

DECEMBER 2020/JANUARY 2021

# Food New Zealand

NZ'S AUTHORITY ON FOOD TECHNOLOGY, RESEARCH AND MANUFACTURING

## FEATURED IN THIS ISSUE:

**Technical Services for food companies - Overview**

**Antioxidants for food - natural alternatives**

**New tricks for fermentation microbes**

**NZIFST Awards citations**

## **SUPERMARKET STUDY - A GAME CHANGER FOR OUR INDUSTRY**

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NZ'S AUTHORITY ON FOOD TECHNOLOGY, RESEARCH AND MANUFACTURING

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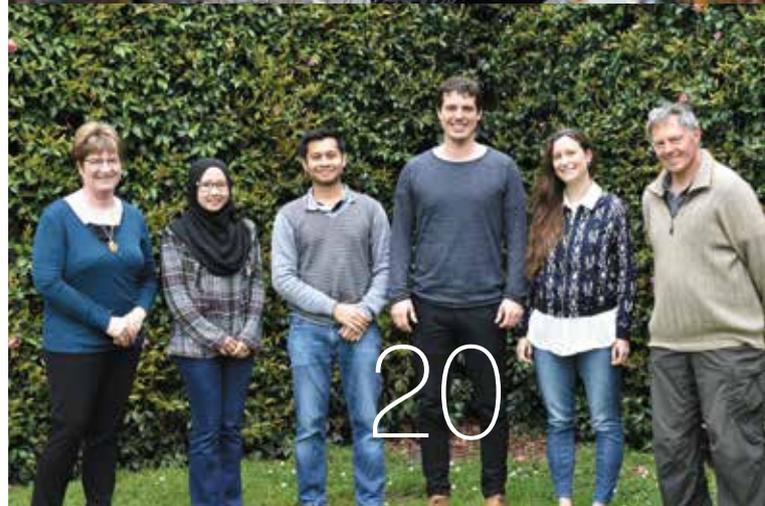
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**On the cover**

The government initiated Supermarket Study aims to determine if consumers are paying a fair price for food. Its broad parameters will also review how supermarkets interact with suppliers in determining the prices of food. See page 7.



**Next editorial and advertising deadline:** January 25, 2021

**Features for February/March 2021**

Overview: Laboratory Consumables and equipment, rapid analysis technologies and instrumentation

# EDITORIAL

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## Sugar

I used to quite like watching Nigel Latta on TV. He seemed refreshingly common-sensical on the topic of human psychology and human relationships.

Then he continued the morph from psychologist to TV presenter and strayed into far fields. He lost me when he did a show on sugar and concluded that sugar is toxic. I have struggled to see the sensible, dispassionate observer since.

I do have to admit I am well beyond my own expertise here too – so treat these lines as thoughts and opinions designed to stimulate thoughts and opinions. This is not Class 1 fact here.

### Is sugar toxic? Really?

If you took Thaddeus Thwaites, a field labourer of 1770, and gave him a tablespoon of refined sugar with his meal each lunch time you may well be looking at a health food. If you do the same thing to his middle age spreading lazy descendent Thierry Thwaites working at a desk today, then you have excess: you push Thierry one inch closer to obesity and its attendant disease risks. But it is the same sugar. Dietary context is important.

If you take that same X grams of glucose and fructose as orange juice to finish off breakfast then what? You get a wealth of other nutrients with the carbs, you feed a glycogen-depleted body. The balance of benefits changes. Meal context is important.

What is the difference between 100 calories of fully gelatinised starch in hot potato or 100 calories in fresh white bread or 100 calories of sugar? Nothing in energy content. So why is sugar the evil one?

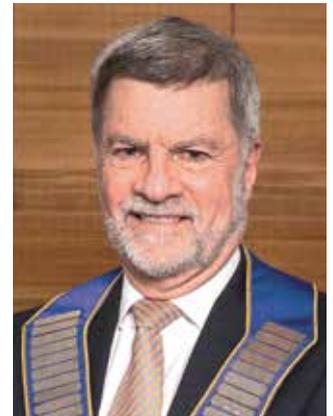
Food Technologists (and cooks, of course) find sugar very useful. It drags down water activity and amplifies fruity flavours, helps give mouthfeel and stops soft drinks freezing when put on ice. It can make food safer. It is the heart of most confectionery. And it can be bought nearly pure very cheaply. It is even natural!

But it is bad in our modern context. The surfeit in energy is bad. Fructose repeatedly deluging the liver is bad. The glycaemic assault, time after time is very tough on insulin receptors. Soft drinks with 10% sugar can wear down a metabolism with repeated assaults. Some people even seem to develop a dependency, whether psychological or physiological.

Sugar is not fundamental to much real food – a clever Food Technologist can do without it in many places. But it is fundamental to treats. In my book, carbonated sugary drinks are treats. The problem is mostly about how can we relocate our treats, now so affordable and so available, back into their boxes and consumed rarely and in moderation?

The key to all this is the purchase decision in the supermarket. If a product is not bought then it cannot be consumed. We spend most of our Food Technological time and skill making sure it is bought – although more and more of us are now using our skills to make sure the sugar-free variety is bought instead. Can we take credit for this shift? Not likely. Low sugar has become trendy amongst those who can afford it.

Each of us has a different job. Each of us influences society differently. We have the scientific ability to read nutrition literature with a more discerning eye than most. We can interpret ropery literature better than most. We must make up our own minds and direct our own careers to achieve our own version of what is good for our fellow consumers. Is sugar toxic? You decide.



*Richard Archer, President  
NZIFST*

**Richard Archer, President NZIFST**

# In-Brief

In Brief is Food New Zealand's pick of the news stories about NZIFST members, about companies with relationships with NZIFST plus items that catch our interest.

Discover commercial potential

## THE FOODPILOT

**New service scans journals, patents and conferences for new technology**

Do you ever worry that you are missing out? That your competitors are working on some hot new technology that has passed you by? How can you keep up with the 300 journals that publish on food related topics, or make sense of new patents or attend all those conferences?

The FoodPilot at Massey University has started a new technology scanning service for food companies which scans journals, patents and conference proceedings.

Technology advances occur continuously. Universities, research institutes, equipment suppliers around the world are working and publishing in one manner or another. But it is difficult to know how to hear about it early - and immensely difficult to pick winners.

Often the best new technology comes from fields unrelated to food processing. Those are quick wins – mature technology, affordable, understood and available – just new to food.

Is there a new technology that you could use? Maybe a process using specific gases in bubbles of a few tens of microns across to control viscosity, a novel, reduced-pressure microwave drying technology, or a method to simplify the removal of labels from recycled beverage bottles? Researchers are making advances in ultrasonic techniques to increase the aging rate of spirits and wine and in technology to reduce the mineral content of sugar solutions.

Synthetic meat has had much press recently, but researchers have also proposed synthetic production of a colostrum analogue. Some organisations report advances in solvent-types for extraction of valuable compounds from grape marc. The examples are many.

The FoodPilot's new technology scanning service for food companies has access to journals, patents and conference proceedings. We can do a one-off technology search and analysis to "plug a gap". We can set up a routine periodic scan of your specified field(s) or an automated alert system. In addition, we have experts in the know and well-placed to identify technology advances matched to your fields of interest.

If you are interested, please contact Nikki Middleditch at the FoodPilot, in confidence, to discuss how this service can assist you. Nikki can work out what exactly you want and arrange something you can afford. [N.Middleditch@massey.ac.nz]



Technology scanning service contact, Nikki Middleditch



### Sustainable Palm Oil

#### World Wildlife Fund features DuPont Nutrition & Biosciences case study to support responsible palm oil

The World Wildlife Fund (WWF) recently published over 30 case studies documenting industry efforts to transition to 100% sustainable palm oil.

Since 2004, DuPont N&B has been an industry leader in developing sustainable solutions to palm oil production. The company was the first ingredient manufacturer to join RSPO and has since advocated for inclusive collaborations to transform the palm oil industry. By highlighting DuPont N&B's efforts, the WWF aims to inspire the collective action required for responsible palm oil production, trade, and consumption.

In line with the WWF's vision for the responsible production of palm

oil, DuPont N&B is now working towards its 2025 goal of achieving 100% physical certified sustainable palm of grade Mass Balance or above, alongside the phasing out of RSPO credits globally. In 2020, DuPont N&B achieved a key milestone by sourcing 100% physical RSPO certified palm oil and derivatives for its emulsifiers produced in Europe and North America.

In addition to sourcing certified raw materials, DuPont N&B has achieved significant progress in developing transparent and responsible supply chains, striving for 100 percent traceability to the mill within the next five years and implementing supplier scorecards.

DuPont N&B has joined with over 560 other companies as signatories of the Business for Nature's Call To Action. This collective is calling on governments around the world to adopt policies to reverse nature loss in the next ten years.

### OCEANIA FOODS Conference Proceedings available

The Food and Agriculture Organisation (FAO) of the United Nations has published the proceedings of the last OCEANIAFOODS Conference held in Auckland last year. The Conference proceedings titled "Smarter Data 2016 – Food Composition in this Digital Age", provide 20 presentations on collecting, collating, management and use of food composition data in South Pacific region from a

distinguished group of international and regional local speakers.

The conference, was organised by Plant & Food Research as an aspect of its role as OCEANIAFOODS regional co-ordinator for INFOODS, which is the UN-FAO NGO overseeing international support for food composition data. You can access the proceedings [here](#).

# Supermarket study –

## a game-changer

### Katherine Rich, Chief Executive NZFGC

The Government-ordered market study by the Commerce Commission into supermarkets is a game-changer for the supplier industry. It will also result in more transparency for shoppers.

Here's why.

It's clear from the announcement by Commerce and Consumer Affairs Minister David Clark that he understands the issues involved.

While talking about Kiwis "getting a fair deal at the checkout" he acknowledged the issues involved: *we have one of the most concentrated retail grocery markets in the world* (though I would say THE most concentrated), *and indicators suggest that competition in the sector has weakened over time.*

The study, he said, would look at whether the sector is as competitive as it could be, including "whether there are issues affecting competition, potentially leading to recommendations that could ensure the weekly shop is gentler on the household budget."

He added: "If issues affecting competition are identified ... the Government will consider the necessary changes to bring about better outcomes for consumers."

Though he didn't elaborate on exactly what those "necessary changes" might mean, he said in a later television interview that if the industry practices were stopping competitors coming in, the Government could act. He pointed out that "many suspicions" about supermarket behaviour arise from having two major players dominating most of the market.

The terms of reference for the study include, but are not restricted to:

- the structure of the grocery industry at the wholesale and retail levels
- the nature of competition at the wholesale and retail levels
- the pricing practices of the major retailers
- the grocery procurement practices of the major retailers
- the price, quality, product range and service offerings for retail customers.

These are exactly the questions that need to be asked in a small market where two dominant teams control more than 95% of mainstream supermarkets.

Though they claim there is already healthy competition, there's not. It's a duopoly, and when you have that, you have to have additional accountabilities and responsibilities.

We need to see what their dominance and the impact of the array of costs, rebates, deductions, claims, discounts, deletion threats, shelf auctions and supermarket margin expectations have on final prices to the consumer and the health of the supplier community as well.

For the supplier industry, the issues of pricing and grocery procurement practices are vital, and we're hoping from there the review will pave the way for a Grocery Code of Conduct.

For too long, suppliers have had to put up with egregious behaviour when entering so-called negotiations over prices. These include threats to delete products from shelves if suppliers speak out about tactics such as huge margins and being billed for instore thefts. In many cases, for suppliers to get their products onto shelves, they have to offer supermarkets a gross profit margin of anywhere between 30%



*Katherine Rich, Chief Executive, New Zealand Food and Grocery Council*

and 45%. On top of that there will be costs to promote, shelf costs, merchandising costs ... it goes on.

Most suppliers, particularly smaller ones, have little or no negotiating power. Rather, they're forced into the position of being a price taker, often being told, "accept this price or don't supply us/have your product deleted".

Much of the time they have no option but to accept what's on offer because if their products are deleted they could lose half or more of their business – because there's only one other major buyer in town.

That's the problem with a two-buyer market.

A Code of Conduct, similar to what they have in Australia and the UK, would protect suppliers from that sort of behaviour by setting agreed benchmarks.

Suppliers really believe it has now come down to this. Food and grocery leaders I've been speaking to all agree that a Code would be an excellent baseline for business dealings with supermarkets.

It won't solve all the problems, but it will make a difference.

Those with experience with the Australian and UK markets say their Codes have made a huge difference by ruling out some egregious behaviours immediately and laying the foundation for better retailer/supplier relationships.

A Code here will ensure better treatment of all grocery suppliers to supermarkets – growers, manufacturers, marketers, and particularly merchandisers, who keep the shelves stocked.

FGC recently launched a petition asking Parliament to support a Grocery Code of Conduct and we're confident we'll get enough support to push it through.

It's time to improve the culture of our industry and put negotiations back onto a more level playing field.

You can access FGC's petition on Parliament's website here.



*Members of the Supreme Sikh Society, winners of the People's Choice NZ Food Heroes Award*

### Food Heroes 2020

A gala dinner to celebrate “food heroes” who fed communities in cities and rural areas during the pandemic lockdown was one of the key events to take place on Auckland’s first day back in Alert Level 1.

Winners in seven categories of the unique New Zealand Food Heroes 2020 awards were chosen from 48 finalists selected from over 340 nominations.

They represented Aotearoa’s unsung food heroes – including a tourism company, industry bodies, community groups, small-town supermarket workers and cafés.

West Auckland-based Fair Food Charitable Trust was named the country’s ultimate “food hero”, winning the Massey University Supreme Winner NZ Food Heroes Award. They transformed tonnes of surplus food from supermarkets into fresh food parcels for thousands of people in need during lockdown

Winners of the People’s Choice NZ Food Heroes Award, the Supreme Sikh Society, started a food bank at the Sikh Temple in Takanini, aiming to distribute 1100 food parcels to people struggling during the lockdown. They were able to feed around 66,000 families impacted by the lockdown from Auckland right down to Queenstown with their simple motive to “recognise the whole human race as one”.

Their nation-wide food distribution project started the day after lockdown. Daljit Singh says Sikh philosophy states that the basic principle of Sikhism is to share with others, and food was the important part of that during COVID-19 – “so that nobody goes to sleep without food”.

Due to the huge impact of the COVID-19 pandemic, the New Zealand Food Awards, powered by Massey University, shifted from its usual programme to delivering a community-focused celebration of innovators across all sectors of the food and beverage industry.

Other winners were the team at New World Foxton for the way they engaged with the community, continued to support the food chain and adapted their services – picking up donations to a local food bank and Women’s Refuge. Innovators NZ Food Heroes Award Winner SOS Café provided much needed cash and support to local cafes with their innovative initiative.

Industry Supporter NZ Food Heroes Award Winner, the Restaurant Association of New Zealand, was recognised as a hero for its commitment to members by lobbying for wage support, providing navigation of legal matters, as well as much needed encouragement and training webinars for their members to use the lockdown time effectively.

The Dream Team NZ Food Heroes Award Winner Waitare Beach Four Square were honoured for their unique, local and amazing story of Kiwi community spirit. Catering to their small community of approximately 700 people, Waitare Beach Four Square was open every day, managing the needs of their residents so that the community could “remain a bubble” for a lengthy period of time.

### Category winners:

Massey University Supreme Winner NZ Food Heroes Award: Fair Food Charitable Trust

Countdown People's Choice NZ Food Heroes Award: Supreme Sikh Society

New Zealand Food Safety Outstanding Service NZ Food Heroes Award: New World Foxton

Cuisine Local Hero NZ Food Heroes Award: Diana Greer

James and Wells Innovators NZ Food Heroes Award: SOS Café

New Zealand Trade and Enterprise Industry Supporter NZ Food Heroes Award: Restaurant Association of New Zealand

Palmerston North City Council Greater Good NZ Food Heroes Award: Fair Food Charitable Trust

AsureQuality The Dream Team NZ Food Heroes Award: Waitare Beach Four Square staff

Apart from Massey University, as principal sponsor and event organiser, the awards are made possible with the support of New Zealand Food Safety, Countdown, Cuisine Magazine, James & Wells, AsureQuality, New Zealand Trade and Enterprise, Villa Maria, The Intermedia Group New Zealand, Palmerston North City Council, FoodHQ, The FoodBowl, XPO, and The FoodPilot.

For more information, please visit [www.foodawards.co.nz](http://www.foodawards.co.nz)

## Fat's re-birth fuels growth for brands

### Study by New Nutrition Business

For decades, fat has been the dietary demon. But consumers, especially younger people, are rapidly losing the fear of fat – and that's opening up huge new opportunities for product developers in multiple categories.

A five-country study by food industry analysts, New Nutrition Business, reveals that 34% of 25 to 44 year-olds (see Chart) want to eat more healthy fats. By contrast, among consumers aged 55-64, who grew up in the era in which 'low fat is best' was the nutritional dogma, only 23% are trying to eat more healthy fats.

The growing embrace of fat is partly fuelled by the view of carbs and sugar as the new dietary demons, with just 16% of Americans seeing fat as the nutrient most likely to cause weight gain compared with 48% blaming carbs and sugar. It's a complete turnaround on a decade ago, when 70% of Americans were trying to reduce their fat consumption.

"When people discover fat, there's such a taste difference," said Julian Mellentin, director of New Nutrition Business. "Fat is the Product Developers' friend, improving texture, mouthfeel, structure and moisture content. In all categories, as time passes there will be less reason to produce products that have low levels of fat. The challenge for companies is to ensure they use good quality fats where they can point to a good, natural source."

Changing views about the healthfulness of saturated fat are starting to re-shape categories. Challenger brands, big brands, retailer own-labels – all are benefiting from consumers' declining fear of fat.

#### 1. In the UK:

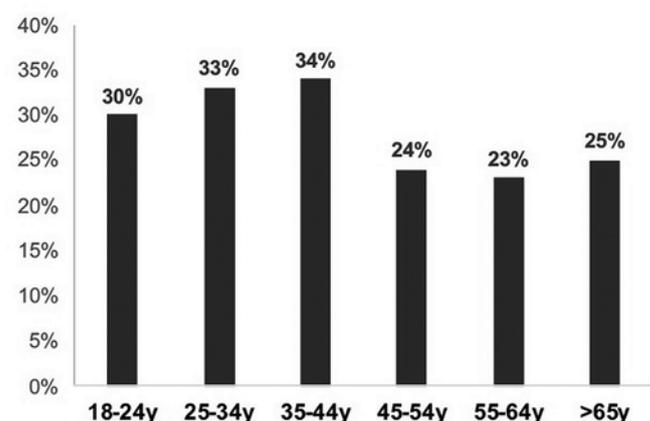
- Grocery retailer Marks & Spencer markets an own-label 10% fat Greek yoghurt alongside its zero fat and 5% fat lines. It carries the retailer's Eat Well label, designed "to help customers navigate healthy eating".
- Its competitor Tesco, the UK's largest supermarket group, also has a 10% fat own-label Greek yoghurt.
- Deliciously Ella's – a challenger brand popular with health-conscious millennials and particularly those with a plant-based diet – offers indulgent nut butter cups sweetened with date syrup and coconut sugar. Fat content – from coconut oil, cacao butter and almond butter – is 23g per 100g.

#### 2. In the US market:

- Love Good Fats, a start-up born in 2017, has distribution in more than 20,000 stores including Walmart, Kroger and Costco for its 'good fat, low sugar' snacks. Each of its bars has over 12g of fat – a level of 33g per 100g – from a blend of almond butter, peanut butter and coconut oil. It recently secured \$10.7 million of equity financing to accelerate growth.
- Yoplait, a leader in US dairy, is introducing Americans to crème fraîche, one of France's traditional high-fat dairy dessert products, which is typically 30-45% milk fat.
- Butter's all-natural credentials and taste have propelled growth

### Chart 71: Younger consumers more open to 'good fat'

Younger consumers are more open to the idea that fat is not bad, with a higher number of younger consumers (<44y) trying to eat more healthy fats when compared to older consumers.



Source: NNB survey of 5,000 consumers in 5 countries (United States, Brazil, UK, Spain, Australia)

for many years. Sales of butter – already at record levels – jumped during the pandemic as people ate at home more often. The increase in dollars consumers spent on butter outpaced – by 360% – the increase in spending on margarines and spreads. The biggest winner was Irish brand Kerrygold. Sales jumped an impressive 28.3%, to \$235.4 million (€207.5 million), making it the number-two butter brand in the US.

"The re-birth of fat is a long, slow and steady trend," said Mellentin. It is interlinked with other trends:

- fewer carbs and more protein
- weight management
- consumers' growing willingness to do their own online research and challenge experts and orthodoxies

The change is also driven by people who enjoy the more satisfying taste and texture of full-fat products and now believe that they can enjoy them without guilt.

"Official dietary guidelines in almost every country still call on consumers to limit their intake of saturated fats," said Mellentin. "But a steadily increasing number of consumers – driven by what they discover during their own on-line research and the loss of credibility of nutrition experts over the last 15 years – are making up their own minds and embracing the idea that fat can be good, particularly in relation to weight management, one of the biggest consumer motivations."

NB. Data used here is taken from the newly-published report 10 Key Trends in Food, Nutrition & Health 2021, authored by Julian Mellentin. It is the food industry's only analysis of the key trends which also show the strategies which companies are using to succeed with the trends. More information here



AgResearch senior scientist Dr Linda Samuelsson will be working on the "Seaweed as superfood" project

### Seaweed – potential new "superfood"

It is far from a staple on most Kiwi dinner tables, but AgResearch scientists are aiming to unlock the potential of seaweed as a go-to food with proven health benefits. And they have enlisted the services of a world-class chef to help them do it.

The scientists are joining counterparts in Singapore in a project funded by New Zealand government, in the amount of \$3.3 million, alongside parallel funding from the Government of Singapore. The New Zealand funding is from the Catalyst Fund: Strategic – New Zealand-Singapore Future Foods Research Programme.

The research, focused on the *Undaria pinnatifida* species of seaweed abundant in waters around New Zealand and Singapore, also involves partners the University of Otago, University of Auckland, A\*STAR, AgriSea NZ, Ideas 2 Plate and AMiLi.

"People around the world have been eating seaweed for centuries, including Māori," says AgResearch senior scientist Dr Linda Samuelsson.

"But despite it being easily grown and rich in important nutrients, it is not a staple in most peoples' diets. Partly that is because it isn't a familiar taste to many people, but also because many of these

important nutrients are locked inside the seaweed and aren't readily absorbed by our bodies when we eat it."

"What we are aiming to do with this research is develop ways to cook or process the seaweed so that we have flavours and textures that appeal to people, but we also want to look at the health aspect. Seaweed proteins are typically less digestible than animal proteins, so we will be looking at in what form the seaweed can better deliver the nutrients to the person eating it. We'll also be looking at how the seaweed proteins interact with peoples' gut microbiome (the collection of microorganisms that live in the digestive tract)."

*Undaria pinnatifida* is listed as one of the 100 most invasive species worldwide, and past eradication programmes in NZ have failed. The proposed research could also potentially encourage an interest in wild harvest of the seaweed from infested coastlines, allowing for re-establishment of native seaweed species.

The first year of this three-year research project will focus on unlocking the nutritional value of seaweed, and towards the end of the second year the scientists expect to have developed a flavourful and nutritious seaweed prototype food.

## CoRE Funding confirmed for The Riddet Institute

The Riddet Institute, hosted by Massey University, has been re-selected as a New Zealand Centre of Research Excellence (CoRE) by the Tertiary Education Commission (TEC) and awarded \$38.25 million over the next 7½ years. The Riddet Institute has been a CoRE since 2008 and has established a global reputation for its high-quality research in the field of food science and nutrition, as well as providing vital science capability for the New Zealand food sector. In particular, the Institute is a global leader in the fundamental understanding of the structure of food and its effect on digestion and health.

The Riddet Institute's new CoRE research programme is entitled "Future Foods in Harmony with Nature" and will help address one of the great contemporary challenges facing humanity – a sustainable and nutritious food supply.

The new CoRE research programme will include not only the food materials science, nutrition and health that has been a Riddet Institute strength since 2008, but several new areas of research exploring new plant and combinatorial proteins and new transformative technologies, the fast-moving areas of food innovation that have the potential to disrupt existing food

production systems and markets. The new programme will bring together a national cohort of scientists and the latest advances in disciplines such as bioengineering, biomedical science, complex systems science and molecular biology to generate new scientific insights. The programme will lead to the development of foods that are sustainable, support optimal nutrition, human health and wellbeing, and appeal to the preferences of tomorrow's global consumers.

The Riddet Institute has five partner organisations; Massey University (host), AgResearch, Plant & Food Research, The University of Auckland and the University of Otago, and a number of collaborators (Auckland University of Technology, Lincoln University, University of Canterbury, University of Waikato and Victoria University Wellington). Scientists within these New Zealand organisations, specialists in food science as well as other supporting disciplines, are brought together within the Institute. The Institute will continue in its role with the partner universities, in training highly skilled graduates that move into careers in industry, research institutes and universities. This transfer of skills and knowledge will strengthen the nation's research capacity in food.

## COVID-19 intensifies interest in well-being products

Healthy ingredients and label transparency are more important to consumers than ever before following the COVID-19 pandemic, concludes a new global survey commissioned by the market research company FMCG Gurus on behalf of BENEEO.

The results show that across the globe consumers are becoming more conscious about their well-being - particularly immunity - as they question their vulnerability to disease and illness. They are also concerned about the environment and whether the virus' impact has been intensified because of increased levels of environmental damage. As a result of these attitudinal shifts, consumers are looking to purchase food and drink products that increasingly promote well-being and sustain their energy in challenging times, whilst minimising impact on the environment.

Furthermore, the widespread effect of COVID-19 has also resulted in 64% of consumers saying that they are now more conscious about their immune health. This mirrors the number in Asia, with 65% of consumers more conscious about their immune health. Even consumers who previously deemed themselves to have a good immune system are now questioning their vulnerability to disease and illness. This is having a direct impact on purchasing behaviour, with two-thirds (64%) of consumers more interested in ingredients, or food and drink products, that provide protective or preventative health benefits. This number is even greater in Asia, with 71% of consumers more interested in ingredients with health benefits. This trend is likely to continue being prevalent in the market for the foreseeable future.

Michael Hughes, Director of Insights at FMCG Gurus, comments: "The results of our latest consumer survey clearly show that beneficial ingredients and label transparency are now more important than ever before to consumers across the globe, as a result of the pandemic. People are exploring topics such as inner defence, staying fit and healthy, blood glucose control, as well as sustained energy and wanting to buy products with proven health benefits. Beneo is well equipped to help manufacturers tap into these key growth areas. The company's probiotic chicory root fibres and slow-release carbohydrate offer a



*In Asia 65% of consumers are more conscious about their immune health*

range of scientifically proven health benefits that help support long-term health and can be communicated on pack."

Beneo offers functional ingredients derived from chicory roots, beet sugar, rice and wheat and is the ideal partner to help improve a product in its nutritional and technological characteristics. Key nutritional benefits are 'less fat', 'less sugar', 'less calories', 'added fibre', 'gluten-free' and dairy alternatives as well as energy management, digestive, bone and dental health. Key technological benefits focus on taste and texture improvements.

# Services for food companies

Looking for someone to do your routine testing? Need help formulating or re-formulating a product? Wondering where to start to get ready for an audit? Is it time to prepare a risk management plan? Looking for software to support your food safety programme?

A scan through the following should help find what you need.

## Experts in food testing and product analysis

Cawthron Institute offers an independent testing service for the food and natural products sector to meet food safety and export requirements. We have a fully accredited laboratory, and a specialist research and development team who can develop customised analytical solutions to meet the unique needs of your business.

Our accreditations include:

- IANZ (ISO17025)
- USFDA
- MPI
- TGA (nutraceuticals)
- RLP
- GMP (MedSafe – MoH)

We have extensive experience with:

- analytical method development and validation
- analytical chemistry and microbiology
- chemical isolation and characterisation
- synthetic organic chemistry
- qPCR capability
- food technology
- scientific support for registration of dietary supplements and stability trials
- Good Manufacturing Practice (GMP) certified manufacturing and natural product chemistry

One area of specialty is the testing method developed by Cawthron to detect toxins in shellfish, which is helping to set a world standard for the global seafood industry.

Our internationally recognised and accredited laboratories offer comprehensive

food composition and microbiological testing services including:

- label claims
- freshness, quality, and rancidity analyses
- vitamin and trace element testing
- export certification
- product shelf life testing
- plant hygiene and environmental compliance testing

Following recent requests from our customers, we have developed methods for the detection of other food toxins and contaminants including:

- 3-MCPD (in oils and infant formula)
- DCD
- Melamine

Cawthron also facilitates access to government funding for many types of research and development projects and is a registered provider through the Ministry of Business, Innovation and Employment's Science. Recent examples of our work include:

- identifying actives in Greenshell™ mussel powders, seaweed, and kiwifruit
- analysing the composition of lipids in marine oils
- semi-synthesis of active compounds from natural products

Cawthron is committed to helping your business provide important products and services to New Zealand, and the world.



*Among many capabilities, Cawthron are experts in detecting toxins in shellfish and recent work includes identifying actives in Greenshell™ mussel powders, seaweed, and kiwifruit and analysing the composition of lipids in marine oils*

## FOOD TESTING

Cawthron delivers industry leading analytical testing, reliable results and market changing insight.

- Method development and validation team
- IANZ (ISO) accreditation
- Food safety
- GMP certified for Nutraceuticals
- Export certification
- Label claims





AsureQuality's laboratories are state-of-the-art

## AsureQuality

### Delivering a difference for Aotearoa's food producers

We are the leading provider of food assurance services to Aotearoa's primary and food production sectors. Our team are more than just experts in their field, they have a personal sense of commitment and connection to our customers and are dedicated to delivering fast and accurate results for every test.

We offer a comprehensive range of analyses for food manufacturers ranging from environmental swabs and raw materials through to finished products, with two key rapid service offerings that make a difference for Aotearoa's food producers. Our rapid 1-day microbiology testing delivers improved specificity with a market leading low false-positive rate, and we are the only laboratory in New Zealand offering 1 day confirmation following presumptive outcomes for *Listeria*, *Salmonella* and *Cronobacter*. We are also the only commercial

laboratory in New Zealand offering an accredited FT-NIR service for simultaneous analysis and rapid turnaround times of fat, protein, moisture and ash in selected dairy powders and infant formulas, which is great news for kiwi exporters.

Investing in the latest technology has always been a focus for AsureQuality, and the FT-NIR instrument provides great benefits such as the ability to adjust levels of different components for improved nutritional value for overseas market access and can also improve yield, reduce wastage and increase profit margins. Best of all, this new carbon neutral method is extremely precise and delivers results within 1-2 days.

Talk to our team about how we can support your business; 0508 00 11 22 or go to [asurequality.com](http://asurequality.com).



Helping Aotearoa shape a better food world

## Enjoy the advantage of our RAPID testing methods

- RAPID and precise testing for chemistry and microbiology
- Pathogen test results in just 1 DAY
- NZ's first laboratory offering an accredited FT-NIR service
- NZ's only laboratory offering 1 DAY pathogen confirmations

Talk to us today 0508 00 11 22 [asurequality.com](http://asurequality.com)

## Eurofins

### Food and Water Testing NZ – Really local. Truly global.

Eurofins New Zealand offers an unmatched range of independent analytical testing and support services to customers across the food, water, agricultural, environmental, pesticide and pharmaceutical industries. Our extensive laboratory network is spread nationally with facilities in Auckland, Katikati, Taupo, Wellington, Christchurch and Dunedin.

Drawing on an international portfolio of over 200,000 analytical methods for characterising the safety, identity, purity, composition, authenticity, and origin of food and agricultural products, our testing services include: microbiology, food nutrition, general chemistry, pesticide residues, potable and process water, environmental, and physical and chemical contaminants.

We believe in listening to, and working closely with, our customers to understand their needs, and delivering tailor-made solutions to help them achieve their goals. We offer the dairy, meat, seafood, honey and natural products sectors a unique range of analytical techniques to assure quality and safety standards, and provide solutions to support product development, compliance and market access.

Eurofins' extensive IANZ accreditations in the areas of potable water, sewage and effluent, trade waste and environmental analysis, have enabled us to provide sampling and analytical testing services to councils and other organisations around New Zealand for over 25 years.

We are passionate about helping the food industry navigate the rigorous standards of quality, safety, ethics and environmental sustainability. When a customer partners with Eurofins New Zealand, they are partnering with a leading global network of laboratories with over 50,000 dedicated employees, across more than 800 facilities in 50 countries

## Foodinc - expert technologists

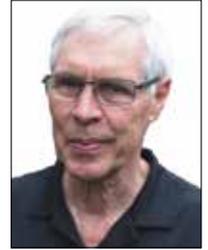
Want to be proactive and improve the Health Star Rating of your food?

Need help formulating a new product, or reformulating an existing one?

Are you about to design and build a new factory, or develop new process and plant?

What about your Food Safety and (or) Risk Management Plan – time to update?

You will find the support you need amongst the members of foodinc.



*New member of Foodinc, Cameron Russell*

foodinc is a network of independent food technology consultants, operating since 1997. All members are respected experts in their fields and adhere to a strict code of ethics, hence confidentiality is guaranteed. Primarily based in Auckland, they work all over New Zealand and overseas and can operate as individuals or as a team of experts with complementary skills.

Foodinc has a strategic alliance with the FOODBOWL and consultants are available to clients who are considering using this and other Food Innovation Network facilities.

The newest member of foodinc is **Cameron Russell**. Cameron has over 35 years of project engineering experience working in the New Zealand food industry. He is a skilled and competent Project Engineer and Project Manager, who has proven himself for turning ideas into reality.

His areas of expertise include Project Design, Procurement, Site Supervision, Commissioning and hands-on Management of multi-disciplined Capital Projects. Cameron's contact details can be found, with other members of foodinc at [www.foodinc.co.nz](http://www.foodinc.co.nz).

**foodinc – Your choice of independent food industry experts:** Martyn Atack, David Bayliss, Marion Cumming, Anny Dentener-Boswell, Wolfgang Hiepe, David Lowry, Cameron Russell, Anne Scott (technical writing), Lesley Steeples and Geoff Webster.

Please note that we welcome approaches by other experienced independent food industry consultants who have an interest in joining our supportive network. Visit [www.foodinc.co.nz](http://www.foodinc.co.nz) for more information and to contact members of foodinc.



## Testing New Zealand's drinking water for over 25 years.

Check your water supply is safe and clean with our extensive water testing suites. We analyse source water, raw water, treatment plants and reticulated water supplies for a wide range of analytes, and can test:

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- Public water supplies
- Bottled water
- Rural supplies
- Water tankers
- Workplaces
- Roof water
- Bore water
- Ice

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**Eurofins.**  
Really Local. Truly Global.

## Nutrition Laboratory, Massey University

### Palmerston North

The Nutrition Laboratory is an independent testing laboratory offering a wide range of analytical services. IANZ accredited to ISO 17025 and a registered MPI transitional facility. A variety of testing options are available on most food products including, amino acid profiles, fatty acid profiles (trans fatty acids, PUFA's, omega's, saturated fat etc.), vitamins, protein, fat, energy, lactose, water activity, total solids, skatole and collagen estimation.

Megazyme kits are utilised for a number of our methods including; Total, Soluble & Insoluble Dietary Fibre, Starch,  $\beta$ -glucan, fructan and resistant starch. We can look at one-off projects regarding new methods/kits depending on quantities and time frame.

Nutrition Laboratory offer routine Quality Control testing of ingredients and finished products as well as Nutrition Information Panels and Shelf Life Testing.

For physiological type trials our Clinical Analyser is kept busy analysing biological samples for cholesterol, triglycerides, glucose, urea, creatinine, calcium, phosphorus, uric acid, NEFA etc.

In conjunction with the Scientists and Food Technologists of the School of Food and Advanced Technology we offer a unique consultancy service encompassing both problem solving and product development work to maximise the value of results for clients throughout the food and feed industry. <http://nutritionlab.massey.ac.nz>



A Nutrition Laboratory technician carries out the filtering step of the Total Dietary Fibre assay

## Megazyme for measuring Dietary Fiber



**The Megazyme TDF (Total Dietary Fiber) kit determines soluble and insoluble content in processed foods and raw materials.**

- Megazyme TDF enzymatic kits are used in the recommended AOAC Method 985.29 and 991.43, and AACC Method 32-05.01.
- LOD of the kit is 0.5g/100g with a total assay time of ~100 mins.
- Very competitive price (cost /test).
- All reagents stable for > 2 years.
- Mega-Calc™ software tool; FREE for hassle-free raw data processing.



Find out how Megazyme can help your business perform best-in-class dietary fiber analysis.  
View Megazyme's Dietary Fiber Portal at <https://www.megazyme.com/focus-areas/dietary-fiber-portal>

**Food Tech Solutions are New Zealand agents for Megazyme.**

For more information and to order Megazyme kits online [Click here](#)

T: 09 576 7326

W: [www.fts.co.nz](http://www.fts.co.nz)

E: [sales@foodtechsolutions.co.nz](mailto:sales@foodtechsolutions.co.nz)

## Overview

### Butler Techsense Ltd

#### IoT Temperature Monitoring for Food Safety

Modern food safety and quality assurance documentation is slowly moving away from paper based to digitally based systems, typically hosted in the cloud.

Local instrumentation specialist, Butler Techsense Ltd, has partnered with European manufacturer JRI to provide a complete digital cloud-based temperature monitoring and recording solution for food production and food service companies.

The solution is two separate systems sharing a common cloud database, dubbed MyFoodCheck and MySirius.

MyFoodCheck is a mobile app and automates manual food temperature recording using a handheld thermometer, proactively detecting temperature excursions at each stage of the food production process. During the receipt of goods, storage, cooking, hot and cold storage and cook-chill production, MyFoodCheck pulls all this recording documentation under one shared database.

The application works in conjunction with a Bluetooth connected thermometer and pushes the temperature measurements directly to the MyFoodCheck application via the operator's tablet or smartphone. If the tolerances are exceeded, corrective actions are suggested, allowing the operator to make quick corrective action decisions. There is a full audit report detailing who did what, meaning that full traceability throughout the process is maintained. The app is available free on Google Play and will soon be released on Apple App Store, allowing users both Android and Apple platforms.

There is no doubt that MyFoodCheck saves time as temperature readings become more automated. Consequently, food safety risks across the organisation are reduced. MyFoodCheck creates detailed reports required for HACCP documentation that are always up to date, making audit time less stressful. Weekly PDF and weekly activity reports are generated to ensure traceability of measurements and corrective actions taken.

MyFoodCheck is used in conjunction with the JRI MySirius monitoring



platform which automatically carries out 24/7 recording and alarming of fridges, freezers, cool rooms, and ovens using the latest IoT devices. Operators can activate the FoodCheck tab in their account and allow all collected data in the MyFoodCheck app to be automatically synchronised, backed up and available at any time on the JRI MySirius cloud platform.

MyFoodCheck is a free app and MySirius is a subscription-based solution. Companies can choose between three plans depending on the number of devices used and features they require.

In Europe, MySirius temperature monitoring solution has been installed in many of France's 1400 McDonalds restaurants. In conjunction with McDonalds, the MySirius platform includes a special temperature simulation feature that records the temperature of frozen products, like chicken nuggets, without the need to probe the frozen product. Each frozen product has its own special algorithm to enable the system to calculate core temperature based on the surrounding air temperature and display it in real-time in the MySirius cloud solution.

"This has the potential to also be incorporated into other areas like cooking and cook-chill processes" according to John Butler, Managing Director of Butler Techsense Ltd.

For more information contact [info@butlertechsense.co.nz](mailto:info@butlertechsense.co.nz)

### Callaghan Innovation

A first-of-its-kind report launched by Callaghan explores how Waste to Value, a growing subcategory of CleanTech, has significant potential to grow New Zealand's economy.

'NZ CleanTech' refers to businesses developing innovative products, processes and services that bring about a stable climate, clean water and smart-resource use, locally and globally. Waste to Value involves turning waste streams into income and such innovations can support the country's post-COVID-19 economy recovery.

The report identified both industrial and biological waste-to-value as key growth areas, profiling Zincovery, Geo40, Usedfully, Citizen, Frenz Eggs and Ligar/The Refinery as Kiwi companies already seizing opportunities to capture value from biological and industrial waste in new and enhanced products.

Smarter resource use could contribute billions of dollars to NZ's economy. One study by Sapere Research Group found that if Auckland alone converted to a circular economy, up to \$8.8bn could be liberated in additional economic activity.

Around half of Callaghan Innovation's CleanTech businesses are



still in the early stage, just over a quarter are expanding, and another quarter are established. A very promising sign is that venture capital (VC) investment in ClimateTech globally is growing five times faster than overall VC investment, and three times faster than AI, according to PWC's report 'The State of Climate Tech'.



*Produco provide expert food safety and compliance advice*

### Produco

Produco provide expert food safety and regulatory compliance advice to dairy, food and beverage, seafood, horticulture and transport industries.

We're highly experienced at assessing which regulations your products require and ensure they comply with domestic and export regulatory requirements to any country worldwide.

Our customer base spans small family-owned operations to large multi-nationals across New Zealand and Australia.

We're agile and capable of filling short to medium term recruitment gaps, providing backfill while staff are on key projects and we project-manage to deliver your business-critical projects.

Our team of Senior Quality Assurance Managers and Specialist Advisors includes New Product Development, Health and Safety and Quality Systems, available in full or part-time capacities.

### Services

**Auditing:** Our expertise and knowledge will evaluate your business facility, suppliers, systems and processes with guidance to remedy

defects or non-conformances to create step changes in your organisation.

**Risk Management Plans | Food Control Plans:** Technical support tidying up existing documentation to writing complete programmes for greenfield sites.

**HACCP|VACCP|TACCP:** Our skilled and knowledgeable personnel thoroughly check your processes and identify risks, weaknesses and gaps.

**Incident Management | Product Recall:** Have a persistent pathogen? We're highly experienced and skilled to facilitate problem solve workshops.

**Labelling Requirements:** Ensure compliance to domestic and export markets. We hold specialist product category knowledge for infant formula, supplemented foods etc.

**Quality Management Systems | Validation:** We inspect the outputs of a system/process to ensure it consistently and reliably meets the requirements of your business.

For more information, please contact us to discuss your needs.

### LabSupply

Proudly New Zealand owned and operated, we are independent importers and distributors of scientific equipment and consumables from some of the world's leading brands. We also support what we sell with in-house servicing, calibration and repair capabilities for a wide range of laboratory equipment. But most of all, we pride ourselves on being responsive and proactive, answering requests as quickly as possible and never leaving customers in the dark.

We aim to keep high stock levels of our most popular products so we can promptly turn around orders with 24 hour delivery for the South Island and 48 hours for the North Island.

For those items that must be sourced internationally, we are sympathetic to timelines and promise transparent communication and regular progress updates.

We are careful to only source and supply reputable products that

won't risk compromising result continuity or lab standards. We look for equipment and consumables which are reliable, accurate and consistent.

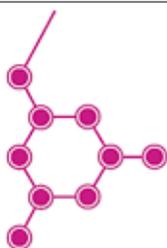
With backgrounds in science, our team know how to help find the right product and offer technical advice and recommendations on the use of equipment to show how different outcomes can be achieved.

We can also help install your equipment and train staff as we are experienced in the set up of new testing of equipment to ensure it works within set parameters.

Whether it's standardised testing or innovative experiments, we've answered the needs of a diverse client mix spanning Food and Beverage production, Crown Research Institutes and Universities across New Zealand.

How can we answer yours?

**LAB**  
SUPPLY



### IF and IPP Incubators

- Peltier cooled options
- German made
- Sizes available from 32L to 1060L

**MORE INFO**





### Uniservices

Established in 2011, The University of Auckland's Food and Health Programme takes an interdisciplinary research approach, drawing on the specialist expertise of 200 researchers across food science, process engineering, nutrition, health, social sciences, business and commercialisation.

Using multi-disciplinary research teams, we are creating new knowledge and new technology such as: long life sensors; machine learning and computational sustainability for soil and pasture management, robotic and virtual simulation of environmental and animal systems, non-thermal technologies for food preservation, and anti-fouling and antimicrobial surfaces and delivery systems. We also support innovations in food and food ingredients with clinical efficacy trials.

An important area of research in the programme is the inter-connected

relationships between food safety, flavour, nutrition, shelf-life, sustainability and consumer beliefs and attitudes. Changing one of these dimensions often impacts one or more of the others.

The Food and Health programme is supported by UniServices to work with our New Zealand government and industry partners (locally and internationally) to meet the demands of local and global, social and economic change by connecting them with leading researchers to develop effective solutions that address real world challenges.

UniServices is the University of Auckland's exclusive agent for procuring research services. It supports industry partners in engaging with academics, and it can also assist with accessing government funding for R&D. We welcome enquiries for collaborative research with the University of Auckland's uniquely positioned Food and Health Programme.



*Mätt Solutions' service covers all the bases required to measure and extend shelf-life*

## Mätt Solutions

### Optimise your product's shelf-life

Controlling your product's shelf-life is key to a profitable relationship with retailers and customers.

This is particularly critical in chilled, short-shelf-life products, (think chiller cabinet in the supermarket) or ambient, hot fill, complex foods, such as soups. That's not forgetting bakery products, which have their own challenges.

Mätt Solutions (formerly FF Instrumentation) has developed a comprehensive suite of analysis tools and resources to ensure clients' products are fit-for purpose - not just safe to eat, but good to eat.

Their service covers all the bases required to measure and extend shelf-life and they will work with you to optimise the shelf-life of your product.

Some laboratory analysis, eg microbiology, may need to be sourced outside the Mätt facility, but will be fully integrated into any shelf-life extension projects.

Their expertise includes:

- MAP (Modified Atmosphere Packaging)
- Water activity, sorption isotherms and moisture control.

- NIR solutions for testing e.g. fat, protein, ash monitoring and control
- Leak Detection
- Reducing gas costs in MAP
- Meeting MPI regulations
- Texture and Viscosity analysis
- Temperature, pH and humidity tracking and much more

Mätt are one of New Zealand's leading providers of specialist instrumentation for measuring and extending product shelf-life. They have a strong focus on analytical instrumentation and process monitoring equipment for the food/dairy manufacturing sector.

Mätt Solutions provides a complete peace of mind service by ensuring the availability of backup instrumentation with minimal downtime. This is something our clients require and have grown to depend on. Fully trained in-house technicians ensure we can locally repair, service and calibrate all our instruments.

With an extensive knowledge of Shelf-Life Analysis, Mätt are one of New Zealand's leading providers of specialist instrumentation for measuring and extending product shelf-life. The company has been built on its reputation and commitment to service.

Bob Olayo is your first contact. More information and contact details at [ffi.nz](http://ffi.nz)

## Quality Auditing Specialists

Quality Auditing Specialists Ltd (QAS) offers a range of evaluation and verification services to the food and wine industries nationwide. Maree Haddon leads a team of practical, efficient and objective evaluators and verifiers who offer consistency of interpretation of standards for Multi-Sites, Custom and Template Food Control Plans, National Programmes, Importers and WSMPs.

All evaluators/verifiers have a strong background relating to manufacturing, food service, horticulture, retail, storage and transport and are fully qualified to fulfil all your requirements. Our team will work with your business to ensure you are meeting your Food Act or Wine Act compliance requirements while endeavouring to keep the process practical and simple.

We also offer consultancy services through our sister company Quality Systems Specialists (QSS), that include Integrated Management Systems, Food Safety, HACCP Development, Training and Internal audits. QSS can help you develop appropriate documented systems that will meet the requirements of the Food Act and the associated legislation.

QSS can develop and deliver training packages to suit your company's needs. Training includes general food safety, HACCP, internal auditing, traceability or any other area where you require assistance. The training can be undertaken via virtual meeting at a central location or alternatively if you have the facilities available, at your place of business.



Quality Auditing Specialists

## Quality Auditing Specialists Limited

### AUDITING SERVICES TO THE FOOD & WINE INDUSTRY

100% New Zealand owned and operated, we are a Ministry for Primary Industries (MPI) recognised food and wine verification agency. We have MPI recognised Food Act Evaluators, Food Act Verifiers and Wine Act Verifiers.

We offer a range of services to meet your needs, so call us today on 0800 122 225 or email [info@qasltd.co.nz](mailto:info@qasltd.co.nz)

[www.qasltd.co.nz](http://www.qasltd.co.nz)

Our friendly and experienced team assist through the verification process with the following steps:

1. Guidance
2. Registration
3. Verification

# FIET Project 7: Drying of sticky products

Authors: Prof. Tony Paterson<sup>1</sup>, Dr Lee Huffman<sup>2</sup>, Dr Sebastian Linnenkugel<sup>2</sup>, Dr Aiman Jamsari<sup>1</sup>

1. Massey University, Palmerston North 2. The New Zealand Institute for Plant and Food Research Limited (Plant & Food Research), Palmerston North

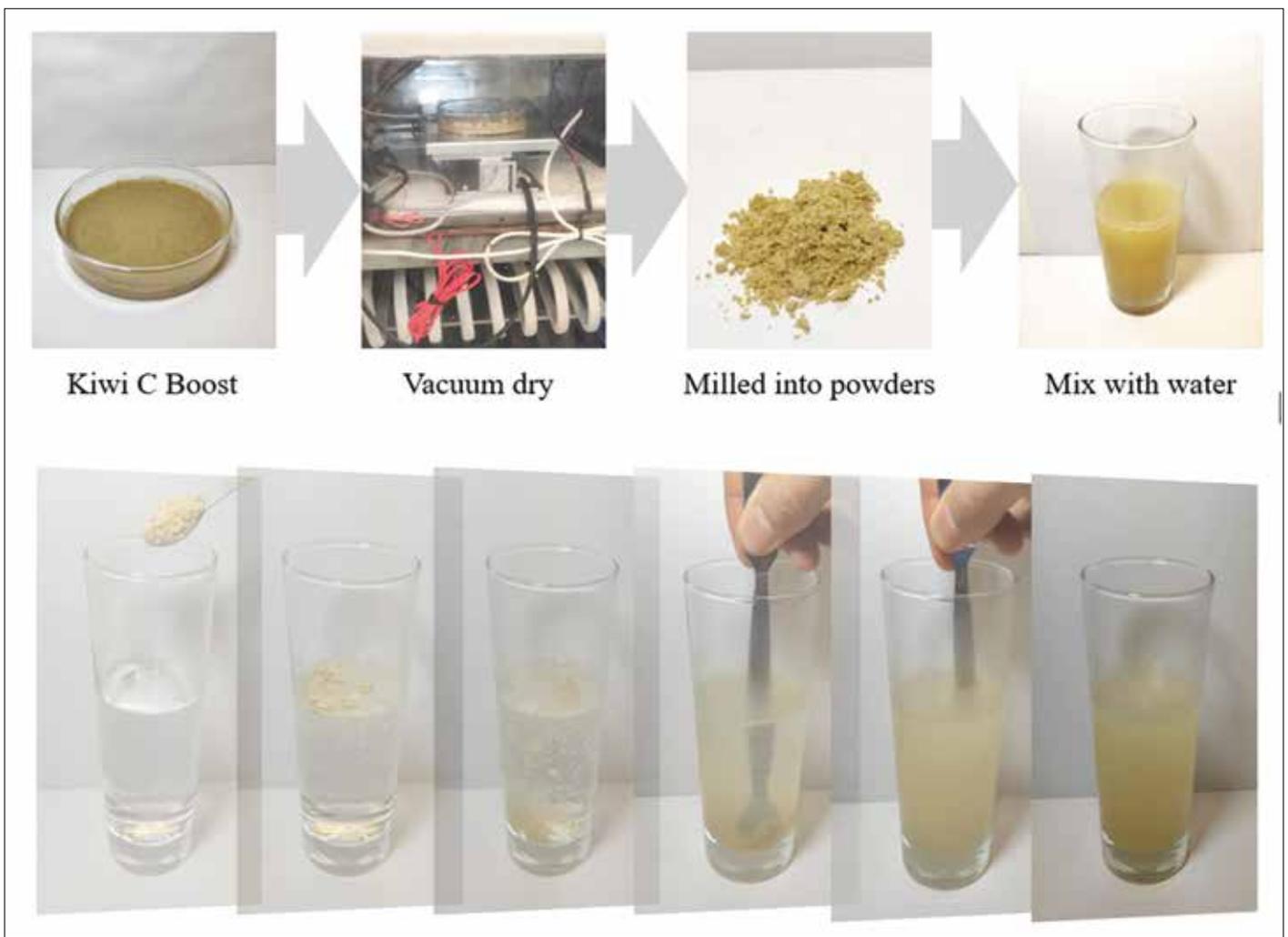


*Dr Lee Huffman, Dr Siti Mohd Rozali, Dr Aiman Jamsari, Dr Sebastian Linnenkugel, Dr Florencia Yedro, Prof Tony Paterson*

## New Zealand networks work!

This project has an interesting back story typical of the classic Kiwi “two-degrees of separation”. As mentioned, both Sebastian and Siti completed their PhD’s in the first three years of the programme. In the second stage of the project, Sebastian was employed as a Post Doc, along with his then fiancé Dr Florencia Yedro. Florencia was initially a Post Doc on the related FIET project, pomace fracturing, which had come to an end. Six months into the project and with a lot of success in working out how to reduce the pomace fibre particle sizes, Florencia was snapped up by Fonterra’s Research and

Development Centre. By then Siti replaced Florencia in the Post Doc position. However, Fonterra Research again realised the quality of the people working on the project and offered Siti a job as well, which she accepted. Fortunately for our project, her husband, Aiman Jamsari, was just finishing his PhD and we were able to persuade him to come on board as a Post Doc, bringing his expertise in mechanical engineering into the mix. The timing of Aiman’s arrival fitted perfectly with the stage of the project: modifying a spray dryer to be able to dry certain products that cannot be dried in a normal dryer.



*There and back again: from juice to powder to juice - success!*

Since we last reported on this project, the team of Dr Lee Huffman from Plant & Food Research, myself (Prof Tony Paterson), Sebastian Linnenkugel and Siti Mohd Rozali have made some exciting breakthroughs, and Sebastian and Siti have completed their PhDs.

Sebastian's PhD work on the prediction of the glass transition temperature of fruit juice powders from their composition formed the basis for being able to predict which juices can or cannot be successfully dried in a spray dryer in the absence of traditional drying aids. He developed a computer programme that predicts, given the conditions of the spray dryer, whether a powder will become sticky and require a drying aid (Linnenkugel, 2019). Siti's PhD focused on the effects of the rheological properties of complex model solutions and

juices on their fluid flow and atomisation by spray dryer nozzles. She confirmed that two fluid nozzles are critical to the fluid flow for these complex model solutions.

Some fruit juices will never be able to be dried in a spray dryer without the addition of a drying aid (e.g. maltodextrin) in such large quantities (>50%) that you would essentially be drying maltodextrin with a fruit juice flavouring. Therefore, we decided to look at alternative drying technologies.

Atmospheric freeze-drying works but with these high-sugar juices it struggles to achieve low enough water activities to produce powders that will be stable during storage. At such low temperatures it takes days to dry the products.

## Quotes from our partners

“We (JPNZ) are collaborating closely with the highly experienced and knowledgeable team at Massey and Plant & Food in the efforts to provide premium quality and sustainable food products to our customers. Their expertise and professionalism is helping us reach our goal of innovative food products faster.”

**Vidya Kethireddy**

*Technical & Quality Manager  
Juice Products New Zealand  
<https://www.jp-nz.com/>*

“Kii Tahī is proud to be partnering with FIET in this innovative approach to drying our product. These trials will allow us to explore additional product ranges under our Kaitahi food and beverage business. Kaitahi is currently ranged in various stockists around Aotearoa <https://kaitahi.co.nz/pages/stockists.>”

**Dallas Hepi**

*Research and Development Manager  
Kaitahi*

“We continue to see new blackcurrant-based products coming into the market month on month in New Zealand, all championing the health benefits of the product. Blackcurrants are finally shaking off the old-fashioned image of sugary kids’ drinks and grandma’s jam. This doesn’t mean that the unique taste profile of blackcurrants is any less important and bringing the two attributes together seems to be what the consumer is demanding of the brand owners and industry alike. We’ve always felt that a stable juice-based dry product without added sugar would deliver exactly this, and the opportunities for products derived from the FIET drying project are even greater now than when the project first evolved, so we are excited to be able to have this product on offer.”

**Mike Callagher – General Manager**

*New Zealand Blackcurrant Co-operative Ltd.  
Website: <https://www.nzblackcurrants.com/en/>*

We experimented with vacuum belt drying and vacuum freeze drying and found that, if the right conditions were used, it was possible to dry juices to low enough water activities that stable powders were achievable.

These optimal conditions are currently being assessed for IP protection and hence cannot be disclosed here. We are currently working with Juice Products New Zealand Ltd. and Kii Tahī and have successfully dried their products using our technique and the Bucher continuous vacuum belt dryer at the FOODBOWL, and are confident that we can dry almost all fruit juices after some further research work on specific products. We are currently looking for more juices to try and are in discussions with the NZ Blackcurrant Co-op to look at blackcurrant juice.

**Reference**

Linnenkugel, S. (2019). Prediction of the glass transition temperature of fruit juice powders. (PhD), Massey University



Food Industry Enabling Technologies (FIET) is funded by the Ministry for Business, Innovation and Employment and its purpose is to support new process developments that have the potential to add significant value to our national economy. The programme has six research partner organisations, Massey University (the host), Riddet Institute, University of Auckland, University of Otago, Plant and Food and AgResearch. Funding is \$16.65m over six years (2015-2021) and targets pre-commercialisation activities. If you are interested in more information, then please contact either Dr Ross Holland (R.Holland1@massey.ac.nz) or Professor Richard Archer, Chief Technologist, (R.H.Archer@massey.ac.nz).

# Your Career after COVID-19 - a continuing story

John Lawson, Lawson Williams Consulting Group

## The big picture!

Prior to 2020 there was significant discussion on the “Future of Work”. This was mainly attributed to increasing automation, technology and globalisation. These appeared to pose the greatest risk to labour market stability or the security of our jobs.

2020 has added significant and unexpected disruption to world labour markets with immediate effects on the livelihoods of people and household incomes of families. Covid-19 appears to be increasing existing inequalities across labour markets: it has significantly reversed the gains in employment made since the GFC in 2007-2008 and has accelerated the arrival of the “Future of Work”

The World Economic Forum in its *Future of Jobs Survey* says that “early evidence indicates that employers are set to accelerate their job automation and augmentation agenda, and this raises the possibility of a jobless recovery. 80% of employers report that they are accelerating the automation of their work processes and expanding their use of remote work. 50% report that they are set to accelerate the automation of jobs in their companies.

### Skills required post Covid for success.

The Future of Jobs survey also presents the top 10 skills required for work in 2025 and I would like to draw your attention to 4 of the top 5 and number 10. These skills fall under the broader category of Problem Solving



## Jobs: Outlook

March 2020 to March 2025

### More jobs

	New jobs	Replacement jobs	Total job opportunities
Professional, scientific, technical services	27,520	43,922	71,442
Health and social assistance	20,375	53,914	74,289
Manufacturing	11,914	57,256	69,170
Administrative and support services	10,968	28,518	39,486
Public administration and safety	10,380	27,239	37,619
Education and training	9,925	39,686	49,611
Agriculture, forestry and fishing	7,519	33,684	41,203
Other services (hair, repairs, etc.)	6,580	20,951	27,530
Retailing and wholesaling	4,282	80,179	84,461
Finance and insurance	2,880	12,512	15,392
Arts and recreation services	2,782	10,285	13,067
Rental, hiring and real estate	2,406	14,680	17,086
Transport, postal and warehousing	1,387	20,786	22,174
Mining, electricity, gas, water and wastes	1,241	4,463	5,704
<b>Fewer jobs</b>			
Construction	-2,540	51,790	49,250
Information media and telecoms	-2,694	7,228	4,534
Accommodation and food services	-7,956	34,033	26,077
<b>TOTAL JOBS</b>	<b>106,969</b>	<b>540,525</b>	<b>647,494</b>

Source: Infometrics, Herald Network graphic

## The local picture!

A recent NZ Herald article on the best Covid options for Tertiary Education, Training courses and jobs presented recent Infometrics research showing the NZ Jobs outlook from 2020 through to 2025. The research projected a continued decline in total jobs out to 2022, however the sector with the fastest growth as we emerge from Covid-19 will be “professional, scientific and technical services, with manufacturing being the third fastest in growth of jobs.

Considering both the BIG and LOCAL pictures – NZIFST members are in a strong position.

Globally we know the future of work involves greater automation and technology and as a result of Covid we are now moving there more quickly. Employers will be looking for the skills that will enable their people to succeed in this future with significant focus on analytical thinking and innovation, complex problem solving, critical thinking and analysis, reasoning and ideation.

Locally, we are seeing the global trends influencing the sectors that will have the fastest rates of job growth in New Zealand following Covid: professional, scientific and technical services and manufacturing.

NZIFST members typically fall into both these categories. Our training and jobs typically incorporate a significant number of the Top 10 skills required for job success in 2025 and the majority of us are employed in the sectors that will show the strongest Job growth in New Zealand post Covid.

Although I am sure no one would wish for Covid to be repeated, as NZIFST members we can take some comfort in what the future of work will hold.

John Lawson is founder of Lawson Williams Consulting Group. He initially studied Biotechnology at Massey and is a professional member of NZIFST. He now enjoys leading a team of recruitment consultants, helping people like you develop satisfying careers.



# Natural antioxidants for food and health applications

Geoff Webster, Michael Eyres and Laurence Eyres FNZIFST

## Why antioxidants?

Rancidity is the term to describe the unpleasant tastes and odours that arise in food or oils when lipid oxidation occurs. The term comes from the Latin, *Rancidus* which means stinking. Many years ago, lipid oxidation was determined to be a free radical process involving oxygen and catalysts such as heavy metals and light. Classic phenolic antioxidants were free radical inhibitors. The original phenolic compounds in recent years have been found to be nutritionally undesirable and a gradual replacement process has occurred.

Antioxidants help maintain freshness of foods in significant ways. They inhibit the formation of off-flavours that arise from oxidative degradation of compounds containing lipids, they prevent discolouration in foods, and they inhibit the destruction of micronutrients such as certain vitamins and various amino acids. These are all changes that can make a food inedible or reduce its nutrition content.

The use of antioxidants in the food matrix is increasingly being shown to have health benefits over and above preserving the food. Current research is discovering new and powerful plant bioactive benefits in the gut that are changing the way we think about these molecules regarding human health.

## Natural antioxidant preservatives in foods

Oxidation is a free radical process and is inhibited by compounds that trap free radicals in the initiation phase. These then prevent secondary oxidation which will lead to the eventual production of offensive odours and flavours. In this article we are talking about deterioration at ambient temperatures as breakdown at frying temperatures is a separate process.

Over recent years the synthetic antioxidants BHA, BHT, TBHQ and Propyl Gallate have been gradually replaced by natural alternatives. Some of the most common types and sources of naturals are the tocopherols (mainly from soya bean oil), rosemary and its extracts, and green tea. Becoming more common are extracts of oregano, lemon balm, olive leaf, grapeseed and sesame seed. There are many other potential sources. Depending on your view of what constitutes natural, ascorbic acid and ascorbyl palmitate may also be included.

Which antioxidant or combination to add depends on many factors:

- The food matrix – oil, emulsion, meat or meat-derived such as sausage, deep fried snack food, nut bar, and so on.
- The intended shelf life – from a few days for fresh products up to several years for canned.
- The manufacturing process – involving heat, oxygenation, light exposure, trace metals, for example. The latter are best chelated using citric acid or in some instances E.D.T.A.
- The regulatory landscape – for example tocopherols could improve butter shelf-life but are not permitted.

- Choice of packaging – for example clear glass or plastic should be avoided: a good oxygen barrier, gas flushing.
- Conditions of storage – frozen, chilled, moderate ambient, high ambient (over 30°C), light exposure.

Complicating the picture is the potential of some antioxidants to behave as pro-oxidants. For example adding more than 500ppm tocopherols or 200ppm ascorbic acid may mean that instead of prolonging shelf life, the reverse might occur.

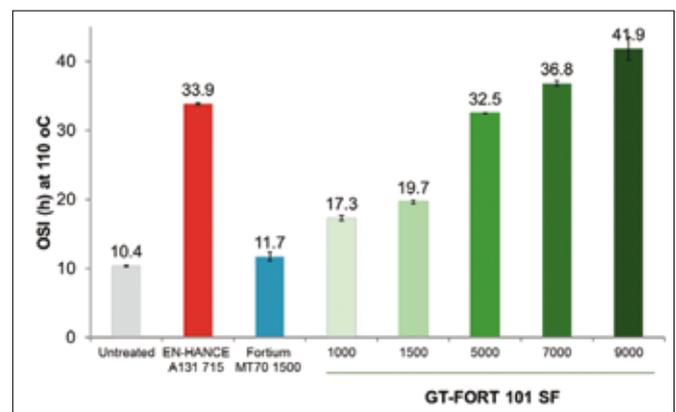
## Natural antioxidants – technical literature from Kemlin

Natural antioxidants for pure oils are used to extend the shelf life that is already provided by the natural antioxidant compounds in the oils such as tocopherols (most oils), and polyphenols (olive oil).

Kemlin is a manufacturer and supplier of food antioxidants in Australasia and they are represented in New Zealand by Hawkins Watts. If you put Kemlin and “Technical Literature” in your Google search, you will find the recommended antioxidant for your application – or you can ask Hawkins Watts. The following case studies are with Kemlin products, comparing the effectiveness of natural vs synthetic antioxidants.

### Case Study 1:

Canola Oil: In canola oil, approximately 5000 ppm of GT-FORT 101 SF was able to match the OSI (Oil stability index) hours of the TBHQ-based product EN-HANCE. Mixed tocopherols did not increase the OSI substantially. A linear dose response was observed up to the max dose level of GT-FORT. (a) OSI correlates with shelf life. The higher the bars on the graph, the better the shelf life. TBHQ is synthetic, mixed tocopherols (blue bar) which are not very effective, but green tea extracts (GT-FORT) are better.

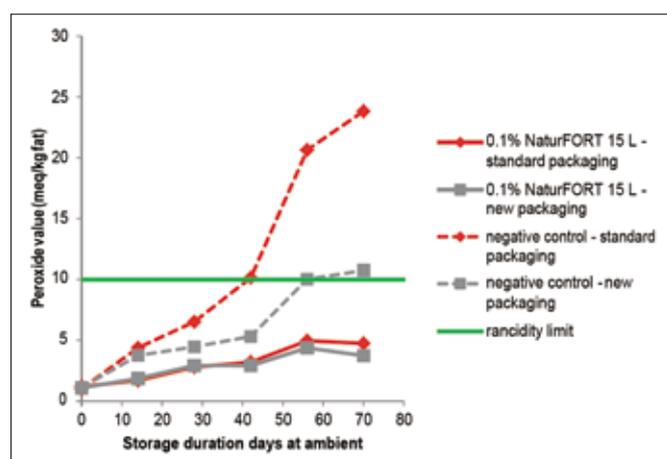


OSI hours of canola oil at 11°C. Error bars represent standard deviation of duplicates

In our opinion, you can more than double shelf life using 2000 ppm of GT-FORT, and this would probably be adequate for bottled oil. If you want to match TBHQ, you need to go up to 5000 ppm GT-FORT, and this would be fairly expensive. It is a truism that just about any natural alternative to a synthetic food additive will be more expensive, whether it's an antioxidant, a colour or a flavour.

Each application will demand a different natural antioxidant, and it is often a synergistic mixture that is best. The different parts of the mixture may concentrate in different phases of an emulsion (the oil phase, the interface or the water phase) and support each other in complex ways. Some ingredients such as ascorbic acid or ascorbyl palmitate may help regenerate spent antioxidants.

## Case Study 2: Low fat Mayonnaise



### Peroxide values of low fat mayonnaise at ambient storage

In this Kemin technical paper a mixed natural antioxidant using green tea and rosemary extracts (NaturFORT™ 15 L Liquid Natural Flavourings) is used in a low fat mayonnaise. (b)

In this case the peroxide value increases with time, so lower values are better. It is interesting that the right packaging choice can make a useful improvement to the shelf life, but the antioxidant mix has a more profound benefit.

## Natural antioxidants – health benefits

We are all familiar with the free radical theory of ageing and the proposed role that dietary antioxidants have in quenching free radicals. New Research however is elucidating new and powerful mechanisms of how plant bioactives work once absorbed that are changing the way we think about these molecules in regards to human health.

Through nutrigenomic effects, plant bioactives have been shown to upregulate endogenous antioxidant mechanisms that have the ability to quench free radicals in orders of magnitude higher compared with what would be possible via direct antioxidant mechanisms. It is generally accepted that dietary antioxidant compounds will exert direct antioxidant effects in the gut lumen but questions have been raised in the past as to how these compounds can exhibit systemic effects due to their lack of bioavailability (1).

New research on the importance of the microbiome has shown that the metabolism of phenolic materials in the gut by the microbiome is more important than first thought. Polyphenols are now viewed as novel pre-biotics and have a positive effect on the growth of beneficial species and an inhibitory effect on pathogenic species (2). The interactions of the effects of dietary polyphenols on the local gut redox environment,

the microbiome and gut epithelial receptors, is an active and fascinating area of study with new research. These interactions that all occur in the gut are now thought to contribute to the health benefits of ingesting polyphenols at the clinical level which include reduced inflammation, improved metabolic health and improved cardiovascular risk factors (3).

Sulforaphane from cruciferous vegetable sources has become the superstar of the nutrigenomic world, being found to be the most effective activator of the transcription factor NRF2. Although not generally utilised as a food antioxidant it works as a great example of how a plant bioactive can benefit human health through interaction with our genes as opposed to direct effects. NRF2 is a key modulator of cellular defence mechanisms, its activation causes NRF2 to travel from the cell cytosol into the cell nucleus where it upregulates a raft of cytoprotective genes that code for enzymes that produce endogenous antioxidants such as glutathione. The actions of these enzymes and endogenous antioxidants are thought to be responsible for the health benefits of the dietary antioxidant compounds which include reduced oxidative stress and improved detoxification pathways. Other than sulforaphane additional natural antioxidant compounds now found to activate NRF2 include carnosol from Rosemary, quercetin, several citrus bioflavonoids, and many other plant compounds (4, 5).

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Mike Eyres is a qualified Naturopath working in the field of health ingredients formulations.

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# Egg pasteurisation –

Crack the challenge of thermal egg processing with tubular heat exchangers



Matt Hale, International Sales & Marketing Director, HRS Heat Exchangers

Eggs are a key foodstuff and ingredient. According to industry data<sup>1</sup>, New Zealanders eat an average of 230 eggs a year. While shell-on eggs account for the bulk of this consumption, processed egg products represent an important part of the market. These can take a number of forms but the most common is liquid egg.

## Buying local

Overall consumer demand for eggs has risen steadily over the decade and Kiwis increasingly want the reassurance of home-produced eggs, with New Zealand demand growing 15% over the last ten years<sup>2</sup>. One of the reasons for this is the recognised high production and food safety standards which come with New Zealand eggs. That quality and reassurance is also sought by the buyers of processed egg products.

Not only does this place specific requirements on the raw materials used by egg processors, but it also means that the equipment used must be of the highest quality, delivering reliable results time after time.

## The importance of pasteurisation

There may be several reasons to process eggs, including convenience, to extend shelf life or as part of other food processing and manufacturing operations. The main reason to pasteurise egg products is for food safety, but other reasons include ease of use, improved hygiene, and product uniformity. Depending on the exact combination of treatment time and temperature used, it is possible to produce a shelf life of up to 16 weeks for refrigerated liquid egg products.

Irrespective of the treatment method used, it is important to use fresh, clean, and sanitised eggs, and to chill and filter them immediately after breaking. The contents of an egg are essentially sterile until broken, so one of the aims of processing is to reduce or eliminate any bacteria or contamination which may be introduced once the egg is cracked. Liquid whole egg and yolk should be held at or below 4°C, and egg whites below 7°C.

## Egg characteristics

Fresh eggs have a thick white and an upstanding yolk. Over time, water and CO<sub>2</sub> are lost through the egg shell pores. In consequence, the egg pH is altered, resulting in loss of the thick albumen protein structure. Because of this, eggs are refrigerated and processed quickly, usually within a week.

Liquid egg is a very delicate product as the proteins in egg are more sensitive to heat than other products such as milk or juices. This is because the white and yolk are distinct components with different compositions and behaviours. When mixed, they interact mutually – for example, egg white is denatured at 58°C while yolk is denatured at 65°C. These low temperatures also make it hard to aseptically process natural liquid egg products; the eggs are frequently cooked before the required time and temperature minimums are achieved.

Yolk and whole egg products are generally pasteurised in their liquid form, while liquid egg white may be pasteurised when sold as a liquid



*Eggs contain a complex mixture of white and yolk, each with different processing requirements*

or frozen product. In contrast, dehydrated egg yolk (with the glucose removed) is normally pasteurised by holding containers in a large chamber over several days.

## Technical challenges

For most liquid egg products, pasteurisation using heat exchangers remains the main form of heat treatment. Various time and temperature regimes are used to pasteurise eggs depending on the product, which could be whole egg, separated egg (whites or yolks), or a treated product, like salted yolk. Each type of product presents a different challenge in terms of viscosity, and products with added salt also introduce a higher likelihood of equipment degradation or corrosion.

Pasteurisation itself is a relatively simple process. It requires that a material be held for a certain time at a certain temperature in order to kill micro-organisms. There is no doubt that pasteurisation adds an additional step into the overall manufacturing process, but if well-designed it should not slow down throughput or place additional management burdens on the plant.

However, pasteurisation can have several unwanted effects, including gel formation and softening of the yolk, or irreversible denaturation of the proteins and changes to the appearance. If not handled correctly,



*Corrugated tube heat exchangers provide a number of benefits over other designs*

thermal pasteurisation can decrease protein content, change physical characteristics such as texture and colour, and increase product viscosity. Choosing the right pasteurisation regime and equipment is therefore vital to minimise and prevent such unwanted effects.

In the past, many processors have used plate heat exchangers to pasteurise egg products, but these allow product to coagulate on the plate surface, fouling the heat exchanger so that frequent CIP (cleaning-in-place) is required to maintain operational efficiency. This adds time, energy, and cost to the processing, and reduces overall capacity.

Tubular heat exchangers overcome some of these problems (for example, the larger diameter helps the product to run through the heat exchanger more easily) but there can be issues around heat transfer efficiency and the necessary size of the exchanger to achieve effective pasteurisation.

### Corrugated heat exchangers reduce fouling

These issues can be overcome with the use of corrugated tube technology as employed by HRS, which uses turbulent flow to reduce fouling.

Turbulence makes tubular heat exchangers more efficient by preventing viscous (thick) materials sticking to the wall of the tube, where they can act as insulation and prevent efficient heat transfer – known as a boundary layer. Turbulence also prevents materials in suspension from dropping out of the carrier fluid and having a similar effect. This is the main benefit of corrugated tubes.

Because a corrugated tube has an increased heat transfer rate

compared to a smooth tube of the same length, the heat exchanger can be made smaller. For example, if corrugations increase the heat transfer by 10% compared to a smooth tube, then the unit can be made 10% shorter than an equivalent smooth tube while delivering the same performance. The increased thermal efficiency—which can be up to three-times that of a smooth tube heat exchanger—also means that less space is required to achieve the same level of heat transfer. Depending on application, a corrugated tube heat exchanger can therefore be up to half the size of its smooth tube equivalent. This is why HRS' heat exchangers are commonly specified for installations where space is restricted.

It is also important that the equipment chosen allows regular inspection and suitable CIP. Not only do HRS corrugated tube heat exchangers facilitate this, but because their design helps to prevent fouling in the first place, they also reduce downtime. In many cases, a corrugated tube provides sufficient turbulence to prevent the need for mechanical agitation, such as in a scraped-surface or screw-driven heat exchanger. With no moving parts, a corrugated tube is much easier to clean and maintain and may be more reliable than a scraped-surface heat exchanger although there are applications where a scraped surface heat exchanger is the better option. Therefore, the operational run times between cleaning cycles are generally much longer with corrugated tubes than smooth ones, further increasing the overall efficiency of the process.

### References

<sup>1</sup> <https://www.eggfarmers.org.nz/eating-eggs>

<sup>2</sup> <https://tinyurl.com/y2lu4f9x>

### About HRS Heat Exchangers

Located in Melbourne, HRS Heat Exchangers is part of the HRS Group which operates at the forefront of thermal technology, offering innovative heat transfer solutions worldwide across a diverse range of industries. With almost 40 years' experience in the food and dairy sectors HRS units are compliant with global design and industry standards. HRS has a network of offices throughout the world: Australia, New Zealand, UK, Spain, USA, Malaysia and India; with manufacturing plants in the UK, India and Spain.

## MANAGING ENERGY EFFICIENTLY

HRS provide a range of Corrugated Tubular and Scraped Surface heat exchangers, components, modules and complete processing systems that help you to optimise production, make the most of raw materials, while reducing energy consumption, waste and emissions:

- Pasteurisation
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- Aseptic Filling
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# Meat fermentation at mini-scale

## Laboratory methods to study starter cultures

Jihan Kim, Scott Knowles and Li Day, AgResearch, Palmerston North

### Introduction

Fermentation is a traditional and economical way to preserve and enhance the quality of meat. The process is a complex biological chain of events mediated by a shifting balance of dominant microorganisms. These convert carbohydrates into organic acids that quickly acidify the meat environment, leading to further changes in sensory and textural properties. Managing the microbiome is key to determining the characteristics of products.

Fermented meats are produced in many countries. The sausage format typified by salami is common, as is whole leg muscle turned into ham. Their diverse flavours and textures reflect regional differences in ingredients, climate conditions (temperature, humidity, airflow, storage) and environmental microorganisms. For authentically traditional processing, the growth of indigenous microbes is encouraged, and additional starter cultures are not used (Coppola et al. 2000; Talon et al. 2007). However, environmental microbes are an uncontrolled variable. They may have poor enzyme functions (e.g. nitrite reductase, or the lipases and proteases responsible for flavour development), or have weak resistance to the curing salt, or be outcompeted by less desirable strains. Producing consistently high quality fermented food relies on some luck, even in the hands of artisan manufacturers.

There is an opportunity to expand the roles that microbes can play in meat fermentation, in effect to teach them new tricks. This is an aim of a New Zealand government-sponsored MBIE Endeavour Research Programme called “Accelerated Evolution: A step-change in food fermentation”. Our researchers and industry partners are interested in how indigenous and commercialised strains can be stimulated to acidify better, generate novel flavour compounds, provide stronger defence against pathogens, and be biological substitutes for chemical additives.

### Traditional and contemporary protocols

The traditional stages of meat preservation for salami-style products involve salting/curing, fermentation, drying and ripening (Figure 1A). The first step is under cool, anaerobic conditions to suppress pathogens and promote the growth of beneficial indigenous microbes. Subsequent aerobic warming triggers vigorous fermentation and concomitant acidification to a food-safe value below pH 5.2. The acidified meat is left to dry to a stable water activity and then ripen, sometimes for many months. The employment of commercialised starter cultures during curing simplifies manufacturing because they are designed to grow anaerobically and to speed up acidification. This phenomenon is recognised as the main driver of texture changes, as the acid causes gelation and protein denaturation of the meat (Alting et al. 2004; Barbut 2005; Houben & van 't Hooft 2005).

Whether historical or modern, these protocols are slow and not easily amenable to innovation. Trial and error experimentation at

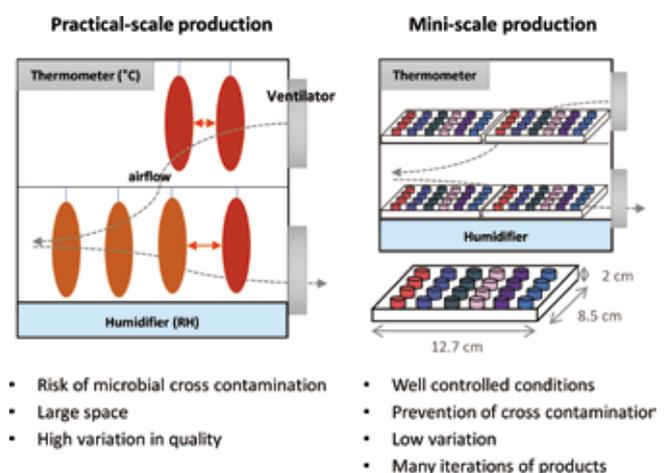


Figure 1 A & B. Comparison between practical-scale production (A) and mini-scale production (B)

the butchery requires hands-on time and expensive raw materials. A nimble method that can quickly test meat ingredients and study new microbe strains is needed.

### Mini-scale development

Lab-scale fermentation techniques can leverage well-controlled conditions to provide speed, accuracy and reproducibility (John et al. 2019). They expedite product development with less risk and less waste than pilot plant scale production. These methods seem to be most useful for studying strain selection, characterisation, and optimisation (Ammor et al. 2006; Olughu et al. 2019).

We have developed a mini-scale system that simplifies the formulation and environment necessary for fermenting meat (Figure 1B). At its most basic, the system uses a 24-well plastic culture plate with each well containing 1.5 g of homogenous fat-free meat paste or batter. The paste contains adjuncts typical of salami-making. Plates are incubated at fixed temperature and humidity for 2-3 days of active fermentation followed by up to 5 days of drying/ripening. By using these plates, we can put many iterations of ‘sausages’ into very little space. Additionally, this improves sample quality compared to the variable distributions of temperature, humidity and airflow that would occur in practical-scale production. A protective membrane over the plate limits the risk of cross-contamination of microbes within and between plates.

The initial phase of our project was a proof of concept of the mini scale system. We identified five distinct strains of bacteria that are common in commercial starter cultures and screened them for their ability to

acidify a simple meat matrix. One strain was then selected to confirm that acidification during fermentation is associated with texture properties of the meat product.

## Materials and Methods

Fresh pork loins were trimmed of surface fat and connective tissues, cut into small cubes, then freeze-dried to a moisture content of approximately 5%. The material was ground to powder, vacuum-packaged and stored at -20°C.

Five pure single strains of starter cultures designed for fermented meat production were sourced from local and international suppliers. They were *Lactobacillus sakei*, *Lactobacillus curvatus*, *Pediococcus acidilactici*, *Staphylococcus xylosum*, and *Staphylococcus carnosus*.

### Mini-scale fermented meat processing

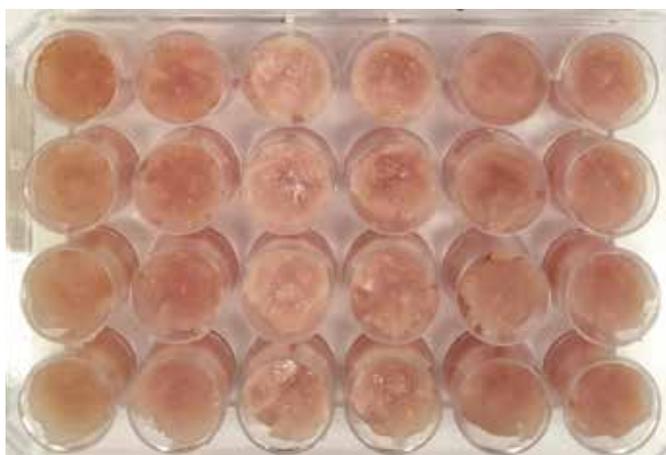


Figure 2. Photo of fermented pork produced in mini-scale method

Freeze-dried meat powder was resuspended in distilled water to form a fat-free paste with a moisture content of 85%. Additives were 2.5% sodium chloride, 2% glucose and 0.25% Prague Powder, which is a commercial curing product containing 6.25% sodium nitrite carried in 93.75% sodium chloride. The final NaNO<sub>2</sub> concentration was approximately 160 ppm in the meat paste. Starter culture was added at 20 mg per 100 g to provide 5 × 10<sup>6</sup> CFU/g meat. 1.5 grams of the mixture was stuffed into each well of the plate (Figure 2). The microplate was sealed with a Breathe-Easy self-adhesive membrane (Diversified Biotech), which is permeable to moisture vapour and oxygen while protecting the meat from internal microbial cross-contamination as well as the growth of moulds from the external environment. The wrapped microplate was placed in an incubator equipped with air ventilation and temperature controller. The fermentation condition was 3 days at 30 °C and relative humidity (RH) of 75-80%.

### Technical measurements

**pH** – One gram of sample was 10-fold diluted in distilled water and then shaken to be mixed. The pH of the mixture was measured by a Lab 850 pH meter (Schott, Mainz, Germany). The mean of three measurements was recorded for each treatment.

**Texture** – The texture characteristics were measured by using a texture analyser (Stable Micro Systems TA, Surrey, UK) with a 10 mm cylinder probe. The samples were compressed to 50% of their original height using a cross head speed of 1mm/s. The following parameters were calculated: hardness (kg) and chewiness (kg), according to the methods described by Bourne et al. (1978).

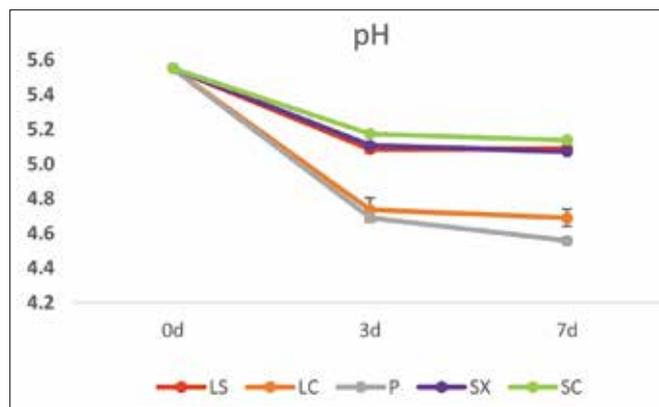


Figure 3. Change in pH of fermented pork produced by five different starter cultures during the process. LS) *Lactobacillus sakei*, LC) *Lactobacillus curvatus*, P) *Pediococcus acidilactici*, SX) *Staphylococcus xylosum* and SC) *Staphylococcus carnosus*

## Results and Discussion

### Effect of five single starter cultures on pH of fermented pork

Figure 3 shows that even in this very non-traditional system, pork meat ferments and acidifies appropriately. The pH of meat inoculated by different starter cultures fell over 7 days in the expected manner. Fermentation rapidly acidified the material from its initial pH of 5.6 to below 5.2, the value recommended by FSANZ (2008) to discourage the growth of pathogens. Strains LC and P showed the greatest acidification ability. The pH changed only slightly during drying and ripening stage.

Further experiments with the mini system were truncated to 3 days and used only the *P. acidilactici* strain to test whether acidification was affected by the quantity of added culture (1X, 2X and The traditional stages of meat preservation for salami-style products involve salting/curing, fermentation, drying and ripening (Figure 1A). The first step is under cool, anaerobic conditions to suppress pathogens and promote the growth of beneficial indigenous microbes. Subsequent aerobic warming triggers vigorous fermentation and concomitant acidification to a food-safe value below pH 5.2. The acidified meat is left to dry to a stable water activity and then ripen, sometimes for many months. The

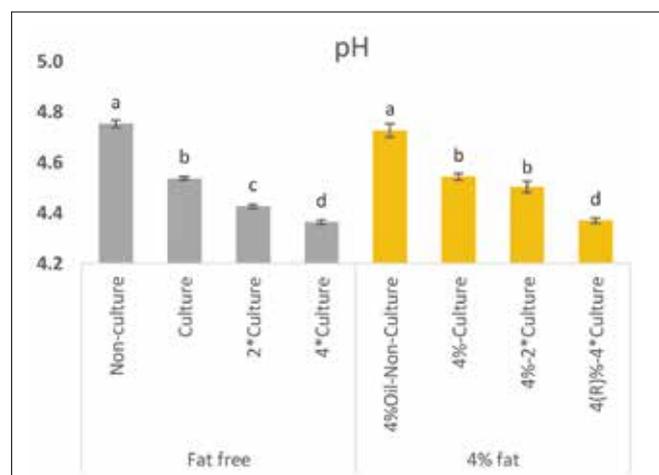


Figure 4. Effect of three inoculation doses of *Pediococcus acidilactici* and 4% fat on pH of meat samples after 3 days of fermentation (all values at day 0 were 5.5). Non-culture, without starter culture; Culture, inoculated with 5x10<sup>6</sup> CFU/g meat; 2\*Culture, 1x10<sup>7</sup> CFU/g meat; and 4\*Culture, 2x10<sup>7</sup> CFU/g meat

**Table 1. Effect of three inoculation doses of *Pedococcus acidilactici* and 4% fat on two texture properties of meat samples after 3 days of fermentation.**

	Fat-free				4% fat				S.E.M	p-values		
	NC	Culture	2* Culture	4* Culture	NC	Culture	2* Culture	4* Culture		Dose	Oil	Interaction
Hardness (kg)	0.65	0.93	1.31	1.18	0.37	0.71	0.71	0.94	0.06	0.04	0.07	0.25
Chewiness (kg)	0.22	0.42	0.71	0.57	0.11	0.26	0.31	0.38	0.10	0.04	0.07	0.18

NC, without starter culture; Culture, inoculated with  $5 \times 10^6$  CFU/g meat; 2\*Culture,  $1 \times 10^7$  CFU/g meat; and 4\*Culture,  $2 \times 10^7$  CFU/g meat.

employment of commercialised starter cultures during curing simplifies manufacturing because they are designed to grow anaerobically and to speed up acidification. and by the composition of the mock salami (inclusion of 4% fat as oil into the meat paste).

### Effects of inoculation dose and fat addition on pH and texture properties

Figure 4 shows that the mini-scale method is sufficiently sensitive and repeatable to discriminate between small (2- and 4-fold) adjustments in the quantity of inoculum, in both the absence and presence of 4% fat. Initial pH was 5.5 for all treatments. Decrease in pH with increasing inoculum was observed in dose-response, with minor differences due to fat (2\*Culture fat free 4.43 versus 4% fat 4.5). Adding fat to the lean meat formulation retarded acidification in both rate (time to minima) and extent (minima achievable), perhaps due to effects of emulsification on the bacteria-friendly aqueous phase.

As mentioned above, the full protocol for meat preservation is long and slow. Our mini system is not intended to replicate its entirety but rather provide rapid clues about likely outcomes from changes to recipes and processes. One such outcome is creating desirable texture in products, such as the right amount of chewiness in a finished salami. As a proxy for this we did instrumental texture analysis on meat paste after 3 days of fermentation.

Table 1 shows that adding the recommended dose of starter culture ( $5 \times 10^6$  CFU/g meat) in both the absence and presence of fat increased hardness and chewiness by 1.5-fold compared to meats without *P. acidilactici*. Increasing the quantity of inoculum further increased the hardness and chewiness, although not in strict dose response.

Addition of 4% fat to the lean meat paste made the formulation softer, as measured by a decrease in both hardness and chewiness regardless of starter culture. The 4\*Culture sample showed the highest hardness and chewiness in the presence of fat. This demonstrates that the mini scale method can produce mock salamis in 3 days with sensible distinctions in texture. Increasing the amount of inoculum and concomitant acidification led to firmer textures.

### Conclusion

A sensitive and repeatable laboratory method is useful for food product development in order to rapidly identify consequences of experimental variables. As part of the MBIE Endeavour Research Programme called “Accelerated evolution: A step-change in food fermentation”, we developed a mini-scale fermented meat system that operates in a

tightly controlled environment. It was able to discriminate acidification and texture properties attributable to strains of microbes. This system is a screening tool to facilitate tests of fermentation strains, recipes and other industry-relevant factors. Successful results will be extended stepwise through small-scale and pilot plant scale production.

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# Pasture-raised beef and lamb –better for you?

News from the Meat Industry Association

## Comparing grain-fed with pasture-raised

New Zealanders will be invited to take part in a major research programme to assess the health and well-being benefits of eating pasture-raised beef and lamb, compared to grain-finished beef and plant-based alternatives.

Approximately 100 people will be monitored in two ground-breaking clinical studies, led by researchers from AgResearch, the Riddet Institute and the University of Auckland.

The projects will assess the physical effects on the body from eating the different foods for up to 10 weeks, as well as psychological elements, such as satisfaction, sleep and stress levels.

The research team includes meat scientists, agricultural academics, dietitians, behavioural experts and social scientists.

Sirma Karapeeva, Meat Industry Association Chief Executive, is excited by the programme of research being undertaken by the Meat Industry Association's Innovation arm. She said much of the global research on the health, nutritional and environmental aspects of red meat was based on intensive grain-finished farming systems.

"However, New Zealand specialises in producing livestock that is naturally pasture-raised, antibiotic-free and hormone-free. We know there are myths and misinformation about the production and benefits of eating red meat, so we have turned to research to help bring balance to what consumers are hearing.

"Nutritionists tell us moderate amounts of red meat can be an important part of a well-balanced diet, and this research aims to build on the substantial credible evidence that underpins this advice.

"Consumers are choosing to make ideological decisions about what they eat. In part, this is a backlash against broken food systems, such as factory farming and 'big food'. There is a growing consumer desire for better quality food produced from natural systems, which supports a strong future for 'real' red meat as produced in New Zealand.

"New Zealand farmers have a compelling story to tell about our natural farming systems and a strong point of difference against many of our international competitors. The red meat sector is working hard to ensure that story is heard by consumers around the world."

The initial stages of the programme are led by AgResearch and the Riddet Institute. AgResearch will develop nutritional profiles and the Riddet Institute will undertake lab-based (or "in vitro") digestive analysis of the products.

University of Auckland researchers will then oversee the final two stages, investigating both the short-term and long-term well-being and health benefits of red meat consumption.

The highlight of the programme, a sustained clinical study, will see members of 40 households on a managed flexitarian dietary regime



*Meat Industry Association Chief Executive, Sirma Karapeeva*

over 10 weeks. The participants will be monitored over the course of the study and changes in health status, behaviours and attitudes and perceptual well-being recorded.

Senior scientist Dr Emma Bermingham of AgResearch said: "We will carry out an advanced analysis of red meat, looking at its unique components, such as bioactive lipids and minerals, that make red meat such a nutritious form of protein when included as part of a balanced healthy diet."

Dr Mike Boland and Dr Lovdeep Kaur both senior scientists at the Riddet Institute, will demonstrate how the human digestive system responds to the differing food compositions to release the nutritious proteins and lipids for the body to use.

"We will examine how well these three contrasting foods are digested, using gastric simulation techniques," says Dr Boland.

Dr Andrea Braakhuis, an Academic Director and Research Dietitian at The University of Auckland, and her team will examine how the beneficial lipids and nutrients from a single meal are absorbed and utilised by the body, before moving to the longer 10-week study where health and well-being benefits of red meat as a part of a balanced diet will be the focus for the researchers.

The research is supported by Meat Industry Association Innovation Ltd (MIA Innovation) and jointly funded with Beef + Lamb New Zealand Ltd (B+LNZ), the High-Value Nutrition National Science Challenge <https://www.highvaluenutrition.co.nz/> and the Ministry of Business, Innovation and Employment (MBIE).

## 2021 Meat Industry Association Scholarships

Students considering a future career in New Zealand's red meat sector are encouraged to apply for a Meat Industry Association Scholarship.

Six undergraduate scholarships providing \$5,000 a year for each year of study and four post-graduate awards of \$10,000 a year for each year of study are awarded to the successful applicants.

Applications can come from across a wide range of fields of study that are relevant to meat processing, marketing or exporting. That includes food sciences and engineering, agribusiness, commerce, environmental science, international marketing, process design and industrial innovation.

The MIA also runs a mentoring programme for scholars and every year the successful applicants are invited to Wellington to learn more about the industry.

Applications close 1 December for 2021 Scholarships. However, it may be worth contacting Kevin Cresswell on 04 495 8377 if you are interested.

# FSANZ News

Glen Neal, General Manager Risk Management and Intelligence,  
Food Standards Australia New Zealand



*FSANZ, counting all its past guises, reaches the significant milestone of 30 next year*

## Important milestones

Food Standards Australia New Zealand, including its previous guises the National Food Authority and the Australia New Zealand Food Authority, turns 30 next year. The Food Treaty, which provides FSANZ with 40% of its acronym, turns 25. With good management (not good luck) we will be able to celebrate these milestones in an appropriate manner.

Whilst our purpose is to protect public health and safety, enable informed consumer choice and prevent misleading or deceptive conduct – we exist because of the value realised, and perhaps the pain avoided, in having common standards that facilitate trade. Firstly interstate trade within Australia, and then Trans-Tasmanly.

Anniversaries that end in a zero, or a 5, tend to prompt a bit of reflection and some planning don't they?

## Crystal ball gazing

A recent consultation run by the Australian Department of Health (owners of the FSANZ Act) has posed some pretty big questions about

our future. Our objectives (Should trade be more prominent?), our functions (what role might we play in diet-related public health?), what partnerships will we need, is the legislation fit for purpose and how might we enhance our operation are all 'up there' in terms of importance.

Traditionally FSANZ has been relatively focused on safety – managing pathogens and contaminants. We have developed an enviable reputation for doing that in a transparent, independent and scientifically robust manner. Can these core strengths be adapted to contribute to wider, shared issues associated with the diet – such as prevention of chronic disease and longer term drivers such as sustainability? If so, should they? These are perhaps even bigger questions that may play out over the next 25 or 30 years.

The Department is presently digesting feedback and will likely share its intended next steps before this is published. It is certainly heartening that there has been a lot of interest in the process with more than 80 submissions received in addition to the numerous workshops conducted. Thanks to everyone who has pitched in during what has been an 'unprecedented' year.

# New Zealand Food Safety Update

In this edition, we're focusing on the review of the Australia-New Zealand food regulation system, food rules for importers, and the NZ Food Heroes Awards.

## Unregistered food importers risk delays or fines

We'd like to remind importers of food and beverages to New Zealand that they need to register as a food importer with New Zealand Food Safety.

It's important to know if you are a food importer and need to be registered. Some sectors that have high levels of non-registration are beer brewers, wine retailers, health food/supplement companies, and businesses importing confectionary for promotional giveaways.

If you want to import food or beverages for sale in New Zealand, you must register as a food importer with New Zealand Food Safety (or use an agent who is registered). You may also need a further registration (under either the Food, Animal Products or Wine Act) to sell this imported food or use it as an ingredient in your business.

We encourage people who need to register to do so today to avoid the potential costs and delays that can come with non-compliance.

## How to register

If you want to import food and beverages, you must:

- Be registered as a food importer with New Zealand Food Safety, or use a registered agent. For details, go to the "Register as a food importer" page.
- Register under the correct Act (Food, Wine, or Animal Products Act) if you are selling the food or using it as an ingredient in your business. Go to My Food Rules, and complete the online questionnaire to find out what you need to do.
- Check that the food you are planning to import is safe and suitable.
- Know the ingredients your food is made up of, so that Australia New Zealand Food Standards Code rules can be met, such as correctly labelling the presence of allergens.
- Ensure the food is stored and transported safely.
- Keep good records to show how you've sourced and kept food safe.
- Have a plan in place to recall any food you have imported, supplied or sold directly as needed e.g. if the product was incorrectly labelled.

For more details, visit "Importing Food".

## Meet NZ Food Heroes Winners

Winners of the 2020 NZ Food Heroes Awards were announced on 8 October. They were chosen from 48 finalists and over 340 nominations and represent Aotearoa's food heroes during the COVID-19 response – including a tourism company, industry bodies, community groups, small-town supermarket workers and cafés.

The New Zealand Food Awards organised by Massey University, shifted from its usual programme, due to the impact of COVID-19, to delivering a community-focused celebration of innovators across all sectors of the food and beverage industry.

The winner of the New Zealand Food Safety-sponsored Outstanding Service Award was New World Foxton. The Outstanding Service



*The Outstanding Service Award was presented to New World Foxton owner Jason Davy (centre) with his wife Trish and Minister for Food Safety, Hon Damien O'Connor*

category recognised a person/organisation who demonstrated exceptional service, and/or adaptability to ensure continuity for the food chain during the COVID-19 response.

Well done to New World Foxton owner/operator, Jason Davy and his team who went above and beyond to engage with and support their community. During COVID-19, they continued to support the food chain industry, adapted their services (such as ready-meals for quick shopping), and supported community charities focusing on the elderly and vulnerable.

For more details about New Zealand Food Safety-sponsored awards, click here.

## Review of Australia-New Zealand food regulation system

Don't miss your opportunity to provide direct feedback about areas of inconsistency or duplication within the bi-national food regulation system that could undermine food safety objectives or otherwise disadvantage or impose an unnecessary regulatory burden on businesses.

Submissions are open until 18 December 2020. To have your say, visit the "Review of jurisdictional consistency across the binational food regulation system" page.

New Zealand and Australia have a unique shared regulatory system that sees us jointly developing food composition and labelling policy and standards. This is based on agreements we have with Australia, and has led to joint initiatives, such as our Health Star Rating System.

In November 2019, the Australia New Zealand Ministerial Forum on Food Regulation endorsed a plan to reform the binational food regulation system to ensure it remains strong, robust, and agile into the future. One of the projects under the planned reform aims to identify areas of inconsistency in food regulatory approaches across jurisdictions (jurisdictional consistency). Through this consultation, feedback is sought from stakeholders with experience of inconsistent regulation implementation and enforcement as part of food trade between New Zealand and Australia.

For more information, visit the Food Regulation Secretariat's "Modernisation of the food regulation system" page if you have any questions regarding this consultation or want to subscribe for updates to future consultations, please contact [FoodRegulationModernisation@health.gov.au](mailto:FoodRegulationModernisation@health.gov.au)

# Keeping our food safe

## Meet the 2020 Significant Contribution to Food Safety Awardees

For the first time, the Significant Contribution to Food Safety Award has applauded one winner (Aaron Dodunski from Mobile Beef Packers) and three commendations (Roger Harris from Safe Food Pro, iMonitor team, and Paul Wilson from Chomp).

This is the fourth year that New Zealand Food Safety has sponsored this award, as part of the New Zealand Institute of Food Science and Technology (NZIFST) Awards. The Awards presentation took place on 29 October in a “hybrid hub format” via zoom, connecting six hubs (Wellington, Auckland, Hamilton, Palmerston North, Christchurch and Dunedin).

The Significant Contribution to Food Safety Award is open to anyone involved in improving food safety. In considering who should receive this award, nominees were assessed against three key criteria: the originality or creativity of the achievement; the effectiveness of the achievement; and the level of impact.

The joint New Zealand Food Safety/NZIFST panel had record 21 nominations this year, from a wide background including science and research, industry, technology and the regulatory sphere.

The Award panel was particularly impressed with Aaron Dodunski's nomination, agreeing that this entry was innovative and addressed the needs of a significant domestic market. In addition, the trio of business professionals awarded commended mentions, demonstrate a range of food safety advancements. They have innovated and provided digital solutions that help food businesses meet their food safety needs.

## ..and the winner is...Aaron Dodunski, Mobile Beef Packers



*Bryan Wilson, NZ Food Safety, and Aaron Dodunski from Mobile Beef Packers, winners of the 2020 Significant Contribution to Food Safety award*

Aaron Dodunski and his wife Jo are the owners of Mobile Beef Packers, based in Auckland's Pukekohe East. Mobile Beef Packers is New Zealand's first mobile abattoir with a registered Risk Management Programme (RMP) to process and sell beef, lamb, and deer on the domestic market.

Aaron built the company over 6 years as an innovative system to

service farmers and small livestock hobby farmers. Aaron's business also supports butcher shops with low-cost beef and lamb which they, in turn, can supply to customers at lower cost. Through the RMP, the meat can enter the regulated system. Mobile Beef Packers lets small-scale owners of livestock control their product from paddock to plate, and trade animals that come from their property. The ability to be able to slaughter small numbers of animals on-site was of noticeable benefit during COVID-19.

Mr Dodunski is described as an individual with 24 years' knowledge in the meat processing industry who “takes things to the next level!”. He willingly shares his knowledge with other businesses in the food sector, including through instructional beef processing videos on his web page.

“We're very humbled to win this Award,” Mr Dodunski said. “A massive thanks to everyone who made the project what it is – a great project for the industry.” For more details, visit Mobile Beef Packers on Facebook.

## Paul Wilson, Chomp - Commended



*Bryan Wilson, NZ Food Safety, and Paul Wilson from Chomp, Commended in the 2020 Significant Contribution to Food Safety award*

With background of more than 30 years in the hospitality industry, including managing and owning various establishments in Queenstown, Paul Wilson is now the Managing Director of Chomp, the first digital food safety app on the New Zealand market.

Chomp was designed for commercial kitchens in response to the introduction of the Food Act 2014, to deliver fast, compliant Food Control Plans for the New Zealand hospitality industry. Mr Wilson and his team are dedicated to improving compliance in the hospitality sector with a simple-to-use tool that gives teams visibility of their food records and ensures stronger engagement with task completion, manage food safety and operational efficiency.

Mr Wilson said: “This was an amazing team effort that saw Chomp pioneer digital food safety in New Zealand with all our clients. Our aim is to eliminate inefficiency and improve productivity through offering cloud-based solutions for paper-based problems. We have developed a better, smarter way to manage food safety and operational efficiency.” For more details, visit Chomp.

### iMonitor team – Commended

The iMonitor team developed a food quality and safety management platform that enables manufacturers, hospitality businesses, and food retailers to digitise their food quality and safety management.

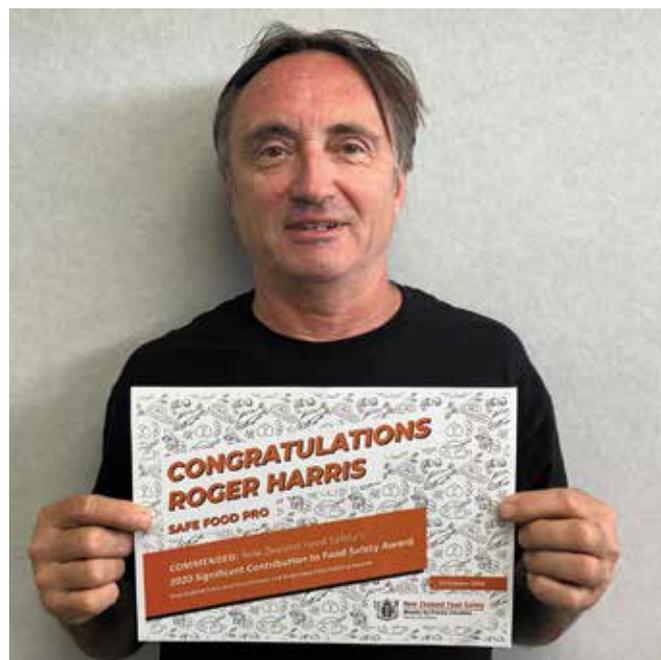
The platform collects continuous and discrete data using IIoT (Industrial Internet of Things) devices to provide meaningful food safety and operational data in real-time. Through automation, iMonitor has taken a significant amount of labour-intensive work out of maintaining compliance through a native app, Bluetooth probes, Infrared Bluetooth Thermometer and integrated in-process IIoT devices. iMonitor has helped improve the data integrity from source and has led to significant process improvements, particularly in production plants.

During the COVID-19 response, they set up a comprehensive online resource centre tool more than 600 individual phone call consultations, and created a COVID-19 checklist for food and pharmaceutical businesses.

iMonitor food scientist Shakeel Ahmed said: “We feel very honoured that our commitment to helping food businesses is recognised with this award. It was self-evident for us that we would support our customers in these unprecedented times. It was incredible how the whole food industry came together and helped each other.” For more details, visit iMonitor.



iMonitor food scientist Shakeel Ahmed with NZIFST Auckland Branch President, Sarah Leakey



Roger Harris, Safe Food Pro: Commended in the Significant Contribution to Food Safety Awards

### Roger Harris, Safe Food Pro – Commended

Roger Harris is Safe Food Pro’s Head of Engagement, a technology entrepreneur focused on the development and marketing of software applications targeting the food and hospitality industries. He is a co-founder of organics business Phoenix Drinks and a co-founder of Comply Pro.

Mr Harris and the Safe Food Pro team developed a leading, subscription-based software system – a powerful compliance engine with a focus on food safety management. Since launching in 2018, Safe Food Pro is now being used by more than 750 organisations across New Zealand, Australia and the USA.

One of the primary benefits to food businesses of this system, is “no longer having to rely on time consuming, bulky paper-based systems”. The app also manages staff training and has a verifier login which means verifiers can do a pre-check or even carry out remote verifications.

During the 2020 COVID-19 response, the team added more practical features and solutions to the app to help their customers, including a QR code contact tracing solution and COVID-19 specific checklists and forms.

“We are extremely honoured to receive this award,” Mr Harris said. “This is a great reflection of our commitment to the NZ food and hospitality industry. I believe that by leveraging smart technology solutions, the industry will thrive once again.” For more details, visit Safe Food Pro.

# A cautionary tale of non-compliance

Be sure that your claims comply with regulatory requirements

## Labelling compliance better informs consumers

Food labels and product advertisements give consumers important information about the food they buy, and, when done properly, can help people make informed choices.

Businesses must provide the right information to their customers, but sometimes things go wrong, and the information is unjustified, misleading or incomplete.

New Zealand Food Safety's Food Compliance Services team is a line of defence helping to minimise risk to consumers and to fix problems when they arise. The team is there to help food businesses get the right information and help them understand what is required for correct food labelling and any advertising material.

## Get your labels right

One recent example of this is when Food Compliance Officer, Linda Sluyter, investigated a report of therapeutic claims for 'black garlic' (slow-cooked garlic). The Nelson business, Neudorf Black Limited used these claims in website advertising.

Ms Sluyter reviewed the website and noted non-compliant therapeutic claims along with non-compliant nutrition and health claims. The claims made on the website included seven benefits of black garlic: "rich with antioxidants, boosts immunity, inhibits cancer growth, benefits heart health, lowers bad cholesterol, increased bio-activity, no garlic breath."

If you sell food in New Zealand, you need to meet labelling, advertising and composition requirements under the Food Act 2014 and the Australia New Zealand Food Standards Code (the Code). The Code states that claims cannot be therapeutic in nature.

The claims made were found to be a genuine mistake by the business and Ms Sluyter worked with them to put it right as quickly as possible.

"It was only a matter of hours from the time I contacted the business owner to him correcting the website advertising. He was quick to respond. He had only recently purchased the business and wasn't aware of the Code," said Ms Sluyter.

"Labels and advertising provide important information to consumers about the food they are buying."

The claims in detail:

- "Inhibits cancer growth" is considered a therapeutic claim, so is prohibited.
- "You can't say 'rich with antioxidants' – you can only say if the food contains or does not contain antioxidants and you also need to list the level of specific antioxidants in the product label's nutrition information panel."
- You also can't claim a food "boosts immunity" as this is seen as a greater effect than maintaining normal and healthy immunity.

The Code outlines health claims that can be made for vitamins, minerals and other bioactive compounds.

Not all foods can make claims though – the food or beverage needs to be sufficiently healthy to justify making a claim by having passed



*Whatever the benefits of your product may be you must ensure your claims comply with regulations*

a nutrition profiling score requirement. Also, some foods such as infant formula, kava and alcohol (with specific exceptions) cannot make nutrition content or health claims.

"Only the pre-approved health claims stated in the Code can be used in the marketing and labelling of foods. The Code lists over 200 pre-approved health claims that can be made on food meeting certain compositional requirements. There is also an option to self-substantiate general level health claims or apply to Food Standards Australia and New Zealand (FSANZ) to have a new health claim approved", Ms Sluyter said.

"It is critical to have the right information as the public need to know what is in a product and what (if any) proven health benefits it may have."

## Non-Compliant Labelling

During the investigation, it was also found that the product labels did not comply with the Code. The labels were carried over from the previous owner and Neudorf Black didn't realise the labels were missing some key information and had non-compliant claims. They needed to update two of their product labels as they contained non-compliant nutrition content and health claims.

One product, Black Sunroot, claimed it "Aids digestion and gut health". Black Garlic claimed it contained "Twice the antioxidants of regular garlic". Neudorf Black did get a laboratory to test the antioxidant content in both regular and black garlic, but the Code did not permit this type of claim.

There were also changes needed to the nutrition information panel.

"A nutrition information panel requires certain things to be declared. You have to declare energy, protein, total fat, saturated fat, carbohydrates, total sugar and sodium levels."

**It is important to know that if a nutrition component or health claim is made about anything else in a product, it must also be listed in the nutrition information panel.**

"The best way to determine this is to have a laboratory test carried out on the product for the quantity of these things. There are also publicly available food composition databases that can be used.

"I helped them to understand what they could or couldn't say according to the Code. I wanted to help them to get it right."

The website information is now compliant, and the business owner ensured the updated labels will comply with the Code.

"At the end of the day, this is about helping businesses to ensure that people can trust what is on food labels so that they can make the right decisions."

Find out more about Food labelling and composition and health and nutrition content claims.

If you would like advice, please get in contact email: [info@mpi.govt.nz](mailto:info@mpi.govt.nz) or call: 0800 00 83 33.

# Lipids and Nutraceuticals

A review of the latest news in the realm of natural compounds and health

Laurence Eyres FNZIFST and Mike Eyres B.Sc.

This issue focuses on polyunsaturated fatty acids, oils and ingredients that enhance or inhibit their benefit. We are pleased to have a distinguished scientist, Professor Philip Calder to give us an update on some of the latest discoveries in this field.

## Polyunsaturated fatty acids and SPM's

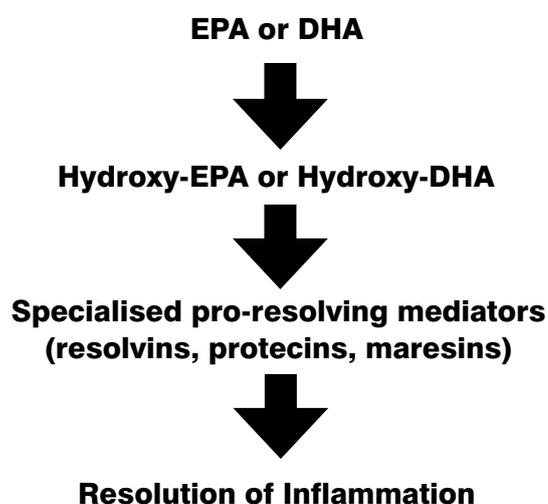
### Update from Professor Philip Calder

Omega-6 and omega-3 polyunsaturated fatty acids (PUFAs) have a range of physiological actions that influence human health. They act through multiple mechanisms. Amongst these is their conversion to highly bioactive lipid mediators that have roles in regulation of inflammation, immunity, platelet reactivity and blood clotting, and smooth muscle contraction. The most well described of these mediators are the eicosanoids – prostaglandins, thromboxanes and leukotrienes – produced from the omega-6 PUFA arachidonic acid (1). These eicosanoids are often pro-inflammatory and numerous pharmaceuticals have been developed to block their production or action (1). Often the lipid mediators produced from arachidonic acid and from the omega-3 PUFAs, EPA and DHA, oppose one another. This is central to the anti-inflammatory actions of EPA and DHA (2).

Research over the last two decades has established that the “turning off” – termed, resolution – of inflammation is an active process and involves the generation of lipid mediators from EPA and DHA termed resolvins, protectins and maresins(3). Collectively these mediators are referred to as specialised pro-resolving mediators or SPMs. The intermediates in the biosynthetic pathways converting EPA and DHA to SPMs are hydroxylated omega-3 PUFAs such as 18-hydroxy-EPA and 14- and 17-hydroxyDHA (see Figure above). It is now known that these precursors to SPMs are also biologically active.

There is great interest in using SPMs to treat acute and chronic inflammatory conditions. However, they are unstable and short-lived and would likely be expensive, limiting their application as supplements. It is therefore interesting that supplements labelled as SPMs but containing the hydroxy-PUFA precursors of resolvins, protectins and maresins have become available. These hydroxy-PUFA precursors are relatively stable and may offer an alternative to supplements providing EPA and DHA.

Nevertheless, it is well demonstrated in human trials that increased intake of EPA and DHA results in higher blood levels of the relevant hydroxy-PUFAs, this increase occurring in a time and dose-dependent fashion (4). Likewise there is now good evidence that increased intake of EPA and DHA results in higher blood levels of the SPMs themselves (5) and results in greater capacity for cells to produce those SPMs, using the pathway outlined in the Figure. In time, formulations of EPA and DHA, hydroxy-EPA and -DHA, and SPMs will all be available, perhaps targeting different markets and applications.



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### Philip Calder: Biography

Philip Calder is Professor of Nutritional Immunology in the Faculty of Medicine at the University of Southampton, UK. He is an internationally recognised researcher on the metabolism and functionality of fatty acids, with an emphasis on the roles of omega-3 fatty acids, and on the influence of diet and nutrients on the immune and inflammatory responses. His research addresses both life course and translational considerations and includes research in cell and animal models



Professor Philip Calder



**Republished NZ omega-3 analysis has shown that over 90% of the dietary supplements from the New Zealand market that were analysed were true-to-label**

and in healthy humans and patients. He has received many awards and prizes for his work including the ESPEN Cuthbertson Award and Lecture (2008), the Normann Medal from the German Society for Fat Science (2012), the Ralph Holman Lifetime Achievement Award from the American Oil Chemists' Society (2015), the British Nutrition Foundation Prize (2015), the prestigious Danone International Prize for Nutrition (2016), and the DSM Lifetime Achievement Prize in Human Nutrition (2017). Professor Calder was President of the International Society for the Study of Fatty Acids and Lipids (2009-2012), Chair of the Scientific Committee of ESPEN (2012-2016) and President of the Nutrition Society (2016-2019). He is currently President of the Federation of European Nutrition Societies (2019-2023). He was previously Editor-in-Chief of the British Journal of Nutrition and is currently an Associate Editor of several journals.

### Oxidation-product levels in commercial omega-3 fish oils

GOED has recently published a study, *Chemical Compositional Changes In Over-Oxidized Fish Oils* in the journal *Foods*. This study addresses in great detail the chemical changes that happen in a fish oil when exposed to conditions that cause a massive over-oxidation of the oil, allowing a better understanding of the temporal changes in its chemical composition. The study was carried out in collaboration with the University of California, Davis, two academic research groups in Belgium and France, and several collaborating GOED members.

The study was instigated following a flawed academic paper (not referenced) several years ago reporting that the administration, during gestation, of a highly rancid hoki liver oil, obtained by oxidation through sustained exposure to oxygen gas and incident light for 30 days, causes new-born mortality in rats. This effect was attributed to lipid hydroperoxides formed in the omega-3 long-chain polyunsaturated fatty acid-rich oil, while other chemical changes in the damaged oil were overlooked. This artificial situation of extreme oxidation coupled with another flawed study on supplements caused a great deal of damage to the omega-3 industry and this resulted in this detailed investigative work by GOED.

In the present study, the oxidation condition employed to damage the hoki liver oil was replicated, and the extreme rancidity was confirmed. A detailed analysis of temporal chemical changes resulting from the

sustained oxidative challenge involved measures of eicosapentaenoic acid/docosahexaenoic acid (EPA/DHA) omega-3 oil oxidative quality (peroxide value, para-anisidine value, total oxidation number, acid value, oligomers, antioxidant content, and induction time) as well as changes in fatty acid content, volatiles, isoprostanooids, and oxysterols.

The authors of the study found that when the same oils used for the extreme oxidation trials were stored in conditions that replicated real world storage conditions, with real world antioxidants added, that non-significant oxidation products were formed.

N.B. A good simple test for consumers to judge their dietary supplements is go for a trusted brand, (not the cheapest) and check the website for credibility and some scientific references. If an omega-3 supplement is rancid it will cause eructation (fish burps.)

#### Reference

*Foods* 2020, 9(10), 1501; <https://doi.org/10.3390/foods9101501>

### Republished NZ omega-3 analysis shows good compliance

A research paper describing the analysis of New Zealand omega-3 supplements, voluntarily retracted last year by the authors, has been republished with new data. The authors originally reported that 60% of New Zealand's dietary supplements containing omega-3's were not true to label. Errors were made in the calculation of the analytical results and these were pointed out by the NZ Natural Health Products Association.

The republished review shows that over 90% of the dietary supplements analysed were true to label. The simple errors that occurred in the original paper were basically calculation errors because the test results were expressed in relation to one-gram capsules and should have been extrapolated for larger capsule sizes.

The authors are to be congratulated for their prompt response to the accurate criticism and for republishing the corrected data reasonably promptly. This situation is quite different to that experienced with other authors of erroneous results who refused to see the errors in their lipid analyses.

The review by Rucklidge and Shaw (referenced below) refers to products that are on the New Zealand market and in parallel to this study GOED have published a full analysis of dietary supplements on the market in the USA. (Bannenberg,2020) This analysis also showed exceptionally good compliance with label claims.

#### Reference

Rucklidge, J., Shaw, I., *NZ Medical Journal*, (2020)vol.133, No. 1522, p.52,2466908 *Food Composition and analysis*, (2020)

Bannenberg, G. J. *Food Composition and analysis*, (2020),88.103435

Mike Eyres, BSc. BNatMed

Mike Eyres is a technical consultant, researcher and Registered Medical Herbalist and Naturopath (NZAMH) with 18 years professional experience in the food, beverage, and natural health industries. He was a co-author of a peer reviewed, scientific article in the journal "Nutrition Reviews" on coconut oil and cardiovascular risk factors. Consulting projects have covered herbal, food and nutraceutical products in various formats including gel caps, soft gels, sachets, bulk powders, tablets, and topicals.

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# NZIFST News

## EHEDG (NZIFST Special Interest Group) News

### Hygienic Design in Focus Globally

The Global Food Safety Initiative (GFSI) is a highly influential not-for-profit foundation serving the food industry. It is structured similarly to EHEDG: all key stakeholders in the food supply chain are represented with a board and advisory council structure. The mission of GFSI is to “enable continuous improvement in food safety management systems to ensure confidence in delivery of safe food to consumers”. Through non-partisan collaboration, GFSI has established a benchmarking system taking a harmonised approach to the recognition of food safety standards and their supporting systems. First, by drawing up a set of food safety criteria to be incorporated into food safety standards, and second, by establishing common procedures for the accreditation and certification bodies responsible for verifying the implementation of these standards (the GFSI Guidance Document).

In 2018 GFSI established a team of industry hygiene thought leaders to develop and deliver a high-level set of hygienic design benchmarking requirements (with input from EHEDG) and the objective of enhancing food safety from farm-to-fork. The *Hygienic Design of Food Buildings and Processing Equipment* have just been published as scope JI

(for building constructors and equipment manufacturers) and JII (for building and equipment users). JI and JII will form the basis for Certification Program Owners (CPO’s) to develop standards for GFSI recognised certification of the hygienic design, fabrication, installation, maintenance and cleanability of facilities and equipment.

EHEDG and 3-A SSI have issued a joint press statement and position paper endorsing these benchmarking requirements - <https://www.ehedg.org/ehedg/new-gfsi-hygienic-design-benchmarking-requirements> EHEDG globally and in New Zealand have the materials and expertise to deliver support to stakeholders to interpret and apply the requirements of JI and JII.

In Europe, EHEDG is moving its administrative offices from Frankfurt Germany to Naarden, near Amsterdam in the Netherlands. The move has been prompted by legal considerations regarding its constitutional basis in the Netherlands and the recognition of the need for governance changes brought about by the increasingly global structure of EHEDG. This includes the appointment of a newly established Operations Director role for EHEDG, Adwy van den Berg, with further administrative appointments to be made before transfer is complete in January 2021.

While Covid has caused huge disruption to the activities of EHEDG globally, most significantly in delivery of face-to-face training and the hosting of the bi-annual World Congress on Hygienic Design, originally scheduled for October this year, a silver lining in the cloud has been the time to focus on completion of EHEDG Guideline documents that have been ongoing.

Recent releases include Documents: #25 – Mechanical Seals update; #50 – Hygienic Design of CIP systems; #54 – Testing of Hygienic Weld Joints; #55 – Hygienic Design of Bakery Equipment and soon to be released #52 – Basic Principles of Cleaning & Disinfection. Visit <https://www.ehedg.org/guidelines> for more information.

### Local news

Locally, EHEDG New Zealand is delighted to have finally been able to deliver the EHEDG Advanced Hygienic Design Training Course (originally scheduled for April) in Christchurch, November 10-12th. Eighteen registrants attended and successfully completed the certified course. The trainers, David Lowry and Shane Mason, were able to complete their authorised trainer assessments, opening the way for more certified and directed training options in 2021 and beyond.

In another initiative, EHEDG New Zealand have been welcomed to join Engineering New Zealand as a Collaborative Technical Society, opening networking, membership and contributory opportunities. EHEDG NZ is planning to contribute to an anticipated webinar series to be delivered through Engineering NZ called “Learning from Failures” in the New Year.

On behalf of EHEDG NZ – wishing you a Merry Christmas and a much brighter New Year!

**David Lowry – Chairperson EHEDG New Zealand**

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# NZIFST Awards 2020

October 29 was the date set, at last, for the NZIFST 2020 Awards. MC, President Richard Archer was MC and opened the event.

"Welcome to our digitally enabled AGM and Awards night. We are fortunate to have this technology at our disposal, and, just quietly, hope that we will never have a year such as 2020: that all future NZIFST AGMs and Awards evenings will be congenial, face-to-face events.

Tonight we are celebrating the achievements of our members within our industry. For NZIFST members this is the continuation for the AGM for the presentation of awards.

## J C Andrews Award: Professor Phil Bremer

This Award is presented annually in memory of Massey University's first Chancellor, Dr Jack Clark Andrews, who proposed that a food technology degree course be established at Massey University.

The award recognises Institute members who have made a substantial contribution to science and technology in the food industry.

Phil Bremer has made outstanding contributions in food science and technology in New Zealand and internationally and provided exemplary leadership to the New Zealand food industry. The breadth and depth of his impact is staggering in both academia and for the industry. He has had significant service with and made a major contribution to NZIFST.

Phil has solved food science challenges across a vast range of areas. He has also made substantial contributions to the NZIFST and to training the next generation of food scientists, as an educator and as a mentor for postgraduate students and young researchers.

He carried out all his study at the University of Otago completing a MSc (Marine Science) in 1984 and a PhD in Microbiology in 1988. He was awarded a Fulbright Scholarship for postdoctoral study in the United States in 1989. He completed postdoctoral fellowships at California State University and Montana State University.

By 1992 Phil was Microbiological Programme Manager at the New Zealand Institute for Crop & Food Research and in 1997 began transitioning to an academic role at the University of Otago where he started fulltime in 2002. He was Head of the Department of Food Science from 2007 to 2014 and was promoted to Professor in 2010.

During his term as the Head of Department of Food Science, he restructured the food sciences degrees in consultation with the food industry, resulting in a growth of 37% in undergraduate student numbers. He also created an environment that encouraged PhD study in the Department of Food Science and grew PhD EFTs from 14 to 29 students. He has been an invaluable mentor to more than 40 PhD students and 13 Masters students and young/emerging researchers at the University of Otago and Massey University.

Phil's academic record speaks for itself, with outstanding research output metrics, including 22 book chapters, 165 refereed journal articles, 31 refereed conference contributions and 214 conference contributions.

Phil Bremer has made (and continues to make) sustained and outstanding leadership contributions to NZIFST at all levels of the organisation. He has been a member since 1997 and was elected



*Professor Phil Bremer*

Fellow in 2008. His list of Committee Roles in the Institute is long.

He is also an active member of the New Zealand Microbiology Society, and of the New Zealand Association of Food Protection and makes significant contributions to Food Safety as Chair of the Science Leadership Team of the New Zealand Food Safety Science and Research Centre.

## The Ron Hooker Award – Estrera

This award recognises significant past or current service or contribution to the NZIFST, developing the affairs of the Institute, its Branches or Divisions.

This year the award goes to Canterbury Branch member Jasmin Estrera who has demonstrated an unwavering commitment to the Branch for many years. She has served as branch secretary and treasurer and is currently a very active committee member

She attends every event, and contributes frequently by inviting and arranging speakers. Often our numbers are notably increased as she proactively invites colleagues to join us - and to join NZIFST.

We can always count on her to help with food, to take photos of events



*Jasmin Estrera, Ron Hooker Award*

and will write up reports if needed.

She is the one person that can be counted on to be there and support every event.

## Distinguished Service Award

The NZIFST Distinguished Service Award recognises ongoing distinguished service and contribution to any sector of the food industry, or support over a long period, above the normal line of duty.

### Norman Lodge

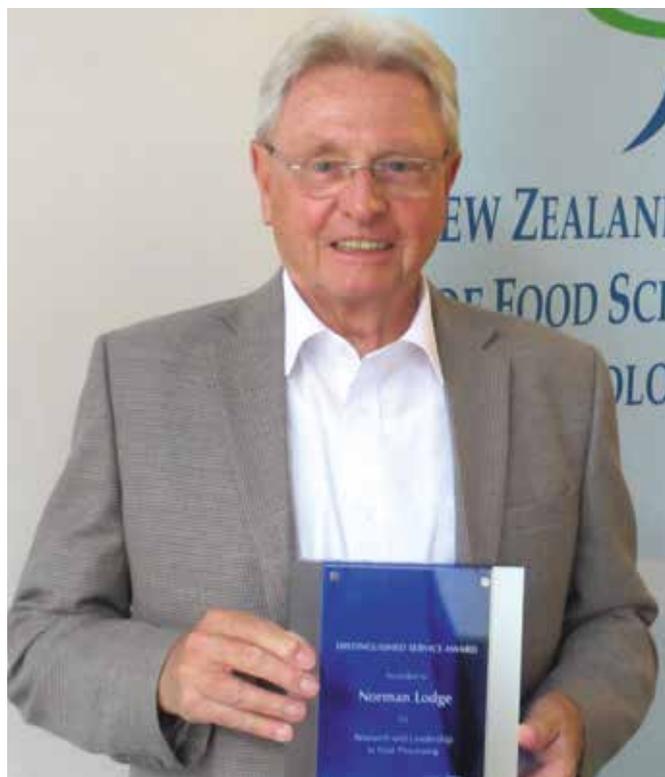
The first Distinguished Service Award recipient is Norman Lodge who has been instrumental in providing leadership and promoting cutting edge research in food and product development throughout his career.

He has made a considerable contribution to international relationships in the Asian and Pacific regions, working with Aid Development over a 20 year period and through his role as Science Liaison Officer for the DSIR at the ASEAN Centre in Singapore which involved setting up research projects and technology transfer in Malaysia, Thailand, Indonesia as well as Singapore. Later he was International Business Manager for HortResearch with projects in China, Vietnam, Indonesia and India.

Always full of energy, he was involved in the development of a range of new food products including green kiwifruit juice, kiwifruit wine and fruit-egg drink during his time at DSIR which became HortResearch during his time there.

After leaving HortResearch, Norman started his own food consulting company and helped many small to medium size companies to develop food safety programmes, HACCP plans, new products and in the marketing and promoting of products, especially in South East Asia.

Nearly 20 years ago, he began teaching the Food Safety Course at



*Norman Lodge, Distinguished Service Award for research and leadership in fruit processing and food safety*

the University of Auckland. His hands-on, practical courses resulted in numerous food safety plans for smaller food factories which the students did as real-life exercises. He also contributed to developing the University of Auckland's on-line Food Safety course.

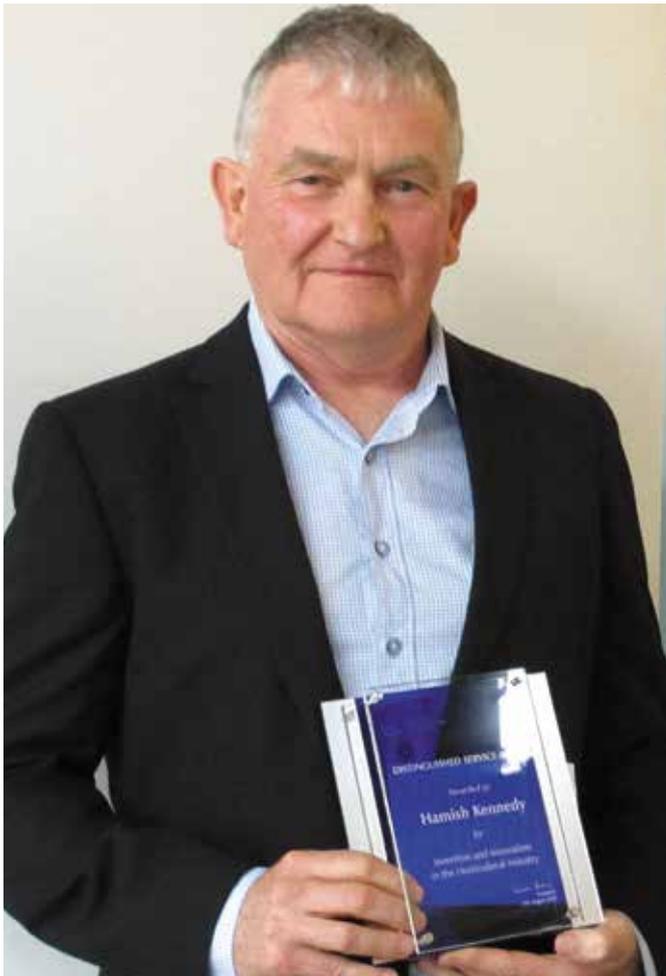
Over many years he has interacted with the public by speaking on a range of food science topics to Lions, Probus, Women's groups, and University of the Third Age groups. He has been a frequent Judge for the NZ Food Awards.

### Hamish Kennedy

Our second Distinguished Service award goes Hamish Kennedy. His application of Kiwi ingenuity and determination, combined with a degree in electrical and electronic engineering, has created an international fruit and vegetable grading equipment designer, builder and supplier.

The son of Kiwifruit growers, Hamish was inspired to build a prototype kiwifruit grading machine in the garage of his shared apartment whilst finishing his Masters degree. On returning home, he created the first working machine for grading and sorting his family's kiwifruit. So successful was the machine that neighbouring fruit producers clamoured to have one for themselves. And so, in 1984, Compac Sorting Equipment Ltd was born. The company has made outstanding contributions in revolutionising fresh fruit and vegetable grading and sorting worldwide. They create, utilise and integrate leading-edge software and new technologies, interfacing horticulture with mechanical, electronic, optical and information engineering to enhance product uniformity and quality and improve product throughput in packing and grading facilities.

From a single machine built in a family garage in 1984 (during university



*Hamish Kennedy, Distinguished Service Award for invention and innovation in the horticultural industry*

holidays), Hamish's company is now an international leader in the innovation, manufacture and installation of fruit sorting machines: delivering turnkey solutions worldwide.

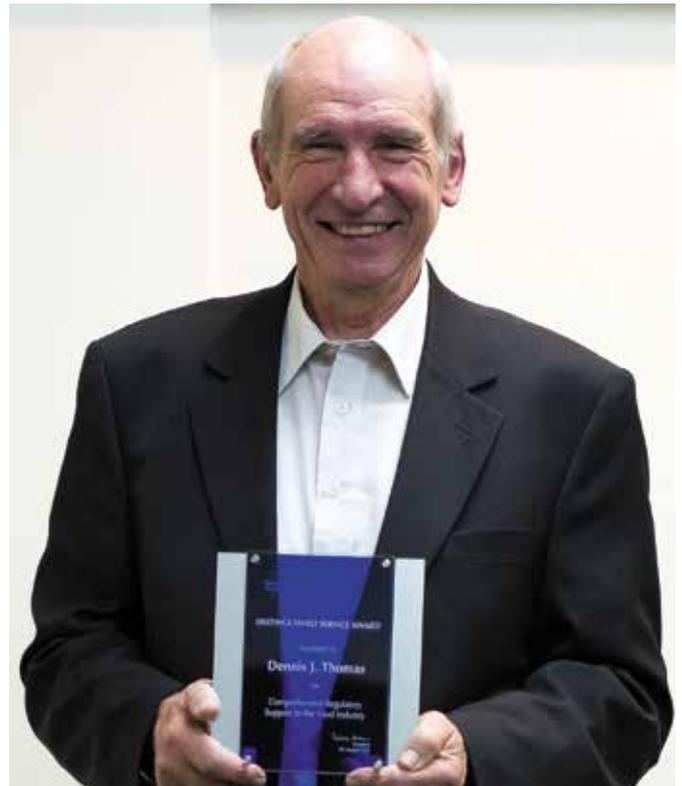
**Dennis Thomas**

Dennis Thomas has had a long and distinguished career within the food industry. Graduating B Tech (Massey) and later Dip Bus Admin (Massey), he embarked on his food industry career at the Lactose Company of NZ, followed by a period in the education sector, including a lectureship in food science at Central Institute of Technology, Upper Hutt. He then returned to industry in senior roles in a number of familiar New Zealand companies and organisations including Griffins and Sons, NZ Dairy Board, Sealord Group, Institute of Nutrition and Human Health (Massey University), Australian Wheat Board and Food Standards Australia New Zealand.

During his career Dennis's technical expertise and ability to translate across technical/scientific/regulatory boundaries was recognised by his appointment to many industry-good roles over a number of years.

Dennis was an active NZIFST Member for many years at both Branch level and Executive level. He was Vice President of the Institute in 1991, President in 1992-1993 and became a Fellow in 1995. He was a strong supporter of the Central Branch during his time in FSANZ and mentored a number of teams in the NZIFST Product Development Challenge.

This long-term NZIFST member has made a significant, sustained contribution to the NZ food industry. He has given his personal time in supporting many external industry-good working groups and in our Institute. He also made an important contribution to Australia New Zealand food regulation arrangements, influencing the practicality of food standards and their implementation.



*Dennis Thomas, Distinguished Service Award for comprehensive regulatory support to the food industry*

**Fellows**

“The awarding of a fellowship by the New Zealand Institute of Food Science and Technology recognises the outstanding contribution of individuals in areas such as;

- Research and development, Technology transfer, Development of the food industry, including promotion of ethical standards and public image or Development of the affairs of the Institute.

**Don Otter**

Don Otter is well known as a dairy chemist around the world as evident by being an Invited Scientist at North Carolina State University in the US and receiving invitations to speak at conferences overseas. His wide ranging research has spanned dairy protein chemistry, analytical chemistry, metabolomics, biochemistry, dairy processing, biowaste recovery and gut health. He was invited to be an Associate Investigator in the Gravida Centre of Research Excellence.

Described as a highly motivated, innovative inter-disciplinary dairy product scientist and teacher, Don has a 30 year proven track-record in the dairy and food industries: leading growth and product development.

He has served as a leader in NZIFST and in the Dairy Industry Association of NZ. His extracurricular activities include supervising 17 PhD students, as an Editorial Board Member of the International Dairy Journal, organiser of workshops and conferences, and a stint as commentator on Radio NZ.

Using his detailed knowledge of dairy chemistry, he has the ability to think laterally to resolve problems. He is keen to share the knowledge that he has acquired through his work in New Zealand and internationally for both industry and academia.

**Peter Bosch**

Colleagues of Peter Bosch say he has an outstanding ability to translate new product development ideas from the lab into very practical processing solutions, using his years of experience in processing innovation and his impressive ability to engineer a cost-effective process.



*Don Otter, Fellow*

He started his career, as a graduate, at Cerebos Greggs and his competence and professionalism were quickly recognised. He has undoubtedly made a significant contribution to the profession of food science and technology in New Zealand. He has a very scientific approach and is unique in that he is incredibly “hands-on” and practical. His most recent project was the design and fabrication of a laboratory sized UHT plant for his employer – in his garage.

During his career Peter has successfully completed innovative new product development projects for international corporates, developed significant knowledge in extrusion and is an authority on the UHT processing of food and beverages in New Zealand.

He has also trained, coached and mentored junior technologists. At all times his approach is scrupulously professional in accordance with the Code of Ethics of this Institute.

**Colin Pitt**

Colin Pitt is well known across a wide band of the Food Industry in New Zealand, along with related science and engineering enterprises.

He started his career with MSc (Tech) from the University of Waikato majoring in materials science, biochemistry, microbiology and the management of innovation. He is particularly recognised for his expertise in filtration applications in the food and related industries. He is one of those people with an amazing range of knowledge and experience across a broad field, including food engineering, food production, brewing, motorsport, general science, and music – an accomplished musician. He freely shares all this knowledge and experience with others willing to learn.

He has been an NZIFST member since 2008. He has been a strong supporter of the Institute and in particular through resurrecting the Waikato Branch.

He has chaired the Waikato Branch for the last 7 years and during this time has worked tirelessly and energetically to bring it to the vibrant branch it is today. His commitment encompasses the wider Institute and he has served on the NZIFST Board as a Director. He also upholds the ethical values of the Institute in his professional life.



*Peter Bosch, Fellow*



*Colin Pitt, Fellow*



Central Branch Fellows, Matt Golding, left and Paul Mougham, right, with NZIFST President, Richard Archer

**Matt Golding**

Matt Golding came to New Zealand to join the staff at Massey University in 2009.

He has practical experience working for one of the world's most recognised food manufacturers, Unilever, and at the most notable research organisation in Australia, CSIRO. His specialist expertise is in colloids and food structure: a speciality that is relevant across many sectors of the food industry. This was recognised by his appointment to the Fonterra-Riddet Chair of Food Material Science in 2016.

Matt has a strong network of top food scientists, world-wide, who have enormous respect for his knowledge and skills. During his career he has authored or co-authored over 110 papers and book chapters that present the results of research studies on the physicochemical properties of milk and milk products. In particular, this work has focused on the emulsification and digestion of fats.

He is always willing to share his knowledge and experience. This is particularly important in his teaching of undergraduate Food Technology students and his energetic supervision of a strong PhD programme that benefits the food industry and New Zealand's reputation as a leader in food – and especially dairy – research. Matt mentors a good many people destined to become industry leaders of tomorrow.

**Paul Mougham**

Distinguished Professor Paul Mougham is an outstanding and acknowledged world expert in nutritional quality of food proteins, digestive physiology and metabolism. His research team has made significant contributions to the understanding of protein digestion in humans at different stages of life. Methods that he has developed with his students and co-workers have become standard when measuring amino acid makeup of a protein or the digestive uptake of amino acids.

Paul was one of the two founding Directors of the Riddet Institute and has co-led this Institute from a small research centre at Massey University in 2003 to the world-renowned Institute that it is today.

He is currently Distinguished Professor at Massey University (where he holds a personal professorial Chair) and a Fellow Laureate of the Riddet Institute. He holds concurrent positions at Universities in Australia, the United Kingdom, and France, and an honorary Doctor of Science from Massey University. He has awards from, and academic appointments in New Zealand, Australia, the United States, the United Kingdom, China,



Clare Chandler, Fellow

Canada, Germany, Switzerland, and the Netherlands: evidence of his world-class status as a scientist and educator.

His publication record of 300 peer-reviewed papers, 75 book chapters, 150 conference presentations and 8 patents is clearly at the high end, showing his impact on scientific developments.

**Clare Chandler**

Clare Chandler completed a Masters in Food Science at the University of Otago in 1983. Her first job, from 1984, was at Griffin and Sons' Wellington factory. Four years later she headed off on her OE, working at the UK Ministry of Agriculture, Fisheries and Food. On her return to



Neala Hart, Young Technologist 2020



Stella Stacey, front left accepted the award on behalf of Sue Wheeler (in absentia), with her dedicated team of quality specialists from Woolworths, left to right, Mark Bell, Head of Quality and Food Safety, Deven Kumaran, Angela Yates and Raj Reddy, winners of the Third Allergen Bureau/NZIFST Award for Excellence in Allergen Management

New Zealand in 1995, she joined the Ministry of Health, in the Food and Nutrition branch. She moved into the Food Safety/Food Standards area when she joined NZ Food Safety Authority in 2002. In this area she has had important roles giving scientific and technical advice on foods. She is a member of the NZ delegation to the Codex Committee on Food Additives.

For the last 18 months Clare has been working as a Senior Food Scientist, within the Standards and Surveillance section, Risk Management and Intelligence Branch at Food Standards Australia New Zealand (FSANZ). Her work involves the technical and secretariat role for the Advisory Committee on Novel Foods, which is a key committee for FSANZ (consisting of FSANZ and jurisdictional representatives).

Clare has mentored a number of local high school teams competing in the NZIFST student product development challenges and is a regular attendee of NZIFST conferences, branch meetings, events and activities and is a current Central Branch committee member.

### Young Technologist 2020 – Neala Hart

This year's young technologist demonstrates strong technical and leadership qualities in her current role, qualities that have been apparent to all those she works with.

Neala Hart graduated Bachelor of Technology with Honours in April 2014 from Massey. While studying, she joined NZIFST as a student member and then in 2012 she joined the Auckland Branch as a Student Representative on the Committee. She very quickly began to be a great advocate for students, helping the committee create relatable and valuable events and tools for our student members.

After graduation she continued to be active in the Branch, and became a Futureintech Ambassador and a NZIFST/CREST Product Development Challenge Mentor.

Neala's Honours project was with Frucor and the company employed her immediately after final exams. While there she worked in several departments, settling in Product Development where she worked on many formulations and projects that are now popular household items and brands.

She then joined Symrise, in 2017 and is now a Senior Application Technologist in their Sydney operation. She has been actively involved in creating a new formulation development service to help customers develop concepts into market ready prototypes. From this new service there have been at least 10 successful product launches in the past year with one gaining the highest consumer rating in the company's market research history. Neala has now returned to a new role in New Zealand.

### Third Allergen Bureau/NZIFST Award for Excellence in Allergen Management

On behalf of the Allergen Bureau and NZIFST, Debbie Hawkes presented the 2020 NZ Best Practice in Food Allergen Management Award.

Nominees are evaluated for their consistent, science-based approach to food allergen risk assessment, management and communication that guides industry best practice and assists allergen sensitive consumers to make informed choices based on label information.

The team from Woolworths was chosen for having ongoing continuous improvement of their Allergen Management programme. This programme already covers the complexity of a very broad range of products and manufacturing processes. The recent area of focus has been on change management and pack declarations to the consumers are aware of any changes that may impact them. A clear decision tree defines actions required if the allergen status changes.

The actions include the alert status needed. This alert can range from advising customers to check the allergen advice or a pink coloured alert that states there is a new recipe, where there may be a change in the ingredient (and therefore allergen status) or a combination of both.

Additionally, there is an Allergen Change Alert form which is shared with the Allergen Action forum for inclusion on relevant consumer websites.

The Allergen Bureau applauds these best practice processes to manage this critical scenario. Unfortunately, history has shown that when recipe and allergen status changes have not been effectively communicated, the results have been tragic.

# Branch News



*Mentors and Mentees in intense communication at Auckland Branch Speed Dating*

## Auckland

### Speed Mentoring

Tuesday 13th October saw the NZIFST Auckland branch host its second Speed Mentoring Event. The Auckland branch was able to draw on the talents of some of the Institute's more senior members including several Fellows and offer advice across a wide range of topics. The format for the evening saw the mentors briefly introduce themselves, followed by six minute speed mentoring sessions with just a 60 second break between sessions. As well as exchanging various ideas, the evening provided all participants with an excellent opportunity to make new connections. Based on the positive feedback from both Mentors and Mentees, the Auckland branch has already booked a date for our Speed Mentoring 2021 event, with a few additional refinements.

### Zoom Meeting: Lynley Drummond

With the Covid-19 Pandemic changing the way we communicate from home or work, NZIFST Auckland branch hosted a second Zoom webinar, with Lynley Drummond speaking to the topic "Do food regulations stifle innovation? A formulative perspective".

Using a number of overseas examples, Lynley developed a robust argument that food regulations do not necessarily stifle innovation, but significant issues lie with which marketing claims can be made, particularly if an entrepreneur were to use regulations such as the Supplemented Food Standards for unique foods or ingredients. Lynley noted the challenges in getting new food ingredients approved in Australia, New Zealand, and indeed most other jurisdictions: the major hurdles being the requirement for extensive safety and efficacy data (and consequent significant cost) and long delays before any financial return. She noted the dominance of overseas food companies logging application for food ingredient approval with FSANZ.

With 23 participants, the question and answer session started via chat, but soon moved to good interactive debate. Thank you again to Lynley for a thought provoking presentation.

**Paul Harrison FNZIFST**



*Members at Mätt Solutions listen to James Carr and Mads Moller from ThinLab, University of Canterbury, at the branch's first hybrid event*

## Canterbury

Our committee works creatively to organise activities for the branch despite restrictions. Since June there have been fewer events, but activity has ramped up over the last few months.

### September Zoom meeting

On September 28th 17 members "zoomed" in to hear Kevin Foxall from AsureQuality speak on the topic of How to Prepare for an Audit. Kevin provided helpful tips which gave members useful tools in the event of an audit being required. As a result, members now feel less intimidated by the thought of an audit.

### "Innovation and Entrepreneurship in Food"

Canterbury Branch hosted our first hybrid event (combined Zoom and in-person) on the 19th Oct 5:30 pm at Mätt Solutions Ltd. The event topic was 'Innovation and Entrepreneurship in Food' with a total of 25 attendees. Speakers were James Carr, Business Manager and Mads Moller from Program Lead Growth, Thinlab, of University of Canterbury. The talk provided insights on the main drivers of innovation in food, the difference between customers and consumers and a process of customer development. To facilitate interaction amongst participants we joined a group exercise on value propositions. Speakers provided a handy guide on setting up a company and launching a product as well as helpful tips on viability, launching and future scale up possibilities.

### FED Talk - Professor C J Henry

Along with all branches of NZIFST we were given the opportunity to hear Prof Christiani Jeyakumar Henry, Director of the Singapore Institute of Clinical Sciences at A\*STAR in Singapore and a Professor in the Department of Biochemistry at the National University of Singapore. His research lies in the making and consumption of foods to minimise adverse effects on body composition and metabolism was of wide interest.

### NZIFST AGM and Awards evening 29th October

About 25 of us gathered in Christchurch along with others from Auckland, Waikato, Palmerston North, Wellington and Dunedin for a well-run Zoom meeting to complete our AGM and Awards event. We were proud to see Jasmin Estrera receive the Ron Hooker Award for her many years of support for the Canterbury branch.

### Changing eating habits and nutrition in NZ – webinar

This webinar was presented by Dr Claire Smith who is a senior lecturer in human nutrition at University of Otago. She discussed how the changing habits of New Zealanders are changing our nutrient intake. Food insecurity is also a significant issue for one in five New Zealand children, as shown by a 2019 survey conducted by the Ministry of Health.

Claire emphasised the need for ongoing monitoring of food and nutrient intakes because influences such as demographic change (ethnicity and age), consumer avoidance of allergens, increase in consumption of plant based foods due to sustainability and climate change, a growing preference for convenience foods, new food trends (e.g. kombucha) and cultural diversity of the population all affect food choices and nutrient intakes.

She described a recent study on the context of evening meals where automated cameras were attached to respondents living in Dunedin (teenagers aged 13 to 17 years). Images were captured every 15 seconds and were coded for screen type used (TV, Laptop, phone), and the types of food consumed. Initial findings show that fewer than 40% of evening meals were consumed in an “ideal context” (i.e. no screen and with others).

An interesting question and answer session immediately followed her talk.

### Christmas dinner and end-of-year event

Our final event for 2020 will be a Christmas dinner at “The Monday Room” on High Street in Christchurch on 24th November. This will include a fun quiz event organised, as usual, by Jono Cox.

We will begin again in February with a committee networking event upstairs at “The Good Home” 16th February.

**Winna Harvey FNZIFST**

### Central

Since the new Branch Committee was elected at the July AGM and under the more relaxed strictures of CV-19-Level 1, the Branch has been hyper-active with events. Space limitations providing detailed reviews of each, so a quick overview is provided instead.



Central Branch Members are briefed on the brewing process at Palmerston North’s Brew Union microbrewery by head brewer Jason

### Wellington Region Schools Science Fairs Judging

In most centres, School Science Fairs were a Covid-casualty. In our region the Manawātū event was abandoned but the Wellington organisers substituted a virtual format for the traditional fair. The NZIFST judging team’s report is presented below.

### In remembrance of Dawn Harvey

Central Branch member, Dawn Harvey, passed away suddenly on Thursday 3rd September. She had been in hospice care only a short time and will be sadly missed by her Plant & Food Research colleagues and friends as well as colleagues dating back to her DSIR days in the 1980’s.



Dawn joined PFR in 1989, as a Research Associate for HortResearch, with a BSc majoring in microbiology and an MSc (Protozoology). Her early career was with Bill Jones in the mono-clonal antibody unit. Dawn developed her role as a Containment Facilities Manager, and in 2013 she joined the Food Solutions team in Palmerston North. Dawn worked in food concepts development, and continued to build her capabilities as a Laboratory Manager and as PFR’s first Food Safety Coordinator. She co-authored 20 peer reviewed publications over her career.

In recent years, Dawn developed her interests with a focus on Māori-relevant research, working with teams to establish safety data for kawakawa, the edible anuhe (kūmara moth caterpillar), and supporting Tolago Bay students in food-safe practices for gathered kai.

Dawn touched many of our lives and leaves behind friendships and a sound legacy of process. She was an active member of the social club and had a deep passion for sport, organising world cup cricket and rugby sweepstakes and quizzes on site.



Central Branch members (L to R) Ann Hayman and Sally Ronaldson with Fork & Brewer Head Brewer Kelly Ryan

### Wellington Visit to Fork & Brewer

Wellington members celebrated the end of lockdown with an evening visit to Fork and Brewer. Head brewer Kelly Ryan gave an entertaining talk on his brewing career. Kelly talked us through his favourite beers provided on our tasting trays, a selection from over 200 varieties produced since working at Fork & Brewer. Kelly also spoke about challenges of brewing in a retail precinct, including carting the ingredients up the stairs by hand and answering the odd “please explain?” when brews somehow made their way to the retail space below – through the floorboards! Thanks to Kelly and Branch members Sally Ronaldson and Clare Chandler for organising the evening.

**Visit to Brew Union Microbrewery**

Brew Union is a micro-brewery and restaurant that has transformed the Palmerston North hospitality scene. Twenty members were provided a tour of the brewery by the head brewer followed by a tasting of 5 beers to match to 5 cheeses.

**Chris Hewins (MPI) "Innovations in Verification"**

The need for verification of food facilities' regulatory compliance did not disappear with Covid. Fortunately responsible authorities had been piloting remote approaches to verification for some months before Covid curtailment of close contact and

**Prof Jeya Henry (Singapore)**

Parlaying our new-found skills in remote meetings into an international context, Professor Christiani Jeyakumar Henry, Director of the Singapore Institute of Clinical Sciences at A\*STAR and Professor in the Department of Biochemistry at the National University of Singapore was beamed in to present to a Central Branch meeting. Prof Henry provided insights to his research interests in making and consuming foods to minimise adverse effects on body composition and metabolism.

**Branch End-of-year Mexican Fiesta Dinner**

This event sits in the future as I write this. Our annual half-way-house get together for the end of year is scheduled for Los Locos Cantina at Waikanae Beach. Loud shirts, big hats and mariachi music will make this an unusual celebration.

**Allan Main, FNZIFST & Ben Sutherland FNZIFST**

**Wellington Schools' Science Fair**

The "virtual" Wellington region Schools Science Fair was judged on 16 September. There were 30 projects on food, water and hygiene-related topics for the judges, Sally Hasell, John van den Beuken and Clare Chandler, to review. It was a different experience with the entries all being electronic, with no opportunity to meet the students. However, having video presentations was very helpful although it was confusing that the files provided were not the same for each entry and it would have been helpful if there had been more consistency. Interestingly many students were inspired by or at least able to work around COVID 19 restrictions. Science Fair organisers did well to hold a successful Science fair when many things were overshadowed by COVID.

**First place:** Agatha Morley, year 7 Wadestown "Will calling something healthy mean people like it less?"

Volunteers were shown two identical pieces of cake labelled 'healthy' or 'unhealthy'. They were then asked to taste both and identify which they preferred. Very few volunteers said the cakes were the same. From the analysis of a questionnaire they completed she found that -

- Younger people are more likely to prefer the healthy cake whilst older people are more likely to prefer the unhealthy cake.
- Males prefer unhealthy cake, and females prefer healthy cake.
- Hungry people prefer healthy cake.
- People who exercise less prefer healthy cake.

She concluded "It seems that the words used to describe food can trick people into believing something that isn't true and can trick their taste buds into imagining differences that do not exist."

**Runners up:**

**Lucy Hansen year 8 Northland** for "The science behind the sauce bottles."

Lucy looked at differently shaped tomato sauce bottles and their effectiveness at delivering the preferred amount of Wattie's tomato sauce for volunteers. She concluded that the tomato shaped sauce dispenser was the best!

**Ishaan Badiyani year 8 St Marks** for "The hot case"

Ishaan had identified a problem that his café owner mother had with delivery of coffee during Covid lockdown. He had developed a prototype insulated handled carrier that would take up to 6 disposable coffees of any size and keep them warm and upright.

**Sally Hasell FNZIFST**

**Hawkes Bay/Poverty Bay**

The Hawke's Bay/Poverty Bay branch took advantage of one of the fantastic Hawke's Bay FAWC events to have an early pre-Christmas drink and catch up. The event was the FAWC! Progressive Cocktail Evening, where various eateries and bars around the Napier CBD served up special cocktails paired with tapas to match. The group of 12, including Sally Ostick, visiting from Auckland, tasted offerings at a couple of venues whilst enjoying catching up on new jobs and plans for next year. The group will next get together with a tour and event in mid-February 2021.



*Fiona Windle, Rachel Campbell and Michelle Jones at the FAWC! Progressive Cocktail Evening*



*Nicky Solomon, Pete Revington and Amanda Clarke at the FAWC! Progressive Cocktail Evening*



*Enjoying a catch-up at the FAWC! Progressive Cocktail Evening. Rebecca Klee, Sandra Chambers, Gerry Townsend and Sally Ostick*



NZIFST judging team at the Aurora Otago Science Fair 2020, left to right, Sheba Duque, Wendy Setyadi, Chris Bloore, Soundarya Karamcheti, Fiona Nyhof and Mylene Anwar

## Otago

### Aurora Otago Science Fair 2020

Our wonderful NZIFST judging panel carefully selected seven prize winners from the many food science and technology entries at the 2020 Aurora Otago Science & Technology Fair in August.

The NZIFST cup for an outstanding project was awarded to **Oliver Hamilton**, a Year 9 student. Oliver investigated the effect of yeast levels on bread dough expansion. He won the award for his careful planning and experimental approach, accurate measurements and clear communication of results.

Oliver's name is now engraved on the NZIFST cup and heads up a brand new column alongside previous winners since 2003! As well as the cup, Oliver was awarded \$30 in prize money and a certificate. Six other projects were also selected for \$20 prizes and an NZIFST certificate.

**Evelyn Young** (Year 8) did a great job investigating consumer perceptions towards packaging colour and marketing messages. Evelyn's results would be of great interest to any food manufacturing company selling snack products to school age children.

**Reuben Allison** (Year 9) studied the effect of storage temperature and time on the quality of colostrum. This study helped to solve practical problems feeding new born calves on a dairy farm.

**Leisel Tolson** (Year 8) compared Vitamin C levels in four different fruit juice products. Her experiment was well researched, executed and delivered!

**Anna** (Year 8) investigated the effect of colour on people's perceptions of flavour. Anna's motivation for the study was based on a study where people's perception of cake quality was influenced by price.

**Nico Pettit and Zak Rizwan** (Year 7) studied the storage life of food, once again good research, careful experiments and great communication of key findings appealed to our NZIFST judges.

As well as prize money and a certificate each winner was given a letter to explain who our organisation is, and an invitation to visit the Department of Food Science, University of Otago.

**Fiona Nyhof FNZIFST**



At the NZIFST Awards, Waikato Branch hub, Branch Chair Chathurika Samarakoon, new Fellow and past Branch Chair, Colin Pitt, Margot Buick and Branch Secretary, Amy Pitt

## Waikato

### Waikato launched 'FED' talks

The first FED Talk- "Making Sense Of Sensory" was successfully held on 20th October 2020 attended by 25 members and students, at Wintec. The participants had opportunity to take part in triangle test in the beginning of the session where the results were discussed at the end of the session. The presenter was Prof. Nazimah Hamid from Auckland University of Technology and she outlined the importance of descriptive analysis in the food industry and how types of descriptive analysis can be applied in different contexts. There were lively discussion and questions, and interest in the QDATM and Spectrum™ methods. Prof. Nazimah shared some of her interesting research related to sensory and consumer science with the participants. Valuable and interesting discussion followed and questions were raised by the NZIFST members on sensory quality of Kina roe and the influence of ambient noise (music) on the perceived taste of ice cream.

### AGM and Awards night

The NZIFST AGM and awards was held on 29th October 2020 attended by 13 members and guests, at Varandah, Hamilton Lake. Colin Pitt and David Tanner were awarded NZIFST fellowships for their substantial contribution to the profession of food science and technology.

### Further FED Talks

Waikato members joined online for November FED talks given by international speaker Professor Christiani Jeyakumar Henry and Lynley Drummond's presentation titled "Do Food Regulations Stifle Innovation: A formulation perspective" organised by the NZIFST Auckland branch.

**Chathurika Samarakoon, MNZIFST**



*If forced to choose between clean meat, conventional meat and other alternative proteins in the market, what will Kiwi consumers choose?*

# What's in a name? Clean meat is served

Joy Sim, Student, University of Otago

This article was awarded second equal prize in the Food Tech Solutions NZIFST Undergraduate Writing Competition 2020. The annual competition is open to undergraduate food science and food technology students who are invited to write on any technical subject or latest development in the food science and technology field that may be important to the consumer.

## Introduction

Clean meat (also called cultured meat or lab-grown meat) is real meat produced through genetic engineering without the need for animal slaughter. Starting with a small sample from the muscle of a living animal, stem cells are extracted and fed with nutrients to grow under special conditions. This prompts them to differentiate into fat and muscle cells before harvesting into “clean meat”, identical to conventional meat at molecular level.

In marketing a food product to consumers, the name used influences consumer perception and sales. Unappetising names like “cultured meat” have led consumers to associate the product with unnaturalness and science, turning them off before the product hits the shelves (Bryant & Barnett, 2019). According to Laestadius and Caldwell (2015), such names promote the naturalistic fallacy in which consumers believe, without evidence, that the product is unnatural and is therefore bad. On the other hand, “clean meat” was found to produce the highest consumer acceptance and positive behavioural intentions to trying the product (Bryant & Barnett, 2019).

Advocates are thus pushing for “clean meat” to be used in popular media and discourse. By 2025, clean meat and its substitutes are foreseen to amass sales of up to NZ\$11.3 billion (Flaws, 2019a). The industry is merely 5-10 years away from scaling up clean meat burgers (Beef and Lamb New Zealand, 2018).

Cost was the biggest barrier to market entry at USD\$330,000 in 2013, but each patty currently costs about USD\$10 and the cost is expected to continue to decline rapidly (Flaws, 2019a). Against the backdrop

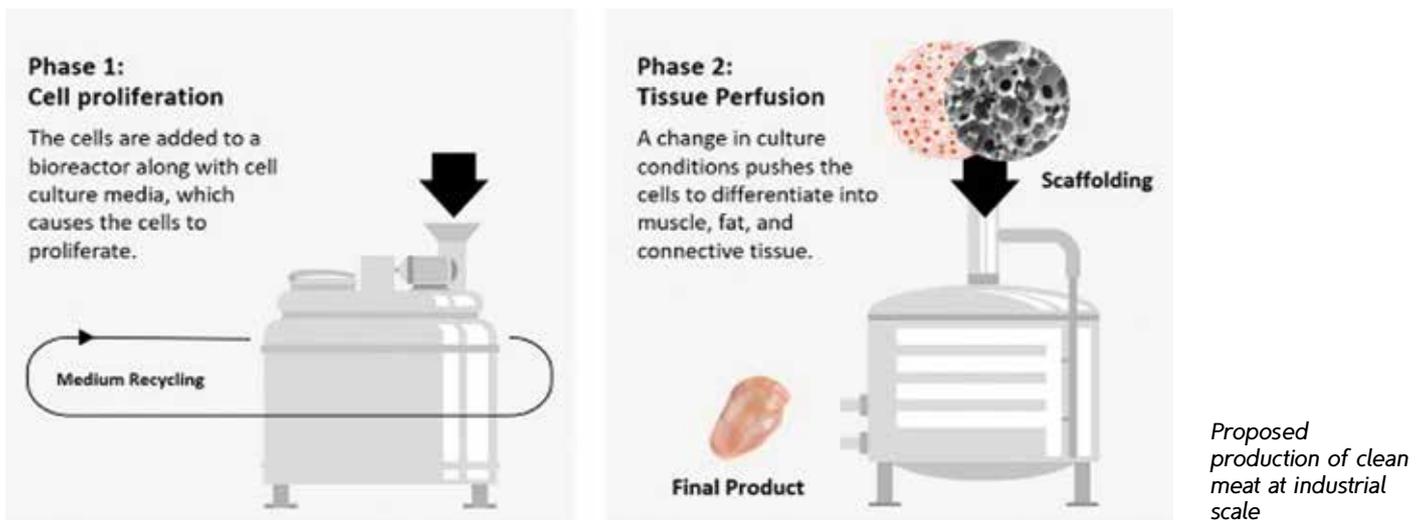
of increasing financial viability and with multinational companies like Fonterra jumping on the bandwagon to invest in clean meat (Flaws, 2019a), is there a clear justification for clean meat production?

## The meat of the matter

An increasing number of New Zealand consumers want to know where their food comes from (Laestadius & Caldwell, 2015) and are concerned about sustainability issues, with 30% more vegetarians in the country from 2011 (Roy Morgan, 2016). However, New Zealanders still remain one of the world's highest consumers of meat at 100kg per person in 2013 (Ritchie, 2019). While red meat consumption in the country has dropped, pork and chicken consumption continued to increase over the past 10 years (OECD, 2019).

Clean meat is said to be the solution to satisfy consumers' desire for meat without the greenhouse gas emissions, land, and water costs associated with conventional meat production. Recent studies have cautioned the potentially higher energy input and environmental footprint of clean meat production (Lynch & Pierrehumbert, 2019).

Nonetheless as research continues to break the technological barriers to commercialising clean meat, the biggest barrier remains in consumer acceptance, with surveys highlighting inconsistent results across different countries. Qualitative studies have revealed common objections to be perceived unnaturalness, fear of risks to public health, taste, and price concerns. (Laestadius & Caldwell, 2015; Verbeke et al., 2015; Mohorcich & Reese, 2019)



## What will Kiwi consumers choose?

Clean meat could become as inexpensive as conventional meat in just a few years. When forced to choose between clean meat, conventional meat and other alternative proteins in the market, what will Kiwi consumers choose?

Tucker (2014) conducted qualitative focus groups throughout the country with 69 individuals on clean meats and insect consumption in order to identify opportunities for reducing meat consumption in the country. Participants were shown pictures of intensive agricultural farming, low input farming, GMO, clean meat, and insect eating, and were asked to share personal thoughts on whether they espouse those practices (Tucker, 2014). Tucker's (2014) research highlighted overall negative attitudes towards clean meats, with 55% opposing the idea of clean meats becoming a diet staple due to taste and unnaturalness. The research showed that younger males, who are more knowledgeable, and city dwellers in New Zealand were more accepting of clean meat. (Tucker, 2014; Flaws, 2019)

To encourage consumers to try clean meat, it has been suggested that marketers highlight the environmental benefits of clean meat in comparison to conventional meat. (Verbeke et al., 2015) However, willingness to try does not reflect purchase intentions in a real marketplace setting. The dearth of research surrounding consumer attitudes toward clean meat in New Zealand warrants more work being done in this area.

## Conclusion

Conventional meat farming has been said to be one of the biggest contributors to greenhouse gas emissions. In response to climate change and the growing world population, clean meat promises to be the solution to preserving the environment and to satisfying consumer thirst for meat. However, consumer acceptance remains a huge constraint.

While the name "clean meat" has enabled greater buy in, consumers are still sceptical about the technology and its potential risks to health. People want to know where their food comes from and food marketers have to be prepared to tell a compelling story. More research thus needs to be done to understand how clean meat can be marketed in New Zealand. Clean meat has found great success in Israel, not because of its name, but because marketers have managed to appeal to the values of its people. Israel is home to the most vegans per capita in the world. (Leichman, 2017)

Bearing in mind that regenerative farming using grazing animals has been found to be crucial to sequestering carbon back into the soil to restore the environment (Flaws, 2019b), it seems there is still a place

for responsibly produced conventional meat and alternative proteins in the market, even as clean meat becomes commercially viable. As the industry searches for ways to serve protein to the world, perhaps it is the collective efforts of reducing our environmental footprint that would justify all the toil.

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