

Government Chemist

Review 2024

CP 1431



Department for
Science, Innovation
& Technology





LGC Limited

Government Chemist Review 2024

Presented to Parliament by the Parliamentary Under-Secretary
of State for State for AI and Online Safety by Command of His
Majesty

November 2025



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Foreword from the Government Chemist



I welcome the opportunity to present some of our achievements during the year. Reflecting the increase in numbers of samples being taken at local authority level, and our work ensuring that both enforcement bodies and the food industry are aware of the available appellate route, I am pleased to see the number of referee cases increase this year.

This, in turn, has enabled us to more effectively address capability-building activities that support strategic government and sector drivers towards a more sustainable circular food economy.

Significant progress is now being made addressing novel food production methods, alternative proteins and refined measurement

techniques for microplastics and other chemicals of concern in food. We have provided scientific expertise that is helping shape food safety (for example, detection strategies for products as a result of New Genomic Techniques (NGTs) and related Engineering Biology approaches, weight of evidence approach for food authenticity and production of a cannabidiol reference material) and inform national and international regulatory standards. We have continued to engage and work with our stakeholders, be it through our network of centres of expertise, our active joint knowledge transfer programme and our support for MChemA trainees.



We have provided scientific expertise that is helping shape food safety and inform national and international regulatory standards



The relocation of the Office of the Government Chemist (with colleagues in the National Measurement Laboratory and MHRA Laboratories) during 2025 presents a great opportunity to future-proof the Government Chemist role, albeit with

some short-term challenges!

Our ambition remains and I am fully confident that the path we are undertaking will lead to continued future success.

A handwritten signature in black ink, appearing to read 'Julian Braybrook', with a stylized flourish at the end.

Professor Julian Braybrook

BSc, PhD, Hon DSc, CChem FRSC

Note from the Chair of the Government Chemist Programme Expert Group



As Chair of the Programme Expert Group, I am privileged to oversee the Government Chemist function, a vital scientific resource that has safeguarded food and feed standards in the UK for over 180 years. As a government asset, the function is subject to rigorous scrutiny to ensure it delivers exceptional scientific work and provides value for taxpayers.

The work programme has evolved significantly in response to key priorities raised by stakeholders in previous years. In 2024, the programme encompasses crucial projects focused on food sustainability, including novel food production methods, alternative proteins, and refined measurement techniques for microplastics in food. Additionally, the Government Chemist has contributed to the UK Food Security Report 2024, providing scientific

insights that help shape food safety and regulatory standards. The team has also played an integral role in knowledge transfer initiatives, including e-seminars on food authenticity and effective sampling methodologies and advanced training for MChemA candidates. My colleagues and I look forward to reviewing the outcomes of these and other projects over the next three years.

Stakeholder engagement remains a top priority for the Government Chemist team. Maintaining an open dialogue not only allows us to communicate findings from the referee function but also ensures that the team remains attuned to emerging scientific and regulatory challenges. This Annual Review highlights just a selection of the team's contributions to meetings, committees, and events.



As the Programme Expert Group, we receive regular updates on these activities, and we continue to be impressed by the frequency with which the Government Chemist's expertise is sought - whether in leadership roles, expert consultations, committee participation, or through publicly accessible resources on [GOV.UK](https://gov.uk).

I trust that this Annual Review will not only inform but also highlight the exceptional, world-class science being undertaken in the UK by one of its longest-standing scientific institutions. The continued impact of the Government Chemist function on regulatory assurance, industry best practices, and public safety remains invaluable.



Professor Paul Berryman
BSc, MSc, MChemA, MBA, PhD, CBiol FRSB,
CSci FIFST, CChem FRSC.

“

In 2024, the programme encompasses crucial projects focused on food sustainability, including novel food production methods, alternative proteins, and refined measurement techniques for microplastics in food



What we do

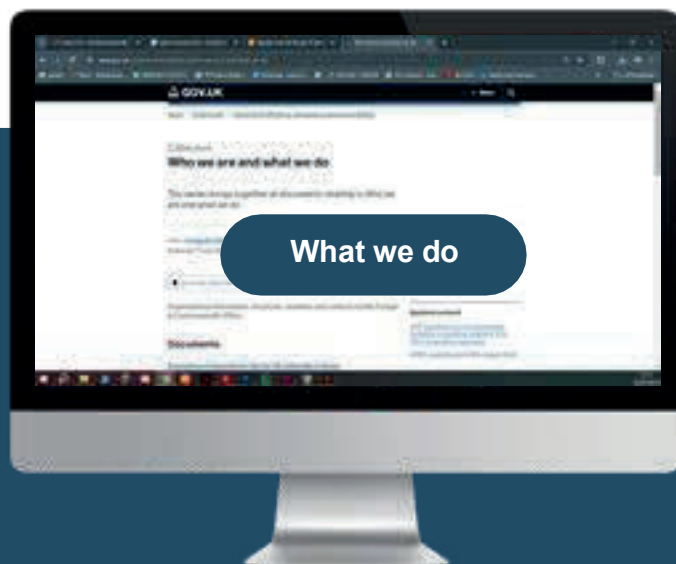
[Statutory function](#) | [Advisory function](#) | [Our governance](#) | [Our people](#)

The Government Chemist role was created originally to protect the public from fraud, malpractice and harm. In 1875, the laboratory was appointed as “referee analyst”, a role linked to the Sale of Food and Drugs Act of that year.

The role continues to this day, fulfilling statutory and advisory functions, funded by the Department for Science, Innovation and Technology (DSIT).

The Government Chemist uses authoritative measurement procedures coupled with experienced interpretative skills to act as a fair and independent arbiter to resolve disputes. In doing so we protect consumers, provide a route of technical appeal for businesses and contribute to regulatory enforcement in sectors where chemical and biological measurements are important.

The Acts and Regulations under which the duties of the Government Chemist as referee analyst are defined and listed in the “**What we do**” section of the Government Chemist website.
(www.gov.uk/governmentchemist).



Our most important responsibility is to act as a “referee analyst” resolving dispute between regulators and businesses

Our statutory function

The science-based duties of the Government Chemist statutory function cover public protection, safety and health, value for money and consumer choice. Our most important responsibility is to act as a “referee analyst” resolving dispute between regulators and businesses, supported by our own independent measurements, interpretations and expert opinions. Thus, we reduce the burden on public

finances as successful resolution often avoids recourse to legal processes and derives secondary spill-over effects by helping maintain a core national analytical testing infrastructure. Our credibility as the referee, and our ability to develop new capability for future challenges, rest on first-class science which is also underpinned by the designation of our home laboratory, the UK National Measurement Laboratory at LGC, for chemical and biological measurement.

Our advisory function

The long history of the Government Chemist function and its involvement in regular and wide-ranging dispute cases means that the team is well placed to provide advice on analytical science implications for policy, standards and regulations. We mainly deliver this function by responding to government calls for advice or published consultations, where there is a significant or important analytical science content. Consultation responses for 2024 are published on the Government Chemist website.

Our capability building

Referee analysis is often most challenging in areas where measurements are difficult, where novel products are being introduced into the market or where there is high public and media interest, for example allergen detection. The Government Chemist Programme carries out capability-building projects to be able to meet future demand for referee analysis in these areas.



Our governance

Responsibility for the Government Chemist programme lies with the Department of Science, Innovation and Technology (DSIT). DSIT has put into place arrangements to ensure that the Government Chemist programme delivers value for money and that scientific standards, impartiality, transparency and integrity are maintained. The Government Chemist Programme Expert Group (GCPEG) provides this independent scrutiny, overseeing the planning, delivery and quality of impact of

the programme, and offering advice to DSIT regarding future priorities and strategic direction of the programme.

The GCPEG comprises representatives of regulatory and enforcement bodies, industry, trade and consumer associations, and academia, each with a broad range of backgrounds, skills and interests.

GCPEG Government Chemist Programme Expert Group membership during 2024 was:



Paul Berryman, Chair

Paul is Director of Berryman Food Science Ltd, which works closely with government and businesses, including the Department for International Trade (DIT), UKRI-Innovate UK and SGS Ltd. He is also a visiting Professor at the University of Reading.



Simon Branch

Simon is Director of Research, Development and Scientific Affairs at Herbalife and has sat on a number of committees including the Royal Society of Chemistry (RSC) Science and Technology Board.



John L Collins

John has a multi-disciplinary background from nuclear physics to biotechnology with experience in R&D, materials and product development, manufacturing and manufacturing technologies, international trade and technical sales.



Johnathon Griffin

Jonathan is a Public Analyst (PA) and Technical Manager for Kent Scientific Services and former President of the Association of Public Analysts (APA).

Kasia Kazimierczak

Kasia leads a multidisciplinary team covering marine science and shellfish hygiene, authenticity, allergens, foodborne viruses and surveillance at Food Standards Scotland (FSS).

Chelvi Leonard

Chelvi is Policy Lead for Accreditation at the Office for Product Safety and Standards (OPSS). Chelvi was the UK representative at CEN and Codex meetings in the standardisation of analytical methods for food from 2009-2019.



Declan Naughton

Declan is currently Professor of Biomolecular Sciences at Kingston University London with research interests ranging from food safety and nutrition to drug discovery and endocrinology. He was Interim Dean and Associate Dean for Research and Enterprise for the Faculty of Science, Engineering and Computing at the university until 2024.



Brenda McRory

Brenda is a Technical Lead Officer at Suffolk Coastal Port Health Authority, based at the port of Felixstowe. Brenda currently leads on imports of fishery products and is involved with the import of foodstuffs of non-animal origin.

Government Chemist Programme Expert Group membership during 2024 continued...

Sophie Rollinson



Sophie is the food science lead in the Department for Environment, Food and Rural Affairs (Defra)'s Food and Farming Directorate and manages the Department's Food Authenticity Research Programme.

Gillian McEneff



Gillian is the Head of Testing Laboratories at the Office for Product Safety and Standards (OPSS) with responsibility for laboratory testing capabilities to support national consumer and construction product regulatory activity, and traceability for the UK's legal metrology system.

Diane Turner



Diane is the Director and Senior Consultant of Anthias Consulting Ltd, an independent provider of analytical training and consultancy. Diane is a visiting Fellow and consultant at The Open University, Immediate Past-President of the Royal Society of Chemistry (RSC) Analytical Division Council and Immediate Past-Chair of the Analytical Chemistry Trust Fund (ACTF).

Jessica Merryfield



Jessica is the Head of Policy and Campaigns at the Chartered Trading Standards Institute (CTSI), a Chartered Trading Standards Practitioner and a CTSI Trainer in Food Standards. Jessica is the former Chair of the Trading Standards East Midlands Food Standards and Allergens group.

Bhavna Parmar



Bhavna is a Senior Scientific Advisor at the Food Standards Agency, in the Scientific Surveillance and Laboratory Policy team and represents the UK on Codex and through BSI on various CEN and ISO standardisation committees.

Our people

LGC staff who directly support the Government Chemist function have clear and independently defined roles (Figure 1). Within this framework, there are particular requirements for the management of statutory casework:

- Nominated officers, one of whom holds the requisite statutory qualification for Public Analysts, have overall responsibility for case supervision. They prepare and sign Government Chemist certificates of analysis;
- Only the Government Chemist or Deputy, once satisfied that the case has been properly completed, countersigns the certificates of analysis.



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Figure 1 Government Chemist organogram and contact points.



In focus:
Gene editing
– an innovative
technology in need
of creative solutions
for market control



**By Dennis Eriksson, Associate
Professor Genetics and Plant
Breeding**

Swedish University of
Agricultural Sciences, Project
Coordinator of the Horizon
Europe funded projects
DETECTIVE

Abstract

Gene editing has provided plant breeders with an efficient and precise tool to improve crops. At the same time, however, this technology is presenting challenges for authorisation of the resulting products, legal enforcement and market control. Current routine methods for detecting, identifying and quantifying genetically modified organisms (GMOs) are not always suitable for gene-edited products; since the edits may resemble what can occur naturally, it is difficult to demonstrate court-proof evidence on how the edits were generated. There is a need for creative solutions, possibly combining technical and non-technical approaches.

For over a century, plant breeders have steadily incorporated scientific progress to improve our capacity and precision in developing high-yielding crops of good quality. Similar progress has also shaped animal breeding as well as the design of useful microorganisms. The introduction of recombinant nucleic acid technology in the 1970s, however, raised safety concerns over its use in microorganisms, which eventually triggered world-wide development of biosafety legislation to regulate genetically modified organisms (GMOs) and their derived products. Details vary, but in general such legislation entails a risk assessment, an authorisation procedure and post-market monitoring.

“Detection and identification of gene-edited products is challenging and generates not only technical, but also legal problems

EU legislation requires that event-specific methods for detection, identification, and quantification (DIQ) are presented and validated before a GMO can be authorised for placing on the market for food or feed use, to enable market control for correct labelling of

authorised products. As of today, real-time PCR is the preferred method for ordinary transgenic GMOs since it can be made event-specific by targeting the junction between the transgene and the host genome. PCR-based methods are also used for import control to screen for the possible presence of unauthorised GMOs, assuming that one of the common regulatory elements has been used in the transformation process.

So far, so good. What happens though if there is no obvious or clearly defined DNA sequence to target with the PCR? Take gene editing through targeted mutagenesis for instance – the latest tool in the breeder's toolbox. This method introduces specific edits, such as base substitutions, insertions or deletions, at predetermined sites in the genome. These introduced sequence variants are often not large or specific enough to enable identification, since the very same variation could also be as a result of naturally occurring mutations. As a consequence, detection and identification of these products is challenging and generates not only technical, but also legal problems, for the required authenticity. Any conclusion on the event-specificity of a method may not be court-proof.

There are two ways to overcome this challenge. One option is to adapt the law so that products of targeted mutagenesis are not subject to the “GMO-type” regulations – essentially removing the requirement to monitor, or screen for, what is today either authorised or non-authorised products. This approach has been adopted by several countries, notably in North and South America. It is worth noting that the Genetic Technology (Precision Breeding) Act, made law in England in 2023, amended the definition of a GMO to exclude organisms that had genetic changes as a result of modern biotechnology which could also have been achieved through traditional processes. Such organisms are often referred to as Precision Bred Organisms (PBOs). The other option is to innovate the whole DIQ approach and develop creative solutions for market control. It is worth noting though that DIQ of transgenic GMOs is subject to challenges and in recent years there has been a notable rise in the number of unauthorised GMOs evading the control system by, for example, not containing any of the common screening elements.

It is likely therefore that a combination of approaches will be needed for market control and legal enforcement if gene-edited products continue to be regulated as GMOs. Keep in mind that there are two types of market control in this context: 1) the requirement for a DIQ method to monitor authorised products and ensure proper post-authorisation measures such as labelling, and 2) untargeted screening to protect the market from unauthorised products. There have already been a number of attempts at developing DQ (detection, quantification) methods for specific gene-edited products, such as a real-time PCR method targeting a herbicide-tolerant canola from its US-based company. However, such methods hitherto suffer from the double drawback that they require prior knowledge of the event and that they do not allow unambiguous identification. Enter sequencing technology, which has developed rapidly in the past decade and now presents promising alternatives for both known and unknown targets.



In the Horizon Europe project DETECTIVE (2024-2027), we are developing a portfolio of targeted methods for a number of important crop-trait combinations on the European market. We are also investigating the power of sequencing technology, coupled with machine learning-based algorithms, to assess whether or not it is possible to determine the likelihood for different types of mutations without prior knowledge of the edited locus. It remains to be seen if these technical approaches will meet the minimum performance requirements for validation and be suitable for routine implementation and legal enforcement. Furthermore, it is crucial to tackle the challenge of securing adequate funding and skilled staff; advanced techniques like whole genome sequencing could detect edits, but currently they are expensive and time-consuming.

As a complement to analytical detection, DETECTIVE goes a step further by exploring knowledge-based discovery as a screening tool for unknown targets. Information available from various sources in the agri-food domain, such as the common catalogue of registered plant varieties, other plant variety registers, results of enforcement actions, available information from seed companies and scientific literature will be queried to identify points of interest for further enforcement actions.

Plant breeding continues to explore and incorporate novel scientific breakthroughs and innovations into the toolbox and it is for certain that new challenges for legal enforcement of detection obligations will arise in the future. It is reasonable to expect that we will need a combination of innovative and creative technical- and non-technical-based approaches, together with proportionate and workable legal framework, to maintain

a comprehensive and adequate control of regulated and unregulated food and feed products on the market.

Recommended literature

Broll H et al. (2025). Current status and trends in the analysis of GMO and new genomic techniques. *Journal of Consumer Protection and Food Safety*, 20, 89-92.

European Commission, Joint Research Centre (2024). Sequencing strategies for the traceability of GMOs - methods and related quality aspects, Publications Office of the European Union, Luxembourg, JRC137607.

European Network of GMO Laboratories (2023). Detection of food and feed plant products obtained by targeted mutagenesis and cisgenesis, Publications Office of the European Union, Luxembourg, JRC133689.

Guertler P et al. (2023). Detection of commercialized plant products derived from new genomic techniques (NGT) – Practical examples and current perspectives. *Food Control*, 152, 109869.

Hubar-Kolodziejczyk A and Purnhagen K (2025). Regulatory requirements for the identification, detection and quantification of gene-edited products in light of the (R) evolution of new genomic techniques: state of the art and prospects for change. *European Journal of Risk Regulation*, 1-17.



Protecting consumers in increasingly challenging times

Dispute resolution | Referee cases



Consumer demand, high energy costs, the cost-of-living crisis and other geopolitical factors are all driving changes to the way food is produced, sold and consumed. In addition, climate change is impacting negatively on food systems and supply chains, and, if left unchecked, will make it increasingly challenging to fulfil the mission of providing food we can trust. Embedding environmental sustainability considerations into practice will help influence the wider food ecosystem.



Additionally, following EU Exit, the operating environment for many UK regulators has already changed significantly and they have taken on new responsibilities, which has resulted in delays in establishing new regulatory requirements or extending deadlines. Divergence from EU regulation also has the potential to increase barriers to sharing intelligence and potentially give rise to disputes in international trade.

The Government Chemist supports the UK Government in its aim to protect consumers and food businesses against these risks by providing definitive resolution of complex referee cases in a timely manner, providing measurement science advice on matters of national and international importance, monitoring regulatory developments through horizon scanning activities and continuing to work collaboratively with stakeholders to help prevent future disputes.

Dispute resolution

The Government Chemist underpins industry and public confidence in the food and feed official control system by guaranteeing independent impartial technical appeal to the highest standards. We maintain the credibility of this referee role by stringent governance, painstaking analytical rigour and well-informed interpretation of the resulting data.

Analytical results must be interpreted in an increasingly global supply chain and often in increasingly complex scientific, legal and

policy contexts. Our default analytical strategy practically amounts to a stand-alone method validation and provides the necessary high level of analytical confidence. Significant analytical steps are witnessed by a second scientist and data transcriptions verified. The entire dataset is evaluated independently by statisticians for bias and outlying results and to yield a case-specific measurement uncertainty if required. A certificate is drafted and reviewed by a qualified person before, finally, the case file is brought to the Government Chemist for peer review. If all steps are satisfactory the Government Chemist will allow the findings to be released.

The analysis of retained portions of samples referred to the Government Chemist (referee analysis) is more complex and resource intensive than the work of an official control or trade laboratory. This is necessary because:

- our results and opinion must be definitive and bear detailed scrutiny, sometimes at national and international level,
- referrals may be on matters close to a legislative limit, hence analytical confidence in our data must be of the highest standard, and
- the problems we seek to resolve may occur where the science, the law or both are uncertain or controversial.

Overview of referee cases in 2024

Referee cases – resolving disputes in the UK official control system for food and feed – is a demand-led service, which has been at the core of the Government Chemist's function since 1875. Publishing the outcomes in our annual reviews and in more detail in peer reviewed scientific papers contributes to avoiding similar disputes in the future.

The number of referee cases received this year has increased compared to last year.

This reflects both the increase in numbers of samples being taken at local authority level

and the work that the Office of the Government Chemist has carried out to ensure that both enforcement bodies and the food industry are aware of the appellate route available through the Government Chemist remit.

Acephate in frozen okra

The sample, referred by the food business operator, was received as the result of a dispute over the presence of the pesticide 'acephate' in frozen okra, the consignment being detained at point of entry. Consisting of a single laboratory sample of frozen okra, the sample was extracted according to the procedure described in BS EN 15662:2018 Foods of plant origin, multi-method for the determination of pesticide residues using GC- and LC-based analysis following acetonitrile extraction/portioning and clean-up by dispersive SPE – i.e. a modular QuEChERS-method. An isotopically-labelled acephate internal standard was employed to allow for matrix effects.

The sample was analysed as three separate batches on separate days, with appropriate quality control applied, including blank samples, spiked samples and matrix standards. Final analysis was carried out using LC-MS/MS, utilising three transitions to ensure identity. Recovery of the target analyte was determined as 91.0% and a limit of detection set at 0.003mg/kg. The result for the sample was as follows:

LGC Sample Reference	Mean Acephate
	Concentration (mg kg ⁻¹)

Sample A	0.021
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The measurement uncertainty was determined as ± 0.0079 mg kg⁻¹ at the 95% confidence interval with a coverage factor of 2, giving results (rounded outwards) of not less than 0.013 mg kg⁻¹ and not more than 0.030 mg kg⁻¹.

The Pesticide (Maximum Residue Limits) Regulations 2008, which enforce in England assimilated EC Regulations 396/2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin, prescribe maximum limits for pesticide residues in foods. There is no specific limit for acephate in okra and therefore the default limit of 0.01 mg kg⁻¹ applies. The amount of acephate found in this sample was in excess of the maximum residue limit, and therefore the sample was considered non-compliant with the requirements of the Regulations.



Bubble tea

The sample consisted of a large jar of multi-coloured jelly type pieces described as 'Rainbow Jelly'. The sample was referred by the Trading Standards body as a result of discussions between themselves and the food business operator. The request to the Government Chemist was to assess the presence or otherwise of konjac as an additive and to determine the potential risk for choking on the product in the event of ingestion. The case was accepted and due to its nature is on-going. A report on the outcome of the investigation will be presented in the next review.

Formaldehyde migration

A single laboratory sample consisting of five melamine bowls was received, having been referred by the food business operator at point of entry due to excessive and increasing (within the bounds of the requisite testing regime) formaldehyde migration.

Items of melamine kitchenware are subject to import controls to ensure the level of migration of formaldehyde from the product into a food simulant does not exceed maximum permitted levels. Assimilated EC Regulation 10/2011 on plastic materials and articles intended to come into contact with food prescribe a maximum permitted migration level of 15 mg kg⁻¹ when tested in accordance with the Technical Guidelines on Testing the Migration of Primary Aromatic Amines from Polyamide Kitchenware and Formaldehyde from Melamine Kitchenware. These Regulations also prescribe that repeat use items must demonstrate stability compliance, such that the level of migration in the second test shall not exceed the level of migration in the first test, and the level of migration in the third

test must not exceed the level in the second test.

Accordingly, three of the bowls were subject to challenge testing using 3% aqueous acetic acid at 70°C for 2 hours. This procedure was repeated three times using separate simulant for each test. The fourth bowl was used for determination of surface area and fill volume. The fifth bowl was not required in that there was no dispute as to the sample composition. The presence and concentration of formaldehyde was determined in the resultant nine solutions in triplicate using two different derivatisation chromophores (chromotropic acid and pentane 2,4 dione) by spectrophotometry. Appropriate quality controls and blank solutions were also employed.

The average fill volume was determined as 1902mL and the surface area as 7.7dm³. The mean recovery of formaldehyde was determined as 100.2% and 94.9% for the chromotropic acid and pentane 2,4 dione methods respectively.

The mean results of analysis are shown below.

Mean results of analyses (migration 3)

Sample Number B	Migrated Formaldehyde (mg kg ⁻¹ ±U) (Chromotropic acid)	Migrated Formaldehyde (mg kg ⁻¹ ±U) (Pentane-2, 4-dione)
Item 1	10.57 ± 0.200	10.07 ± 0.242
Item 2	12.68 ± 0.108	11.72 ± 0.119
Item 3	7.76 ± 0.108	7.71 ± 0.022

Where: U is the expanded uncertainty, calculated as a 95% confidence interval, with appropriate degrees of freedom.

The results of the migration challenge test are within the maximum permitted amount of 15 mg kg⁻¹ for the third migration. However, when the results of the individual migration tests are considered (shown in the table below), an

increase from migration 1 to migration 2 was observed. Therefore, the sample did not meet the requirements of the legislation, in that the sample failed the stability tests.

Results of individual migration analyses

Item Number	Migration 1 Formaldehyde (mg kg ⁻¹)	Migration 2 Formaldehyde (mg kg ⁻¹)	Migration 3 Formaldehyde (mg kg ⁻¹)
Item 1 CTA*	9.68	10.96	10.57
Item 2 P24D	9.49	10.83	10.07
Item 2 CTA*	11.89	12.47	12.68
Item 2 P24D	11.00	11.98	11.72
Item 3 CTA*	3.68	9.15	7.76
Item 3 P24D	3.83	9.03	7.71

* CTA – Chromotropic acid method, P24D – Pentane-2,4-dione

Aflatoxins in rice

The case, referred by the food business operator, arose as the result of a dispute concerning the level of aflatoxin in a sample of Basmati rice. The sample consisted of one laboratory sample that had been slurried with water at a ratio of 1 part sample to 1 part water (information provided by the official control laboratory).

Mycotoxins are regular target analytes for referee cases, and therefore an established

analytical plan was employed for this sample; this being 3 replicates of the sample repeated 3 times on separate days. Appropriate spiked samples, analytical blanks and spiked blank material were also analysed.

The analytical regime consisted of extraction with acetonitrile/water, immunoaffinity cleanup and analysis using HPLC with fluorescence detection. Confirmation of identity was carried out using LC-MS. The results were as follows:

LGC Sample Reference	Mean Concentration Aflatoxin B1 ($\mu\text{g kg}^{-1}$)	U ($\mu\text{g kg}^{-1}$)	Mean Concentration Total Aflatoxins ($\mu\text{g kg}^{-1}$)	U ($\mu\text{g kg}^{-1}$)
Sample C	2.30		2.49	0.20

Assimilated Commission Regulation (EC) No 1881/20062 of 19 December 2006 invoked in England by the Contaminants in Food (England) Regulations 2013 sets maximum levels for certain contaminants in foodstuffs. The maximum permitted level for aflatoxin B1 in rice is $2.0 \mu\text{g kg}^{-1}$ and for total aflatoxin $4.0 \mu\text{g kg}^{-1}$.

Section B.6 of Annex I to assimilated Commission Regulation (EC) 401/2006 of 23 February 2006 laying down the methods of

sampling and analysis for the official control of the levels of mycotoxins in foodstuffs provides, for rice, the rejection of a lot or sub lot of such a product if the laboratory samples exceeds the maximum limit beyond reasonable doubt, taking into account the correction for recovery and measurement uncertainty.

The amount of aflatoxin B1 found in this sample was in excess of this maximum permitted level and therefore the consignment was rejected at point of entry into the UK.

Propiconazole in rice

The case, referred by the Port Health Authority, concerned a technical dispute on the level of the pesticide 'propiconazole' in a sample of Basmati rice. The sample consisted of one laboratory sample of rice that had been slurried with water in a ratio of 1 part sample to 4 parts water (information provided by the official control laboratory).

The sample was extracted using standard procedures based upon the QuEChERS method and analysed using LC-MS/MS. Isotopically-labelled propiconazole was employed as an internal standard, thereby allowing for any matrix effects. Due to a limited amount of sample, only two batches were extracted on separate days, along with blank samples, spiked samples and matrix standards.

Assimilated EC Regulation 396/2005 on maximum residue levels of pesticides in or on

food and feed of plant or animal origin, sets maximum limits for pesticide residues in food. The maximum residue limit for propiconazole in rice is 0.01 mg kg⁻¹.

Analyte recovery was determined at 97%, and a reporting limit set at 0.004 mg kg⁻¹ based on calibration standards and analyte recovery. Propiconazole was detected in the sample in each of the replicate analysis. However, the amount found was below the set reporting limit on every occasion. The sample was therefore reported as not detected.

LGC Sample
Reference

Mean Propiconazole
Concentration
(mg kg⁻¹)

Sample D

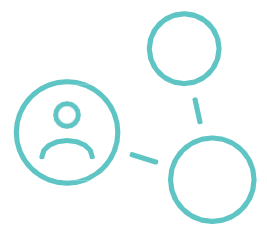
<0.004

Bifenazate in passion fruit

The sample was referred to the Government Chemist as the result of a technical dispute concerning the presence of the pesticide 'bifenazate' in passion fruit. The Official Laboratory initially reported a level of 0.08 mg kg⁻¹ in the sample. However, prior to receipt of the third portion, the Official Laboratory identified a calculation error in their results and re-issued their report stating that bifenazate was not detected in the sample. No analytical work was undertaken by the Government Chemist.



Supporting business and government across the four nations of the UK



Advisory function | Supporting stakeholder networks



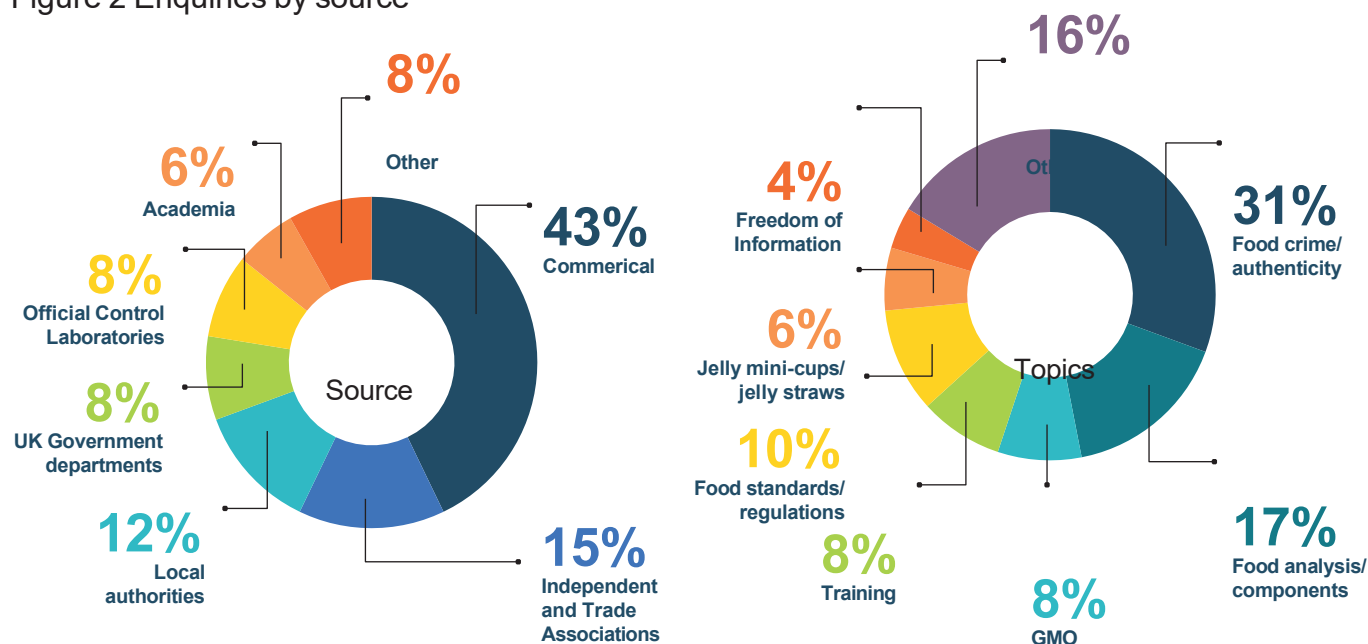
The Government Chemist team provides world class measurement science to support an innovative and growing UK agrifood sector to trade sustainably on a global basis. This is achieved through the provision of impartial technical advice as a valued expert resource, as well as application of worldclass measurement science, forging meaningful dialogue with all stakeholders and participating and/or leading relevant committees and networks.

Advisory function

The Government Chemist provides specific advice related to measurement topics on a broad range of policy and regulatory developments to local, central and devolved administration governments, the European Union and the wider community of stakeholders. Scientific and measurement-based support is also provided

to those industries where chemical and biological measurements are an important aspect of their activities. The publication of our outputs through the Government Chemist website is an important means of disseminating such advice, as well as receiving feedback.

Figure 2 Enquiries by source



Enquiries from stakeholders

Many stakeholders regularly turn to the Government Chemist for advice on a wide range of topics. Often the enquiries are related to measurement techniques and result interpretation. Sometimes our expert opinion is sought on topical issues such as cannabidiol, allergens or food authenticity claims. We answered 49 requests for advice during 2024. Figure 2 shows the origin of the source of the enquiries. Figure 3 shows the breadth of enquiries across many topics – measurement issues (food analysis), cannabidiol, and food safety and authenticity being amongst the most common. The “other” category included enquiries on allergens and artificial intelligence.

In each case, we gave carefully considered advice, supplying a copy of peer reviewed research findings on the question where applicable, or referring the enquirer to another source of information. The enquirers are invariably grateful for our time and advice.

Expert opinion to stakeholders

The Government Chemist team is regularly called upon to provide expert opinion on matters of food analysis, regulation, authenticity and other similar topics by stakeholder organisations at meetings and events. These are some examples of where the team contributed:

- GC staff gave a talk on the training requirements for testing for GMOs in rice/rice products originating from China at the FSA ‘Food and Feed Laboratory’ Workshop
- GC staff provided their expertise in a knowledge exchange and training course for a UK Official (Control) Laboratory led by the GMO NRL function. The course focused on meat/fish speciation, NGS, allergens and reference materials.
- GC staff provided advice and assistance on DNA extraction approaches to the EU Reference Laboratory for GMOs in Food and Feed (EURL GMFF) following their proficiency test round of a spiked soy protein concentrate matrix. The EURL had received results showing anomalous behaviour and very variable DNA extraction yields coupled with an inverse relationship between extraction yield and estimated GMO content.

Response to consultations

Consultations are carried out by the government (including the devolved administrations and agencies), standards bodies or Directorates-General of the European Union to obtain the input of both interested and expert stakeholders on proposed new policy, guidance or legislation, prior to enactment. They are considered by legislators to be an important part of the development process for new legislation.

The Government Chemist has continued to provide input to these official consultations, being well-placed through the additional expertise within the National Measurement Laboratory and wider LGC organisation across a range of analytical science, to respond authoritatively and independently where the consultations have chemical or bioanalytical measurement implications.

We responded to 4 consultations during 2024:

- **FSA Consultation on applications for authorisation of miscellaneous regulated products.** The consultation sought stakeholders' views, comments and feedback in relation to the four novel food and three food additive applications, which have been submitted for authorisation; an application to remove the authorisation for twenty-two food flavourings; and a proposal to set a limit for ethylene oxide in all food additives.

In reply to the FSA consultation concerning changing the limit for ethylene oxide in food additives, the GC noted the reduction of the limit for ethylene oxide and its breakdown product 2-chloroethanol across all food additives, replacing the current limit of 0.2 mg kg⁻¹ to a new limit of 0.1 mg kg⁻¹ for 8 specified food additives and suggests

methods are made available to enable official control laboratories to make suitable measurements.

- **FSA Consultation on amendments to assimilated Regulation 2019/1793: Official Controls Applied to Imported High Risk Food and Feed not of Animal Origin (England and Wales specific).** Proposed amendments to the lists within assimilated Commission Implementing Regulation 2019/1793 ('Regulation 2019/1793') which applies a temporary increase of official controls and special conditions governing the entry into Great Britain of specified food and feed of non-animal origin from specified countries.

The GC noted the proposed amendments and did not have comments.

- **FSA/FSS Consultation on proposed reforms to the regulated products authorisation process.** This consultation sought stakeholders' views on initial proposals for legislative reform to streamline the authorisation process for regulated products. The current authorisation process was inherited from the EU and the FSA and FSS Boards agreed that significant change will be necessary to achieve a high-quality service that can keep up with the pace of innovation in the food industry.

The two proposals contained in this consultation are to:

- remove renewal requirements for feed additives, food or feed containing, consisting of/or produced from genetically modified organisms (GMOs) and smoke flavourings.
- allow regulated product authorisations to come into effect on publication, likely to an official register, following a ministerial decision.

Although the GC recognised a more streamlined approach to the renewal process could be economically beneficial, it was supportive of continuing to implement the necessary scientific checks to ensure that methods remain up to date and fit for purpose.

The GC support a requirement to implement scientific checks to inform whether a laboratory-based method validated ten years ago, was still appropriate and applicable. This was on the basis that the original method associated with the authorised product was based on laboratory instrumentation, kits, reagents or consumables, which were applicable ten years ago and current at that time. Such materials may now have become obsolete, having been updated or withdrawn from the market (for example, being replaced with more effective systems or having been removed for health & safety or sustainability concerns).

● **FSA Consultation Pack on Market Authorisation of 10 Regulated Food and Feed Products.** This consultation sought

stakeholders' views, comments and feedback in relation to regulated product applications including:

- a new specification of an existing permitted food additive.
- a new use for an existing permitted feed additive.
- a new authorisation for one food flavouring.
- the removal of 8 food flavourings (one application covering eight food flavourings).
- a new authorisation for one Food Contact Material (FCM).
- 3 new authorisations for 3 Genetically Modified Organisms (GMOs) for food and feed uses
- a new authorisation of one novel food and an extension of use of an existing novel food.

The GC noted the proposed regulated product applications and did not have comments.

Supporting stakeholder networks

Food Authenticity Network

The Food Authenticity Network (FAN) is a centralised, open-access platform that brings together critical resources related to food authenticity testing and food fraud prevention. By curating and consolidating the latest information in online platform, FAN empowers stakeholders to improve food safety standards and adopt best practices. Ultimately, FAN supports efforts to enhance food integrity, helping consumers worldwide to have greater confidence in the food they buy.

FAN's Food Fraud Prevention page (www.foodauthenticity.global/tools-guides-reports) presents information on leading tools, guides and reports aimed at helping stakeholders implement food fraud mitigation strategies. Currently, 21 tools, 23 guides and 17 food fraud prevention tools are listed and stakeholders can choose those that are most appropriate for their needs:

FAN Food Fraud Prevention page:
www.foodauthenticity.global/tools-guides-reports

		
21	23	17
Tools	Guides	Reports

FAN serves as a vital hub, connecting regulators, testing laboratories, industry professionals, academics and subject matter experts to enhance global resilience against the threat of food fraud.

FAN was set-up in 2015 with UK Government funding but to create a sustainable funding framework as the fight against food fraud is a collaborative effort, FAN transitioned into a Public-Private funded partnership in 2019, led by LGC. We are fortunate to still enjoy UK Government support today. Our current Partners are:

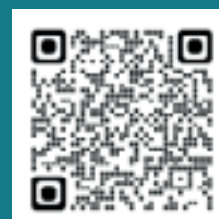
Our Partners



Thanks to the Partner support, FAN can operate on an open access basis for all stakeholders in the world and undertake Partner Projects, such as the monitoring of [global food fraud reports](#), the Authenticity [Database Search Tool](#), and the Compendium of [Analytical Techniques](#), and offer information on Food Authenticity [Centres of Expertise](#).

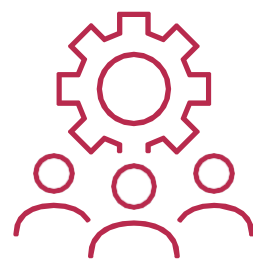
FAN now has over 5,500 members from over 112 countries and over 55,000 unique users have accessed the website: <http://www.foodauthenticity.global>

Anyone can become a FAN member; its free and very simple to join:





Collaboratively building a resilient national skills base



Building networks | Knowledge dissemination | Capabilities & training

The Government Chemist has a long history of supporting and underpinning the skills base across the UK through dissemination and collaborative training. The Government Chemist maximises the impact of the capability developed through the programme by efficient and timely dissemination, building on existing initiatives and proactively developing new collaborative opportunities both nationally and internationally, so that the right information is delivered to stakeholders in the most appropriate format.

Building networks

Food authenticity Centres of Expertise – framework for a coordinated response

An essential part of Recommendation 4 of the Elliott Review called for the provision of a virtual network of expert food authenticity testing laboratories. It was anticipated that this virtual network of laboratories would function like a National Reference Laboratory (NRL) and provide technical advice to UK government in response to emergency situations or food-related incidents.

By working with UK government to acknowledge laboratories with existing food authenticity expertise that meet Defra Analytical Methods Working Group (AMWG) criteria, twenty one Food Authenticity Centres of Expertise ([CoEs](#)) have been acknowledged grouped into 5 different categories as shown in Figure 4.

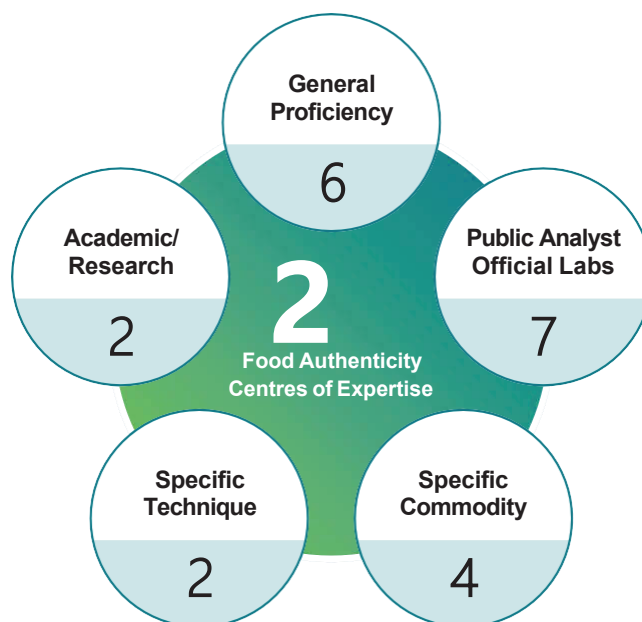


Figure 4: Food Authenticity Centres of Expertise

For each organisation, a named contact, telephone number and email address for accessibility to any stakeholder is available; this was not the case during the 2013 horsemeat incident where it was difficult for stakeholders to know where they could get trustworthy results from.

In 2024, an additional five Public Analyst Official Laboratories (PA OLs) were acknowledged alongside the existing two similar Laboratories as Food Authenticity CoEs.



Joint KT activities

The JKT framework, is aimed at sharing knowledge from government funded research to stakeholders to support UK laboratory capability and best practice in food safety and standards analysis via dissemination activities. The dissemination activities are agreed with the funding partners Defra, FSA, FSS and DSIT through the Government Chemist, working with external experts as required.

During 2024, the following activities were delivered and published under Resources on the Government Chemist website (<https://www.gov.uk/government/collections/knowledge-resources>):

Seminars

E-seminar:
[An introduction to alternative proteins](#)

E-seminar:
[Weight of Evidence approach in food authenticity](#)

E-seminar:
[Examples of sampling approaches employed by the FSA](#)

Reports

[Joint Knowledge Transfer Framework for Food Standards and Food Safety Analysis Report and Impact Analysis 2020-2023](#)



The Defra report, which includes an impact assessment of the programme, demonstrates the value of the Joint Knowledge Transfer Framework to stakeholders. A dissemination plan is being executed to ensure it is widely seen. Many scientists from the Government Chemist have provided expert contributions.

Capabilities & training

MChemA training

The training contract, funded by the FSA and supported through the Government Chemist programme, delivers focused training to support MChemA candidates, Official Laboratory (OL) staff and practicing public and agricultural analysts.

The training topics are demand-led by MChemA candidates and OL staff. The training in 2024 was delivered as more in-depth and focused courses, rather than numerous hour-long sessions. Further input is obtained from MChemA counsellors, examiners and the APA Educational Trust.

Courses

University of Birmingham residential

Held over three days with a focus on practical skills not deliverable remotely, 13 MChemA candidates participated in topics such as food microbiology, microscopy and labelling.

We delivered training in beginner, intermediate and advanced groups enabling each participant to gain maximum benefit contingent upon their ability. Positive feedback (overall score of 4.4 out of 5) was received from candidates.

Introduction to statistics and quality assurance

This was an online course for 9 registered MChemA part A candidates, but also provided refresher training to 17 more experienced candidates, PAs and other laboratory staff. Delivered on 22 – 23 October as 7.5 hours of learning, feedback indicated that delegates considered all modules to be useful or very useful.

Seminars

Two seminars were provided under the programme, topics being food contact materials delivered by Emma Bradley (Fera) which had 22 attendees and food additives delivered by Duncan Campbell (Public Analyst) which had 15 attendees.

Other support provided to candidates

In addition to full support for the above courses, financial support has been provided to two candidates with exam fees and membership of the RSC (a requirement of the MChemA exam process).

Ad-hoc advice has also been provided to a number of individual learning enquiries.



Maximising UK measurement expertise to address global challenges



Capability building | Committee memberships | Stakeholder engagement
Collaborative projects

The Government Chemist Programme aims to extend and grow links with the scientific community, partner organisations and the government departments across the four nations of the UK, to enhance and future-proof existing capabilities and maximise collaborative synergies between stakeholders to address global challenges.

The capability building projects delivered in each programme are prioritised to address key drivers identified in consultation with stakeholders at regular intervals. This activity is complemented by the participation in committees, working and expert groups and in actively seeking collaboration in projects involving stakeholders across government department, industry and academia.

Capability building projects

The impact of the work of the Government Chemist programme is broad and the effects can be observed in a number of ways. Regular horizon scanning activities identify the areas where referee cases are more likely to arise or where new legislation may lead to food business operators and local authorities requiring advice or support. We can then prioritise the resources required to plan and carry out our research projects to support the areas identified.

These projects have benefits beyond the Government Chemist's statutory function. They often impact on the wider measurement community by promoting best measurement practice in the scientific areas where disputes are more likely to arise.

The breadth of knowledge generated through the Government Chemist's advisory function – disseminated to UK government, European Commission and wider stakeholder communities – provides a secure scientific basis for more efficient and cost-effective regulations. This is achieved by translating current capabilities into timely support and advice, by generating chemical and biological measurement solutions for its own referee case use and for adoption by stakeholders, and by predicting future regulatory issues.

Non-dairy substitutes

Non-dairy milk substitutes, such as soya, oat, coconut and almond, are increasingly prevalent on supermarket shelves due to consumer demand. Aside from coconut, all are identified as allergens alongside dairy milk. The manufacture of non-dairy milk substitutes has a potential for cross-contamination as similar products can be produced on the same premises. Methodology to determine the concentration of trace allergens of non-dairy milk substitutes was developed, expanding methodology previously developed by the Government Chemist for trace measurement of allergenic proteins.

A presentation entitled: "Simultaneous screening of 9 allergens in plant milks by mass spectrometry" was given at the British Mass Spectrometry Society (BMSS), British Society for Proteome Research (BSPR) Super Meeting held at the University of Warwick in September 2024 and a peer review publication has been submitted.



Microplastics in food

Over 350 million tons of plastic waste are produced globally every year, with nearly 90% made from fossil fuels. Plastic waste continues to be released into the environment at an unprecedented scale. In the environment plastics undergo fragmentation upon weathering, biofouling, UV radiation, as well as mechanical stress. Fragmentation produces microplastics, defined as particles in the size range from 1 μm to 1-5 mm, and eventually nanoplastics, with sizes $<100\text{ nm}$). Microplastics and nanoplastics are accumulated in all environmental compartments and are considered critical persistent pollutants of increasing global concern. From the environment, microplastics can enter our food chain. Plastic particles can also enter food products directly from the packaging materials. However, at present there are no defined maximum daily exposure limits due to the lack of robust toxicological data. There is also lack of consensus with regards to the typical quantities (per size class) of various polymer types that can be found in food. The need for robust analytical methods for plastic characterisation

has significantly increased. Such methods will be invaluable for future risk assessments.

The Government Chemist has developed and validated robust methodology for microplastics detection and reliable characterisation in food. The project focussed on developing an integrated multi-method analytical platform, based on a combination of separation, spectroscopic and imaging techniques. These included Optical Detection and Mass Spectrometry for small microplastics (1 – 10 μm) and imaging spectroscopy for microplastics $>10\text{ }\mu\text{m}$. Challenges in sample preparation, arising from the food matrix and the need to isolate and quantitatively deposit the analyte on solid supports before imaging, have been addressed through development of filtration and fractionation procedures combined with quality control materials with well-defined particle sizes, chemical composition and number concentration. The outputs of the project will enable traceable monitoring of microplastics, support decision-making and mitigation measures around plastics in food.



Polyfluoroalkyl substances in food and feed

The impact of per- and poly-fluoroalkyl substances (PFAS) in food and feed, as well as food packaging, in European and American regulation is becoming increasingly prominent.

Understanding the chemistry of perfluorinated compounds and developing methods to implement regulation is currently being undertaken within the Government Chemist programme portfolio.

Alternative proteins

The need to achieve a reduction in greenhouse gas emissions (GHG) is well understood, as is the role in livestock production in contributing to these emissions. A review of the sustainability of novel food production methods was undertaken by the Government Chemist team, with a focus on alternative protein production.

The review, [available on the Government Chemist website](#), looked at the major areas of plant-based, insect, microalgae/macroalgae and precision fermented alternative protein sources. Each production alternative was considered in terms of its current state of development, commercial viability, consumer acceptance, and associated measurement and regulatory issues. The output from the review informed the next steps with regards to an analytical plan to support UK alternative protein production.

For the final year of the current Government Chemist programme, focus is being centred on aquaculture products and insects.

As part of the portfolio of our activities, a further focussed study was conducted with Queen's University Belfast on replacing soya protein with alternative sources and the effect on broiler production. This study examined a number of alternative feeding regimes and the effect on feed conversion ratio and average weight gain. A peer review publication has been submitted for review.



iKANN Research Registry

Nutrition is central to health and wellbeing and plays a pivotal role in achieving sustainability goals. The relationship between diet, nutrition and health is well recognised, as is the need to mobilise multiple sectors, disciplines and communities, at varying levels of society, to work together towards 'One Health'.

Personalised nutrition has gathered momentum as public health programmes have focussed more on preventing, rather than mitigating, existing disease. Although studies have shown personalised nutrition can bring about positive health interventions, these inferences are mostly based on observational studies with a low level of reproducibility. The Government Chemist has undertaken literature searches

to identify the key technologies supporting personalised nutrition and assess the validation strategies used. An online Research Registry available on iKANN has been created to enable stakeholders to monitor the nutrient quality of food to ensure it is maintained/ improved as food production methods are adapted to achieve net-zero target



Input into committees – committee membership

The Government Chemist has continued to contribute to national and international committees to ensure the establishment of legislation, standards and policy that are relevant and contain references to measurement practice that are fit for their intended purpose.

The list of committees the Government Chemist team contribute to is available under the membership section in www.gov.uk/governmentchemist. Notable contributions during 2024 are highlighted below.

- **CEN standard EN 18033:2024.** A Government Chemist developed method, with funding by FSA and Defra, has been published as an European standard by the European Committee for Standardisation (CEN). EN 18033:2024 outlines a DNA-based method for quantifying equine DNA relative to mammalian DNA in raw beef products.
- **CEN TC460 Working Group 8.** A new work item proposal to establish a standard method to detect previously frozen chicken samples by determination of HADH activity was proposed by the Government Chemist. The method, validated by the Government Chemist through funding by FSA and trialled in an interlaboratory comparison through funding by Defra and the EC, has been further developed and submitted to CEN for open enquiry ballot by July 2025.
- **CEN TC460 Working Group 1 - Concepts, terms and definitions.** CEN WG1 has adopted two new work items for standardisation; protocol for the sampling of reference honey and food authenticity weight of evidence toolkit, both developed by the Government Chemist and Defra.
- **Committee on Food Import/Export Inspection and Certification Systems (CCFICS).** In September, the 'Draft Guidelines on Prevention and Control of food fraud' was agreed to be moved forward to the Codex Alimentarius Commission for adoption at Step 5. The Government Chemist provided input into the UK view on the draft ahead of the meeting.
- **Scientific Advisory Board for an EU funded project (DETECTIVE - New detection methods on products derived from new genomic techniques for traceability, transparency and innovation in the food system).** The project aims to create, validate and apply pioneering detection techniques for the identification of New Genomic Techniques (NGTs) and their resulting products in plants and animals. Malcolm Burns was invited to be part of the Advisory Board and will provide scientific advice and input to the project's direction of travel and provide an independent challenge function to ensure the project is based on the latest sound science, evidence and measurement.

Engagement with stakeholders

In addition to the regular participation on the advisory committees, the Government Chemist organises and is invited to contribute to a number of events organised by stakeholder organisations. Some of the key stakeholder engagements are listed below:

- The GC team presented on the role of the Government Chemist in the UK official food and feed control system at the Association of Port Health Authorities AGM ([Presentation at the Association of Port Health Authorities AGM - GOV.UK](#)) and at the FSA Industry Liaison Group.
- Malcolm Burns attended the scientific kick-off meeting for the UK Bezos Centre for sustainable proteins at Imperial College London. Malcolm met with key stakeholders involved in this emerging scientific discipline, holding discussions on the need for measurement science to help underpin the confidence of results, as well as having conversations on the route to market placement and the relevant regulations in place.
- Selvarani Elahi spoke at the Safe to Trade webinar which explained the delivery of the Safe to Trade scheme. As Chair of the Certification Body Impartiality Committee, she highlighted the structure of the committee and the importance of independence and impartiality in gaining trust.
- Selvarani Elahi chaired the inaugural fiin (Food Industry Intelligence Network) – FAN (Food Authenticity Network) webinar on stable isotope ratio analysis which included a presentation from Alison Johnson of Food Forensics Ltd, a Food Authenticity Centre of Expertise, and a Q&A panel discussion for which Alison was joined by fiin's Paul Dobson and FAN Secretary John Points. Over 80 fiin members joined the webinar and posed searching questions to the panel.

Collaborative projects

Working with its stakeholders, the Government Chemist collaborates on matters to address global challenges and ensure food safety and authenticity.

Honey

Honey authenticity assessments are complex and consequently lead to disputed results on a frequent basis causing confusion among stakeholders and ultimately impacting negatively on consumer trust. For this reason, the Government Chemist, Defra, FSA and FSS have been collaborating, since 2018, to identify areas where government can facilitate progress on some of the underpinning scientific issues related to the subject.

In 2024:

- To aid adoption, the Protocol for the Collection of Honey Reference Samples for the Construction of Authenticity Databases, published in 2023, was updated to include [online forms](#).
- A Weight of Evidence Toolkit for Food Authenticity Investigations was [published](#). This toolkit was converted into an [E-seminar: Weight of Evidence approach in food authenticity](#) as part of the Joint Knowledge Transfer Framework for Food Standards and Food Safety Analysis.
- FSA has published a [blog on honey authenticity](#), which explains how, working together, Defra, FSA and the Government Chemist have created practical approaches to improve honey authenticity testing.
- [‘From the Hives’ honey authenticity survey: methodological expert review](#) on methods and markers used in the EU ‘From the hives survey’ (which ran from November 2021 to February 2022) used to assess honey authenticity.



Research Registry for Nutrition

Nutrition-related health challenges are among the most pressing global concerns, exacerbated by food insecurity, climate change and socioeconomic disparities. Addressing these issues requires an integrated approach that transcends disciplines and ensures research is effectively translated into real-world practice.

Understanding the critical link between nutrition and health, the Government Chemist collaborated with [NNEdPro](#) to create the International Knowledge Application Network in Nutrition (iKANN) back in 2018 (www.ikann.global)

The core aim of iKANN has been to establish an open-access online portal featuring bespoke e-learning, curated knowledge resources with

expert commentary, for capacity building. It connects knowledge from real-world initiatives to an international audience, enabling regional adaptations that support learning, promote globally relevant information, and drive the implementation of policies and practices.

At the heart of [iKANN is the Research Registry](#) a comprehensive collection of peer-reviewed studies, systematic reviews, and policy briefs in nutrition science developed by NNEdPro in partnership with [BMJ Nutrition, Prevention & Health](#)¹ and funded by DSIT through the Government Chemist Programme. [13 Special Collections](#) have been developed to showcase some of the most innovative work in nutrition and lifestyle factors.

The Global Alliance (GA) on Food Crime

The Global Alliance (GA) is a coalition of international leaders, consisting of food regulatory and enforcement organisations from Australia, Canada, New Zealand, the UK and the USA, who have agreed to work together on the prevention, detection and disruption of food crime. Members of the GA aim to collaborate as enforcement bodies to protect consumers from intentional acts of fraud or misrepresentation, wherever they take place within global food supply chains.

FAN has created a page on its website dedicated to the [GA](#), as the initiative did not have an online presence, to promote awareness of its important work. All GFAC members agreed to consider partnering with FAN to see how they could assist in extending its reach in each member country for the benefit of their stakeholders.

³ Is co-owned by NNEdPro and BMJ (Since 1840, BMJ Group has been at the forefront of providing research, knowledge and education to health professionals worldwide, envisioning a healthier world for all. With a global reach, we maintain our position as one of the most trusted brands in the world by providing the very best publishing expertise, digital health tools, and learning resources)

Cannabidiol (CBD) Reference Material

The work carried out under the 2020-23 Government Chemist Programme identified a robust method for the determination of certain controlled cannabinoids in cannabidiol-containing products.

Building on the methodology developed, the LC-MS/MS method has been extended to include all 12 controlled cannabinoids. Sample preparation was achieved by solvent extraction with centrifugation using propan-2-ol followed by acetonitrile and then acetonitrile/water. Separation was achieved using reversed phase UPLC coupled with a triple quadrupole mass spectrometer for detection. Isotopically labelled

standards were employed. Studies have been carried out to determine linear range, limit of detection and quantification and method acceptance criteria. The method was also challenged by utilisation of a second platform and additional analysts.

Preliminary data has shown the method to be robust across both platforms with relative standard deviation of <10%. The recoveries of Δ^8 THC and CBNM were observed to be lower than required, with further work to address this being planned. A peer review publication is in preparation.



Partnering for excellence

We have established that a strong alignment between university-based R&D and the local innovation ecosystem helps maximise the output of long-term collaborations leading to measurement research translation. So, by working within a framework of open-system orchestration centred around regional centres of excellence, the Government Chemist is not only getting closer to end-users but is also delivering improvements in research translation that is implemented, in partnership, at a local level.

These regional centres of excellence are catalysing several project initiatives and new ways of engaging with researchers working in themes that are critical to the delivery of the Government Chemist Programme. For instance, the e-seminar: “Point of Contact Devices for Food Safety, Authenticity and Quality Testing” was developed with support from the Scottish Government’s National Transition Training

Fund programme, the National Manufacturing Institute of Scotland (NMIS) and the [NML Centre at the University of Strathclyde](#). The GC-funded research being conducted at Queens University Belfast (QUB) is looking at alternative proteins in animal feed formulations; more specifically, making direct comparisons in the environmental footprint of potential alternatives to soybean (SBM).

We expect to further leverage the connections to these centres of excellence by engaging with larger network initiatives, including the National Alternative Protein Innovation Centre ([NAPIC](#)) based at the University of Leeds and the [Co-Centre for Sustainable Food Systems](#) based at QUB, and by supporting the training of the next generation of food researchers through the [Food Biosystems Doctoral Landscape Programme](#) based at the University of Surrey.

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