

4

Predicting the future of food safety

6

Raw drinking milk – state of play

9

Managing metabolomics interpretation



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UNDERSTANDING REGENERATIVE AGRICULTURE

David Burrows explores how the health of our soil impacts the quality of the food we produce

In September I spent two days in Amsterdam, at the second annual 'Regenerative Agriculture and Food Systems Summit'. In the space of just a couple of years, this has become the topic that big food companies want to talk about. It offers huge potential in helping to fix what is clearly a broken food system. This is the chance, as one of the opening speakers put it, "to rewrite the narrative of agriculture". But could it offer more than that?



David Burrows

At its heart, regenerative agriculture is about the soil and there are five underlying principles: don't disturb the soil; keep the soils surface covered; keep living roots in the soil; grow a diverse range of crops; and bring grazing animals back to the land. That might sound a little like 'conservation agriculture' or 'biological farming' systems but regenerative should go further and encompass farmer wellbeing and profitability too. As more than one speaker noted at the summit: "farmers can't go green if they're in the red".



SHOULD HEALTHY SOILS NOT EQUAL HEALTHY CROPS AND ANIMALS AND IN TURN HEALTHY PEOPLE?

Whether food companies, governments or consumers are prepared to all help fix the system remains moot. 'Who' will pay for regenerative farming is one of many live debates which come under a broad theme of 'what' regenerative farming can deliver – environmentally, economically and socially. There are layers of questions beneath this, including: Can it achieve greenhouse gas reductions on the scale that some companies forecast? Will consumers pay more for regeneratively-farmed products – and should they even have to? Where do livestock, with their considerable environmental impact, fit into these systems? Can cows or chickens or pigs that are housed their entire lives be regenerative, for example? Can genetically modified or edited crops, or controversial chemicals like glyphosate be part of regenerative systems?

However, one area that remains under the radar is health. Everyone is talking about 'healthy soil' but as far as I can see there is little consideration of human health (at least in across 'big food'). It was mentioned only briefly in two days, and more than a dozen panels and presentations in Amsterdam. "We haven't talked about the food we are producing," explains Geraldine Gilbert, food transition lead UK and Europe for Forum for the Future, an international sustainability non-profit organisation. Gilbert was one of the few to ask: where does diet fit into the current discourse? In one session she left Nestlé group head of sustainable agriculture thinking about this very question. It is about "people's demands", said Pascal Chapot. (Food companies always say they are there to grow and sell what people want to eat).

The response reminded me of an event I was involved in around this time last year. I was on a panel to discuss the media's role in disseminating information around controversial climate topics like eating less meat. However, it was Professor Tim Benton, research director at the Chatham House think-tank, who stole the show (organised by Sustain, the alliance for better food and farming). Something he said stuck with me: "We don't need to grow more food, we need to grow different food in different ways."

Looking at the Amsterdam summit through this lens leads me to wonder, are we witnessing a full transition of the food system – one that is low impact and fair and leads to accessible, affordable and sustainable food. Or not? I am still chewing this over but there are a few things to consider.

The first is this idea that regenerative farming is simply being woven into, or layered on top of, the current food system – what Adele Jones, executive director at the Sustainable Food Trust (SFT), refers to as "tweaks around the edges". In a conversation we had as part of a new report for Footprint, a sustainability platform, she warned that the current dialogue, dominated of course by the major corporates, is leaning towards how to sell the concept.

"People come at it the wrong way around: they think of a label and then work backwards," Jones explains. Whether the marketing teams at major food companies ruin regenerative by greenwashing before it's even germinated is certainly creating unease. It is a slightly woolly concept, and opinions are split on whether a stricter set of rules, or a certification, would actually make or break it.

Clear as mud

A label might provide an antidote to greenwashing but it's not a sure bet (just ask anyone who has labelled goods with the now damaged concept of carbon neutrality). A more holistic ecolabel (which I discussed in a previous article for *The Food Chain*) could incorporate some of the benefits of regenerative approaches, like nature restoration, reduced use of chemical inputs, lower

greenhouse gas emissions and higher animal welfare. "We need some clarity in this chaos," says Maria Coronado Robles, global head of sustainability insights at Euromonitor.

Consensus on one label will be hard to find though. Much as it will for a regenerative agriculture one. The Regen10 group, an initiative involving major food companies and farming organisations globally, that was launched at the COP26 climate talks in Glasgow UK in 2021, is developing a framework for regenerative agriculture that it wants 500 million farmers to be involved with by 2030. For now, companies are by and large going their own way, which is risky. "Companies and consumers are both left wondering 'what's what?'" says Coronado Robles. Given its profile, there is relatively little research on how consumers feel about regenerative farming and food. Research published in September by McCain Foods and Demos, a think tank, did show that 70% of people are not yet familiar with the term 'regenerative farming' but there is significant support (around 70%) for the practice in principle.

What appears to be clearer, is that people want more (trustworthy) information so they can choose sustainable foods that align with their values. However, with myriad green claims thrown at them every time they shop or eat out, they are left baffled – and even by some of the simpler claims to verify.

Like carbon. Bord Bia's Thinking House report, titled *Consumer & Carbon Cutting through the Carbon Jargon*, showed support for a global and European-recognised standard for carbon impacts was particularly high in Ireland. There is currently a lot of confusion about the claims and who to trust. It seems that companies may be ploughing a similar furrow with regenerative agriculture: there is already unease that, as with net-zero, there are currently more promises being made than progress.

"Substance is key to build trust with both investors and consumers," says Max Boucher, senior R&E manager (biodiversity and oceans) at Fairr, an investor consortium that represents over \$70tn in combined assets. Boucher and his colleagues have just unpicked the commitments on regenerative agriculture that have been made by 79 of the world's largest agri-food companies. Of the 50 that publicly refer to the potential of regenerative agriculture as a solution to the climate and biodiversity crises, 32 have yet to put in place any formal quantitative company-wide targets to achieve those ambitions.

Once again there is a lot of talk about soil health in the narratives but nothing about human health, nor the nutritional value of crops grown regeneratively. Should healthy soils not equal healthy crops and animals and in turn healthy people? I posed this question to one of the panelists in Amsterdam



recently. He suggested that some early research is producing signs that healthy soil produces more nutrient dense food that enhances human health, but the challenge is “nailing concrete cause and effect in such a complex ‘system of systems’.” It is certainly something people are looking at,” he added.

Two of those looking hardest are David Montgomery and Anne Biklé, authors of the book: *What your food ate*. “One of the big conclusions of the book is that what’s good for the land is good for us too,” explained Montgomery in a recent *Investing in Regenerative Agriculture and Food* podcast. They reviewed some 1,000 papers during their research and have also produced a peer-reviewed paper of their own, in the journal *PeerJ*. They studied paired vegetable, wheat and beef/pork farms which followed either conventional or regenerative practices for five to ten years. Their paper notes that, despite the small sample sizes, “all three crop comparisons showed differences in micronutrient and phytochemical concentrations that suggest soil health is an under-appreciated influence on nutrient density, particularly for phytochemicals not conventionally considered nutrients but nonetheless relevant to chronic disease prevention. Likewise, regenerative grazing practices produced meat with a better fatty acid profile than conventional and regional health-promoting brands.”

Stephan van Vliet, a researcher at Duke University School of Medicine in the US, is another looking in detail at the way food is produced and its nutritional quality. “What we’re seeing initially in our data is that definitely, the ranchers that use these agroecological [or regenerative] practices, such as rotational grazing on biodiverse pastures, moving the animals around regularly, not overgrazing on the pasture, end up with the most favourable omega-6 to [omega]-3 ratios,” he said recently. There are also positive signs regarding saturated fats as well as phytonutrients – the compounds we get from eating plants but can also come in “meaningful amounts” from eating grass-fed animals, though we don’t yet know whether consuming these in meat has any human health effects, van Vliet explained.

Nutrients and nuance

Though our health isn’t front of mind when regenerative is discussed, start to dig and there is quite a bit going on. The Bionutrient Food Association (BFA) in the US has recently written about the assessments it has conducted on over 5,000 samples of almost 30 different crops across two continents. They showed that individual metrics like local vs. grocery store, organic vs. not organic, this variety vs. that variety, are not a

good identifier of the overall nutrient levels of a crop. It is the overall system function of the soil, instead of claims like no-till or cover crop, which is “much more likely” to be the dominant causal factor in determining the quality of crops produced. So we can’t be tweaking around those edges.

There is far more work to do of course (the BFA is doing human trials comparing grass-fed, grain-fed, and plant-based “meat” on a subset of the beef). But the potential of regenerative approaches to provide more nutritious food offers hope following plentiful research showing how our food may well look bigger and juicier than ever yet nutrient levels are falling. It will certainly take time for us to learn about regenerative farming: what works, who benefits, and how it can scale. It will also take time to help consumers understand what it means for them, not to mention how they can identify it in stores (Waitrose and Marks-and-Spencer already have products available). Organic by contrast is simple, explains Gill Wilson, sustainability marketing professor at IE Business School in Madrid, Spain. Consumers see it as ‘no pesticides, better for my health’ and that’s all they need to know.

Crunch time

The debate over the nutritional qualities of organic food is more nuanced than that but it’s one that many consumers perceive to be true. They also see them as more environmentally friendly and natural, but again it’s not always clear cut.

Whether regenerative will allow such perceptions to grow remains to be seen. Companies like PepsiCo have already begun planting the seed though. By focusing on regenerative practices, our farmers can grow nutritious quality potatoes, which we can all enjoy, says a spokesperson from Walkers. But can a packet of crisps really be part of a regenerative food system?

ABOUT DAVID BURROWS

David Burrows is a freelance writer specialising in sustainability within the food chain. A graduate in agricultural sciences, he researches and writes features and reports for publications including Just-Food.com, FoodNavigator.com, FoodserviceFootprint.com, *Poultry Business*, *Pig World*, *The Grocer*, and *Transform*.



PREDICTING THE FUTURE OF FOOD SAFETY

Following the International Heads of Food Agencies Forum, Bernie Commins speaks to FSAI Chief Executive, Dr Pamela Byrne.

The Food Safety Authority of Ireland (FSAI) recently welcomed global food regulators to Dublin for the fourth annual International Heads of Food Agencies Forum. This forum facilitated discussion on how best to prepare for food safety crises and manage food safety incidents in what is becoming an increasingly complex global food system.



Dr Pamela Byrne

"Predicting the future of food safety, even on an Irish scale, is uncertain let alone on a global scale," says Dr Byrne. "That said, some of the main drivers are clear: climate change, geopolitical instability, advances in technology, sustainability of the food system. Online selling continues to challenge the traditional organisation of food safety oversight and authorities like the FSAI must adapt and adopt new techniques to address unsafe foods promoted and sold electronically."

Climate change, Dr Byrne explains, disrupts food supply: "Extreme weather events cause food scarcity by destroying harvests, forcing supply chains to switch to sources that are less familiar and that have a food safety track record that is not so well established. Potential food safety threats linked to weather include increased mycotoxin concentrations in crops caused by fungal growth, spoilage of food and ingress of bacterial pathogens as well as contamination threats from poorer quality water sources."

Sustainability, she says, will broaden the availability of different protein sources where research will be needed to establish safety – in the case of edible insects, for example – and consumer responses will drive changes to eating patterns that will make fringe diets become more mainstream. "With that comes higher demand for new foods, which can expose a greater proportion of the population to food safety issues associated with these. For example, with the rise in demand for

vegetable proteins comes a rise in the threat of bacterial toxins from *Bacillus cereus* if appropriate preservation strategies are not adopted," says Dr Byrne.

Risk and assessment

The FSAI has an active emerging risk identification system in tandem with other EU Member States and the European Food Safety Authority (EFSA). "Our vision is 'safe and trustworthy food for everyone' and within that context we assess food safety risks." Assessment takes the form of inspections of food businesses, sampling of the food supply, audits, responding to consumer complaints, dealing with protected disclosures, engagement with regulatory partners at national, European and international level, and developing horizon scanning tools to identify emerging risks. "From these assessments, we take the appropriate action to remove, manage or mitigate the risk within the bounds of the legal framework," says Dr Byrne. "Proactively, we support food businesses to understand their legal obligations through the provision of materials, resources and engagement with subject-matter experts. However, we also take enforcement action when a food business is not complying with the law such as issuing closure orders, improvement notices, prohibition orders, right through to prosecution. Our national, European and international networks, such as the International Heads of Food Agencies Forum, are important in ensuring ongoing communication between peer organisations as well as building trust that supports our engagement in times of crises."

Food safety crises

On average, there are approximately 600-700 food safety incidents per year. "The FSAI has a risk management team in



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place, which is working on a 24/7 basis as required by law. There are protocols that provide a framework for how we deal with food safety incidents as well as food safety crises. These protocols were developed in collaboration with the food safety inspectorate and other stakeholders, including Government departments and other State agencies, to ensure we are prepared to manage food incidents and crises when they arise.”

“Every three to four years, we carry out simulation exercises either at a national or European level and use the learnings from these to adapt and evolve our approaches. We also ensure we are connected to our European and international counterparts, so that we gain access early to incidents that are going on in other countries that may impact Ireland.

“As a member of the EU, we are connected to the Rapid Alert System for Food and Feed, which ensures timely and accurate dissemination of information, as well as rapid response to that information.

“At global level, we are the Irish contact point for the FAO/WHO International Food Safety Authorities Network, which facilitates the rapid exchange of information across borders and between members, during hundreds of food safety events. Our ultimate goal is to protect consumers in Ireland and the consumers of Irish food in 180 markets across the world from risk and these protocols and systems are critical in enabling us to do our job.”

The importance of a solid food safety reputation for Irish food and drink exporters cannot be overstated: “A recent Eurobarometer survey of almost 27,000 EU citizens in 27 Member States identified that food safety matters for 50% of European citizens,” says Dr Byrne. “Seven out of 10 citizens recognise the important role that science and scientists play in ensuring food safety. In Ireland, 47% of consumers surveyed take it for granted that their food is safe and 84% trust the national authorities as sources of information on food risks.

This trust is based on a strong system of regulatory controls and transparency regarding reporting of the results of these food safety control measures,” says Dr Byrne.

Abroad, Ireland is seen as having one of the most trusted food safety control systems and, by extension, safe and trustworthy food. Dr Byrne explains that this is down to the hard work of the food industry in Ireland which recognises the importance of only placing safe food on the market. “Reputation of any entity, public and private, is hard fought for but easily damaged when the proper action isn’t taken when things go wrong,” she says. “And things do go wrong but Ireland has always taken prompt action, and this is recognised internationally. The FSAI’s primary focus on the protection of public health through science-based decision-making is critical in ensuring Ireland’s reputation as a producer of safe food is maintained. But the industry needs to continue to work hard to comply with the law. We encourage companies that are finding it difficult to comply to engage with us and use the resources we make available on our website to gain as deep an understanding as possible of their legal obligations.”

Room to improve

The food supply system is very complex and becoming more complex year-on-year, says Dr Byrne. “Supply chains are interwoven; therefore, traceability of food is critical. Businesses need to fully understand their suppliers and supply chains and if there is a change in those, build those into their food safety management systems.”

Another area that needs improvement is culture, she says. “We have identified a number of businesses, some through disclosures made to us under the Protected Disclosure legislation, over the last few years where the culture of food safety is not at the standard it should be. We all know the impact of culture on organisational performance and where the culture is not right, issues arise, and this applies to food safety also.”

Numerous investigations have revealed where shortcuts have been taken and workarounds have been put in place, some of which raise serious questions over the safety of the food, according to Dr Byrne. “And where we can’t get verification of traceability, for example, we have no other choice but to take the appropriate enforcement action.”

A third area relates to authenticity. Food information must be accurate, clear, and easy to understand for the consumer. It must not be misleading. “A strengthening of the EU food safety control system for the detection of fraudulent and deceptive practice, following the horsemeat scandal, is now in place and the FSAI, along with our counterparts across the EU have structures and systems in place to control this.

“Food businesses should be assessing the vulnerabilities of their supply chains and taking appropriate action to remove or minimise those vulnerabilities, thereby gaining greater assurance regarding the authenticity of their products.” says Dr Byrne.



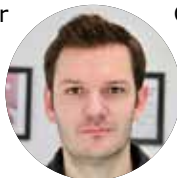
RAW DRINKING MILK — STATE OF PLAY

Nick Hughes explores the concerns and claims of raw milk

Nutritional superfood or public health hazard? Or perhaps a combination of both? These are the questions that have dominated debate around raw drinking milk for years.

Banned in Ireland as recently as 2006, raw milk for human consumption has been gaining popularity in recent times among consumers who believe it has stronger nutritional properties than conventional, pasteurised milk. Supporters claim drinking it can boost consumption of key nutrients and lead to reduced incidence of certain health conditions and allergies in children.

But gold-standard evidence supporting such claims is thin on the ground. For regulators, raw milk remains an inherently risky product that poses particular dangers to specific groups of people – namely children, pregnant women, older people or those who are unwell or have chronic illness.



Nick Hughes

Given the concerns of regulators why then does it remain legal to sell raw milk in Ireland, England, Wales and Northern Ireland (Scotland has banned it since 1983)? In a word: balance. Opposition to raw milk centres on evidence that unpasteurised milk can carry bacteria such as *Salmonella*, *E. coli* and *Listeria* at levels that pose a danger to public health. But the UK Food Standards Agency (FSA) concluded back in 2020 that the risk is not so unacceptable as to justify removing the right of adult consumers to choose to drink it.

For all their concerns over the possible safety risks, regulators are mindful that there is a significant cohort of the public that wants the option to drink raw milk through legal channels. Research by the FSA published in 2018 (the latest available data) found that the proportion of the population consuming raw drinking milk had increased from 3% of the population in



2012 to 10% of the population in 2018. A typical consumer was likely to be under 45 years old, from within the ABC1 socio-economic group and from England. Farmers have responded by supplying more raw drinking milk – 135 producers are currently registered across England, Wales and Northern Ireland – up from 108 in 2012.

Given burgeoning demand for raw drinking milk alongside a growth in production, a compromise position has developed whereby controls are tight on its production and information on the risks of consumption are made clear to consumers at the point of purchase, but the product itself is permitted to be sold direct to the consumer by registered businesses (not via a third-party seller like a supermarket).

“The FSA considers raw drinking milk to be a risky product,” says Callum Stewart, senior policy manager at the FSA. “There are stricter hygiene standards for farms selling raw drinking milk direct to consumers and these farms are inspected more frequently than those producing milk to be pasteurised. These controls aim to ensure that raw drinking milk is safe for people to consume whilst balancing consumer choice.”

The Food Safety Authority of Ireland (FSAI) has adopted a similar stance. It says it continues to be of the view that milk that has not been heat-treated may contain harmful microorganisms and therefore strongly advises that, unless it is boiled first, raw drinking milk should not be consumed by children, pregnant women, older people

or those who are unwell or have chronic illness.

There have been no food poisoning outbreaks associated with raw milk reported in Ireland since 2015 when an outbreak of verocytotoxigenic *E. coli* involving three members of a family was linked to consumption of raw milk. The evidence in that case was however not conclusive, and so the outbreak was described by the Health Protection Surveillance Centre as having weak evidence. At EU level, meanwhile, three strong evidence outbreaks linked to consumption of raw milk were reported in 2021.

Regulation of raw milk is governed by a combination of EU law (EC) No 853/2004) and national legislation which, among other requirements, sets out thresholds for microbiological standards relating to plate count and coliforms. Producers are subject to routine hygiene inspections and raw milk drinking products must be labelled as having not been heat-treated and at risk therefore of containing organisms harmful to health.

In Ireland, the regulation governing raw milk has not changed significantly since 2015 when a new legal amendment in the form of a statutory instrument was introduced by the Department of Agriculture, Food and the Marine (DAFM) clarifying that farmers producing over 30 litres per week of raw drinking milk have to operate under the regulations (those selling under 30 litres are exempt).

This marked a shift from the government’s position in 2011 when then agriculture minister Simon Coveney seemed set on reintroducing a ban. Relations between producers and regulators subsequently improved to the extent that in 2018, the producers’ association, Raw Milk Ireland, published new good practice guidance for raw milk producers in conjunction with DAFM and in consultation with the FSAI, with the aim of reducing the risks associated with raw milk.

On publishing the guidance, Raw Milk Ireland declared itself: “delighted to have been able to have jointly fostered a spirit of cooperation working with, rather than against, the authorities”. Building on legal requirements, the guidance includes advice on implementing strict controls across all aspects of production, as well as testing for pathogens and the provision of shelf life and labelling information. This included the provision of a new warning label that is mandatory for all producers signed up to the guidelines. It reads: “This milk has not been heat-treated and may contain harmful bacteria. The FSAI strongly advises that, unless it is boiled first, it should not be consumed by children, pregnant women, older people or those who are unwell or have chronic illness.”

In the UK, the FSA has also withheld from developing new legal requirements post EU-exit, instead favouring a guidance-led approach. Last updated in 2020, the current guidance emphasises two main controls: to have an effective and verified food safety management system (FSMS) in place (which is a legal requirement) and to commit to best practice in carrying out regular tests for those pathogens which can be found in raw milk.

As part of the validation of their FSMS, producers are advised to provide one full set of satisfactory test results to the FSA and apply a sampling and testing regime that provides ongoing assurances that the system is effective.

The FSA also recommends providing extra information on storage conditions and shelf life beyond statutory requirements, and to label raw milk with the additional warning: “The Food Standards Agency strongly advises that it should not be consumed by children, pregnant women, older people or those who are unwell or have chronic illness” – a warning that is already mandatory in Wales.



Like Raw Milk Ireland, the UK-focused Raw Milk Producers Association (RMPA) welcomes the shift to greater cooperation between the raw milk industry and regulators. "We are pleased to have been engaged in constructive dialogue with the FSA throughout the process of refining the new controls, aiming to ensure they are both practical for producers and focussed on improving food safety," said Tali Eichner, membership secretary of the RMPA on publication of the guidance. "The approach proposed by the FSA meets this need by enabling the producer to assess the risks in their own system and setting controls appropriate to their individual situation," he added. While compromise may have been reached over safety concerns, debate over the nutritional benefits of raw milk consumption remains far more polarised. On its website, the RMPA says, "raw milk farmers hear regularly from customers who experience an improvement in their health or a condition after switching to raw milk". While it concedes that "unfortunately, there is not sufficient research to provide any definitive answers on any health benefits of raw milk", it points to "a number of studies which do show a correlation between raw milk and positive health effects, or with pasteurisation and negative health effects". These include studies that show pasteurisation reduces concentrations of some nutrients such as Vitamins E, B12, B2, C and folate and the absorption of Vitamin D and calcium, and studies that have found a correlation between drinking raw milk and reduced incidence of asthma (Raw Milk Ireland cites a study of over 8,300 children in rural parts of continental Europe which found a significant reduction in asthma development of 41% for raw milk drinkers). The RMPA also states that: "many people with diagnosed or undiagnosed milk intolerance report that they can drink raw milk without symptoms, although it isn't clear what the mechanism is". Other claimed benefits from raw milk consumption have included a reduction in the risk of osteoporosis and Crohn's disease.

Yet the evidential base for health and nutrition claims associated with raw milk consumption remains relatively weak. A systematic review and meta-analysis of the effects of pasteurisation on milk vitamins, and evidence for raw milk consumption and other health-related outcomes, found that the effect of pasteurisation on milk's nutritive value was minimal because many of the vitamins are naturally found in relatively low levels. Raw milk consumption may have a protective association with allergy development, according to the analysis, although this relationship may be potentially confounded by other farming-related factors. Consumption was not associated with cancer or lactose intolerance. The authors noted that the findings should be interpreted with caution given the poor quality of reported methodology in many of the included studies.

Moreover, no health claim relating to raw milk has, as yet, been approved under the EU health and nutrition claims regulation. For the moment, raw milk proponents and sceptics are managing to co-exist in a way regulators believe protects public health without restricting the right of people to drink the product. The debate over raw milk's nutritional value, by contrast, shows no sign of reaching an *entente cordiale*.

ABOUT NICK HUGHES

Nick Hughes is a freelance writer and editor specialising in food and environmental affairs. He contributes articles to specialist publications including *The Grocer* and *Footprint* and is the author of numerous reports and whitepapers on food-related issues. Nick has previously worked in advisory and policy roles for DEFRA and the World Wildlife Fund (WWF).

CATERING TO ALL

Meeting the needs of coeliac customers can be very lucrative for Irish businesses, as Frances Buckley explains

Frances Buckley is an applied culinary nutritionist, licenced food safety trainer and chef with over 25 years of professional cooking experience in restaurants and diplomat catering. "My classical training was in Dublin College of Catering, Cathal Brugha Street. I have worked for over five years in food sensory science evaluation with Teagasc and Diageo as part of their food sensory testing panels, and for several years, I have been a guest judge for the Associated Craft Butchers of Ireland."

Frances attained a Master of Science in Applied Culinary Nutrition at Technological University of Dublin in 2020. "It provides me with the expertise to apply culinary skills and nutrition knowledge in developing food for health and wellness. It combines advanced nutrition science with professional culinary skills to provide health-supportive meal solutions. In my applied research project on coeliac disease, I evaluated the understanding of coeliac disease in workplace catering, together with the potential deficiencies in the gluten-free diet."



Frances Buckley

What is coeliac disease?

Frances says: "Coeliac disease is an autoimmune disease which causes an adverse reaction in adults and children when they eat gluten. Gluten is a protein (gliadin) that is found in wheat rye and barley. Even a grain of gluten can cause abdominal harm such as diarrhoea or other symptoms which can last for several days. It is not an anaphylactic reaction. The only treatment for the condition is a fully gluten-free diet."

Frances works with the Coeliac Society of Ireland and the Dublin and Dún Laoghaire Education and Training Board educating and training chefs, catering staff and health professionals about coeliac disease and the gluten-free diet. "I developed a Catering Training Programme funded by the Restaurant Association and Skillnet. Catering Safely for Coeliacs is a guide to the importance of good practice to avoid cross-contact with gluten.

"This programme was created for the Coeliac Society, and it stemmed from my Masters: *The workplace chef's understanding of nutrition in the coeliac diet*. What I explored was if you were a chef working in places with a cohort of people for a long period of time, such as a boarding school or a prison, what does the chef understand about what should be included in food for coeliacs. They may know what they have to avoid – wheat – and about 'hidden' or less obvious sources of wheat such as some condiments like mustard. But are they aware of what the coeliac diet can lack in terms of nutrition?" Coeliacs suffer from malabsorption of certain nutrients as a direct result of the damage to the lining of the small intestine in those with coeliac disease. Increased intake of calcium, magnesium, iron, B vitamins, vitamin D and fibre is important in a coeliac diet, and pseudo cereals (ancient grains) such as



amaranth, sorghum and teff can help to mitigate the risk of nutrient deficiency. Frances says, research has shown that if you eat foods higher in those nutrients, you will absorb more of them.

The programme incorporates videos of real situations, procedures for the safe production of foods for coeliacs, with a guide to good practice to avoid cross-contact with gluten aimed at chefs and managers, and front-of-house staff. "Very often, chefs will understand the needs of the coeliac customer, but the communication doesn't reach the wait staff, mistakes happen and the person is given the wrong plate. For example, we have heard of cases where the customer will be told the soup is gluten free, but it will arrive with croutons sprinkled on top of it." The programme also looks at non-verbal communication of front-of-house staff when interacting with the coeliac customer. "If your front-of-house staff is giving the eyes turned up to heaven when you say you are coeliac, then regardless of what is coming from the kitchen, the customer has already lost faith in it."

Restaurants and catering operations that participate in the programme receive a certificate and a 'coeliac circle' sticker that highlights that they are trained in the safe production of food for the coeliac customer.

The instance of coeliac disease has risen in Ireland, probably, Frances says, due to better testing, and meeting the needs of this audience can be very lucrative. "The most common request for 'free-from' foods in restaurants and other catering outlets is for gluten-free food, so the provision of dishes for coeliacs can be a valuable part of your business. You may decide to provide a separate menu, this can allow you to produce the dishes for this selection at a different time (time zoning) or in a different section to minimise disruption to the kitchen workflow.

"It's not just the person living with coeliac disease your business could be missing out on as a customer, but their entire party. Research shows that 63% of coeliacs eat out once a month with the average spend on food €120, and 70% of coeliacs will be the decision-maker on what restaurant the party goes to, based on menu choices without gluten and staff understanding of their needs. It's worth about €1 million to business a year."

ABOUT FRANCES BUCKLEY

What are you currently watching, reading and listening to? I am watching *The Long Shadow*, reading *The Great Plant-Based Con*, and listening to Yotam Ottolenghi's podcasts.

What do you enjoy in your spare time? I enjoy swimming, baking and taking part in a choir.

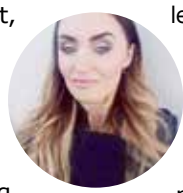
What is your favourite food? I love shellfish, particularly prawns and scallops. Eating out, I love Thai food.



MANAGING METABOLOMICS INTERPRETATION

A forensic toxicologist and forensic science lecturer, **Dr Geraldine Dowling's** current focus is on metabolomic data management.

Dr Geraldine Dowling is a forensic toxicologist, lecturer in forensic science, and chief executive officer/chairperson of ForenSics InnovAktion in ReseArch and Nutrition (SARAN). "I have a first-class honours degree in Industrial Environmental Chemistry from South East Technological University, but I have been working mainly in the area of analytical chemistry, food safety, toxicology and in laboratory-based analysis." Previously, she has held posts in ISO 17025-accredited laboratories in The Marine Institute, Teagasc and The State Laboratory for 12 years during which time she obtained a research M.Sc. and Ph.D. in analytical science, veterinary and human toxicology. She subsequently moved into academia in 2016 and in her current role in Atlantic Technological University, she lectures and researches in the fields of food safety, forensic science, chemistry education, analytical science and metabolomics. "We are developing techniques and strategies for data management and interpretation because metabolomic data is very cumbersome – you get a huge amount of information. We are looking at potential biomarkers that can be used in a variety of fields, both in food safety and forensics." One example she cites is identifying poisoning cases: "Here, we are looking at the potential biomarkers for example, for certain compounds or drugs that may have short detection windows. Another example is looking at obesity and the impact of metabolites in the body as a result of various diets." There are ample opportunities for her students to apply these



Dr Geraldine Dowling
SFHEA

learnings. "Some of them take up roles in analytical and nutrition companies, others in pharmaceutical companies, government laboratories or forensic organisations." Geraldine is also an experienced researcher and has published/produced over 70 projects in various fields. "Many of the projects I work on concern method development, data management or validation studies, trying to see what type of data can be used and applied to food safety or other studies such as metabolomics or forensic work."

When asked about the current food safety and toxicology challenges, she cites the detection of biomarkers in food safety and toxicology using metabolomics studies and data interpretation from these studies. Earlier this year, Geraldine availed of a **safe food** Food Safety Skills Fund grant to attend the TIAFT 2023 conference in Rome which focused on this issue.

"The aim of the visit was to evaluate the use of metabolomics for non-targeted approaches for analytical toxicological applications in food safety, nutrition and food fraud. In addition, to explore the potential for ATU to collaborate with international partners.

"The use of Quadrupole Time-of-flight Mass Spectrometry (Q-TOF-MS)/mass spectrometry (MS) and Full-scan Accurate MS for routine analysis allows detection of target analytes as well as non-targeted compounds in food safety and metabolomics studies. However, the technique generates an enormous amount of data and, depending on the matrix, this can make the identification and quantitation of analytes difficult. Strategies and databases can be built which allow a wider range of substances to be screened for. Metabolomics for biomarker monitoring is now being applied in food safety, nutrition and toxicology globally but data management is challenging."

What is metabolomics?
Metabolomics involves high-throughput identification and quantification of small chemical compounds (<1000 to 1500 Da), present in a variety of biological systems such as a cell, an organism, or biological fluids. The metabolome includes endogenous (e.g., amino acids, fatty acids, sugars, carbohydrates, vitamins, lipids, and their derivatives) as well as exogenous (e.g., pollutants, pharmaceuticals, food additives, xenobiotics) compounds. The targeted and untargeted application of metabolomics to physiology can help with rapid screening of the majority of metabolites and detect potential changes in their concentrations leading to a better understanding of complex physiological, biological and biochemical interactions in various models.

ABOUT DR GERALDINE DOWLING
What are you currently watching/reading/listening to? I love listening to music, playing my DJ decks and learning the tin whistle.
What do you enjoy in your spare time? Going on road trips in my motorhome, cycling, hill walking, singing, make up artistry/hair and fashion.
What is your favourite food? Mackerel, kefir and hummus.

NEWS AND EVENTS



A safe and tasty Christmas with safefood

This December, **safefood** is reminding home cooks to use a meat thermometer when cooking their Christmas turkey: just pop it in the thickest part of the turkey and when it reaches 75 degrees Celsius, it's both safe and tasty. The two-week campaign includes the memorable "75!" advertising across TV, radio and online as well as free information leaflets for food shoppers, available in more than 250 butcher shops and food retail settings. For the complete guide to cooking your Christmas turkey including an interactive turkey cooking calculator and food shopping guide, visit www.safefood.net/Christmas

All-island Public Health Laboratory Forum 2023



safefood were delighted to host a Public Health Laboratory Forum meeting in the Ashling Hotel in Dublin on the 16th November. The meeting brought together representatives from public health laboratories across the island to discuss mutual interests, share knowledge, and exchange ideas.



All-island Environmental Health Forum 2023

safefood hosted an all-island Environmental Health Forum on the 17th of November in the Ballymascanlon Hotel, Dundalk. The forum was the first event of its kind and brought together environmental health representatives from the Northern Ireland Councils and Health Services Executive in Ireland to exchange information and ideas, and discuss challenges faced by both services.



Dr Alfonso Rodriguez-Herrera

Gluten Free Roadshow 2023

The Gluten Free Roadshow 2023 was held at the Rochestown Park Hotel in Cork on Sunday 22nd of October, and **safefood** sponsored an update on the importance of annual blood tests and bone health for coeliacs that was given by Dr Alfonso Rodriguez-Herrera. Dr Herrera is a medical consultant in paediatrics with special interest in paediatric gastroenterology and nutrition. His main research topics are biomarkers of dietary compliance, including those pertaining to coeliac disease.

QUIZ TIME

Try your hand at this issue's quiz and you could be in with a chance to win a fantastic prize!

Question 1

What allergen labelling law affects prepacked for direct sale (PPDS) foods in Northern Ireland?

Question 2

A pre-workout snack should be high in...

Question 3

What is the national dish of Lithuania?

Question 4

What plant family do legumes belong to?

Question 5

Foods labelled 'Gluten-free' means the gluten concentration is up to 20mg of gluten per kg – true or false?

Question 6

Honeycrisp, Rome, and Winesap are varieties of what?

Question 7

What cheese would you traditionally find in a calzone?

Question 8

What three vegetables go into a mirepoix?

Question 9

What colour is the skin of a dragon fruit?

Question 10

Storing fruit in a paper bag can hasten ripening – true or false?

safefood is delighted to offer one lucky quiz winner a fantastic food hamper (similar to pictured).



Congratulations to Sinead Reilly who was the winner of issue 27's quiz.

Answers:

1) Red chili; 2) Little ears; 3) Raw; 4) Okra; 5) The boot; 6) Peru; 7) 75°C; 8) Berlin, Germany; 9) Challah; 10) Basil

To enter: Simply complete the quiz above and send your answers to knowledgenetwork@safefood.net before 1st March 2024. This competition is open to Knowledge Network members on the island of Ireland only.

Food safety training

safefood for business is a free e-learning food safety tool for small businesses in the food industry, from manufacturing to catering, to service. It covers all aspects of basic food safety training for staff in eight short, practical and engaging modules using real-life scenarios and workplace activities. With **safefood** for business you can provide staff training and track their progress across any device as they work to achieve certificates of completion. Scan the QR code to sign up and access all the modules and resources to help keep your business food-safe. See www.safefoodforbusiness.com



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We'd love to hear from you. Would you like us to feature your research or industry sector? What else would you like us to cover in the world of food safety? Send your article ideas, feedback and suggestions to knowledgenetwork@safefood.net

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To obtain free membership of the **safefood** Knowledge Network, go to safefoodkn.net and click 'Sign Up'. Once your membership is quickly approved, you can follow the latest Knowledge Network news, learn about events, and access Knowledge Network videos, conference presentations and lots of other useful resources.

Everybody at safefood would like to wish you a merry and peaceful Christmas.

The Food Chain is printed on recycled paper and is packaged in recyclable plastic.