

The Food Chain

Knowledge Network

The SafeFood Knowledge Network Newsletter

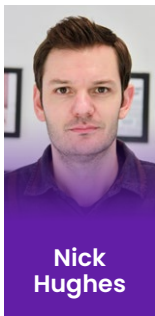
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Ultra-processed people

Is it time to take action against ultra-processed foods, asks Nick Hughes



Nick Hughes

Why do we all eat stuff that isn't food – and why can't we stop? That was the provocative question posed on the front cover of Dr Chris van Tulleken's best-selling book *Ultra-processed people*, in which the medical doctor and TV presenter made the case for the damage to our health caused by diets high in so-called ultra-processed foods (UPFs).

The book's publication in the spring of 2023 raised the temperature on a global debate that had been simmering for a number of years. The question at its heart is this: are UPFs, which include most mass-produced baked goods, cereals, snacks and other convenience food products, inherently bad for our health due to the structural changes that occur during their processing, or are there bad UPFs and good UPFs depending on their specific nutritional profile? Certainly, the impact of consuming UPFs on human health is still not fully understood, which explains why most regulators have so far been reluctant to curtail their availability or warn against their harms. What we do know is that these types of food now form a central part of the average diet, albeit with significant variations by country. A 2021 review of studies providing

data on the level of UPF consumption found that the United States and the United Kingdom were the countries with the highest percent energy intake from UPFs (generally >50%), whereas Italy had the lowest levels (about 10%). More recently, research published in July found that UPFs account for almost two thirds of the daily energy intake of UK adolescents, according to analysis of food diaries kept from 2008 to 2019. The debate over UPFs has filtered into the public's consciousness, sparking concern over the risk to future health. A survey of 10,000 people from 17 European countries from the EIT Food Consumer Observatory, published in February 2024, found that a majority (67%) of European consumers do not like it when their foods contain ingredients they do not recognise, and 40% do not trust that UPFs are regulated well enough by authorities to ensure these foods are safe and healthy in the long term.

Weighing the risks

Regulators are coming under growing pressure to act, not only from members of the public but from health campaigners and scientists like van Tulleken. Should they choose to do so, they will need to weigh the risks of UPF consumption against the advantages of food processing, which has long played an important role in improving food safety and delivering other social



benefits. Pasteurisation, for example, kills off harmful bacteria in products such as milk, while processing can improve the taste or texture of food and increase its shelf-life, making food more accessible or affordable and helping reduce waste.

There is currently no legal definition of a UPF, however most academic studies categorise foods according to the NOVA classification – a system of grades developed in Brazil that compares the degree of processing of food and drink products on a scale of one to four. It ranges from unprocessed or minimally processed foods like fruits and eggs in group one, to ultra-processed foods like cereals, biscuits, cakes and chicken nuggets in group four. These are distinguished from other foods both by the use of non-domestic, industrial processes like hydrogenation, extrusion and moulding, and by the fact the final product contains little if any intact food from group one.

One shorthand way for the public to decide whether something is a UPF is to consider whether it contains an ingredient they wouldn't recognise from their own kitchen. UPFs are often associated with the use of food additives such as emulsifiers, stabilisers, gelling agents and thickeners that help to mix or thicken ingredients, and preservatives that are used to keep food safer for longer by slowing the growth of microorganisms. Food additives have to pass a robust assessment to check they are safe for people to eat, including analysis of the toxicological profile of a particular additive, its concentration in particular foods, the range of foods in which it is used, and how much we might be exposed to it in our overall diets.

Yet the argument over the dangers of UPFs is less to do with harm caused by specific additives or foods and more concerned with dietary patterns and how this cocktail of substances interacts with our bodies when consumed over a sustained period of time.

Dividing lines

Van Tulleken set out his hypothesis in an interview

with the *New Scientist* magazine in 2023 in which he explained: "The industrial processes involved in food manufacturing change its chemical and physical structure. They reduce food crops to their core constituents, such as high fructose corn syrup made from corn starch or hydrolysed vegetable protein from soya beans, which are then reformulated into substances that are highly palatable and calorific. These processes strip out fibre and micronutrients. Then ingredients are added that our bodies haven't evolved to cope with, such as artificial flavourings and emulsifiers. We have evolved to eat naturally arranged matrices of different chemical constituents and when you separate them into their molecular components and chemically modify them, they seem to interact with the body in a very different way."

The food industry has pushed back against the notion that UPFs are intrinsically bad amid criticism that the NOVA system is too simplistic in classifying products such as wholemeal bread alongside those like chocolate biscuits and doughnuts. In April 2023, I attended a briefing organised by the trade body, FoodDrinkEurope, which questioned whether the concept of UPFs places too much emphasis on the processing of foods and not enough on the ingredients that go into making them. Gert Meijer, Nestlé's Deputy Head for corporate regulatory and scientific affairs, summed up the industry line of defence when he described a, "mix up between what we would say is formulation and actual processing". He added: "There is no proven relationship between the degree of processing and the healthiness of a food product." Although evidence does exist (and is growing) to suggest a relationship between UPF consumption and negative health outcomes, proving causality has indeed remained out of reach. The British Nutrition Foundation (BNF), which is part funded by food companies, reflected this fact in a position statement in which it argued against blanket dietary advice to avoid UPFs, some of which, like wholemeal bread



and lower sugar wholegrain breakfast cereals, can contribute to an affordable, healthy, balanced diet. The BNF noted how current evidence is largely based on observational studies that, by design, cannot demonstrate cause and effect, and called for further studies to be undertaken.

Evidence base

Evidence showing a correlation between UPF consumption and poor health outcomes includes research into UK adults published in 2020 that found a diet high in UPFs is associated with a clinically important increased risk of type 2 diabetes. The findings prompted the researchers to conclude that, "identifying and implementing effective public health actions to reduce UPF consumption in the UK and globally are urgently required". Another study from 2023 found that diets high in UPFs could be linked to an increased risk of developing and dying from cancer. Researchers from Imperial College London's School of Public Health found that higher consumption of UPFs was associated with a greater risk of developing cancer overall, and specifically with ovarian and brain cancers. A more recent addition to the evidence base came courtesy of research from the University of Central London (UCL), published in July, which found that UPFs contain more calories, fat, saturated fat, sugar and salt than minimally-processed foods – but that not all UPFs are unhealthy. Researchers compared data on the level of processing in commonly eaten foods to the nutritional information found on front-of-pack labels and found that UPFs (as classified under NOVA) had worse nutritional scores, with greater levels of energy, fat, saturated fat, sugar and salt than minimally processed foods. Yet the results also indicated that not all UPFs are unhealthy based on their nutrient profile with products such as meat-free mince scoring positively under traffic light label systems, despite being categorised as ultra-

processed. "At the moment, things aren't so clear cut as to say all UPFs are bad and there is a risk of confusing people about what is healthy to eat," said Dr Adrian Brown, a specialist dietitian from UCL Division of Medicine.

Regulatory waiting game

The volume of noise around UPFs has been sufficient for regulators in some countries to tentatively intervene. In May, the UK's Food Standards Agency (FSA) published advice for consumers in which it stated that, while there is a correlation between poorer health outcomes and diets that are high in UPFs, "we still don't know whether it is because these foods are unhealthy because of how they are made, or if it's because a large majority of processed foods are high in calories, saturated fat, salt and sugar". The FSA also pointed to an evidence review by the UK Government's expert scientific committee, the Scientific Advisory Committee on Nutrition (SACN), which concluded that more research is needed before it could draw any firm conclusions about whether UPFs cause poor health, despite finding associations between increased consumption of UPFs and an increased risk of health issues such as obesity, chronic diseases like type 2 diabetes, and depression. In Europe, meanwhile, there is no sign that regulators are considering targeting UPFs as a distinct food group for reduction or avoidance, with the European Food Safety Authority (EFSA) having remained largely silent on the issue.

Beyond Europe, however, some countries are taking decisive action to guard against excessive consumption of UPFs. Brazil's dietary guidelines emphasise the benefits of diets based on a variety of natural or minimally processed foods, mostly plants, and freshly prepared meals as well as the multiple negative effects of ready-to-consume ultra-processed food and drink products. Brazil and Chile have also introduced warning labels for foods high in salt, sugar and fat, a group dominated by ultra-processed products which tend to have a poorer nutritional profile than unprocessed foods. Some campaigners would have European countries follow suit, albeit any such policies would be fiercely resisted by parts of the food industry. More likely is that regulators will continue to watch with interest from the sidelines until research proves conclusively of the harm to health from eating ultra-processed foods.

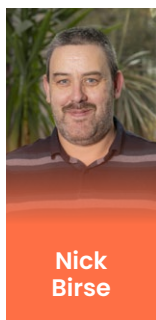
ABOUT NICK HUGHES

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 the UK Department for Environment, Food & Rural Affairs (DEFRA) and the World Wildlife Fund (WWF).



Testing Times

From developing flavour profiles to uncovering food adulteration, Nick Birse discusses the work of the ASSET Technology Centre



Nick Birse

Nick Birse is a lecturer in mass spectrometry at the Institute for Global Food Security (IGFS) and the School of Biological Sciences in Queen's University, Belfast. He speaks to us about the ASSET Technology Centre, a leading analytical chemistry and mass spectrometry research hub within the IGFS, that hosts the National Measurement Laboratory's Centre for Excellence in Agriculture and Food Integrity.

"The ASSET Technology Centre, which stands for assured, safe and traceable, was established by Professor Chris Elliott a decade ago when he founded the IGFS. It was inspired by incidents such as the dioxin scandal that occurred in the pig industry in Ireland, the horsemeat scandal in Ireland, the UK and the Netherlands, and the melamine-in-milk scandal in China.

Inside the lab

The laboratory was established to provide a variety of experts to support the local agricultural sector in Northern Ireland. "Agriculture is such a large and important part of the economies of Northern Ireland and Ireland that we want to ensure we have the skills and expertise on site, not just to undertake product development testing for companies, but also to train the next generation of food scientists and analysts that will be employed in the sector," says Nick.

The laboratory has a dual structure with a two-tier testing approach, Nick explains. "We've got a spectroscopy side with a variety of handheld, portable instrumentation: near infrared, mid infrared, ultraviolet, and elemental spectroscopy, as well as larger bench-top instruments that are very sensitive but work better in a laboratory environment." Queen's University has worked with a spin-out company, Bia Analytical, to develop handheld devices

that use advanced computer modelling technology. "The data is transferred through Bluetooth onto your smartphone and transferred up to the cloud, where it's processed. The result is then sent back to the smartphone so the user can see in real time if the product is passing or failing testing.

"This computer modelling technology can achieve a wide variety, from assessing quality to checking the flavour or taste characteristics producers are looking for, through to identifying for contamination or adulteration," Nick explains.

The advantage of the spectroscopy approach, he says, is that it moves away from genetics and DNA, meaning it can identify where non-biologic ingredients like brick dust, soil or clay have been added.

"If you were to test something like a chilli powder that's been adulterated with brick dust genetically, all that's in there is 100% chilli, but it could be 50% brick dust. Lead chromate is put into turmeric to make it brighter. The genetic profile of the product remains unchanged, so if a genetic test is used, it will look as if it's passed. But using the spectroscopy, there's a difference in the chemical fingerprint, and we can see that we've got a problem."

Adulteration can be caused by a variety of things from deliberate criminality such as adding clay powder to bulk out a product, to pesticide residue as a result of weather conditions.

Nick elaborates: "Most pesticides are designed to break down when they're exposed to light and ozone. In Ireland the ideal weather conditions may not occur, and the pesticide may not degrade as quickly as expected. When the product is harvested, there could be a higher level of pesticide residue than expected which can lead to illness."

Another function of the lab is to work with industry to examine new products to ensure they have the correct levels of certain key ingredients like vitamins and minerals. "This can be food products or animal



feed. We do a lot of work with the grain traders associations to ensure that new animal feeds have the correct composition."

Elsewhere in the lab, he says, staff are working on new novel animal feeds and supplements to reduce methane emissions and improve animal health. There are ongoing trials on willow in animal feed to help the gut microbiome in sheep and cattle and cut methane emissions

"Some of the other work that we do is consumer preference understanding. We can do all of this work to deliver new food products that are better for the environment, have lower emissions or enhanced nutrition, but if its unpalatable to consumers, particularly if it tastes worse than what is available at a lower cost, or if it just doesn't taste pleasant, consumers won't buy it," he says.

Market forces

Food safety issues change depending on market demand, supply and availability. According to Nick: "For example, if it's been a particularly poor year for grain yields, grain that's been sitting on farm with higher levels of fungal mycotoxin contamination might make it onto the market. There might be some blending and other illegal activities to try and get it under the thresholds."

Trending food items, often driven by cookery programmes, can also have an impact on food safety, something Nick calls the 'Delia Smith effect'. "If organic chicken is trending, suddenly you will find that the supply starts to accommodate demand, but production hasn't changed, so products can be mislabelled to meet demand."

The lab can be notified of these fraudulent cases through a number of channels, from supermarkets to government agencies. Nick outlines a recent example: "There was a case recently where consumers in Scotland reported to Trading Standards that their vodka had an odour, smelling a bit like nail varnish remover. Trading Standards seized it and sent it for testing, which revealed that isopropyl alcohol

was present. When they looked at the product and packaging in more detail, they could also see that it was missing laser etching on the bottle.

"A previous collaborator of ours, Roy Goodacre at the University of Liverpool, has worked on a spatially offset raman spectroscopy system. This is a handheld device that can be placed against a bottle to indicate if there is a problem with the contents without having to open it. This is an example of where scientists can collaborate with government on quick and easy ways to test items without necessarily having to open up the packet and get an answer."

Daily routine

A typical day for Nick involves lecturing, project management, grant writing, training and school board meetings. "Work in the lab usually starts at 8:30am or 9am. The instrument does the work rather than the person so we will have samples lined up and running automatically.

"We'll double check that anything running overnight has completed, check for errors or if there is anything to repeat. Then we start to analyse and process the data and get our next set of samples prepared. The results can steer what we do in terms of further work."

Advances in food safety technology have meant that the volume of samples processed by the lab has increased. "We're able to get more samples processed in a shorter period of time. If we have a grain ship arriving at Belfast Harbour and it takes us an hour to process each grain sample, it's going to take us a long time to get representative samples from 20 or 30,000 tonnes of grain. With rapid technologies, we can now process 15 or 20 times as many samples, and this allows us to overcome representative sampling. More samples mean more data, and better quality results give us more certainty, more confidence."

These advances help in other ways, too, he says.

"We have simplified many of the techniques, and instrumentation has become more sensitive, so there isn't as much sample clean up or pre-processing required. Consequently, the number of people involved to get samples into instruments has reduced."

The simpler something is in terms of a test, he explains, the more robust it is. "There are fewer failure points compared with how things were done 10 or 15 years ago, so we can have more confidence in the results that we provide."

ABOUT NICK BIRSE

WHAT DO YOU ENJOY IN YOUR SPARE TIME?

I spend a lot of time on a rowing machine to try and avoid the excesses of an academic lifestyle.

WHAT ARE YOU READING?

I tend to read history and popular culture. I'm reading about John Harrison and the development of modern watches; what went on behind the wall in East Germany in the communist period; and I've got Quentin Tarantino's book about film on my shelf.

WHAT ARE YOU LISTENING TO?

I'm very keen on Smith and Sniff, the automotive podcast. I'm enjoying the new David Gilmour album and obscure German prog rock bands like Eloy.



A problem repackaged

David Burrows writes about the potential impact of chemicals in plastic packaging on our health



David Burrows

Plastic pollution of the oceans is considered to be an environmental disaster, but is there a food scare lurking beneath the waves too? This question was posed in an article for *The Food Chain* in May 2019. Evidence of a problem was snowballing, with both plastic, and the chemicals used in its production, attracting the attention of more academics and campaigners.

However, this wasn't really an issue that had yet cut through to the public psyche. Fast-forward four and a half years and the trickle of research, reports and articles has become a flood. From the microplastics reportedly infiltrating our brains to the chemicals released from milk bottles for babies, hardly a week goes by without a study showing the impacts of our (still) growing use of plastic packaging.

"Plastics are incredibly useful [including for preserving foodstuff]. I don't want there to be any doubt about that," explained Jane Muncke, Managing Director at the Food Packaging Forum (FPF), in an interview on *The Great Simplification* podcast earlier this year. "The problem with the material is that it's not inert. So that means chemically it can interact with the environment that comes in contact with or with the foodstuff in the case of food packaging – and we call that migration."

In other words, chemicals can transfer into the food or drink. Muncke and her team of scientists at the

Zurich-based non-profit have been at the forefront of unpicking this topic to raise awareness and feed in to both European and global regulations. Their latest work, published in September together with experts from four academic institutions, compared over 14,000 known food contact chemicals (FCCs) with data from five human biomonitoring programmes, three metabolome/exposome databases, and the scientific literature.

"Certain groups of chemicals have been widely detected in human samples and in FCMs [food contact materials], such as bisphenols, PFAS, phthalates, metals, and volatile organic compounds," the Forum noted. "Many of these chemicals have hazard properties of concern and have been linked to harming human health. However, for other chemicals that transfer from the packaging into the food, such as synthetic antioxidants and oligomers, little is known about their presence and fate in humans."

Their findings, published in the peer-reviewed *Journal of Exposure Science and Environmental Epidemiology* and garnering widespread media coverage, revealed evidence of 3,601 FCCs present in humans, representing 25% of the known FCCs. The team also showed which chemicals used in food packaging and other food contact articles have been found in human samples, such as urine, blood, and breast milk.

Responding to the research, the Brussels-based non-profit Safe Food Advocacy Europe (Safe) noted that: "194 of these substances [food contact chemicals] are routinely tested for in humans, because they are potentially damaging above certain levels. Most



worryingly, 80 of these substances have hazard properties of high concern.”

What fascinates Muncke, and has done so for the past 16 years, is the fact that “even the people who manufacture plastics don’t know the chemical composition of the finished material, and so we are putting this material in contact with food, we know that its chemical constituents can transfer from packaging into food, but we don’t know exactly what those chemicals are.”

Plastic food packaging is certainly a big area of focus. However, there is a growing realisation that it represents only part of the problem. Chemicals are used in other packaging materials too: “The food we eat travels and is sold wrapped in over 14,400 non-edible chemical substances, present in bottles, cans, plastic foil, paper, and any other packaging,” according to Safe.

Bitter sweets

PFAS, the so-called forever chemicals that have been the subject of movies and documentaries, have emerged as a key issue for food companies who swap their single-use plastic for paper alternatives. “Manufacturers are working to ensure sufficient product protection and effective wrapping techniques to produce a robust, appealing and sustainable solution,” noted *ConfectioneryNews* in October. “Yet one concern remains: the presence of chemicals.”

The companies that produce sweets and chocolate bars, in particular, have spent millions designing paper packaging that can offer the same flexibility as plastic wrappers (which remain difficult to recycle). But in their attempt to address one problem – plastic – they have encountered another: chemicals. “Per- and polyfluoroalkyl substances (PFAS) [...] pose an ongoing risk to consumers,” warned the *ConfectioneryNews* article. “PFAS are hazardous chemicals often found in food packaging, such as sweet wrappers and popcorn bags. They can travel

from food contact materials onto the food we eat and into our bodies.”

The tone of the article is significant: this is not a tabloid newspaper seeking clicks, but a reputable business title read by those with influence in the global food sector. Indeed, what might have been sidelined at the outset is now very much grounded in science – and increasing amounts of it.

“Food packaging comes in different shapes, sizes, and colours to ensure that our food remains fresh and safe, but many people are unaware that it can also be harmful because it may contain toxic chemicals that seep into our food and, eventually, enter our bodies,” wrote Dorota Napierska, toxic-free circular economy policy officer at Zero Waste Europe (ZWE) in a blog for the waste management title *Circular Online* last year. “Although these chemicals are not detectable through our senses, they can be measured in our blood or urine, and scientists warn that they can cause long-term health problems.”

Napierska is one of many campaigners that have been pressing for tighter EU rules on food packaging. Basic food contact legislation is 45 years old, Napierska told *The Food Chain* in 2022 and “has never been systematically evaluated”. She and others want legislation to be reshaped in line with a key principle of the Chemicals Strategy for Sustainability: to eliminate hazardous chemicals from products. “It’s time to ensure proper protection from our real-life exposure to a large number of different chemicals,” Napierska insisted.

Recently ZWE and other European non-governmental organisations (NGOs) called on the European Commission to ban PVC (polyvinyl chloride), the plastic they say that, “has the potential to contain a high volume of additives and the largest number of substances of concern out of all the plastic types”. PVC and additives, they noted, featured in the Restriction Roadmap – an EU list of the most harmful chemicals that will likely need restriction – yet no action has been taken.

Damage limitation?

Restricting chemicals at EU level can be a slow process – even when the evidence is stacked against certain substances, including those still being used in food packaging. Bisphenol A is due to be banned from FCMs in the EU at the end of this year. The ban, based on a scientific assessment from the European Food Safety Authority that concluded that Bisphenol A has potential harmful effects on the immune system, will apply mainly to the use of the chemical in packaging, such as the coating used on metal cans. However, it will also apply to its use in, for example, reusable plastic drinks bottles and water distribution coolers.

Indeed, it's worth noting that the problem with packaging and chemicals is not exclusive to single-use items. Several studies have highlighted the benefits of reuse over single use in terms of environmental impacts but, "very little literature exists investigating the effects that repeated contamination and washing can have on the material's intrinsic properties", noted academics, including those from the Technological University of the Shannon in Ireland, in a November paper for the journal *Current Research in Green and Sustainable Chemistry*.

The Food Packaging Forum references a previous study that detected 509 chemicals in plastic FCMs made for reuse while 853 chemicals were identified in recycled PET alone. Companies that have been running trials on reusable packaging, for example in supermarkets or coffee shops, are beginning to dig deeper into the containers and cups they use in terms of environmental impact and hygiene. Whether they consider food safety and chemical migration is moot.

The Forum's tips for reuse explain how, "all plastics are complex materials containing many different chemicals that can transfer from the packaging into the food they carry, contact, or cook. However, this process of chemical migration into food is dependent on the type of plastic, contact time, temperature, food type, and the contact area between the plastic container and the food. Therefore, whether your plastic container is safe to reuse depends on what it was designed for and how you are using it."

Did you know for example that the warmer the food and the package, the more chemicals are likely to migrate from the container into food? Or that many chemicals migrate at higher levels in fatty and/or acidic foods than in aqueous foods?

European NGOs have been running campaigns to help educate everyone on all this, but it is complicated and confusing. A review of citizens' level of understanding of FCMs and the risks they represent showed that "most current labels about food contact materials are ill-understood; participants recognised them, but they did not understand their meaning". There is "ample room" for improvement, the review concluded.

The current EU food contact materials regulation is in need of updating. A revision of the EU legislation on FCMs was announced in May 2020, and a subsequent review highlighted a number of deficiencies in the current law, including poor quality, availability and transparency of information in the supply chain and a serious lack of enforcement rules across Europe. In light of this and as part of the Farm to Fork Strategy, the Commission has planned to revise EU FCM rules. As consultants at EY noted in a March presentation, "the ultimate aim is to establish a robust regulatory system for FCMs that fosters food



safety, public health protection, market effectiveness, and sustainability".

There have already been delays and more are expected. "Long-delayed overhaul of food contact material rules [are] still far off," reported *Ends Europe* recently. A 'sustainability study' on revising the regulation should be ready by February next year, for example, as the Commission complained of a "high workload on implementation". A presentation by the working group on FCMs within DG Sante noted that FCM design "generally undershoots on sustainability" and that FCMs "meet current needs but they undermine future generations' ability to satisfy theirs".

Indeed, plastics alone undermine all planetary boundaries. November and December are being billed as a tipping point, however, but which way we tip depends on the outcome of the final talks to agree a global plastics treaty. The Scientists' Coalition for an effective plastics treaty is among those who want chemicals to be addressed within the agreement. In a briefing paper they warn that our food can be "contaminated via environmental pollution and the plastics used to produce, process, package and prepare them, including recycled and reusable plastics", while "widespread environmental pollution further contributes to acute, chronic, and transboundary human exposures to plastic chemicals".

Jane Muncke at the FPF is among those involved in the voluntary coalition. She has a stark warning. "There are progressive rules to a certain extent [for food contact materials], but they are not being enforced. So, I don't feel that European citizens are better protected from these chemicals than people elsewhere in the world, to be honest."

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*.

A day in the life

Adaptability and ongoing learning are key to career success, advises Colm Walsh, laboratory technician in the Public Analyst Laboratory in Cork



Colm Walsh

With a Bachelor of Science in Analytical Chemistry with a focus on Quality Assurance, Colm Walsh's career began in the private sector, where he developed a strong foundation in analytical techniques and quality control processes. "I love the challenges that science presents, its ever-changing nature keeps me interested and passionate about my work, as no problem is ever truly the same."

In his current role as a laboratory technician in the public sector, his primary focus is on the analysis of food samples to detect the presence of heavy metals. "This position allows me to contribute directly to public health by ensuring that the food products people consume are safe and compliant with regulatory standards," he says.

As a laboratory technician, Colm's core responsibilities include preparing and analysing food samples that are sent to the laboratory by various government agencies. He explains: "These samples are analysed using Inductively Coupled Plasma Mass Spectrometry (ICP-MS), a highly sensitive technique that allows for the precise detection of heavy metals such as arsenic, cadmium and lead. Through this process, we can determine whether food products meet the safety limits set by EU legislation. Our work is critical in ensuring that foods entering the market are safe for consumption, and we play an essential role in protecting public health by identifying non-compliant products before they reach consumers."

Ongoing evolution

One of the most challenging aspects of his role, he says, is navigating the ever-evolving landscape of food safety legislation. "As new research and studies emerge, we gain a deeper understanding of potential sources of heavy metal contamination in the food supply chain. This often leads to the introduction of new regulatory limits and sampling matrices, which means our laboratory must adapt quickly. New matrices and updated limits require us to validate our existing analytical methods continuously to ensure their accuracy and compliance." This dynamic environment keeps his work challenging, he says, as it demands both adaptability and a commitment to maintaining high standards of precision and accuracy in analyses.

For anyone interested in pursuing a career in food safety and laboratory work, Colm's advice is to strive to improve and remain open to learning. "The world of science is constantly evolving and it's crucial to keep pace with new developments. Staying current with scientific literature and advances in analytical instrumentation can prove incredibly useful, as these tools and techniques can help address unexpected challenges in the lab. Adaptability and a commitment to professional growth are key attributes for success in

this field. Embrace the mindset of continuous learning, and you'll find opportunities to make meaningful contributions to food safety."

Peer learning

Workshops are an excellent way to learn about the latest developments in food safety, he believes, and a recent workshop at the Technical University of Denmark afforded training and facilitated knowledge-sharing among food safety professionals from across the EU. "The European Union Reference Laboratory for Metals and Nitrogenous Compounds in Feed and Food (EURL-MN) hosted a workshop titled, *Training in the determination of inorganic arsenic in feed and food by HPLC-ICPMS*. This experience allowed me to bring back new insights and methodologies to our laboratory, helping us to stay at the forefront of food safety testing. These workshops not only offer practical training but also serve as platforms for exchanging information, discussing emerging trends, and building networks that help to improve our understanding of food safety standards across the EU."

Colm's participation in this workshop was supported by the Safefood Knowledge Network Food Safety Skills Fund. "The primary aim of my visit was to gain comprehensive training on the inorganic arsenic HPLC-ICP-MS method. This trip was intended to equip me with the necessary skills and knowledge to implement this method effectively within our laboratory, thereby enhancing our ability to detect inorganic arsenic. The training I received was comprehensive and has since become integral to my daily work. It has significantly enhanced the food safety activities in our laboratory, allowing us to improve our methodologies for detecting inorganic arsenic in food products. The detection of inorganic arsenic is crucial for ensuring food safety, given its toxic nature and potential health risks. This training was relevant to our laboratory's goals of maintaining high safety standards and complying with EU regulations.

"Beyond the technical training, the workshop also provided a platform for connecting with experts and peers from various countries. This network has become a valuable resource, enabling us to share insights, best practices and new research findings. The connections established during this event continue to support our lab's efforts in maintaining high standards of food safety through improved detection methods," Colm explains.

ABOUT COLM WALSH

WHAT ACTIVITIES DO YOU ENJOY IN YOUR SPARE TIME?

I'm an avid runner and swimmer who loves the outdoors, often finding that it can clear one's head. I come from a farming background so have always been surrounded by the outdoors.

WHAT ARE YOU CURRENTLY READING?

I love to travel so am currently reading up on my next trip, hopefully to Italy.



Food safety culture

Following the introduction of new EU regulations, Safefood set out to uncover attitudes to, and awareness of, food safety culture among small food businesses on the island of Ireland

In March 2021, the European Commission updated its regulation on hygiene and safety of foodstuffs (Regulation (EU) 2021/382) (EU, 2021) to include new regulations on food safety culture (FSC). The new EU regulations say that all food businesses must put an appropriate food safety culture in place and have evidence of it. Committing to a culture of food safety excellence can help a Small Food Business (SFB) to not only remain compliant and reduce any nonconformities but also to enhance their business performance. In September 2024, Safefood concluded research into the current attitudes to, and awareness of, FSC among SFBs on the island of Ireland (IOI), and to identify the barriers to, and facilitators for, adopting a culture of food safety within the businesses. The research project was divided into four stages: a rapid review; group discussions; a consumer survey, and follow-up group discussions.

Rapid evidence assessment

The rapid review of available academic studies and grey literature (e.g. government reports) yielded 17 studies of food safety interventions. No intervention focused on FSC as a whole or addressed more than one component of FSC. Most studies aimed to improve knowledge among food handlers (such as proper handwashing techniques, cleaning practices and temperature control of food) which was found to be lacking across the food businesses. No sustained behavioural change was reported following any intervention, which suggests that interventions to improve food safety should be dynamic and ongoing if they are to ensure lasting change.

Stakeholder discussions

Thirty-three participants (10 external experts and 23 SFBs) from across the IOI were recruited to the study. Results indicated a general lack of awareness of FSC and current EU legislation relating to FSC. The following themes emerged:

- Understanding FSC as a strategic imperative
- Investing in FSC-focused capacity building
- Prioritising FSC alongside business survival
- Encouraging continuous communication on food safety
- Embedding a mindset of FSC culture
- Striking the balance between regulation, reassurance and safety.

Survey of owners, managers and operatives

A total of 459 respondents (34% from Northern Ireland and 66% from Ireland) from SFBs participated in the phone survey. They were asked to assess the FSC within their SFB using an FSC maturity index score with 9 FSC components. Participants had to be aged 18 years or

over, work in an SFB (50 or fewer employees) on the IOI and be either the owner/manager or a staff member handling food. Results revealed that 79% of owners/managers and operatives were aware of the term FSC. However, fewer (61%) were aware of the EU legislation on FSC. Overall, managers/owners and operatives all considered their food business had implemented a high standard of FSC (total mean FSC score 5.18/6).

According to FSC component scores, operatives believed everyone in their food business took on their responsibility to encourage safe food practices (highest component score 5.46/6). Owners/managers considered there was strong FSC leadership within their business (highest component score 5.24/6). The research identified the following areas needing improvement.

- For operatives: communication and information sharing about food safety practices throughout the business to ensure all staff meet expectations and address safety concerns (5.17/6).
- For owners/managers: inclusion of food safety in businesses management systems such as processes, policies and procedures (4.96/6).

Level 3 food safety and hygiene training was the highest level of training undertaken by most owners/managers. This suggests there is an opportunity for further development and training. Both operatives and owners/managers preferred training formats that could be tailored to the needs of the business and delivered face-to-face.

Follow-up discussions

External experts (EE) and small food business (SFB) owners and managers who had participated in Stage 2 or 3 were re-contacted and invited to join a follow-up discussion. Twenty-one people including 9 EEs (Northern Ireland 7, Ireland 2) and 12 SFB owners/managers (Northern Ireland 6, Ireland 6) participated. Three themes emerged:

- Harnessing a holistic approach to FSC
- Cultivating a clear understanding of FSC
- Supporting SFBs with appropriate resources

Recommendations

The research project provided valuable insights at each stage on awareness, understanding, and practices in regard to food safety culture within small food businesses on the island of Ireland. The key recommendations that emerged are as follows:

1. A whole-systems approach for interventions on FSC is required. Proposed interventions should consider:
 - An ongoing dynamic approach rather than a once-off intervention
 - Sustained behaviour-change as the intended outcome



- The influence of novel incentives on FSC
 - A range of teaching techniques, particularly demonstrations in the workplace and group discussions
 - Including management staff in the target group
2. A multi-functional tool for FSC measurement, auditing, and research should be developed to better assess the cultural aspects of food safety. This could be achieved by:
 - Planning in partnership between environmental health officers (EHOs) and SFBs
 - Identifying proxy measures of FSC
 - Linking business performance to overall FSC performance
 3. Development of a business-to-business awareness-raising campaign for SFBs. Key messages should emphasise the importance of integrating FSC into management systems and communication within a business. The messages should consider:
 - a. Defining FSC and its importance
 - b. Dedicated training support and resources on FSC
 - c. Safefood as an information source and point of contact for SFBs
 - d. Promotion of level 3 and above food safety training to owners/ managers
 4. Development of training courses on FSC, taking account of training preferences (such as on-site and interactive training), tailored to:
 - a. EHOs – FSC concept; its importance; how to assess it; and tools to support SFBs
 - b. SFB operatives – FSC concept; its importance; and how it is implemented within a business
 - c. SFB owners/managers – FSC concept; FSC as a strategic imperative; how to communicate FSC within their business; and how to implement it within a business through business systems
 5. Integration of the FSC concept within existing FS training programmes and communications
 6. Development of a practical resource area for EHOs and SFBs on the Safefood website (such as templates, multi-lingual resources, leadership role model examples, and case studies). This could be combined as part of the awareness-raising campaign
 7. Promotion of a co-design approach for implementing a FSC within an SFB
 8. Development of a live app chatbot, ping notifications and mapping of accredited food safety trainers to support SFBs with their FSC training needs and communication
 9. Creation of an FSC network for SFBs and stakeholders, covering all aspects of FSC and incorporating many of the above recommendations
 10. Proposal to implement a food hygiene rating scheme for Ireland
- To read the full report please visit www.safefood.net/research

News and events

Public Health Laboratory Forum 2024

On the 21st of November 2024, Safefood hosted its third annual forum for Public Health Laboratory staff from across the island of Ireland, held in Dublin. Building on the success of previous events, this meeting brought together laboratory professionals to address shared challenges and



advancements in the field. Dr Niall Delappe presented on *The Role of Whole Genome Sequencing of Foodborne Pathogens*, emphasising its significance in identifying and managing outbreaks. The forum

included discussions on laboratory methods, reporting standards, training, and emerging protocols. It also provided a valuable opportunity for networking and collaboration among laboratory staff.

All-island Environmental Health Forum 2024

On 15th November 2024, Safefood hosted the second all-island Environmental Health Services Forum in Dundalk. Building on the success of the inaugural forum in November 2023, which fostered valuable interaction between services, it brought together approximately 35 Environmental Health Officers from across the island. The agenda featured external presentations on key topics such as allergen management in catering and food safety culture. The forum successfully strengthened collaboration and addressed shared challenges in environmental health and food safety across jurisdictions.

News and events

Public Analyst's Laboratory Forum 2024



On the 24th of September 2024, Safefood hosted the annual forum for Public Analyst's Laboratory staff, held in Limerick. Building on the success of the inaugural event, this meeting brought together Executive Analytical Chemists and Public Analysts from the Dublin, Cork and Galway laboratories to discuss ongoing challenges and issues of mutual concern within the sector. Dr James McIntosh of Safefood chaired the forum, which featured a presentation by Dr Cormac McElhinney from the Food Safety Authority of Ireland on *Horizon Scanning: Chemical Threats to Food Safety in the Short to Medium Term*. This presentation highlighted emerging chemical risks and strategies for mitigation. The forum served as a valuable opportunity for staff networking and fostering cooperative development among laboratories.

A safe and tasty Christmas with Safefood

Worried about cooking your turkey this Christmas? A recent Safefood survey found 55% of people share that concern, while 30% struggle with timing their turkey to be ready alongside other dishes. With the rising cost of living, 35% are shopping around for cheaper food, 27% are choosing smaller turkeys, and 41% plan to buy less overall. Safefood is here to help! The Christmas Dinner Food Planner simplifies preparation and reduces waste (safefood.net/Christmas/Shopping), while the Turkey Cooking Time Calculator ensures everything is ready on time (safefood.net/Christmas/turkey-cooking-calculator). Just enter your dinner time, turkey weight, and oven type for a stress-free solution. For perfect results, use a meat thermometer to ensure your turkey reaches the safe internal temperature of 75°C. Safefood has all the tools you need for a safe, tasty, and stress-free Christmas!

2024 Gluten-free Roadshow

The 2024 Gluten-free Roadshow is the primary annual event of the Coeliac Society of Ireland and this year Safefood sponsored a presentation by Dr Sarah Keogh, CORU-registered dietitian, on *Eating for better digestion: how to help your gut*. In addition, Dr James McIntosh, Safefood, partook in a panel discussion on the theme of *What's in your gluten-free foods*.

Quiz time

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



Questions

1. Imperial Star, Lorca and Madrigal are varieties of what vegetable?
2. What food would you avoid if you had alektorophobia?
3. Where would you expect to eat street food snack, Jing Lee?
4. What T is a traditional Moroccan cooking vessel?
5. Peppercorns date back to the 4th century BC. True or false?
6. What American company invented the stand mixer?
7. Ackee and saltfish is the national dish of this country.
8. On average, how long does mild food poisoning last?
9. How many eggs does Paul Newman eat in the film, Cool Hand Luke?
10. What is a beurre blanc?



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

To enter: Simply complete the quiz above and send your answers to knowledgenetwork@Safefood.net before 28th February 2025. This competition is open to Knowledge Network members on the island of Ireland only.

Congratulations to **Hilary Condon**, Environmental Health Officer, HSE National Environmental Health Service, St Canice's Hospital, Kilkenny.

Answers to Issue 30 Quiz

- | | |
|--|---------------------------|
| 1. Kefir | and water used to thicken |
| 2. Deipnophobia | |
| 3. The microwave | 7. Khachapuri |
| 4. Cabbage | 8. True |
| 5. A White Russian | 9. Every other day |
| 6. A mix of starch, such as cornflour, | 10. Shandon, county Cork |

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.