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# Cutting through turbulent times

Innovation and technology help overcome safety and supply challenges



## *Also Inside*



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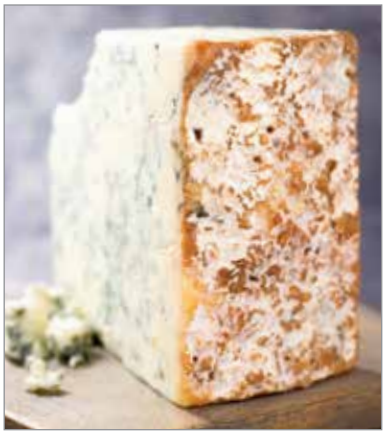

# ON THE COVER

## A trusted partner to the dairy industry

DTS have been proudly supporting the dairy industry for over 50 years with a comprehensive range of analytical and assurance services. NATA accredited since 1961, we are passionate about quality, service, performance, customer focus and forming partnerships through teamwork to become an integral part of our client's business.

### Behind Farm Gate

The DTS Milk Analytical Services business unit operates seven days per week in supporting the analysis of milk samples for various aspects of quality. Using state-of-the-art equipment such as Combi FOSS and Bactoscan, this provides a rapid service and assurance at the first stage of the milk supply chain. A new service which has been launched in the past 12 months is mastitis testing which uses real time PCR technology or RtPCR to rapidly identify mastitis causing bacteria in bovine milk.

### Laboratory Services

Since 2008 DTS has been strengthening its portfolio of service assets to service our industry partners and support their quality and risk programs. Microbiological testing is an integral part of a food safety program and DTS have two business units, General Microbiology and Pathogens, operating seven days per week, utilising rapid technology such as TEMPO, BAX, VIDAS to support the requirements of our customers.

One of the most common causes of food recalls is the detection of allergens; DTS have an experienced team to test for the most common food allergens such as gluten, soy, egg, dairy, crustacea, peanuts and tree nuts. Part of the same business unit is the GMO lab which tests for all major GMO strains and we have a close relationship with Genescan AG who pioneered testing in this field.

A major global trend is that of health and wellness. DTS are one of the leaders in chemistry and nutritional parameter testing and offer analysis in vitamins, minerals, nutritional panels, dietary fibre, proximates and peptides to align with this market.

DTS is investing in the future and aligning our business with our customers and their markets. Our innovation and technical services areas develop and implement new technologies and methods to support our customers business through improved accuracy, quality, and turnaround time.

### Audit, Inspection and Training

Our strategic partner AsureQuality works alongside the dairy industries in Australia and New Zealand helping customers meet the rising expectations of consumers worldwide and strict international standards. AsureQuality regularly audits food safety and inventory control processes to provide ongoing assurance of programme integrity to dairy customers. AsureQuality's robust training systems and processes mean that our training is of the highest standard in terms of quality, consistency and professionalism. Our courses have been designed by our own food safety experts who have extensive industry experience, ensuring they reflect the current food safety standards both in Australasia and further abroad.

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## FEATURES



## REGULARS

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# FROM THE EDITOR

The importance of the origin, supply and safety of food has been made fairly apparent the public over the past few months. From a serious *listeria* outbreak here in Australia (News, page 10) and concerns over chemicals in New Zealand pastures (page 25) to widespread dismay over the unexpected appearance of horse meat in numerous products, consumers have learned quite a bit more about where and how their food is sourced in recent times.

On the other hand, the industry is once again being reminded about steps that should be taken and improved to ensure enhanced product safety and confidence from consumers.

The release of the updated Australia Dietary Guidelines has also ensured that food and nutrition continue to retain high visibility in the public eye (pages 7, 18 and 26). However, doubts about whether the extensive resources spent to revise the guidelines will have any impact on the eating habits and health of the Australian public remain high.

As a big fan of red wine, I was somewhat dismayed to learn that one of my major excuses for imbibing – the famed French paradox – is now under question ("Blue Cheese under the Microscope", page 20). Perhaps I just need to ensure that I pair each glass of cabernet (Australian, of course!) with a chunk of blue cheese and slice of whole grain bread.

Lynn Elsey
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BY THE NUMBERS

# FOOD SECURITY STARTS AT HOME

Australia may be the "Lucky Country" and the frequent recipient of best places to live accolades, but life here is not always a bed of roses.

It is estimated that around 2.2 per cent of the population live in poverty; of those, 12 per cent are children. A number of organisations are working to alleviate the problem, including Foodbank.

The non-profit was established in NSW in 1992 and is now Australia's largest food relief organisation with distribution centres across Australia. Acting as a conduit between surplus food in the food industry and charities and community groups who help provide food to those in need, Foodbank collaborates with many players in the Australian food industry and government for help in its quest to alleviate hunger.

31.8 million

31,794,967 meals provided by Foodbank in 2012

3 million

*3 million loaves of bread, the target of a recent Goodman Fielder donation*

1.5 million

*100,000 Mac & Cheese packets and 1.5 million Easter Eggs were donated by Kraft Foods in 2012*

2.2%

*2.2 per cent of the population live in poverty*

*24 million kilograms of food – equalling 32 million meals, 88,000 per day – was distributed by Foodbank in 2012*

24 MILLION

105,000

*105,000 people in Australia are homeless*

100,000

100,000 jars of Vegemite were donated to Foodbank as a 2012 Christmas gift, providing 8 million servings

*10.9% of children live in poverty*
*25% of pensioners live in or close to poverty*
*13% of Australians says they cannot afford to eat nutritionally-balanced meals*

10.9% 25% 13%

*All facts/figures are from Foodbank.*

# NEW SUPPORT FOR GM

After campaigning against genetically modified foods since the mid 90s, a key leader of the anti-GM movement has done a complete about face and decided that GM is the only option for the survival of the environment.

In a public address at the Oxford Farming Conference (UK) in January 2013, Mark Lynas renounced his long-held belief that genetically modified foods were dangerous. Along with proclaiming that GM foods are the only way to feed the world without devastating the environment, Lynas also came out against organic farming – declaring that it was no better than non-organic for people or the environment and probably worse for biodiversity.

Lynas credits his abrupt change of heart to discovering science. After years arguing against GM foods, when he finally looked at the research he determined that science was on the side of GM.

"My conclusion here today is very clear: the GM debate is over …. over a decade and a half with three trillion GM meals eaten there has never been a single substantial case of harm. You are more likely to get hit by an asteroid than to get hurt by GM food. More to the point, people have died from choosing organic, but no-one has died from eating GM."

Lynas' change of heart aligns with a new report aiming to counter consumer and governmental concerns about GM foods.

EuropaBio, a European association for the bio industries, has released "Science not fiction: Time to think again about GM" with hopes it will address and counter what it says are non-scientific

concerns and fears about GM crops and products.

The report documents an extensive review of 130 GM-related research projects undertaken over the past 25 years. It concludes that there is no scientific evidence associating GMOs with a higher risk to food or the environment than from conventional plants and organisms.

The report, which can be found at www.Europabio.org, is supported by a number of high profile leaders and organisations including Bill Gates and the WHO.

# DOES EVERYTHING GIVE YOU CANCER?

Weary of what seemed like a continual flow of news stories linking food and cancer, a team of researchers decided to investigate if it was true that nearly everything we eat is associated with cancer.

Although the result of their research was, "yes" – the more important finding was that most of the links haven't been scientifically verified.

John Ioannidis, Stanford Prevention Research Center, and Jonathan Schoenfeld, Harvard Medical School, decided to examine the association between specific food and risk of cancer, as links between the two have become quite widespread in research literature and attract significant media attention.

After selecting 50 common ingredients from random cookbook recipes, they searched through academic literature, including recently published studies and meta-analyses, for any research that associated the ingredients with a risk of cancer.

They found that 80 per cent of the foods selected had been linked to cancer. These included veal, salt, pepper spice, flour, egg, bread, pork, butter, tomato, lemon, duck, onion, celery, carrot, parsley, mace, sherry, olives, mushrooms, milk, cheese, coffee, sugar, potato, beef, mustard, nuts, wine peas, corn, cinnamon, cayenne, orange, tea and raisins.

Thus, they concluded that most food ingredients have been linked to cancer (the 20 per cent of foods not linked were less common ingredients, such as bay leaf, hickory, molasses, baking soda and terrapin).

However, when they closely examined the studies they found that most of the results had either borderline or no statistical significance. And although most trials had repeatedly failed to produce verifiable data linking cancer to food, the studies still created public concern.

The researchers also noted that alleged links between food and cancer were a recent trend, with around 85 per cent of all scientific studies linking food and cancer conducted between 2000 and 2011.

The research has been published in the *American Journal of Clinical Nutrition* (doi: 10.3945/ajcn.112.047142).

# NANOTECHNOLOGY LEADING TO SAFER FOOD

Scientists from the University of Queensland and DAFF have developed a new technology that that can quickly detect and type different bacteria.

The nanotechnology enables DNA amplification on microspheres, allowing it to rapidly find and identify large numbers of bacteria at the same time.

According to Ross Barnard, director of the Bio-technology Program at UQ, it is estimated that Australians are affected by around 5.4 million cases of food-borne gastroenteritis each year. Of these, around 200,000 are associated with *Campylobacter jejuni* and *Campylobacter coli*.

"We hope to use this new technology to be able to detect and type C. *jejuni/coli.* These quick identification techniques can underpin relevant and sustainable programs to further improve food safety," Barnard said.

He said that infectious doses for these bacteria can be very low, around 500 organisms, which makes the availability of sensitive, specific and rapid techniques for detection especially important.

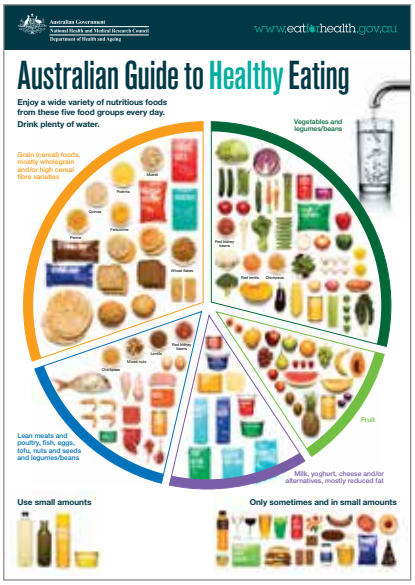
"Because this testing is based on a platform technology, it can be applied in many different way, such as mutation screening in plant, animal and human genomes, as well as for applications in the realm of infectious diseases," Barnard said.

Other testing methods currently available are slower and less effective according to the researchers.

The full range of benefits of the new technology is still unknown and the team will continue working on extending the technology. N

# UPDATED DIETARY GUIDELINES

The long-awaited revised Australian Dietary Guidelines and Infant Feeding Guidelines are now available.




The recommendations were updated following an extensive review process which included the modelling of around a hundred dietary patterns and systemic literature reviews of more than 55,000 pieces of scientific research.

The guidelines, which are overseen by the Council of the National Health and Medical Research Council, now focus more on food choice recommendations rather than a specific nutrient target, the basis of the 2003 version.

The changes include covering infants from six months of age, rather than from two years of age in the earlier edition and a greater emphasis on energy requirements for the least active people in each age and gender population.

Unsurprisingly, the revision recommends that Australians eat more vegetables, fruits, whole grains and low fat dairy and less refined cereals, energy-dense and nutrient-poor foods and high and medium fat dairy.

Details of the guidelines can be found at www.eatforhealth.gov.au N

# NEW PRODUCE SAFETY WEBSITE

A new website designed to provide access to a variety of fresh produce safety information has been launched by the University of Sydney Faculty of Agriculture and Environment and PMA (Produce Marketing Association) Australia – New Zealand.

The site, called Fresh Produce Safety – Australia & New Zealand (freshproducesafety-anz.com) is part of a project to identify a model and priorities for fresh produce safety research and to raise awareness of fresh produce safety challenges and the importance of enhancing current safety practices.

The project will focus on the following objectives:

- plan how the produce industry will respond to major food safety outbreaks in the region,
- identify Aus/NZ specific research needs and develop local and international collaborative partnerships to address these needs, and
- translate relevant research outcomes from the Center for Produce Safety at the University of California-Davis for application in Australia and New Zealand.

A taskforce, including representatives from all sectors of the supply chain, has been appointed to help with the project and work with industry on communication and outreach. N

# SUGAR LINK TO OBESITY STRENGTHENED

A new University of Otago-led study that provides further evidence of a link between sugar and obesity may lead to changes in international guidelines for sugar intake.

The New Zealand study, which has been published in the *British Medical Journal*, (BMJ 2013;346:e7492) provided evidence that cutting down on sugar has a small but significant effect on body weight.

The World Health Organisation commissioned the research to review and analyse numerous studies involving sugar intake and body fat and examine associations between consumption of free sugars and body weight in children and adults.

The researchers, led by lead authors Lisa Te Morenga, Otago's department of Human Nutrition and the Riddet Institute of New Zealand, and Jim Mann, Otago's department of Human Nutrition and Medicine and Edgar National Centre for Diabetes and Obesity research, searched through nearly 8,000 trials and 9,500 cohort studies to find 68 studies that specifically focused on the effects of free sugars and weight.

From these, researchers found that reducing free sugars in the diet had a small but notable effect on weight, with an average reduction of 0.8kg in adults. They also found that increasing sugar intake was linked to a 0.75kg increase in weight. However, the evidence was less consistent in children, which may be due to dietary compliance issues.

The WHO is planning to integrate the results into its new guidelines that recommend that sugar intake be limited to 10 per cent of energy intake.

# READY MEALS LADEN STILL LADEN WITH SALT

Although reducing sodium has been on the dietary radar for some time, a new study has found that the amount of salt in many Australian ready-to-eat products has remained level or increased over the past four years.

Research undertaken by The George Institute for Global Health found that only 57 per cent of RTE meals met the salt reduction targets (280 milligrams of salt per 100 grams) that were set in 2011 by the Australian Division of World Action on Salt and Health.

The study, "Changes in the sodium content of ready-to-eat meals from 2008-2011" has been published in the *Asia Pacific Journal of Clinical Nutrition* (doi: 10.6133/apjcn.2013.22.1.10). It showed that although recently introduced RTE meals tended to have slightly less sodium than previous ones, salt levels in the popular, well-established products hadn't been reduced.

"The high levels of sodium identified in these products, coupled with the growth in sales of these products, suggest that ready-to-eat meals are now a significant contributor to Australian daily salt intakes," said Anthea Christoforou, the lead author on the article.

The research covered prepared meals for the freezer, fridge and shelf and included products from Coles, Woolworths and small independent retailers. It found that Coles' meals had increased their average sodium levels by 13 per cent and that products from McCain had the highest average levels at 310 milligrams per 100 grams.

Christoforou said that the Australian results were in "stark contrast" to similar findings in the UK, where a 45 per cent decrease of RTE products was noted over a four-year period.

"The absence of any overall reduction in sodium levels of Australian ready meal products is discouraging. The failure of voluntary industry efforts to reduce the saltiness of these foods suggests a regulated approach will be required to drive product reformulation", the authors surmised.

# LEAFY GREENS TOP CAUSE OF FOODBORNE ILLNESS

The CDC has just released an extensive study showing that in the US, leafy greens are the biggest source of foodborne illness. However, poultry and meat cause more deaths.

The paper, "Attribution of Foodborne Illnesses, Hospitalizations, and Deaths to Food Commodities By Using Outbreak Data, United States, 1998-2008", published by the Centers for Disease Control and Prevention, found that more than nine million cases of foodborne illnesses are blamed on major pathogens acquired in the US.

According to the study, 46 per cent can be attributed to produce, including fruits, nuts and vegetables. Out of these, 23 per cent are associated with leafy vegetables.

Dairy products are linked to 14 per cent of illnesses and poultry accounts for 10 per cent. Meat and poultry cause the highest percentage of deaths, 43 per cent. Of these, 19 per cent are from poultry.

# PROBIOTIC COFFEE HITS THE MARKET


Tipton Mills has launched what it claims is the world's first probiotic instant coffee in the US.

Sold under the tag line of "coffee for life", the coffee contains a probiotic called Ganaden BC30 designed to withstand extreme temperatures and digestive acids that normally hinder probiotics.

Tipton Mills says a cup of probiotic coffee delivers up to five times the amount of active probiotic cultures found in a single serving of yogurt.

The price, $US 5.49 for six sachets, is significantly more expensive than standard instant coffee. However, Tipton is confident that consumers will see the value in a probiotic product. At the present time the company is not including health claims on the coffee but instead is relying on consumer awareness of the benefits of probiotics.

Initial sales and marketing of the coffee will focus on the US but other markets, especially Asia, are targeted for exploration.

# BLAME IT ON IODINE

Following the outcry over poor academic test results by Australian school children, a Sydney-based expert says that iodine deficiency may be to blame.

Cres Eastman, a professor at Sydney Medical School and regional co-ordinator for the Asia Pacific region of the International Council for Control of Iodine Deficiency Disorders, published an article for Fairfax Media nothing that countries with diets high in iodine – including Singapore, Korea, Hong Kong, Taiwan and Japan – came out tops in the academic tables for math, science and literacy. Australian students, on the other hand, ranked 27 out of 49 countries for reading, 22 in science and 18 in math.

Eastman acknowledged the complexity of the problem and other previous explanations for the rather abysmal results but said that the possibility that Australian children have an "intellectual performance" problem was an area that hadn't been explored.

Changes in Australian dairy industry practices over the past two decades have resulted in a decrease in iodine in milk and dairy products which, along with a reluctance of Australian consumers to purchase iodised salt to use at home, appears to have contributed to iodine deficiency Eastman said.

"Until we eliminate the scourge of iodine deficiency from Australia it is likely that the intellectual performances of current and future generations will decline further when compared with countries where iodine nutrition is optimal," he offered.

# UNDERSTANDING LISTERIA

*Following the recent outbreak of listeriosis and recall of Jindi cheese, a better understanding of the pathogen might help deter future problems.*

**Words by** *Janelle Brown and Geoff Knight*

Listeriosis is a severe illness with high hospitalisation (90.5 per cent) and case fatality (15–30 per cent) rates that typically affects pregnant women and their foetuses, the elderly and immunocompromised individuals. During the past two months Australia's largest outbreak of listeriosis has unfolded. Twenty-six cases, three resulting in death and one in miscarriage, have been reported to date. As food safety experts seek to establish the cause of the outbreak, we thought it useful to take a closer look at the bacterium/pathogen involved and at what makes it difficult to control.

*Listeria monocytogenes* is small rod-shaped bacterium that occurs widely in the environment – in soil, water and decaying plant material and in food animals at a rate of 1 to 10 per cent. Consequently, raw foods of almost all types, including vegetables, milk, fish and shellfish, poultry and beef can be contaminated with this pathogen. While cooking or pasteurisation (equivalent to 72°C for 15s) kills *L. monocytogenes*, cooked foods may also harbour this pathogen as a result of post-processing contamination. Potential sources of post-processing contamination include raw food ingredients (which contact cooked food as a consequence of poor manufacturing practices or are intentionally added to the cooked food in the preparation of multi-component dishes), food processing surfaces/environments, food handlers, and the air. Among these, contaminated food-contact surfaces pose perhaps the greatest threat.

As a frequent contaminant of raw foods *L. monocytogenes* enters, and is constantly re-introduced into, the food processing environment. Its survival and growth in this environment is favoured by cool, moist conditions and by the deposition of organic soil. It can be found in all manner of niches, including refrigerator floors, drains, cracks, trolley wheels and conveyor belts. Once it establishes itself, this pathogen is difficult to eliminate. One reason for this is that it can attach to surfaces and form biofilms, which reduce the effectiveness of sanitation procedures.

Once it settles on food, *L. monocytogenes* has a better chance than most pathogens of surviving and proliferating under conditions that others can't. It grows under acidic conditions (pH ≥ 4.4), in the presence of high concentrations (10 per cent) of salt and at refrigeration temperatures (as low as 0.5°C).

As a consequence, pre-prepared chilled foods with intrinsic properties that don't prevent the growth of *L. monocytogenes* and are "ready to eat'"(RTE) carry substantially elevated risks with respect to this pathogen. This is borne out by the fact that the foods most commonly implicated in recalls and/or outbreaks of listeriosis are refrigerated dairy products, RTE meat products including deli meats and patés and other RTE foods such as smoked seafood, cooked crustaceans, and pre-prepared salads and fruit salads.

While it is essentially impossible to eliminate *L. monocytogenes* from raw

foods, the likelihood of producing contaminated products can be greatly reduced by following good manufacturing practices. For example, it is important to maintain separate areas for the handling and storage of raw foods and processed or cooked foods, to minimise traffic between those areas and to implement a rigorous cleaning and sanitation program that is validated through an environmental monitoring program.

With consumer demand for preservative-free RTE products on the rise, the current outbreak is a timely reminder that we must be vigilant in controlling this pathogen at every avenue of entry.

*Janelle Brown, research scientist, and Geoff Knight, research project officer, conduct food safety and stability research as microbiologists at CSIRO Animal, Food and Health Sciences.*

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## Changes at Fonterra

Following a restructure, John Doumani, managing director ANZ, has retired from Fonterra. Additionally, CFO Jonathan Mason will retire shortly; an international search is underway place to find a replacement. Process improvement manager Chris Rolls has also left the company and is now manager of Brancourts.

## Milk2Market

Corrie Goodwin is the new general manager of Milk2Market. Previously, Goodwin was general manager operations at Dairy Food Safety Victoria.

## Growcom Ombudsman

Stephanie Papapavlou is the new horticulture mediation adviser and produce and grocery industry ombudsman for Growcom.

## Boost for Juice

Scott Meneilly of Boost Juice has been named the Retail Executive of the Year by CEO magazine. Meneilly has served as the general manager for Boost for four years and is also the COO of the parent company.

## New Chair for NSW Advisory Group

Garry Browne has been appointed chair of the senior industry advisory group that provides advice to the NSW government. Browne is the CEO and managing director of Stuart Alexander.

"I hope that through my new role in the Government's advisory group I can help the sector further by creating more efficient, simpler processes for companies looking to do business with the Government," Brown said.

## New Chairman for AFGC

Terry O'Brien is the new chairman of the Australian Food and Grocery Council board. O'Brien, the managing director of Simplot Australia, has replaced John Doumani. O'Brien has represented the food industry on the federal Government's Food Processors Industry Steering Group and the National Food Policy Working Group.

## New chair at Retail Food Group

Colin Archer is the new chairman of the Retail Food Group. Archer, who has served as an independent non-executive director on the board for the past seven years, is a Queensland businessman. He replaces Bruce Hancox.

## Franchised Food Company

Phill Tucker is the new head of business development for the Franchised Food Company. Tucker was previously the franchise development manager for Eagle Boys pizza. FFCo includes brands such as Cold Rock Ice Creamery, Mr Whippy and Nutshack.

"The tasty treats market is filled with opportunity for solid growth and future success and I'm confident Phill is the man to assist FFCo in reaching our company goals and vision," Stan Gordon, Franchised Food Company CEO, said.

# 46th Annual AIFST Convention

Yesterday, Today, Tomorrow

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AIFST

# NEWS & EVENTS

*Improve your microbiology knowledge and skills, learn more about* listeria *and collaborate with colleagues in the upcoming months.*

## The Annual Convention

Plans are being finalised for the 2013 AIFST Annual Convention in Brisbane. The meeting will open on Sunday, 14 July with a post grad workshop and the student product development competition presentations. These will be followed by the formal opening of the meeting and a presentation on "The neuroscience of leadership". Jeff Stewart's talk on the "Medicinal history of beer" will definitely provide an appropriate segue to the Welcome Reception.

The conference will include an array of thought-provoking and highly informative sessions, including:

- "Probiotics: An emerging science meets consumers", Lars Bredmose, Chr Hansen, Denmark
- "The concept of shelf life", Christina Nicoli, University of Udine, Italy
- "Prebiotics and healthy ageing", Koen Van Praet, Beneo Asia Pacific, Singapore
- "Understanding how various food structure, including dairy materials, are modified during digestion", Harjinder Singh, Riddet Institute, Massey University, NZ
- "What new technologies are needed to address tomorrows problems?", Ross Crittenden, vice president of Valio, Finland.

Other highlights of the convention include the ever-popular wine and cheese evening, the conference dinner and the Innovation Breakfast, featuring experts from Cochlear and Intellectual Ventures.

On Wednesday, 17 July, a number of workshops will be held including a focus on turning ideas into reality called"Beyond the NPD Process" and a practical half day workshop focusing on developing sensory skills and improving products to match customer expectations.

## Back to Basics: Food Microbiology

The NSW Food Microbiology Group is hosting an event for those working in microbiology and quality assurance and food manufacturers in general to brush up on their skills related to producing safe food.

"Opening Pandora's Box of Food Microbiology" takes place on Wednesday, 19 June, from 10am to 3pm, at the CSIRO auditorium in North Ryde.

## Listeria Update Meeting

The recent outbreak of listeriosis has renewed attention on *Listeria monocytogenes*. The NSW branch is hosting an afternoon program focusing on the topic at the CSIRO auditorium in North Ryde, on 11 May.

## Demystifying Microbiology

Non micro specialists working in the food industry looking to update their background in food microbiology should consider attending a workshop covering food microbiology for the non-food microbiologist.

The CPD seminar, which takes place on 10 April, will cover microorganisms, controls, testing regimes and interpretation of results. The workshop is designed to provide a broad overview of food microbiology and applications in food safety and food production. It is designed for those with food safety responsibilities, HACCP team members and quality assurance staff.

The seminar will be presented by Gary Kennedy, a food safety consultant and trainer and director of Correct Training Systems, at CSIRO in North Ryde.

### Innovation on Tap at SA Branch Annual Meeting

The ephemeral topic of innovation will feature at South Australia's annual meeting and dinner on Wednesday, 15 May. Guest speakers include Roman Buckow – who's work involves enhancing the nutritional value of processed foods and ingredients and designing new food structures by using novel food technologies and processes – and Vince O'Brien, who has a passion for securing sustainable, competitive advantage in the manufacturing sector through the application of technology.

### Annual Meeting and Trivia in Victoria

Learn about the latest activities from the Victoria branch, network with industry colleagues and enjoy dinner and a trivia competition at the branch's annual meeting, Tuesday, 2 May. The event takes place at Caulfield Racecourse, starting at 6.30 pm.

## VALE RAYMOND CHARLES STANHOPE

Ray Stanhope died on 25 August 2012, just two months short of his 87th birthday, leaving behind not only his devoted wife Norma, daughters Virginia and Sarah and grandson Frank, but also a big space in the Royal Melbourne Philharmonic Choir and a group of food scientists and colleagues.

Ray graduated from the University of Melbourne in 1948. After working at the Victorian Health Department, he gained a Master of Science in food science and technology from MIT in 1963.

He was appointed chief chemist at Vic Health and then assistant director of the Food Science Branch of the State Chemical Laboratories, from where he retired in 1987. He became a food consultant before finally retiring in 2007.

Ray was literally the keeper of the Victorian Food and Drug Regulations and was rarely seen without his red-cover bulky copy of the regulations, which was overflowing with cut and paste changes and was instantly available for the inevitable and expected on-the-spot questions.

Whenever those of us in the food industry had a query we could always turn to Ray for an opinion as consultants were non-existent and the internet was not available. Ray understood the nuances of poorly worded regulations and tirelessly requested correct, unambiguous legal language. He was respected throughout the Victorian Food Industry for his contributions to the unification of the various Food Standards of the Australian States and Territories into a single set of standards.

Ray became an associate of AIFST in 1975 and a fellow in 1976. He was also a fellow of the RACI and honorary life member.

Although the golden voice and the sage advice of Ray Stanhope are no longer with us, he will be remembered and respected by all who knew him. Vale Ray. — *Tony Zipper*

# AIFST SUMMER SCHOOL

*The 2013 summer school provided Australian research students with opportunities to network, explore career options and formally present their work.*

*Summer School attendees at the University of NSW.*

The impressive depth and breadth of research being undertaken by Australian research students, which was presented during AIFST's third annual food science summer school, illustrates the great potential of food science in the near future.

The 2013 summer school was held at the University of NSW from 6 to 8 February. Postgraduate students from across the country joined 10 industry and academic speakers to share knowledge and insight about food science.

Topics ranged from health, nutrition and microbiology to food processing and food safety. Martin Cole, chief of CSIRO Animal, Food and Health Sciences, helped kick off the event with a focus on the importance of global food security. And following the recent outbreak of listeria in Australia, Lisa Szabo, a chief scientist with the NSW Food Authority, provided some rather timely information about foodborne illness in NSW and beyond. All of the speakers not only provided useful food science insights but were available for informal discussions with the students.

Jayashree Arcot, associate professor of nutrition, food science and technology at UNSW and one of the event organisers, said that the participants were very pleased to have the chance to network with other students and to learn about what others are doing in research.

"And, it gave them the opportunity to not only meet, but talk to, researchers they have read about," Arcot said. Having the chance to present their work in a smaller group format was also a big plus for many of the students.

"It was a good opportunity to network with teachers, other post grad students and a chance to show something of my research to others," Luisa Fernanda Fuentes Amaya, from Curtin University, said. She said that presenting her PhD research, her first formal presentation, was a big challenge and summer school provided an excellent chance to try it out.

The following research was presented during summer school by the students.

***Peptides as dual functional ingredients in food nanoemulsions***
Randy Adjonu,
Charles Sturt University

***Short chain fatty acids as immune regulators***
Miloud Asarat, Victoria University

***Canola peptides show blood pressure-reducing effects after oral administration to spontaneously hypertensive rats***
Adeola Alashi,
Charles Sturt University

***Bioactive compounds in canola meal***
Saira Hussain, Charles Sturt University

***Transport of folic acid from fortified bread is greater than 5-methyltetrahydrofolate in Caco-2 cells absorption model***
Maria Chandra-Hioe,
University of NSW

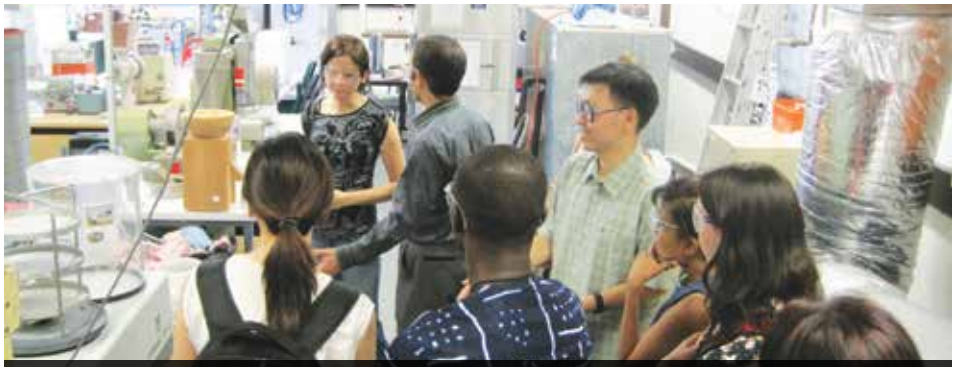
***Micronutrient fortification of rice using the parboiling technique***
Nishaanthini Thiruselvam,
University of NSW

***Carotenoid bioaccessibility from tropical fruits in-vitro***
Dorrain Low, University of Queensland

***Unravelling the bioactive properties of Australian native plants***
Kitty Tang, University of NSW

***Antioxidant activity of phenolic acid fractions in selected Malaysian traditional vegetables***
Normah Haron, University of NSW

***Antioxidative peptides derived from rice bran protein hydrolysates***
Chatchaporn Uraipong, University of NSW



*Discussing food-drying research in the UNSW Food Science and Technology Group drying laboratory.*

*Differential immune-modulatory properties of lactic acid bacteria and probiotic organisms*
Rabia Ashraf, Victoria University

*Evaluating the effectiveness of the total viable count as an indicator of seafood spoilage in fresh finfish fillets*
Luisa Fernanda Fuentes Amaya, Curtin University

*Are yeasts essential for cocoa bean fermentation?*
Van Ho, University of NSW

*Quantification and antioxidant activity of lutein in heat processed corn*
Pauline Loh, University of Queensland

*Identification of volatiles produced by common stored product pests in wheat using solid phase microextraction gas chromatography mass spectrometry (SPME-GC-MS)*
Wathukan Laopongsit, University of NSW

*Developing antibodies specific to Ara h2/6 as biomarkers for peanut allergy*
Xin Sun, University of NSW

*Extracts of polyphenols, flavonoids and saponins with bitter melons from five solvents and their antioxidant activity*
Sing Pei Tan, University of Newcastle

*Development of immunoassays for detection of 2-methylisoborneol in foods*
Sung-Wong ang, University of NSW

*The effect of genotype, growing location and phosphorus fertilisation on cooking time, pasting and thermal properties of chickpeas*
Christina Chin, Charles Stuart University

*Comparative study of denaturation of whey protein isolate (WPI) in convective air drying and isothermal heat treatment processes*
Amdadul Haque, University of Ballarat

*Determination of fatty acids composition induced by ultrasound processing of milk*
Fatima Suljagic, Victoria University

*Utlisation of waxy wheat, waxy durum and normal durum flour blends to improve the baking quality of frozen bread dough and staling of bread*
Kanch Wickramarachchi, University of Adelaide

*Single kernel corn drying model for CFD applications*
Wiyanto Bie and George Srzednicki, University of NSW

*Bread staling at the molecular level*
Laura Blake, University of Adelaide

*Phenolic acid profile of Australian red sorghum*
Ghazaleh Ghodsizad, University of NSW

*HPLC analysis of tocopherol of different roasts of Arabica coffee beans*
Sutthida Punya-in, University of NSW

*Soluble fibres arabinoxylan and beta-glucan affect pancreatic α-amylase activity in growing pigs*
Anton Pluschke, University of Queensland

*Emulsifying properties of protein fractions extracted from Australian canola meal*
Siong Tan, Charles Sturt University

*Volatile compounds in shiitake mushrooms*
Lina Ashmore, University of NSW.

# ASSESSING THE NEW AUSTRALIAN DIETARY GUIDELINES

*The release of the new Australian Dietary Guidelines have prompted an array of accolades and critiques, including the following assessments.*

### Tim Crowe, Deakin University

The newly revised dietary guidelines represent a potent set of recommendations targeted at promoting health, reducing obesity, and protecting against the major chronic disease killers of heart disease, cancer, and type 2 diabetes.

The revised guidelines have a greater focus on foods and food groups rather than nutrients and this is a good step forward. People eat food, not nutrients, so it makes sense to describe more of the foods that people should eat more of and those to eat less of.

While nutritionists may spend endless hours debating the wording of each recommendation, the methods and evidence that informed them, and where they believe the emphasis should lie, are these guidelines really stating anything new? Eat plenty of vegetables and fruit, choose mostly unprocessed grains and cereals, cut back on salt, fat and sugar, and get more active. Hardly controversial stuff.

The guidelines have an important role to play in informing government health policy, and for use by food manufacturers and health professionals which is why so much time was invested into revising these and taking all views on board.

But what about for the average Australian: what do these guidelines mean for them? Having the most perfect set guidelines in the world amounts to little if people don't follow them and this is the real elephant in the room, not debating over wording.

Research from 2003 found that only a third of middle-aged Australian women met at least half of the dietary guidelines, and from a total of 10,561 women surveyed, just two (yes, two) met all 13 guidelines. For what amounts to such basic common sense advice that your grandmother would give, it shows that dietary guidelines currently are more aspirational, than attainable for most people.

### Gary Sacks, Deakin University

The newly released Australian Dietary Guidelines do not adequately consider the environmental sustainability of the food supply chain. In fact, environmental sustainability is almost completely sidelined, with a discussion of the topic included only as an appendix to the main document.

The previous version of the Australian Dietary Guidelines, released in 2003, also had an appendix that discussed the environment, and so, in effect, there has been very little progress in addressing this critical issue.

It would have been far better if environmental sustainability was integrated into the guidelines all the way through. For example, there is a clear link between over-consumption, environmental sustainability and obesity. Not only do highly-processed junk foods that are high in salt, sugar, fat and energy provide very little nutritional benefit, but valuable resources are used in their production, processing and distribution.

It is clear that, in putting together the new version of the guidelines, major public health and environmental compromises were made to take into account the profit-seeking interests of the food industry. This is a similar situation to another key government strategic policy document, the National Food Plan (released in 2012), that also does not adequately address nutrition, health and environmental considerations.

It is a travesty that the private sector has such strong influence over government policy decisions, and they should have a much more limited role in the policy development process.

### Clare Collins, University of Newcastle

Importantly, the revised Dietary Guidelines for Australians are evidence based. They have been informed by a series of systematic literature reviews of the best available research evidence from studies investigating food, diet and health relationships from 2002 (for the 2003 guidelines) until 2009.

From the review, a series of evidence statements were derived to guide how strong this evidence is. We know a lot about the relationship between nutrition, diet and health risks and there is evidence to guide the advice we give on food and nutrition.

Grade A evidence statements can be trusted to guide practice. There were a number of these, demonstrating convincing associations between nutrition, diet and health risks, such

as the risks associated with obesity in infancy and childhood and later weight status (page 18), and for reduced sodium intakes leading to a decrease in blood pressure in hypertensive adults (page 74).

The majority of evidence statements were Grade B, indicating that the body of evidence can be trusted to guide practice in most situations or Grade C, indicating that the body of evidence does provide some support for the recommendations but care should be taken when applying the evidence.

The Dietary Guidelines released today provide a comprehensive source of information about what to eat to improve health. Each chapter sets out the specific guidelines, the research evidence underpinning it and how to implement the guidelines in practical ways. There is also additional advice for those with specific needs due to age, stage of life including pregnant and breastfeeding women, infants, children and adolescents, or due to being part of a population group with special needs.

There are no surprises, the guidelines address the most prevalent nutrition related issues of excess body weight, and poor food choices that increase the risk for chronic diseases such as type 2 diabetes and heart disease. There is more emphasis on reducing total saturated fat by reducing processed food intakes and returning to eating more of the basic food groups. The guidelines mention some of the new foods that have appeared on the market since 2003, such as trying quinoa and reducing energy drinks, which is helpful when choosing what to put in your shopping trolley.

Overall, the guidelines offer a way forward and there is no time to waste in helping people to adopt eating patterns that adhere to them more closely as way to help people eat better, feel better and improve their health and well-being.

## Peter Clifton, Baker IDI Heart and Diabetes Institute

As far as I can see, very little has really changed since the 2003 guidelines.

There are still problems in the guidelines and some evidence seems to have been misinterpreted.

**1)** The benefits of dairy are overstated. They state that the evidence base has strengthened for the association between the consumption of milk and decreased risk of heart disease. This seems completely wrong, with the most recent review of the evidence[1] showing milk to be neutral, overall.

**2)** The section on fat (page 71) states: Increasing the proportion of unsaturated fats in the diet can be achieved by choosing vegetables, fruit, lean meats and low fat milk, yoghurt and cheese products, nuts and seeds and using small amounts of unsaturated spreads and oils. Dairy products contain 50 per cent of their fat as saturated fat, so recommending an increase in dairy to increase unsaturated fat is not particularly useful, as saturated fat will increase at the same time, with no change in the usual dietary ratio of saturated fats: monounsaturated fats. In addition, there is virtually no polyunsaturated fat.

**3)** We're advised to "drink plenty of water" but the evidence this has a health effect is almost non existent. Tea and coffee are associated with benefits but tap water is not.

**4)** Guideline 2 recommends eating a wide variety of nutritious foods from the five food groups every day, including "Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties…"

However the evidence of benefit is purely related to whole grain and fibre and not cereals in general. There is no benefit – but possibly harm – from eating a large amount of refined grain foods and the recommendation does not truly reflect the evidence. The recommendation, therefore, should say "wholegrain and high-fibre cereal foods".

Also, the recommendation of six serves of grain foods as a minimum for men is too high. With two-thirds of the population overweight or obese, such a recommendation will ensure continuing obesity. Fibre and micronutrient intakes can be achieved with a much lower amount of wholegrain foods than this recommendation.

*Tim Crowe is an associate professor of nutrition at Deakin University; Gary Sacks is a research fellow at Deakin. Clare Collins is a professor in nutrition and dietetics at the University of Newcastle and also a NHMRC CDF research fellow. She was also one of the team leaders on the Evidence Report for the new guidelines. Peter Clifton is laboratory head in nutritional interventions at Baker IDI Heart and Diabetes Institute.*

1. "Milk and dairy consumption and incidence of cardiovascular diseases and all-cause mortality: dose-response meta-analysis of prospective cohort studies"
*Am J Clin Nutr.* 2011 January; 93(1): 158–171 doi: 10.3945/ajcn.2010.29866

*The comments originally appeared in The Conversation, published on 18 February 2013.*

# BLUE CHEESE UNDER THE MICROSCOPE

*New research on blue-veined cheese questions widely held assumptions about the French diet while scientists claim to have uncovered the secret of their smell.*

**Words by** *Lynn Elsey*

Could mouldy cheese be the secret to the French paradox?

Researchers in the UK have called into question the much-touted link between red wine consumption and low rates of cardiovascular mortality and instead are pointing to mouldy cheese, such as Roquefort, as a possible explanation for the low rates of cardiovascular mortality in France.

The so called French paradox – that a population noted for its high consumption of saturated fat also exhibits low rates of cardiovascular death – has often been explained as a result of the French love of red wine.

But after assessing a number of recent studies, scientists at Lycotec – a UK company that focus on the development and commercialisation of lycopene and high carotenoids bio-medical technologies – have found that the reputed link between red wine, with its resveratrol component, and low cardiovascular mortality doesn't hold up outside of France.

They said that the research indicated that red wine alone didn't explain the paradox and that other factors in the French diet could be responsible for the low mortality rates.

To test their theory the authors designed a study to determine whether cheese, especially mouldy types, could be a contributing factor. Their findings, "Could cheese be the missing piece in the French paradox puzzle?" have been published in *Medical Hypotheses.*

They concluded that it was plausible that cheese consumption could be an important factor in the resistance to cardiovascular disease in France – especially mouldy blue cheese. They noted that recent advances in cheese proteomics, "have allowed the identification and isolation of novel peptides capable of inhibiting the angiotensin-converting enzyme which controls systemic blood pressure".

The study authors, Ivan Petyaev and Yuriy Bashmakov, also suggested that mouldy cheese has additional health benefits.

"In our opinion, there is great and as yet poorly acknowledged promise in the dietary use of blue-veined cheeses. It is obvious that besides vasoactive peptides attributable to bacterial-induced modification of the cheese core, Roquefort and other blue-veined cheeses contain some important secondary metabolites produced by *P. roqueforti* and other fungi."

The paper (doi.org/10.1016/j.mehy.2012.08.018) also points out that cheese consumption is widespread

> *"There is great and as yet poorly acknowledged promise in the dietary use of blue-veined cheeses"*

among other European countries, such as Switzerland, Greece and Italy, where low cardiovascular mortality is documented. It concludes that carefully designed clinical trials and studies would needed to be held to measure the benefits of using blue-veined cheeses as a way of managing cardiovascular patients.

## Another pungent note

Another team of British researchers say they have pinpointed the source of the distinctive smell of blue cheese. Scientists from the University of Northampton and the University of Nottingham claim they have discovered a "secondary microflora component" that is responsible for enhancing the smell of blue cheese.

The team, under the leadership of Kostas Gkatzionis in the Northampton's School of Health, has been examining the role that various microorganisms play in the production of East Midland cheese, such as Stilton. They said that a strain of yeast called *Y. lipolytica* directly influences the blue cheese smell in dairy products.

The research involved the use of trained sensory experts who tested different cheese models containing varying levels of yeast to isolate the particular strain responsible for the aroma.

"Ultimately, we hope that this work will lead to greater consistency during production for Britain's cheese makers, which will help them achieve a greater slice of the worldwide blue cheese market, which is worthy millions," said Richard Worrall. Worrall is the director of Food and Drink iNet, an innovation company that helped fund the research.

The findings are being shared with cheese producers across the UK.

*Lynn Elsey is the editor of food Australia.*

# NEW PROTEIN QUALITY SCORING SYSTEM PROPOSED

*The proposed DIAAS methodology is designed to improve current limitations.*

**Words by** *Ramon Hall*

A new methodology for determining the quality of dietary proteins proposed by the Food and Agriculture Organisation of the United Nations (FAO) was highlighted at the Protein Quality Symposium at the IDF World Dairy Summit in Cape Town in early November 2012.

Paul Moughan, co-director of the Riddet Institute in New Zealand and chair of the FAO Expert Consultation on Dietary Protein Quality in Humans, gave the keynote address, "Dietary Protein Quality – New Perspectives", sharing details on the proposed new methodology called Digestibility Indispensable Amino Acid Score (DIAAS). He highlighted the need to update the current methodology, Protein Digestibility Corrected Amino Acid Score (PDCAAS), as it has a number of shortcomings that lead to erroneous quality scores.

The newly proposed DIAAS methodology is designed to improve on the limitations raised in relation to the PDCAAS scoring system, including:

1. Measurement of the true ileal digestibility of each dietary indispensable amino acid
2. Measurement of the true ileal digestibility of available lysine
3. Removal of the truncation of scores for ingredients
4. Use of the pig as the preferred animal model for assessing true ileal amino acid digestibility.

A contentious feature of the current system is that it uses a truncation system for food ingredients, capping protein scores at 1.0, and therefore does not differentiate between higher quality proteins (such as dairy proteins) and other plant based proteins that may marginally score at 1.0. The system also uses faecal crude protein digestibility data to estimate the amino acid digestibility. Moughan indicated that faecal values are in error and that absorption should be measured at the end of the small intestine (terminal ileum) because faecal protein digestibility overestimates digestibility.

Also, the current PDCAAS score uses a rat assay approach. A pig model has been suggested as a much better measurement for protein digestibility at the terminal ilium in terms of human nutrition. Another issue with the current system is lysine digestibility measurement in processed cereal foods. Moughan said that current approaches are inaccurate for some processed foods, as damaged lysine molecules revert to lysine with conventional testing procedures. He suggested using a new approach that has been developed at the Riddet Institute (Moughan and Rutherford Assay).

Finally, Moughan indicated that one of the main points coming out of the FAO Expert Consultation on dietary protein quality held in 2011 was the need to put more emphasis on the individual amino acid compositions of foods and therefore to treat each amino acid as an individual nutrient.

Protein quality has profound importance for vulnerable populations such as the elderly, the very young and the malnourished, but also is of importance to the general population in terms of choosing a high quality nutritious diet. Under the current system, a soy protein isolate (SPI) and whey protein isolate (WPI) are both given PDCAAS scores of 1.0, whereas with preliminary data using the DIAAS system the SPI would be given the same score of 1.0 (limited by amino acids methionine/cysteine) and the WPI would be given the score of 1.25 (limited by the amino acid histidine).

The proposed DIAAS system will provide a significant point of differentiation in terms of protein quality for dairy proteins compared to plant based protein and hasconsiderable implications for nutritional guidance, particularly for vulnerable populations, and ramifications for future food product development and food labelling claims.

The report has been released and can be found at www.fao.org/ag/humannutrition/35978-02317b979a686a57aa4593304ffc17f06.pdf

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

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# NEWS FROM THE DAIRY INDUSTRY

*From yogurt cultures designed to withstand storage challenges to issues with chemicals in farming, dairy is rarely out of the news.*

**Words by** *Lynn Elsey*

## Yogurt culture tackles post acidification

DSM has launched new yogurt cultures that delay post acidification, allowing the taste and texture of the yogurt to remain optimal through the shelf life of yogurt product, according to the company.

Post acidification frequently occurs during processing, storage and transportation. Changing customer eating habits, including more "on the go" snacking, and a broadening of the market means that yogurt products are not always stored in the fridge, which provides challenges to yogurt manufacturers.

The company says it has developed a range of new cultures under the DelvoYog branding that limit post acidification, allowing yogurt to retain optimum flavour and texture profiles. DSM says that the cultures are suitable for all type of yogurt recipes and also noted that they do not extend the shelf life of the product.

DSM believes that the new cultures should be especially useful in the Asia Pacific region where lengthy transportation issues and other factors have created more challenging supply chain issues.

## Fortifying with omega-3 without the fishy taste

Researchers claim to have discovered a method of incorporating fish oil into dairy-based products, including milk, without negatively affecting the product's taste or smell.

The study, which has been published in the *Journal of Dairy Science* (doi: 10.3168/jds.2102.5364), was undertaken by researchers at Virginia Polytechnic Institute and State University (also known as Virginia Tech).

The study involved 25 volunteers who evaluated one ounce servings of standard 2 per cent fat milk along with milk samples containing 78 parts butter oil to 22 parts fish oil. The formulation contained 432mg of omega-3 fatty acids per cup, just below the US recommended level of 500mg a day.

According to Susan E Duncan, from Virginia Tech, the results showed no differences in aroma between the two samples.

"We were concerned the fish oil would undergo a chemical process called oxidation, which would shorten the milk's shelf life, or the milk would acquire a cardboard or paint flavour by reacting with the fish oil. It appears we have a product that is stable, with no chemical taste or smell issues," Duncan said.

## Organic dairy expanding

It isn't all doom and gloom on the dairy front.

A decade ago, a small group of farmers decided to go organic and formed a cooperative for organic dairy farming. Today the Organic Dairy Farmers of Australia Co-operative (ODFA) supplies 80 per cent of Australia's organic milk and offers a range of products including Cheddar, mozzarella and pecorino cheese.

The entire supply chain is certified organic and the cows are free to graze outdoors, year-round, on a diverse mix of grasses and herbs. According to the farmers who run the 22 dairy farms that supply milk, "a healthy, happy cow can produce remarkable, high quality certified organic milk products."

The endeavour has been so successful that the cooperative is now establishing a manufacturing plant that will allow the group to make commercial level quantities of organic butter and cream products.

The new plant, a $1.2 million joint venture with Aussie Farmers Direct, will be located in Camperdown, Victoria. The facility will be used to produce both standard and organic dairy products with expectations of producing between one and two million packs of butter during the first year, making it Australia's largest organic butter manufacturer. It is scheduled to open in June 2013.

The group is also working with third generation cheese maker Matthieu Megard on several new products, including a semi-hard cheese typical of the Alpine Swiss/French border region where Megard is originally from. The ODFA expects the new Swiss-style cheese, which is scheduled to be available in May, to appeal to consumers who enjoy the sweet nutty flavour of Jarlsberg.

The group's organic butter is sold under the True Organic brand at Coles, Woolworths and some Western Australian independents. However, the ODFA does not supply private label products. A spokesman for the group, Richard Furphy, said that they prefer to focus on their own brands, which allows the group to "tell the story of ODFA and its farmers and cheese makers".

## Fonterra and NZ government in the hot seat over DCD

Fallout from a decision to delay announcing the discovery of DCD in dairy products continues to plague Fonterra and the New Zealand Government.

The chemical DCD (dicyandiamide) was being used on New Zealand pastures to reduce the leaching of nitrogen into waterways and to reduce greenhouse gas emissions, according to the New Zealand Ministry for Primary Industries and Fonterra.

On 26 January 2013 the New Zealand MPI Director-General Wayne McNee issued a statement acknowledging that the use of DCD had been suspended after traces of it had been found on Fonterra products. Although the statement was designed to clarify the suspension and address concerns about impacts on food safety, it only escalated the problem.

Questions were then raised regarding the delay in releasing official information about the discovery, especially in regards to a highly visible share float during the intervening time. The NZ Primary Industries Ministry and Fonterra have acknowledged learning of the problem in September.

McNee said that the DCD residues were not a food safety risk as DCD itself was not poisonous. Also, it has been used by less than five per cent of NZ dairy farmers who apply it twice a year. According to McNee, the treatment leaves just traces of residue, which means that only a small number of cows would have come into contact with the chemical.

*Organic farmer John Smith, Matthieu Megard and Bruce Symons, CEO of ODFA.*

McNee said that DCD had not been used on New Zealand pastures since September 2012 and that the level of residue found in the NZ products was so low that a 60kg person would need to consume more than 130 litres of milk or 60kg of powdered milk to reach the EC limit for acceptable daily intake.

Theo Spierings, the CEO of Fonterra, belatedly tried to explain why the company decided not to publicly release information about the DCD findings, including saying that the levels did not pose a threat and that in absence of an international standard for DCD Fonterra was concerned that there was potential for "an inconsistent approach by food regulators around the world."

A considerable level of criticism has been levelled at Fonterra for not coming forward with the information when originally discovered, accusing the company of drawing negative publicity to the New Zealand dairy industry and of failing to learn from the company's earlier problem with the melamine scandal just a few years ago.

Senior officials in China have asked the New Zealand government for a detailed assessment of the country's dairy products.

*Lynn Elsey is the editor of food Australia*

D

# A CLOSER LOOK AT THE NEW DIETARY GUIDELINES FROM A DAIRY PERSPECTIVE

*Although the benefits of dairy have been strengthened, the 2013 Australian Dietary Guidelines provide a mixed message on low fat and other aspects of dairy consumption.*

**Words by** *Anita Lawrence*

The following is a response to the newly released 2013 Australian Dietary Guidelines.

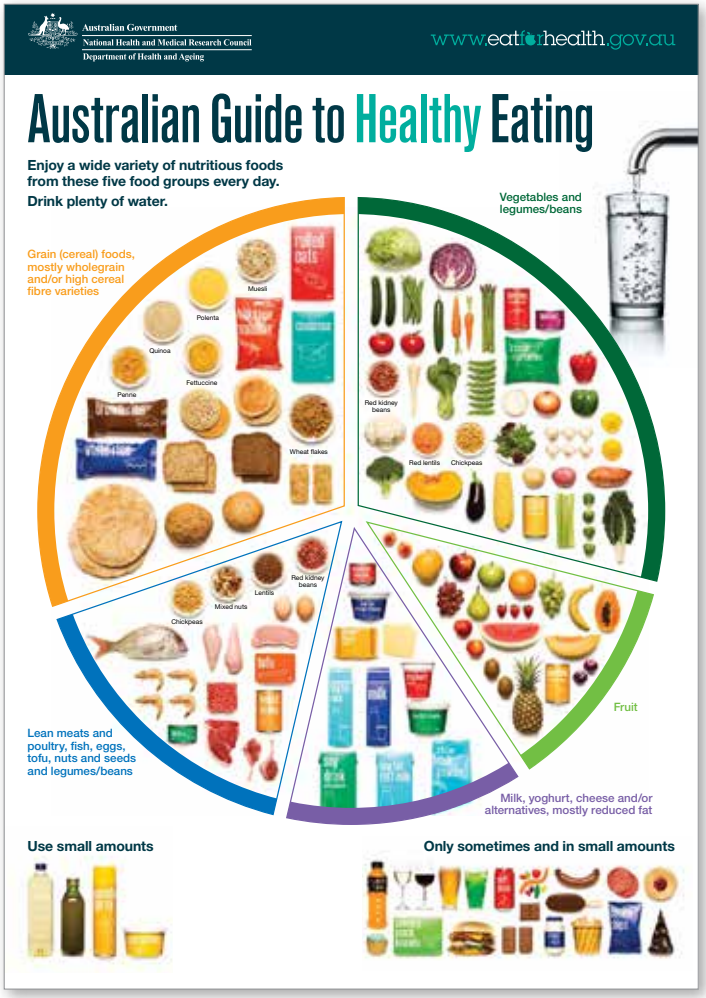
The new guidelines note that the evidence for the health benefits of dairy consumption has strengthened since the 2003 edition of the dietary guidelines. These are summarised as: "Consumption of milk, yogurt and cheese can protect us against heart disease and stroke, can reduce our risk of high blood pressure and some cancers, may reduce our risk of Type 2 diabetes and may contribute to stronger bones" (page 23).

All types of milk, yogurt and cheese remain part of the five food groups categorised as foods to enjoy every day. Both regular-fat and reduced-fat milk, yogurt and cheese are depicted on the central 'five food groups' plate shown on the new Australian Guide to Healthy Eating. This is important as the new guidelines have a greater emphasis on getting people to replace energy-dense foods with minimal nutritional value (discretionary choices) with the nutritious foods listed in the five food groups.

## Raised recommendations

A key dairy-related change has been a doubling of the minimum recommended intake of milk, yogurt, cheese and/or alternatives for women over 50 years from 2 serves to 4 serves per day. This change in recommendation will need to be followed by strong promotion as according to the most recent national nutrition survey, 69 per cent of women over 50 years consumed less than 2 serves a day and 93 per cent consumed less than 3 serves a day. Minimum recommendations for men over the age of 70 years have also jumped, from 2 serves per day to 3.5.

For men 70 years and under, women 50 years and under and teens, the minimum recommended intake of milk, yogurt, cheese and/or alternatives has increased by half a serve a day (from 2 to 2.5 for adults and from 3 to 3.5 for teens). For children, there are now five different minimum recommended intakes of milk, yogurt, cheese and/or alternatives, depending on their age and gender. These typically translate into three age-appropriate portions a day (small portions for little children, bigger portions for bigger children).




## Regular versus reduced-fat varieties

Although the 2003 dietary guidelines stated that "reduced-fat varieties should be chosen where possible", the 2013 version advises people to enjoy "mostly reduced-fat" milk, yogurt, cheese and/or alternatives. As has been discussed previously (*food Australia* November/December 2012), this advice is not based on the findings from the scientific reviews that formed the "Evidence Report", as these showed that the benefits of dairy foods relate to both regular-fat and

reduced-fat dairy foods. Rather, it was based on a theoretical dietary modelling exercise that was set up in a way that inappropriately pre-determined that most of the dairy foods selected would be reduced-fat.

A second rationale provided for the "mostly reduced-fat" recommendation is concern that consumption of regular-fat dairy foods will lead to excessive energy intake. However, recent systematic reviews have demonstrated that this is not relevant, as higher intakes of regular-fat dairy foods are actually associated with a reduced risk of obesity. Moreover, the new guidelines include the evidence statement "Recent evidence suggests that consumption of dairy foods is not associated with weight change or risk of obesity" (page 20).

Unfortunately, the "Australian Dietary Guidelines Summary" and "Educator Guide", which were not open to public consultation (yet are likely to be used more often than the lengthier, more detailed guidelines), tend to create the incorrect impression that only reduced-fat dairy foods are healthy for those over the age of two. Not only is this not consistent with the scientific evidence, but it may also be a barrier to some people achieving their minimum recommended intake of this food group and accessing its health benefits. Two Australian randomised controlled trials have reported that dairy food consumption declines when men are advised to change from regular-fat to reduced-fat milk, yogurt and cheese (Collins et al., 2011; Nolan-Clark et al., 2012).

## Cheese

Cheese (all types) is considered to be part of the five food groups and is listed in guideline 2 "Enjoy a wide variety of nutritious foods". However, recommendations about cheese are contradictory in places. For example, page 75 of the new guidelines says that the public should not avoid cheese as it has important health effects but should check food labels and select lower-sodium types. Both the guidelines summary and the educator guide, on the other hand, suggest that "full-fat cheese" intake be limited to 2 to 3 serves per week (pages 24 and 17). The latter recommendation is not in the Australian Dietary Guidelines and it is difficult to find any evidence base for it. All of the Evidence Statements that mention cheese relate to health benefits and the Dietary Modelling Report, which partly informed the recommendations, states that 3.5 serves of cheese a week were modelled for adults (page 33).

Following correspondence with the NHMRC, it appears that advice to limit "full-fat cheese" is included so that there is room in the diet for other "high fat dairy choices (>10g total fat/serve)" such as some types of Greek yogurt and sheep's milk (NHMRC personal communication).

Unfortunately, readers of the guidelines summary and the educator guide are not made aware that the restriction on cheese to 2 to 3 serves of cheese a week only applies if other "high fat" foods from the milk, yogurt, cheese and/or alternatives group are consumed.

What are these other "high fat" dairy foods and how widely are

they consumed? The "high fat" dairy choices alluded to in the NHMRC correspondence are a 250ml serve of sheep's milk and a 200g serve of Greek yogurt containing over 5g/100g fat – foods that are not even listed in the standard food composition tables for Australia (NUTTAB 2010). Sheep's milk is rarely consumed as a drink in Australia as it is mostly used to make cheese and yogurt, and sales of Greek-style yogurt with a fat content above 3g/100g accounted for only 6 per cent of yogurt sales by volume in 2012. Unlike lower fat yogurts which are often eaten alone, the Greek-style yogurts with the highest fat content tend to be used as a cream replacement or in cooking, so typical portion sizes are much lower than a standard yogurt serve size (200g).

In reality, few people appear to be consuming one half to 1.5 serves a week of non-cheese "high fat" foods from the milk, yogurt, cheese and/or alternatives group. Therefore, the NHMRC rationale for the advice to limit "full-fat cheese" to 2 to 3 serves per week does not appear to be applicable to Australian eating habits.

## Recommended drinks for children

The guidelines state "milk and water are the recommended drinks for children" (page 79). Flavoured milk continues to be considered part of the five food groups. The guidelines point out that flavoured milk provides nutrients but, as it can also be energy dense, "plain milk is preferable". It is important that users of these guidelines distinguish clearly between drinks to be limited (sugar-sweetened soft drinks, cordials, fruit drinks, vitamin waters, energy and sports drinks) and drinks to be encouraged (all types of milk and water).

## Other useful information

The dietary guidelines also recognise the importance of dairy foods in supplying key nutrients. For example, the educator guide states that "The foods in this group [milk, yogurt and cheese] are an excellent source of calcium; very few other foods in the Australian diet contain as much of this important nutrient. These foods are also a good source of other nutrients including protein, iodine, riboflavin and vitamin B12".

Also, a section on lactose intolerance (page 60) points out that up to 250ml of milk may be tolerated if it is broken up throughout the day and consumed with other foods and that cheese contains little lactose. It also says that the lactose in yogurt is partially broken down by bacteria, so would be easily tolerated. It also notes that lactose-free dairy products are available. Unfortunately this practical information is not included in the educator guide or summary. However, these documents do point out that there is no scientific link between milk and mucus production.

## Concluding comments

Under-consumption of milk, yogurt and cheese is widespread in Australia, with 6 out of 10 males and 7 out of 10 females aged 12 years and over not meeting the previous dairy food recommendations (2 daily serves for adults, 3 for teens). With the new Australian Dietary Guidelines recommending increased minimum recommended intakes for teens, adults and older adults, it is important to enhance efforts to change people's eating habits to accommodate more milk, yogurt, cheese and/or alternatives. The more Australians that achieve their minimum recommended intake of dairy foods, the greater the improvements in health and the lower healthcare costs will be. Doidge and colleagues (2012) reported that an estimated $2 billion in health care costs could be saved if Australians consumed the recommended amount of dairy foods. This is a figure comparable to the entire public health budget.

The new dietary guidelines provide many evidence-based recommendations. In particular, they summarise a body of research evidence and highlight the important role that dairy foods could play in addressing chronic diseases and some of the most important causes of death in Australia. The benefits of dairy foods are now acknowledged by the NHMRC to extend well beyond bone health. However, they have also missed an opportunity to improve the health of Australians and cut healthcare costs. In particular, they focus disproportionately on encouraging consumption of reduced-fat dairy foods and limiting cheese consumption, rather than translating the scientific evidence and addressing the real public health issue which is the under-consumption of milk, yogurt and cheese.

*Anita Lawrence is a nutrition science manager at Dairy Australia.*

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# READY-TO-EAT MEALS VIA HIGH PRESSURE THERMAL PROCESSING

*Innovative HPP processing technology is driving two new concept meals developed by CSIRO.*

**Words by** *Michelle K. Bull and Sandra A. Olivier*

Advances in high pressure processed (HPP) products, combined with the market push for ready-to-eat chilled meals, presents a unique opportunity for development.

High pressure processed products address the increasing consumer desire for convenience foods that are fresh tasting, reduced in chemical additives, microbiologically safe and have an extended shelf life. In Asia, Europe, the US and Australia, the number of commercial HPP products – including fruit juices, fruit preparations, yogurt smoothies, guacamole, salsa, oysters, RTE rice and sliced RTE poultry and meats – is steadily growing.

> *"The increasing consumer desire for convenience foods that are fresh tasting, reduced in chemical additives, microbiologically safe and have an extended shelf life"*

Although at present no HPP RTE meals have been commercialised in Australia, market data and projections for the chilled, RTE category, significant market growth opportunities for Australian food manufacturers exist. In the Asia Pacific region, the sector has grown by 11.5 per cent since 2009 and represents over $3b. In Europe, the RTE chilled meals category is valued at over $8b and has experienced 21 per cent growth since 2009.

At CSIRO's food processing centre in Werribee, Victoria, we have turned to high pressure thermal (HPT) processing to develop a validated concept RTE meals range with commercial potential.

The multi-component test products were developed in conjunction with food industry marketing specialist, Ken Melia of FOMO and were showcased at the International Nonthermal Food Processing Workshop, FIESTA 2012.

The focus of the range is superior quality characteristics, including colour, texture, and nutritional content, with an extended shelf life. The assessment of critical process criteria and shelf-life boundaries, targeting foodborne pathogens and spoilage microorganisms and quality traits, is continuing within the research program.

Preservation of low-acid foods (LAF) (pH >4.6) is traditionally achieved by thermal processing, which directly inactivates or prevents (in combination with other treatments) the growth of bacterial spores or vegetative microorganisms in the final product during normal conditions of distribution and storage. However, LAF that are microbiologically safe and stable are only obtainable by HPP when combined with a moderate thermal component. HPT processing can inactivate bacterial spores through high-pressure treatment at 600 MPa with initial temperatures above 60°C.

The advantage of HPT processing for RTE chilled meals lies in the reduced thermal load applied to products due to (1) reduced heating and cooling times achieved through rapid heating/cooling developed in the product during pressurisation and depressurisation, and potentially (2) reduced processing temperatures and/or times through synergistic effect of pressure and heat on spore inactivation. The accelerated and uniform heating and cooling of foods during HPT processing from the increase in temperature accompanying the physical compression of the product, facilitates delivery of heat to all food packs and reduces the need for excessively long heating times.

This results in improved food quality attributes, such as flavour, texture, nutrient content and colour, compared with thermal processing, as HPT products receive less heat damage HPT is, therefore, a potential alternative to conventional thermal processing to deliver quality benefits to a range of processed foods, such as chilled soups, sauces and multi-component meals with extended shelf-life.

## Basic HPT principles

As a food processing parameter, pressure acts very differently to temperature. Pressure is instantaneously transmitted to all points within a pressure vessel due to the isostatic principle, unlike thermal

processing where heat transfer relies on conduction and/or convection. Therefore, assuming uniform thermal distribution within a sample, process time is independent of sample size, shape or packaging material. Additionally, physical compression decreases the volume of a product which is accompanied by an increase in temperature.

The magnitude of temperature change within a product depends on its thermal expansion properties, density and specific heat capacity. Compression heating of water has been reported to range from 2.5, 3.0 and 5.3°C/100 MPa at initial temperatures of 15, 25 and 90°C. Fats and oils have higher thermal expansion coefficients, lower densities and lower specific heating capacities than water and increase 3.2 to 8.7°C/100 MPa at initial temperatures of 25°C. Product composition (especially heterogeneous or multi-component foods), initial product temperature and the applied pressure will all affect the increase in temperature developed in a pressurised product.

Spore inactivation by HPT processing is reliant on higher temperatures. Therefore it is therefore critical that temperature gradients throughout the vessel and the product are accounted for to achieve the minimum process performance in every product unit in the process.

## Spore inactivation by pressure

Of particular interest for chill stable LAF is the ability of a combined HPT process to inactivate spores of the major bacterial spore-forming pathogens of concern, which are the psychrotrophic, non-proteolytic *Clostridium botulinum*. HPT processed LAF with extended ambient shelf-life would need to have

*The Advertising Works.*

demonstrated safety with respect to proteolytic strains of *C. botulinum*. HPT processing conditions for the inactivation of non-proteolytic *C. botulinum* spores are more moderate than required for inactivation of proteolytic *C. botulinum*.

Interestingly, the pressure and heat resistance of bacterial spores does not necessarily correlate with their heat-only resistance. In our study of spore-forming spoilage-associated bacteria (Olivier et al., 2011) we found that two very heat resistant strains of *Bacillus amyloliquefaciens* and *Geobacillus stearothermophilus* were highly HPT-sensitive; conversely, a more heat sensitive *Bacillus coagulans* proved to be the most HPT-resistant strain under most HPT conditions studied.

The combination of high pressure and heat is often more effective than under equivalent heat-only conditions, i.e. synergistic, for various species, including *C. botulinum* (psychrotrophic and non-psychrotrophic strains), and relevant spoilage-associated sporeformers. The amount of synergy observed, however, is affected by both the product and the bacterial strain under observation. In our study of five proteolytic *C. botulinum* strains in three model food products, we observed strain to strain variation in the degree of synergy between high pressure and heat (Bull et al., 2009).

In another study, we demonstrated that inactivation of psychrotrophic *C. botulinum* spores by HPT processes (Fz90°C, 600 MPa 2.1-3.6 min) was greater, or at least approximately equivalent, to that achieved by thermal-only processes of nominally greater lethality (Fz90°C, 0.1 MPa 10 min), in media and model pea and carrot purees.

The mechanism of spore inactivation has been primarily studied in *Bacillus*

*subtilis*; high pressure initiates spore germination via at least two mechanisms: at moderately high pressures (50 – 300 MPa) and at very high pressures (400 – 800 MPa. At moderately high pressure, the spore nutrient receptors are activated and germination proceeds down the nutrient-triggered pathway. Very high pressures trigger the release of calcium dipicolinate acid (DPA), possibly by opening the DPA channels in the inner membrane or via another action on the inner membrane, and subsequent germination and heat sensitivity. An understanding of the physiological effects of HPT processing on spore inactivation would enable improvement of the efficacy of HPT treatments and process optimisation.

## Toward commercialisation

The thermal and pressure profiles of individual HP units vary, complicating direct comparisons of results of HPT microbiological and product quality studies from different research groups. Parameters affecting the pressure and temperature profiles include compression rate, maximum pressure, initial and maximum temperatures, pressure vessel size, compression fluid, vessel thermal insulation capabilities, packaging materials and pack sizes. Combined with these constraints, the lack of consistency of response to HPT conditions between strains of resistant microorganisms of public health significance, it is practical to take a case-by-case approach to demonstrating the safety of HPT processed foods.

*CSIRO is currently fielding inquiries from food manufacturers, equipment and packaging suppliers and retailers regarding co-development and commercialisation opportunities of the meals.*

*Michelle Bull and Sandra Olivier are research microbiologists in the Food and Industrial Microbiology Program at CSIRO Animal, Food and Health Sciences.*

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# BRIDGING THE GAP

*A frozen snack that started out as a healthy dessert is now being marketed as a breakfast option.*

**Words by** *Lynn Elsey*


Drew Harrington and Amanda Klane originally set out to create a frozen novelty, to fill what they viewed as a gap in the market.

But now the Boston (US) entrepreneurs have their eyes on a bigger, and healthier, slice of the market with a yogurt bar they say contains as much protein as an egg but less sugar than a cup of orange juice, fewer calories than a bowl of cereal with milk, less sodium than a slice of bread and as much calcium as a half a cup of milk.

In short– a new breakfast item.

Yasso bars were developed as a frozen treat that were low in fat, sugar and calories and high in protein. By selecting Greek style yogurt as the base ingredient, the duo encountered many challenges trying to create a product that would be creamy enough to eat and still taste good. They ended up partnering with staff at the Food Processing Center at the University of Nebraska-Lincoln (US) who helped develop a formula that allowed Greek-style yogurt to be frozen but still have an appropriate texture and taste.

The initial products – three 75g fruit flavoured Yasso bars with 6g of protein and zero fat – had just 70 calories (293kJ). The bars debuted in the northern spring of 2011 and quickly became a success.

Klane and Harrington then decided to re-work the recipe, with the help of the Nebraska scientists and feedback from their customers.

The new wave of gluten-free bars now contain 80 calories and come in a wider range of flavours, including coconut, mango and vanilla bean. The bars are sold at 15,000 stores across the US and, now being targeted as a breakfast option.

"You don't find many people picking up ice cream sandwiches for breakfast but we want to make a product that you can eat for breakfast that has the same amount of protein as an egg," Klane said.

Yasso has shunned much of the traditional sales and marketing angles (and budgets) and instead focuses on using social media, PR and sampling tours to promote their products. This allows them, a very small business, to be competitive in a market where many of other players are large, well-established companies.

Use of social media to establish rapport with their customers has been a key factor in everything from the development of new flavours to impressive sales.

"We would just throw out questions – 'what flavour would you like to see?' – and we would, within minutes, get hundreds and hundreds of comments about different flavours," Klane said.

Although many frozen products have fairly seasonal sales patterns, the Yasso bars sell well, year round. The company believes that the "healthy yet indulgent" marketing is what drives the consistency in sales.

Klane and Harrington are aware that market competition means that they need to continually innovate in order to stay ahead of the game, which involves adding new flavours and products, creating a loyalty program and also updating the packaging.

"Four years from now, there will be a lot of frozen Greek yogurts", Stuart Klane, Yasso head of sales said. "We want to be the best one."

# THE GIRL SCOUTS GAMBLE ON NUTRIENTS

*A decision to give cookies a "healthy' badge may backfire on the scouts.*

**Words by** *Lynn Elsey*

With an eye on the evolving snack food landscape, Girl Scouts USA have unveiled a cookie with what it claims has the nutritional value of fruit.

Until now, the cookie lineup – a key part of the scout's fund raising program – has been entirely based on traditional sweet concoctions. For nearly 100 years the cookies have been made to appeal to the public's sweet tooth with products such as Samoas (crisp cookies coated in caramel, sprinkled with toasted coconut and striped with dark chocolaty coating), Trefoils (traditional shortbread cookies) and the perennial favourite, Thin Mints (crispy chocolate wafers dipped in a mint chocolaty coating).

> *"If there was a badge for misleading marketing I'm afraid the Girl Scouts of the USA just earned it"*

But now the scouts are moving with the times and the market. The organisation engaged ABC Bakers to develop a new "healthier" option in response to consumer demand for "great-tasting cookies that also have health benefits".

The new cookies, Mango Crèmes (crunchy vanilla and coconut cookie with the mango-flavoured crème filling), are described as having "all the nutrient benefits of eating cranberries, pomegranates, oranges, grapes and strawberries". According to ABC, a three-cookie serving will provide 15 per cent of the RDA of vitamin B1 and 5 per cent for vitamins A, C, D and E.

The vitamin factor is derived from an infusion of GrandFusion, which is produced by NutriFusion, a South Carolina (US) based venture. According to the product description, the fusion is a blend of fruits and/or vegetables designed to increase the nutritional profile and marketability of food, beverage and snack products. NutriFusion claims that the product does not affect taste or functionality of foods and is 100 per cent natural. The company uses the whole of each fruit or vegetable, including peels and skin, in the concentrates, which it says allows a greater nutritional outcome.

The company says that it has special procedures and processing methods that result in highly concentrated fruit and vegetable powders with a high nutrient level. It also claims that its technology prevents much of the normal deteriorating process involved in manufacturing food products, including being subject to high temperatures, and provides an extended shelf life for certain products.

## Less than happy campers

The health-related claims of the new cookie are causing concern with a number of groups, including the Center for Science in the Public Interest.

The group said that the Girl Scouts shouldn't pretend that the new cookies are nutritionally equivalent to fruit, noting that they are "98 per cent white flour, sugar, palm oil and dextrose" and that the amounts of nutrients from the fruit concentrate "don't make the cookies remotely equivalent to fruit of any kind".

The executive director and director of nutrition policy of the CSPI have sent a letter to the CEO of the scouts, Anna Maria Chávez, encouraging her to stop promoting the new cookies as healthful and look for a "healthier" way to raise funds. In their letter they noted that the cookies contain 4 grams of "heart-disease-promoting" saturated fat and 11 grams of "tooth-decaying" sugars per three cookie serving.

"If there was a badge for misleading marketing I'm afraid the Girl Scouts of the USA just earned it," said Margo G. Wootan, the nutrition policy director of the CSPI.

*Lynn Elsey is the editor of food Australia. In her younger years she sold more Girl Scout cookies than she cares to remember.*

# UNCLE TOBY'S RESPONDS TO NEW STANDARDS

Following formalisation of the new Nutrition, Health and Related Claims Standard in December 2012, Uncle Toby's has announced that its entire range of 44 breakfast cereals now meets the nutritional requirements of the new standard.

According to nutrition manager Nilani Sritharan, Uncle Toby's has spent the past five years reformulating their products to reduce sat urated fat, sugar and sodium and increase wholegrain and fibre. Their cereals now use 67 tonnes less sugar and 2.5 tonnes less sodium while adding 193 tonnes of additional wholegrain.

Sritharan said that the company based many of their changes on the National Heart Foundation's Heart Tick criteria – when they started their reformulation process it wasn't clear what new requirements would be involved in the final health claims.

The changes required close collaboration among the company's different departments and involved making small, ongoing changes to formulations, to give their customers ample time to adjust.

> *"Their cereals now use 67 tonnes less sugar and 2.5 tonnes less sodium."*

Reducing sugar while ensuring that replacement ingredients didn't negatively affect the overall nutritional profile of the products was just one of the major challenges involved. Costs were also a consideration, in regards to how much consumers would be willing to spend for a healthier product.

"Our R&D team worked closely with the nutrition and commercial teams, especially in regards to sensory aspects, to ensure that the final product covered all the angles," Sritharan said.

# THE CHANGING FACE OF BREAKFAST

*Food producers are developing new products with an eye on an ever-changing and movable consumer.*

Australians can now sip their way through their morning cereal with the launch of liquid versions of the popular Nutri-Grain and Coco Pops.

The liquid cereals, which have just been launched by Kellogg's, are two of the new products the company has developed to address changing trends for eating breakfast.

According to Mintel, the US breakfast food market will increase to $15.7 billion in five years, with a strong movement towards consumers who want more portable and convenient to eat food products.

The beverages are made from 90 per cent "real" Australian low-fat milk and have around 10 per cent sugar, although Kellogg's says that the majority of the sugar comes from the natural sugar found in the milk.

A 250ml serving of Coco Pops Liquid Breakfast contains 740kJ, 9.8 grams of protein, 3.2 grams of fat and 150 mg of sodium. The Nutri-Grain liquid cereal has 700kJ with 9.5g protein, 3.0g fat, 137mg sodium.

The company is promoting both beverages as low in GI and high in fibre.

"We believe Kellogg's breakfast drinks offer a quick and easy, mess-free solution that can be enjoyed at home on on-the-go", said marketing director John Broome.

In the US, the company is also offering frozen sandwiches for breakfast. The frozen flatbread sandwiches, which come in three flavours – sausage, egg and cheese; ham, egg and cheese and egg with vegetables and cheese – are ready to be

microwaved for 90 seconds.

A spokesman for Kellogg Australia said that the new products would "definitely not" be launched in Australia.

## Cereals with "super" benefits

Victorian health food producer Goodness Superfoods has launched a new range of cereal products with claims of health and nutritional benefits.

The cereals all contain Barleymax, the CSIRO developed "super" grain with twice the dietary fibre of regular grains and four times the amount of resistant starch and low GI.

Along with Barleymax, the Protein 1st cereal contains golden syrup, soy flakes, wholegrain amaranth, honey and natural flavour. It is designed for youth and others who lead active lifestyles, "to help maintain new tissue and muscle". A 45g serving provides 8.7g of protein.

According to the company, Heart 1st helps lower cholesterol and enhances the immune system. The ingredients include soluble fibre beta-glucan, Barleymax, wholegrain rolled oat flakes, golden syrup, sweetened cranberries, sunflower oil, seeds, nuts and honey. A third cereal, Digestive 1st, contains sultanas, apple, honey and syrup along with Barleymax and is claimed to help those with sluggish digestive systems.

# KEEPING IT FRESH

*Anneline Padayachee, the first food scientist finalist in a national communication competition, is helping keep the importance of research in the public eye.*

**Words by** *Marea Martlew*

Research scientist, food technologist, nutritionist, personal trainer and health coach: 29-year-old Anneline Padayachee can rightly lay claim to all these titles. In October 2012 she added "Freshie" to this impressive list, joining a select group of young Australian scientists as a finalist in Fresh Science, the first food scientist to do so in the competition's 15 year old history.

Fresh Science is a national program funded by the commonwealth government, aimed at training young scientists in the art of clear communication so that their research can engage a broader audience.

"It was the best experience I've ever had and has opened up so many opportunities," Padayachee said.

The program targets emerging scientists whose research, although published in peer reviewed journals, had yet to gain a broader audience or media coverage.

Padayachee, a professional member of AIFST, admits to being slightly overwhelmed by the public response to her research, involving nutrients found in black carrots, generated by her participation in Fresh Science.

"I had to start a Facebook page to answer nutrition enquiries and I was working as a contract food technologist at OneHarvest [ a Brisbane based company specialising in supplying fresh produce to supermarkets] and some children in a visiting school group recognised me as the 'Black Carrot Doctor' from my appearance on the ABCs Midday Report. That really amazed me," she laughed.

Based at the Centre of Nutrition and Food Sciences, a division of the Queensland Alliance for Agriculture and Food Innovations located at the University of Queensland (UQ), Padayachee worked on a collaborative project involving the ARC Centre of Excellence in Plant Cell Walls and CSIRO. The study, a world-first, found that up to 80 per cent of antioxidant polyphenols, which have demonstrated anti-cancer behaviour, bind to the fibre component in fruits and vegetables during cell breakage, caused by chewing, juicing, pureeing etc. Fibre not only helps keep the gut clean but delivers the polyphenols to the colon where they are released, playing a vital role in bowel cancer prevention. Black carrots, the forerunner to the now more common orange variety, are rich in polyphenols and were used as the model system by Padayachee.

"I really believe in my research so if I can get anyone else interested in terms they can understand then I feel I've done a good job," she added.

"I'm really pleased that the media picked up on the main message I wanted to get across about the importance of consuming everything (when eating fruits and vegetables), not just the juice, but the fibrous pulp as well," Padayachee said.

The outcomes from Padayachee's PhD research and her ability to engage with a panel of science media experts earned her a Queensland state finalist berth in the Fresh Science competition and, ultimately, a place in the finals.

> *"The process really forces you to get down to the essence of the research you're doing"*

"We learnt the basics of media releases and met journalists as part of a two day workshop for state finalists. This was followed up by intensive media training in Melbourne with journalists and science communicators for the 12 national finalists," Padayachee said.

"It was a fantastic experience and I'd really encourage students to give it [Fresh Science] a go. The process really forces you to get down to the essence of the research you're doing," she said.

## A Passion for Food

Padayachee, who migrated to Australia with her family from South Africa at the age of five, credits her family as a big influence on her attitude towards healthy food choices and appreciation of different food flavours and textures.

"Food has always been a central part of my family … Whilst my family were not nutritionists they liked us to eat

well," she said.

Padayachee's passion for food science was ignited at high school when she was introduced to the concepts of food chemistry in a home economics class.

"I came alive and found the subject so interesting. Then I did work experience with a dietitian in a hospital, which didn't really appeal to me. But another stint of work experience with a food technologist at food equipment manufacturer Heat and Control really left me wanting to know more. I remember she was making chocolate topping and garlic flavoured nuts and I found the science behind it fascinating," Padayachee said.

Still, when it came to choosing an undergraduate degree she was torn between studying food science and studying nutrition. In the end a bachelor of applied science at the University of Queensland fulfilled both ambitions, combining the two disciplines and, ultimately, leading to a doctorate in nutritional food science in July 2012.

Padayachee's supervisor at UQ and nominator for Fresh Science, Mike Gidley, is the director of the Centre for Nutrition and Food Sciences. He said that her passion for communicating nutrition developed as her research project unfolded.

"Anneline has an engaging presentation style coupled with an infectious enthusiasm for communicating the benefits of healthy food choices," Gidley said.

As both a registered nutritionist and qualified personal trainer and fitness instructor Padayachee takes her role as an educator and health coach seriously, advising clients with chronic health issues such as diabetes and obesity.

If that is not enough, the talented researcher has also found time to present her research findings at AIFST and IUFoST conferences and symposia. She is currently on the organising committee for the Nutrition Society of Australia's national conference being held in Brisbane in 2013.

Having decided to take time out from research to consider her future career, Padayachee is currently lecturing in nutrition at a private college and is involved in Healthshare, an online health information network. She is sure that the lure of research will lead her back to academia.

"I think it's important to take time out to think about where you want to take your career. Now I feel I'm definitely ready to go back to research. When you are doing your PhD it drives you nuts by the end but it also opened up so many possibilities and raised so many questions that I'd like to answer," she said.

Padayachee is interested in broadening her research to include other nutrients and to unlocking the mechanisms behind how nutrients create a protective environment against diseases such as colorectal cancer. A firm believer in the development of functional foods, Padayachee believes that the Australian food industry has a very important role in developing healthy foods that consumers want and is proud of the fact that One Harvest is starting to use black carrots in their salads.

In the meantime, as a Fresh Science finalist she will be writing about her research for the general science publication *Australasian Science*, further honing her communication skills and getting the message out about the importance, and excitement, of scientific research to our everyday lives. By doing so she will be adding the titles of science communicator and role model to a growing list of achievements.

*Marea Martlew is a science communicator at The University of Technology Sydney (UTS) and also lectures in advanced science communication.*

# FUNCTIONAL FOODS ROUNDUP

*The continued growth of Greek-style yogurt products and the appearance of oats in beverages are two of the new trends in the market.*

**Words by** *Ranjan Sharma*

## Oats making inroads into beverages

Oats as flakes or flour have traditionally been used in breakfast cereals, bakery and confectionery products. To a limited extent, oats in the form of granola have been successfully marketed as toppings for yogurt. However, recent trends suggest oats are now making inroads into functional beverages. Examples include oat-based smoothies, juices and milks, marketed as fibre-rich, grab-and-go breakfasts or as meals for busy people. In addition to claims such as "natural" these beverages boast benefits such as "reducing cholesterol and aiding digestion".

Oatworks, one of the new beverages, was launched last year in US. The oat and fruit smoothies contains 100 per cent real fruit juice, puree with no added sugar and PromOat, a proprietary water-soluble oat fibre ingredient from Sweden. Each 10.8oz (320ml) bottle of Oatworks contains essential vitamins and minerals in addition to 2g of soluble fibre, equivalent to approximately two bowls of oatmeal. It is marketed as a natural fruit smoothie with the goodness of oatmeal.

Another thick and creamy product launched last year, Simpli OatShake is being marketed as a non-dairy drink made from oat flakes. This 8.4oz (250ml) low-fat smoothie contains 1g of dietary fibre and comes in chocolate, coffee and tropical fruit flavours. Another oat-based drink, Naturally Oatstanding, was launched to target younger generation to encourage healthy beverage drinking habits. Considerably thinner than a fruit smoothie it has 40 calories and 3 grams of fibre per 12oz bottle (355ml), and is available in apple, grape, mango, peach and raspberry flavours.


One of the main drivers for the success of these beverages has been the awareness of the health benefits of oats and the marketers' ability to communicate recently approved cholesterol-reducing health claim for oat-based ingredients. The key component responsible for the cholesterol reduction is beta glucan, the soluble fibre that is abundantly present in oats.

Studies have shown a direct correlation between the amount of beta glucan and the reduction in blood cholesterol. When oats are treated with enzymes that destroy beta-glucan, the cholesterol-lowering potential of oats dissipates. One of the mechanisms for the cholesterol lowering effect of oats involves the formation of a viscous gel by beta glucan, which binds bile acids and increases their excretion within the faeces. However, there may be additional ways in which oats lower cholesterol.

The cholesterol-related health claim for oat fibre has also been approved in Australia and New Zealand. Under Food Standards Code 1.2.7, products low in saturated fatty acids containing 3g of beta-glucan per day are allowed to make cholesterol reduction health claim provided the food contains at least 1g beta glucan per serving from oat bran and/or wholegrain oats. Although breakfast products with oats have been widely marketed with health claims throughout Australia, opportunities exist for the introduction of drinking beverages with oat fibre ingredients such as beta glucan.

Overall, functional health and wellness products in Australia continue to be in high demand and the oat-based beverages offer a unique proposition for marketers as they capture the traditionally healthy image of oats (i.e. from porridge) and align them with current consumer desire for convenience and taste.

## "Greek" dominates new product launches

In the new food products area, product launches with the word "Greek" seem to be dominating.

The growth of the Greek yogurt in the US and worldwide can largely be attributed to success of the Chobani brand which was launched in Australia last year. Danone, the biggest yogurt manufacturer in the world, has now joined in the race with Greek yogurt offerings.

However, it has been caught up in a legal battle between Greek company Fage and US company Chobani for the use of the word "Greek" in yogurts which are not manufactured in Greece. In order to comply with the court orders, Danone has ceased labelling the work "Greek" on its recently launched yogurt Danio in UK. It appears that in the short term, a ruling in favour of Fage may have some impact on new product launches with the word "Greek" especially in UK and Europe.

Danone has launched a high protein yogurt, Silhouette, in Canada with an eye on weight management. According to Danone, while many women are still not satisfied with their weight, they want to strike a balance between eating right (e.g., to lose weight) and eating enjoyably. These women are looking for more natural, nutrient-dense products with fewer empty calories. Danone Silhouette Greek yogurt comes with no added sugar and twice the protein with only 50 calories per 100g serving.

Chobani has launched two new Greek yogurt products in the US. With an eye on weight loss, Chobani Bite is a 3.5oz (100g) cup of blended Greek non-fat and low-fat yogurt available in four flavours: fig with caramel zest, caramel with pineapple, coffee with dark chocolate chips and raspberry with dark chocolate chips. Chobani has also launched a new product called Flip, which allows the consumers to flip the lid and add bold, delicious mix-ins to strained Greek yogurt. Although twin portion packaging for yogurt and topping such as fruit and cereal has been available in the market for quite some time, Chobani has extended the simply concept to Greek-style yogurt.


Greek-labelled yogurt has also moved into the frozen foods aisle with the launch of Healthy Choice frozen yogurt by ConAgra in US. The frozen yogurt contains 100 calories per cup and is available in four flavours — strawberry, vanilla bean, raspberry and blueberry.

Other products include Greek-style cream cheese from Franklin Foods in the US, which claims to be first of its kind and contains twice the protein and half the fat of regular cream cheese, plus live and active cultures, and a breakfast cereal containing whole grain flakes and crunchy granola clusters coated with Greek-style yogurt.

Ingredient suppliers have also noted the success of the Greek yogurt. Danish-Swedish company Arla Foods has launched protein powder Nutrilac, which it says will enable yogurt manufacturers to produce Greek-style yogurts on its existing plant, with dramatically reduced levels of wastage. Sales of Greek and Greek-style yoghurts are soaring globally according to Arla. But the specialist equipment usually needed to make Greek-style yogurt and the low yields per kilogram of milk required are major barriers to entry into the market for dairy companies. According to Arla Foods, Nutrilac allows companies to get thick Greek-like yogurt consistency at a lower cost than the traditional method.

Ranjan Sharma, the editor of Functional Foods Weekly, www.functionalfoods.biz, has more than 20 years experience in food research, innovation and commercialisation.

# QUESTIONING WHOLE GRAIN GUIDELINES

*A new study critiques some of the commonly-used benchmarks for whole grains.*

**Words by** *Lynn Elsey*

A new study has found that many of the commonly used guidelines in the US for whole grain products are not doing the job.

The Harvard study, "Identifying whole grain foods: a comparison of different approaches for selecting more healthful whole grain products" determined that many of the current standards for earmarking whole grain foods in the US are confusing and misleading to consumers, policy makers and organisations.

The study concluded that out of five commonly-used US industry and governmental guidelines for grain products, only one – the 10:1 ratio (the ratio of carbohydrates to fibre), which is recommended by the American Association – offers a potentially useful option for identifying healthy whole grain products.

## Background

Researchers at the Harvard School of Public Health were concerned that the rapidly increasing interest in whole grain (WG) food products by consumers around the globe had not been matched by efforts to provide helpful and healthful standards related to their appearance and marketing, leading to potential confusion and mis-information.

"In 2010, the number of new grains marketed as WG was nearly 20 times higher than the number introduced in 2000. The global market for WG foods is expected to exceed $US 24 billion by 2015.

"Remarkably, this formulation, marketing and promotion of 'whole grain' foods has come with relatively little standardization to assist individuals and organizations in identifying and selecting healthful WG options," the authors say.

The researchers were also concerned that whole grain products adhering to health claims are often based on the whole grain factor alone and do not include any limitations or guidelines on sugar, sodium, energy or trans fats. They also noted that there are few regulations for products that aren't promoted with a health claim in regards to how the term "whole grain" can be used or defined.

By questioning some of the widely-used whole grain guides to identify healthful products – including the whole grain stamp – the authors invoked the ire of some involved with those schemes, including the Whole Grain Council, an influential US industry sponsored and funded organisation.

> *"The only program that can potentially improve public health is one that is widely adopted and used"*

## The study

The study involved a selection of 545 grain products found at two US grocers (Wal-Mart and Stop & Shop). The researchers grouped the products into eight categories: bread, bagels, English muffins, cereal, crackers, cereal bars, granola bars and chips. Nutritional content, ingredients and the presence or absence of the whole grain stamp on the products was collected and analysed.

The products were categorised by different whole grain criteria including the WG stamp; whole grain as the first ingredient; whole grain as the first ingredient without added sugar; the word "whole" before any grain in the ingredients and a carbohydrate to fibre ratio.

They then investigated the association of each of the criteria with health-related characteristics including fibre, sugar, sodium, energy, trans-fat and price.

Their findings showed that the 10:1 ratio provided the best indicator of healthfulness (higher in fibre, lower in trans fats, sugar and sodium and lower in calories).

They also found that the other four commonly used guidelines – any whole grain as the first listed ingredients (recommended by the USDA and FDA); any whole grain as the first ingredient without added sugar (USDA); the word "whole" before any grain (USDA) and the Whole Grain Stamp (created by the Whole Grain Council, signaling products that contain at least 8g of whole grains per serving) – did not necessarily indicate that the product was healthy.

## The fallout

The Whole Grains Council has criticised the study, claiming it does not fairly represent the whole grain stamp and is based on an outdated and inaccurate definition of whole grains.

The group's whole grain stamp is one of the most widely used front-of-package symbols in the US and internationally. The stamp is currently found in 36 countries worldwide, including Australia. It appears on more than 8,000 different products, according to the Whole Grain Council.

The council's director of food and nutrition strategy, Cynthia Harriman,


said that the stamp was never intended to indicate the healthiness of products. Additionally the group feels that its widespread adoption adds more weight to their product.

However, a statement from the organisation says that "The only program that can potentially improve public health is one that is widely adopted and used," before documenting the wide usage of the stamp both in the US and overseas.

The Harvard School of Public Health study was published ahead of printing in *Public Health Nutrition* (doi: 10.1017/S1368980012005447).

*Lynn Elsey is editor of food Australia.*

# TASTE A MATTER OF PERCEPTION

In a boost to those marketing "healthy" products, a team of researchers has found that women rate food identified as "healthy" as better tasting than "unhealthy", even though they are eating the identical product.

The researchers also found that branding a food as "healthy" encouraged those trying to restrict their caloric intake to increase consumption.

The study, which was undertaken by Kevin Cavanagh and Catherine Forestell, psychology department at the College of William and Mary, Virginia (US), sought to investigate the impact of brands on consumption and flavour perceptions.

It involved providing women with cookies labeled with either a "healthy" brand name (Kashi) or "unhealthy" (Nabisco). All participants rated the healthier brand of cookie as more satisfying and having a better taste and flavour than those branded as unhealthy, even though the cookies were the same.

The study also found that those who were restricting their diet consumed more of the cookies that were tagged with the healthier brand and less when they thought they were the unhealthy brand.

"Developing an understanding of the factors that moderate both food choice and food intake is important from both a health and marketing perspective," Forestell said. She also said that the study suggested that "healthful" brands might actually confuse those who are trying to restrict their calories.

The researchers concluded that "food-related beliefs do influence consumers intake, especially that of restrained eaters. Further research is warranted to investigate these beliefs in order to improve recommendations for healthful eating in a society facing an increased prevalence of overeating and obesity."

The research, "The Effect of Brand Names on Flavor Perception and Consumption in Restrained and Unrestrained Eaters", has been published in *Food Quality and Preference* (doi: 10.1016/j.foodqual.2012.12.004).

# A HEALTHIER PUFFED RICE

A new extrusion process has the potential to produce puffed rice with triple the protein and significant amounts of other nutrients.

Scientists at Cornell University wanted to find a way to cut down on the loss of nutrients during the normal commercial puffed rice process, which uses steam extrusion (rice flour mixed with water is extruded through a narrow opening at high temperatures and pressure) to make the rice to puff up.

In response, they have developed a process called supercritical fluid extrusion (SCFX), which decreases the loss of nutrients and also enriches the rice with protein and other nutrients.

The process uses supercritical carbon dioxide (SC–$CO_2$) to create shelf-stable puffed rice. It allows the production of products with good textural qualities at lower temperatures ( 100°C) than currently occur in the conventional steam-based extrusion, which requires temperatures from 130-180°C.

The new puffed rice contains eight per cent dietary fibre and 21.5 per cent protein. It also provides iron, zinc, vitamins A and C up to their US recommended daily values (100g). The process allows for retention of all added minerals, 55 to 58 per cent of vitamin A and 64 to 76 per cent of vitamin C. The researchers concluded that the extrusion process was an effective approach for producing cereal grain-based, low moisture products that were fortified with protein and a range of micronutrients without compromising the sensory or nutritional qualities.

They noted that these types of products were ideal for breakfast cereals, snack foods and nutrition bars.

The study has been published in the *Journal of Agricultural and Food Chemistry* (doi: 10.1021/jf3034804).

# HEALTHY DRINKING

Health and wellness beverages are tipped to outperform traditional soft and hot drinks over the next three years, according to Euromonitor.

The US company said new research found that "healthy" beverages now make up 44 per cent of sales in the non-alcoholic beverage market, with "naturally healthy" drinks comprising 64 per cent of the category.

It also found that although low calorie products are important to consumers, they also are seeking out healthy beverages with functional attributes.

# DIARY

## AUSTRALIA & NEW ZEALAND 2013

April 3-4. **AIFST Food Microbiology Rapid Methods Update Wet Workshop and Seminar.** Deakin University, Burwood Campus. Visit www.aifst.com.au for more information.

April 8. **Think Food.** SA tradeshow for food producers and industry. Banquet Room, Adelaide Festival Centre. Visit foodsouthaustralia.com.au for more details.

April 8-11. **Retort Supervisor's Course.** GoTAFE, Shepparton. Visit www.foodstream.com.au for more information.

April 14-16. **Fine Food WA.** Perth Convention and Exhibition Centre. Visit www.finefoodwesternaustralia.com.au for more information.

April 29-3 May. **Approved Persons Course for Thermal Processing of Low-Acid Foods.** CSIRO Animal Food and Health Sciences, Werribee, Vic. Visit www.csiro.au for more information.

May 1. **"Choc-o-Block" Conference.** The Australian Society of Baking conference. Bayview Eden, Melbourne. Visit www.aifst.com.au for details.

May 7-10. **AUSPACK PLUS.** Sydney Showgrounds, Sydney Olympic Park. The biennial packaging and processing machinery and materials exhibition in Australia. Visit www.auspackplus.com.au for more information.

May 14-15. **ConTech 2013 Group Confectionery and Food Sector Technical Conference.** Hilton on the Park, Melbourne. Visit www.aigroup.com.au for more details.

May 23-25. **AUSVEG 2012 National Convention.** Adelaide Convention Centre. The annual convention, trade show and awards for excellence event. Visit www.ausveg.com.au for more information.

May 24-26. **The Food Show Wellington.** Westpac Stadium, Wellington, NZ. Visit www. foodshow.co.nz for more details.

June 11-13. **PMA Fresh Connections 2013.** Sydney Convention and Exhibition Centre. Visit www.pmafreshconnections.com.au for more details.

June 24-25. **Lunch! Sydney.** Royal Hall of Industries, Moore Park. Industry event for the food-to-go market. Visit www.lunchshow.com.au for more details.

July 2-4. **NZIFST Annual Convention.** "Time for Action". Hawke's Bay, NZ. Visit www.nzifst.org.nz for more details.

July 14-16. **The 46th Annual AIFST Convention.** Brisbane Convention and Exhibition Centre. Visit www.aifst.asn.au/convention for more information.

August 12-13. **Lunch! Melbourne.** Melbourne Convention and Exhibition Centre. Industry event for the food-to-go market. Visit www.lunchshow.com.au for more information.

August 12-14. **Food and Feed Extrusion Course.** Bribie Island, Qld. Visit www.foodstream.com.au for more details.

September 9-12 . **Fine Food Australia.** Sydney Convention and Exhibition Centre, Sydney, NSW. Visit www.finefoodaustralia.com.au for details.

## INTERNATIONAL 2013

April 28-30. **Food Hydrocolloid Conference 2013.** Charleston, South Carolina, US. Theme: Sustainability, Functionality and Awareness". Visit hydrocolloid.com/conferences/conferen.asp for more details.

May 7-9. **Fi Istanbul** Shanghai New International Expo Center. Theme: "Revealing Food Innovations in Asia". The annual food and beverage event will be co-located with Wine World Shanghai. Visit www.sialchina.com for more information.

May 7-9. **SIAL China** 2013. Istanbul Convention & Exhibition Centre, Turkey. A new event for food and beverage companies from Turkey and other countries in South East Europe, the Middle East and North Africa. Visit www.ingredientsnetwork.com for more information.

May 7-9. **Distinctive Nutrition Asia Expo.** Shanghai New International Expo Centre. Visit www.dna-expo.com for more information.

May 15-17. **2nd International Pharma-Nutrition,** Singapore. Visit www.pharma-nutrition.com for details.

May 15-17. **International Association of Food Protection European Symposium on Food Safety**. Marseilles, France. Visit www.foodprotection.org for details.

May 24-26. **FoodAgro Africa 2013.** Dar-Es-Salaam, Tanzania. The 17th annual trade exhibition includes exhibitors from more than 30 countries. Visit www.foodagroafrica.com for more details.

May 16-17. **2nd World Conference on Sugar, Salt and Saturated Fat Reduction Strategies.** Paris, France. Visit www.wso-site.com for more details.

May 17. **5th World Congress on Stevia.** Paris, France. Theme: Stevia Tasteful 2013 - Food and Beverages Formulation: The Subtle Balance. Visit www.wso-site.com for more information.

July 8-9. **International Conference on Food Processing and Technology.** London, UK. Visit www.waset.org for more information.

July 13-16. **The US Institute of Food Technologists Annual Meeting,** Chicago, US. Visit www.ift.org for more details.

September 9-11. **13th ASEAN Food Conference.** Singapore. Visit www.sifst.orgsg for more details.

September 11-13. **Food Ingredients Asia.** Bangkok, Thailand, Visit www.ingredientsnetwork.com for more details.

September 16-20. **drinktec 2013.** New Munich Trade Fair Centre. Munich, Germany. Web: www.drinktec.com.

October 5-9. **Anuga.** Cologne, Germany. "Taste the Future". Visit www.anuga.com for more information.

# NOBEL SECRETS

Last year, Franz Messerli, the Swiss-born director of hypertension program at St Luke's-Roosevelt Hospital and Columbia University in New York, published a slightly tongue-in-cheek paper in the *New England Journal of Medicine*, linking chocolate consumption with winning Nobel prizes.

Messerli found a correlation between a country's level of chocolate consumption and the number of Nobel laureates per capita. Switzerland came out on top – both in number of laureates and chocolate consumption – closely followed by Sweden and Denmark.

"Since chocolate consumption has been documented to improve cognitive function, it seems most likely that in a dose-dependent way, chocolate intake provides the abundant fertile ground needed for the sprouting of Nobel laureates," Messerli said in the paper.

He also noted that the link did not prove causation between the two.

And now a team of British researchers has reported that drinking milk is related to winning Nobel prizes. The scientists, from Gloucester Royal Hospital in the UK, analysed milk consumption data from 22 countries and discovered that Sweden had the highest rate of milk and dairy product consumption per capita (340 kg per year) and also the highest rate of Nobel Prize winners (33 per 10 million population).

Switzerland, which followed closely behind with an average dairy consumption of 300 kg, has produced 32 laureates (per 10 million). China, with no Nobel winners, had the lowest dairy consumption with just 25kg per person.

Results of the Nobel milk study were published in a letter in the January 2013 issue of *Practical Neurology.*

The researchers noted (as Messerli did) that although they found an association between dairy and Nobel laureates, this did not prove a cause and effect relationship.

The authors said that the higher levels of dairy consumption could be a reflection of a strong educational system but also suggested that the flavonoid content in chocolate might increase brain function.

"So to improve your chances of winning Nobel Prizes you should not only eat more chocolate but perhaps drink milk, too: or strive for synergy with hot chocolate," the authors concluded.


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