



# Government Chemist

Review 2022



Department for  
Science, Innovation,  
& Technology

# Contents

Foreword from the Government Chemist	2
Note from the Chair of the Government Chemist Programme Expert Group	3
What we do	4
In focus	8
Dispute resolution	12
The advisory function	18
Impact of our work	20







'... the Government Chemist team will help secure compliance with the UK enforcement system by advising on sound policy and regulatory decision making and promoting greater awareness about the need for measurement standards'

# Foreword from the Government Chemist

'You live life looking forward, you understand life looking backward'

Soren Kierkegaard



Never has this felt more true as I balance a review of the Government Chemist activities over the past year with plans for the future Government Chemist work programme.

The flurry of referee cases seen immediately post-pandemic, directed mainly at potentially genetically modified products, has settled into a more predictable pace with their usual broader remit of measurement challenge.

Beyond the Government Chemist statutory referee function, I have welcomed the continued recognition of perceived benefits and value of the technical contributions of the Government Chemist Team to a number of departmental and strategic cross-departmental issues, the Devolved Administrations, as well as NGOs and industry. There is, however, still much opportunity here that I will be exploring further.

Stakeholder consultation during the summer brought together a diverse cross-section of interested parties to identify the factors most likely to impact the Government Chemist Programme over the years ahead. The 300 or so ideas generated initially framed the definition of the themes of the Government Chemist Strategy 2023-2026 and, subsequently, the prioritisation of

the capability-building projects approved for delivery as part of the 2023-2026 Government Chemist Programme.

I was keen that the Strategy and Programme should clearly address activities that support strategic government and sector drivers around food safety and security in a challenging world, where sustainable development objectives are to be achieved through complex interacting social, political and economic systems, and against geopolitical uncertainty.

To protect consumers from risks introduced by novel foods and evolving dietary habits, the Government Chemist team will help secure compliance with the UK enforcement system by advising on sound policy and regulatory decision making and promoting greater awareness about the need for measurement standards.

The team will work on greater engagement with UK Government and stakeholders around appropriate measurement solutions addressing the concerns of the UK agri-food sector. This should support achievement of the additional benefits to be gained from an increasingly innovative and growing sector, both nationally and internationally.

Maximising use of the UK measurement infrastructure means ensuring continued development of core skills within the sector, expansion of the team's expert technical provision, and transfer of knowledge from referee analysis and the wider work of the Government Chemist Programme, beyond first-line stakeholders to wider sector benefit.

This ambition presents a challenge to all our current thinking and behaviours, but I am confident that the foundations laid out in terms of the visible outcomes highlighted in this year's Annual Review show us the path to future success is possible.

A handwritten signature in black ink, appearing to read 'Julian Braybrook', written in a cursive style.

**Professor Julian Braybrook**  
*BSc, PhD, Hon DSc, CChem FRSC*

# Note from the Chair of the Government Chemist Programme Expert Group

It is with some relief to observe that finally, during 2022, we could largely transition from working under the constraints of a global pandemic to interacting and working in more flexible ways. Whilst technological advances enabled the work of the Government Chemist to carry on unaffected in the past few years, there is no doubt that there is value in getting together in person at key events and meetings.

The stakeholder workshop held in June at the Royal Society of Chemistry was one such event. Government Chemist stakeholders from across the food and feed sector, representing manufacturing, distribution, retail, imports, regulation and government met to establish the key drivers to which future Government Chemist programmes should respond. A wealth of ideas were generated and prioritised, with issues such as food authenticity, food security, alternative proteins, contaminants in novel foods, and packaging and recycled materials making it to the top of the list. These priorities in turn will define the work programme for 2023-2026.

Stakeholder engagement, as exemplified in the workshop mentioned above, is at the core of the Government Chemist function. Horizon scanning for future challenges and opportunities, expert advice on health

crises such as Covid-19, discharging the referee function in dispute cases, and providing information on a wide range of topics such as regulation, food analysis and labelling, are some of the ways in which the team interacts with its primary stakeholders. The impact of this engagement was measured via a comprehensive survey, reported in the Impact section, which highlighted the importance of knowledge transfer and dissemination, and showed that the advisory and referee function services meets or exceeds expectations for the majority of users. Whilst positive feedback is important, the survey provided an opportunity to identify improvement actions for future work programmes.

The Government Chemist programme is scrutinised at regular meetings by the Programme Expert Group (PEG, its membership is detailed on page 6). During the last meeting in November, the PEG met to assess and prioritise the capability building projects for the next work programme (2023-2026) proposed following the stakeholder workshop. This is always a difficult task as there are several important and critical issues to address and limited funding and resources to work with. However, it was clear to the PEG that the Government Chemist makes excellent use of the diverse skills not just in the team, but through

collaboration with stakeholders and by leveraging knowledge gained through participation in national and international scientific programmes. The good value the programme offers for the funding it receives was universally recognised.

As I mention the PEG, I would like to take the opportunity to thank one of the longest standing members, Dr Roger Wood, who retired at the end of 2022, for all his useful and timely contributions to the work of the PEG over the years. We wish Roger a well-deserved restful retirement.

I have been contributing to these reviews for over a decade, and I always appreciate having the chance to reflect on the progress of the Government Chemist contribution to the safety, security and sustainability of food and feed in the UK. I hope you enjoy reading about it.



**Professor Paul Berryman**  
*BSc, MSc, MChemA, MBA, PhD,  
CBiol FRSB, CSci FIFST, CChem  
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# 1

## What we do

The Government Chemist role was created originally to help in the protection of 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) (formerly the Department for Business, Energy and Industrial Strategy, BEIS).

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 bio-measurements are important.

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





## Our statutory function

The Government Chemist's statutory function comprises science-based duties prescribed in several acts of Parliament. These duties cover public protection, safety and health, value for money and consumer choice. Our most important responsibility is to act as a "referee analyst" resolving disputes 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 underpinned by the designation of our home laboratory, the UK National Measurement Laboratory (NML) for chemical and bio-measurement at LGC.

► **Section 3 looks at the year's completed referee cases.**

## 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 are published on the Government Chemist website; 2022 consultation responses have been listed on page 19.

► **See Section 4 for more about the wider advisory function.**

## 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 prepared for demand for referee analysis in these areas.

► **Section 5 provides an overview of some of our current capability-building activities.**

## Our governance

Responsibility for the Government Chemist Programme lies with the Department for Science, Innovation and Technology.

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 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.



# Government Chemist Programme Expert Group membership during 2022

## **Paul Berryman, Chair**

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

## **Robbie Beattie**

Robbie is appointed as Public Analyst, Agricultural Analyst and Food Examiner to nine local authorities in Scotland. He is currently a senior manager with The City of Edinburgh Council where he manages a portfolio of income generating assets.

## **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.

## **Keneth Chinyama**

Keneth works for the Food and Drink Federation in the Food Science and Safety Division. Keneth is responsible for scientific and regulatory issues, particularly on residues and contaminants and regulated products including food additives, flavourings, enzymes and plant protection products.

## **David Franklin**

David leads the Scientific Sampling and Laboratory Policy Team in the Food Standards Agency (FSA), which is responsible for policy and scientific advice for Official Control Laboratories, National Reference Laboratories and Sampling.

## **Jonathan Griffin**

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

## **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, Department for Business and Trade. Chelvi was the UK representative at CEN and Codex meetings in the standardisation of analytical methods for food.

## **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 also involved with the import of foodstuffs of non-animal origin.

## **Declan Naughton**

Declan is currently Professor of Biomolecular Sciences at Kingston University London with research interests spanning food safety, nutrition, natural products, performance enhancing drugs, inflammation, drug discovery and endocrinology. He is also Interim Dean and Associate Dean for Research and Enterprise for the Faculty of Science, Engineering and Computing at the university.

## **David Pickering**

David is the Trading Standards Manager for the Buckinghamshire and Surrey Trading Standards Service. He has been the Chartered Trading Standards Institute Lead Officer for food for many years and represents the profession on numerous groups including the national Food Standards Focus group.

## **Sophie Rollinson**

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

## **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 academic and consultant at The Open University, President of the Royal Society of Chemistry Analytical Division Council and Chair of the Analytical Chemistry Trust Fund.

## **Roger Wood OBE**

Roger is an experienced food analysis specialist, formerly a senior scientist in FSA. Roger has represented the UK at numerous EU methods of analysis and sampling working groups in the food and feed sectors over many years and has been Chair of a number of international food analysis working groups. Roger retired during 2022.



## 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

# 2

## In Focus: The retained EU Law Bill and its implications for UK food safety

**By Iain Ferris, Lecturer,  
Food Safety, Standards & Law,  
University of Birmingham**



At the beginning of 2023 the UK Government's plans had been to "sunset" all retained EU law (REUL). But as the saying goes, 'a week is a long time in politics' and the position has evolved to a very different prospect. Much of the immediate threat of inadvertently weakening regulatory standards has now been lifted and replaced with a more gradual paced review.





Whilst it is true that the Retained EU Law (Revocation and Reform) Act 2023 will still revoke around 600 pieces of legislation, the majority of the laws included are inoperable due to them being superseded or no longer relevant to the UK. This is essentially the legal equivalent of “having a good sort out”.

Authorities such as the FSA and DEFRA have however still been tasked by the government with reviewing hundreds of retained EU laws by the end of June 2026. The FSA has stated five guiding principles behind their review of REUL namely, protecting public health, food safety and standards, protecting consumer interests, maintaining consumer and trading partner confidence, supporting innovation and growth, and managing divergence.

The FSA have highlighted Official Controls Regulations, import controls and how regulated products (e.g. novel foods) are approved as obvious candidates for reform. Arguably though, reforms of these laws were an inevitable consequence of Brexit and the subsequent increased demands in these areas. The increased burden on the FSA meant a reprioritisation of its workplan for the year, including, for example, a pause on the consultation on making the Food Hygiene Rating Scheme mandatory in England.

It is important to remember though that much of the REUL has its origins beyond the EU, as in large parts it reflects Codex Alimentarius standards. It would seem unlikely that significant changes would be made to the provisions of any regulations that originate from Codex standards as these are negotiated by its 188 member countries in order to promote trade and maintain standards of food

safety and quality. These standards are also used as a reference in any World Trade Organisation disputes.

There are also many provisions that do not originate from the EU and are therefore unlikely to be subjected to significant changes. Allergen labelling rules for prepacked foods for direct sale, for example, were introduced independently by the UK, and the FSA has highlighted food hypersensitivity as a key focus in the forthcoming years. Other UK laws include The Bread & Flour Regulations 1998. These will now apply to products imported into the UK from the EU which will require mandatory fortification to protect against nutrient deficiencies in the UK population. The Products Containing Meat etc. Regulations 2014 (PCMR) will also apply to imported meat products and their preparation, setting minimum meat levels. Some of these regulations will need amendments if they rely on definitions contained in REUL, such as the definition of meat in the PCMR.

Additionally, whilst the UK now has the power to reform its own laws on what can be sold here, it has little control over other countries' requirements. Furthermore, areas such as official controls carried out by the competent authorities must also be acceptable to other countries in order to provide confidence and frictionless trade. The UK for instance, has not yet implemented official controls and checks on goods originating from the EU despite the EU doing so for goods imported from the UK. This has resulted in additional costs and delays for exporters but easier access to the UK market for EU goods. Divergence in legislation is also likely to result in friction of trade and the need for more checks if standards vary from one country to another. For example, current differences



in permitted additives mean that some foods sold in the US cannot be sold in the UK. The FSA also has the added complication of agreeing standards across the Devolved Administrations to avoid differing rules within the UK as, since Brexit, many of the policy decisions previously taken by the EU now fall under their remit.

Any changes that are made to food REUL need to maintain a high level of protection of public health and must be acceptable to UK consumers. Consider for example the public discontent when rumours of chlorinated chicken were first circulating post-Brexit. One concern introduced by the Act, however, is the abolition of general principles of EU laws at the end of 2023. In the case of food law, Retained Regulation 178/2002 sets out some general principles which includes the precautionary principle and protecting consumers interests that will no longer apply.

However, a thorough review of our current laws does have some merits. Over the years UK legislation has developed piecemeal fashion as a result of various EU directives and regulations in addition to UK law, and navigating these as a food producer can be challenging. The review also provides an opportunity to reassess how laws are enforced and provide more consistent enforcement powers.

Ultimately it seems unlikely that there will be any significant revocation of current food laws, nor the bonfire of regulation that some had predicted. It is feasible that the UK Government may require evidence supporting the reformation of laws in order to rationalise the Brexit decision. If this is

the case, food standards rules such as the use of certain terms for plant-based food and drinks (e.g. soya milk and vegetarian chicken), or the complex spirit drink designation rules could be candidates for consideration.

The Act also prescribes that the Higher Courts are no longer bound by the previous decisions of the EU courts which introduces a degree of uncertainty and potential grounds for appeal. EU cases such as the packaging of fruit tea produced by the company Teekanne provides some useful steer on food labelling and misleading presentation. The Court of Justice of the European Union ruled that even though the list of ingredients was correct, it did not adequately correct the consumer's misleading impression gained from pictures displayed on front of pack. This could open up the opportunity to review this decision again, although it remains to be seen if a different decision would be made.

There are also opportunities to reduce regulation by removing some of the standards where the UK previously took advantage of derogations, for example the compositional standards for minced meat. If the original standard is removed, then the derogation is no longer required, thus removing two laws in one.

Finally the Act also prescribes that REUL should be referred to as "assimilated law" after the end of 2023 and whilst ultimately it will come down to the Government to make the final decisions, in my view it would appear that much of the actual laws will remain similar to their current forms, albeit in a different format and purged of any reference to the EU.

## References

<https://www.food.gov.uk/board-papers/retained-eu-law-update>

Retained EU Law (Revocation and Reform) Act 2023 (<https://www.legislation.gov.uk/ukpga/2023/28/contents/enacted>)

Legal Case: Judgment of the Court (Ninth Chamber) of 4 June 2015. Bundesverband der Verbraucherzentralen und Verbraucherverbände - Verbraucherzentrale Bundesverband e.V. v Teekanne GmbH & Co. KG. Case C-195/14 (<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A62014CJ0195>)







# 3

## 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 2022

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 statutory conditions for referral usually begin with either the contemplation or commencement of legal proceedings where the prosecution intends to offer analytical evidence, or rejection of imported goods at point of entry. After an increase in enforcement activity following the pandemic, the number of cases received has remained steady. A total of 10 cases were received, compared to 11 in 2021.

The spike in cases seen through 2021 regarding Genetically Modified Organisms (GMOs) in Chinese rice and rice products abated with a more "traditional" mix of cases received, which included disputes concerning levels of mycotoxins, pesticides and food contact materials.

## Genetically Modified Organisms

Retained EU law<sup>1</sup> prohibits the placing on the market of genetically modified (GM) food or feed unless it is officially authorised and provides for its labelling and supervision. Authorisation is only granted after demonstration that the GM food or feed does not have adverse effects on health or the environment and that it does not mislead the consumer. In addition, the GM food must not differ from the food it is intended to replace to such an extent that its normal consumption would be nutritionally disadvantageous.

There are currently no genetically modified rice or rice products authorised for use in the UK, however, as the result of the on-going detection of such organisms in consignments from China, all imports are subject to inspection, sampling and analysis.

Three cases concerning the presence of GMOs were received during 2022. The first concerned the alleged presence of the genetic elements CaMV P-35S and T-NOS in a sample of round grain white rice, the second, the alleged presence of the genetic element Cry 1Ab/Ac in rice balls and the third the presence of the genetic element CaMV P-35S in rice noodles.

Owing to the lack of detail of the full DNA sequences of GM rice varieties available in China, a screening approach is adopted for certain generic genetic elements. GM plants are generally produced by inserting a transgenic sequence that encodes

for a desired trait into the host genome. The trait sequence is typically bounded by regulatory promoter and terminator sequences, some of the most common being the 35S promoter (P-35S) derived from Cauliflower Mosaic Virus (CaMV) and the nopaline synthase terminator (T-NOS) derived from *Agrobacterium tumefaciens*. Thus, P35S and T-NOS are useful screening targets. Further screening targets are genes encoding for the *Bacillus thuringiensis* endotoxin Cry1Ab/Ac, genetically engineered as an insect resistance trait sequence.

The samples were analysed using the approach detailed in the Government Chemist Review 2017 (p18). For the first two samples the results agreed with those of the official control laboratory, and therefore deemed non-compliant with UK law. For the third sample, genetically modified material could not be detected and therefore this sample was deemed compliant.

## Mycotoxins

Mycotoxins are chemical compounds produced by certain moulds. They vary in chemical structure and toxicity, and can occur due to adverse conditions during crop growth or product storage. Maximum permitted levels are prescribed by retained Commission Regulation 1881/2006 and requirements for sampling and analysis prescribed by retained Commission Regulation 401/2006. Three cases were received during 2022 as the result of disputes over the level of aflatoxin (x2) and ochratoxin A (x1) in food.

Case 2023-18 concerned the level of ochratoxin A in raisins. The two-parts of a pre-slurried sample were received and were analysed using HPLC with fluorescence detection following immunoaffinity clean-up. Spike recoveries were acceptable, and the results as follows in Table 1.

The presence of ochratoxin A was also confirmed using LC-MS/MS.

Correcting for recovery and allowing for measurement uncertainty, the amount of ochratoxin A found in both samples was above the maximum permitted amount of 10 µg kg<sup>-1</sup> prescribed by the Regulations.

**Table 1: Results obtained for ochratoxin A in raisin samples**

LGC Sample Reference	Mean Concentration Ochratoxin A (µg kg <sup>-1</sup> )	U* (µg kg <sup>-1</sup> )
Sample A	20.25	2.82
Sample B	27.40	1.21

*\*U is the expanded uncertainty, calculated as a 95% confidence interval, with appropriate degrees of freedom. The above uncertainties take due account of the uncertainty associated with variation in the analytical recovery.*

<sup>1</sup> Regulation (EC) No 1829/2003 of the European Parliament and of the Council of 22 September 2003 on genetically modified food and feed, <https://eur-lex.europa.eu/eli/reg/2003/1829/2008-04-10>



Case 2023-21 concerned the presence of aflatoxin in in-shell peanuts. Again, the sample consisted of two parts which had been pre-slurried. The samples were analysed using HPLC with post-column derivatisation and fluorescence detection. The results are given in Table 2, and the presence of aflatoxin confirmed by LC-MS/MS.

The amounts of aflatoxin B1 and total aflatoxin found in the samples were in excess of the maximum permitted amount for peanuts intended for direct human consumption, however, these amounts were within the maximum permitted amount for peanuts which are to be subjected to physical sorting or use as an ingredient in a foodstuff.

Case 2023-23 concerned the level of aflatoxin in a sample of curry powder, the results of which are shown in Table 3.

Again, allowing for measurement uncertainty, the level of aflatoxin B1 was in excess of the maximum permitted amount and the sample deemed unsatisfactory for this reason.

**Table 2: Results for aflatoxin in in-shell peanut samples**

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 A	9.4	2.8	10.6	3.0
Sample B	<0.1		<0.4	

*\*U is the expanded uncertainty, calculated as a 95% confidence interval, with appropriate degrees of freedom. The above uncertainties take due account of the uncertainty associated with variation in the analytical recovery.\*\* The total aflatoxin content is calculated as the sum of the individual aflatoxins B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub> and G<sub>2</sub>.*

**Table 3: Results for aflatoxins in curry powder samples**

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 A	13.5	4.0	14.1	4.2



## Pesticides in food

### Dinotefuran in jasmine tea

The sample was referred by the food business operator following detention at the point of entry. The pesticide dinotefuran had been detected in the sample above the maximum residue limit (MRL). The second part sample had been analysed, detecting the residue but below the limit of quantitation (LOQ) and MRL.

The sample was analysed using LC-MS/MS following a QuEChERS (Quick, Easy, Cheap, Effective, Rugged, Safe) extraction regime tailored for pesticide analysis. Isotopically labelled dinotefuran was used as the internal standard. Multiple extractions were carried out over multiple days, with dinotefuran detected at  $0.0115 \pm 0.0046 \text{ mg kg}^{-1}$ .

There is no specific limit set for dinotefuran in jasmine tea, as prescribed by retained EC Regulation 396/2005 on MRLs of pesticides in or on food and feed of plant and animal origin, and therefore the default limit of  $0.01 \text{ mg kg}^{-1}$  applies. The mean amount detected was above this limit, however, the sample was considered satisfactory when the measurement uncertainty of the result was considered.

### Captan in organic flaxseed

The sample was jointly referred by the port health authority and the food business operator. The sample consisting of golden flaxseed described as "organic" had been detained following the detection of captan residues above the MRL.

The case was technically challenging with initial attempts at analysis for captan and its metabolites using LC-MS/MS proving unsuccessful due to breakdown of the analyte and poor instrument sensitivity. Thus, the analysis was switched to a GC-MS/MS approach which resolved the issues.

Extraction and clean-up of the sample proved equally difficult with the QuEChERS method providing zero recovery in spiking experiments prompting a change to a more traditional solid phase extraction (SPE) methodology. The resultant regime provided a limit of detection (LOD) of  $0.01 \text{ mg kg}^{-1}$  with recoveries of 98.7% and 47.7% for captan and its metabolite THPI, respectively.

The sample was then analysed multiple times over multiple days with neither captan nor THPI being detected above LOD. The sample, in terms of captan residue content, was therefore deemed compliant with relevant legislation and permitted entry into Great Britain.





## Kitchen utensils for primary aromatic amines

The sample consisted of three sets of kitchen utensils, comprising six individual items, and was referred by the port health authority as the result of a dispute concerning the level of migration of primary aromatic amines from the sample.

The sample was analysed in accordance with EUR 24815 EN<sup>2</sup>, namely a two-hour immersion in 3% acetic acid at 100 °C for three immersions. All three examples of each item were tested (individually) resulting in a total of 18 tests. The resultant solutions were analysed by LC-MS/MS using isotopically labelled internal standards for the presence of aniline and 4,4-MDA.

The Materials and Articles in Contact with Food (England) Regulations 2012 implement a number of EU Regulations which require, inter alia, that materials and articles:

- shall be manufactured in compliance with good manufacturing practice so that, under normal or foreseeable conditions of use, they do not transfer their constituents to food;
- are consistently produced and controlled to ensure conformity with the rules applicable to them;
- prohibit the transfer into food or a food simulant of primary aromatic amines, such as aniline and 4,4-MDA, in a detectable quantity from materials such as the sample in question

(detectable quantity being defined as 10 µg of PAA (as the sum of aniline and 4,4-MDA) per kg of food).

Two of the items tested exhibited migration of primary aromatic amines in excess of the prescribed limit (at  $13.0 \pm 1.2$  and  $11.5 \pm 1.0$  µg kg<sup>-1</sup> food, as sum of aniline and 4,4 MDA), and therefore the sample was considered non-compliant with the stated provisions of the aforementioned Regulations.

## Nitrofurans in prawns

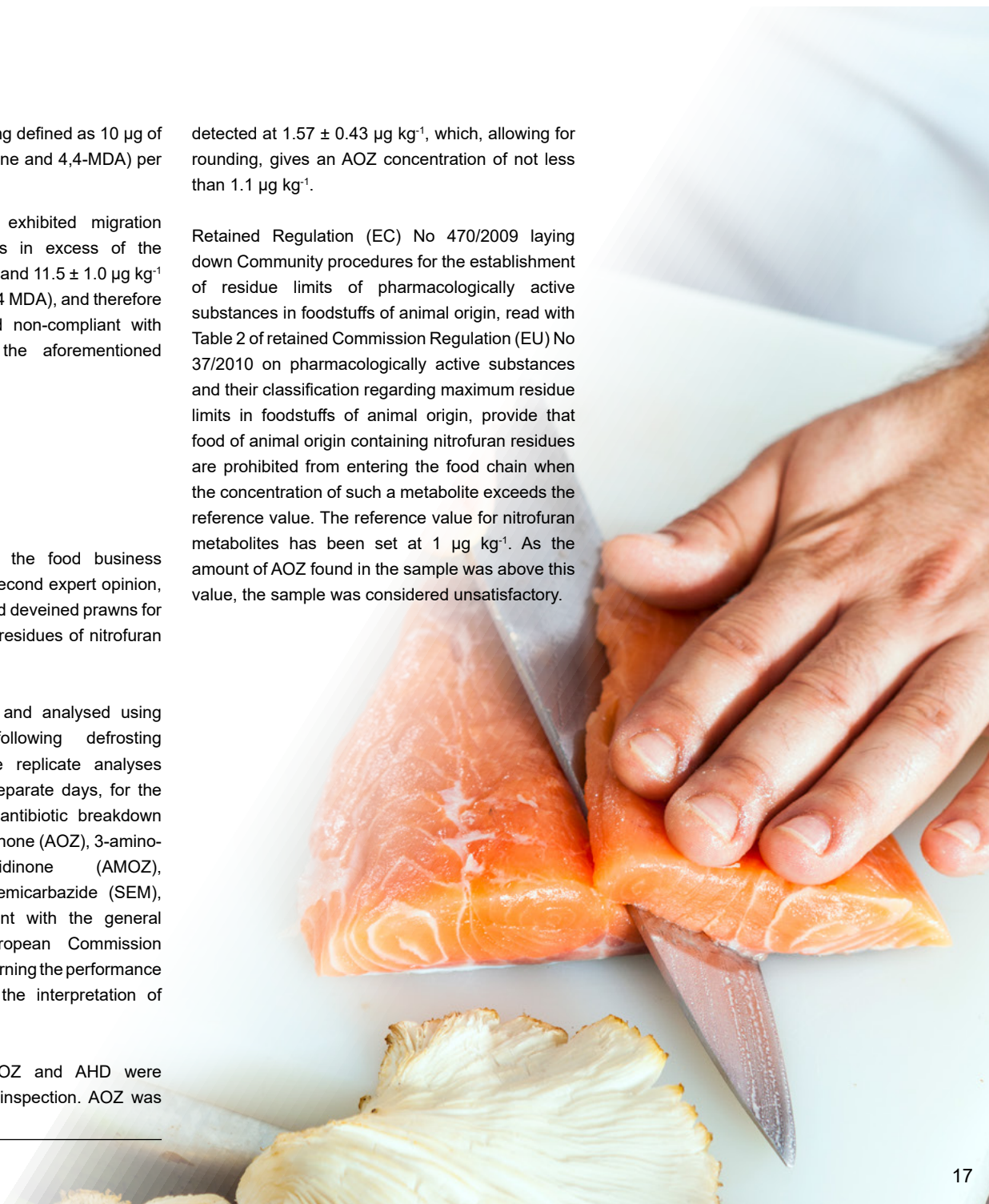
The sample, submitted by the food business operator as a request for a second expert opinion, consisted of frozen peeled and deveined prawns for analysis for the presence of residues of nitrofurant antibiotics.

The sample was extracted and analysed using established techniques following defrosting and homogenisation. Three replicate analyses were carried out on three separate days, for the presence of the nitrofurant antibiotic breakdown products 3-amino-2-oxazolidinone (AOZ), 3-amino-5-morpholinomethyl-2-oxazolidinone (AMOZ), 1-aminohydantoin (AHD), semicarbazide (SEM), the analysis being compliant with the general principles of retained European Commission Decision 2002/657/EC, concerning the performance of analytical methods and the interpretation of results.

The results for SEM, AMOZ and AHD were considered not detected by inspection. AOZ was

detected at  $1.57 \pm 0.43$  µg kg<sup>-1</sup>, which, allowing for rounding, gives an AOZ concentration of not less than 1.1 µg kg<sup>-1</sup>.

Retained Regulation (EC) No 470/2009 laying down Community procedures for the establishment of residue limits of pharmacologically active substances in foodstuffs of animal origin, read with Table 2 of retained Commission Regulation (EU) No 37/2010 on pharmacologically active substances and their classification regarding maximum residue limits in foodstuffs of animal origin, provide that food of animal origin containing nitrofurant residues are prohibited from entering the food chain when the concentration of such a metabolite exceeds the reference value. The reference value for nitrofurant metabolites has been set at 1 µg kg<sup>-1</sup>. As the amount of AOZ found in the sample was above this value, the sample was considered unsatisfactory.



<sup>2</sup> Simoneau, C., (Ed) Technical guidelines on testing the migration of primary aromatic amines from polyamide kitchenware and of formaldehyde from melamine kitchenwares, 1<sup>st</sup> Ed 2011

# 4

## The 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 bio-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.





## 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 42 requests for advice during 2022.

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, jelly mini-cups and authenticity being amongst the most common. The “other” category included enquiries on organic precedence and labelling.

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 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](http://www.gov.uk/governmentchemist). Notable contributions in 2022 included:

- Acting as convenor for Working Group 2 (Species analyses using DNA-based methods) of CEN/TC 460 (Food Authenticity), the Government Chemist oversaw the adoption of a UK developed method for the determination of horse meat in beef meat adopted for standardisation. The Government Chemist was also appointed Convenor and Secretary of Working Group 8 (Spectrophotometric methods) and has started discussions on the standardisation of a UK/EC validated method for the detection of previously frozen poultry.
- Acting as UK Co-Chair of the Codex Committee on Food Import and Export Inspection and Certification Systems (CCFICS) electronic working group (EWG) on “Guidance on the Prevention and Control of Food Fraud”, the Government Chemist conducted Co-Chair duties as directed by the Chair (US); these included collaborating with the Chair and other Co-Chairs to review EWG comments received on the draft protocol, approve amendments to the protocol for re-circulation to EWG and contribute to plans for an EWG webinar in February 2023. The Government Chemist also held regular meetings with FSA and Defra colleagues to update them on technical progress and on any issues arising that required urgent consideration from a UK perspective.

## 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.

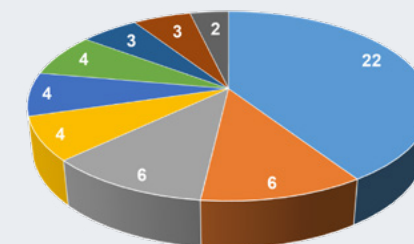
The Government Chemist has continued to provide input to these official consultations, being well-placed through the additional expertise within the NML and wider LGC organisation across a range of analytical science, to respond authoritatively and independently where the consultations have chemical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

The consultations responded to by us during the year are listed below:

- Review of Consultation Paper on Amendments to the Poisons Act 1972 - April 2022**
- Contribution to the Consultation on proposed changes to national (England only) law in relation to EU Directives on animal feed, food contact materials and extraction solvents - July 2022**
- Contribution to the Consultation on Amendments to Retained Regulation 2019/1793: Controls Applied to Imported Food and Feed not of Animal Origin - July 2022**
- Contribution to the Consultation on Transitional Arrangements for Edible Insects in Great Britain - August 2022**
- Contribution to the Consultation on Changes to Proposed draft Guidelines on the Use of Technology to Provide Food Information (revised June 2022) for Codex Committee on Food Labelling - September 2022**
- Contribution to the Consultation on Review of the Food Law Code of Practice for the Food Standards Delivery Model (England) - October 2022**
- Contribution to the Consultation on Review of the Food Law Code of Practice for the Food Standards Delivery Model (Northern Ireland) - October 2022**

### Source of enquiries

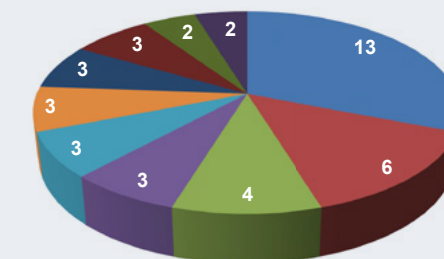
Figure 2 Distribution of enquiries by source



- Commercial / Consultant
- Local authorities
- Industry and trade associations
- Academia
- Government Department overseas
- Official Control Laboratory
- UK Government departments
- Journalist / press / radio / TV / journals
- Independent

### Topic

Figure 3 Distribution of enquiries by topic



- Food analysis
- Food standards / regulations
- Food crime
- Nutrition and health claims
- Honey
- Freedom of information
- Cannabidiol
- Jelly mini-cups
- Other
- Referee analysis

# 5

## Impact of our work

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 such as the stakeholder workshop mentioned in this section 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 – and disseminated through to 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 bio-measurement solutions for its own referee case use and for adoption by stakeholders, and by predicting future regulatory issues.

This year, the Government Chemist conducted its first major impact evaluation, surveying 80 stakeholders from a broad range of sectors to establish the economic, industrial and social benefits of the Government Chemist Programme.

## Stakeholder impact survey

During 2022 the Government Chemist team conducted an online impact survey, consulting stakeholders from a broad range of sectors to better understand the economic, industrial and social benefits of the Government Chemist Programme.

The survey yielded 94 responses from stakeholders in the food and feed industry, manufacturers, distributors, retailers, importers, regulators and government. Stakeholders were most likely to be familiar with the Government Chemist through long-standing connections (61% of respondents), while a smaller proportion (9%) had become acquainted with the Government Chemist through social networks, search engines and blogs.

The majority of stakeholders (95%) reported a good understanding of the services that the Government Chemist offers, with its advisory function, statutory function and knowledge transfer events being the most frequently cited. These were also the most used services, alongside publications, articles and guides. No respondents reported having used the Government Chemist's consultancy services. This may be due to lack of awareness or the survey not reaching those stakeholders who have previously engaged with the Government Chemist in this way.

While it was difficult for respondents to place exact figures on the economic value of work conducted by the Government Chemist, it was possible to discern mechanisms through which economic benefit was realised. For example, 57% of respondents believed that the work of the GC had reduced risk to the UK and 42% felt that the work had promoted

consumer safety. Testimonials received through open ended responses went further to quantify these benefits. One respondent stated:

'Personally, at least 30 hours of my direct time and €7.5k have been saved [...] I was able to direct at least 30 individuals to two allergen webinars for training purposes.'

Another stated: 'In the modern world with changing food supply patterns, increased food pricing, global competition and threats associated with climate change both food quality and authenticity are likely to be placed under even more pressure than hitherto. [The Government Chemist's] role in refereeing analyses is a critical part of protecting UK public interest, and it is essential that this valuable role is preserved in the future. How valuable is this? Priceless.'

The Government Chemist impact report recommended greater promotion of the role of the Government Chemist, including the range of services offered and how potential customers are able to access these. As a response, the team aims to initiate and scale up various outreach activities including greater engagement with users of the Government Chemist services, and increased communication through alternative mechanisms, such as training events, use of stakeholders networks, social media and targeted knowledge transfer events.

The Government Chemist impact survey is the first piece of work in a wider internal evaluation of the function. Regular impact assessment is crucial for measuring the effectiveness of the interventions listed above.

## Building new capabilities

### Assessing the authenticity of coffee using isotope ratio analysis

The UK coffee industry alone contributes billions of pounds to the economy every year and, as there is a market for coffees of specific geographical origin, there is a subsequent need to establish analytical techniques that can be used to help verify labelled origin claims. The relative abundances of stable isotopes of elements can vary measurably between different sources of the same element. As a result, isotope ratio analysis is often used as a tool for investigation of food authenticity and/or adulteration. Where geographical origin is of importance, including for verification of Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) foods or simply for confirmation of country-of-origin, combinations of multiple isotope ratios measured on the same sample have proven most useful.

To apply isotope ratio analyses to questions surrounding authenticity for coffee and foods more generally, it is often necessary to compile a database of isotope ratio results for known-origin materials that can then be queried following analysis of questionable origin samples to infer source. It is imperative that such databases contain isotope ratio data that is compatible and comparable over the long-term and hence metrological considerations such as traceability and uncertainty as well as use of standardised methods are important. Investigation of food preparation processes (e.g. roasting for coffee) that

may alter isotope ratios between raw materials and final products can help provide relationships that reduce the ranges of materials needed in such a database as expected parameters for known-origin samples can be determined through models rather than only by measurements.

Under a Government Chemist project funded by DSIT, the NML has collaborated with the British Coffee Association to study the geographical variations in isotope ratios of four different elements in both green and roasted coffees collected from all major coffee producing nations around the world. The isotope ratio signals for the selected elements in coffee beans are expected to vary with geographic origin of the coffee plant, but crucially, the mechanism by which the isotope ratios vary are different: oxygen isotope ratios reflect local precipitation; boron isotope ratios reflect the boron found in the soil; strontium isotope ratios in plants follow the variations of strontium isotopes in local bedrock; and carbon isotope ratios can record differences in photosynthetic efficiency.

The project has developed and validated methods for each of the four isotopic signals in coffee that provide results traceable to international standards. We can therefore be assured that future measurements that apply these methods will produce data compatible with those already within the database. This experience has allowed us to lead the drafting of a CEN standard method for the determination of carbon and/or nitrogen isotope ratios in foods by elemental analyser-isotope ratio mass spectrometry within CEN/TC 460/WG6 - Stable Isotope Analysis (publication date tbc). We have also investigated the relationships between the isotope ratios of green and roasted coffee

beans from the same origin as well as carried out roasting experiments of our own to determine whether a database of coffee isotope ratios need contain both, or whether one can be modelled from the other.

The observed differences in the isotope ratio distributions between the different elements have allowed countries of origin to be separated. Together with the method precisions, these differences can guide future sampling campaigns to build up a more comprehensive isotope ratio database for worldwide coffee that can be used to verify labelled claims of origin and protect coffee consumers and producers alike.





## Nanoplastics EURAMET project

Two-thirds of the 359 million tonnes of plastic produced annually at the global scale is released into the environment, where it undergoes complex physicochemical processes, degrading over time. Larger pieces of plastics are fragmented into small microplastics (SMPs, 0.1  $\mu\text{m}$  - 5 mm), then nanoplastics (NPs, 1-100 nm). SMP and/or NPs in turn accumulate in the environment, especially in water and soil, then enter food chain. According to EU Plastics Strategy<sup>3</sup>, reducing microplastic release is a key objective towards fulfilling the European Commission's circular economy action plan<sup>4</sup>. Although extensive research has been conducted on microplastics, SMP/NPs are still very much unexplored. This is because SMP/NP are difficult to isolate and detect in complex matrices due to high background concentrations of native hydrocarbons and naturally occurring particulates with similar sizes. SMP/NPs also tend to have undefined morphologies and polydisperse nature, which further add complexity. Hence, the lack of traceable methods and reliable data to underpin comprehensive risk assessments.



The METPART PlasticTrace project (<https://plastictrace.eu/>), in which LGC participates as the leader of one of the work streams, is focused on the development and comparison of selected, mostly "stand-alone" measurement methods, for characterisation of SMP/NPs using pristine reference test materials, produced within the project, spiked into simple food matrices, such as drinking water. To ensure alignment of PlasticTrace's goals with the current measurement needs, a wide group of stakeholders, spanning food and environment monitoring agencies, testing laboratories and instrument manufacturers, have been invited to join the project's Advisory Board, with the FSA being one of the key members.

Since the NML participation in PlasticTrace is very much focused on pristine materials added to drinking water and the use of a monomodal platform, further development of measurement capability for SMP/NPs will be undertaken in the Government Chemist Programme, under the measurement methods for microplastic in food project. This project will address specific UK needs highlighted by the FSA, and focus on development of an integrated multimethod platform for the analysis of SMP/NPs, based on a combination of separation, spectroscopic, mass spectrometry and imaging techniques. The project will also address challenges in sample preparation, arising from more complex food matrices, such as table salt, bottled fruit juices, fizzy drinks or beer. The outputs of the project will enable traceable monitoring of SMP/NPs, and support decision-making and mitigation measures around plastics in food.



<sup>3</sup> [https://environment.ec.europa.eu/strategy/plastics-strategy\\_en](https://environment.ec.europa.eu/strategy/plastics-strategy_en)

<sup>4</sup> [https://environment.ec.europa.eu/strategy/circular-economy-action-plan\\_en](https://environment.ec.europa.eu/strategy/circular-economy-action-plan_en)

## Sharing and transferring knowledge

The Government Chemist supports innovation and policy-making by sharing knowledge gained through our work, particularly in referee analysis, with the analytical and regulatory communities to improve knowledge and skills.

### The Government Chemist website

The Government Chemist website is hosted on the GOV.UK platform with the landing page: [www.gov.uk/governmentchemist](http://www.gov.uk/governmentchemist)

The Government Chemist pages can also be reached from anywhere on the site by entering "Government Chemist" in the search box. Updates on Government Chemist news can be obtained by subscribing for alerts via the website.

**During 2022, 16 articles (including news and reports) were published on the Government Chemist webpages.**

The Government Chemist team also uses Twitter (@NML\_ChemBioGC) and LinkedIn (<https://www.linkedin.com/showcase/uk-nml/>) for wider dissemination of articles, events and news.

### Joint Knowledge Transfer Framework webinars

The Government Chemist contributes to the Joint Knowledge Transfer (KT) Framework for Food Standards and Food Safety Analysis, which aims to deliver a strategic programme of scientific knowledge transfer activities to ensure effective analytical laboratory capability in the UK for food standards and food safety analysis. During 2022, the programme included two webinars and a number of e-seminars all available from [www.gov.uk/governmentchemist](http://www.gov.uk/governmentchemist)



**The global honey supply chain:** A webinar developed in collaboration with Michelle McQuillan (Team leader of the Food Compositional Standards Team, Defra), and Cathal Henigan (Procurement Manager, Valeo Foods, UK). During the webinar Michelle provided an overview of the current standards and regulations that govern both the production and composition of honey. Cathal, then provided an explanation of the global honey supply chain, as well as a brief overview of the process of honey production, from the honeybee and beekeeper to the packer and retailer. He also provided some insight on areas of the supply chain vulnerable to food fraud. The presentation was followed by a Q&A session, chaired by Selvarani Elahi. This webinar was attended by over 500 people.

**Analysis for substances causing food hypersensitivity:** During this webinar Dr Hazel Gowland (Allergy Action) explained why food allergens are important, why and how allergen avoidance may fail and how those at risk can be protected. Dr Michael Walker (Queen's University Belfast) provided an overview of analysis and bioanalysis for substances causing food hypersensitivity. This webinar was attended by over 400 people.



### Seminars

The following e-seminars are now available from the "Knowledge resources" page on the Government Chemist webpages.

- Introduction to IR-MS for food authenticity
- Screening for GMOs in consignments of rice products originating from China
- Introduction to databases for non-targeted, multianalyte analytical methods
- Point of Test methods for non-targeted, multianalyte analysis
- Testing for CBD in novel foods
- Testing for food allergens







## Publications

Walker, M.J., Cowen, S., Gray, K. et al. Honey authenticity: the opacity of analytical reports – part 1 defining the problem. *npj Sci Food* 6, 11 (2022). <https://doi.org/10.1038/s41538-022-00126-6>

Walker, M.J., Cowen, S., Gray, K. et al. Honey authenticity: the opacity of analytical reports – part 2, forensic evaluative reporting as a potential solution. *npj Sci Food* 6, 12 (2022). <https://doi.org/10.1038/s41538-022-00127-5>

Remington, B.C., Baumert, J., Blom, W.M., Bucchini, L., Buck, N., Crevel, R., De Mooij, F., Flanagan, S., Hindley, J., Javed, B., Stavropoulou, D. A., W. van den Dungen, M., van Ravenhorst, M., Wang, S., Walker, M. Allergen quantitative risk assessment within food operations: Concepts towards development of practical guidance based on an ILSI Europe workshop. *Food Control*, Volume 138, 2022, 108917, ISSN 0956-7135. <https://doi.org/10.1016/j.foodcont.2022.108917>

POST (Parliamentary Office for Science and Technology) produces research briefings on current topics called POSTnotes. The Government Chemist team contributed to a POSTnote on “Genome edited food crops”<sup>5</sup>.

<sup>5</sup> <https://post.parliament.uk/research-briefings/post-pn-0663/>

<sup>6</sup> <https://www.cbd.int/abs/about/default.shtml/>

## Engagement with stakeholders

In addition to the regular participation on the advisory committees described in the Advisory Function section of this Review, the Government Chemist organises and is invited to contribute to a number of events organised by stakeholder organisations.

One of the events organised by the Government Chemist was the stakeholder workshop on 6 June 2022 at the Royal Society of Chemistry, Burlington House, London. Thirty stakeholders from across the food and feed sector, including representatives from manufacturers, distributors, retailers, importers, regulators, legal and government, established the key drivers influencing the food and feed sector to which the proposed Government Chemist Programme 2023-2026 should respond. The workshop comprised of two components; an initial brainstorming followed by a prioritisation stage. In excess of 320 ideas were gathered in the initial brainstorming phase. From this wealth of information, participants decided the following as priorities:

- Food authenticity and food fraud prevention
- Food security

- Alternative proteins
- Contaminants in novel foods, packaging and recycled materials
- Environmental claims/food labelling
- Gene editing/GMOs
- Data capture, mining and effective use/misinformation
- Enhanced surveillance
- New regulations for novel foods
- Skills – gaps, availability and training

Other concerns highlighted related to global food shortages, ethical kitemarks/verification and ownership of new plant/genetic species (e.g. Nagoya protocol)<sup>6</sup>.

Based on these identified priorities, the Office of the Government Chemist prepared the proposals for further prioritisation by the Programme Expert Group in November 2022 and final definition of the work programme for 2023-2026.

## Areas of collaboration with stakeholders

It is clear that collaboration with other organisations with common or complementary interests not only helps the Government Chemist discharge its roles efficiently, but also contributes to a more rapid development and implementation of methods and standards.

### Review of the National Food Crime Unit

The Deputy Government Chemist, Selvarani Elahi MBE (also the Executive Director of the Food Authenticity Network), along with Adam Irwin and Keith Bristow QPM, carried out a review of the National Food Crime Unit (NFCU) during 2022.

In June 2018, the FSA Board agreed to expand NFCU activities from a strategic and tactical intelligence capability to a comprehensive response to criminal threats and vulnerabilities, including investigative capabilities.

In December 2021, the FSA Board endorsed a full organisational review of the expanded activity.

The terms of reference for the review were to:

- assess the delivery by the NFCU of the Key Performance Questions as laid out in the FSA Board paper of June 2018;
- assess delivery of the expanded functions of the Unit as set out in the aforementioned FSA Board paper;
- assess progress against the recommendations of the Savill Review, presented to the FSA Board in December 2020;
- to consider the most suitable governance arrangement for the NFCU which will assist the fight against food crime and food fraud, as well as its contribution to the wider aims of the FSA around food safety and authenticity.

The review collected evidence and insight from:

- 28 focus groups;
- 40 external stakeholders;
- an online survey sent to over 1000 food industry employees and all local authorities;
- the review of a large tranche of related documents; and
- extensive engagement with over 80 members of FSA staff, including NFCU officers.

The review reported 22 findings and made five recommendations, under the headings of Redefine Purpose, Build Capability, Enhance Impact, Nurture Culture and Project Message. These recommendations relate to:

- Clearer definition of the Unit's purpose, with performance indicators aligned to its strategy.
- Using this enhanced clarity to assess "as-is" capability, and then design and build the required "to-be" position.
- Ensuring access to the latest tradecraft and capability within law enforcement to enhance capabilities.
- Nurturing of internal culture and improvements to internal career pathways.
- Better projection of the Unit, its food crime messaging and its successes.







### Honey authenticity

The Government Chemist has been working with Defra, FSA and FSS since 2018 on honey authenticity. The work conducted during 2022 is outlined below.

- A webinar on “The Global Honey Supply Chain”, which was the third in the Quarterly Webinar Series of the Joint Knowledge Transfer Framework for Food Standards and Food Safety Analysis, was hosted on 19 January 2022. Read more about this webinar on page 24.
- The Government Chemist published two significant scientific papers in Nature Portfolio Journal, npj-Science of Food, highlighting the increasing complexity of honey authentication. The papers, “Honey authenticity: the opacity of analytical reports – part 1 defining the problem”; and “part 2, forensic evaluative reporting as a potential solution”, are based on a story that appeared in the UK media in November 2020 which claimed that supermarket brands of honey are ‘bulked out with cheap sugar syrups made from rice and corn’. After this media coverage, the FSA asked the Government Chemist to investigate the methods that underpinned the story.
- Paul Hancock chaired a Defra working group that is looking at producing guidance on applying a weight of evidence approach to honey authenticity. A number of meetings were held, progressing towards production of a toolkit that can be used when a weight of evidence approach is needed.
- Selvarani Elahi chaired a working group to develop a protocol for the sampling of reference honey samples for inclusion in food authenticity databases, for which David Hoyland (Independent Consultant, ex-Head of the Food Authenticity Centre of Expertise for honey and Technical Advisor to the Honey Association) is the Secretary. Three meetings were held and good progress has been made on a draft protocol. Once finalised in early 2023, the protocol will be sent to interested parties seeking their feedback.
- The scope of work for a second working group to be led by the Government Chemist aimed at creating a framework for the interrogation of databases for honey authenticity, has been agreed with Defra. This work will start in 2023.
- UKAS, FSA and Defra are inviting UK- based laboratories to express an interest to join a pilot programme to become accredited by UKAS to perform non-targeted food/feed authenticity testing against the conformity assessment requirements of ISO/IEC 17025:2017 and UKAS document Lab 13 for expressing opinions and interpretations. Over the past two years, the Government Chemist has been engaged in this activity, inputting into its scope. It is anticipated that a call will be issued in early 2023 with the Government Chemist promoting this initiative to all Food Authenticity Centres of Expertise and all Food Authenticity Network Members who are in the “Analyst” category (~1,000 members).

## Food Authenticity Network

The Food Authenticity Network (FAN) ([www.foodauthenticity.global](http://www.foodauthenticity.global)) operates as a public-private partnership model. FAN welcomed Tesco and Tenet (compliance & litigation) as new partners in 2022.

FAN continues to share best practice on food authenticity testing and food fraud mitigation measures around the world, helping to better protect food supply chains and provide greater consumer trust in the food they buy.

The network now has over 3800 members from 95 countries (Figure 4) belonging to industry, regulators, academia and laboratories.

During 2022 FAN contributed to a number of reports including “Validation of Methods to Quantify Horse and Pork Meat Adulteration in Raw and Processed Beef”<sup>7</sup> and “Review of Global Food Fraud Definitions and Standardisation Activities”<sup>8</sup>.

FAN led the agreement of a framework for a coordinated response from Food Authenticity Centres of Expertise to food and feed fraud incidents/investigations. This framework positively impacts the UK’s preparedness to deal with future situations.

### Food Industry

1126 | 32%

### Consultants

371 | 10.5%

### Academia

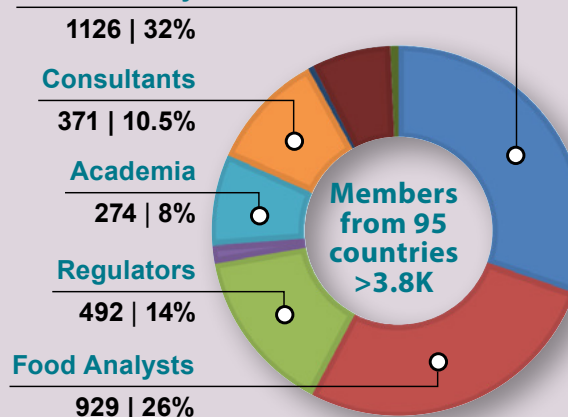
274 | 8%

### Regulators

492 | 14%

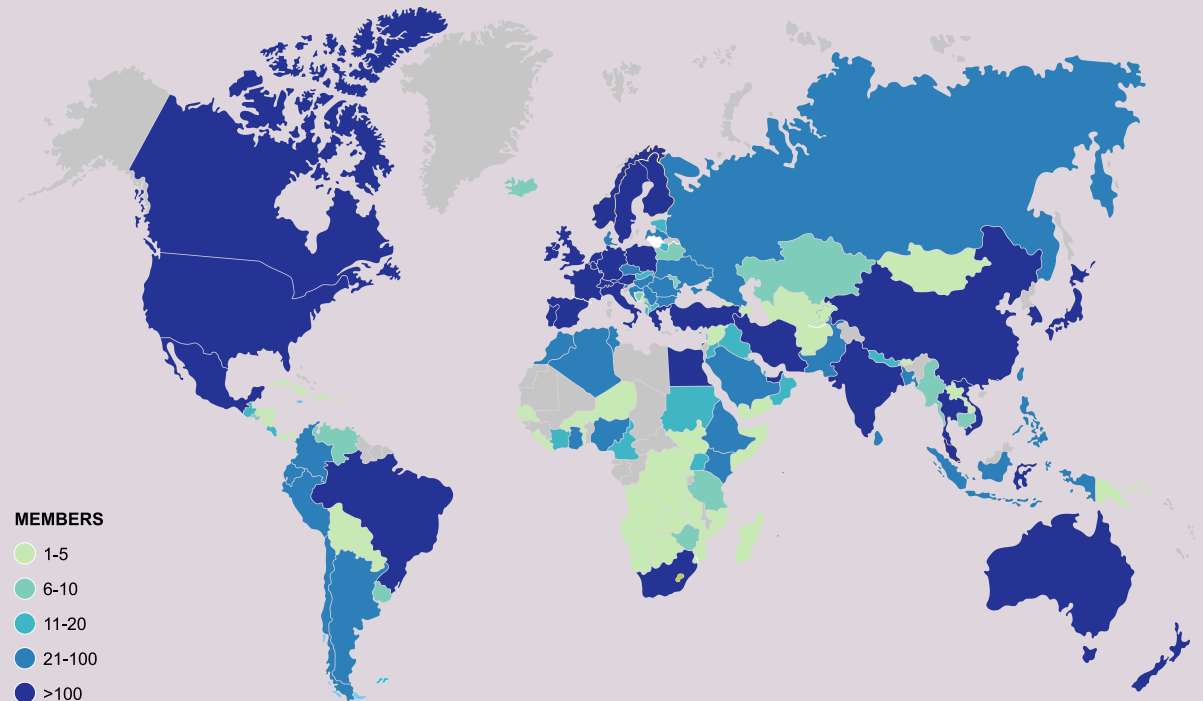
### Food Analysts

929 | 26%



In 2022,  
**35,459**  
unique users

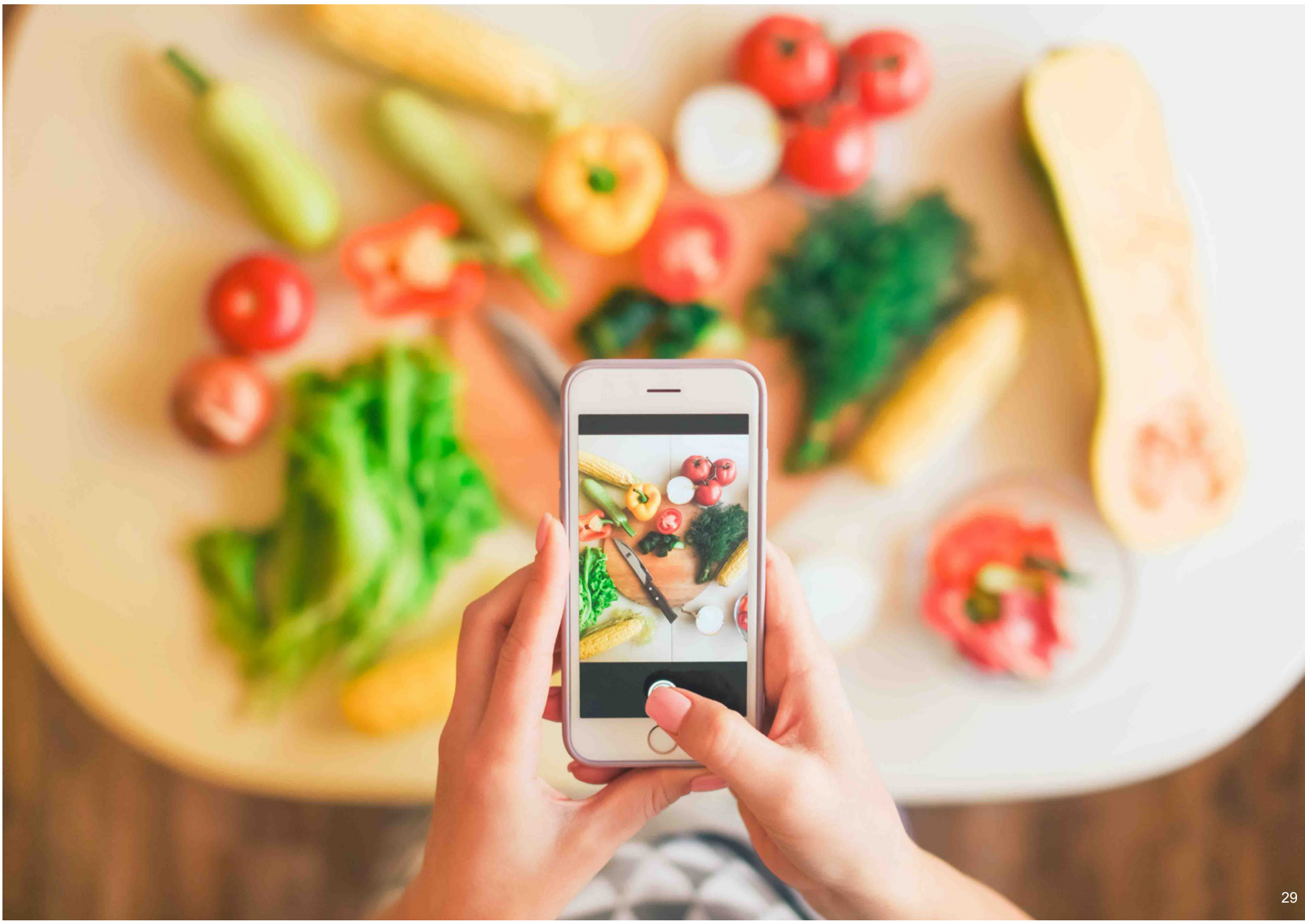
from  
**164 countries**  
accessed the website



<sup>7</sup> <https://randd.defra.gov.uk/ProjectDetails?ProjectId=20146>

<sup>8</sup> <https://randd.defra.gov.uk/ProjectDetails?ProjectId=20900>









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