Feidhmeannas Seirbhíse Sláinte
Health Service Executive

Dublin Region
Public Analyst's Laboratory

Sir Patrick Duns

Annual Report 2014

Health Service Executive
Dublin Mid-Leinster

Dublin Region

Public Analyst's Laboratory

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Annual Report

for the year ended 31st December 2014

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ACKNOWLEDGEMENTS

This Annual Report describes the multitude of analytical services that the laboratory provided in 2014. It reflects the high level of teamwork, commitment and expertise of our staff. I want to thank all staff for their dedication during the year.

The number of accredited tests in the laboratory continues to expand. We now have over 140 accredited analyses, distributed between chemistry and microbiology. This is a major achievement by the staff and I want to fully acknowledge and complement them all for this. The robust quality system that we have in place is entirely due to the staff working to a high standard and complying with all the requirements of the quality system on a daily basis. This enables us to give to our numerous and wide-ranging customers a service with confidence and reliability, which is the fundamental of our service.

Currently we are dealing with a loss of 10 Whole Time Equivalents (WTE) in the laboratory. This loss of staff represents a major reduction in specialist knowledge and expertise and impacts greatly on the key testing service delivery. The laboratory is a small specialist operation with no capacity whatsoever for suppression of posts or redeployment of same. Continuing failure on an ongoing basis to fill staff vacancies is resulting in a real danger to Irish public and consumer health.

I thank Ms. Martina Queally, Chief Officer Community Healthcare Organisation (CHO) Area 6 Dublin South/Wicklow, for her regular communication with, and valued attention to, the laboratory during 2014. This supports us in our mission of excellence in the analytical service we give to our many customers.

This Report is a full accountability to Ms. Queally and the HSE for the laboratory budget.

I want to highlight the close cooperation between the HSE Environmental Health Service (EHS) and the laboratory. Sampling and analysis is critical to food control and this is reflected in the beneficial and constructive collaboration between the laboratory and the EHS. I want to thank the Environmental Health Officers for providing the variety of samples, their communication with the laboratory and their full key contribution to the various programmes.

The laboratory is a complex business and it requires much teamwork and staff effort to achieve an efficient and smooth running organisation. In addition to the front-line analytical work, it embraces a myriad of other activities.

The success of the laboratory results from all these and the success is the staffs' success.

Michael O'Sullivan.

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Dr. Michael O'Sullivan
Public Analyst.

1. INTRODUCTION

1.1 Scope of the laboratory

The Dublin Public Analyst's Laboratory (PAL) is an Official Food Control laboratory within the Health Service Executive (HSE). It is administered by the HSE Dublin Mid-Leinster.

The laboratory provides both a chemical and microbiological analytical service to the HSE Dublin Mid Leinster and Dublin North East Areas which comprise the following counties:
Dublin, Kildare, Wicklow, Laois, Offaly, Longford, Westmeath, Cavan, Louth, Meath and Monaghan.

This ambit can be referred to as the Eastern Region and is equivalent to a population of over 2 million.

In addition to the testing of foodstuffs, a substantial number of other sample types are analysed. These include water, clinical, cosmetics, environmental and miscellaneous samples. Water is a food ingredient and examination of potable water is an essential activity in official food control.

The Dublin PAL provides a National service in its wide area of specialised testing, including food chemical testing following the full implementation of the agreed PALs specialisations, microbiological testing of cosmetics and heavy metal analysis of clinical samples.

The Dublin PAL is unique amongst both PALs and the Public Health/Official Food Microbiology Laboratories (PHL/OFMLs) in providing a fully integrated and seamless multidisciplinary analytical service, both chemical analysis and microbiological examination, under one roof.

- **i)** it has a single budgetary cost-centre designation
- **ii)** there are multidisciplinary teams covering food safety control, water analysis, food complaints and food export certification testing
- **iii)** one Certificate of Analysis with multidisciplinary based conclusions is issued to our customers
- **iv)** it utilises a fully integrated LIMS incorporating both chemistry and microbiology in a single database
- **v)** the laboratory provides a comprehensive food safety and food quality analytical service
- **vi)** it gives an all-inclusive water analytical service
- **vii)** on a service-led and customer-led basis this powerful seamlessly integrated chemical and microbiological multidisciplinary service is fully consistent with HSE vision and policy and entirely accordant with the new health services structures.

1.2 Analytical services provided by the laboratory

The laboratory performs an extensive range of chemical and microbiological testing for a wide range of customer groups. Samples of food, water, clinical specimens, cosmetics, environmental and miscellaneous items are analysed. An important aspect of the laboratory service is performing substantial method research and development in response to new and emerging contaminants and toxins and extending existing parameters to new matrices and sample types.

Customers of the laboratory include

i) the HSE
ii) the HSE Environmental Health Service (EHS)
iii) the Food Safety Authority of Ireland (FSAI)
iv) the Department of Health
v) the EU
vi) other Government Departments (Agriculture, *et al*)
vii) local authorities
viii) Local Authority Veterinary Inspectors
ix) Sea Fisheries Protection Authority
x) *safe*food
xi) the general public
xii) hospitals & GPs
xiii) private food companies
xiv) Joint Research Centre (JRC), Geel, Belgium.

1.2.1 Monitoring Service Delivery to Customers

A key role of the monthly Laboratory Management Team (LMT) meeting is monitoring the reporting deadlines policy for samples, Test Item Delivery and Reporting according to Timeframes and Deadlines Policy. This is available at:
http://www.publicanalystdublin.ie/en/Downloads/TestItemDeliveryandSampleReportingTimes/PDFFile_17047_en.pdf

The primary monitor is a LIMS Management Report (MR); an example is shown in Appendix 1. In the MR the critical record is the column titled 'Unreported samples exceeding deadlines' in which entries of '0' reflect best customer service. In the MR presented, at mid-year only a small number of tests exceeded the reporting deadlines.

1.2.2 Official Control of Foodstuffs Legislation

The statutory role of the Public Analyst's Laboratory is to test food for compliance with the relevant legislation and guidelines. It plays a key role in public health and consumer protection by analysing the chemical and microbiological content of food in order to ensure that it is safe for human consumption. The laboratory has a vital role in food safety by providing objective scientific evidence for the safety and quality of the food that we eat. It provides data for the accurate risk assessment and risk analysis of food.

Accredited food testing is undertaken for:

i) protection of public health
ii) consumer protection
iii) EU safeguard decisions
iv) food safety alerts
v) risk assessment
vi) risk analysis
vii) legislative compliance monitoring
viii) targeted surveys
ix) intake studies
x) responses to emerging food safety issues
xi) protection against food fraud

xii) supporting the issuing of certificates for the export of food of non-animal origin to non-EU countries
xiii) nutritional purposes
xiv) labelling
xv) quality checks.

In the realm of chemical analysis, the comprehensive analytical categories in 2014 comprised:

i) contaminants
ii) materials in contact with food
iii) allergens (sulphur dioxide)
iv) additives
v) compositional
vi) quality components.

Microbiological testing comprises a broad range of enteric pathogens and indicator organisms across a wide range of foodstuffs.

The laboratory is an Approved Laboratory under the Control of Foodstuffs legislation. This means that the laboratory is approved to analyse any samples of food taken for the purposes of food control.

EU Regulation 178/2002 lays down the general principles and requirements of food law and procedures in matters of food safety. It established the European Food Safety Authority.

EU Regulation 882/2004 on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules describes in detail how the principles in Regulation 178/2002 must be interpreted and implemented. Revisions to Regulation 882/2004 are under active discussion at EU Council Working Group meetings of Member States including Ireland.

S.I. No. 473 of 2012 European Communities (General Food Law) (Amendment) Regulations 2012 gives further effect to EU Regulation 178/2002.

The FSAI has responsibility for all National food safety. The FSAI fulfils this responsibility by means of Service Contracts between the Authority and the Official Agencies including the HSE. The fifth HSE-FSAI Contract came into force on the 1st January 2012 and applied for 3 years. By agreement it has been extended for a further year. The contract states that the Official Agency (i.e. HSE) shall carry out in its functional area on behalf of and as an agent for the Authority, (*inter alia*), the determination of compliance with food legislation by means of –

(*inter alia*) the inspection, sampling and analysis of food, including food ingredients and
the inspection and analysis of food labelling.

The Public Analyst's Laboratory provides this analytical service. It analyses foodstuff in the interest of public health and consumer protection. The production of safe food has important economic implications for Ireland as a major food exporter.

1.3 Administration of the laboratory

Distinctively, the Dublin Public Analyst's Laboratory comprises both a chemistry testing laboratory and a microbiological laboratory that is one of the Official Food Microbiology Laboratories (OFMLs).

The Public Analyst's Laboratory is administered by the HSE Dublin Mid-Leinster and specifically within the CHO Area 6 Dublin South East/Wicklow.

1.4 Staffing and Budget

In order for this laboratory to fulfil its service obligations under the HSE Service Contract with the FSAI and to all its other customers it must have resources made available. The laboratory's success in a number of areas has led to pressure on resources. Our appointment as EU National Reference Laboratory (NRL) has brought with it major responsibilities which require proper resourcing by the HSE.

The scope of accreditation is continuously expanding which, combined with the necessity for new method development makes it essential that resources are made available for staff and equipment.

Currently there is a loss of 10 WTEs in the laboratory comprising retirements, resignation, maternity leave and non-discretionary WTE reductions. This loss of staff represents a major reduction in specialist knowledge and expertise and impacts greatly on the key testing service

delivery. The laboratory is a small specialist operation with no capacity whatsoever for suppression of posts or redeployment of same.

The laboratory provides a front-line service to its customers in the critical areas of food, cosmetics and water safety.

An important responsibility of the NRL is being the arbiter reference laboratory when analytical results are disputed by food businesses. Continuing failure on an ongoing basis to put in place replacements for staff vacancies is resulting in a real danger to Irish public and consumer health.

1.5 Developments in the laboratory

1.5.1 The Health Services Reform Programme

The health services reform programme progressed in 2014. Nine Community Healthcare Organisations were established, replacing the former Integrated Services Areas.

Within this major restructuring is the opportunity to implement the Report of the HSE Review of the Public Analyst and Public Health Microbiology Laboratories.

1.5.2 HSE Review of the Public Analyst and Public Health Microbiology Laboratories

The Report of the HSE Review of the PALs and PHLs was finalised in November 2008 and was distributed to HSE management for their examination of the findings and recommendations contained therein. The Review Group took full cognisance of the recommendations of the 2004 Report "Strategic Developmental Review of Health Board Food Control Laboratories" which was commissioned by the Minister of Health and undertaken by s*afe*food, the Food Safety Promotions Board.

None of the recommendations of the Reports have been implemented.

The HSE Review Report contains seven major Recommendations which if implemented would greatly benefit all service users and is a practical application of delivery reform, resulting in efficiency, integration and value for money within the health service.

On the subject of laboratory facilities both the 2008 HSE and the 2004 Department of Health (DoH) reports recommend that laboratory accommodation be reviewed to meet current and future requirements. This is particularly relevant to this laboratory which is providing a chemical and microbiological service to the expanding population of the Eastern, North Eastern and Midland region in addition to a wide National service in key areas of testing. As far back as 2000 the DoH proposed the relocation of the Dublin PAL because of the limitations of our present location and facilities. A planning brief for a new laboratory was completed in July 2003 and submitted to the then East Coast Area Health Board for presentation to the DoH&C.

Since moving to Sir Patrick Duns in 1996 our technical staff complement has doubled, resulting in our present accommodation being totally inadequate.

In view of the acute accommodation problem at this laboratory there is an urgent need for the HSE to advance the provision of additional laboratory facilities.

The 2008 PALs/PHLs Review Report was considered, regarding the extent to which it fell within scope, by the HSE Laboratory Services Modernisation Group, which was charged with modernising Medical Laboratory Services, prompted by an external review of existing services.

1.5.3 Efficiencies and Value for Money Initiatives

A continual review by the laboratory of workflows and processes, identifying and removing constraints and redundant dependencies, results in improved efficiencies. This has included employing aspects of the managerial tool Lean Six Sigma.

These measures continued in 2014. In light of the overall continuing stringent budgetary situation, value-for-money initiatives are a high priority comprising areas such as:

- **i)** planned requisitioning and bulk ordering resulting in negotiated discounts from suppliers
- **ii)** measures have been put in place to reduce supplier delivery charges
- **iii)** engagement with HSE National Procurement for all maintenance contracts
- **iv)** the benefits of the euro-sterling exchange rate are maximised for the significant amount of our supplies originating in the UK and sold through Irish agencies

1.5.4 EU National Reference Laboratory Responsibilities

This laboratory is the EU National Reference Laboratory (NRL) for Mycotoxins, Polycyclic Aromatic Hydrocarbons (PAHs) and Food Contact Materials (FCM).

During 2014 the laboratory undertook substantial NRL related work, comprising:

- **i)** attending and contributing to workshops and plenary sessions for the NRL & Community Reference Laboratory (CRL) networks in each of the three areas of responsibility - one each for the mycotoxins and PAHs; and two for the FCMs
- **ii)** taking part in proficiency tests for zearalenone in maize oil, and aflatoxin B_1 (AFB_1) in coconut powder
- **iii)** submission of tenders for the stability checking of certified reference materials - pistachio powder and paprika powder for aflatoxins and ochratoxin A
- **iv)** participating in a proficiency test for the surface area calculations of kitchen utensils
- **v)** participating in a proficiency test for the identification of polymers used in food packaging materials by FT-IR
- **vi)** taking part in a proficiency test for the migration of a range of substances (7) from Tenax
- **vii)** participating in a proficiency test for the metals lead, cadmium, cobalt, nickel, arsenic, barium, aluminium and manganese in a 4% acetic acid simulant solution from ceramic materials
- **viii)** participating in a proficiency test for the metals barium, cobalt, copper, iron, manganese, zinc, lithium and antimony in a 3% acetic acid simulant solution from plastic materials
- **ix)** considerable associated preparatory and post activity work.

The Cork PAL is the NRL for heavy metals.

1.5.5 CEN/TC 275/WG 5–Biotoxins

In late 2013 the laboratory joined the CEN Committee of TC 275/WG 5–Biotoxins which is involved in the development, validation and publication of analytical methods for use throughout Europe, and additionally by others outside Europe, for the analysis of biotoxins (including mycotoxins). It is an important and relevant forum for this laboratory.

The Working Group (WG) recently received a new EU mandate for the development of a range of analytical methods relating to mycotoxins as follows:

- **i)** ergot alkaloids in cereals and cereal products
- **ii)** deoxynivalenol and its acetylated in cereals (pasta, bread and snacks)
- **iii)** trichothecenes n cereals and cereal products
- **iv)** aflatoxins in spices
- **v)** multi-mycotoxins in cereals and cereal products
- **vi)** alternaria toxins in tomato, wheat and sunflower seeds
- **vii)** ochratoxin A in liquorice and spices, cocoa and cocoa products
- **viii)** citrinin in food
- **ix)** phomopsins in lupin and lupin-derived products.

There was one meeting of the WG in 2014 and a programme of interlaboratory studies for the analytical methods mentioned above was proposed for 2015. Participation in these studies involves a considerable body of work, with the benefits that the laboratory has access to these analytical methods as they are being developed, which saves on development time and ultimately leads to a shorter timeframe from development to accreditation.

1.5.6 Human Biomonitoring

The Public Analyst Service participated in a European project DEMOCOPHES (DEMOnstration of a study to COordinate and Perform Human biomonitoring on a European Scale) which ran from September 2010 to November 2012. The objective was to demonstrate the feasibility of a harmonised approach to human biomonitoring surveys (HBM) to obtain comparable results from across Europe on human exposure to certain environmental chemicals by the analysis of biological material such as hair, blood and urine.

The final report of the survey was published in 2013 and is available at http://www.eu-hbm.info/euresult/media-corner/press-kit.

There have been a number of scientific articles in the publications Environmental Research, The Journal of Public Health and International Journal of Environmental Research and Public Health, co-authored by laboratory staff, on the project results. Titles include Mercury Exposure in Ireland: Results of the DEMOCOPHES Human Biomonitoring study and Exposure determinants of cadmium in European mothers and their children.

In 2014 there have been discussions at European level on proposals for further human biomonitoring. The laboratory returned an expression of interest on participating in a future study, subject to detailed project scoping.

1.5.7 Method Research and Development

The discovery of new contaminants in food together with new regulations or lower regulatory limits for existing contaminants and additives means there is a need for the research and development of reliable and robust analytical methods. These methods are required not just for enforcement purposes but for surveys used to assess dietary exposure. There is additionally a requirement to expand on existing methods to cover additional simultaneous analytes to make more efficient use of finite and decreasing resources.

These methods are not just required for enforcement purposes but for surveys used to assess dietary exposure.

During 2014 method research and development was performed for the following parameters:

- **i)** pyrrolizidine alkaloids in honey and plant material
- **ii)** ergot alkaloids
- **iii)** bisphenol A in food and food simulants
- **iv)** mycotoxins
- **v)** food fraud
- **vi)** PAHs
- **vii)** plasticisers in food and PVC gaskets
- **viii)** photoinitiators
- **ix)** MCPD esters
- **x)** nitrate in non-leafy vegetables

xi) artificial sweeteners in food supplements
xii) antioxidants in chewing gum
xiii) taurine
xiv) sulphur dioxide in various foods
xv) sugars in soft drinks
xvi) additional improvements to some existing analytical methods.

Pyrrolizidine Alkaloids in Honey and Plant Material

In 2014 work continued on this group of compounds. As part of the 2014 Food Sampling Programme (FSP) 25 honey samples were analysed for 7 pyrrolizidine alkaloids - senecionine and its corresponding N-oxide, seneciphylline and its N-oxide, retrorsine and its N-oxide and senkirkine together with the total pyrrolizidine alkaloids. Although the previous year's interlaboratory studies included plant materials such as teas these was not extended to the FSP.

Ergot Alkaloids

The laboratory continued analytical development work on ergot alkaloids, namely ergometrine, ergosine, ergotamine, ergocornine, ergocystine, ergocryptine and their corresponding '-inines', and analysed 25 cereal samples as part of the FSP. Further refinements to the method will be made in 2015. Ergot alkaloids are one of the sets of analytes on the CEN list for interlaboratory studies in 2015 that have been referred to above.

Bisphenol A (BPA) in Food and Food Simulants

The analytical method for the determination of BPA in canned foods underwent further development in 2014. It will be progressed further in 2015, likely by LC-MS/MS instead of a HPLC-UV method.

Mycotoxins

This laboratory is the EU NRL for mycotoxins. Mycotoxins are produced by many species of mould and have been found to cause contamination of foods such as cereals, nuts and dried fruit, amongst many others. They comprise a large number of diverse compounds some of which, like aflatoxins, are highly carcinogenic. Their analysis has been performed for many years but due to the specificity of the extraction and clean up techniques they are normally analysed as individual compounds or discreet groups. Due to advances in LC-MS/MS technology the analysis of food extracts for a wider range of analytes has become possible.

Research into developing a screening method and quantitative methods for the analysis of a broader spectrum of mycotoxins by LC-MS/MS continued during 2014, examining particularly trichothecene toxins such as T-2, HT-2, nivalenol (NIV), deoxynivalenol (DON) and its conjugates, zearalenone (ZON) and fumonisins. This involves considerable work but there are substantial efficiency advantages of screening a single sample for a wider range of toxins.

The analytical method for T-2 and HT-2 in cereals was accredited in 2014. This is the first LC-MS/MS method for mycotoxins put forward for accreditation.

Other mycotoxin development work in 2014 comprised the following.

Fumonisin B3

Fumonisin B_3, added to the analytical method for the determination of fumonisins B_1 and B_2 during 2013, was accredited in 2014. All samples of cereals analysed for fumonisins B_1 and B_2, as part of the FSP, were also tested for fumonisin B_3.

Patulin

The laboratory accredited juices and smoothies for patulin content in 2014. There remain a number of other matrices for which analytical methods have not been fully developed. Patulin in ciders is one such; it is intended to accredit this matrix in 2015.

Sterigmatocystein

In 2004 at the request of FSAI the laboratory developed an analytical method for the determination of sterigmatocystein in cereals, coffee and cheese and a number of samples were analysed with no levels found.

The laboratory was requested to add sterigmatocystein to the 2014 FSP and test for it in a wider range of matrices. The matrices concerned were chilli, paprika, mixed spices, coffee, beer, cereals and dried vine fruit. The method was amended to accommodate changes to laboratory equipment and a wider range of matrices. 4 Chilli samples, 25 cereals, 8 mixed spice samples, 6 coffee (green beans), 6 dried vine fruit and 11 beer samples were analysed and none of the samples was found to contain sterigmatocystein.

There is currently no legislation for sterigmatocystein.

Ochratoxin A

Development work was carried out on two additional matrices for ochratoxin A, mixed spices and cocoa. The development work was successful and these matrices were accredited during 2014 bringing the total number of matrices accredited for Ochratoxin A to 19. 10 Cocoa and 2 chocolate samples were subsequently analysed and all were compliant. 8 Mixed spices samples were analysed, all of which were compliant.

Zearalenone

The EURL for mycotoxins organised a proficiency test for zearalenone in maize oil during 2014. As the NRLs are mandated to participate in these proficiency tests the laboratory was required to develop an analytical method. The development work was successful, the method accredited and the proficiency test successfully completed. 5 Samples of maize oil were analysed as part of the FSP, all of which complied with legislative limits.

3- and 15-Acetyldeoxynivalenol and Diactoxyscirpenol

Work progressed on the detection of 3- and 15-acetyldeoxynivalenol (3- and 15-OAc-DON) and diactoxyscirpenol (DAS), so-called conjugates of deoxynivalenol (DON). Development work succeeded for DAS in 2013 while 3- and 15-OAc-DON proved more difficult. The problems we encountered with 3- and 15-OAc-DON related to the fact that they were difficult to separate from one another. In most instances it was possible to separate the two analytes from one another. This allowed 20 samples of cereal-based baby foods and 15 cereals to be tested for these analytes. None contained any of these analytes.

Citrinin

The mycotoxin citrinin is of interest due to its nephrotoxic properties. It is found in rice and cereals, often co-occurring with ochratoxin A. Regulation 212/2014/EU was published in March 2014. Legislative limits are in place for food supplements based on rice fermented with red yeast Monascus purpureus. Method development was continued to put in place a procedure for the detection of citrinin in these products. In the meantime during 2014 25 samples of cereals and 11 samples of rice were analysed with none containing any citrinin

Food Fraud

Following on from the horsemeat scandal in 2013 there is an increased awareness of food fraud and its widespread occurrence. Food fraud may or may not constitute a risk to public health but on all occasions it deceives the consumer. During 2014 the laboratory became involved in two areas where widespread food fraud takes place, namely Manuka honey (worldwide) and Vodka (local).

Manuka Honey

There is more Manuka honey sold annually throughout the world than can be physically produced in New Zealand. Therefore a considerable quantity of honey sold as Manuka honey is not Manuka honey.

Methylglyoxal is a marker for Manuka honey, the level present being an indicator of the quality and it also dictates the price that can be charged for the product.

During 2014 the laboratory initiated development for the detection of methylglyoxal in honey. As part of this development work 6 samples of Manuka honey were analysed for methylglyoxal and all were satisfactory. However, 3 of them had other quality issues, 2 for diastase content and 1 for hydroxymethylfurfural content. Alerts were issued for these non-compliances. Work will continue on 2015 as the laboratory intends adding at least 1 further analyte to the analytical suite for honey.

Spirit Drinks–Vodka

Towards the end of 2013 it became apparent to the FSAI that there was a considerable amount of illegal vodka on sale in Ireland, constituting food fraud. The laboratory undertook the necessary analysis to distinguish authentic from fraudulent product. An analytical method was developed and accredited for the detection of markers present in brands of authentic vodka. Several samples were analysed as complaints during 2014, leading to a successful court prosecution in early 2015.

PAHs

Polycyclic aromatic hydrocarbons (PAHs) are a class of compounds with multiple fused aromatic rings that are formed during the incomplete combustion of organic material, with many being highly carcinogenic. They can enter the food chain during food processing, such as smoking in the case of fish and meats, the application of heat in the case of extraction of edible oils from seed pulp, cooking, particularly over a naked flame, or forced drying. They can also be present as a result of environmental contamination.

Beneficial changes to the analytical method were successfully introduced and validated in 2014.

Legislation currently in place, Commission Regulation (EC) No 1881/2006 as amended by Commission Regulation (EC) No 835/2011, controls the level of benzo[a]pyrene (BaP) and the sum of PAH4 - benzo[a]pyrene, benz[a]anthracene, benzo[b]fluoranthene and chrysene - in certain foods such as meats and seafood, baby foods and edible oils & fats.

A survey of flour was carried out in 2014 following reports that levels had been found in whole-wheat products. Because flour is a high use commodity even low levels can contribute significantly to total dietary intake; for this reason the method was modified to achieve a limit of quantitation of 0.04 µg/kg.

The method was developed and validated in 2014 and 28 samples of various types of flour were analysed. The mean benzo[a]pyrene content found was 0.07 µg/kg with a mean sum of PAH4 of 0.34 µg/kg. The highest levels, benzo[a]pyrene 0.29 µg/kg and a mean sum of PAH4 of 1.24 µg/kg, occurred in spelt flour. These levels are not a cause for alarm.

There is currently no legislative limit for PAHs in flour

High levels of PAHs found in food in the EU are reported through the Rapid Alert System for Food and Feed (RASFF). In 2014 there were 41 entries relating to PAHs. These arose mainly from foodstuffs such as edible oils and smoked fish products, particularly smoked fish from Baltic States and West Africa.

Plasticisers in food and PVC gaskets

Development work continued in this important broad area of analysis.

The twist off metal closures found on glass jars have a PVC gasket bonded to their inside surface that is essential for forming the air tight seal that protects the food inside from contamination. The gasket is formulated with a range of additives like plasticisers which make the PVC pliant enough to form a good seal with the glass rim.

Other additives used include fillers, slip agents (which allow the lid to twist off relatively easily), antioxidants and thermal stabilisers. The latter improve the stability with time and allow the gasket to be effective at high temperatures such as during hot filling and sterilising.

These additives all have the potential to migrate from the gasket into the food. Legislation is in place which sets maximum limits on the migration of specific plasticisers, ESBO, phthalates, adipates, sebacates and polyadipates, into food and restricts the use of others.

A change in the legislation has introduced a new category of total plasticisers. This means that samples need to be analysed for a suite of analytes, as well as the individual compounds, in order to test for compliance. A method for the determination of a range of plasticisers in food using the QuEChERS scheme (Quick, Easy, Cheap, Effective, Rugged and Safe) for sample preparation is currently under development.

In 2014 there were 12 rapid alert notifications arising from high levels of plasticisers in food.

Photoinitiators

Printed food packaging is essential for the transmission of legally required information to the consumer, including nutritional content, indications of durability, presence of allergens, ingredients list and contact address in case of complaints. Food manufacturers also regard attractive packaging as a way of engaging the attention of shoppers. Photo initiators (PIs) are used in this modern printing technology.

However it has been found that the PIs can migrate from the printed material to food.

There is no specific legislation in place in the EU for control of PIs in food although some compounds, such as benzophenone, are listed as permitted additives in the Commission Directive 10/2011/EC on plastic materials and articles intended to come into contact with foodstuffs and have specific migration limits. Most however are not included in this legislation.

A method for determination of a range of PIs in food using the QuEChERS approach for sample preparation is under development.

In 2014 there were 3 rapid alert notifications arising from high levels of PI in food.

MCPD esters

3-Monochloropropandiol (3-MCPD) is a contaminant produced during the hydrochloric acid treatment used in the production of some soy sauce and hydrolysed vegetable protein products. It is suspected to be carcinogenic and to have male anti-fertility effects. A maximum level of 20 µg/kg in soy sauce and hydrolysed vegetable protein products is defined in Commission Regulation 1881/2006.

In 2007 fatty esters of 3-MCPD were reported for the first time in a number of foodstuffs including refined edible fats, such as margarine and oils, as well as infant formula and breast milk. The levels found in oils and fats are considerably greater than those found in soy sauces. It has recently been reported that the bioavailability of 3-MCPD from the esters is around 100%. Since 2007 a large amount of work has been done refining the methodology for the determination of MCPD from esters.

While there are currently no regulatory limits for these analytes, in 2014 Commission Recommendation 2014/661/EU was published that recommended the monitoring by Member States of fatty acid esters of 2-MCPD, 3-MCPD and glycidol in food. It also recommended a specific method of analysis to be used. The monitoring data will be forwarded to the EFSA for the purpose of risk assessment.

In 2014 we validated the recommended method for MCPD and glycidol esters in oils and fats. Results for 24 edible oils were reported. 87.5% Of the samples received contained levels of 3-MCPD esters greater than the limit of quantitation of 0.1 mg/kg. The highest levels of 2- and 3-MCPD esters were found in a sample of hydrogenated palm oil and were 1.55 and 2.80 mg/kg respectively. The highest level of glycidol esters was 2.28 mg/kg, found in a sample of sunflower oil.

It is intended to extend this analysis to cover MCPD and glycidol esters in oils and fats extracted from foods.

Nitrate in Non-Leafy Vegetables

A method is currently in use in the laboratory for the determination of nitrate in lettuce and spinach in order to determine compliance with Commission Regulation (EU) No. 1258/2011. In 2014 the method was used as the basis for the determination of nitrate in other vegetables such as spring onions, leeks and celery, which are often used as ingredients in a variety of foodstuffs. Although there is currently no legislation to cover these sample types, there was a request from the FSAI to establish the nitrate levels present to determine their potential contribution to nitrate levels in some compound foodstuffs.

In 2014 10 samples of spring onions, celery and leeks were analysed. Further work will continue in this area in 2015.

Artificial Sweeteners in Food Supplements

Existing HPLC-based methods for the determination of the artificial sweeteners; sucralose, aspartame, acesulfame-K and saccharin in various foodstuffs were extended and validated for the analysis of a range of food supplement matrices.

In 2014, 48 samples of food supplements were analysed for the listed artificial sweeteners as part of the HSE National Chemical Sampling and Analysis Programme for Food Supplements Manufactured, Packed and Distributed in Ireland. The types of products analysed included solid tablets, chewable capsules, effervescent tablets, liquid supplements, including syrups and body-building/recovery (protein powder) shakes.

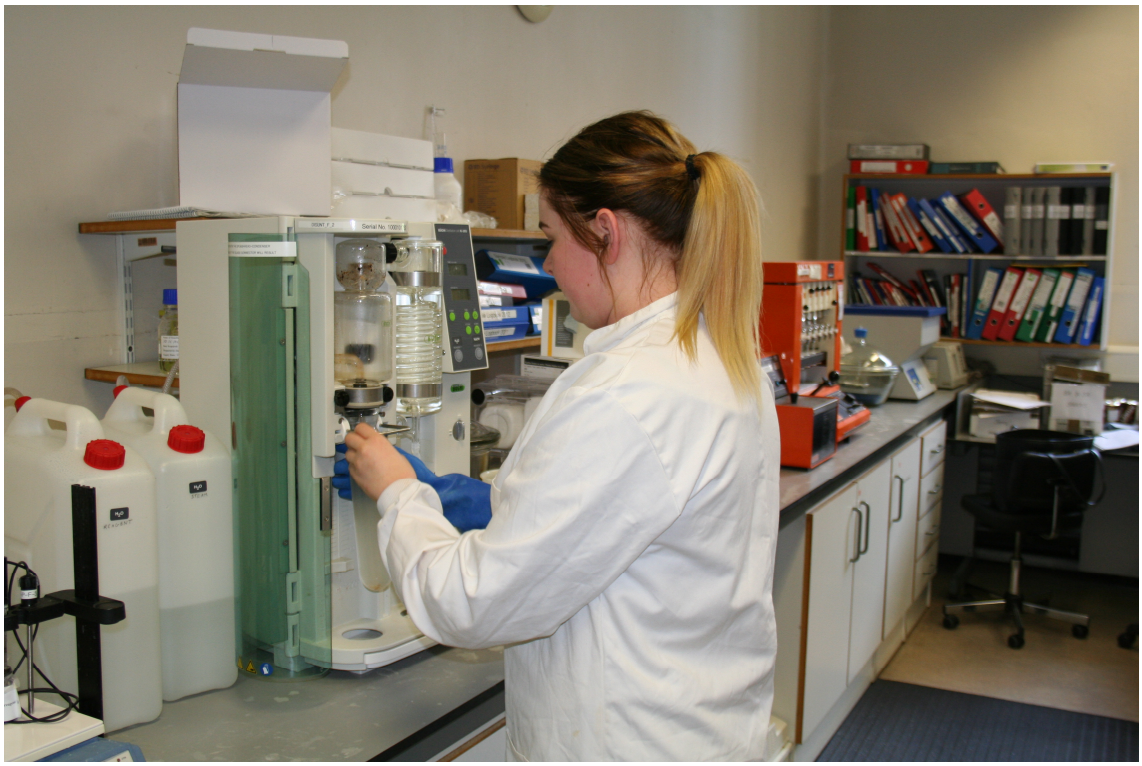
Antioxidants in Chewing Gum

Antioxidants are substances which prolong the shelf-life of foodstuffs by protecting them against deterioration caused by oxidation, such as development of fat rancidity and colour changes.

Regulation (EC) No. 1333/2008 lists six antioxidants, namely butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), propyl gallate, octyl gallate, dodecyl (lauryl) gallate and tertiary-butyl hydroquinone (TBHQ). It specifies a range of foodstuffs in which they are permitted for use and the corresponding maximum permitted levels. Article 32 of the Regulation specifies that all food additives permitted for use before the 20th January 2009 should be subject to a new risk assessment by EFSA. As antioxidants are one of the groups of food additives to be re-evaluated, information on the permitted antioxidants needs to be collected and EFSA has asked EU Member States to submit information on antioxidants with regard to:

- **i)** analytical methods available for antioxidant determination in food
- **ii)** present use and use patterns, comprising which food categories and subcategories, proportion of food within categories/subcategories in which they are used
- **iii)** actual use levels, typical and maximum.

In 2014, this laboratory as the PAL specialising in antioxidant testing, developed and validated a method for the determination of the six permitted antioxidants listed above in chewing gum samples. 18 Samples of these products were tested. The test results will be submitted to EFSA as part of the re-evaluation of permitted antioxidants.



Taurine

In 2014 an alternative analysis method with improved chromatography and selectivity was validated for the determination of taurine in infant formula and follow-on formula. 22 Samples of powdered and ready-to-feed products were analysed for taurine for the DAFM to monitor compliance with limits for taurine as specified in Commission Directive 2006/141/EC.

Sulphur Dioxide in Raw Prepared Parsnips and Potatoes and Raw Meat Products

Sulphur dioxide is not permitted for use in prepared parsnips under Regulation (EC) No. 1333/2008, as amended. The existing method for sulphur dioxide testing was extended and validated for the analysis of raw prepared parsnips to allow for investigation of suspected instances of non-permitted use of sulphur dioxide as preservative in this matrix, in the range 10 – 3000 mg/kg.

The existing measuring range of 10 – 100 mg/kg for sulphur dioxide in raw prepared potatoes was extended to 10 – 1000 mg/kg and validated.

The existing measuring range 10 – 450 mg/kg for sulphur dioxide in raw meat products was extended to 10 – 1000 mg/kg and validated.

Sugars in Soft Drinks

Fructose, glucose and sucrose in fruit juices and honey have been accredited for many years. Analytical methods were developed for the same sugars in soft drinks and energy drinks in 2014, with these methods also being accredited.

1.5.8 EU Food and Veterinary Office Missions

Each year the FVO implements an inspection programme, identifying priority areas and countries for inspection. In order to ensure that the programme remains up to date and relevant, it is reviewed mid-year. The programmes are published on the FVO website.

The FVO is part of the EU Directorate-General for Health and Consumer Protection.

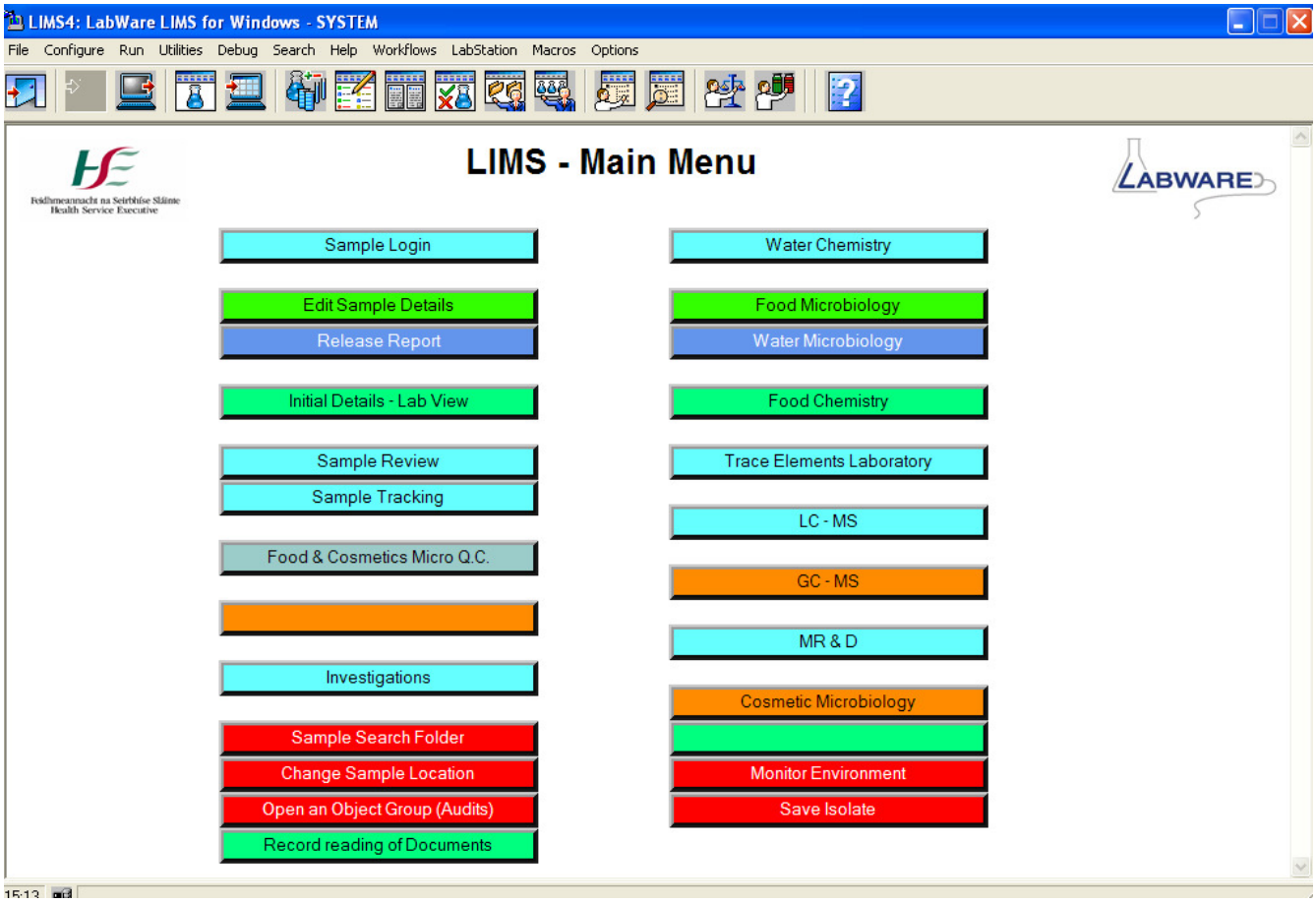
Through its evaluations the mission of the FVO is to:

- **i)** promote effective control systems in the food safety and quality, veterinary and plant health sectors
- **ii)** check on compliance with the requirements of EU food safety and quality, veterinary and plant health legislation within the EU and in third countries exporting to the EU
- **iii)** contribute to the development of EU policy in the food safety and quality, veterinary and plant health sectors

and to inform stakeholders of the outcome of such evaluations.

In 2014 no member of staff participated in FVO missions. The missions planned by the FVO were not in any of the areas of expertise of the laboratory staff.

1.5.9 Laboratory Information Management System (LIMS) and IT



In 2014 the extension of the LIMS implementation in the chemistry laboratory sections continued. Instrument records were created and the recording of routine calibration, checks of instrument performance and routine maintenance was transferred into LIMS from a paper-based system. This allows the data contained in these records to be easily accessed through the customised auditing module already in place. A range of analytical methods were implemented in LIMS, thus superseding the paper-based system previously in place. Work continues to migrate additional paper-based records and methods to the LIMS.

Analytical data from the laboratory's testing is communicated electronically to the FSAI on a weekly schedule. Newly required fields have been added to enhance the already extracted data. Considerable laboratory resource has been devoted to addressing problems relating to the extract of a small amount of data, usually arising from infrequent testing, which was not being extracted or not adequately extracted.

Results are also transmitted electronically to other customers at the customer's request.

The LIMS continues to support the laboratory's operations in the chemical and microbiological analysis of food, food contact materials, cosmetics, water, and clinical samples. During the year LIMS workflows for the QC area were extended to give greater clarity to a very complex area.

1.5.10 Laboratory Web Site http://www.publicanalystdublin.ie/

The full content-rich laboratory web site provides for our customers full information on our analytical services, costs thereof as appropriate, downloadable sample request forms & Annual Reports, and more. The site is regularly updated.

2. LABORATORY WORKLOAD IN 2014

In 2014 the laboratory analysed a total of **9,375** samples, comprising *c.* 50,000 individual tests. The following broad sample types, including both chemical and microbiological testing, were analysed:

Food	3075
Water – Chemical	2546
Water – Microbiological	2487
Clinical	1027
Cosmetics	112
Non Foods	128
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Total	**9,375**

The total includes more than 350 samples analysed under Proficiency Schemes and other Quality Control programmes.

3. FOOD

The food testing performed by the laboratory in 2014 comprised:

- **i)** programmed chemical analysis of food samples under the National Chemical Food Sampling Programme
- **ii)** a National chemical analysis service in its wide area of specialised testing.
- **iii)** microbiological examination of Programmed Food Testing and surveys for the HSE Dublin Mid-Leinster and the HSE Dublin North East
- **iv)** foodstuffs arising from the EU RASFF and Emergency Decisions
- **v)** surveys for the FSAI
- **vi)** foodstuffs from other Agencies
- **vii)** complaint samples
- **viii)** food fraud samples
- **ix)** food export certification examination and analysis
- **x)** miscellaneous food samples.

Sampling for the programmed testing was conducted by the Environmental Health Officers (EHO). Additionally certain samples were provided by Local Authority Veterinary Inspectors (LAVI), the Sea Fisheries Protection Authority (SFPA), the Department of Agriculture, Food and the Marine (DAFM) and the FSAI.

3.1 Programmed Chemical Food Testing

The 2014 National Chemical Food Sampling and Testing Programme was compiled following detailed discussions between the laboratory, the Cork and Galway PALs, the EHS and the FSAI. The three Regional Programmes now form a National Programme.

The parameters and foodstuffs in the programme were drawn up on the basis of

- **i)** emerging food safety issues
- **ii)** the national obligations for monitoring of compliance with the regulations
- **iii)** NRL responsibilities
- **iv)** surveillance
- **v)** surveys
- **vi)** regional food production
- **vii)** regional concerns
- **viii)** results from previous years.

The Chemical Food Programme is available at the laboratory web site - http://www.publicanalystdublin.ie/en/

A Summary of the 2014 Chemical FSAI Food Incident Report Forms is given in Appendix 2.

Contaminants – Natural and anthropogenic

Organic, Inorganic, Process Contaminants

Mycotoxins

During their growth stage, many fungi have the ability to produce a diverse range of secondary metabolites which can be toxic and/or carcinogenic if ingested by animals or humans. These secondary metabolites include the mycotoxins.

Mycotoxins are very heterogeneously distributed in foodstuffs so proper sampling is critical. EC Regulation 401/2006 amended by Commission Regulation (EU) No 178/2010 specifies the sampling and analysis methods for the mycotoxins in foodstuffs for which legal limits are in place.

The National Mycotoxin Sampling Plan (NMP) continued in 2014. Under the plan the focus of sampling points has changed from small retail samples, more the norm in the past, to bulk or large scale samples taken according to the sampling regulations from shipments entering Ireland at the designated points of entry i.e. Dublin and Shannon and at distribution level. One of the consequent many benefits is that the analytical results are immediately actionable under the food control legislation without the necessity of follow-up sampling.

In 2014 the laboratory tested 112 samples as part of the NMP. These included a wide range of foodstuffs for the following mycotoxins:
aflatoxins, ochratoxin A, zearalenone, fumonisins, the trichothecenes DON, T-2 & HT-2, nivalenol, diacetoxyscirpenol, sterigmatocystein, citrinin, and patulin.

Legislation for mycotoxins

Legislation for currently regulated mycotoxins has been consolidated into Regulation EC No 1881/2006, as amended. Commission Recommendation No 212/2014 sets the levels of citrinin in food supplements based on rice fermented with red yeast *Monascus purpureus*.

An amendment to Commission Regulation 401/2006 was published. It concerns the methods of sampling of large lots, spices and food supplements, performance criteria for the T-2, HT-2 toxins and citrinin. It also for the first time introduced criteria for screening methods used for the analysis of mycotoxins. These amendments have since been consolidated into the original Regulations.

Aflatoxins

Aflatoxins are a group of compounds produced by strains of the fungi *Aspergillus flavus* and *Aspergillus parasiticus*. In certain conditions of moisture, pH and temperature the fungi can attack foods resulting in the production of a range of toxins. Food processing often inactivates the fungi but the toxins are stable and remain in the food. Aflatoxins are associated with liver cancer in humans and other mutagenic effects. The toxins are known as B1, B2 G1 and G2 with B1 being the most toxic and it is a powerful hepatocarcinogen, teratogen and mutagen. Mammals that eat food contaminated with B1 produce the toxic metabolite M1 which is then present in their milk and tissue.

Aflatoxin analysis in 2014.

A total of 63 samples were analysed for aflatoxins B1, B2, G1 and G2, under the NMP, with the samples mainly taken from shipments entering the State at the designated points of entry. 5 Of the samples were also tested for a range of other mycotoxins.

In addition 20 samples of cereal-based baby foods, also part of the NMP, were analysed for aflatoxin B1. These were submitted for multi-parameter testing, with other suites of analysis comprising ochratoxin A and PAH testing.

335 Tests for aflatoxins B1, B2, G1, G2 & Total were carried out on the samples.

Additionally 36 samples were tested for aflatoxin M1.

Details are given in Table 1.

Foodstuff	*No of samples received*	*No of samples exceeding limits for Aflatoxin B1*
	Aflatoxins B1, B2, G1, G2, Total	
Spices	10	4 Samples of spice mix were above the B1 limit of 5.0 µg/kg.
Whole Nuts	12	
Nut Products	3	1 Sample of peanut candy was *c.* 4 times over the B1 limit of 2.0 µg/kg.
Cereals	35 cereals comprising: 20 Rice 9 Popcorn 2 Wheat 2 Flour 1 Barley 1 Hops	
Dried Fruit/ Dried fruit products	2	
Seeds	1	
Baby foods	20	

Aflatoxin M1		
Milk and milk powder	7	0
Baby foods (Infant formula and follow-on formula)	25 (Samples from DAFM)	0
Others	4	0

Table 1 Details of aflatoxin testing in 2014

Ochratoxin A (OTA)

The ochratoxins are a group of mycotoxins produced by various *Penicillium* and *Aspergillus* species with the main analogue ochratoxin A (OTA) found in naturally contaminated foods such as cereals, coffee beans, cocoa beans and dried fruit all over the world. It has also been detected in cereal products, coffee, wine, beer, spices and grape juice, and in products of animal origin such as pig kidney. Foodstuffs are frequently contaminated. OTA has carcinogenic, nephrotoxic, teratogenic, immunotoxic and possibly neurotoxic properties.

Ochratoxin A analysis in 2014

144 Samples were tested for ochratoxin A. The details are presented in Table 2.

Foodstuff	*No of samples*	*No of samples exceeding limits*
Coffee	10	0
Baby foods	20	0
Beer	11	0
Paprika & Chilli	8	0
Turmeric	5	0
Ginger	6	0
Nutmeg	4	0
Black & White Pepper	8	0
Cereals	16	1 (labelling)
Rice	11	0
Dried vine fruits	6	0
Wine	9	0

Liquorice	5	1 (RASFF issued)
Grape juice	6	0
Chocolate	2	0
Cocoa	10	0
Mixed Spices	7	0

Table 2 Ochratoxin A analysis

In addition 3 large scale samples of dried vine fruit were analysed for OTA under the NMP; these were compliant.

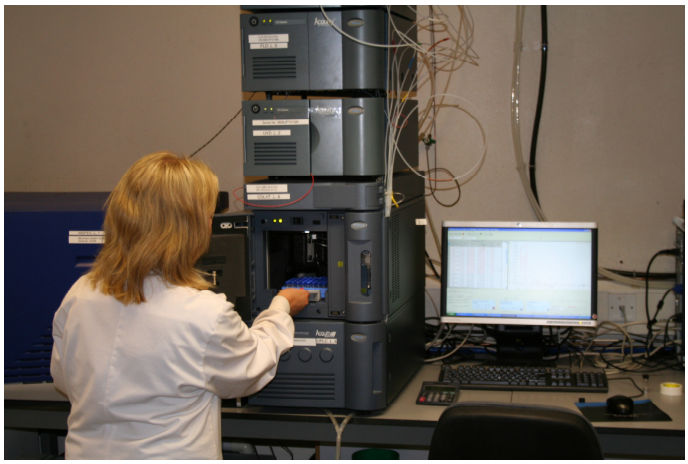
In 2014 due to the continued implementation of the NMP fewer retail samples of certain matrices were tested for ochratoxin A. Nevertheless the number of samples analysed increased slightly.

Where possible, following the more extensive use of multi-parameter testing, samples submitted for ochratoxin A testing were further analysed for other relevant mycotoxins.

Citrinin

The 11 rice samples analysed for ochratoxin A were also analysed for citrinin. Citrinin was not detected in any of the samples. In addition 25 samples of cereals were analysed for citrinin as part of the MPT programme, all were satisfactory.

Other mycotoxins - Zearalenone, Fumonisins (B_1,B_2,B_3), Trichothecenes T-2, HT-2, Nivalenol, Deoxynivalenol, 3-- and 15-Acetyldeoxynivalenol and Diacetoxyscirpenol.



These toxins are produced by various *Fusarium* species which are known to colonise cereals and which develop during cool and wet growing and harvest seasons, except for T-2 and HT-2 which are produced under hot and dry conditions. Zearalenone possesses strong oestrogenic properties. The most important effect of zearalenone is on the reproductive system, particularly of animals.

Fumonisins had been associated mostly with maize but have subsequently been found in other products, including rice, sorghum and navy beans, but so far in much lower concentrations than are common in maize.

Fumonisin B_1 has been shown to be causative of a number of syndromes and conditions in animals. In humans it has been statistically associated with the prevalence of oesophageal cancer.

Intake estimates indicate that the presence of T-2 and HT-2 can be of concern for public health.

Fumonisin B_3 was included to the *Fusarium* toxins tested in 2014 and is now accredited. Nivalenol and diacetoxyscirpenol were also added to the analytes list for all the samples, as were 3- and 15'acetyldeoxynivalenol

Additionally sterigmatocystein was added to the analyte list for 2014. This mycotoxin has similar toxicological properties to those of the aflatoxins and is produced by *Aspergillus versicolor*.

Results from the investigations into the trichothecenes and the other *Fusarium* mycotoxins in 2014 are given in Tables 3 and 4, respectively.

Foodstuff	*Parameter*	*No of samples*	*No of non-compliant results*
Cereals	T-2, HT-2	15	0
Cereal based baby foods	T-2, HT-2	20	0
Cereals	DON, 3- and 15-AcetylDON, , Diacetoxyscirpenol	15	0
Cereal based baby foods	DON, 3- and 15-AcetylDON, Nivalenol, Diacetoxyscirpenol	20	0

Table 3 T-2, HT-2, DON, 3- and 15-AcetylDON, Nivalenol, Diacetoxyscirpenol

Mycotoxin	*Foodstuff*	*No of samples*	*No of samples exceeding limits*
Zearalenone	Cereals, cereal products	15	0
Zearalenone	Cereal based baby foods	20	0
	Maize Oil	5	0
Fumonisins B_1, B_2, B_3	Cereals & cereal products (mainly corn)	15	0
Fumonisins B_1, B_2, B_3	Baby foods	20	0
Sterigmatocystein	Chilli, Paprika	8	0
	Mixed Spices	9	0
	Cereals	15	0
	Green Coffee Beans	6	0
	Cereal-based Baby Foods	10	0
	Dried Vine Fruit	6	0
	Beer	11	0

Table 4. Testing for further mycotoxins.

The EU Commission states that more information is required as a priority on all aspects of these toxins.

International bodies continually assess the risk posed by mycotoxins as new information comes to hand. Therefore it is important that this type of monitoring continues to be performed.

Patulin

In 2014 14 juices, 5 ciders and 13 other apple products were tested for patulin content. All were compliant. 1 Sample of apple juice taken outside the scheduled FSP was found to be non-compliant and required extensive follow-up as the analytical result was challenged by the FBO. The non-compliant sample resulted in the product not being available for retail sale.

Ergot Alkaloids

Testing continued on samples of cereal products for their ergot alkaloid content. Samples were analysed for the six ergot alkaloids, ergometrine, ergosine, ergotamine, ergocornine, α-ergocryptine and ergocristine, and their corresponding 'inines'. The results were gathered over two campaigns with details in Table 5.

Foodstuff	*Parameter*	*No of samples*	*No of non-compliant results*
Cereals (Rye products)	Ergot alkaloids (6) and their corresponding 'inines'	25	0

Table 5 Ergot Alkaloids

Process contaminants

Polycyclic Aromatic Hydrocarbons

117 Samples were analysed for PAHs, resulting in a total of 1755 individual tests. The details are presented in Table 6.

In addition to PAH testing, cereal-based baby foods were tested for multi-parameters such as ochratoxin A and aflatoxin B1. Infant formula and follow-on-formula samples were tested for multi-parameters such as taurine, aflatoxin M1 and 5 of these were tested for ESBO and phthalates. Spices were additionally tested for Ochratoxin A.

Foodstuff	*Number of samples*	*PAH range µg/kg*	*BaP range µg/kg*	*ΣPAH4 range µg/kg*
Heat-treated meat	21	<0.5 – 11.5	<0.5	0 – 5.6
Herbs	10	<0.9 – 186.3	<0.9 – 56.9	0 – 186.3
Spices	21	<0.9 – 56.4	<0.9 – 7.5	0 – 56.4
Smoked Fish	8	<0.9 – 4.2	<0.9	0 – 4.2
Flour	28	<0.05 – 1.24	<0.05 – 0.29	0 – 1.24
Food supplements	9	<0.9 – 11.1	<0.9 – 1.1	0 – 11.1
Infant Formula and Follow-on-Formula	20	<0.2	<0.2	0
Totals:	**117**	**-**	**resulting in 1755 individual tests.**	

Table 6 Summary of PAH testing results

No samples were found to exceed the regulatory limits for PAHs in Commission Regulation (EC) No 1881/2006 as amended by Commission Regulation (EC) No 835/2011. The legal limits apply for benzo[a]pyrene (BaP) and the sum of 4 specific PAHs namely, benzo[a]pyrene, benzo[b]fluoranthene, benzo[a]anthracene and chrysene.

No regulatory limits apply for the herbs, spices and flour. This is also the case for food supplements, with the exception of 5 oil samples, which were compliant.

In 2014 the PAH method was further extended for starch based products including *inter alia* flours, bran, breakfast cereals, pasta, corn & potato snacks, bread, malted cereals. Cereal products such as flour are currently not regulated under Commission Regulation 1881/2007, although some surveys have reported finding levels of PAHs in this food category. While the levels found are relatively low, the high consumption of foods from this group adds considerably to the importance of such monitoring.

Acrylamide

Acrylamide is a genotoxic carcinogen produced when starchy food is heated, as first reported by Swedish scientists in 2002. Foods particularly susceptible are those made from potatoes or wheat, which are rich in reducing sugars and the amino acid asparagine. A considerable risk of endometrial cancer was reported in a 2007 study on the dietary intake of acrylamide.

Acrylamide levels in food have been monitored by Member States from 2007 – 2009 under Commission Recommendation 2007/331/EC. The monitoring exercise was extended by Commission Recommendation 2010/307/EU to target foodstuffs that were known to contain high acrylamide levels and/or contribute significantly to the human dietary intake.

Acrylamide levels in some foodstuffs were significantly higher than the levels in comparable products of the same product category. Therefore the Commission considered it appropriate that Member States carry out investigations by examining the production and processing methods used by food business operators. As a result, Commission Recommendation of January 2011 on investigations into the levels of acrylamide in food set indicative acrylamide values.

The most recent scientific report, published by EFSA in 2012, gives an update of results relating to acrylamide levels in food from the monitoring years 2007 to 2010. It is available at: http://www.efsa.europa.eu/en/efsajournal/doc/2938.pdf.

EFSA concluded that there was no consistent trend across food groups towards lower levels of acrylamide and that a decrease in acrylamide levels was shown in only a few food categories while in other categories an increase in the levels was observed.

On the basis of the results of the investigations performed during the years 2011 and 2012 and on the monitoring results obtained pursuant to Recommendations 2007/331/EC and 2010/307/EU, the Commission deemed it appropriate to modify certain indicative values provided for in the Annex to the 2011 Recommendation, resulting in 2013/647/EU.

Where the acrylamide level found exceeds the indicative values, listed investigations are recommended. These are not safety thresholds; there are still no legislative limits for acrylamide in foods.

Under the Recommendation chips/French fries continue to be analysed twice a year, in March and November, from the same outlet. This is to measure the seasonal effect on acrylamide formation in fresh potatoes versus stored ones. When potatoes are stored the level of free sugar increases leading to elevated acrylamide levels on cooking.

For the 2014 sampling French fries were taken from the same 4 suppliers in March and November. In November acrylamide levels were found to have increased for samples provided by three of the suppliers; a decreased level was observed in the sample from the fourth supplier.

62 Samples were analysed in 2014, covering a variety of foods. Table 7 presents the range of levels found. 3 Samples had acrylamide levels exceeding their indicative values, 2 wafers and 1 in the category of baby foods other than processed cereal based foods.

A sample of vegetable crisps contained the highest level of acrylamide at 3710µg/kg; this product falls into the category of ‘other products’ for which no indicative value is set.

Foodstuff	*Number of samples*	*Acrylamide range µg/kg*	*Indicative Values µg/kg*
French fries sold as ready-to-eat	10	20 – 320	600
French fries for home-cooking	4	<20 – 70	No indicative value set
Potato crisps	9	220 – 800	1000
Soft Bread	2	<20 – 20	150
Wheat based bread	7	<20 – 40	80
Breakfast cereals	5	<20 – 360	400 *(excl. muesli and porridge)*
Biscuits, crackers, wafers, crisp bread and similar, excl. pastry and cake	6	130 – 940 (2 samples of wafers at 570 and 940 µg/kg)	500 Biscuits 1000 Ginger Bread
Roast coffee	2	160 – 190	450
Baby foods, other than processed cereal based foods	4	<20 – 60 (1 sample of meat based baby food at 60 µg/kg)	50
Processed cereal based baby foods	1	<20	50
Biscuits and rusks for infants and young children	3	40 – 160	200

Other (Including savoury-based corn snacks, cakes, pastries and potato-based products)	9	30 – 3710 (1 sample of vegetable crisps at 3710 µg/kg; all other samples <460 µg/kg)	No indicative value set

Table 7. Acrylamide testing in 2014

The laboratory participated in stability testing of acrylamide in toasted bread European Reference Material (ERM) for the European Commission.

Nitrate in various foods.

Table 8 summarises the testing for nitrate in 2014.

Commission Regulation (EU) No. 1258/2011 of December 2011 amending Regulation (EC) No. 1881/2006 sets maximum levels for nitrates in lettuce, spinach and rocket (rucola). The samples detailed in Table 9 were judged on the basis of these maximum levels.

Foodstuff	*No of samples*	*Non compliant samples*
Lettuce	5	0
Spinach	3	0
Rocket	3	0

Table 8 Nitrate

10 Samples of scallions, leek and celery were tested to determine the nitrate levels present. This testing was undertaken for risk assessment information purposes.

Furan

In 2004 the US-FDA reported finding furan in food in sealed jars and cans. Furan is a small molecule with a boiling point of 32°C and is a suspected carcinogen. It is a process contaminant, produced in situ in foods and beverages due to the heat degradation of naturally-occurring sugars, polyunsaturated fatty acids and ascorbic acid (vitamin C) during cooking/processing.

There is currently no legislation setting maximum levels for furan in food.

EFSA has requested data for dietary intake evaluation and has established a monitoring database. In previous years, particular focus has been on the furan content in the food as prepared. Due to the highly volatile nature of furan, most of it will evaporate when an airtight sealed pack/pouch, can or jar is first opened and when the food is heated. The aim of the monitoring is to establish the extent of exposure of the consumer to the toxin, therefore establishing the loss on preparation is important.

This necessitates analysing samples twice, once as received and again when prepared as directed. This allows the provision of data on actual consumption levels to EFSA for dietary exposure evaluation, as per Commission Recommendation 2007/196/EC.

EFSA has published a scientific report http://www.efsa.europa.eu/en/efsajournal/doc/2347.pdf that gives an update of results on the monitoring of furan levels in food. It highlights the furan data contributed from Ireland to date and the importance of providing information, especially on furan levels in prepared foods. Ireland provided 10% of the data reported by Member States within the period 2004 - 2010. Following this EFSA has requested more data on products for which little data has been received.

EFSA has reported that furan estimates are highest for toddlers and adults, with jarred baby foods containing vegetables and coffee being the major contributors, respectively.

Consequently for furan testing in 2014 our focus remained on coffee and baby food, with an average of 85% of total furan exposure for adults attributed to brewed coffee. The most recent Scientific Report of EFSA, "Update on furan levels in food from monitoring years 2004-2010 and exposure assessment", reported mean values of 45 µg/kg for brewed coffee, and 3,660 µg/kg for roasted coffee beans. The highest 95th percentile was determined for roasted coffee beans at 6,407 µg/kg. A number of general jarred foods were also tested.

59 Samples were analysed as received for furan. 58 were analysed after preparation for consumption.

Tables 9 and 10 present the results.

Foodstuff	*Number of samples analysed (as received)*	*Furan range µg/kg*
Babyfood	31	<5 - 60
Coffee, comprising:	20	143 – 7030
Instant coffee	4	143 – 1175
Filter coffee	15	1651 – 7030
Espresso coffee	1	5648
General foods	8	<5 – 25

Table 9 Furan - Samples as received

Foodstuff	*Number of samples analysed (as received)*	*Furan range µg/kg*
Babyfood	30	<5 - 63
Coffee, comprising:	20	<5 – 192
Instant coffee	4	<5 – 8
Filter coffee	15	11 – 61
Espresso coffee	1	192
General foods	8	<5 – 25

Table 10 Furan - Samples after preparation

There is a significant difference between the levels in raw coffee and that consumed, which is probably explained by losses of this very volatile chemical during processing or brewing. The levels determined are typically highest in espresso coffees, decreasing for filter coffees, with the lowest levels determined in instant coffees.

Solvent residues analysis was also performed on the coffee samples.

Solvent residues

Extraction solvents are solvents which are used in an extraction procedure during the processing of raw materials, foodstuffs, or components or ingredients of these products. The solvent is removed but the unintentional and technically unavoidable presence of residues or derivatives in the foodstuff or food ingredient can occur. The removal of caffeine and some bitter flavours from coffee and tea is sometimes achieved with the use of organic solvents.

Commission Directive 2009/32/EC sets maximum limits for extraction solvents used in the production of food. The following are determined:

i) methanol
ii) propan-2-ol
iii) dichloromethane
iv) methyl acetate
v) hexane
vi) methyethyllketone

in foods such as tea, coffee, oils, fats, chocolate and chocolate products.

43 Samples were analysed for solvent residues, namely 20 samples of coffee (decaffeinated and caffeinated) and 23 edible oils. This resulted in a total of some 122 individual tests. Results are shown in Table 11.

Foodstuff	*Number of samples*	*Solvent range mg/kg*	
Decaffeinated Coffees	10	Dichloromethane	<0.5
		Methanol	<0.1 – 32.6
Caffeinated Coffees	10	Methanol	<0.1 – 38.1
Edible oils	23	Methyethyllketone	<0.5
		Methanol	<1.0 – 1.0
		Propan-2-ol	<1.0
		Hexane	<0.1 – 0.2

Table 11 Solvent Residues testing in 2014

The coffee samples were submitted for multi-parameter testing, with other suites of analysis including furan and caffeine analysis. The samples of edible oils were also analysed for MCPD-esters.

10 Samples of decaffeinated coffee (dry matter) were analysed and found to contain methanol levels up to 32.6 mg/kg. This would have indicated a problem had methanol been declared as being used for extraction. A number of coffees have been found to contain significant methanol levels in recent years. To assess the extent of this observation, a range of regular caffeinated coffees were tested, revealing that methanol was also present in these coffees.

The other solvents tested for were within the legislative limits.

3-MCPD

3-Monochloropropandiol (3-MCPD) is produced when hydrochloric acid is used during the manufacturing of soy sauce. It is classified by the IARC as a probable carcinogen. The maximum limit for 3-MCPD in soy sauce is 50µg/kg of dry matter, as defined in Commission Regulation 1881/2006.

In 2014 12 samples of soy sauce were analysed for 3-MCPD. 11 Of the 12 samples were found to have levels below 10 mg/kg. All samples were found to comply with the legislation. Table 12 presents the results.

Foodstuff	*Number of samples*	*3-MCPD in dry matter Range µg/kg*
Soy sauce	12	<10 – 21.5

Table 12 3-MCPD testing in 2014

MCPD esters

The extraction of oil from oil seeds is sometimes achieved with simple crushing to produce virgin or extra virgin oils. However, oil is extracted more efficiently and cheaply by pre-treating with acid or roasting followed by solvent extraction. The acid treatment can produce 3-monochloropropandiol esters by the action of acid on triglycerides.

It is estimated that there is 100% release of 3-MCPD from its fatty esters in humans and the latest scientific studies indicate an almost entire release of glycidol from fatty acid esters within the human digestive tract.

Glycidyl fatty acid esters (GE) are process contaminants generated during the deodorisation step of edible oil refining. Glycidol itself is categorised as probably carcinogenic to humans.

There have been a considerable number of improvements to the analytical methods for the determination of MCPD and glycidyl esters. The direct approach of determining the individual concentrations of each ester and summing has also been used but it requires a large number of analytical standards. The most favoured approach is an indirect determination of the MCPD released from fat after hydrolysis. However the fact that 3-MCPD and glycidol can inter-convert and that 2- and 3-MCPD can be generated by the hydrolysis conditions used in some procedures has possibly lead to an over-estimation of the levels in food in some early studies.

There are currently no legislative limits for MCPD or GE esters, although an EU Monitoring Recommendation came into force in September 2014 which requires monitoring of the levels of 2-MCPD, 3-MCPD and GE esters in a range of foods. This is necessary to enable a more accurate exposure assessment. It recommends the use of American Oil Chemist's Society (AOCS) methods Cd 29 a or b or c-13 in order to standardise the results submitted to EFSA. This method was successfully validated in the laboratory and has been submitted for accreditation in 2015.

In 2014 23 samples of edible oils were analysed for MCPD esters, with results shown in Table 13.

Foodstuff	*Number of samples*	*MCPD Esters range mg/kg*	
Edible oils	23	2-MCPD from esters	<0.1 – 1.55
		3-MCPD from esters	<0.1 – 2.8
		Glycidol from esters	<0.1 – 2.28

Table 13 MCPD Esters testing in 2014

Benzene in fruit flavoured bottled waters and soft drinks

Benzene is a known carcinogen and is thought to be produced by the degradation of benzoic acid in the presence of ascorbic acid and light. Testing for benzene was a component of multi parameter testing which was conducted on 20 samples of soft drinks.

There is currently no legislative limit for benzene in soft drinks. 15 Samples had levels less than 0.1µg/L and 5 had levels between 0.1 and 0.4µg/L

Perfluorinated Alkyl Substances (PFAS)

PFAS form a large class of chemicals that have been used for many years in various applications such as surfactants, fire retardants and foams, surface treatments and as polymerisation aids in the manufacture of PTFE and other fluoropolymers. They are extremely stable and trace levels have been found in environmental water samples. They are known to accumulate in animals causing tumours and disturbing reproductive development.

2 Environmentally persistent chemical compounds – perfluorooctane sulphonate (PFOS) and perfluorooctanoic acid (PFOA) – are being increasingly found in the environment. EFSA was asked to evaluate the importance of food to human exposure to these substances, with a scientific opinion being published in February 2008.

Under Commission Recommendation 2010/161/EU Member States monitor the presence of PFAS, prioritising the analysis of PFOS and PFOA, in addition to precursors such as perfluorooctane sulphonamide (PFOSA), N-ethyl perfluorooctane sulfonamidoethanol (NEtFOSE) and 8:2 fluoroteleomer alcohol. Also to be included in the monitoring programme, if possible, are compounds similar to PFOS and PFOA but with different chain lengths (C4 – C15) and polyfluoroalkyl phosphate surfactants (PAPs).

In 2014 21 samples of fish were analysed for a range of perfluoroalkyl acids and sulphonates.
6 Samples had levels of PFOS above the limit of quantification (1 µg/kg), ranging from 1.1 to 4.1 µg/kg. There is currently no legislation setting maximum levels of PFAS in food. The purpose of this testing is to inform future regulation, with EFSA receiving the data, as stipulated in the Commission Recommendation.

Flavourings

Samples of compound foods were tested, as appropriate, for coumarin or quassin and the results were assessed against Regulation (EC) No. 1334/2008 on flavourings and certain food ingredients with flavouring properties for use in and on foods.

Coumarin

27 Samples of cinnamon-containing products including seasonal Easter and Christmas bakery products, bread, bagels, cakes, porridge and muesli were analysed for coumarin content. All the bakery products tested complied with the maximum level of 50 ppm as specified in the Regulation.

Quassin

10 Samples of lemon-flavoured non-alcoholic beverages were analysed for quassin content. All products tested complied with the maximum level of 0.5 ppm for non-alcoholic beverages as specified in the Regulation.

Food additives

Food additives are natural or manufactured substances that are intentionally added to foodstuffs during preparation or manufacture to perform a specified technological function or functions in the final product. The current applicable legislation in this area is Regulation (EC) No. 1333/2008, as amended.

Examples of functions and associated additives are:

- **i)** prevention of deterioration of foodstuffs during storage and protection against food poisoning - preservatives
- **ii)** provision of sweetness in low-sugar products - sweeteners
- **iii)** the restoration of colour to foods that lose natural colours during processing – colours.

In 2014, the laboratory tested a wide range of foodstuffs for the following additives:

- **i)** artificial sweeteners – aspartame, acesulfame-k, saccharin and sucralose
- **ii)** natural sweeteners - stevioside and rebaudioside A
- **iii)** preservatives – nitrite (as sodium nitrite), nitrate (as sodium nitrate), sulphur dioxide, benzoic acid, sorbic acid.
- **iv)** caffeine
- **v)** antioxidants – BHA, BHT, propyl gallate, octyl gallate, lauryl gallate and TBHQ

Table 14 gives the results of testing for additives in 2014. Where labelling is presented as the reason for a sample not being compliant, this was due to either the detection of undeclared ingredients, labelling only in a language other than English or non-designation of an additive into an additive category in an ingredients list.

63 samples were not compliant, representing 13.9% of the 453 samples tested. This is a high percentage and it illustrates the need for continuing rigorous monitoring and surveillance.

The highest numbers of non-compliant results were observed for the preservatives sulphur dioxide in a variety of foodstuffs (18.3% of the 126 samples tested) and sodium nitrate & sodium nitrite in cured meats and brines (18.8% of the 112 samples tested).

Additive	*Foodstuff*	*No of samples*	*No of Tests*	*No of non-compliant Samples*
Artificial sweeteners other than sucralose - Aspartame Acesulfame-K Saccharin	Cordials/squash drinks, yoghurt, sauces, soup, marmalade	43	129	1 Cordial – saccharin detected but not declared 1 Jelly – excessive level of acesulfame-K 2 Tomato ketchup – excessive level of saccharin 2 Sauces – aspartame detected but not declared
	Food supplements	42	126	0
Sucralose	Non-alcoholic beverages, flavoured bottled waters, yoghurt, cereal bar, biscuit	19	19	0
	Food Supplements	42	42	1 Liquid food supplement – excessive level of sucralose
Steviol Glycosides (Stevioside and Rebaudioside A)	Water-based flavoured drinks	16	32	1 - Labelling
	Chocolate	4	8	
Antioxidants (Gallates x 3, TBHQ, BHA & BHT)	Chewing Gum	18	108	0
Sulphur dioxide (SO_2)	Dried fruit, wine, raw crustaceans, vac-packed prepared potatoes & parsnips, raw sausages and burgers, cordials/squash drinks	126	126	Sausages and burgers: 12 - excessive level of SO_2 and 4 – SO_2 detected but not declared Parsnips: 2 – non-permitted use Potatoes: 4 - excessive level of SO_2 Dried fruit: 1 - SO_2 detected but not declared

Nitrite (as Sodium Nitrite) and Nitrate (as Sodium Nitrate) $NaNO_2$, $NaNO_3$	Cured meats and brines	112	224	21- Excessive levels of $NaNO_2$ and/or $NaNO_3$
Benzoic Acid & Sorbic Acid	Non-alcoholic beverages, flavoured bottled waters, cakes, jams, marmalades, sauces, spreads, cheeses	82	164	1 Cheese - excessive level of sorbic acid 1 Non-alcoholic drink - sorbic acid detected but not declared 9 Non-alcoholic drinks - excessive levels of benzoic acid
Caffeine	High energy drinks	4	4	0
	Totals:	**453***	**982**	**63**

Table 14 Results of additives testing in 2014.

*Multi-parameter testing was performed on 42 food supplement samples (aspartame, acesulfame-K, saccharin and sucralose) and on 13 cordial samples (aspartame, acesulfame-K, saccharin and sulphur dioxide). The numbers of these samples are included only once in the total number of samples.

Carbon monoxide

Carbon monoxide is a gas that forms an irreversible complex with haemoglobin to produce a cherry red colour. Carbon monoxide itself and "clean smoke", which is predominantly carbon monoxide, have been used to enhance the colour of red meats particularly fresh and frozen tuna to give the flesh a fresh appearance. Carbon monoxide is not on the list of permitted additives and its use is not authorised.

In 2014 the Sea Fisheries Protection Service (SFPA) submitted 9 samples of fish for carbon monoxide testing. These consisted of 2 swordfish and 7 tuna fish. No positives were found.

Biogenic amines analysis was also performed on 3 of the tuna samples.

Compositional / Quality / Labelling analysis

In 2014 the laboratory performed testing to determine the quality of 2 in-use cooking oils. The parameters tested were acid value and peroxide value.

10 Samples of decaffeinated coffee were tested for caffeine content to determine compliance with Directive 1999/4/EC which states that the product labelling on coffee may include the term "decaffeinated" provided that the anhydrous caffeine content does not exceed 0.3% by weight of the coffee-based dry matter.

Taurine testing was performed on 22 samples of infant formula and follow-on formula to determine compliance with limits for taurine that are detailed in Commission Directive 2006/141/EC.

23 Samples of honey were tested for sugars, HMF, moisture, diastase number, free acidity, conductivity, insoluble matter, the suite of pyrrolizidine alkaloids, and methylglyoxal for the Manuka samples.

The testing of honey is further excellent example of multi-parameter testing of samples – each sample can be tested for 13, 14 in the case of Manuka honey, individual parameters.

Table 15 gives the data for compositional testing in 2014.

Parameter	*Foodstuff*	*No of samples*	*No of tests*	*No of non-compliant samples*
Acid Value Peroxide Value	In-use cooking oils	2	4	0
Caffeine	Decaffeinated coffee	10	10	0
Taurine	Infant formula and follow-on formula	22	22	0
Sugars, HMF, Moisture, Diastase number, free acidity, conductivity, insoluble matter	Honey, (incl. Manuka)	23 (incl. 11 from DAFM)	207 (excl. the pyrrolizidine alkaloids)	5 Low diastase number 2 HMF 1 for labelling
Methylglyoxal	Manuka honey	6	6	0
	Totals:	**57**	**249**	**8**

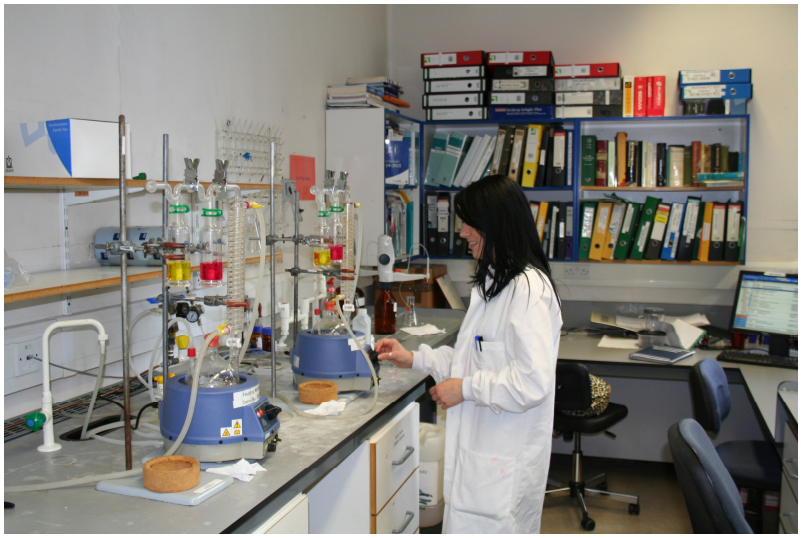
Table 15 Compositional testing in 2014

Of the 57 samples tested 8 non-compliances were found, all in the honey samples. At 14% it is a high percentage and it illustrates the need for rigorous monitoring and surveillance.

Food labelling

The purpose of food labelling is to inform and protect the consumer. Detailed labelling, which gives the exact nature and characteristics of a product, enables a consumer to make an informed choice when selecting a foodstuff. The principal rule of food labelling is that it must not be misleading regarding the characteristics of a foodstuff.

Regulation (EU) No. 1169/2011 of October 2011 on the provision of food information to consumers (FIC) came into effect in December 2011 and generally applied from mid-December 2014, with a couple of exceptions.



It amended Regulations (EC) No. 1924/2006 and (EC) No. 1925/2006 and replaced Directive 2000/13/EC, as amended, on general labelling and Directive 90/496/EEC, as amended, on nutrition labelling.

New requirements of this regulation include the introduction of a minimum font size for mandatory information, allergen labelling for non-packaged foodstuffs, labelling requirements for foodstuffs sold via the internet, country of origin labelling and requirements for mandatory nutrition labelling for many pre-packaged foodstuffs.

Foods placed on the market or labelled prior to 13th December 2014 which were compliant with the existing rules (i.e. Directive 2000/13/EC), but which do not comply with the requirements of the new regulation, may be marketed until stocks are exhausted.

Labelling analysis in 2014

A substantial amount of general labelling analysis was conducted.

Where analysis of additives was performed, the list of ingredients was checked for a declaration of the additives detected and the designation of these additives into the appropriate categories was also examined.

Sulphur dioxide functions as a preservative in foodstuffs but it is also an allergenic substance and, as such, its presence in a food product must be clearly visible to a consumer. Where present at levels exceeding 10 mg/kg or 10 mg/l expressed as SO_2, sulphur dioxide and sulphites must appear on the product label under their chemical name e.g. sodium metabisulphite. A specification of the additive category and the additive (E) number is not sufficient. These specific labelling requirements were checked for all pre-packaged products received for testing in 2014.

Tables 14 and 15 contain information on the results of labelling analysis in 2014.

Biogenic amines

Directive 91/493/EEC on fish hygiene specifies limits for histamine levels in the *Scombridae* and *Clupeidae* fish species. This states that 9 samples must be taken from each batch of fish and that the histamine levels must meet the following requirements:

- the mean value must not exceed 100 mg/kg
- two samples may have a value between 100 and 200 mg/kg
- no sample may have a value exceeding 200 mg/kg .

Regulation (EC) No 2073/2005, as amended, on microbiological criteria for foodstuffs specifies similar histamine limits for fish and doubles the respective values for fermented fish products.

Foods normally may contain small amounts of biogenic amines which are metabolised easily in the body. However some foods, such as those that have undergone spoilage, aged fermented products and fish sauces/pastes can contain higher levels of the amines.

The most important of these, from the food-borne illness perspective, are histamine and tyramine. Others, such as putrescine and cadaverine, are noteworthy because they are thought to exert a potentiating effect on the action of histamine. Histamine and tyramine are vasoactive agents with histamine being a vasodilator and tyramine a vasoconstrictor.

In 2014 the following biogenic amines were measured in a range of foodstuffs – histamine, tyramine cadaverine and putrescine. The number of amines tested for was reduced from 10 to 4 based on an EFSA opinion on Biogenic Amines in fish and the lack of legislation for the six Biogenic Amines removed from the suite of tests.

Table 16 gives the details.

Foodstuff	*No of samples*	*Histamine range Ppm*	*Tyramine range ppm*	*No of non-compliant samples*
Fish, crustacean, molluscs	31 * (incl. 5 SFPA)	<10–325.3	<10–50.6	1 1 (labelling)
Sauces	8	<10–133.3	<10–50.6	0

*For 8 samples the number of sample units was 9 thus complying with the sampling regulations. Each individual unit of fish was analysed and the results assessed in accordance with Regulation 2073/2005.

Table 16 Biogenic Amine analysis in 2014

Food Contact Materials (FCMs)

This laboratory is the specialist testing facility in Ireland and the National Reference Laboratory (NRL) for Food Contact Materials reporting to the European Union Reference :Laboratory (EURL).

Primary Aromatic Amines

Primary Aromatic Amines (PAAs) are a series of compounds widely used in industry in the manufacture of products such as pesticides, pharmaceuticals, explosives, rubber, azo-dyes, epoxy polymers and polyurethane. They are not intended to be in the final product but residues are sometimes present due to incomplete reactions, as reaction by-products or as breakdown products of reaction intermediates or the final product. Some PAAs are highly toxic and/or carcinogenic.

High levels have been detected in certain plastics intended to come into contact with food, such as kitchen cooking utensils. According to Commission Regulation (EU) No 10/2011 food contact materials may not release PAAs into food simulant in detectable quantities.

In 2014 the laboratory analysed 10 sets of black nylon kitchen utensils for two common PAAs, aniline and 4,4'-methylenediamine. 7 Samples did not meet the requirements for specific migration and Rapid Alerts were raised with the FSAI for these.

1 Sample was received for analysis under the emergency legislation introduced during 2012 (Commission Regulation (EU) No 284/2011) and was found to be compliant.

Photo initiators (PIs)

14 Samples were analysed for a range of PIs. These consisted mainly of dry products packaged in paperboard such as pasta, rice, porridge oats, muesli, breakfast cereals. 8 PIs were tested for in the food itself, including benzophenone (BP) and 4-methyl benzophenone. A total of 112 individual tests were performed.

All samples were determined to have levels of < 0.1 mg/kg.

Follow-up testing was carried out on a further 7 samples, 2 of which had been previously analysed in 2013 with high levels of BP determined. 3 Were found to contain high levels of BP in the food - 2 porridge samples and a muesli.

The packaging from the 7 samples was additionally tested for the presence of BP to determine its source, with levels of BP found in all. A correlation was made between the high levels in the food and a component of the printing process used to print on the packaging.

Plasticisers in PVC gaskets

Epoxidised soybean oil (ESBO)

To ensure the integrity of foods sold in glass jars with metal lids, a PVC gasket seal is used between the metal lid and the rim of the jar. As PVC is a rigid plastic it has to be softened by the addition of 20-40% plasticiser to ensure a good seal.

ESBO is often used as this plasticiser. It has valuable hydrochloric acid scavenging properties. However ESBO is fat soluble and has the potential to migrate into the foodstuffs during sterilisation and storage, especially into fatty foods.

Commission Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food limits the content of ESBO that can migrate into the food to 60mg/kg. In the case of infant formulae and follow-on formulae or processed cereal-based foods and baby foods for infants and young children, this specific migration limit (SML) is lowered to 30 mg/kg.

In future years the use of ESBO in gaskets may decrease due to replacement with other plasticisers such as polyadipates.

In 2014 36 samples in total were analysed for ESBO. The samples comprised 4 infant formulas from the DAFM, 15 baby foods and 17 other jarred foods. The results are presented in Table 17.

Foodstuff	*No of samples*	*ESBO range mg/kg*
Infant formula	4	<3
Baby foods	15	< 3– 6
General jarred foods	17	<3 – 16

Table 17 ESBO results

The samples of infant formula and follow-on-formula were also analysed for taurine, aflatoxin M1, phthalates and PAHs.

Other plasticisers

Gaskets from the lids of the samples tested for ESBO were also tested for the presence of the following phthalate plasticisers:

- **i)** diisodecyl phthalate (DIDP)
- **ii)** benzylbutylphthalate (BBP)
- **iii)** diethylhexylphthalate (DEHP)
- **iv)** di-iso-nonylphthalate (DiNP)
- **v)** dibutylphthalate(DBP)
- **vi)** di-iso-butylphthalate(DiBP)
- **vii)** di-n-hexylphthalate(DnHP)
- **viii)** di-n-octylphthalate(DnOP)
- **ix)** di-iso-octylphthalate(DiOP)
- **x)** di-cyclo-hexylphthalate(DcHP)
- **xi)** diexylphthalate(DEP)
- **xii)** dimetylphthalate(DMP)

The 36 samples that were analysed for phthalates resulted in 432 individual tests.

The analysis is used to identify those additives permitted for use by the legislation and detect the presence of those not permitted.

The permitted limit for di-iso-decylphthalate, 0.1% in the final product, also applies to benzylbutylphthalate, diethylhexylphthalate and di-iso-nonylphthalate. The permitted limit for dibutylphthalate is 0.05% in the final product. The other phthalates tested for are not on the list of permitted additives and are therefore not allowed.

All samples were compliant with no levels of the above listed phthalates found.

The intensive work on plasticisers will continue since the legislation continues to be amended to reflect changes in the technology associated with the manufacture and use of these gaskets.

Melamine in foodstuffs

During 2014 a total of 7 samples were submitted to the laboratory for testing under the import control legislation (Regulation 669/2009, as amended). All were compliant.

Melamine and formaldehyde in kitchenware

21 Samples of kitchenware were analysed for specific migration of melamine and residual formaldehyde, comprising 42 analytical tests. All samples were compliant for both analytes.

In addition, 2 samples were received from the port for formaldehyde testing under the emergency legislation Regulation No 284/2010), both were compliant.

Bisphenol A (BPA)

3 Samples of 20 litre carboys used for drinking water and 1 sample of baby bottles were checked for the specific migration of BPA. The carboys complied with Regulation (EU) No 10/201. The baby bottle sample also complied with legislation, Commission Implementing Regulation (EU) No 321/2011 of April 2011 amending Regulation (EU) No 10/2011 as regards the restriction of use of BPA in plastic infant feeding bottles.

11 Samples of canned foods were analysed for BPA. All were compliant.

Migration of lead and cadmium from ware.

37 Samples of ceramic ware, 22 from small Irish manufacturers and 15 imported samples, were analysed for the specific migration of lead and cadmium. Council Directive No. 84/500/EEC specifies the maximum limit for lead and cadmium allowed to be transferred from ceramic articles. All samples were compliant.

9 Samples of glass ware were analysed for the specific migration of cadmium and lead. The migration of cadmium and lead from all samples was below 3ug/litre. Currently there is no legislation for migration of lead and cadmium from glass ware.

Migration of chromium and nickel from kitchenware

Nickel and chromium are used in the production of stainless steel articles ranging from cutlery to utensils. Whilst there are no specific maximum migration levels established for nickel and chromium in European legislation, the Council of Europe previously adopted guidelines on the use of metal food contact articles, which suggested that the migration of nickel to foodstuffs should be less than 0.1 mg/kg as a general limit of migration into foodstuffs. There is no recommended maximum migration proposed for chromium.

11 Samples of metal utensils & cutlery were analysed for the migration of chromium and nickel giving 22 analytical tests. All results were less than 0.01mg/kg for both chromium and nickel.

Migration of metals

The laboratory successfully participated in a JRC proficiency test where the objective was to evaluate NRL performance to identify and quantify elements released from plastic (Ba, Co, Cu, Fe, Mn, Zn, Li and Sb) and ceramic (Ba, Co, Mn, Pb, Cd, Ni and Al) food contact materials.

Analysis associated with FSAI Guidance Note 25: Guidance for enforcement of legislation applicable to: Natural Mineral Waters, Spring Waters and Other Bottled Waters

This analysis is associated with FSAI Guidance Note 25 entitled 'Guidance for enforcement of legislation applicable to: Natural Mineral Waters, Spring Waters and Other Bottled Waters'.

PAHs in Bottled Waters

20 Samples were submitted for PAH analysis.

The PAHs applicable to water are benzo[a]pyrene and the sum of four specific ones namely, benzo[b]fluoranthene, benzo[k]fluoranthene, indeno[1,2,3-cd]pyrene and benzo[g,h,i]perylene.

All samples were within the the parametric values for benzo[a]pyrene and the sum of the four specific PAHs, 0.01 and 0.10 µg/L respectively.

3.2 A Review of the Results of the Microbiological Food Sampling Programme 2014

Introduction

The food microbiology laboratory examined 1332 food samples submitted by EHOs for Food Control purposes. No hygiene swab samples were submitted.

Categories and testing purpose

The breakdown of categories recorded as the 'Reason for Analysis' for samples submitted varies from year to year. The core ones of 'Routine', 'Repeat' are always significantly represented.

In 2014, the FSAI performed 1 National Survey (14NS1). 38 Samples were taken at the Port as 'Import' samples. 26 Samples fell into the 'Follow-up' category. 'Follow-up' samples are usually taken consequent to allegations of food poisoning or as a follow-up investigation into previously non-compliant or suspect results. There were 5 samples marked as complaint as they were taken as a follow-up to a food poisoning complaint investigation. All 'Import' 'Repeat' 'Complaint' and 'Follow-up' samples are non-programmed which has a major impact on laboratory time and resources.

Table 18 shows a breakdown of the samples according to the purpose of sampling, and also shows the overall outcome for the samples. Where legislative limits were not applicable, the interpretation categories for samples were based on the criteria set out in FSAI Guidance Note No. 3 - Guidelines for the Interpretation of Results of Microbiological Testing of Ready-to-Eat Foods Placed on the Market, Revision I of which was introduced by FSAI during 2014. From September, interpretations by this laboratory were based on Revision 1 of the document. Prior to the implementation of Revision 1 the following interpretations applied, Acceptable and Satisfactory samples under those guidelines are combined as 'Compliant' in Table 18.

Category	*Number*	*OUTCOME*			
		Compliant	*Borderline*	*Non-compliant*	*No Designation*
Routine	919	800	48	71	0
14NS1	165	163	0	2	0
Repeat	75	57	8	8	1
Import	38	37	0	1	0
Follow-up	26	22	2	1	1
RASFF	5	5	0	0	0
Complaint	5	5	0	0	0
Total	**1232**	**1089**	**58**	**83**	**2**

N/A = Not applicable

Table 18 Microbiology Food Sampling Programme – General data on food samples for 2014

Results of food testing

In 2014 only 0.2% of food samples were not designated against a criterion compared with 1.7% in 2013. A designation is not assigned to samples if there is no specific guideline for the sample type tested or if the sample category is not clear from the information provided/available when reported. A designation is also omitted from samples which have results that fall into the non-compliant category but where the temperature on receipt is not available or where the final result was an estimate.

After removing the 'No Designation' category food samples, the compliant samples represented 88.5% of the remaining samples. Food samples designated to be non-compliant represented 6.7% of samples analysed against which there is a designation. The proportion of non-compliant food samples was 3% lower in 2014 than in 2013 (9.7%). Non-compliant samples had been following a consistent downward trend up to 2011, after a slight rise in proportion in 2012, they appear to have decreased slightly again for 2014.

Table 19 summarises the results found for each test parameter for routine food samples in 2014.

	Parameter	Total tests	Non-compliant	% Non-compliant (of samples tested for this parameter)	Non-Compliant	Range cfu/g for N
Indicator Organisms (Enumeration)	Aerobic Colony Count 30°C	407	50	12.3	N/A	N/A
	Enterobacteriaceae	354	8	2.3	$\geq 1.0 \times 10^4$	5.1×10^4 - $>1.5 \times 10^5$
	Escherichia coli	617	0	N/A	$\geq 1.0 \times 10^2$	N/A
Pathogens (Presence or Absence test)	*Salmonella*	568	0	N/A	Detected	N/A
	Campylobacter	0	0	N/A	Detected	N/A
Pathogens (Enumeration)	Presumptive *Bacillus cereus* and other pathogenic *Bacillus spp.*	549	2	0.4	$\geq 1.0 \times 10^4$	4.6×10^4 – 2.3×10^5
	Clostridium perfringens	546	0	N/A	$\geq 1.0 \times 10^2$	N/A
	Coagulase positive staphylococci	540	5	0.9	$\geq 1.0 \times 10^2$	1.7×10^2 – 3.0×10^3
	Listeria monocytogenes Enumeration	843	1	0.1	$\geq 1.0 \times 10^2$	3.9×10^2
	Vibrio parahaemolyticus enumeration	3	0	N/A	$\geq 1.0 \times 10^2$	N/A
	Totals:	**4,427**	**66**	**1.5**	**N/A**	**N/A**

N/A = Not applicable/available.

Table 19 Breakdown of results by parameter (test) for 2014 routine food samples

The majority of routine food samples that are found to be non-compliant fail for indicator organisms and most of these samples fail only for the Aerobic Colony Count (ACC) parameter. We found only 8 routine samples (0.9%) with non-compliant results due to food pathogens. These are listed in Table 20 below.

The proportion of routine samples with non-compliant ACC levels was 12.3% in 2014. After ACC, the parameter that provides more non-compliant results than any other is Enterobacteriaceae. In 2014, 2.3% of samples were non-compliant for this parameter. Enterobacteriaceae are very widely distributed in the environment so this result is not surprising. Enterobacteriaceae are common on raw vegetable matter so high levels of Enterobacteriaceae in samples containing raw vegetables are

not considered hygienically significant. For this reason we do not examine for this parameter on samples which are known to have a raw vegetable component.

There were no non-compliant Escherichia coli results for routine food samples in 2014.

Further pathogens

Coagulase positive staphylococci were found in 4 routine samples tested where the level could be deemed as non-compliant. Table 20 shows summary data for all pathogens tested and detected at non-compliant levels.

Food	*Analysis Reason*	*Pathogen*	*Non-Compliant Pathogen Level cfu/g*
Chicken	ROUTINE	*Listeria monocytogenes*	3.9×10^2
Prepared Wrap	ROUTINE	Presumptive pathogenic *Bacillus* species (*B. licheniformis*)	4.6×10^4
Gravy	ROUTINE	Presumptive pathogenic *Bacillus* species (*B. licheniformis*)	2.3×10^5
Coleslaw	ROUTINE	Coagulase positive staphylococci	4.0×10^2 Estimate
Tuna Salad	ROUTINE	Coagulase positive staphylococci	9.0×10^2 Estimate
Salad	ROUTINE	Coagulase positive staphylococci	1.7×10^2 Estimate
Coleslaw	ROUTINE	Coagulase positive staphylococci	3.0×10^3 Estimate
Sandwich	ROUTINE	Coagulase positive staphylococci	6.4×10^2

Note: Where a result is reported as an Estimate, this is for statistical reasons.

Table 20 Non-compliant routine food samples containing pathogens

The 5 Routine samples which tested positive for Coagulase positive staphylococci represented 0.9% of routine food samples tested for this parameter. This percentage is similar to that found in 2013 (0.7%). The level of Coagulase positive staphylococci in the non-compliant samples in 2014 ranged from 170cfu/g to 3,000cfu/g for the 5 routine samples. *Staphylococcus aureus (S. aureus)* generally needs to grow to levels of 100,000 to 1,000,000cfu/g in food for sufficient toxin to be produced to cause food poisoning. Not all *S. aureus* produce toxin. This parameter was previously reported as *S. aureus;* most Coagulase positive staphylococci are *S. aureus*.

Presumptive *Bacillus cereus* was not determined to be at non-compliant levels in any of the routine samples tested for this parameter. 2 Routine samples tested had presumptive pathogenic *Bacillus* species other than *Bacillus cereus* at non-compliant levels.

No routine samples had *Clostridium perfringens* at the non-compliant level of >100cfu/g.

One routine sample had *Listeria monocytogenes* at the non-compliant level of 390cfu/g.

The *Vibrio parahaemolyticus* parameter is only applied to fish and fish products. Only 3 of our routine samples were items for which it would have been appropriate for the laboratory to add this parameter and none of the 3 samples tested had the organism at a non-compliant level.

Samples that had pathogens which were on or only slightly above the designated non-compliant level were considered satisfactory or borderline after measurement of uncertainty had been taken into account.

No routine samples tested positive for *Salmonella* species.

The Campylobacter detection parameter test was not applied to any of the routine foods tested.

Coleslaw samples were again a prominent food type in 2014 with 6.5% of the total routine samples submitted. However, the proportion of coleslaw samples had been above 10% for the previous 3 years, so this year's percentage shows a decrease. Table 21 shows some food types that are prominent in the database where the sampling reason was stated as "Routine".

Food Name	*Number*	*% of Total submitted*
Coleslaw	112	9.1
Egg mayonnaise salad	39	3.2
Cooked ham *	35	2.8
Tuna salad	21	1.7
Potato salad	17	1.4

* Excludes samples that had ham in combination with other ingredients

Table 21 Some prominent food types submitted as "Routine" samples.

National Surveys

There was 1 National Survey (14NS1) in the microbiological food laboratory in 2014, co-ordinated by the FSAI in conjunction with the laboratories and the EHS. These surveys take account of issues of particular interest under the EU Co-ordinated programme as well as issues of local interest.

This survey investigated the microbiological safety of ready-to-eat cakes, pastries and desserts with high risk fillings from establishments in Ireland. The survey ran from 1st April to 30th June, inclusive, and 165 samples were tested. As the survey was performed as part of monitoring activities for official controls single samples (n=1) and not batch samples (n=5) were taken. The 165 samples were each tested for all of the parameters listed in Table 22.

Parameter	*Method*
Enumeration of presumptive Bacillus cereus	EN/ISO 7932
Enumeration of coagulase positive staphylococci	ISO 6888-2
Enumeration of Listeria monocytogenes	EN/ISO 11290-2
Detection of Salmonella spp.	EN/ISO 6579

Table 22 14NS1 – Parameters tested and Methods applied

For 1 of the 165 14NS1 samples tested, presumptive Bacillus cereus was enumerated at the unsatisfactory level of 1.0^5cfu/g.

Coagulase positive staphylococci were enumerated in a separate 14NS1 sample at a level of 1.8^3cfu/g which was also a non-compliant level. All other samples tested were compliant for the parameters examined.

As in previous years, this overview of microbiological quality and safety of prepared foods provided by the sampling programme has again provided evidence of a continuing good standard in 2014.

3.3 Food Complaint samples

A total of 183 consumer complaint samples were submitted by the EHS in 2014. This was approximately 30% less than in 2013. After analysis / examination, 66 samples were considered compliant, 1 sample was considered borderline (a microbiological category), 44 samples were considered non-compliant, while in the case of 72 samples no reliable conclusion could be drawn from the sample submitted. Many complaint samples have suffered spoilage, which is not the subject of the complaint, before they are received at the laboratory. Other food samples have spent a long time in storage in a consumer's home under uncontrolled conditions before a problem arises.

In addition to the above, 14 samples were received from private customers related to the investigation of consumer complaints, 2 more than last year.

Tables 23 & 24 below summarise the breakdown of samples by EU category code and analytical outcome for the EHS complaint samples (Table 23) and those from private customers (Table 24).

The following are details of the food product and the problem encountered for the 44 EHS samples designated as non-compliant.

Food	Problem
Chicken balls – Take away	Batter discoloured
Custard – RTE from carton	Fungal growth
Canned peas	Spoiled in can
Filled ravioli	Crab shell fragment in filling
Canned spaghetti in sauce	Spoiled in can
Sandwich	Included a spider
Soda bread	Included piece of wheat stem

Beefsteak	Blue bottle fly eggs on steak
Chicken fillet roll	Included blue paper
Rice	Flour beetle was present
Packet of currants	Clumps of currant debris included in pack
Egg fried rice meal in microwaveable pack	Spoiled by fungal growth
Pack of prepared baby food	Spoiled by fermentation
Canned beans in sauce	Discoloured beans in can
Canned lager	Filter material in can
Whole cooked chicken	Had not been properly eviscerated
Crumbed chicken (cooked)	Moth larva present in the crumb coating
Brie cheese pre-pack	Contaminated with blue bottle larvae
Take away meal	Included a human hair
Cheese burger in bread bun	Timber fragment included in bun
Frozen peas	Included gelatinous specimen of fungal origin
Pack of fruit based baby food	Spoiled by fermentation
Frozen broccoli	Included a moth pupa
Battered chicken	Bristle fibres included in the batter
Biscuits	Bakery char fragments included in biscuit
Vodka	Alcohol by volume - not compliant with legislation
Fish cakes	Yarn fibres included in fish cake
Vegetable stir-fry pre-pack	Mouse hair included
Cod fish fingers	Fly included in fish finger
Breaded chicken fillet (take away)	Had not been adequately cooked
Chicken pate (x7)	Contaminated with *Listeria monocytogenes*
Cooked ham	Excessive aerobic colony count
Take away meal	Cooked chicken feet were included
Fruit juice drinks	Fungal spoilage caused unpleasant odour
Bread	Mixed hairs baked in the bread
Biscuits	Moth larva damaged biscuits and pupated
Take away chicken meal	Daddy-long-legs fly cooked in meal
Packet of rice	Clump of mixed debris and fibres included

Below are presented some of the problems and the range of products encountered where we were unable to establish with confidence the origin of the problem from our analysis. The range and type of complaint samples received were similar to those received in previous years. Many of the problems may have originated at production or in distribution. Some others will more likely have occurred in the domestic environment. Insect and other infestations are now much more likely to be of domestic origin while instances from production or distribution have become much less frequent. Sometimes we are provided with control material that can help us resolve a problem.

Problem	Products affected
Alleged chemical taint,	Bottled waters, rapeseed oils, cola drink, sweets, cake, fresh vegetables
Human, Cat & rodent hairs, Rodent damage	Salad leaves, sandwich, breads, cakes
Dental amalgam, various metal objects	Sweets, canned fruit, filled rolls, cereal bar, bakery products
Pieces of plastic, false nail	Taka-away meal, filled roll, meat & vegetable salad, pastries, prepared meals
Spider, various moth larvae, Wasp, Fly,	Infant formula, fresh fruit, cooked noodles, baked

Millipede, Lacewing lava, Psocids, Maggots	beans, flour, fish with salad, tomato based cooking sauce, Jam, baked beans, minced beef, T/A meals, fish salad, cooked sausage
Glass pieces/fragments	Prepared dish, pizza, muesli
Plant seed, vegetable tissue, wheat stem tissue, woody fragments, fruit/vegetable peel, vegetable matter, plant stem material, connective tissue	Oatmeal, milk, breads, T/A meals, dried fruit, meat
Food ingredients mistaken for foreign matter. Flavouring mistaken for contaminant	Ready meals, cake
Fungal & yeast spoilage	Sausage, Passata
Organoleptic problems	Variety of soft drinks, Rapeseed oils, Whole oranges
Discoloured food items, discoloured food packaging, damaged food	Potato chips, oatmeal, sandwich, chocolate bar, cooked fish, soup, milk container, meat, breads
Poor microbial quality	Prepared dishes, fruit juices
Particles in water	Bottled water,
Stone	Potato chip
Bone specimens	Filled wrap, breakfast cereal

Occasionally minor problems such as pellets of discoloured dough in bakery products are mistaken for rodent faecal pellets. Some allegations of undercooking of meat were substantiated. Instances in which this is confirmed remain infrequent. As in the previous year, none of the allegations concerning microbial food poisoning associated with the consumption of complaint samples were substantiated through analysis of the food submitted. In many cases of gastrointestinal illness, food may not be the vector.

	Type	Total samples	Compliant	Borderline	Not compliant	No designation	% Not compliant
1	Dairy Products	9	4	0	3	2	33
2	Eggs and Egg Products	3	3	0	0	0	0
3	Meat, Game and Poultry	43	21	1	13	8	30
4	Fish, Shellfish and Molluscs	6	1	0	3	2	50
5	Fats and oils	3	0	0	0	3	0
6	Soups, Broths and Sauces	3	0	0	0	3	0
7	Cereals and Bakery Products	26	10	0	6	10	23
8	Fruits and Vegetables	16	2	0	5	9	31
9	Herbs and Spices	0	-	-	-	-	-
10	Non-alcoholic Beverages	8	2	0	1	5	25
11	Wine	0	-	-	-	-	-
12	Alcoholic Beverages (other than wine)	5	1	0	2	2	20
13	Ices and Desserts	0	-	-	-	-	-
14	Cocoa, Coffee, Tea	0	-	-	-	-	-
15	Confectionery	7	2	0	0	5	0
16	Nuts and Nut Products, Snacks	3	0	0	0	3	0
17	Prepared Dishes	35	11	0	8	16	23
18	Foodstuffs for Particular Nutritional Uses	14	9	0	2	3	14
19	Additives	0	-	-	-	-	-
20	Materials in contact with foodstuffs	2	0	0	1	1	50
21	Others	0	-	-	-	-	-
	Totals	**183**	**66**	**1**	**44**	**72**	**24**

Table 23 Complaint samples received from Environmental Health Officers during 2014

Not Compliant: The complaint was justified and the sample was unsafe because it does not comply with the requirements of Article 14 of Regulation (EC) No 178/2002, **or** the sample was not of the quality demanded, or the sample did not comply with other relevant legislation.

No Designation: Compliance of the food with food law at purchase could not be determined on the basis of the sample provided and the information available.

Borderline: A microbiological category

	Type(EU category)	*Total samples*	*Compliant*	*Not compliant*	*No designation*	*% Not compliant*
1	Dairy Products	1	1	0	0	0
3	Meat, Game and Poultry	8	7	0	1	0
10	Non-alcoholic Beverages	1	0	0	1	0
14	Cocoa, Coffee, Tea	1	0	0	1	0
21	Others	3	0	0	3	0
	Total:	**14**	**8**	**0**	**6**	**0**

Table 24 Complaint samples / complaint investigation samples received from private clients during 2014

Not Compliant: The complaint was justified and the sample was unsafe because it does not comply with the requirements of Article 14 of Regulation (EC) No 178/2002, **or** the sample was not of the quality demanded, or the sample did not comply with other relevant legislation.

No Designation: Compliance of the food with food law at purchase could not be determined on the basis of the sample provided and the information available.

3.4 Food Export Certification testing

The laboratory provides an analytical service to food business operators particularly regarding analysis of food products for Certificates of Free Sale for export of foodstuffs outside the EU.

In 2014, over 150 samples from numerous different companies were analysed in this category. All samples were non-programmed which had a major impact on the laboratory resources.

The range of parameters tested for included:

- **i)** contaminants (patulin)
- **ii)** additives (sulphur dioxide)
- **iii)** alcohol by volume, methanol and congeners, sugars
- **iv)** labelling
- **v)** microbiological parameters.

The testing required for each product type is risk-based and guided primarily by (i) contaminants and/or additives legislation where there is a specific statutory limit for the food type in question and (ii) the analytical methods that are available in the laboratory.

41 Samples of alcoholic beverages underwent multiple analyses. Microbiological testing was performed on 75 chocolate products; additionally these underwent labelling analysis to ensure compliance with the relevant legislation. 21 Samples of gum base were submitted from a company for antioxidant (BHT) analysis as part of their requirements for export certification.

Costs for analysis are determined, depending on sample type, on how many test parameters are required and on the number of samples being submitted.

Some countries importing products from the EU have extra requirements for certificates to be issued and requested specific certificates have been issued.

3.5 Other / Miscellaneous food samples.

Examination was performed on a significant number of food samples from various organisations and private companies.

4. WATER / EFFLUENT / SWIMMING POOL SAMPLES

In the year ended 31st December 2014, 4896 samples of water were submitted to the laboratory for chemical and/or microbiological analysis. The majority of the samples were taken from drinking water supplies and were tested for compliance with the European Communities (Drinking Water) Regulations 2014, S.I. No.122 of 2014.

Categories

The water samples were categorised as shown in Table 25.

Category	*Number of Samples*
Local Authorities & the HSE – Chemical samples	1210
Local Authorities & the HSE – Microbiological samples	1907
Local Authorities & the HSE – Fluoride samples (Note 1)	834
General Public, companies (Private) – Chemical samples	444
General Public, companies (Private) – Microbiological samples	501
Total :	**4896**

Note 1*: *Fluoride samples refer to samples submitted for this analysis only, which were tested for compliance with the Fluoridation of Water Supplies Regulations, S.I. No.42 of 2007. Fluoride analysis is also performed on other water samples, as shown in the Appendix 3 Fluoride tables.

Table 25 Water sample categories in 2014

Included in the 4896 samples were the sample/parameter types shown in Table 26.

Type / Parameters	*Number of Samples*
Trihalomethanes (THMs)	45
Swimming pool (including Spa pool)	38
Effluent - Biochemical Oxygen Demand & other parameters	20
Hospital Renal Dialysis unit samples	18
Hydrofluosilicic Acid Samples	28
Bottled/Mineral Water Samples	48
Total :	197

Table 26

Other water samples

In addition, 5 distributions of water samples for both Aquacheck and EPA Proficiency Test Schemes were analysed throughout the year.

4.1 Discussion of some chemical parameters in the 2014 water samples.

Nitrate: ***Parametric Value (PV) 50 mg/l NO3***

Relatively little of the nitrate found in natural waters is of mineral origin. Most of it comes from organic (such as waste discharges) and inorganic sources (predominantly artificial fertilisers). In addition, bacterial oxidation and fixing of nitrogen by plants can produce nitrate. High nitrate levels in drinking water can make it hazardous to infants as the nitrate can induce 'blue baby' syndrome (methaemoglobinaemia). Infants do not have fully developed digestive systems. Their gastric juices are less acidic than those of adults and 100% of the nitrate is converted into nitrite while only about 10% conversion is expected in adults and children. Nitrite oxidises the haemoglobin in the blood to methaemoglobin, which is not an oxygen carrier to the tissues, with consequent anoxia (methaemoglobinaemia).

In 2014, 980 samples were analysed for nitrate. Of these, 4 had nitrate levels greater than the EU PV of 50mg/l NO_3 representing 0.41% of the samples analysed.

Aluminium: ***PV 200 µg/l***

Aluminium is the most abundant metallic element and accounts for approximately 8% of the earth's crust. In the treatment of drinking water aluminium salts are widely used for the removal of colour and colloids. It is through this use that there may be increased concentrations of aluminium in the finished treated water. In their *Guidelines for Drinking Water Quality* the WHO indicates that human exposure to aluminium can arise from a number of sources with drinking water contributing less than 5%. Aluminium intake from foods represents the major route of exposure. The PV of 200µg/l is a maximum level that allows for the beneficial use of aluminium as a coagulant, while minimising the levels in finished treated water.

In 2014, 1448 waters were tested for aluminium. Of these 49 had aluminium levels greater than 200µg/l, representing 3.38% of samples tested.

Lead: ***PV 10 µg/l***

Lead is a poison. Because it accumulates in the body strict limits on levels of lead in drinking water apply. Lead is rarely present in treated drinking water supplies; its presence mainly arises from old household plumbing systems that use lead pipes. The amount of lead brought into solution depends on a number of factors, including pH, temperature and the hardness of the water. The current Parametric Value of 10µg/l came into effect at the end of December 2013.

Out of a total of 492 tests performed for lead in water in 2014, 38 had lead levels above the EU PV limit of 10µg/l. This represents 7.72% of the total samples analysed.

4.2 Fluoridation of Public Water Supplies.

Water fluoridation is the adjustment of the natural concentration of fluoride in drinking water to the optimal recommended level for the prevention of dental caries. The HSE is ultimately responsible for the fluoridation of water supplies in Ireland.

Article 6 of S.I. No.42 of 2007 (Fluoridation of Water Supplies Regulations) states; "The amount of fluoride which may be added to public water supplies shall be such that the water, after the addition of the fluoride, shall contain not more than 0.8 milligrams of fluoride per litre (mg/l) of water, and not less than 0.6 milligrams of fluoride per litre (mg/l) of water."

The fluoride levels found in water supplies in 2014 are given in Appendix 3.

Hydrofluosilicic Acid Analysis

The laboratory continues to perform the independent analysis of Hydrofluosilicic acid (HFSA). HFSA is a chemical substance containing fluoride that is used for the fluoridation of water intended for human consumption. The HSE has the responsibility for the implementation of S.I. No. 42 of 2007 on a National level and to ensure that the HFSA supplied is independently tested. Representative 'grab samples' of the HFSA distributed nationwide are taken at random and submitted to the laboratory for the testing.

The specification for the acid is as follows - 10.9% by weight of HFSA, subject to a tolerance of ±0.3%. The limits for the heavy metals, as specified in European Standard IS.EN 12175: 2013, are listed in Table 27. All 28 HFSA samples submitted for analysis complied with the above standard.

Parameter	*Limit mg/kg HFSA (at 100% active ingredient)*
Antimony (Sb)	80
Arsenic (As)	400
Cadmium (Cd)	40
Chromium (Cr)	400
Lead (Pb)	400
Mercury (Hg)	10
Nickel (Ni)	400
Selenium (Se)	80

Table 27 HFSA Specification

4.3 The Microbiological Examination of Drinking and Other Water

In the year ended 31st December 2014 the laboratory analysed 2467 microbiological water samples.

The samples consisted of the water categories shown in Table 28.

Water category	*Number of Samples*
Drinking Water	2358
Bottled water	32
Ice	2
Swimming / Spa pool	59
Environmental	12
Effluent	1
Bathing	3
Total:	**2467**

Table 28 Categories of waters for microbiological examination

Drinking Water

Drinking water samples were submitted from the HSE, Local Authorities and members of the public and consisted of water originating from both public and private supplies.

The basic standards governing the quality of drinking water intended for human consumption are set out in EU Council Directive 98/83/EC and are implemented by the European Union, (Drinking Water), Regulations, 2014, S.I. No. 122 of 2014.

Drinking Water from the HSE / Local Authorities

Table 29 shows the proportion of samples which conformed to the values set out in S.I. No. 122 of 2014. This data should not be used to assess compliance of Irish drinking water with EU law as our data is aggregated data which includes repeat, pre-treatment and private supply samples, which would be expected to have a higher incidence of contamination.

Parameter	*Limits set by S.I. 122 of 2014*	*% Samples Conforming with S.I. 122 of 2014*	*Sample Numbers Tested*
Safety Parameters			
Escherichia coli	0 cfu per 100ml	97.04%	1823
Enterococci	0 cfu per 100ml	94.78%	1361
Indicator Parameters			
Coliforms	0 cfu per 100ml	84.55%	1826
Clostridium perfringens	0 cfu per 100ml	97.88%	895

Table 29

Microbial indicators of water quality

Indicator organisms are used to assess the microbiological quality of water. The use of indicator organisms, in particular the coliform group, as a means of assessing the potential presence of water-borne pathogens has been paramount to protecting public health.

E. coli is a coliform organism which is an indicator of recent faecal contamination. Coliforms other than *E. coli* may or may not be of faecal origin and may persist and even grow in water. Coliforms are sensitive to chlorine and should always be absent from chlorinated water. Biofilm build-up in domestic taps or pipework can protect the coliform bacteria against residual chlorine.

S.I. No 122 of 2014 states that one of the criteria for a water to be regarded as 'wholesome and clean' is that *E. coli* and Enterococci should be absent from 100ml of drinking water sample.

Enterococci and *Clostridium perfringens* are regarded as secondary indicators of faecal contamination. The main reason for testing for these organisms is to assess the significance of coliform bacteria in a water sample in the absence of *E. coli*. Enterococci do not multiply in water and are generally more resistant to environmental stresses and chlorination than coliform bacteria. Spores of *Clostridium perfringens* are capable of surviving for significantly longer periods than vegetative bacteria and are also more resistant to chlorination. As a result of this *Clostridium perfringens* testing is useful in determining the effectiveness of the chlorination process. However, both *Clostridium perfringens* and Enterococci may be present in faeces in much smaller numbers than Coliforms and *E.coli* and are therefore less sensitive indicators of contamination.

Drinking water from Private Supplies

Private supplies are not normally subject to S.I. No. 122 of 2014. Nevertheless the parametric values set out by the regulation provide a useful basis for assessing fitness of a private water sample. Table 30 shows the level of compliance of drinking water, submitted to the laboratory from private supplies, with S.I. No. 122 of 2014.

Parameter	*Limits set by S.I. 122 of 2014*	*% Samples Conforming with S.I. 122 of 2014*	*Sample Numbers*
Safety Parameters:			
Escherichia coli	0 cfu per 100ml	90.62%	373
Enterococci	0 cfu per 100ml	83.40%	476
Indicator Parameters			
Coliforms	0 cfu per 100ml	61.48%	527
Clostridium perfringens	0 cfu per 100ml	71.74%	46

Table 30

The type and depth of wells/borings can have a big impact on the bacteriological outcome. It can be very difficult to keep a shallow well, less than 10M, free of bacteriological contamination. It may be possible to improve the bacteriological quality of deeper sources through once off sterilisation and attention to details of well protection.

As private wells / borings may be prone to fluctuations in quality, it is important to build a history of quality over time. Owners of private wells / borings are encouraged to have an initial full examination, chemical and microbiological, of their supply carried out and if that is satisfactory, to subsequently at least have a bacteriological test performed annually to ensure that hygienic quality is maintained.

Bottled Water

The National legislation governing bottled water is set out in S.I. No. 225 of 2007. Bottled waters includes natural mineral waters, spring waters and other waters intended for human consumption supplied in bottles or containers other than waters that are medicinal products.

32 Bottled water samples were submitted for microbiological analysis in 2014, all of which were compliant with S.I. No. 225 of 2007 for the Coliform and *E.coli*, Enterococci, *C. perfringens*, sulphite reducing clostridia and *Pseudomonas aeruginosa* parameters.

Table 31 details microbiological parameters examined and percent compliance with S.I. 225 of 2007.

Microbiological Parameter	*Limits set by S.I. 225 of 2007*	*% Samples Conforming with S.I. 225 of 2007*	*Sample Numbers*
Coliforms	0 in 250ml	100%	32
Escherichia coli	0 in 250ml	100%	32
Enterococci	0 in 250ml	100%	32
Pseudomonas aeruginosa	0 in 250ml	100%	31
Sulphite reducing clostridia (Natural mineral and spring water only)	0 in 50ml	100%	29
C. perfringens	0 in 100ml	100%	28

Table 31

Ice for cooling drinks

2 Ice samples were submitted for microbiological analysis in 2014. There are no specified microbiological criteria in European legislation for ice. Given this, the microbiological criteria specified in drinking water legislation have tended to be applied to ice. This approach is too rigorous as ice undergoes an additional process at the point of distribution.

The ice samples complied with S.I. 122 of 2014 for the *E.coli* and Enterococci parameter, whilst 1 was non-compliant for the Coliform parameter.

Table 32 lists parameters tested and conformance with S.I. 122 of 2014 for ice. Such conformance is not a requirement and serves only as a reference point.

Microbiological Parameter	*Limits set by S.I. 122 of 2014*	*% Samples Conforming with S.I. 122 of 2014*	*Sample Numbers Tested*
Coliforms	0 in 100ml	50%	2
Escherichia coli	0 in 100ml	100%	2
Enterococci	0 in 100ml	100%	2

Table 32

Swimming and Spa Pool Samples

There are currently no Statutory Irish microbiological standards or guidelines for swimming and spa pool waters. For the purposes of this report the results were compared with the limits set by the Pool Water Treatment Advisory Group (PWTAG), in 'SWIMMING POOL WATER, Treatment and Quality Standards', 2009 (a UK publication), as an example of good practice.

59 Swimming / spa pool samples were submitted in 2014 comprising 44 swimming pools and 15 spa pool waters. The samples were also analysed for Enterococci though there are no guide levels/criteria indicated in the PTWAG guidelines. Enterococci are used as secondary indicators of faecal contamination and were not detected from 90.91% and 93.33% of all swimming and spa pool samples respectively.

Table 33 shows the percentage compliance of swimming and spa pool samples with PWTAG, 'The Swimming Pool Water, Treatment and Quality Standard, 2009'.

Microbiological Parameter	*Guide level**	*% Conforming Swimming Pool Samples*	*Swimming Pool sample No*	*% Conforming Spa Pool Samples*	*Spa Pool sample No*
Coliforms	0 in 100ml	88.64%	44	86.67%	15
Escherichia coli	0 in 100ml	90.91%	44	93.33%	15
Pseudomonas aeruginosa	0 in 100ml	90.00%	40	100%	14
TVC at 37°C	≤ 10 in ml	90.91%	50	92.86%	14

* PWTAG Swimming Pool Water, Treatment and Quality Standards, 2009

Table 33

Miscellaneous Samples.
12 Environmental waters, 3 bathing water samples and 1 effluent sample were also analysed.

The Water laboratory participates in 5 different proficiency testing schemes: PHE Drinking Water Scheme, PHE Bottled and Mineral Water Scheme, PHE Recreational and Surface Water Scheme, PHE Standard Scheme and LGC QWAS. In addition to the samples listed in Table 29 there were more than 30 samples analysed as part of external proficiency testing schemes.

5. CLINICAL SAMPLES

981 Samples of biological fluids were analysed for metals in 2014. The samples comprised:

Blood:	195
Serum:	751
Urine:	35

The number of metal tests in the different sample types is given in Table 34.

In addition, samples of biological fluids were analysed under Proficiency Schemes and other Quality Control Programmes.

Matrix	*Aluminium*	*Copper*	*Lead*	*Magnesium*	*Manganese*	*Mercury*	*Selenium*	*Zinc*
Blood			**153**		**33**	**9**		
Serum	**235**	**356**					**26**	**134**
Urine		**31**				**4**		
Totals	**235**	**387**	**153**		**33**	**13**	**26**	**134**

Total Number of Tests: 981

Table 34 Metal Tests on Clinical Samples

6. MICROBIOLOGY OF COSMETICS

6.1 Legislative background

Samples of cosmetics to be tested for microbiological parameters are taken under S. I. 440 of 2013. Initial microbiological sampling is informal. If a problem is found formal samples may then be taken and submitted to the laboratory for examination.

6.2 The sampling and analysis program as implemented

The fourth annual programme of microbiological testing of cosmetics commenced in February 2014. We reported on 106 samples. One further sample proved to be a medicine and was not reported. A replacement sample was provided in that instance. The sampling programme was implemented through all 4 HSE areas.

6.3 Testing and Compliance

We examined 100 scheduled cosmetics samples under the 2014 cosmetic Sampling Programme.
2 More samples were examined for repeat testing purposes. A further 4 samples were examined at the request of the Health Products Regulatory Authority. 5 Scheduled samples (5%) were found to be non-compliant with EU microbiological guidelines. 1 Repeat sample was found to be non-compliant. Table 35 shows a breakdown according to EU cosmetic category. The non-compliant products were baby skin powders (2 products) while the skin cleaning products were heavy duty hand cleaners (2 products).

EU Cosmetic Category	*Number*	*Compliant*	*Non-compliant*	*No Designation*
Antiperspirants / Deodorants	7	7	0	0
Hair care	4	4	0	0
Make up	19	19	0	0
Mouth wash	11	11	0	0
Skin care	49	47	2	0
Skin cleaning	20	16	4	0
Sun Tan	1	1	0	0
Total	106	100	6	0

Table 35 Cosmetic samples according to EU cosmetic category

We reported 87 results for aerobic mesophilic bacteria enumeration, 94 results for yeast and mould enumeration, 80 results for Pseudomonas aeruginosa detection and 69 results for Staphylococcus aureus detection. We did not report results for a parameter when we were unable to demonstrate satisfactory performance in challenge tests on the product. This can occur when products are highly inhibitory to particular types of microorganism. In these cases of course, it is highly unlikely that the products are contaminated with microorganisms of that type because of their inhibitory nature. In our experience, products are rarely too inhibitory to support the growth of yeast or moulds hence we are able to report more results for this parameter.

Some cosmetic products are supplied only in very small quantities. Where there is limited sample available for testing we reduce the number of parameters tested.

Non-compliant results were obtained only for the aerobic mesophilic bacteria parameter (4 products, 6 samples). Compliance was assessed using the criteria specified in the 8th Edition of the Guidance Notes for Testing of Cosmetic Ingredients produced by the EU Scientific Committee on Consumer Safety (SCCS, 2012). In the case of general cosmetic products aerobic mesophilic microorganisms are tolerable up to a level of 1000 cfu/g or 1000 cfu/ml. In the case of products intended for children under 3 years, around the eyes, or on mucus membranes, a limit of 100 cfu/g or 100 cfu/ml applies.

2 Different baby powders had aerobic mesophilic bacterial counts of 3500 cfu/g and 13,000 cfu/g respectively. A hand cleaning product had counts of 9,000 cfu/g while a different hand cleaning product had counts ranging from 25,000 cfu/g to 49,000 cfu/g.

6.4 Scope of Cosmetics Accreditation

As resources were again stretched, we did not extend the scope of our cosmetics accreditation during 2014. We continued work to extend the range of parameters available for cosmetic testing. Whenever possible we reported a Presence/Absence result for S. aureus on a non-accredited basis and this work will contribute to an extension of our scope of accreditation in this area in the coming year. All the methods in use in the cosmetics laboratory continue to be full implementations of ISO cosmetic methods.

7. ACCREDITATION

7.1 Legislation

The Public Analyst's Laboratory, Dublin was awarded accreditation by the Irish National Accreditation Board (INAB) in September 1998 to the European standard EN 45001, the ISO Guide 25 and the INAB publication P1.

International Standard ISO 17025 "General requirements for the competence of testing and calibration laboratories" Second Edition was published on 15 May 2005. The laboratory successfully achieved transference to the 'Second Edition'.

The purpose of the Second Edition is to clarify that meeting the requirements of ISO 17025 does not automatically mean that all the ISO 9001 requirements are also met and to align the management requirements of ISO 17025 with the content of ISO 9001:2000.

7.2 Operation of the Laboratory's Quality Management System

7.2.1 Management

7.2.1.1 Organisation

The operation of the Quality Management System is detailed in the following laboratory documentation:

Quality Manual
Administrative Manual
Test Methods - Chemistry
Test Methods - Microbiology

7.2.1.2 Document Control

The laboratory has and maintains procedures to control all documents, internally generated or from external sources, that form part of the quality management system, such as regulations standards, other normative documents, test method, as well as drawings, software, specifications, instructions and manuals. Procedures are established and maintained to control all such documents. All documents are held for a period of at least 5 years in compliance with INAB requirements.

7.2.1.3 Audits

Audits are conducted each year according to a predetermined schedule and procedure. The purpose is to verify that the operations of the laboratory comply with the requirements of the quality management system and International Standard ISO 17025. The internal audit programme addresses all elements of the quality management system.

Three different types of audits are conducted. A horizontal audit is a detailed check of a quality management system element throughout the total range of testing activities covered by the accreditation. Examples are staff training, calibration and maintenance of equipment. A vertical audit is a detailed check that all quality management system elements associated with a test are implemented in a specific assignment. In a vertical audit, a representative performed test is selected at random from work that has recently passed through the laboratory. A test witnessing audit is a detailed check that all quality management system elements associated with the performance of a test are implemented. The performance of the test is witnessed by the auditor.

7.3 Technical

7.3.1 Measurement Traceability

Traceability of measurement to SI units of measurements is established in compliance with ISO 17025.

7.3.2 Test Method Validation

A documented procedure is conducted for the validation of laboratory test methods in order to establish the performance characteristics of the method and to identify the influences which may change these characteristics and to what extent.

7.3.3 Estimation of Uncertainty of Measurement

The uncertainty of a result is a quantitative indication of its quality. A documented procedure is conducted for the estimation of the uncertainty of measurement of laboratory test methods.

7.3.4 Quality Control

In order to ensure the quality of test results, the laboratory operates specified quality control procedures.

7.3.4.1 Internal Quality Control

Following the validation of the test method a validation report detailing performance criteria calculated, including all raw data and calculations, is prepared. This data provides the basis for the preparation of quality control charts.

The use of statistical quality control (qc) charts is a powerful tool for monitoring the stability of an analytical system. In the performance of a test method, a quality control material is measured regularly and the analytical responses are plotted in time-order on a qc chart; if the chart displays other than random variation around the expected result it suggests that there may be a problem regarding the measurement process. Specified action must then be taken.

7.3.4.2 External Quality Control

The Laboratory participates in both inter-laboratory comparisons and Proficiency Testing Programmes. The current series of Proficiency Testing Programmes are detailed in Table 36.

External Quality Control for both accredited and non-accredited Test Methods			
Laboratory Section	**PT Scheme**	**Studies/Parameters**	**Distribution**
		Chemistry	
Food Chemistry ***Including Method Research and Development***	FAPAS	FC: 19 rnds* 19 para** TEL: 3 rnds, 1 para LC-MS: 51 rnds, 115 para, GC-MS: 10 rnds, 45 para	April 2015 – March 2016
	CHEK	LC-MS: 2 rnds, 3 para, GC-MS: 1 rnds, 6 para	
	DAPs	FC 1 parameter Alcohol By Volume	2 rounds (4 samples per year)
	LGC QBS	FC 4 parameters	2 rounds
	SCHEMA	LC-MS 7 parameters TEL: 2 parameters GCMS: 1 rnds 12 para	1 rounds 1 round 1 distribution per year
	JRC-IRMM (Geel and Ispra)	LC-MS: TBD GC-MS & MR&D: 3 rnds 11 para	LC-MS: TBD 1 distribution per year
	IISNL	LC-MS 1 parameter	1 round
	Progetto Trieste	FC 2 parameters	1 round
	DLA	FC 2 parameters	1 round

	Bipea There may be participation in additional schemes throughout the year.	FC 1 parameter	2 rounds
Water chemistry	Aquacheck Ltd	Groups 1 – 5 Maximum of 35 parameters per Distribution	5 Distributions per year
		GCMS: 1 rnd 5 para	1 distribution per year
	EPA	Groups 1 - 4 Maximum of 26 parameters per Distribution	5 Distributions per year
Clinical Chemistry	TEQAS	8 parameters	12 (2 blood, 2 serum & 2 urines samples per monthly distribution)
Food Microbiology	PHE Standard Scheme	For Food Microbiology Examinations (Total 18 parameters)	6 Distributions per year (12 samples) April 2015 – March 2016
	PHE Pathogenic Vibrio Scheme	*Vibrio parahaemolyticus* (2 parameters)	2 Distributions per year (4 samples) April 2015 – March 2016
	Don Whitley Quality Counts Scheme	Spiral Plater counts (1 parameter)	12 Distributions per year (24 samples)
	LGC Environmental Hygiene monitoring PT scheme	3 parameters	2 Distributions per year (4 samples)
Cosmetic Microbiology ***(Not for FSAI)***	LGC Cosmetics (Cosmetics and Toiletries) Scheme	Aerobic mesophilic bacteria (Enumeration), Yeast & mould (Enumeration), *P. aeruginosa* (Detection), *S. aureus* (Detection)	2 per year
Water Microbiology	PHE EQA for Drinking Water	For Coliform, *E. coli,* Enterococci, *P. aeruginosa*, *C. perfringens* and TVC at 37 and 22'C.	Total of 6 distributions, (18 samples)
	PHE EQA – Recreational and Surface Water Scheme	For marine (bathing beach): *E. coli*, Salmonella and Enterococci.	2 Distributions (4 samples)

		For swimming pool waters: Coliforms, *E. coli*, Enterococci, *P. aeruginosa*, TVC at 37'C.	2 Distributions (4 samples)
	PHE Bottled and Mineral Water Scheme	For Coliform, *E.coli*, Enterococci, *P. aeruginosa*, *C. perfringens, SRC and TVC at 37 and 22*'C	3 Distributions (2 samples)
	PHE EQA for Food Microbiology (Campylobacter)	For Campylobacter analysis	2 Distributions(4 samples)
	LGC standards, QWTAS	For Salmonella analysis 419, (surface waste and bathing water).	Total of 4 samples

* rnds = Rounds. ** para = Parameters.

Table 36 Proficiency Testing Programmes

7.4 Schedule of Accreditation

The scope of accreditation for the laboratory (Registration No. 099T) covering both chemistry and microbiology has been greatly extended since initial accreditation was awarded in 1998.

Table 37 shows the extension to the schedule of accreditation which was assessed by the Irish National Accreditation Board in March 2015.

Extension to the schedule of accreditation, assessed by INAB in March 2015
New methods
SOP PALM 0011# Enumeration of viable aerobic mesophilic flora using TEMPO AC
SOP PALC 0137# Determination of Quassin in Non-Alcoholic Beverages by High Performance Liquid Chromatography
SOP PALC 0140# As discussed The determination of monochloropropandiol and glycidol esters in food by GC-MS
SOP PALC 0067# As discussed Testing for Carbon Monoxide in fish (typically tuna and swordfish).
SOP PALC 0089# The determination of bisphenol A in food contact materials and foodstuffs by HPLC and fluorescence detection
SOP PALC 0097# The determination of lead in whole blood by graphite furnace atomic absorption spectrophotometry
SOP PALC 0112# The determination of the migration of lead and cadmium from ceramic articles by inductively coupled plasma mass spectroscopy

Extensions to Currently Accredited Methods

SOP PALM 0104:
Detection and Enumeration of sulphite reducing Clostridia and Clostridium perfringens in drinking water and other waters by membrane filtration
SOP PALCW 0006
The determination of total metals in aqueous samples by inductively coupled plasma/mass spectrometry (ICP-MS)
SOP PALC 0008
Determination of benzoic acid and sorbic acid in non-alcoholic beverages by high performance liquid chromatography
SOP PALC 0011
Determination of sulphur dioxide in food and beverages by distillation and titrimetry
SOP PALC 0011
Determination of sulphur dioxide in food and beverages by distillation and titrimetry
SOP PALC 0011
Determination of sulphur dioxide in food and beverages by distillation and titrimetry
SOP PALC 0011
Determination of sulphur dioxide in food and beverages by distillation and titrimetry
SOP PALC 0028
Determination of Sodium Nitrite and Sodium Nitrate in Meat and Meat Products by Anion Exchange High Performance Liquid Chromatography
SOP PALC 0075
Determination of Polycyclic Aromatic Hydrocarbons in Oils and Fats by GC-MS
SOP PALC 0045
The determination of patulin in apple products, juices and smoothies, and ciders by SPE extraction and quantification by UPLC with ultraviolet or tandem mass spectrometric detection
SOP PALC 0115
The determination of the pH and free acidity of honey by titration to pH 8.30 or equivalence point
SOP PALC 0113
The determination of the diastase activity of honey with Phadebas® by UV/Vis spectrophotometry
SOP PALC 0086
The determination of the water content of honey by refractive index using a hand-held refractometer
SOP PALC 0022
Determination of zearalenone in cereals, baby food and maize oil by immunoaffinity column extraction and HPLC with fluorescence detection

Table 37 Extension to Scope of Accreditation

Full details of the scope of accreditation are available at
http://www.inab.ie/FileUpload/Testing/-Public-Analyst-s-Laboratory-Dublin-099T.pdf

8. TRAINING

The laboratory is committed to providing continual training of staff in a wide range of aspects of chemical and microbiological analysis. In accordance with ISO 17025 a policy and procedures are in place for identifying training needs and providing training of personnel. A Training Officer is appointed to manage the laboratory's Training Programme.

A staff file is maintained for each member of staff in which the following information is recorded:

- **i)** name
- **ii)** date commenced in the laboratory
- **iii)** qualifications
- **iv)** relevant work experience
- **v)** record of experience/responsibilities
- **vi)** record of initial in-house training
- **vii)** record of competence re-assessment
- **viii)** record of training received in house by external trainers
- **ix)** record of external training
- **x)** record of current list of competencies for accredited test methods
- **xi)** record of current list of competencies

8.1 In house Training

Technical

Analysts who are required to carry out an unfamiliar analytical procedure must undergo a training programme under the supervision of an experienced analyst. The protocol for the training programme is detailed in a Standard Operating Procedure (SOP). The end result is the demonstration of competence in that method by the trainee analyst. A personal training record is maintained for each member of staff. All approved analysts must demonstrate an on-going ability to achieve the required standard for each Test Method.

8.2 External Training

A wide range of technical training courses are attended by members of staff each year.

During 2014 staff members attended a diverse variety of training courses and participated in programmes of further education, as detailed in Table 38.

Course/Seminar title	*Organiser*
Skills Development / Technical Training	
Gas Phase Chromatography Workshop	Thermo Scientific
Organic Mass Spectroscopy food and environmental analysis	Agilent technologies
Irish mass spectrometry society IMSS annual meeting	IMSS
Labware Europe Customer Education Conference	LabWare LIMS
Workshop on import controls on feed and food of non animal origin	BTSF
MassHunter software training	Agilent
Annual meeting of the Network of reference laboratories for PAHs	EURL, Geel
Liquid Phase Chromatography Workshop	Thermo Scientific

Gas Phase Chromatography Workshop	Thermo Scientific
Acquity QDa Mass Detector Seminar & Demonstration	Waters Chromatography Ireland Ltd.
Training on Food Additives, Enzymes and Flavourings	Better Training for Safer Food
Nanotechnology in the Agri-food industry: Applications, opportunities and challenges	*safe*food
Field flow Fractionation	Postnova
Grand Challenges for Global Agriculture and Food	Teagasc
Research and Knowledge Transfer for Global Food Security Perspectives on Ireland's Contribution	Teagasc
Ireland's Response to Global Grand Challenges in Agriculture and Food	Teagasc
Workshop with laboratory experts on honey quality testing	European Commission
Exposure Assessment of Chemicals using FACET	EURL, Ispra
Safety of Food Contact Materials: Migration Testing Guidelines in support of Regulation (EU) No 10/2011	EURL, Ispra
Set-up of Waters Xevo G2 QToF Mass Spectrometer	Waters
AF2000 Seminar and Demonstration	LGC
Speciation Software	PerkinElmer
Measurement Uncertainty Training	IRMM, Geel
Induction Training	
General Induction Training	In-house
Induction for students	In-house
Information Technology Training	
Informatics Seminar–Knowledge through Sharing and Benefit form the Latest Laboratory Trends	Waters
Health Safety and Welfare	
Safety Representatives Foundation Course	HSE
Further Education	
Specialist Diploma in Quality Management - Lean Healthcare Systems	University of Limerick

Table 38 Training Courses, Seminars in 2014

9. EXTERNAL MEETINGS

During 2014 laboratory staff participated in numerous committee meetings. These included:

- **i)** FSAI meetings with the Public Analysts
- **ii)** FSAI-PAL-EHS meetings
- **iii)** FSAI meetings with the OFMLs
- **iv)** FSAI-OFML-EHS meetings
- **v)** FSAI Legislation Committee meetings
- **vi)** FSAI Working Groups
- **vii)** FSAI Import Control Group
- **viii)** Regional Food Sampling meetings
- **ix)** Regional Zoonosis meetings
- **x)** National Fluoridation Steering Group meetings
- **xi)** DSE/Wicklow Quality, Safety and Risk Governance Group

10. HEALTH, SAFETY & WELFARE

In accordance with the Safety, Health and Welfare at Work Act, 2005 and associated legislation, it is the policy of the Public Analyst's Laboratory to ensure, in so far as is reasonably practicable, the safety, health and welfare of all its employees and those who have business on its premises.

A Health Safety and Welfare Officer (HSWO) is appointed from the laboratory staff to manage the laboratory's Health Safety and Welfare programme.

A Safety Representative was appointed in June 2014. The Safety, Health and Welfare at Work Act 2005 provides for consultation between employers and employees to help ensure co-operation to prevent accidents and ill-health. Under Section 25 of the Act, employees are entitled to select a safety representative to represent them on safety and health matters in consultations with their employer. Section 26 sets out the arrangements for this consultation on a range of safety and health issues at the workplace.

In the laboratory, consultation is conducted in two ways:

(i) Via the monthly LMT meetings. Health, Safety and Welfare matters are raised at the LMT meetings and also issues raised at the monthly Laboratory Section meetings are raised by the relevant LS representative. The Laboratory Safety Representative attends the LMT Health Safety and Welfare agenda item.

(ii) Direct liaison between the laboratory Safety Representative and laboratory staff.

In 2014, the laboratory Safety Representative attended a three day training course given by the HSE Staff Health Safety and Welfare Department.

10.1 Risk Assessment

Hazard identification, risk assessment and the subsequent implementation of protective and preventative control measures are key to the successful implementation of our safety management programme, thus providing a safe work environment.

The four steps in performing risk assessments are as follows:

Risk Identification
Risk Analysis
Risk Evaluation
Risk Treatment

Risk Assessment tools were imparted at the HSE Risk Assessment Workshops provided to laboratory staff. A risk matrix is used to categorise risks identified i.e. place them into the high, medium or low category. This process allows for the prioritisation of the additional actions which have been identified as being required.

10.2 Safety Statement

The laboratory Safety Statement is a written programme detailing the plans to be implemented to ensure the safety health and welfare of employees while at work.

The operation and documentation of the laboratory Health, Safety and Welfare System is integrated with the operation and documentation of the laboratory Quality Management System.

10.3 Training

Health, Safety and Welfare training was provided for staff in 2014 as detailed in Table 39 above.

10.4 Vaccination Programme

All staff members are informed of the possible health hazard posed by contaminated body fluids and water samples. Most infectious hepatitis is caused by viruses; the most common of these are Hepatitis A and B for which a vaccination programme is in operation.

10.5 Waste Management

There is waste management programme in operation dealing with the environmental disposal of waste, as detailed in Table 39.

Waste – 2014	*Cost for Disposal € (incl VAT)*
General Waste	2143
Solvent/chemical Waste	9321
Clinical Waste including Contaminated Glass	46239
Mercury Waste	Nil
Paper waste	Included in General Waste cost
Cardboard	Included in General Waste cost
Glass waste	145
Obsolete Equipment	170
Specialised Waste- Plastic	63
Total	58081

Table 39 Waste Management Programme

11. LABORATORY STAFF AS OF 31st DECEMBER 2014

Public Analyst	Dr Michael O'Sullivan
Deputy Public Analysts	Mr Vincent Young (Microbiology) Ms Rosemary Hayden. Quality Manager.
Executive Analytical Chemists	Post vacant (September 2014) Dr Elizabeth Horne (Resigned July 2015) Dr John Keegan Mr Liam Dolan Dr Ian Nesbitt Mr Chris Griffin Mr Ken McCartney Ms Rachel Hewitt (Microbiology) Dr David Browne Ms Juanita O'Melia (Microbiology) Ms Niamh Murphy Mr Patrick English Ms Ruth Buckley Ms Bernadette Bradley (Microbiology) Ms Karen Moore Ms Elaine Eustace (Microbiology) (A)
Chief Laboratory Technician	Post vacant
Senior Laboratory Technicians	Ms Margaret Murphy Ms Alison Brazil Mr Kevin Smith (Microbiology) Ms Annette D'Arcy Mr Barry Hurley Ms Orna McDaniel (Microbiology)
Laboratory Technicians	Ms Geraldine Drew (Microbiology) Ms Maresa Holland Ms Aisling Connolly Ms Siobhan Kelly (Microbiology) Ms Anne O'Boyle Ms Susan Carney Ms Marie Maxwell Ms Alma Keenaghan (Microbiology) Ms Martina Brady Ms Nicola O'Sullivan Ms Denise Fitzgerald

	Ms Edel Murphy (Microbiology)
	Ms Claire Prendergast
	Ms Aundre Hunter
	Ms Susan Fitzpatrick
	Mr Antoni Llovera (Microbiology)
	Mr Patrick Duffy
	Dr. Sarah O'Reilly
Laboratory Assistant	Post vacant
Clerical Officer Grade V	Mr John Gallagher
Grade IV	Ms Sandra Parr
Grade III	Ms Mary Flannery
Grade III	Ms Martina Vaughan (Job sharing)
Grade III	Ms Lee Hwa Young (Job sharing)
Laboratory Aide	Ms Mary Whyte (Retired May 2015)

Most laboratory staff, on the occasion of a recent retirement.

Appendix 1. Management Report for Monitoring Service delivery to Customers (compiled from the LIMS).

Date of this Report 17/07/14 Time 09:33:18

Samples received since 1st January 2014 - ***Excludes PT samples***

2014	Number Received	Number Cancelled	Number Reported	Number Not Reported	*Number of outstanding samples....* ≤ 10 days	11-20 days	21-30 days	Unreported (within deadline)	Unreported (exceeding deadline)	Memos
Food Chemistry Section										
FLC	299	1	240	58	5	6	46	57	1	
FPC	14	0	12	2	2	0	0	2	0	
FLM	3	3	0	0	0	0	0	0	0	
CLF	18	0	16	2	2	0	0	2	0	
CPF	1	0	1	0	0	0	0	0	0	
Group total	*335*	*4*	*269*	*62*	*9*	*6*	*46*	61	1	
GC-MS Section										
FLC	220	0	205	15	15	0	0	15	0	
FPC	25	0	5	20	0	0	20	20	0	
CLF	10	0	8	2	2	0	0	2	0	
WLC	1	0	1	0	0	0	0	0	0	
WPC	1	0	0	1	1	0	0	1	0	
Group total	*257*	*0*	*219*	*38*	*18*	*0*	*20*	38	0	
Trace Element Laboratory										
CLF	1	0	1	0	0	0	0	0	0	*0*
CLN	1	0	1	0	0	0	0	0	0	*0*
NLC	11	0	11	0	0	0	0	0	0	*0*
HS	577	1	459	117	61	54	1	116	1	*1*
Group total	*590*	*1*	*472*	*117*	*61*	*54*	*1*	116	1	*1*
LC-MS Section										
FLC	227	0	208	19	8	1	9	17	2	*2*
FPC	3	0	2	1	0	1	0	1	0	*0*
FLM	2	2	0	0	0	0	0	0	0	*0*
CLF	1	0	1	0	0	0	0	0	0	*0*
NLC	25	0	25	0	0	0	0	0	0	*0*
Group total	*258*	*2*	*236*	*20*	*8*	*2*	*9*	18	2	*2*
Chemistry Water										
WL	658	6	595	57	44	6	4	54	3	

2014	Number Received	Number Cancelled	Number Reported	Number Not Reported	*Number of outstanding samples....* ≤ 10 days	11-20 days	21-30 days	Unreported (within deadline)	Unreported (exceeding deadline) Memos
WP	**151**	4	**139**	**8**	**4**	**3**	**1**	**8**	**0**
WLC	**41**	0	**29**	**12**	**3**	**7**	**1**	**12**	**0**
WPC	**69**	1	**47**	**21**	**12**	**5**	**4**	**21**	**0**
WLF	**467**	2	**465**	**0**	**0**	**0**	**0**	**0**	**0**
WPF	**2**	0	**2**	**0**	**0**	**0**	**0**	**0**	**0**
Group total	***1388***	*13*	***1277***	***98***	***63***	***21***	***10***	**95**	**3**
Microbiology									
FPC	**6**	0	**6**	**0**	**0**	**0**	**0**	**0**	**0**
FLM	**658**	13	**621**	**24**	**20**	**3**	**0**	**23**	**1**
FPM	**89**	1	**88**	**0**	**0**	**0**	**0**	**0**	**0**
CLF	**87**	1	**85**	**1**	**1**	**0**	**0**	**1**	**0**
CPF	**6**	0	**6**	**0**	**0**	**0**	**0**	**0**	**0**
CLN	**4**	0	**4**	**0**	**0**	**0**	**0**	**0**	**0**
WL	**659**	7	**621**	**31**	**31**	**0**	**0**	**31**	**0**
WP	**148**	1	**146**	**1**	**1**	**0**	**0**	**1**	**0**
WLM	**393**	4	**373**	**16**	**16**	**0**	**0**	**16**	**0**
WPM	**105**	3	**96**	**6**	**6**	**0**	**0**	**6**	**0**
KLM	**63**	0	**38**	**25**	**12**	**0**	**5**	**24**	**1**
Group total	***2217***	*30*	***2084***	***104***	***87***	***3***	***5***	**102**	**2**

Boxed figures indicate number of Memos printed *e.g.* 3

Appendix 2. Summary of the 2014 Chemical FSAI Food Incident Report Forms

Parameter	Foodstuff	Details of Incident/Hazard	Applicable Legislation (If Appropriate)	Agency (e.g. EHS, DAFM)	Reported By (Initials)	Date Reported
Sodium nitrite and sodium nitrate	Cured Meat	By routine sampling and testing of foods. Sodium nitrite and sodium nitrate were determined at a level of 159.5 mg/kg and 386.6 mg/kg respectively in the product. The limit for this product for sodium nitrite is 100 mg/kg and sodium nitrate is 250 mg/kg.	Comm. Reg. (EU) No. 1129/20011	EHS	RB	13/02/14
Sodium nitrite and sodium nitrate	Cured Meat	By routine sampling and testing of foods. Sodium nitrite and sodium nitrate were determined at a level of 272.7 mg/kg and 319.7 mg/kg respectively in the product. The limit for this product for sodium nitrite is 175 mg/kg and sodium nitrate is 250 mg/kg.	Comm. Reg. (EU) No. 1129/20011	LAV	RB	13/02/14
Sodium nitrite and sodium nitrate	Cured Meat	By routine sampling and testing of foods. Sodium nitrate was determined at a level of 291.4 mg/kg in the product. The limit for this product for sodium nitrate is 250 mg/kg.	Comm. Reg. (EU) No. 1129/20011	LAV	RB	13/02/14
Histamine	Packaged Fish	By routine sampling and testing of foods. Histamine was determined at a level of 325.3 ± 15.6 mg/kg in the product. The limit for this product for histamine is 200 mg/kg.	Comm. Reg. (EC) No. 2073/2005 and 1019/2013	EHS	PE	20/02/14
Primary Aromatic Amines	Nylon Kitchen Utensils	By routine sampling and testing of nylon utensils. Total PAAs were determined at levels of 0.0173±0.0008, 0.0224±0.0011 and 0.0268±0.0014 mg/kg in the product. The limit for this product for Total Primary Aromatic Amines is 0.01 mg/kg.	Comm. Reg. (EU) No. 10/2011	EHS	PE	05/03/14
Primary Aromatic Amines	Nylon Kitchen Utensils	By routine sampling and testing of nylon utensils. Total PAAs were determined at levels of 1.3929±0.0586, 0.6454±0.0261 and 0.7630±0.0304 mg/kg in the product. The limit for this product for Total Primary Aromatic Amines is 0.01 mg/kg.	Comm. Reg. (EU) No. 10/2011	EHS	PE	05/03/14
Primary Aromatic Amines	Nylon Kitchen Utensils	By routine sampling and testing of nylon utensils. Total PAAs were determined at	Comm. Reg. (EU) No. 10/2011	EHS	PE	05/03/14

		levels of 0.2678±0.0066, 0.1722±0.0034 and 0.1540±0.0032 mg/kg in the product. The limit for this product for Total Primary Aromatic Amines is 0.01 mg/kg.				
Primary Aromatic Amines	Nylon Kitchen Utensils	By routine sampling and testing of nylon utensils. Total PAAs were determined at levels of 0.0130±0.0007 and 0.0440±0.0022 mg/kg in the product. The limit for this product for Total Primary Aromatic Amines is 0.01 mg/kg.	Comm. Reg. (EU) No. 10/2011	EHS	PE	06/03/14
Sodium nitrite and sodium nitrate	Cured Meat	By routine sampling and testing of foods. Sodium nitrite was determined at a level of 1305.2 mg/kg in the product. The limit for this product for sodium nitrite is 175 mg/kg.	Comm. Reg. (EU) No. 1129/2011	LAV	NM	25/03/14
Sodium nitrite and sodium nitrate	Cured Meat	By routine sampling and testing of foods. Sodium nitrite and sodium nitrate were determined at levels of 192.2 mg/kg and 275.7 mg/kg respectively in the product. The limit for this product for sodium nitrite is 100 mg/kg and for sodium nitrate is 250 mg/kg.	Comm. Reg. (EU) No. 1129/2011	LAV	NM	25/03/14
Sodium nitrite and sodium nitrate	Cured Meat	By routine sampling and testing of foods. Sodium nitrite and sodium nitrate were determined at levels of 317.0 mg/kg and 392.0 mg/kg respectively in the product. The limit for this product for sodium nitrite is 100 mg/kg and for sodium nitrate is 250 mg/kg.	Comm. Reg. (EU) No. 1129/2011	EHS	NM	25/03/14
Sodium nitrite and sodium nitrate	Brine	By routine sampling and testing of foods. Sodium nitrite was determined at a level of 863.8 mg/kg in the brine sample. Based on the information provided on the weight of portions of meat before and after injection with brine solution, and on the analysis result for the brine, the levels of sodium nitrite that are added to the meat during manufacture are calculated to be (i) 172.8 mg/kg (ii) 167.3 mg/kg (iii) 167.8 mg/kg. The limit for this product for sodium nitrite is 150 mg/kg.	Comm. Reg. (EU) No. 1129/20011	LAV	NM	25/03/14
Sodium nitrite and sodium	Brine	By routine sampling and testing of foods. Sodium	Comm. Reg. (EU) No.	DAFM	NM	25/03/14

nitrate		nitrate was determined at a level of 1065.8 mg/kg in the brine sample. Based on the information provided on the weight of a portion of meat before and after injection with brine solution, and on the analysis result for the brine, the level of sodium nitrate that is added to the meat during manufacture is calculated to be 160.4 mg/kg**.** The limit for this product for sodium nitrate is 150 mg/kg.	1129/2011			
Primary Aromatic Amines	Nylon Kitchen Utensils	By routine sampling and testing of nylon utensils. Total PAAs were determined at levels of 12.6217±0.5735, 7.3701±0.2989 and 9.8373±0.4155 mg/kg in the product. The limit for this product for Total Primary Aromatic Amines is 0.01 mg/kg.	Comm. Reg. (EU) No. 10/2011	EHS	PE	08/04/14
Primary Aromatic Amines	Nylon Kitchen Utensils	By routine sampling and testing of nylon utensils. Total PAAs were determined at levels of 0.1424±0.0071and 0.2045±0.0102 mg/kg in the product. The limit for this product for Total Primary Aromatic Amines is 0.01 mg/kg.	Comm. Reg. (EU) No. 10/2011	EHS	PE	08/04/14
Primary Aromatic Amines	Nylon Kitchen Utensils	By routine sampling and testing of nylon utensils. Total PAAs were determined at levels of 3.7931±0.1897, 2.379±0.1192 and 2.9786±0.1492 mg/kg in the product. The limit for this product for Total Primary Aromatic Amines is 0.01 mg/kg.	Comm. Reg. (EU) No. 10/2011	EHS	PE	08/04/14
Ochratoxin A	Liquorice	By routine sampling and testing of liquorice root. Ochratoxin A was determined at level of 69.3±30.0 µg/kg in the product. The limit for this product for Ochratoxin A is 20 µg/kg.	Comm. Reg. (EU) No. 1881/2006	EHS	PE	28/05/14
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 565 mg/kg. The maximum permitted level for sulphur dioxide in breakfast sausages is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	LH	13/06/14
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was	Dir. 2003/89/EC amending Dir. 2000/13/EC.	EHS	LH	13/06/14

		determined at a level of 413 mg/kg. The retail label on the sample does not declare sulphur dioxide or sulphites.				
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 708 mg/kg. The maximum permitted level for sulphur dioxide in breakfast sausages is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	LH	13/06/14
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 169 mg/kg. The retail label on the sample does not declare sulphur dioxide or sulphites.	Dir. 2003/89/EC amending Dir. 2000/13/EC.	EHS	LH	13/06/14
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 589 mg/kg. The maximum permitted level for sulphur dioxide in breakfast sausages is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	LH	13/06/14
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 581 mg/kg. The maximum permitted level for sulphur dioxide in breakfast sausages is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	LH	13/06/14
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 618 mg/kg. The maximum permitted level for sulphur dioxide in breakfast sausages is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	LH	13/06/14
Sulphur Dioxide	Burgers	By routine sampling and testing of burgers. Sulphur dioxide was determined at a level of 767 mg/kg. The maximum permitted level for sulphur dioxide in burgers is 450 mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	LH	13/06/14
Sulphur Dioxide	Burgers	By routine sampling and testing of burgers. Sulphur dioxide was determined at a level of 24±3 mg/kg. The retail label on the sample does not declare sulphur dioxide or sulphites.	Dir. 2003/89/EC amending Dir. 2000/13/EC.	LAVS	LH	13/06/14
Sulphur Dioxide	Burgers	By routine sampling and testing of burgers. Sulphur dioxide was determined at a level of 1328	Comm. Reg. (EU) No 1129/2011 amending Reg.	LAVS	LH	13/06/14

		mg/kg. The maximum permitted level for sulphur dioxide in burgers is 450 mg/kg. The ingredients list states that preservative E221 was used in the product but the full name of the ingredient is not provided.	(EU) No 1333/2008 Dir. 2003/89/EC amending Dir. 2000/13/EC.			
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 954 mg/kg. The maximum permitted level for sulphur dioxide in sausages is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	LH	13/06/14
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 794 mg/kg. The maximum permitted level for sulphur dioxide in sausages is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	LH	13/06/14
Sulphur Dioxide	Sausages	By routine sampling and testing of sausages. Sulphur dioxide was determined at a level of 514 ± 72 mg/kg. The ingredients list states that preservative E221 was used in the product but the full name of the ingredient was not provided.	Dir. 2003/89/EC amending Dir. 2000/13/EC.	LAVS	LH	13/06/14
Sulphur Dioxide	Burgers	By routine sampling and testing of burgers. Sulphur dioxide was determined at a level of 617 mg/kg. The maximum permitted level for sulphur dioxide in burgers is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	LH	13/06/14
Sulphur Dioxide	Burgers	By routine sampling and testing of burgers. Sulphur dioxide was determined at a level of 609 mg/kg. The maximum permitted level for sulphur dioxide in burgers is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	LH	13/06/14
Diastase	Honey	By routine sampling and testing of honey. Diastase was determined at a level of 4.76 ± 0.70 DN. The limit for this product for Diastase is not less than 8 DN.	Council Dir. 2001/110/EC	EHS	PE	19/06/14
Diastase	Honey	By routine sampling and testing of honey. Diastase was determined at a level of 4.10 ± 0.61 DN. The limit for this product for	Council Dir. 2001/110/EC	EHS	PE	19/06/14

		Diastase is not less than 8 DN.				
Diastase, Conductivity, HMF	Honey	By routine sampling and testing of honey. Diastase was determined at a level of 0.70 ± 0.10 DN. The limit for this product for Diastase A is not less than 8 DN. Conductivity was determined at a level of 1.27± 0.01 mS/cm. The limit for this product for Conductivity is 0.8 mS/cm. HMF was determined at a level of 57.9 ± 14.6 mg/kg. The limit for this product for HMF is 40 mg/kg.	Council Dir. 2001/110/EC	EHS	PE	19/06/14
Diastase, HMF	Honey	By routine sampling and testing of honey. Diastase was determined at a level of 2.61 ± 0.39 DN. The limit for this product for Diastase is not less than 8 DN. HMF was determined at a level of 212.3 ± 53.5 mg/kg. The limit for this product for HMF is 40 mg/kg.	Council Dir. 2001/110/EC	EHS	PE	19/06/14
Diastase	Honey	By routine sampling and testing of honey. Diastase was determined at a level of 1.48 ± 0.22 DN. The limit for this product for Diastase A is not less than 8 DN.	Council Dir. 2001/110/EC	EHS	PE	19/06/14
Sodium Nitrite	Cured Meat	Follow-up sampling and testing of bacon ribs. Sodium nitrite was determined at a level of 253.8 mg/kg in the product. The limit for sodium nitrite in this product is 175 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	LH	20/06/14
Aflatoxin B1	Peanut Candy	By routine sampling and testing of peanut candy, Aflatoxin B1 and total aflatoxins were determined at a level of 7.5µg/kg and 8.5µg/kg respectively. The limit for this product for Aflatoxin B1 and total aflatoxins are 2µg/kg and 4µg/kg respectively.	Comm. Reg. (EU) No 1881/2006 + amendments.	EHS	LD	04/07/2014
Aflatoxin B1	Special Bombay Biryani	By routine sampling and testing of Bombay Biryani, Aflatoxin B1 was determined at a level of 8.3µg/kg. The limit for this product for Aflatoxin B1 is 5µg/kg.	Comm. Reg. (EU) No 1881/2006 + amendments.	EHS	KM	07/07/2014
Aflatoxin B1	Chicken Tikka Mix	By routine sampling and testing of Chicken Tikka Mix, Aflatoxin B1 was determined at a level of 10.4µg/kg. The limit for this product for Aflatoxin B1 is 5µg/kg.	Comm. Reg. (EU) No 1881/2006 + amendments.	EHS	KM	07/07/2014

Sodium Nitrite	Cured Ham	Follow-up sample. Sodium nitrite was determined at a level of 150.7 mg/kg in the product. The limit for this product for sodium nitrite is 100 mg/kg.	Comm. Reg. (EU) No. 1129/2011	EHS	LH	11/07/14
Sulphur Dioxide	Sausages	Follow-up sample. Sulphur dioxide was determined at a level of 618 mg/kg. The maximum permitted level for sulphur dioxide in sausages is 450 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	NM	21/07/14
Aflatoxin B1	Special Bombay Biryani	By routine sampling and testing of Bombay Biryani, Aflatoxin B1 was determined at a level of 7.8µg/kg. The limit for this product for Aflatoxin B1 is 5µg/kg.	Comm. Reg. (EU) No 1881/2006 + amendments.	EHS	KM	22/07/2014
Aflatoxin B1	Special Bombay Biryani	By routine sampling and testing of Bombay Biryani, Aflatoxin B1 was determined at a level of 9.3µg/kg. The limit for this product for Aflatoxin B1 is 5µg/kg.	Comm. Reg. (EU) No 1881/2006 + amendments.	EHS	KM	22/07/2014
Patulin	Apple Juice	As part of the Laboratory's NMSP patulin at a level of 158.3 *µ*g/kg was found in a sample of apple juice. The limit for this product for patulin is 50 *µ*g/kg.	Comm. Reg. (EU) No 1881/2006 + amendments.	EHS	PE	25/07/14
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 229.5 mg/l. The maximum permitted level for benzoic acid in a non-alcoholic flavoured drink is 150 mg/l.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS (Import)	LH	12/08/14
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 430.7 mg/l. The maximum permitted level for benzoic acid in a non-alcoholic flavoured drink is 150 mg/l.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS (Import)	LH	12/08/14
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 431.9 mg/l. The maximum permitted level for benzoic acid in a non-alcoholic flavoured drink is 150 mg/l.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS (Import)	LH	12/08/14
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 388.2 mg/l. The maximum permitted level for benzoic acid in a non-alcoholic	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS (Import)	NM	21/08/14

		flavoured drink is 150 mg/l.				
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 396.2 mg/l. The maximum permitted level for benzoic acid in a non-alcoholic flavoured drink is 150 mg/l.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS (Import)	NM	21/08/14
Sulphur Dioxide	Peeled Potatoes	By routine sampling and testing of peeled potatoes. Sulphur dioxide was determined at a level of 77 mg/kg. The maximum permitted level for sulphur dioxide in peeled potatoes is 50 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	03/09/14
Sulphur Dioxide	Peeled Potatoes	By routine sampling and testing of peeled potatoes. Sulphur dioxide was determined at a level of 100 mg/kg. The maximum permitted level for sulphur dioxide in peeled potatoes is 50 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	03/09/14
Sulphur Dioxide	Peeled Potatoes	By routine sampling and testing of peeled potatoes. Sulphur dioxide was determined at a level of 554 mg/kg. The maximum permitted level for sulphur dioxide in peeled potatoes is 50 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	03/09/14
Sulphur Dioxide	Peeled Potatoes	By routine sampling and testing of peeled potatoes. Sulphur dioxide was determined at a level of 231 mg/kg. The maximum permitted level for sulphur dioxide in peeled potatoes is 50 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	03/09/14
Sulphur Dioxide	Peeled Parsnips	By routine sampling and testing of peeled parsnips. Sulphur dioxide was determined at a level of 558 mg/kg. Sulphur Dioxide is not permitted in peeled parsnips	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	03/09/14
Sucralose	Liquid Food Supplement	Sampling and testing of food supplements as part of a National survey of food supplements. Sucralose was determined at a level of 680.2mg/kg. the maximum permitted level for sucralose in liquid food supplements is 240mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008	EHS	NM	16/09/14
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 390.6 mg/l. The maximum permitted level for benzoic	Comm Reg (EU) No 1129/2011 amending Reg (EU) No 1333/2008	EHS (Import)	LH	17/09/14

		acid in a non-alcoholic drink is 150 mg/l.				
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 390.5 mg/l. The maximum permitted level for benzoic acid in a non-alcoholic drink is 150 mg/l.	Comm Reg (EU) No 1129/2011 amending Reg (EU) No 1333/2008	EHS (Import)	LH	17/09/14
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 229.9 mg/l. The maximum permitted level for benzoic acid in a non-alcoholic drink is 150 mg/l.	Comm Reg (EU) No 1129/2011 amending Reg (EU) No 1333/2008	EHS (Import)	LH	17/09/14
Benzoic Acid	Non-Alcoholic Flavoured Drink	By import sampling and testing of a non-alcoholic flavoured drink, Benzoic Acid was determined at a level of 246.1 mg/l. The maximum permitted level for benzoic acid in a non-alcoholic drink is 150 mg/l.	Comm Reg (EU) No 1129/2011 amending Reg (EU) No 1333/2008	EHS (Import)	LH	17/09/14
Sulphur Dioxide	Peeled & Diced Parsnips	Sulphur dioxide was determined at a level of 46 mg/kg. Sulphur Dioxide is not permitted in peeled parsnips	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	LH	26/09/14
Sodium Nitrate	Corned Beef	Sodium Nitrate was determined at a level of 274.4 mg/kg. The maximum permitted level for Sodium Nitrate in corned beef is 250mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	NM	14/10/14
Sodium Nitrite & Sodium Nitrate	Ham	Sodium nitrite was determined at a level of 209.3 mg/kg and sodium nitrate was determined at a level of 425.2 mg/kg. The maximum permitted levels for sodium nitrite and sodium nitrate in traditional ham are 100mg/kg and 250mg/kg respectively.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	14/10/14
Sodium Nitrite	Ham	Sodium nitrite was determined at a level of 131.2 mg/kg. The maximum permitted level for sodium nitrite in traditional ham is 100mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	14/10/14
Sodium Nitrate	Bacon	Sodium Nitrate was determined at a level of 266.1 mg/kg. The maximum permitted level for Sodium Nitrate in traditional bacon is 250mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	LAVS	NM	14/10/14
Sodium Nitrite	Brine	Sodium nitrite was determined at a level of 891.5 mg/kg in the brine sample. Based on the	Comm. Reg. (EU) No 1129/2011	LAVS	NM	15/10/14

		information provided on the weight of a portion of meat before and after injection with brine solution, and on the analysis result for the brine, the level of sodium nitrite that is added to the meat during manufacture is calculated to be 167.6 mg/kg. The limit for this product for sodium nitrite is 150 mg/kg.	amending Reg. (EU) No 1333/2008.			
Sodium Nitrite	Brine	Sodium nitrite was determined at a level of 1074.7 mg/kg in the brine sample. Based on the information provided on the weight of a portion of meat before and after injection with brine solution, and on the analysis result for the brine, the level of sodium nitrite that is added to the meat during manufacture is calculated to be 159.6 mg/kg. The limit for this product for sodium nitrite is 150 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	DAFM	NM	15/10/14
Sodium Nitrite	Brine	Sodium nitrite was determined at a level of 803.9 mg/kg in the brine sample. Based on the information provided on the weight of a portion of meat before and after injection with brine solution, and on the analysis result for the brine, the level of sodium nitrite that is added to the meat during manufacture is calculated to be 193.2 mg/kg. The limit for this product for sodium nitrite is 150 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	DAFM	NM	15/10/14
Sulphur Dioxide	Dried Apricots	Sulphur dioxide was determined in the product at a level of 1394 mg/kg. The retail label on the sample does not declare sulphur dioxide or sulphites.	Directive 2003/89/EC amending Directive 2000/13/EC, as regards indication of the ingredients present in foodstuffs, Annex IIIa (annex amended by Directive 2007/68/EC).	EHS	LH	24/10/14
Acesulfame K	Jelly	Acesulfame K was determined at a level of 457.7 mg/kg. The maximum permitted level of acesulfame K in jelly (category 16 reg 1129/2011) is 350	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No	EHS	NM	29/10/14

		mg/kg	1333/2008.			
Saccharin	Tomato Ketchup	Saccharin was determined at a level of 334.2 mg/kg. The maximum permitted level of saccharin in tomato ketchup is 160 mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	29/10/14
Saccharin	Blackcurrant Cordial	Saccharin was determined at a level of 15.5 mg/l but was not declared in the ingredients list	Directive 2000/13/EC	EHS	NM	29/10/14
Saccharin	Tomato Ketchup	Saccharin was determined at a level of 630 mg/kg. The maximum permitted level of saccharin in tomato ketchup is 160 mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	11/11/14
Sorbic Acid	Tomato & Black Pepper sauce	Sorbic Acid was determined at a level of 1363 mg/kg. The maximum permitted level of saccharin in tomato ketchup is 1000 mg/kg Note: On 20/11/14, following consultation with the FSAI & the manufacturer, this sample was recategorised as an emulsified sauce (fat content <60%) with a maximum permitted level of 2000mg/kg sorbic acid – the report for the sample was reissued- the sample is compliant wrt SA content	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	19/11/14
Sodium Nitrate	Bacon Ribs	Sodium nitrate was determined at a level of 271.6 ± 10.9 mg/kg in the product. The limit for this product for sodium nitrate is 250 mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008	LAVS	LH	21/11/14
Sodium Nitrate	Ham	Sodium nitrate was determined at a level of 276.8 ± 11.1 mg/kg in the product. The limit for this product for sodium nitrate is 250 mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008	EHS	LH	21/11/14
Sorbic Acid	Dairy Free cheddar style slices	Sorbic Acid was determined at a level of 5138 mg/kg. The maximum permitted level of sorbic acid in analogues of cheese based on protein is 2000 mg/kg	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	25/11/14
Sodium Nitrite	Brine	Sodium nitrite was determined at a level of 1923.3 mg/kg in the brine sample. Based on the information provided on the weights of portions of meat before and after injection with brine solution, and on the analysis result for the brine, the levels of sodium nitrite that	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	EHS	NM	02/12/14

		are added to the meat during manufacture are calculated to be 769.3 mg/kg, 641.1 mg/kg & 769.3 g/kg. The limit for this product for sodium nitrite is 150 mg/kg.				
Sodium Nitrite	Brine	Sodium nitrite was determined at a level of 618.9 mg/kg in the brine sample. Based on the information provided on the weight of a portion of meat before and after injection with brine solution, and on the analysis result for the brine, the level of sodium nitrite that is added to the meat during manufacture is calculated to be 190.5 mg/kg. The limit for this product for sodium nitrite is 150 mg/kg.	Comm. Reg. (EU) No 1129/2011 amending Reg. (EU) No 1333/2008.	DAFM	NM	02/12/14
Aspartame	Tomato Ketchup	Aspartame was determined at a level of 254.7 mg/kg but was not declared in the ingredients list	Directive 2000/13/EC (as amended)	EHS	LH	10/12/14
Aspartame	Brown Sauce	Aspartame was determined at a level of 187.1 mg/kg but was not declared in the ingredients list	Directive 2000/13/EC (as amended)	EHS	LH	10/12/14
Sorbic Acid	Soft Drink	Sorbic Acid was determined at a level of 75.1 mg/l but was not declared in the ingredients list	Comm. Reg. (EU) No 1169/2011	EHS	NM	17/12/14

Appendix 3

FLUORIDATION OF WATER SUPPLIES

Tables

FLUORIDATION OF WATER SUPPLIES
Levels of Fluoride in Drinking Waters Tested in 2014. DUBLIN CITY AND COUNTY

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2014
MILLIGRAMS PER LITRE (PARTS PER MILLION) OF FLUORIDE

WATER SCHEME	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VARTRY	0.57 & 0.58	0.56	0.57	0.58	0.61	0.63	0.60	No Sample Submitted	0.62	0.63	0.63	0.58
BALLYBODEN	0.67	0.67	0.65	0.66	0.67	0.64	0.66	0.62	0.64	No Sample Submitted	0.61	0.57
BALLYMORE EUSTACE	0.67	0.64	0.65	0.62	0.68	0.58	0.59	0.59	0.66	0.61	0.64	0.53
LIFFEY – Leixlip	0.60 & 0.57	0.34 & 0.45	0.46 & 0.55	0.64 & 0.61	0.52	0.59 & 0.56	0.59, 0.62, 0.63	0.58	0.58, 0.57, 0.61	0.57 & 0.54	0.61 & 0.61	0.64
BALLYEDMONDUFF	0.70	0.69	0.67	0.62	0.66	0.65	0.69	No Sample Submitted	0.64	0.66	0.64	0.64
GLENCULLEN	0.69	0.73	0.77	0.65	0.69	0.69	0.70	No Sample Submitted	0.75	0.67 & 0.60	0.63 & 0.76	0.63
KILTERNAN	0.70	0.74	0.70	0.65	0.66	0.68	0.67	No Sample Submitted	0.68	0.70	0.67	0.64
BOG OF THE RING	0.58 & 0.62	0.47 & 0.49	0.47 & 0.47	0.64 & 0.64	0.52	0.55 & 0.55	0.57, 0.59, 0.57	0.56	0.54, 0.57, 0.54	0.57 & 0.55	0.54 & 0.63	0.59

FLUORIDATION OF WATER SUPPLIES
Levels of Fluoride in Drinking Waters Tested in 2014.
WICKLOW

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2014
MILLIGRAMS PER LITRE (PARTS PER MILLION) OF FLUORIDE

WATER SCHEME	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
BALTINGLASS	0.69	0.61	0.65	No Sample Submitted For Fluoride	0.59	0.55	0.55	0.54	0.55	0.55	0.53	0.52
LARAGH/ ANNAMOE	0.59	0.71	0.58	0.65	0.70	0.64	0.54	0.71	0.83	<0.1	0.74	0.64
WICKLOW	0.60	0.65	0.59	No Sample Submitted For Fluoride	0.62	0.62	0.67	0.64	0.64	0.64	0.61	0.58
ARKLOW	0.64	0.66	0.67	0.62	0.64	0.65	No Sample Submitted For Fluoride	0.62	0.63	0.59	0.58	0.58
TINAHELY	0.71	0.67	0367	0.68	0.66	0.63	0.68	0.70	0.73	0.72	0.65	0.51

NOTE: Other water samples from Wicklow were submitted for fluoride testing under S.I No.42 of 2007 & S.I. No.122 of 2014.

FLUORIDATION OF WATER SUPPLIES
Levels of Fluoride in Drinking Waters Tested in 2014.
KILDARE

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2014
MILLIGRAMS PER LITRE (PARTS PER MILLION) OF FLUORIDE

LEIXLIP REGIONAL SCHEME

LOCATION	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT.	OCT	NOV	DEC
MAYNOOTH	0.66	0.22	0.22	0.69	0.47	0.57	0.56	0.56	0.54	0.56	0.69	0.64
LEIXLIP	No Sample Submitted For Fluoride	0.23	0.26	0.70	0.43	0.63	0.55	0.60	0.52	0.55	0.72	0.63
CELBRIDGE	0.69	0.31	No Sample Submitted For Fluoride	0.61	0.40	0.59	0.55	0.56	0.54	0.54	0.70	0.65
STRAFFAN	0.70	0.29	No Sample Submitted For Fluoride	0.72	0.44	0.54	0.56	0.57	0.56	0.54	No Sample Submitted For Fluoride	0.65

POULAPHOUCA REGIONAL SCHEME

LOCATION	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT.	OCT	NOV	DEC
NAAS	0.68	0.65	0.65	0.63	No Sample Submitted For Fluoride	0.63	0.62	0.60	0.61	0.68	0.63	0.56
KILDARE TOWN	No Sample Submitted For Fluoride	0.65	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride	0.67	0.67	0.64	0.60	0.61	0.65	0.67	0.65
NEWBRIDGE	0.67	0.68	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride	0.63	0.63	0.64	0.62	0.65	0.64	0.63	0.66

NOTE : Other water samples from Kildare were submitted from both schemes for fluoride testing under S.I No.42 of 2007 & S.I. No.122 of 2014.

FLUORIDATION OF WATER SUPPLIES
FLUORIDE LEVELS IN PIPED WATER SUPPLIES : JANUARY - DECEMBER 2014

			Number of Samples Within the Following Ranges (mg/l or ppm)		
County Supply	**Total No. of Samples**	**% Results <0.8mg/l S.I.122 of 2014 Compliant**	**<0.6**	**0.6-0.8**	**>0.8**
Dublin City & County	233	100.0	91	142	0
Wicklow	105	99.0	33	71	1
Kildare	346	98.3	100	240	6
Meath	149	100.0	34	115	0
Louth	78	93.6	13	60	5
Monaghan	52	96.2	6	44	2
Cavan	94	98.9	44	49	1
Offaly	117	96.6	36	77	4
Westmeath	84	100.0	12	72	0
Longford	48	85.4	9	32	7
Laois	93	100.0	14	79	0
Totals	**1399**	**Average 98.1%**	**392**	**981**	**26**