combined to increase saltiness, restore the umami, add salty taste or achieve a homemade meat or vegetable flavour.

According to the company the yeast extract-based flavours are designed to help compensate for tastes that are lost during a normal salt reduction process.

### Salt reduction by stealth

A Minnesota (US) company is offering a potassium chloride replacement for salt, claiming it has no adverse taste. Although the company has been producing the reduced sodium ingredient, Nu-Tek, for a few years, it recently shot to prominence following an endorsement from Bill Gates. The product offers a one-to-one replacement for salt and allows up to a 50 reduction in salt in finished products.

According to John Musselman, senior director of sales, “we have found a way to suppress the bitterness via a wet chemistry process, using rice flour or maltodextrin”. Because the ingredient doesn't contain any taste masking agents, labelling will only require listing potassium chloride and rice flour.

Musselman obviously believes this is a key feature, as he said that the company has found that although consumers say they want to see more reduced sodium products in the stores, they are actually quite reluctant to purchase them. Therefore using Nu-Tek allows food manufacturers to reduce the salt content “by stealth”. Musselman said that around 90 per cent of Nu-Tek's customers are reducing salt this way.

### Reducing salt with enzymes

Last year the “biocats” at Cardiff-based Biocatalysts released a microbial enzyme that can be used to reduce salt content in products that require a high level of savoury and mature flavour. Flavorpro umami is an exopeptidase with endopeptidase and glutaminase side activities. It releases a high level of glutamic acid, an amino acid that provides a strong umami flavour commonly found in fermented or aged food. The enzyme elevates the flavour profile, which helps increase apparent saltiness. The ingredient is often used in the manufacture of enzyme modified cheese, which requires strong, mature protein flavours.

### Process meat replacer

AkzoNobel is now offering a salt replace for processed meat. The ingredient, Suprasel OneGrain TS-M100, combines sodium chloride, potassium chloride and flavour in each grain. According to the company, this allows the ingredient to taste, flow, blend and dissolve exactly as salt.

AkzoNobel has partnered with Givaudan to develop the product, which can be used on a one-to-one basis for up to a 40 per cent reduction in salt in processed meat. The companies plan on producing a broader range of salt reduction options.

*Lynn Elsey is the editor of food Australia.*

# THE UPSIDE OF SALT

*Mandatory iodisation shows positive results.*

According to Tasmania's Department of Health and Human Services, mandatory requirements for fortifying bread with iodine have resulted in significant nutritional improvements in schoolchildren.

Historically, Tasmania's population has exhibited high rates of iodine deficiency, which the department said was due to the state's soil. As iodine deficiency can negatively affect growth and intellectual development in infants, children and in fetuses during pregnancy, various campaigns have been enacted to improve iodine intake over the years.

These included providing iodine tablets to schoolchildren and pregnant women in the fifties and sixties. In the late 1970s, iodine was added to

bread but concern that people could be ingesting too much iodine, possibly due to iodine-based cleaning agents in dairy products, prompted a halt to the program.

However, by the late 90s, iodine deficiency was again identified as a problem and iodised salt in bread was determined to be the best solution. In 2001 the Tasmanian baking industry was asked to voluntarily replace the regular salt used in making bread with iodised salt to help improve nutrition. In 2009 the initiative was taken up on a national level and became law (with some minor exceptions) across Australia and New Zealand.

A recent study tested the urine of 320 Tasmanian school students and

found that the students were now getting ample amounts of iodine in their diet.

The study, "Improved iodine status in Tasmanian schoolchildren after fortification of bread: a recipe for national success", has been published in the May issue of the *Medical Journal of Australia*. The Tasmanian researchers found a progressive improvement in iodine levels in the children, from pre-fortification to voluntary and then mandatory fortification, which they say illustrates the benefits of mandatory over voluntary supplementation initiatives.

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# THE TRUTH ABOUT FRUIT AND VEG

*New research uncovers some interesting news about vegetarian diets and tinned fruit.*

Words by Lynn Elsey

## Vegetarian diet linked to lower mortality rates

A new study, which indicates that following a vegetarian diet can lead to lower mortality rates, has also raised issues regarding how to define a vegetarian diet.

The study, which was published in *JAMA Internal Medicine* (doi: 10.1001/jamainternmed.2013.6473), focused on the diets and mortality rates of 73,000 US and Canadian Seventh-day Adventists from 2002–2007. The participants were broken into five groups: non vegetarian (eating red meat, poultry, fish, milk and eggs more than once a week); semi-vegetarian (eating red meat, poultry and fish less than once a week); pesco-vegetarian (includes seafood, milk and eggs but rarely red meat or poultry); lacto-ovo-vegetarians (consuming eggs and/or dairy regularly, but red meat, fish or poultry less than once per month) and vegan (eating red meat, fish, poultry, dairy or eggs less than once a month).

The research team, led by Michael Orlich and Gary Fraser at Loma Linda University (US), found that vegan, lacto-ovo-vegetarians and pesco-vegetarians (as defined by the study) all exhibited significantly lower mortality rates from cardiovascular disease, diabetes and renal disorders compared with non vegetarians. The associations were substantially greater with men.

The authors have separately commented that the study raised a number of important issues including the impact of differing types of “vegetarian” diets on health outcomes. They also noted limitations to their results, including that because the study was based on participants reporting their diet only at the beginning of the research, diet patterns could have changed over the intervening time.

They also said that dietary influence on mortality might require a longer time period to provide accurate results.

Researcher Gary Fraser said that trying to describe vegetarianism as a dietary pattern was quite challenging as there are so many different variations within the diets. However he did say that, in general, vegetarians eat more fibre, less saturated fat and fewer calories.

“The problem is, the absence of one food – eg, meat – cannot adequately define a dietary pattern, which makes it hard to compare vegetarian research results, so it would be helpful to define and publish a recommended vegetarian diet.”

Critics of the study have noted however, that the extensive intake of more phytochemical-rich plant foods rather than avoidance of animal food could help explain the results along with questioning the basis for the dietary assessment.

## Fresh not always best?

Another study has found that when it comes to peaches, canned may be as good – if not better – than fresh.

The study by researchers at Oregon State University (US) analysed the nutritional aspects of a variety of peaches – fresh freestone, fresh cling, canned cling – in regards to vitamins A, C, E, folate, antioxidants and more.

“

*Trying to describe vegetarianism as a dietary pattern was quite challenging*

”





“ Canned versions contained significantly higher levels of vitamin C, antioxidants and folate than the fresh peaches ”

They found that the canned versions contained significantly higher levels of vitamin C, antioxidants and folate than the fresh peaches. They also had higher, but not significantly different, levels of vitamin A and lower, but not significantly different, levels of vitamin E, total phenolics and total carotenoids.

The researchers also found that three-month storage did not affect the nutritional profile of the peaches.

The study, which was published in the February 2013 issue of *Journal of Science of Food and Agriculture* (doi: 10.1002/jsfa.5849), concluded that: “canned peaches can provide comparable nutrient levels to the consumer as fresh peaches, meaning that consumers can enjoy peaches year round without worrying about loss of nutrients in their diet.”



### A triumph for prunes

Prunes have made their mark across Europe after becoming the first whole fruit to receive approval for claims under the EU’s new food marketing rules.

Prunes (dried plums) that are sold in Europe can now be marketed with the claim that they contribute to “normal bowel function.” According to the EFSA, the claim can only be used if it includes a recommendation for a daily intake of 100g of prunes.

The verdict will be especially pleasing to the California Prune Board, which has been pursuing the claim for a number of years, after it was initially denied by the EFSA.

“This EFSA ruling has confirmed what people have known for centuries and should help people make a more informed choice about what they are eating and feeding their families,” said Mark Dorman, international marketing director of the Californian Prune Board.

*Lynn Elsey is the editor of food Australia.*

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## OTHER NUTRITION NEWS

### Trans fat reduction update

Following mounting evidence that trans fat consumption is linked to a variety of unhealthy conditions, food manufacturers have been making efforts to reduce their levels in food products.

In response, a group of researchers at the Harvard School of Public Health decided to investigate the extent that trans fat has been reduced or removed from food products, from 2007–2011.

Their results, which have been published in the May issue of *Preventing Chronic Disease*, found that around two thirds of the products they checked contained reduced levels of TFA, with 82 per cent containing less than 0.5g per serving, although more than half still had partially hydrogenated vegetable oils.

However, the researchers also found that the reduction of TFA had slowed over the years, from a high of 30.3 per cent (2007–08) to 3.4 per cent (2010–11). According to the researchers, the slowing was a reflection of fewer reformulations and smaller amounts of TFA reduction.

The study involved checking brand name food products in major supermarket chains in the Washington DC area. The researchers collected data on products identified as likely

to contain TFA (including bread, cakes and pastries, cookies, biscuits, margarine, pizza and popcorn), with 0.5g or more per serving of TFA.

The products were re-examined yearly (except for 2009) through 2011. The largest gram per serving reductions in TFA were found in doughnuts (-2.8g/serving), crackers (-1.9g/serving) and pies (-1.4g/serving) while the largest overall drops were found in French fries (eg, chips) (88 per cent), doughnuts (81 per cent) and ice cream (73 per cent). The smallest declines were found in rolls, margarine and popcorn.

The authors singled out popcorn as the highest serial TFA offender, containing an average of 4.5g/serving in 2007 and 3.8g/serving in 2011. Chips, on the other hand, showed an impressive turnaround, with all products being reformulated to contain 0.5g or less of TFA, with 13 out of 18 products completely eliminating PHVO and TFA.

The researchers concluded that although progress has been made in reducing TFA, the pace and amount had slowed and they emphasised the need for ongoing efforts to reformulate or discontinue producing these products that contain TFA.

### Defining whole grains

A global grain science organisation has suggested that a food product must contain eight grams or more of whole grain per 30 grams to be considered as “whole grain”.

The definition was developed by a working group of the American Association of Cereal Chemists International (AACCI) which was formed to assess science-based claims and definitions of whole grains and whole grain products. As a part of that exercise the group decided to develop a suitable definition of whole grains so that consumers could easily recognise and select foods that met the US dietary guideline requirements.

The group said that providing a standard definition for whole grains will help “level the playing field” for products in the cereal grain industry and enable consumers to select appropriate food products.

Locally, the definition has been met with interest by some groups.

“The approval of the whole grain products characterisation has been highly anticipated not only by the American cereal grains industry but also the European and of course, Australian industry. As a participant of the Whole Grains Working Group, the Grains & Legumes Nutrition Council is pleased to see an agreed position towards defining whole grain products,” said GLNC Managing Director, Georgie Aley.

Aley also said that the new definition aligns with the GLNC’s soon to be released industry standard for Australia. <sup>13</sup>





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## AUSSIE RESEARCHERS KEEPING BUSY

*From using directed evolution to improve winemaking to exploring the potential of using pulses to fight obesity, Australian scientists are continuing to expand scientific boundaries.*

Words by Lynn Elsey

### Vines and almonds

Researchers at the University of Adelaide are keeping busy with a number of new and ongoing horticultural projects.

Detection of a harmful grapevine virus is the focus one major project at the university.

Researchers from the university's Waite Campus have used DNA analysis to develop a diagnostic test kit for the detection of Grapevine red blotch-associated virus (GRBaV).

The GRBaV, which was recently discovered in the US, is said to be significantly more damaging than already established Grapevine leafroll-associated viruses. According to University of Adelaide grapevine virologist Nuredin Habili, the red blotch disease is apparently widespread in the US. It significantly reduces the levels of grape sugar, therefore reducing the grapes' suitability for wine.

"Viruses in grapevines are insidious and often cause serious diseases which affect production and quality, and can even result in vine death," said John Randles, the director of Waite Diagnostics.

"We don't have any way of immunising plants like we can with animals and so we need to employ different methods of control which require detailed knowledge of the virus' biological properties."

### Directed evolution to improve fermentation

Another team of scientists has received \$1.9 million to develop new strains of micro-organisms to assist in the

wine fermentation process. The grant was awarded by the Grape and Wine Research Development Corporation to the university's Wine and Microbiology and Microbial Biotechnology Laboratory.

The project aims to use directed evolution, a lab based version of natural selection, to produce strains that will make fermentation quicker or more reliable, without the need for supplements.



"Within the winemaking industry there are increasing difficulties in achieving successful and efficient fermentation as winemakers push their operational boundaries to seek greater flavor and efficiency," explained Vladimir Jiranek, one of the project leaders. "Climate change and associated extreme weather and water restrictions also lead to unintended increases in grape ripening, with higher sugar and higher alcohol."

Jiranek said that ultimately the team hopes to be able to exactly define

the genes that make a wine yeast or bacterium particularly suited to a specific winemaking situation. He said that they anticipate that the strains would be available to the industry soon after development.

### Creating super almonds

The Australian Almond Breeding program at the University of Adelaide has received \$2.35 million to continue its research in developing new varieties of almonds.

The five-year project received the funds from Horticulture Australia, the Almond Board of Australia and the Australian government. The breeding program aims to help raise production by 15 per cent and decrease reliance on existing cultivars over the next decade, according to program leader Michelle Wirthensohn. This will allow the industry to take advantage of a growing market for new types of almonds.

The program started in 1997 with an aim to produce self-fertile almond cultivars with superior kernel quality, high productivity and local adaptation for local and overseas markets. It utilises classical breeding, molecular techniques such as fingerprinting and genome mapping and tissue culture techniques including cryopreservation.

Wirthensohn said: "our breeding program will have benefits for industry, by providing a bigger range of almond varieties, by improving the productivity of those varieties, and at the same time producing a more nutritious almond for the consumer".

The program expects to release up to five "superior" almonds by 2018.



Image courtesy of the Almond Board of Australia

### Could pulses help combat obesity?

An Australian research student has uncovered a potential link between pulses and treatment for obesity.

Kyle Reynolds, while studying at Charles Sturt University, discovered that compounds in pulses appear to stop adult mouse stem cells from developing into fat cells and inhibiting fat absorption during digestion.

Reynolds, who has now commenced a PhD through CSU at CSIRO in Canberra, said that the results could be used to help determine if pulses could be used for the treatment or prevention of obesity.

“While this result doesn’t completely explain the anti-obesity effects of pulses, it does go some way to providing a mechanism by

which pulses may help us maintain a healthy weight,” he said.

“The findings are also good news for the Australian pulse industry. If it can be further shown that pulses do have the potential to fight obesity, the demand for pulses is likely to increase, boosting the value of the industry and its products.”

Reynolds’ research involved extracting compounds from chickpeas, faba beans and field peas and then incubating them with adult mouse stem cells that were being converted to fat cells. He found that the pulse extracts seemed to be inhibiting fat cell development, which suggested that pulses might contain compounds that interact with genes.

Reynolds said that whole animal experiments would need to be undertaken to fully determine how

pulse extracts are metabolised in the body, with the next step being to isolate fractions of the pulse extracts to identify the specific compounds responsible for the potential health benefits.

“These compounds could then be used in the preparation of pharmaceuticals or in the development of value added food products, for the treatment or prevention of obesity,” he said.

Researchers at CSU are continuing to explore Reynolds’ findings and are examining extracts from other grains to see if they can create similar results.

*Lynn Elsey is the editor of food Australia.*



## POWDERING ON

*Growing interest in avocados has prompted the development of a new powder.*

A New Zealand open access innovation precinct is helping propagate the development and commercialisation of avocado powder.

High quality avocado powder is becoming quite popular in a range of food items including re-hydrated guacamole, smoothies and baby food, along with cosmetics and nutraceutical supplements.

With an eye on the growing market, a team of food scientists from Avocado Oil New Zealand decided to develop a powder that was free from added fillers but still retained the nutritional benefits of avocados.

Through the use of a government sponsored innovation facility, the company has created and launched Avopure; an avocado powder that the company says is totally different than other products on the market.

"It will be the first premium avocado powder available which contains no added fillers or carriers and contains higher levels of potassium, fibre and energy," said Brian Richardson, the executive director of the company.

He said that the company's development process, involving 100 per cent New Zealand grown avocados and nothing else, ensures that the product retains all the nutritional and skin benefits within a more flexible and compact form.

Avopure will be the second avocado product produced by Avocado Oil New Zealand, following its launch of an olive oil in 2000. Initially the product will be sold in the US, Japan, China and Australia.

The new product was developed for broad commercialisation at Waikato, an open access facility in New Zealand's Bay of Plenty. The plant is part of the New Zealand Food Innovation Network, a government sponsored



*Dave Shute, manager of the FoodWaikato plant*

initiative to encourage innovation, development and commercialisation in the food sector, with a goal on increasing exports.

Richardson said that having access to the Waikato Innovation Park allowed the company to make the leap from undertaking small-scale research and development to creating a product suitable for widespread export.

According to Waikato plant manager Dave Shute, drying avocado is just one of myriad uses the plant can offer to the food industry.

"Our plant has been up and running for one year now and we've primarily been drying milk products. So, drying avocados – in fact fruit of any kind – was new territory for us. We did our first trial run in January, which introduced us to the challenges of dealing with a fruit that is fibrous, highly viscous and oxidises rapidly if exposed to air."

Shute also said that, as an additional challenge, the plant had to be cleaned and returned to the appropriate high

levels of food safety standards within 24 hours of making the avocado powder in order to be ready to process milk products.

Shute said that the plant is now holding discussions with a number of other companies who are interested in trialling fruit and vegetable products.

"We want to get the word out to food innovators within New Zealand and throughout Australasia that we're here to help," Shute said. "If you have a great idea for a new dairy, fruit or vegetable product that requires drying, come talk to us." 🍌



## Sustainable Manufacturing Solutions

While trading conditions in the manufacturing industries are presenting business challenges, many companies are continuing to adapt innovative thinking and approaches to material sourcing, material efficiencies, processing options and productivity to take on the current challenges. In many cases this is leading to improved productivity, increased value across the supply chain or products with a different market position. All these changes are helping companies face the future with greater confidence.

These ongoing efforts of industry are now boosted by the establishment of VCSCM to help support Sustainable Manufacturing Solutions. The centre was formed by a \$24.9 M combined investment from the Victorian Government, Monash University, CSIRO, PACIA and EPA (Vic). This investment in sustainable manufacturing is designed to encourage continued leadership and innovation by manufacturers to enhance their ongoing competitiveness. While the current focus has been to support Victorian manufacturing, VCSCM can work to support manufacturers and suppliers across the nation.

With Food Manufacturing one of two focus sectors, the Centre's mission is to engage with businesses to develop targeted, company specific programs applying best in class sustainable science and engineering technologies, R&D and capabilities to achieve profitable commercial solutions and reduce environmental impact. Benefits to companies have come from reassessment of incoming materials and processing conditions, or identifying potential value from current waste streams. VCSCM can also provide training on sustainable manufacturing and its financial benefits to help develop a company's inner strength and ongoing capabilities. With strong skills in project management, the sector specialists in the team are able to assist with access to R&D and act as project facilitators in the delivery of projects to company specific needs.

### For more information contact:

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# BEER HELPS SHED LIGHT ON GLUTEN TESTS

*A new method of detecting gluten in beer could pave the way for a more sensitive and reliable way of testing gluten in foods and beverages.*

Words by Luisa Volpato

Celiac disease (CD) occurs in one per cent of most worldwide populations, equal an estimated 70 million people. People with CD, gluten allergy and intolerance are advised to avoid foods and beverages containing gluten, such as flour, malt or beer made from barley. Specifically the gluten proteins to avoid include those in wheat (gliadin and glutenins), barley (hordeins), rye (secalins) and in some cases, oats (avenins).

The global gluten-free food industry, valued at over \$6 billion in 2011, is predicted to grow by US\$1.2 billion over the next five years. This expanding economic market currently depends on the food industry using antibodies in an Enzyme-Linked Immunosorbent Assay (ELISA) for validation of the gluten-free status of food products.

However, research by CSIRO's Food Futures Flagship into methods for measuring barley gluten in beer has highlighted shortcomings of ELISA and shows the potential for mass spectrometry (MS) as a more sensitive and reliable test to detect hordeins in beer and potentially for testing gluten in a whole range of other food and beverages in the future.

## Early insights

The shortcomings of ELISA were first identified when CSIRO scientists, who for years have been working on breeding new barley lines with lower levels of hordeins, were struggling with how to precisely measure the hordein content.

"We found that calibrating the ELISA system with an appropriate standard is difficult as the standards may not be representative of the sample being tested," said Crispin Howitt, research scientist with CSIRO Plant Industry.

"That's because you first have to know the exact hordein composition

the measurement problem.

Colgrave is an expert in the use of mass spectrometry to measure the concentration of proteins and at the time was working on measuring small neuropeptides produced in the brains of cows. "Michelle showed us how the technique could be adapted to measure

“

*ELISA determination of hordein content, while convenient, is no longer suitable for measurement of gluten in beverages*

”

of the seed, so the composition of the calibrating solution exactly mirrors that of the plant that the seed comes from. When we calibrated the extracts from our barley genetic lines against different antibody based tests, we saw that we were consistently altering the levels of different classes of hordein, but that each test gave significantly different results because the tests had different sensitivities to different types of hordeins. So it was clear that we needed a better measurement method."

As is the nature of scientific research, sometimes work in one field can provide insights into a completely different area of research. A chance meeting in 2010 between CSIRO Plant Industry scientists and Michelle Colgrave, a scientist with CSIRO Animal, Food and Health Sciences, provided a new perspective on

hordeins in grains," said Howitt. "It was a pretty exciting discovery for us because in one step not only could we measure how much hordein was present, but we could also confirm the biochemical identity of the hordein being measured."

## A new approach

These initial insights lead to further research and two recently published studies that highlight the factors affecting the accuracy of ELISA and the potential of multiple reaction monitoring mass spectrometry (MS) for the accurate analysis of hordein levels in beer.

"Beer contains trace levels of hordeins which are considered too high to be safely consumed by most coeliacs. We chose beer as a starting point to validate the method as it is relatively simple



and there is international debate as to the gluten content in beer," said Howitt. "Eventually we hope to extend this technology to measure other forms of gluten, such as that found in wheat, oats and rye."

"When investigating the factors affecting the accuracy of ELISA analysis of hordeins in beer our key finding was that for ELISA to work reliably the hordein standard used to calibrate the test must be identical in composition to the hordeins present in the test substance. In practice, it's just not feasible to isolate a hordein standard for each test food or beverage.

"While when we compared the hordein levels in 60 beers, using ELISA versus MS, we showed that all barley-derived beer samples tested contained hordeins yet there were several significant differences in testing between ELISA and MS that highlight the limitations of using ELISA."

### Hidden findings

Underestimation and false negatives were the main concern. Two declared gluten-free beers had zero ELISA readings, but MS indicated that the samples tested contained a low level of hordeins between 1–4 per cent of the average for all beers. Ten beer samples had very low ELISA readings of less than 1 ppm, but had several hordein peptides close to the overall average by MS.

"We were surprised to find that the samples we tested of two beers marketed as low gluten had zero level detected by ELISA, but near average hordein levels as detected by MS," said Colgrave. "Six other beers also had zero ELISA readings, but near average hordein levels by MS."

The main difference between ELISA and the MS method is that ELISA measures intact proteins. With MS, proteins are extracted from the beer. And then using proteolytic enzymes that act as molecular scissors, the proteins are chopped into small pieces (peptides) that can be detected by the mass spectrometer. Each peptide is further fragmented into its building blocks (amino-acids) inside the machine and the amino-acid sequence acts as a fingerprint for each peptide, allowing their identification in computer databases. The signal observed for each peptide is proportional to the amount of protein.

"By using this method we can measure extremely low hordein levels and very precisely identify the type of hordein being measured," said Colgrave. "The method can currently measure relative levels of hordeins, and the next steps in this research will include refining the method to be able to measure absolute levels of hordeins."



Howitt sees a lot of potential for the applicability of this MS method in the future, but stresses that it is still at the development stage.

“We can only conclude that ELISA determination of hordein content, while convenient, is no longer suitable for measurement of gluten in beverages and should eventually be replaced with suitable MS based methods. The MS equipment required to carry out such analysis is now not uncommon and is increasingly available to the food industry. However, despite its limitations for the quantification of hordeins in beer, ELISA remains the only method currently available. It’s important to remember that this research is specific to hordeins so we are unable to speculate on the reliability of ELISA for other forms of gluten,” said Howitt.

While the potential of mass spectrometry has been clearly shown it will still need to be further tested and validated in other laboratories before it can be approved as a standard method

for detecting hordeins in beer. Further down the line CSIRO hopes to be able to adapt the technology to test for wheat gluten, which will be an even greater challenge than barley gluten due to the diversity of gluten proteins found in wheat.

In the meantime, CSIRO researchers continue to work on developing barley varieties that could be used to produce foods and beverages that can be tolerated by those with coeliac disease.

“Investigating how new barley varieties might be used in the production of foods such as gluten-free breakfast cereals or malt, is high on our agenda,” said Howitt. “Due to the high fibre content of barley, compared to grains such as rice or corn, this would be a real bonus for those on a gluten free diet.”

“We’re proud of what we have achieved to date as we see our research as an important step towards finding a more sensitive and reliable method of detecting and quantifying gluten in foods and beverages,” said

Howitt. “When that happens it will be welcome news to the growing gluten-free food industry and the millions of people who suffer from gluten allergy or intolerance.”

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*Luisa Volpato is a freelance writer and communication advisor to CSIRO Food, Health and Life Science Industries Group.*



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# MORE BEVERAGE NEWS

*Sugary drinks are linked to diabetes and fruit juice loses popularity with Australians while interest in coconut water continues to grow.*

## Sugar sweetened drinks and diabetes

Drinking one sugar-sweetened beverage a day could increase the risk of developing type 2 diabetes by 18 per cent according to a new study.

The research, which was headed by Dora Romaguera from Imperial College (UK), analysed data on the consumption of sugar and artificially sweetened soft drinks and juices from more 28,000 Europeans.

It found that drinking one 336g sugar and artificially sweetened drink per day was associated with a 22 per cent increase in risk for type 2 diabetes; the risk factor dropped to 18 per cent once BMI and caloric intake was considered.

The results were published in the *April Diabetologia* (doi: 10.1007/s00125-013-2899-8).

“Together with observations from randomised controlled trails, this observation suggests that consumption of these beverages should be limited as part of an overall healthy diet,” said Nick Wareham, University of Cambridge and leader of the InterAct consortium which undertook the research.

## Fruit juice sales decline

Australians are drinking fewer soft drinks and fruit juice than four years ago, while coconut water is on the rise, according to a new research.

Consumption of non-alcoholic beverages for Australians aged 14 and above has dropped from 61 per cent to 57 per cent since 2008, with fruit juices dropping from 41 per cent to 33 per cent in the year ending December 2012, according to Roy Morgan Research.

According to Norman Morris, a Roy Morgan communications director, the decrease is largely related to those aged under 35 and could be motivated by a desire to drink less sugar.

Australians are also consuming



*The coconut water industry grew by 540 per cent between 2008 and 2012*



less bottled spring water, down to 15 per cent from 17 per cent in 2008. Sparkling mineral water and sports and energy drinks have remained stable according to the report.

Iced tea was the only beverage in the category to show an increase, with five per cent of the population now drinking iced tea during a week-long period; a 25 per cent increase over 2008.

On the other hand, coconut water appears to be booming in most global markets. According to research from Mintel, the coconut water industry grew by 540 per cent between 2008 and 2012.

Jonny Forsyth, a Mintel analyst, said that the popularity of coconut beverages was due to the drink's “naturally high levels of electrolytes, including potassium, calcium and magnesium”, which matched changing needs of the market. Mintel also credited the surge in interest to

promotion by celebrities and other high profile individuals.

The company found that coconut water has become especially popular in North America, encompassing 35 per cent of new global product launches, up from 17 per cent in 2008. The drink has around the same popularity in Europe, with 34 per cent of new products in 2012. The Asia Pacific region accounted for 14 per cent of new coconut water products, up from 9 per cent in 2008. The only market not to fall under the drink's aura is Latin America, where the introduction of new coconut water products dropped from 61 to 16 per cent between 2008 and 2012. <sup>5</sup>



## FUNCTIONAL FOODS ROUNDUP

*High protein items and fat reducing bananas are some of the trends and products hitting the market.*

Words by *Ranjan Sharma*

### High protein products draw interest

In the past few months consumer products with high protein claims have shown a significant growth. Protein is an essential nutrient required for the growth and development of the human body. The recommended daily intake of protein is 0.8g per kilogram of body weight per day (g/kg/day), i.e. a person with 60 kg weight needs a minimum 48g of protein per day. Physically active individuals require significantly more protein than those with sedentary lifestyles, with up to 2.0 g/kg/day recommended (120g for a 60Kg person).

A survey conducted by Datamonitor in 2011 showed that nearly 43 percent of US consumer food and drinks choices are influenced by claims of "high" or "very high" protein on labels. Global Industry Analysts (GIA) believe that a growing health-conscious population, coupled with scientific developments and rising middle class income levels, could drive

the total market for protein ingredients market to \$27.6 billion by 2018.

The market for high protein ingredients such as whey protein has largely been driven by the sports nutrition market, although protein ingredients such as those from soy and field peas are also gaining popularity. According to Euromonitor, protein supplements have long been the core of sports nutrition, with the global sales of protein-based sports nutrition products reaching \$5.4 billion in 2011.

Although the sports market has been the biggest driver of the protein market, the latest figures from Euromonitor suggest that the non-sports aspect of the market is showing a healthy growth, with market value reaching \$1.6 billion in 2011.

One of the key elements behind the growth has been targeting the weight control market through the satiety effect of high protein products. Recent examples include Greek-style yogurts and yogurts fortified with protein. Although the target market for these

products is women who want to lose weight, they are also popular with men and children.

For example, in the "tween" market, Yoplait Proforce claims to contain double the amount of protein found in the normal yogurt. It comes in flavours suitable for young 'tweens.

The importance of protein fortification of yogurts, especially Greek-style, without the need for whey drainage has been recognised by Arla Food Ingredients who recently introduced Nutrilac functional milk proteins. According to Arla Foods, Nutrilac allows manufacturers of standard yoghurt to add a Greek-style product to their production line without the need for additional equipment or technology yet resulting in a high protein product. By all indicators, growth in high protein products seems sustainable and likely to lead to the introduction of many more products with "high protein" label claims.



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## Innovations

A number of new products that have been launched in the past few months are being marketed on health and nutrition platforms. The following are a few examples.

### Muscle Milk Evolve

With a focus on high protein, Muscle Milk Evolve was launched in US earlier this year. The beverage is specially formulated for women who are active and want to reduce body fat. The product contains 12 grams of protein, 20 vitamins and minerals, 5g fibre and is sweetened with stevia, monk fruit and cane sugar. To help reduce fat, Muscle Milk Evolve contains Tonalin CLA, a plant phytosterol marketed by BASF. CLA (Conjugated Linoleic Acid) is a polyunsaturated, conjugated fatty acid that is a natural part of the human diet, found mainly in meat and dairy products.

The product is probably one of the few products in a drinkable form that specifically addresses women's need for high protein. Previous high protein products for the female market have largely been confined to cereal bars and breakfast cereals. The product is also marketed as dairy- and gluten-free.

### Osteum for bone health

Bone health remains a concern for the whole population as the consumption of natural calcium products such as milk is declining. Calcium plays an important role in children, helping guarantee a high peak bone mass, and in adults to help prevent and treat the risk of bone diseases such as osteoporosis.

According to Osteoporosis Australia, over one million Australians have osteoporosis. An ageing population, increasing obesity and changing lifestyles are the main reasons for this trend. Osteoporosis occurs when bones lose minerals, such as calcium, more quickly than the body can replace them, leading to a loss of bone thickness (bone density or mass).

In response, French company Ingredia Nutritional has developed a milk-calcium based ingredient called Osteum. According to Ingredia, Osteum is a 100 per cent natural solution that helps reinforce and preserve bone health by acting on the bone's entire life cycle. Ingredia has backed its health claims with clinical trials carried out at INRA Paris which showed that Osteum was able to decrease bone degradation by enabling mineralisation through the stimulation of osteoblast activity, the cells responsible of bone formation and mineralisation. Ingredia claims that Osteum contains native micellar calcium derived from fresh milk and therefore has a bioavailable form of calcium. If the claims hold up, this would be a welcome ingredient for foods and beverages by the food industry.

### Fat-fighting bananas

Monsanto has launched a genetically-modified banana, called Banana Plus, aimed at the image conscious consumer. According to Monsanto, Banana Plus flushes away bum and belly fat, allowing weight losses of up to 20 pounds a week. Banana Plus also claims to whiten teeth better than any toothpaste on the market.



This bold innovation is part of Monsanto's aggressive new marketing plan to stop being defensive about its negative GM image and to focus on products that benefit from using genetic materials and advances. It will be interesting to see if consumers ignore the gene modification process behind the banana if the claimed benefits of weight reduction are verified. Although Banana Plus is likely to receive strong opposition from European farmers, it remains to be seen if Australian farmers will see this as an opportunity. 🍌

*Ranjan Sharma is the editor of Functional Food Weekly, [www.functionalfoods.biz](http://www.functionalfoods.biz).*

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DAIRY

## THE GREEK PARADOX

*The healthy image of Greek yogurt is under attack due to concerns about the disposal of its by-products.*

Words by Lynn Elsey

“

*How do you handle all the whey without screwing up the environment*

”

As its producers take great pains to emphasise, the process of making Greek yogurt involves using three or more litres of milk to make one litre of yogurt. While this may lead to laudable levels of protein and business for the dairy farmers, it also results in a substantial amount of excess or acid whey.

Although whey is used by farmers as feed and fertiliser and as an ingredient in dietary supplements, the rapid rise in popularity of Greek yogurts has led to a surge in excess whey in the US, which is leading to disposal problems. The whey can't be dumped into rivers as the acidity poses a potential risk to fish and plant life.

The issue was recently highlighted in a widely-quoted report published in *Modern Farmer*, which documented how the highly visible Chobani company is paying farmers to accept tonnes of whey and leaving them to try and find methods of disposal.

The article quoted one New York farmer, Neil Rejman, who is getting rid of the whey by mixing it into feed for his cows, combining it with manure for fertiliser and converting it into methane to generate electricity (at a very expensive cost, \$US4.5 million for the hardware). However, Rejman admitted that he was having problems trying to dispose of all of the whey, "how do you handle all the whey without screwing up the environment?" he asked, noting that there was a limit to how much his cows could eat before upsetting their digestive systems.



Another yogurt manufacturer, Fage, is disposing its whey into a city wastewater treatment plan, where it says anaerobic microorganisms can convert the waste to a renewable gas that can be used as an energy source.

A manager at Arla Foods, Torben Jensen, joined the fray with his recent comments: “The controversy currently raging over the generation of ‘acid whey’ in Greek yoghurt production – and the impact it can have on the environment – highlights that the inefficiency of traditional Greek yoghurt making techniques is unsustainable both from an ecological and a commercial point of view.”

Jensen said that the acid whey issue highlighted the need for the industry to adopt new manufacturing techniques.

Meanwhile scientists at a number of research institutes, including Cornell and the University of Wisconsin, are looking into a variety of alternatives for the whey, including possibly as an ingredient in infant formulas and as a source of edible lactose.

“*The inefficiency of traditional Greek yoghurt making techniques is unsustainable both from an ecological and a commercial point of view*”

### Addressing concerns

Some yogurt manufacturers are now taking efforts to point out that their processes for making Greek yogurt are free of the acid whey problem.

Muller Quaker Dairy, a PepsiCo and German dairy Muller joint venture, said that the process the company uses to create yogurt, which involves adding milk protein from strained milk, doesn’t generate whey waste.

And a spokesman from Ultima Foods, which makes Greko Greek yogurt, said that it uses an “ultrafiltration process”, involving filtering the product through a cheese cloth for 24 hours, rather than using a traditional acid whey process, to make its yogurt.

In the meantime, concerns that even small amounts of the whey ended up in waterways could wreak havoc on the ecosystem have prompted both Chobani and Dannon to say they are looking at more responsible ways of disposing the whey.

In a statement Chobani said it is promising to explore ideas and options for “beneficial whey use”, while Dannon has been quoted as promising to “improve the usage of whey from a nutritional and environmental perspective”.

*Lynn Elsey is the editor of food Australia.*



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# TRENDS AND RESEARCH IN DAIRY

*Yogurt makers continue to stretch the boundaries while camel milk is linked to stopping the growth of cancer.*

## Yogurt spreads its wings

The global yogurt market continues to expand and evolve. According to Innova Market Insights, companies are increasing efforts to differentiate their products through a variety of innovations, including creating new flavours, adding non-traditional ingredients and by offering limited editions or seasonal options to generate new interest, in response to increasing competition within the market.

The split-pot concept, for example, is now expanding to three rather than just two pots. German producer Ehrmann has added a new option to its Almighurt Nach Herzenslust line – a lemon cheesecake flavoured yogurt. The product contains vanilla yogurt in the main pot. Lemon sauce and crispy wafer segments are provided in two separate pots within the overall heart shaped package.

Other yogurt products are moving further into the traditional confectionery and bakery sections. Müller's Crema de Iaurt Stracciatella yogurt, for example, contains whipped cream and chocolate flakes along with yogurt. The ingredient list from another of the company's stracciatella flavoured offerings, Gracie Yogurt, includes yogurt, sugar, water, cream, chocolate chips dextrose and



glucose-fructose syrup.

New Zealand's Collective Great Dairy is now offering berry flavoured probiotic yogurt 'freeze and go' "suckies". The frozen yogurt products are vegetarian, gluten and gelatin free with 2g of fat per 100g.

## Chobani changes its tune

In response to a UK ruling in March 2013 that called the name of its US made yogurt "Greek" misleading, Chobani has responded.

The company has now renamed and relaunched its products in the UK, titling the yogurt "Strained" rather than "Greek". The company is still planning on appealing the earlier ruling and says it stands by its position that the term "Greek" describes the process of making the yogurt rather than its origin.

## Camel Milk

The potential benefits of camel milk continue to saunter on. A recently published study in *Food Chemistry* (doi: 10.1016/j.foodchem.2013.03.039) found that camel milk may stop the growth of colon cancer.

The research focused on lactoferrin, the main iron binding protein of camel milk. A team of scientists applied lactoferrin to HCT-116 colon cancer cells and discovered that high concentrations, between 3mg/ml and 5mg/ml, resulted in a 56 per cent drop in cancer cell growth after two days. They said that use of concentrations in levels lower than 1mg/ml did not affect cell growth.

The study also found that lactoferrin has antioxidant properties and, as it binds with iron, could prevent DNA damage from cancer.

This study will add to the growing body of research regarding the potential health benefits of camel milk, which



has been signaled out by a number of organisations, including the FAO, for its potential health benefits and value (see Feb/March *food Australia*, pg 45).

Camel milk is noted for being lower in fat and cholesterol than cow's milk while having five times the level of vitamin C. It has also been found suitable for people suffering from lactose intolerance.

## Flavoured milk on the rise

Sales of flavoured milk are tapped to grow at twice the rate of regular milk and at a higher rate than carbonated beverages, according to a new report

Tetra Pak has forecast that globally, flavoured milk will increase by 4.1 per cent a year until 2015, to 19.2 billion litres, while sales of regular (white) milk will only expand at 1.7 per cent during the same time. Though the rate of growth is lower, traditional milk still is projected to reach 219.5 billion litres in 2015.

The packaging company said that consumers are selecting flavoured milk as an alternative to other beverages, with developing countries leading the demand.

"With white milk increasingly commoditised, flavoured milk offers dairies the opportunity to provide value not only to consumers but to their bottom line," said Dennis Jönsson, president and CEO of Tetra Pak Group.



According to the company, the growth is a response to greater interest in nutritious and healthier foods, expanding “on the go” consumption patterns and an interest in trying new things.

The report also forecasts flavoured milk to increase at a much higher rate than carbonated soft drinks, which are expected to grow by just 1.3 per cent until 2015. The demand for flavoured milk to be especially noteworthy in Asia and Latin America. According to Tetra Pak, six countries – China, India, Indonesia, Malaysia, the Philippines and Thailand – currently consume 47 per cent of the world’s flavoured milk.

### Making the most of leftovers

Some 2,800 litres of superfluous thickened cream have been put to better use thanks to clever thinking from Australia’s OzHarvest.

The food rescue organisation used the cream, which otherwise would have been discarded although still perfectly good, along with a week’s supply of surplus bread and other donated products to make 17,040 servings of bread and butter pudding.

Around 30 OzHarvest volunteers made the pudding during a nine-hour shift under the direction of Pierre Issa, creator of Pepe Saya butter, Merna Taouk from Dessertmakers and Michael Klausen from Brasserie Bread. The majority of the puddings, 12,040, were immediately delivered to Australians in need, through a series of charities and welfare agencies. The remaining puddings were frozen for a future event.



Merna Taouk with a tray of pudding en route to the oven

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# DASHING DAIRY MYTHS

*New research is raising questions with some common assumptions about dairy products.*

## Osteoporosis not just a female concern

According to new research undertaken by Fonterra, osteoporosis and other bone related diseases pose a serious threat to men, as well as women, across Asia.

A study of bone health found that 47 per cent of Singaporean men were at risk of poor bone health, with men aged between 20 and 40 years old having a higher level of risk than women. The numbers were worse in Indonesia, where 52 per cent of men were identified as being at risk along with nearly 40 per cent of Malaysian and Philippine men.

According to the International Osteoporosis Foundation (IOF), low rates of calcium and vitamin D have been identified as possible contributors.

The study, which was published in the March issue of *BMC Musculoskeletal Disorders* (doi:10.1186/1471-2474-14-81), was based on more than 15 million free bone health checks conducted in Asia by New Zealand dairy company Fonterra. Fonterra has been conducting the bone health checks since 2005.

"It is clear that more needs to be done to raise awareness about bone

health. Osteoporosis, a disease causing bones to breakdown and fracture, has commonly been associated with women and the elderly, but the results unveiled clearly show that men from as young

as 20 are also at risk of developing this debilitating disease," said Alvin Ng of the Endocrine Clinic at Singapore's Mount Elizabeth Novena Specialist Centre.

The study found extensive occurrence of poor bone health in both men and women across all regions of Asia. The researchers said that up to 70 per cent of the Indonesian population aged 50 and over were at risk of either being osteopenic or osteoporotic.

According to the Judy Stenmark, CEO of the IOF, by 2050 half of all osteoporotic hip fractures will occur in Asia.

According to Fonterra, the average Asian consumes the equivalent of 30 litres of milk each year – rather less than the New Zealand average of 245 litres. However, demand for high quality dairy nutrition has increased across Asia over the past decade by 49 per cent.

The company said that Chinese consumers are the highest dairy

consumers in Asia, with an average of 60 per cent of the population eating at least one serving of dairy a day. The Philippines follows, with 53 per cent consuming dairy on a daily basis.

## Not all dairy equal

A few months earlier, a team of researchers at the Institute for Aging Research (IFAR) at Hebrew SeniorLife, an affiliate of Harvard Medical School, found that when it comes to bone mineral density (BMD), not all dairy is equal.

The scientists found that while milk and yogurt were associated with higher levels of BMD in the hip, they did not have the same effect on the spine. The researchers said that the results, which were published in the *Archives of Osteoporosis*, indicated that not all dairy products are equally beneficial for promoting bone strength.

"Dairy foods provide several important nutrients that are beneficial for bone health," said lead author Shivani Sahni, a member of the IFAR musculoskeletal research team. "However, cream and its products such as ice cream have lower levels of these nutrients and have higher levels of fat and sugar."

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*Not all dairy products are equally beneficial  
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Sahni said that the study found that 2.5–3 servings of milk and yogurt a day were associated with better bone density. Sahni also said that more research was needed to examine the role of cheese and whether individual dairy foods have a significant affect on reducing fractures.

The study was based on data collected from a food frequency questionnaire, completed by 3,212 participants. The team then compared the participants' dairy intake with BMD measurement. They noted that selecting certain dairy products, such as low-fat milk or yogurt instead of cream, could allow people to increase their protein intake, calcium and vitamin D while limiting saturated fats.

The IFAR has noted that osteoporosis is considered a major public health threat for an estimated 44 million Americans, or half of those aged 50 and older, and around 25 per cent of those who suffer a hip fracture die within a year of the injury.

### Skim milk more fattening than full cream

Although parents have been directed to steer children aged two and older to drink low fat or skim milk – in order to reduce saturated fat intake and avoid excessive weight – a study of preschool children has found that drinking low-fat milk is associated with higher weight.

Even the researchers, from the University of Virginia and Columbia University (US), were surprised by the findings, as they had hypothesised the opposite.

The results, “Longitudinal evaluation of milk type consumed and weight status in pre-schoolers” were published in the *Archives of Disease in Childhood* (doi:10.1136/archdischild-2012-302941).

The study involved 10,700 two and four-year-old US children. Parents provided information about their child's beverage consumption and the researchers gathered measurements of height and weight (to determine BMI) of the participants.

The researchers found that the children who drank 1 per cent or skim milk (rather than whole or 2 per cent milk) had higher BMI scores. The results held up across all racial, ethnic and socioeconomic groups.

Virginian scientist and project leader Mark DeBoer suggested that drinking whole-fat milk might make the children feel fuller, and therefore prevent them from eating additional calories, as an explanation for the unexpected results.

“At least theoretically, high fat milk intake may result in less weight gain if its consumption leads to an overall decrease in calories consumed,” the authors said.

“The presence of fat can induce satiety through the release of cholecystokinin and other factors. This could potentially lower appetite for other calorically dense foods, as noted in preschoolers who drink excessive volumes of milk and concurrently eat less iron containing food, contributing to iron deficiency anaemia.”

The authors also acknowledged that the study did not include information regarding the total number of calories the children consumed nor what types of food they ate. 🍌

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# NUTRITION WATCH

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

Words by *Ramon Hall*

## **Nut intake does not affect body weight**

A recent meta-analysis conducted by researchers in Spain revealed that nut-rich diets, in comparison with other control diets, did not increase body weight, body mass index or waist circumference (Flores-Mateo et al., 2013) and actually resulted in small, non-significant reductions in these three measures. The meta-analysis included 33 randomised controlled clinical trials that met strict inclusion quality criteria and included both individual nut studies (pistachios, walnuts, almonds, hazelnuts and peanuts) and combination nut studies. These results confirm earlier epidemiological studies that suggested that nuts consumption is associated with lower BMI and risk of obesity or no association.

Although nuts are energy-dense foods, as they contain  $\geq 50$  per cent fat, they are featured in the Australian Dietary Guidelines (ADG) as a nutritious alternative to meat, fish and eggs and noted to be of importance in plant-based, vegetarian and vegan meals and diets. They are described as providing a good source of protein, dietary fibre, monounsaturated and polyunsaturated fatty acids, polyphenols, phytosterols, folate, vitamin E, selenium and magnesium.

This meta-analysis provides robust support to the ADG statement, "that there is evidence to suggest that consuming (65-110g per day) is not related to risk of weight gain in the short term", which was based on a review of five studies.

This study should remind us not to judge foods based on a single nutrient or total energy value alone, but to look at the contribution and impact of the food in the context of the whole diet.

Flores-Mateo et al. (2013) "Nut intake and adiposity: meta-analysis of clinical trials", *American Journal of Clinical Nutrition*, 2013; 97: 1346-55, (doi: 10.3945/ajcn.111.031484).

## **Dietary fatty acid composition has differential effects on satiety markers**

In a recent study undertaken at Texas Technology University, researchers found that different fatty acid profiles in foods can exert different effects on subjective satiety measures and satiety biomarkers. In a randomised controlled cross-over design trial involving 15 healthy weight women, participants undertook three high fat liquid meal treatments on different occasions (70 per cent of energy from fat) containing predominantly saturated fatty acids (SFA)(42 per cent of total energy), poly-unsaturated fatty acids (PUFA)(42 per cent of total energy) or mono-unsaturated fatty acids (MUFA)(42 per cent of total energy).

The results showed that meals containing higher SFA or PUFA elicited a significantly higher level of the satiety biomarker peptide YY (PYY) than the MUFA containing meal. PYY is a satiety hormone that is released from the gastrointestinal tract in response to nutrient consumption and provides a signal to stop eating and also to delay gastric emptying. According to the researchers, this is the first study to show differential effects

of PYY responses to different fatty acid containing meals.

Other results indicated that the higher SFA liquid meal exhibited greater subjective score for "feelings of fullness" compared to the MUFA or PUFA meals over the five hour period and there was also a significant lower subjective score relating to the question "how much could you eat" for the SFA rich meal compared to the MUFA and PUFA meals over the five hours. Both of these results suggest that SFA may have a greater impact on satiety than MUFA and PUFA.

This study did not measure next meal intake and therefore we do not know if these effects translate into reduced calories consumed. Further studies are warranted to validate these findings and to understand in more detail if specific fatty acids may modulating these effects.

Kozimor et al. (2013) "Effects of dietary fatty acid composition from a high fat meal on satiety" *Appetite*, published online 18 May 2013 (doi: 10.1016/j.appet.2013.05.006).

## **Sequential release of milk protein bioactive peptides in gut**

Researchers from the French Institut National de la Recherche Agronomique (INRA) have undertaken a sophisticated study to understand more about the digestion of whey and casein proteins and the peptides that are formed. Using specially designed nasogastric tubes that reach the proximal jejunum (middle section of the small intestines), the researchers were able to sample over a six-hour period after feeding participants 30g of radio-labelled casein (n=7) and whey

(n=6) and measure peptides using mass spectrometry.

The study showed that whey protein derived peptides were released almost twice as fast as the casein derived peptides with the larger sized whey derived peptides (1050-1800 kDa) being released within three hours, whereas the medium sized casein derived peptides (750-1050 kDa) were released over a six-hour period due to the slower gastric emptying of casein. The study revealed that a total of 356 peptides were detected in the jejunum from casein and another 146 peptides were detected in the jejunum from whey protein. Also, the study determined the levels of previously identified bioactive peptides such as casomorphins (opioid activity), angiotensin-converting enzyme (antihypertensive activity) and peptides purported as having antithrombotic, immunomodulatory and antimicrobial activity. The authors suggest that the levels found in these bioactive peptides are sufficient to exhibit some degree of biological activity, although they need to be absorbed into the bloodstream to induce these effects and the suggested rate of absorption is considered extremely low (<1%) as indicated for ACE-inhibitory peptides.

This study provides further details into the complexities of human digestion of two key dairy proteins and the characterisation and quantification of peptides. Further studies should be undertaken on complete foods such as milk to understand how the interaction between proteins and other factors within the food matrix may affect peptide kinetics.

Boutrou et al. (2013) "Sequential release of milk protein-derived bioactive peptides in the jejunum in healthy humans" *American Journal of Clinical Nutrition*, 97(6): 1314-23 (doi: 10.3945/ajcn.112.055202).

### Meta-analysis of genome reveals common genetic variants linked to macronutrients intake

An international team of researchers has recently published a meta-analysis that found that variants in genes involved in nutrient metabolism and obesity are associated with macronutrient consumption in humans. The researchers undertook a genome-wide association meta-analysis using macronutrient intake derived from food frequency questionnaire data in populations of European descent. Initially using 12 cohort studies involving 38,360 individuals, 35 independent loci associated with macronutrients were identified. These identified loci were then taken forward and replicated using an additional three cohort studies involving 33,533 individuals. For one well-documented loci fat mass obesity associated protein (FTO), further replication was provided by a smaller cohort of 7,724 individual with specific genotype data related to this loci.

The study highlighted that a variant in the chromosome 19 locus (rs838145) was associated with higher carbohydrate and lower fat consumption. The researchers proposed that a candidate gene found in the related region (19q13.33) was responsible for the fibroblast growth factor, which is known to be involved in glucose and lipid metabolism and suggested a need for further functional assessment and fine mapping of this

region. The study also highlighted an association between the body mass index (BMI)-increasing allele of the FTO variant (rs1421085) and higher protein intake.

This method of genome-wide association meta-analysis can help provide links between important genetic variants that are associated with dietary factors and health. Information coming out of these studies can be used to highlight some of the key genetic modulators relating food and health and may one day help inform tailored dietary advice based on an individual's genetic profile.

Tanaka et al. (2013) "Genome-wide meta-analysis of observational studies shows common genetic variants associated with macronutrient intake" *American Journal of Clinical Nutrition*, 97(6): 1395-402 (doi: 10.3945/ajcn.112.052183).

*Ramon Hall is manager of the Dairy Health and Nutrition Consortium at Dairy Innovation Australia.*

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# PRINT AND EAT – A FOOD ODYSSEY IN 3-D

*One of these days dinner may come out of a printer, rather than an oven.*

Rapid advances in technology mean that printing of an array of items, from guns to jewelry, is now a viable – if not slightly frightening – reality.

So it comes as no surprise to learn that food is now being created from a 3-D printer.

Researchers from the University of Exeter (UK) have developed what they claim is the world's first consumer 3-D chocolate printer. According to one of the scientists, Liang Hao, the device works by making a flat cross-section image, similar to the way that standard printer works, and then prints individual layers of chocolate to create a 3-D shape. The device relies on an element of human intervention, however, as the user needs to provide melted chocolate. The process can be used to make formed chocolates or to "print" complex 2-D patterns onto other desserts.

Hao and his colleagues have created a company called Choc Edge to commercialise their product and are now selling the chocolate printer for £2,888.

On a loftier scale, NASA wants a 3-D food printer to provide meals for astronauts on lengthy space travel. A Texas-based mechanical engineer, Anjan Contractor, recently received funding from the agency's small business innovation research program

to develop a prototype 3-D printer for customised, nutritious food.

Contractor is developing a cartridge-based system that contains either powdered versions of core foods




(carbohydrates, proteins and nutrients) or cooking basics (such as water and oil). In order to address NASA's shelf life targets of up to 30 years, removing moisture from the food items is essential Contractor said.

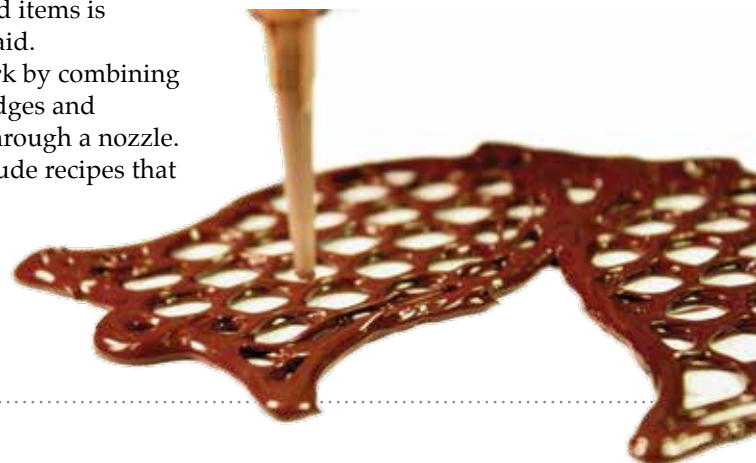
The printer will work by combining the appropriate cartridges and extruding the result through a nozzle. The software will include recipes that

tell the printer how to mix the various ingredients and detail the proper order for printing the food layers.

Contractor has mastered printing chocolate and is now working on pizza. He aims to have the machine first print the dough, which will cook while being printed. Next it will make a tomato sauce, followed by a layer of protein to be added to the pizza base. Contractor is experimenting with some unusual pizza toppings – insects, algae and grass – with an eye on future options for the world's growing population.

"I think, and many economists think, that current food systems can't supply 12 billion people sufficiently," Contractor said. "So we eventually have to change our perception of what we see as food."

Although NASA is funding the research for long-distance space travel, Contractor believes the food printer has real earthly benefits. Along with providing a method of reducing food waste, recipes could be individually tailored, allowing people to print food that best suits their specific needs. 





## DIARY

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**September 7-8. Real Food Festival.** Maleny Showgrounds, Sunshine Coast, visit [www.realfoodfestival.com.au](http://www.realfoodfestival.com.au) for more details.

**September 9-12. Fine Food Australia.** Sydney Convention and Exhibition Centre, Sydney, NSW. Visit [www.finefoodaustralia.com.au](http://www.finefoodaustralia.com.au) for details.

**September 12. Food Microbiology for the Non Food Microbiologist.** CSIRO, North Ryde, NSW. Visit [www.aifst.asn.au](http://www.aifst.asn.au) for details.

**September 22-27. 2013 Food and Grocery Executive Program.** Melbourne Business School. Visit [ifgm.worldsecuresystems.com](http://ifgm.worldsecuresystems.com) for details.

**October 20-23. Pulse Breeding Australia's Inaugural Pulse Conference.** Theme: Expanding Horizons. Sebel Playford, Adelaide. Visit [www.grdc.com.au](http://www.grdc.com.au) for more details.


**October 22-24. Food Structures, Digestion and Health International Conference.** Bayview Eden Hotel, Melbourne, Vic. Visit [www.foodstructureandhealth2013.com](http://www.foodstructureandhealth2013.com) for more details.

### INTERNATIONAL 2013

**September 11-13. Food Ingredients Asia.** Bangkok, Thailand, Visit [www.ingredientsnetwork.com](http://www.ingredientsnetwork.com) for more details.

**September 15-20. IUNS 20th International Congress of Nutrition.** Granada, Spain. "Joining Cultures through Nutrition. Visit [icn2013.com](http://icn2013.com) for more information.

**September 16-20. drinktec 2013.** New Munich Trade Fair Centre. Munich, Germany. Web: [www.drinktec.com](http://www.drinktec.com).

**September 19. "Maintaining health with nutrient rich diets: The role of dairy in prevention of metabolic syndrome, cardiovascular disease, obesity and sarcopenia",** symposium. Granada, Spain. Visit [www.idfdairynutrition.org](http://www.idfdairynutrition.org) for more details. 



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- AQIS Imported Food Analysis

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