



Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Annual Report 2012

Dublin Region
Public Analyst's Laboratory



Sir Patrick Duns



150th Anniversary Report

Supporting the protection of public health for 150 years.

*Health Service Executive
Dublin Mid-Leinster*

Dublin Region

Public Analyst's Laboratory

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*Annual Report
for the year ended 31st December 2012*

CONTENTS

	Page
Acknowledgements	1
1 Introduction	2
1.1 Scope of the laboratory	2
1.2 Analytical services provided by the laboratory	2
1.2.1 Monitoring Service Delivery to Customers	3
1.2.2 Official Control of Foodstuffs Legislation	3
1.3 Administration of the laboratory	5
1.4 Staffing and Budget	5
1.5 Developments in the laboratory	6
1.5.1 HSE Review of the Public Analyst and Public Health Microbiology Laboratories	6
1.5.2 Efficiencies and Value for Money Initiatives	6
1.5.3 EU National Reference Laboratory responsibilities	7
1.5.4 Human Biomonitoring	7
1.5.5 Method Research and Development	8
1.5.6 EU Food and Veterinary Office Missions	13
1.5.7 LIMS and IT	13
1.5.8 Laboratory web page http://www.publicanalystdublin.ie/	14
2 Laboratory workload in 2012	15
3 Food	15
3.1 Programmed chemical food testing	15
Contaminants	16
Mycotoxins	16
Polycyclic Aromatic Hydrocarbons (PAHs)	22
Inorganic contaminants	23
Process contaminants	24
Flavourings	29
Food additives	29
Composition / Quality / Labelling analysis	31
Biogenic Amines	33
Food Contact Materials	34
Research leading to a Ph.D. degree	38
Bottled Waters (PAHs)	39
3.2 Microbiological Food Sampling Programme	39
3.3 Food Complaint samples	44
3.4 Food Export Certification testing	48
3.5 Miscellaneous foods	48
4 Water / effluent / swimming pool samples	48

4.1	Chemical parameters in the 2012 water samples	49
4.2	Fluoridation of Public Water Supplies	51
4.3	Microbiological examination of waters	52
5	Clinical samples	56
6	Microbiology of Cosmetics	58
7	Accreditation	59
8	Training	63
9	External meetings	65
10	Health, Safety & Welfare	66
11	Laboratory Staff	67
Appendix 1	Management Report for Monitoring Service delivery to Customers	69
Appendix 2	Fluoridation of Water Supplies	71
Appendix 3	150th Anniversary of the Laboratory	76

Acknowledgements



2012 marks the 150th anniversary of the establishment of the Dublin Public Analyst's Laboratory. To commemorate this landmark occasion I have included some historical content in Appendix 3. This includes a listing of staff in the laboratory 100 years ago and an extract from the 1893 Annual Report.

This Annual Report describes the multitude of analytical services that the laboratory provided in 2012. It reflects the high level of teamwork, commitment and expertise of our staff. I want to thank them all for their dedication and support during the year.

The number of accredited tests in the laboratory continues to expand. We now have over 120 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 essence of our role.

Currently we are dealing with a loss of 8.9 Whole Time Equivalents (WTE) in the laboratory that have not been replaced by the HSE. 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, Integrated Service Area Manager for Dublin South/Wicklow, for her regular communication with, and careful attention to, the laboratory during 2012. This supports us in our progress towards 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 underline the close key cooperation between the HSE Environmental Health Service (EHS) and the laboratory. Sampling and analysis is fundamental 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 multitude of other activities.

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

Michael O'Sullivan

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.

Additionally with the full implementation of the agreed PALs specialisation in food chemical testing, the Dublin PAL provides a National service in its wide area of specialised testing.

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 PALD 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 utilising 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, that have been announced by the Minister for Health.

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 & Children
- v) the EU
- vi) local authorities
- vii) Local Authority Veterinary Inspectors
- viii) Sea Fisheries Protection Authority
- ix) *Safefood*
- x) the general public
- xi) hospitals & GPs
- xii) private food companies
- xiii) other Government Departments (Agriculture, *et al*).
- xiv) Joint Research Centre (JRC), Geel, Belgium

1.2.1 Monitoring Service Delivery to Customers

A key role of the monthly Laboratory Management Team 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/PDF/File_17047_en.pdf

The primary monitor is a LIMS Management Report (MR); the December one 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 year end 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)** supporting the issuing of certificates for the export of food of non-animal origin to non-EU countries
- xii)** nutritional purposes
- xiii)** labelling
- xiv)** quality checks.
- xv)**



In the chemical realm of analysis, the comprehensive analytical categories in 2012 comprised:

- i)** contaminants
- ii)** materials in contact with food
- iii)** allergens
- 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.

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 is applicable for 3 years. 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 Dublin South East/Wicklow Integrated Service Area.



1.4 Staffing and Budget

In order for this laboratory to fulfil its obligations under the HSE Service Contract with the FSAI and 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 Department of Health and 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 8.9 WTEs in the laboratory comprising retirements, maternity leave and non-discretionary WTE reductions. None of these have been filled due to the recruitment moratorium. 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 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 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 has been 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 & Children and undertaken by *safefood*, 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 HSE.

On the subject of laboratory facilities both the 2008 HSE and the 2004 Department of Health & Children (DoH&C) 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&C 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 has been considered, regarding the extent to which it falls within the scope of the work underway, by the HSE Laboratory Services Modernisation Group. This Group has been charged with modernising Medical Laboratory Services, prompted by an external review of existing services.

1.5.2 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 2012. In light of the overall increasingly stringent budgetary situation, value-for-money initiatives are a high priority comprising areas such as:

- i) engagement with HSE National Procurement for all maintenance contracts
- ii) planned requisitioning and bulk ordering resulting in negotiated discounts from suppliers
- iii) measures have been put in place to reduce supplier delivery charges
- 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
- v) an ongoing review of subscriptions to scientific journals and organisations leading to appropriate discontinuing of some and converting others to a more cost-effective on-line subscription.

1.5.3 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 2012 the laboratory was involved in 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;
- ii) in conjunction with the Food Safety Authority of Ireland hosted the June Plenary of the EURL/NRL network for Food Contact Materials;
- iii) testing two proficiency samples (olive oil and cocoa butter) for benzo[a]pyrene (BaP) and the sum of 4 PAHs;
- iv) taking part in a proficiency test for deoxynivalenol (DON), zearalenone (ZON) and T-2 and HT-2 toxins in cereals;
- v) taking part in a proficiency test for pyrrolizidine alkaloids in honey and plant materials;
- vi) taking part in a collaborative study to validate a method of analysis for Ochratoxin A in chilli and paprika;
- vii) characterising a cereal reference material for DON;
- viii) characterising a pistachio and paprika reference materials for aflatoxin and OTA content;
- ix) participating in a proficiency test for melamine and formaldehyde in melamine kitchenware;
- x) taking part in a proficiency test for the migration of plasticisers in Tenax;
- xi) taking part in a proficiency test for primary aromatic amines in 3% acetic acid solutions;
- xii) taking part in a migration modelling exercise on a PET bottle;
- xiii) considerable associated preparatory and post activity work.

The Cork PAL is the NRL for heavy metals.

1.5.4 Human Biomonitoring

The Public Analyst Service participated in a European project called 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) in Europe, from monitoring the environmental exposure of humans to certain chemicals by the analysis of hair, blood and urine biological materials.

Teams in 17 European countries studied exposure to mercury, cadmium, tobacco smoke and some phthalates and possible relations to lifestyle, using biomarkers and questionnaire data.

Samples of urine and hair were collected from 120 mother and child pairs from each participating country. The urine samples were analysed for cadmium, cotinine (a metabolite of nicotine to test for active and passive smoking) and phthalates. The hair samples were analysed for mercury. Many of these analytes are already tested for in foods and human biomonitoring is a natural extension that provides valuable information on the actual human exposure.

This laboratory was responsible for the analysis of phthalate metabolites and cadmium in urine.

The preparation for the project included the production of protocols and SOPs, selection of participants, training, ethical approval and proficiency testing.

The sampling, along with the completion of a detailed questionnaire needed to correlate the analytical result with any environmental or lifestyle factors, was performed by the EHS. The analysis commenced in March 2012 with a deadline for completion by mid April 2012, which was successfully met.

All the analytical data from the 3 PALs was collated and statistical analysis performed comparing analytical result with questionnaire responses. The findings of this survey are due to be published in 2013.

1.5.5 Method Research and Development

The discovery of new contaminants in food together with new regulations or lower regulatory limits for existing contaminants mean 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 also a need to expand on existing methods to cover more analytes at one time to make more efficient use of finite and decreasing resources.

During 2012 method research and development was performed for the following parameters:

- i) bisphenol A in food and food simulants
- ii) pyrrolizidine alkaloids in honey and plant material
- iii) ergot alkaloids
- iv) perfluorinated alkyl substances (PFAS)
- v) photo initiators
- vi) plasticisers in PVC gaskets
- vii) mineral oil in food and packaging
- viii) mycotoxins, including patulin in apple juices, apple purée and other apple products, T-2 and HT-2 in cereals, and the development of multi-mycotoxin methods
- ix) PAHs (EU 15 PAHs & 1 JEFFA PAH)
- x) safrole in cola drinks and cajun sauces
- xi) antioxidants in dehydrated soups and mayonnaise

Bisphenol A (BPA) in Food and Food Simulants

In 2012 samples of baby bottles and canned foods were examined for BPA content under the Food Sampling Programme (FSP). The analytical method for the determination of BPA in canned foods continues to require further development as it is a difficult and varied matrix; it will be progressed in 2013. Further samples of baby bottles were sampled from the market to ensure compliance with the regulation introduced in 2011, namely Commission Implementing Regulation (EU) No 321/2011 of 1 April 2011 amending Regulation (EU) No 10/2011 as regards the restriction of use of BPA in plastic infant feeding bottles.

Pyrrolizidine Alkaloids in Honey and Plant Material

In 2010 a staff member from this laboratory attended a workshop on pyrrolizidine alkaloids organised by DG SANCO. In 2012 the JRC organised a preliminary ring trial for a number of pyrrolizidine alkaloids. As preparation this laboratory carried out some development work during 2012 and subsequently participated in the ring trial. Further method development and participation in ring trials/method validation studies are envisaged in 2013.

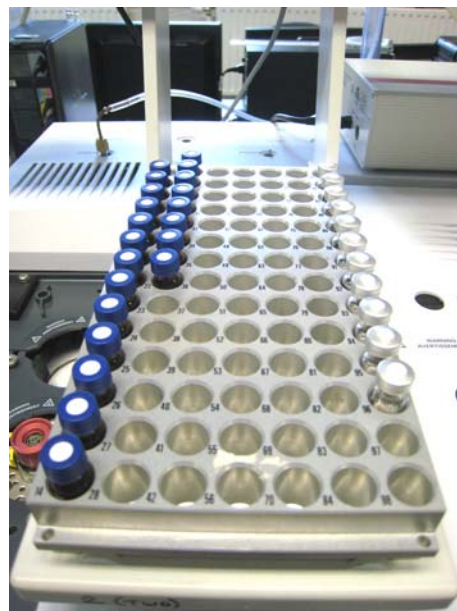
Ergot Alkaloids

The laboratory continued analytical development work during 2012 on ergot alkaloids and carried out analysis of some food products as part of the FSP. The development work was complicated by the fact that a monitoring recommendation was published by the European Commission during the year (Commission Recommendation 2012/154/EU on the monitoring of the presence of ergot alkaloids in feed and food). This recommendation added an additional six analytes (corresponding isomers) to the six that this laboratory has been monitoring for the previous few years. This required a re-development of the analytical method as the existing method under development was found to be unsuitable for the additional analytes required by the recommendation.

Perfluorinated Alkyl Substances (PFAS)

PFASs 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 have also been found to accumulate in animals causing tumours and disturbing reproductive development.

Two environmentally persistent chemical compounds, perfluorooctane sulphonate (PFOS) and perfluorooctanoic acid (PFOA), are being increasingly found in the environment, and the European Food Safety Authority (EFSA) was asked to evaluate the importance of food to human exposure to these substances. A scientific opinion from EFSA on PFOS, PFOA and their salts was published in February 2008.



Member States are recommended to perform monitoring on the presence of perfluoroalkylated substances and to preferably analyse the compounds PFOS and PFOA as well as their precursors (such as perfluorooctane sulphonamide (PFOSA), N-ethyl perfluorooctane sulfonamidoethanol (NEtFOSE) and 8:2 fluoroteleomer alcohol) in a monitoring programme. They are also to include, if possible, compounds similar to PFOS and PFOA but with different chain lengths (C4 – C15) and polyfluoroalkyl phosphate surfactants (PAPs) into the monitoring programme.

In 2012 20 samples of fish were analysed for a range of perfluoroalkyl acids and sulphonates. 2 Samples had levels of PFOS above the limit of quantification (1 µg/kg), at 4.0 µg/kg and 9.2 µg/kg. There is currently no legislation setting maximum levels for perfluorinated alkyl chemicals in food. The focus of this analysis is to inform future regulation. The information will be forwarded to EFSA for this purpose.

Photo initiators

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, 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 mentioned in this legislation.

Development of methodology for the determination of certain PIs in foodstuff and packaging continued in 2012.

As part of our NRL responsibilities we successfully participate in proficiency schemes organised by the Community Reference Laboratory for Food Contact Materials. One scheme in 2012 involved analysis of paper material impregnated with various compounds including benzophenone, board material and an unknown solution. The paper and board material was extracted into food simulant Tenax. This type of undertaking is of great importance in expanding the skills of the laboratory.

Plasticisers in PVC gaskets

Development work continued in this important broad area of activity.

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. The 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, certain adipates and polyadipates) into food and restricts the use of others.

Since the legislation continues to be amended to reflect changes in the technology associated with the manufacture and use of these gaskets, we intend to extend the analysis to cover plasticisers in food. One such change in the legislation has introduced a new category of total plasticisers. This may mean that samples will have to be analysed for a suite of analytes, rather than for individual compounds, in order to test for compliance.

In 2012 there were a total of 22 alerts through the EU Rapid Alert System (RASFF) arising from high levels of plasticisers or use of non permitted plasticisers in food. Of these, 6 were raised by Ireland in relation to a joint project with the European Reference Laboratory for food contact materials (EU-RL FCM) and the Kantonal Labor Zürich (KLZH).

Mineral oil in food and packaging

Tests on recycled packaging have found it to contain mineral oil, a component of printing ink. Recycled cardboard contains different types of mineral oils, including that found in solvents, waxes and adhesives. It is thought that producing paperboard by recycling newspaper increases the level of mineral oil it contains due to the high mineral oil content in newspaper print. Mineral oil hydrocarbons migrate by evaporating into gases that slowly enter foodstuffs over time.

In 2012 development of a method for the determination of mineral oil in food and food packaging began. The difficulty with the analysis is that mineral oil is not a single compound but a complex mixture of several thousand chemicals, the pattern of which can differ depending on their source. One fruitful analytical approach is the coupling together of HPLC and GC.

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 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 2012, examining particularly trichothecene toxins such as T-2, HT-2, nivalenol (NIV), deoxynivalenol (DON), 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. To assist in this work one analyst participated in a course at the JRC, Geel where some of these methods were discussed and demonstrated.

Method development for T-2 and HT-2 in cereals is ongoing.

The laboratory continued with method development work on the analysis of patulin in apple juices, apple purée and other apple products. Food samples had been analysed in previous years under the FSP but full validation and accreditation had not been performed for the method. Methods were further developed and validated for apple juices and smoothies during the year. These have been put forward for accreditation in 2013.

PAHs (EU 15 PAHs & 1 JEFFA PAH)

This laboratory is the EU NRL for PAHs.

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

Legislation currently in place, Commission Regulation (EC) No 1881/2006 as amended by Commission Regulation (EC) No 835/2011, controls the level of BaP and Σ PAH4 in certain foods such as meats & seafood, baby foods and edible oils & fats. The 2011 amendment also introduced maximum limits for some new food categories such as cocoa and derived products (e.g. chocolate), coconut oil, smoked sprats and cooked meat on sale to the final consumer. This last category covers cooked meats sold from restaurants, fast food outlets and similar.

To allow for a transition period the new limits did not come into force until the beginning of September 2012, although for some of the new categories the implementation date is extended. Also for some categories the limit will reduce over time without the need for amending legislation.

Validation work was undertaken on cocoa and derived products (e.g. chocolate) and cooked meat in preparation for sampling and accreditation in 2013.

High levels of PAHs found in food are regularly reported through the EU RASFF. In 2012 there were 13 such occurrences arising from many different foodstuffs such as edible oils and smoked fish products.

Safrole

Safrole (1-Allyl-3,4-methylene dioxy benzene, safrole) is a colorless or slightly yellow oily liquid. It is a naturally-occurring genotoxic and carcinogenic compound and for that reason it is not permitted to be added directly to food. It occurs naturally in a variety of spices such as cinnamon, nutmeg, black pepper and herbs such as basil. The maximum level of safrole that may be naturally present in flavourings and food ingredients with flavouring properties is regulated under Regulation (EC) No. 1334/2008.



In 2012, a method was developed and validated for the analysis of safrole in cola drinks (19 samples analysed) and cajun sauces (10 samples analysed). Further matrices will be validated where deemed appropriate

Antioxidants

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. The current applicable legislation in this area is Regulation (EC) No. 1333/2008. However, Articles 2 and 4 and Annexes I to VI of Directive 95/2/EC continued to apply until June 2013. The legislation lists six antioxidants, namely butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), propyl gallate, octyl gallate, dodecyl (lauryl) gallate and tertiary-butyl hydroquinone (TBHQ) and specifies a range of foodstuffs in which they are permitted for use.

Article 32 of Regulation (EC) No 1333/2008 specifies that all food additives permitted for use before the 20th January 2009 should be subject to a new risk assessment by EFSA. Antioxidants is one of the groups of food additives to be re-evaluated. In preparation for this, information on the permitted antioxidants needs to be collected. EFSA has asked EU Member States to submit information on antioxidants with regard to:

- Analytical methods available for antioxidant determination in food
- Present use and use patterns, comprising which food categories and subcategories, proportion of food within categories/subcategories in which they are used and actual use levels, typical and maximum.

In 2012, this laboratory as the specialised PAL for antioxidant testing, developed and validated a gradient HPLC method for the determination of the six permitted antioxidants listed above in

dehydrated soups and mayonnaise. 17 Samples of these products that declared one or more of the antioxidants as an ingredient(s) were tested. The test results will be submitted to EFSA as part of the re-evaluation of permitted antioxidants.

1.5.6 EU Food and Veterinary Office Missions

In 2012, in response to an invitation, one Executive Chemist staff member accompanied the Food and Veterinary Office (FVO), which is based in Grange, Co. Meath, as a National Expert on an official missions to Azerbaijan.

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.

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 purpose of the mission to Azerbaijan was a follow-up audit to assess aflatoxin contamination in hazelnuts. The responsibility of the National Expert on the mission was to assess the response to the findings of the previous mission and to assess that laboratories fulfil the criteria laid down in the relevant Articles of Regulation (EC) No 882/2004. To this end, the Expert examined laboratories engaged in the analysis of mycotoxins for compliance with official sampling and testing, auditing systems, practices and resources.

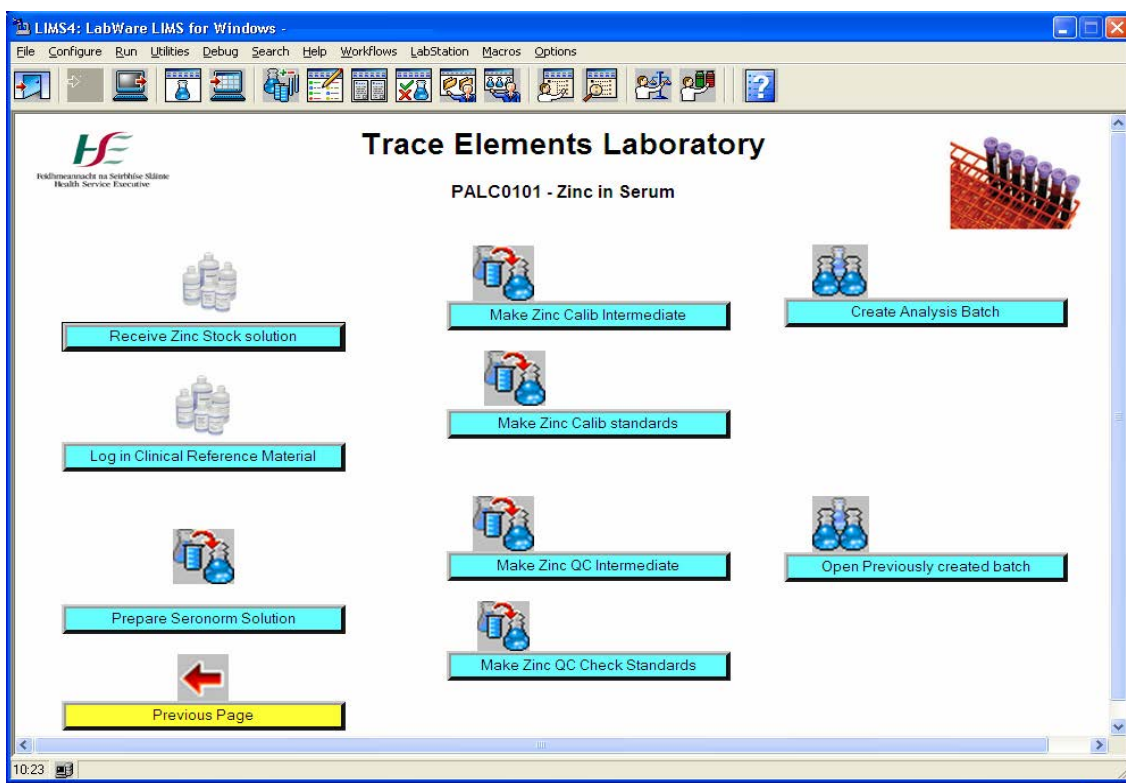
1.5.7 Laboratory Information Management System (LIMS) and IT

Development of the LIMS during 2012 focussed on extending the LIMS implementation in the chemistry sections. The LIMS Instrument Manager was used to record electronically daily performance checks, calibration, cleaning and service events for instruments in the chemistry laboratories, replacing paper records. Such records can now be imported directly into the LIMS-based auditing module. Work continued on a project to ensure that chemistry analytical methods are implemented through LIMS in all sections.

Further developments regarding microbiological testing of cosmetics led to continued refinement of the LIMS implementation in this area. As time allows, some of these developments are introduced into the existing implementation for food and water microbiology.

The laboratory purchased 3.5 days of LIMS consultancy to address routine system maintenance issues and in particular to improve the review and authorisation of test data. An additional half day was provided by Labware as part of their contracted support mechanism. The work allows reporting analysts to conveniently interpret individual results, data from which are subsequently electronically transferred to the FSAI. Additional development took place with regard to this FSAI interface, to

ensure capture of additional sample and test data. Electronic data transfer of water results to large customers expanded in 2012, with additional customers availing of this service.



1.5.8 Laboratory web page <http://www.publicanalystdublin.ie/>

The full content-rich web page for the laboratory is regularly updated to provide for our customers full information on our analytical services, costs thereof as appropriate, downloadable sample request forms & Annual Reports, and more. At the end of 2012 a plan was agreed for the review and update of the whole website.



2. Laboratory workload in 2012

In 2012 the laboratory analysed a total of **12,542** samples, comprising *c.* 75,000 individual tests. The following broad sample types, including both chemical and microbiological testing, were analysed:

Food	3155
Water – Chemical	3949
Water – Microbiological	3670
Clinical	1287
Cosmetics	134
Non Foods	107
DEMOCOPHES Human	240
Bio Monitoring	

Total	12,542

The total includes more than 400 samples analysed under Proficiency Schemes and other Quality Control programmes.

3. Food

The food testing performed by the laboratory in 2012 comprised:

- i) programmed chemical analysis of food samples under the National Chemical Food Sampling Programme predominantly for the HSE Dublin Mid-Leinster and the HSE Dublin North East with some samples also received from the HSE South and West.
- 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 export certification examination and analysis
- ix) 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 (LAVIs), the Sea Fisheries Protection Authority (SFPA) and the Department of Agriculture, Food and the Marine (DAFM).

3.1 Programmed Chemical Food Testing

The 2012 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 webpage - <http://www.publicanalystdublin.ie/en/>

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 (NMSP) continued in 2012. Under the plan the focus of sampling points has changed from small retail samples, more the norm in previous years, 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 2012 the laboratory tested a wide range of foodstuffs for the following mycotoxins: aflatoxins, ochratoxin A, zearalenone, fumonisins, the trichothecenes DON, T-2 & HT-2 and patulin.

Legislation for mycotoxins

Legislation for currently regulated mycotoxins has been consolidated into Regulation EC No 1881/2006 and further amended by Commission Regulation (EU) No 594/2012 for Ochratoxin A in spices.

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 2012.

87 samples in total were analysed for aflatoxins as part of the National Mycotoxin Programme. These samples were mainly taken from shipments entering the State at the designated ports. The 12 babyfood samples were submitted for multi-parameter testing, with other suites of analysis including ochratoxin A and PAH testing.

312 tests for Aflatoxins B1, B2, G1, G2 & Total were carried out on the samples.

Additionally 40 samples were tested for aflatoxin M1. Details are given in Table 1.

<i>Foodstuff</i>	<i>No of samples received</i>	<i>No of samples exceeding limits for Aflatoxin B1</i>
Aflatoxins B1, B2, G1,G2, Total		
<i>Spices</i>	29	Two samples of fish masala were 2 times above the B1 limit of 5.0 µg/kg. 1 sample of peanut ball (spices) was estimated to be 5 times over the limit.
<i>Whole Nuts</i>	7	0
<i>Nut Products</i>	2	1 sample of peanut masala was estimated to be 1000 times over the limit.

Cereals	33 cereals consisting of: 24 Rice 7 Popcorn 2 Flour	0
Dried Fruit	2	0
Seeds	2	One sample of melon seeds was estimated to be 1.5 times over the limit.
Baby foods	12	0
Aflatoxin M1		
Milk and milk powder	15	0
Baby foods (Infant formula and follow-on formula)	25 (Samples for DAFM)	0

Table 1 Details of aflatoxin testing in 2012

Ochratoxin A

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 2012

136 samples were tested for ochratoxin A. The details are in Table 2.

<i>Foodstuff</i>	<i>No of samples</i>	<i>No of samples exceeding limits</i>
<i>Coffee</i>	9	0
<i>Baby foods</i>	20	0
<i>Beer</i>	7	0
<i>Paprika & Chilli</i>	10	0
<i>Turmeric</i>	5	0
<i>Ginger</i>	3	0
<i>Nutmeg</i>	3	0
<i>Black & White Pepper</i>	10	0
<i>Cereals</i>	11	0
<i>Dried vine fruits</i>	11	0
<i>Wine</i>	10	0
<i>Liquorice</i>	4	1
<i>Grape juice</i>	6	0
<i>Chocolate</i>	5	0
<i>Baby Foods</i>	12	0
<i>Mixed Spices</i>	10	0

Table 2 *Ochratoxin A analysis*

In addition 5 large scale samples of dried vine fruit were analysed for OTA under the National Mycotoxin Sampling Plan. All were satisfactory.

In 2012 due to the continued implementation of the NMSP fewer retail samples of certain matrices were tested for ochratoxin A, compared to in 2011. Nevertheless the number of samples analysed increased slightly because of additional sampling of some matrices

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

Other mycotoxins - Zearalenone, Fumonisin, Trichothecenes T-2, HT-2, Deoxynivalenol.

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.

Fumonisin 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 B₁ 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. There is still no legislation for T-2 and HT-2 as the impact of these mycotoxins on public health continues to be the subject of debate, however a recommendation may be issued in the near future.



Results from the investigations into the trichothecenes and the other *Fusarium* mycotoxins in 2012 are given in Tables 3 and 4, respectively.

In accordance with the policy of further progressing the multi-parameter testing of samples, 3 analytical tests were performed on all samples listed in Tables 3 and 4.

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.

<i>Foodstuff</i>	<i>Parameter</i>	<i>No of samples</i>	<i>No of non-compliant results</i>
<i>Cereals</i>	T-2, HT-2	19	0
<i>Cereal based baby foods</i>	T-2, HT-2	20	0
<i>Cereals</i>	DON	19	0
<i>Cereal based baby foods</i>	DON	20	0

Table 3 T-2, HT-2 & DON

<i>Mycotoxin</i>	<i>Foodstuff</i>	<i>No of samples</i>	<i>No of samples exceeding limits</i>
<i>Zearalenone</i>	Cereals, cereal products	19	0
<i>Zearalenone</i>	Cereal based baby foods	20	0
<i>Fumonisin B₁, B₂</i>	Cereals & cereal products (mainly corn)	19	0
<i>Fumonisin B₁, B₂</i>	Baby foods	20	0

Table 4. Testing for further mycotoxins.

Patulin

In 2012 fifteen juices and 13 other apple products were tested for patulin content. All were satisfactory bar one of the juice samples that contravened labelling legislation.

Cereal Survey for Mycotoxins

Because of the poor climatic conditions experienced during the 2012 growing season and the consequent concern about mycotoxin contamination, at the request of the FSAI this laboratory undertook a survey of cereals harvested during the year. The samples were tested for aflatoxin B₁, B₂, G₁, G₂ and total aflatoxins, ochratoxin A, zearalenone, deoxynivalenol, nivalenol, T-2 and HT-2 toxins, and fumonisin B₁, B₂ and B₃. The survey extended into 2013. However, at the close of the year 41 samples had been tested. One sample was found to exceed the limit for OTA and eight samples exceeded the limit for ZON. The results were assessed against the food legislation limits. On investigation none of the non-compliant samples was destined for the human food chain.

Ergot Alkaloids

In 2012 testing continued on samples of cereal products for their ergot alkaloid content. Samples were analysed for six ergot alkaloids (ergometrine, ergosine, ergotamine, ergocornine, α -ergocryptine and ergocristine) in the first campaign. Prior to the second campaign the EU monitoring recommendation (2102/154/EU) was published and following redevelopment of the analytical method the samples were analysed for the six ergot alkaloids and their corresponding 'inines'. The details are given in Table 5.

<i>Foodstuff</i>	<i>Parameter</i>	<i>No of samples</i>	<i>No of non-compliant results</i>
<i>Cereals (Rye products)</i>	Ergot alkaloids (6)	9	N/A
<i>Cereals (Rye products)</i>	Ergot alkaloids (6) and their 'inines'	21	N/A

Table 5 Ergot Alkaloids

Polycyclic Aromatic Hydrocarbons in food

In 2012 114 food samples were analysed for PAHs. This resulted in a total of some 1710 individual tests. The results are presented in Table 6.

<i>Foodstuff</i>	<i>Number of samples</i>	<i>PAH range µg/kg</i>	<i>BaP range µg/kg</i>	<i>ΣPAH4 range µg/kg</i>
<i>Edible oils</i>	25	<0.2 – 3.7	<0.7 – 1.0	0 – 7.4
<i>Canned Oily Fish</i>	12	<0.2 – 6.2	<0.7 – 1.8	0 – 15.3
<i>Solid Chocolate (Including 2 Cocoa Butter samples)</i>	16	<0.5 – 3.3	<0.5 – 1.1	0 – 8.1
<i>Cereal-based Babyfoods</i>	12	<0.2 – 0.3	<0.2	0
<i>Food supplements</i>	12	<0.2 – 102.4	<0.7 – 62.3	
<i>Herbs/Spices</i>	12	<0.2 – 5.7	<0.7 – 1.8	0 – 14.9
<i>Infant Formula and Follow-on-Formula</i>	25	<0.2	<0.2	0

Totals: 114 - Resulting in 1710 individual tests.

Table 6 Summary of PAH testing results

The cereal-based babyfood samples were submitted for multi-parameter testing, with other suites of analysis including ochratoxin A and aflatoxin B1 analysis. The samples of infant formula and follow-on-formula were also submitted for a range of test suites including taurine and aflatoxin M1; 5 of these samples were additionally tested for ESBO and phthalates.

All samples analysed were found to be within the regulatory limits defined in Commission Regulation (EC) No 1881/2006 as amended by Commission Regulation (EC) No 835/2011.



Although the legislation does not cover food supplements, in the case of 2 of the samples analysed, namely spirulina and propolis, the levels found were considered high. In Spirulina benzo[a]pyrene and the sum of PAH4 (benzo[a]pyrene, chrysene, benzo[b]fluoranthene and benzo[a]anthracene) were determined at 15.8 and 100 µg/kg.respectively. In the propolis sample, benzo[a]pyrene and the sum of PAH4 were determined at 62.3 and 280 µg/kg.respectively. In consultation with the FSAI, a risk assessment was carried out based on the margins of exposure to an adult with a body weight of 70kg. Both risk assessments indicated the calculated margins of exposure were acceptable.

Inorganic contaminants (heavy metals)

In 2012, 40 samples of fish and shellfish were analysed for lead, total arsenic, inorganic arsenic, chromium and cadmium

The number of metal tests in the different sample types is given in Table 7, a total of 100 tests.

<i>Matrix</i>	<i>Total Arsenic</i>	<i>Lead</i>	<i>Chromium</i>	<i>Inorganic arsenic</i>	<i>Cadmium</i>	<i>No. exceeding limits</i>
<i>Fish & Shellfish</i>		20	20		20	0
<i>Fish</i>	20			20		0
Totals	20	20	20	20	20	0

Table 7 Inorganic contaminants

Regulation EC No 1881/2006, amended by regulation EC No. 629/2008, specifies maximum levels for lead, cadmium, mercury and tin in foodstuffs.

S.I. No 44 of 1972 Health (Arsenic and Lead in food) Regulations 1972, amended by S.I. No 72 of 1992, specifies the maximum limit for arsenic in food.

At present, there is no legislation governing the concentration of chromium in Fish.

Process contaminants

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 in 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 has been extended by Commission Recommendation 2010/307/EU. This exercise is targeted to those foodstuffs that are known to contain high acrylamide levels and/or contribute significantly to the human dietary intake.



Based on the EFSA monitoring data from 2007 – 2008, Commission Recommendation of January 2011 has set indicative acrylamide values. No indicative values are set for the category ‘other products’ as they tend to contain products that are relevant in certain Member States only. Where the acrylamide level found exceeds the indicative values, listed investigations are recommended. They are not safety thresholds; there are still no legislative limits on acrylamide in foods.

Under the Recommendation chips/French fries are 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. This has given conflicting results as it was found to be the case in 2010 yet was not observed in 2011. For the 2012 sampling, French fries taken from the same two suppliers in March and November were found to have 70 & 90 µg/kg respectively (Supplier 1) and 160 & 80 µg/kg respectively (Supplier 2).

In 2012 49 samples were analysed, covering a range of foods. Table 8 presents the range of levels found and additionally an expression of the typical exposure having regard to estimated portion size. Five samples had acrylamide levels exceeding their indicative values. Three of these were potato crisps and two samples were in the category of biscuits and rusks for infants and young children.

EFSA has published a scientific report which gives an update of results on the monitoring of acrylamide levels in food. This is at: <http://www.efsa.europa.eu/en/efsajournal/doc/1599.pdf>

<i>Foodstuff</i>	<i>Number of samples</i>	<i>Acrylamide range µg/kg</i>	<i>Indicative Values µg/kg</i>
<i>French fries sold as ready-to-eat</i>	9	70 – 390	600
<i>French fries for home-cooking</i>	4	60 – 140	No indicative value set
<i>Potato crisps</i>	4	710 – 2210	1000
<i>Soft bread</i>	4	40 – 70	150
<i>Breakfast cereals (excl.muesli and porridge)</i>	4	60 – 160	400
<i>Biscuits, crackers, wafers, crisp bread and similar, excl.ginger bread</i>	5	70 – 310	500
<i>Roast coffee</i>	2	100 – 160	450
<i>Baby foods, other than processed cereal based foods</i>	5	<10 – 70	80
<i>Processed cereal based baby foods</i>	1	<10	100
<i>Biscuits and rusks for infants and young children</i>	3	230 – 370	250
<i>Other (Including savoury-based corn snacks, cakes, pastries and potato-based products)</i>	9	20 – 330	No indicative value set

Table 8. Acrylamide testing in 2012

Nitrate in various foods.

Table 9 summarises the testing for nitrate in 2012.

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

<i>Parameter</i>	<i>Foodstuff</i>	<i>No of samples</i>	<i>Non compliant samples</i>
Nitrate	Lettuce	9	0
	Spinach	7	0
	Rocket	5	0

Table 9 Nitrate

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. Furan 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.

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>, which 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.

For furan testing in 2012, our target was on food categories where limited results had been available to EFSA. This was to reduce uncertainty associated to exposure estimates.

In 2012 77 samples were submitted for furan analysis, all of which were analysed as received. 5 of these were also analysed as prepared for consumption. Tables 10 and 11 present the results.

<i>Foodstuff</i>	<i>Number of samples analysed (as received)</i>	<i>Furan range µg/kg</i>
<i>Dairy Products</i>	21	< 5
<i>Alcoholic beverages</i>	21	< 5
<i>Cocoa & chocolate beverages</i>	5	<5
<i>Bakery Products</i>	15	< 5
<i>Snacks</i>	15	< 5

Table 10 Furan - Samples as received

<i>Foodstuff</i>	<i>Number of samples analysed (after preparation)</i>	<i>Furan range µg/kg</i>
<i>Cocoa & chocolate beverages</i>	5	<5

Table 11 Furan - Samples after preparation

As the food products targeted in the 2012 FSP were found to contain little or no furan, the focus for 2013 will be on products where furan has been found to be present at relatively high levels. Furan estimates are highest for toddlers and adults, with jarred baby foods (containing vegetables) and coffee being the major contributors, respectively.

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) methylethylketone

in foods such as tea, coffee, oils, fats, chocolate and chocolate products. The analytical method was successfully developed and validated in 2012.

45 Samples were analysed for solvent residues, 20 samples of decaffeinated coffee and 25 edible oils. This resulted in a total of some 200 individual tests. Results are shown in Table 12.

<i>Foodstuff</i>	<i>Number of samples</i>	<i>Solvent range mg/kg</i>
<i>Decaffeinated Coffees</i>	20	<1.0 – >20.0 8 coffee samples exceeded the maximum residue limit for methanol (10mg/kg)
<i>Edible oils</i>	25	<0.1 – 2.66

Table 12 Solvent Residues testing in 2012

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

8 Samples of decaffeinated coffee (dry matter) were found to contain methanol levels above the 10mg/kg maximum residue limit permitted, with levels determined between 14.6 – 27.4 mg/kg. All other solvents analysed for were well within the legislative limits.

3-MCPD

3-Monochloropropandiol is produced by the acid treatment of soya beans during the manufacturing of soy sauce. It is classified by the IARC as a probable carcinogen. A maximum limit for 3-MCPD in soy sauce is prescribed in Commission Regulation 1881/2006 of 20µg/kg.

The analytical method was successfully developed and validated in 2012.

20 Samples of soy sauce were analysed for 3-MCPD. All samples were found to comply with the legislation. Table 13 presents the results.

<i>Foodstuff</i>	<i>Number of samples</i>	<i>3-MCPD range mg/kg</i>
<i>Soy sauce</i>	20	<10

Table 13 3-MCPD testing in 2012

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. There is currently no legislative limit for the MCPD esters.

The analytical method was successfully developed and validated in 2012. 25 Samples of edible oils were analysed for MCPD esters, with results shown in Table 14.

<i>Foodstuff</i>	<i>Number of samples</i>	<i>MCPD Esters range mg/kg</i>
<i>Edible oils</i>	20	<0.2 – 4.3

Table 14 MCPD Esters testing in 2012

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 part of multi parameter testing which was conducted on 20 samples of soft drinks. There is currently no legislative limit for benzene in soft drinks, however the World Health Organisation (WHO) has proposed a limit of 10µg/L in drinking water.

14 Samples had levels less than 0.1 µg/L, 5 had levels between 0.1 and 0.7 µg/L and one undiluted cordial had a level of 44 µg/L, which if diluted 1 in 5 according to preparation details would result in a level of approximately 9 µg/L.

Flavourings

Coumarin

In 2012, 50 samples of cinnamon-containing products including seasonal Christmas and Easter bakery products, apple strudels, carrot cake, biscuits and breakfast cereals were analysed for coumarin content. All the bakery products tested complied with the maximum level of 50 ppm as specified in Regulation (EC) No. 1334/2008 on flavourings. 2 Samples of porridge with added cinnamon (one product) were found to contain coumarin in excess of the maximum permitted level of 20 ppm for breakfast cereals.

Safrole

In 2012 19 cola drinks and 10 cajun sauces were tested for safrole content. All products tested complied with the maximum level of 1 ppm for non-alcoholic beverages and 25 ppm for sauces as specified in Regulation (EC) No. 1334/2008 on flavourings and certain food ingredients with flavouring properties for use in and on foods.

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.

Some 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 2012, the laboratory tested a wide range of foodstuffs for the following additives:

- i) artificial sweeteners – aspartame, acesulfame-k, saccharin, sucralose
- ii) preservatives – sodium nitrite, sodium nitrate, sulphur dioxide, benzoic acid, sorbic acid.
- iii) flavour enhancer – monosodium glutamate
- iv) caffeine
- v) antioxidants – BHA, BHT, propyl gallate, octyl gallate, lauryl gallate and TBHQ

Table 15 gives the results of testing for additives in 2012. Where labelling is presented as the reason for a sample being not compliant, this was due to the detection of undeclared ingredients.

42 samples were not compliant, representing 9.9% of the 425 samples tested. This is a high percentage and it illustrates the need for continuing rigorous monitoring and surveillance.

<i>Additive</i>	<i>Foodstuff</i>	<i>No of samples</i>	<i>No of Tests</i>	<i>No of non-compliant Samples</i>
Artificial sweeteners other than sucralose - Aspartame Acesulfame-K Saccharin	Non-alcoholic beverages, flavoured bottled waters, sauces and energy reduced jams and marmalades	18	54	0
Sucralose	Various categories of foodstuffs	40	50	0
Antioxidants	Mayonnaise and dehydrated soups	17	93	0
Sulphur dioxide (SO₂)	Dried fruit, wine, raw crustaceans, prepared vegetables, sausages and burgers	103	103	15 Excessive levels of SO ₂
Sodium nitrite, sodium nitrate NaNO₂, NaNO₃	Cured meats and brines	101	202	24 Excessive levels of NaNO ₂ and/or NaNO ₃

<i>Benzoic & sorbic acids</i>	Non-alcoholic beverages, cakes, jams, marmalades & sauces	40	80	3 Labelling
<i>Mono sodium glutamate (MSG)</i>	Prepared meals, soups and sauces	40	40	0
<i>Taurine</i>	Infant formula and follow-on formula	25 (from DAFM)	25	0
<i>Caffeine</i>	Decaffeinated products	20	20	0
<i>Caffeine</i>	Soft drinks	21	21	0

Totals: 425 688 42

Table 15 Results of additives testing in 2012.

The highest number of non-compliant results continues to be for the preservatives sodium nitrate & sodium nitrite in cured meats and brines.

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 2012 6 samples of fish in total were analysed for carbon monoxide, consisting of 3 swordfish and 3 tuna. No positives were found.

Compositional / Quality / Labelling analysis

In 2012 the laboratory performed testing to determine the quality of in-use cooking oils. The parameters tested were acid value and peroxide value. Multi-parameter testing was performed on the samples of infant formula and follow-on formula, with the samples being tested for taurine, aflatoxin M₁, ESBO and phthalate migration and PAHs.

22 Samples of honey were tested for sugars, HMF, moisture, diastase number, free acidity, conductivity, insoluble matter. The testing of honey is another excellent example of multi-parameter testing of samples – each sample can be tested for thirteen individual parameters.

Table 16 gives the data for compositional testing in 2012.

<i>Parameter</i>	<i>Foodstuff</i>	<i>No of samples</i>	<i>No of tests</i>	<i>No of non-compliant samples</i>
<i>Acid Value Peroxide Value</i>	In-use cooking oils	26	52	3 Acid values exceeded the guideline limit of 3.0 mg/g
<i>Sugars, HMF, Moisture, Diastase number, free acidity, conductivity, insoluble matter</i>	Honey	19 (incl. 11 from DAFM)	163	1 plus 2 for labelling
Totals:		45	215	6

Table 16 Compositional testing in 2012

Of the 45 samples tested, 6 were non-compliant which is 13.3%. This 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 amends Regulations (EC) No 1924/2006 and (EC) No 1925/2006 and repeals a number of Directives.



This new regulation came into effect in December 2011 and will generally apply from mid December 2014, with a couple of exceptions. The regulation will replace the current foodstuffs labelling requirements as set out in Directive 2000/13/EC and the nutrition labelling requirements as set out in Directive 90/496/EEC.

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 prepackaged foodstuffs.

Foods placed on the market or labelled prior to the 13th December 2014 which are 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 2012

A substantial amount of general labelling analysis was performed.

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. Table 15 contains information on labelling analysis in 2012.

Biogenic amines

Directive 91/493/EEC on fish hygiene specifies limits for histamine levels in the *Scombridae* and *Clupeidae* fish species. This states that nine 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 1441/2007 on microbiological criteria for foodstuffs specifies similar histamine limits for fish and double 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 2012 the following biogenic amines were measured in a range of foodstuffs – histamine, tyramine, cadaverine, putrescine, spermidine, spermine, agmatine, phenylethylamine, tryptamine and serotonin.

Table 17 gives the details.



<i>Foodstuff</i>	<i>No of samples</i>	<i>Histamine range Ppm</i>	<i>Tyramine range ppm</i>	<i>No of non-compliant samples</i>
<i>Fish, crustacean, molluscs</i>	30 * (incl. 5 SFPA)	<10–331	<10–32	1
<i>Sauces</i>	20	<10–225	<10–71	0

* For 10 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 the Regulation.

Table 17 Biogenic Amine analysis in 2012

Food Contact Materials (FCMs)

This laboratory is the specialist testing facility in Ireland and EU NRL for Food Contact Materials.



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 2012 the laboratory analysed 20 black nylon kitchen utensils for two common PAAs. Six samples did not meet the requirements for specific migration and Rapid Alerts were raised with the FSAI for these.

One sample was received for analysis under the new emergency legislation introduced during 2012 (Commission Regulation (EU) No 284/2011) and was found to be not compliant.

Photo initiators (PIs)

In 2012 29 samples were analysed for a range of PIs. These consisted mainly of dry products packaged in paperboard e.g., pasta, rice, porridge oats, breakfast cereals. 6 PIs were tested for in the food itself, including benzophenone and 4-methoxybenzophenone.

A total of 186 individual tests were performed. The results are presented in Table 18.

<i>Foodstuff</i>	<i>No of samples</i>	<i>Benzophenone in packaging mg/dm²</i>	<i>PI range in food mg/kg</i>
<i>Pasta</i>	7		<0.1
<i>Rice</i>	7	0.2	<0.1– 0.6 All <0.1 except one sample, 0.6mg/kg.
<i>Porridge Oats</i>	4	0.2	<0.1– 2.1 All <0.1 except one sample, 2.1mg/kg.
<i>Flour/Bread/Cake Mix</i>	4		≤0.1
<i>Breakfast cereals</i>	3		≤0.1
<i>Quinoa cereal</i>	1		<0.1
<i>Couscous</i>	1		<0.1
<i>Drinking Chocolate</i>	1		<0.1

Table 18. Photoinitiator testing in 2012

In the case of 2 food products, namely a rice and porridge sample, levels of benzophenone at 0.6 and 2.1 mg/kg were found respectively. Therefore the food packaging from these samples was tested for the presence of PIs, with benzophenone levels determined at 0.2mg/dm² in both packaging.

Article 3.1 (a) of Commission Regulation (EC) No 1935/2004 states that materials and articles, including active and intelligent materials and articles, shall be manufactured in compliance with good manufacturing practice so that, under normal or foreseeable conditions of use, they do not transfer their constituents to food in quantities which could endanger human health. Given that the level of Benzophenone found in the porridge sample was high, the product was subject to further checks to verify compliance with Article 3 of Regulation (EC) No. 1935/2004. Follow-up testing of the packaging determined levels of benzophenone at <0.02mg/dm² indicating that it is in compliance with Article 3 of Regulation (EC) No. 1935/2004.

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 and is fat soluble. However ESBO has the potential to migrate into the foodstuffs during sterilisation and storage, especially into fatty foods.

With effect from the beginning of May 2011 Commission Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food replaced Commission Directive 2002/72/EC. The legislation restricts the content of ESBO in food to 60mg/kg. In the case of PVC gaskets used to seal glass jars containing infant formulae and follow-on formulae or processed cereal-based foods and baby foods for infants and young children the Specific Migration Limits (SML) is lowered to 30 mg/kg.

Use of ESBO in gaskets may be decreasing due to replacement with other plasticisers such as polyadipates.

The analytical method for the determination of ESBO has been accredited.

50 samples of infant food and other jarred foods were analysed in 2012 for ESBO. 5 of these were analysed for the DAFM. The samples comprised 5 infant formulas, 25 baby foods and 20 other jarred foods, the majority of which were sauces. The ESBO levels were all less than the legislated SML. The results are presented in Table 19.

<i>Foodstuff</i>	<i>No of samples</i>	<i>ESBO range mg/kg</i>
<i>Infant formula</i>	5	<3
<i>Baby foods</i>	25	< 4– 11
<i>General jarred foods</i>	20 consisting of	<3 – 21
<i>Sauces</i>	13	<3 – 6
<i>Condiments</i>	2	<3 – 11
<i>Prepared meat dishes</i>	4	<3 – 21
<i>Other - sour cabbage</i>	1	19

Table 19 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) diethylphthalate (DEP)
- xii) dimethylphthalate (DMP)

The 50 samples that were analysed for phthalates resulted in 600 individual tests.

A range of other PVC additives were also monitored including:

- i) adipates
- ii) sebacates
- iii) diisononyl cyclohexanedicarboxylate (DINCH)
- iv) tributyl o-acetocitrate (TBAC which is a composition of 21 compounds),.
- v) oleamide and erucamide (slip agents).

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.

A trace of dimethyl phthalate (DMP) was found in 1 gasket of a babyfood sample at 0.007%w/w. DMP is not listed in the list of additives permitted for use in plastic materials and articles in contact with food in Annex II of Commission Regulation (EU) No 10/2011. Our reporting limit of quantitation for DMP in gasket is 0.005%w/w.

This work 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 2012 a total of four samples were submitted to the laboratory for testing under the import control legislation. All were satisfactory.

Melamine and formaldehyde in kitchenware

19 Samples of kitchenware were analysed for specific migration of melamine and residual formaldehyde giving 38 analytical tests. All were compliant.

In addition, 2 samples were received from the port for formaldehyde testing alone under the new emergency legislation. Both were compliant.

2 Samples were received for formaldehyde testing from the Bulgarian food safety authority; both were compliant.

Bisphenol A (BPA) in baby bottles and canned foods

As previously mentioned, new legislation in 2011 restricted BPA use in baby bottles. To check compliance with this new legislation eight baby bottles were tested. None contained BPA. Eighteen samples of canned foods were analysed for BPA. All were satisfactory. Five 25 litre carboys used for drinking water were also checked for BPA and were found to be satisfactory.

Migration of lead and cadmium from ware.

Council Directive No. 84/500/EEC specifies the maximum limit for lead and cadmium allowed to be transferred from ceramic articles. 16 Samples of ceramic ware were analysed for the migration of lead and cadmium. All were satisfactory

Migration of chromium and nickel from kitchenware

20 Samples of metal utensils & cutlery were analysed for the migration of chromium and nickel giving 40 analytical tests. No sample was found to have high levels of either metal migrating from it. There is no legislation governing these tests, nevertheless, these items are a potential source of heavy metals and therefore a concern for public health

Research leading to a Ph.D. degree

Since autumn 2008 a postgraduate student has been conducting research for a Ph.D. degree in the field of FCMs. The project comprises the selection of one or more topics from the wide area of FCMs. By agreement with the college concerned the student developed a method for the analysis of PAAs in black nylon kitchen utensils. The method has been used in the analysis of these items. It was accredited in 2010 and a 2011 paper was published in the journal 'Food Additives and Contaminants'.

Other topics, focussing on the development of analytical methods for FCM compounds, particularly screening methods by UPLC-QToF-MS for photoinitiators, and the application of these methods to the collection of data and the elucidation of the underlying chemistry between the foods and the materials in contact with them, are being pursued. The thesis is nearing completion and will be defended in 2013.

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

18 samples were submitted for PAH analysis.

The PAHs that are 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 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 2012



Introduction

The food microbiology laboratory examined 1254 samples submitted by EHOs for Food Control purposes. This number comprised 1246 food samples and 8 hygiene swab samples.

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 2012, the FSAI performed 1 National Survey (12NS1). Twenty four samples were taken at the Port as 'Import' samples. Eighty seven 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 unsatisfactory or suspect results. All 'Import' 'Repeat' and 'Follow-up' samples are non-programmed, which has a major impact on laboratory time and resources.

Table 20 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 judgement categories for samples were based on the criteria set out in the FSAI Guidance Note No. 3 for Ready-To-Eat (RTE) foods at the point of sale. Acceptable and Satisfactory samples under those guidelines are combined as 'Compliant' in the Table. Unacceptable/potentially hazardous and unsatisfactory samples under the guidelines are combined as 'Non-compliant' in the Table. The judgement applied to any sample was determined by the worst result for any of the individual parameters tested. Samples for which a judgement was not considered appropriate were classed as 'No Designation'. Table 21 gives the same breakdown for the 8 hygiene swab samples tested in the laboratory in 2012.

<i>Category</i>	<i>Number</i>	<i>Compliant</i>	<i>OUTCOME Non-compliant</i>	<i>No Designation</i>
<i>Routine</i>	783	659	89	35
<i>12NSI</i>	315	275	40	0
<i>Follow-up</i>	87	78	6	3
<i>Repeat</i>	30	22	7	1
<i>Import</i>	24	23	0	1
<i>Complaint</i>	4	3	1	0
<i>Food Poisoning Investigation</i>	2	2	0	0
<i>Control</i>	1	1	0	0
<i>Total</i>	1246	1063	143	40

N/A = Not applicable

Table 20 Microbiology Food Sampling Programme – General data on food samples for 2012

<i>Category</i>	<i>Number</i>	<i>Compliant</i>	<i>OUTCOME Non-compliant</i>	<i>No Designation</i>
<i>Follow up</i>	6	N/A	N/A	6
<i>Complaint</i>	2	N/A	N/A	2
<i>Total swabs</i>	8	N/A	N/A	8

N/A = Not applicable

Table 21 Microbiology Food Sampling Programme – General data on swab samples for 2012

Results of food testing

In 2012 only 3.2% of food samples did not have a judgement assigned compared with 26.4% in 2011. A judgement is not made on samples which have results that fall into the unsatisfactory category but where the temperature on receipt is not available or where the final result was an estimate. A judgement will also be omitted 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.

After removing the 'No Designation' category food samples, the satisfactory samples represented 88.1% of the remaining samples. Food samples judged to be unsatisfactory represented 11.9% of samples analysed against which there is a judgement. The proportion of unsatisfactory food samples was 3.2% higher in 2012 than in 2011 (8.7%). Unsatisfactory samples had been following a consistent downward trend up to 2011, but this year has seen a slight rise in proportion.

Table 22 summarises the results found for each test parameter for routine food samples in 2012.

	<i>Parameter</i>	<i>Total tests</i>	<i>Unsatisfactory (UNSAT)</i>	<i>% Unsatisfactory (of samples tested for this parameter)</i>	<i>Unsatisfactory level</i>	<i>Range cfu/g for UNSAT</i>
Indicator Organisms (Enumeration)	ACC 30°C	421	61	14.5	N/A	N/A
	<i>Enterobacteriaceae</i>	495	19	3.8	$\geq 1.0 \times 10^4$	N/A
	<i>E. coli</i>	564	9	1.6	$\geq 1.0 \times 10^2$	2.8×10^2 - $>4.9 \times 10^4$
Pathogens (Presence or Absence test)	<i>Salmonella</i>	525	0	0	Detected	N/A
	<i>Campylobacter</i>	0	0	0	Detected	N/A
Pathogens (Enumeration)	<i>B. cereus</i>	519	3	0.6	$\geq 1.0 \times 10^4$	3.2×10^4 - 6.3×10^4
	<i>C. perfringens</i>	519	0	0	$\geq 1.0 \times 10^2$	N/A
	Coagulase-positive Staphylococci	569	4	0.7	$\geq 1.0 \times 10^2$	1.8×10^2 - 2.7×10^2
	<i>L. monocytogenes</i> Enumeration	550	1	0.2	$\geq 1.0 \times 10^2$	$>3.0 \times 10^3$
	<i>V. parahaemolyticus</i> enumeration	2	0	0	$\geq 1.0 \times 10^2$	N/A
	Totals:	4164	97	2.3	N/A	N/A

N/A = Not applicable/available.

Table 22 Breakdown of results by parameter (test) for 2012 routine food samples

The majority of routine food samples that are found to be unsatisfactory fail for indicator organisms and most of these samples fail only for the Aerobic Colony Count (ACC) parameter. We found only 8 routine samples (1.0%) with unsatisfactory results due to food pathogens. These are listed in Table 23.

The proportion of routine samples tested with unsatisfactory aerobic colony counts was 14.5% in 2012. After ACC, the parameter that provides more unsatisfactory results than any other is *Enterobacteriaceae*. In 2012, 3.8% of samples were unsatisfactory for this parameter. *Enterobacteriaceae* are very widely distributed in the environment so this result is not surprising. *Enterobacteriaceae* are common on raw vegetable matter thus 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.

Unsatisfactory *Escherichia coli* (*E. coli*) results for routine food samples were at 1.6% of samples tested.

Further pathogens

Coagulase-positive staphylococci were found in 4 routine samples tested in 2012 where the level could be deemed as unsatisfactory. Table 23 shows summary data for pathogens detected at unsatisfactory levels.

Food	Analysis Reason	Pathogen	Unsatisfactory Pathogen Level cfu/g
Vegetable Soup	ROUTINE	Presumptive <i>Bacillus cereus</i>	3.2×10^4
Seafood Chowder	ROUTINE	Presumptive <i>Bacillus cereus</i>	4.2×10^4
Egg-Fried Rice	ROUTINE	Presumptive <i>Bacillus cereus</i>	6.3×10^4
Cheese Salad	ROUTINE	<i>L. monocytogenes</i>	$>3.0 \times 10^3$
	ROUTINE	Coagulase-positive staphylococci	2.2×10^2
Coleslaw	ROUTINE	Coagulase-positive staphylococci	1.8×10^2
Chicken curry	ROUTINE	Coagulase-positive staphylococci	1.9×10^2
Chicken dish	ROUTINE	Coagulase-positive staphylococci	2.7×10^2

Table 23 Unsatisfactory routine food samples containing pathogens

The 4 Routine samples which tested positive for Coagulase-positive staphylococci represented 0.7% of routine food samples tested for this parameter. While this percentage shows a slight decrease on the 2011 level of 0.9%, the level has ranged from 0.3% (2008) to 1.3% (2010) over the past 5 years.

When the total number of positive samples is very low annually, as is generally the case with some pathogens, considerable variation in percentages can be expected from year to year for purely statistical reasons. The level of Coagulase-positive staphylococci in the unsatisfactory samples in 2012 ranged from 180cfu/g to 270cfu/g for the 4 routine samples. *Staphylococcus aureus* (*S. aureus*) generally needs to grow to levels of 100,000 to 1,000,000cfu/g 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*.

Three routine samples tested had Presumptive *Bacillus cereus* at unsatisfactory levels.

One routine sample had *Listeria monocytogenes* (*L. monocytogenes*) at the unsatisfactory level of >3,000cfu/g.

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

The *Vibrio parahaemolyticus* (*V. parahaemolyticus*) parameter is only applied to fish and fish products. Most of our routine samples were not items for which it would have been appropriate for the laboratory to add this parameter. The 2 samples tested for this parameter were satisfactory.

Coleslaw samples were again a prominent food type in 2012 with 12.4% of the total routine samples submitted. The proportion of coleslaw samples has been above 10% for the last 3 years.

Table 24 shows some food types that are prominent in the database where the sampling reason was stated as “Routine”.

<i>Food Name</i>	<i>Number</i>	<i>% of Total submitted</i>
Coleslaw	97	12.4
Egg mayonnaise salad	64	8.2
Cooked ham *	50	6.4
Tuna salad	36	4.6
Potato salad	16	2.0

* Excludes samples that had ham in combination with other ingredients

Table 24 *Some prominent food types submitted as “Routine” samples.*

National Surveys

There was 1 National Survey in 2012 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.

The topic of the survey was the verification of compliance with Commission Regulation (EC) No 2073/2005 (12NS1). The survey ran from September to November, inclusive. All samples for this survey were taken in batches of 5, so the 315 samples tested represent 63 batch samples, and the 40 non-compliant samples represent 8 non-compliant batch samples.



The samples were tested for the relevant parameters under the food safety criteria and/or the process hygiene criteria from the regulation, as applicable to the sample types submitted. None of the 63 batch samples tested were non-compliant with the food safety criteria. Eight batch samples were non-compliant with the process hygiene criteria. All of the non-compliant samples were raw minced beef. One sample was non-compliant for both the *E. coli* and ACC parameters. One sample was non-compliant for the *E. coli* parameter only and the other 6 samples were non-compliant for the ACC parameter only.

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 2012.

3.3 Food Complaint samples

A total of 190 consumer complaint samples submitted by the EHS were received in 2012, an increase of about 12% on the previous year.

In addition, 13 samples were received from private customers related to the investigation of consumer complaint. This was less than half the number received in the previous year and continues the downward trend in private samples evident for many years.

Tables 25 & 26 below summarise the breakdown of samples by EU category code and analytical outcome for the EHS complaint samples (Table 25) and those from private customers (Table 26).

The following are details of the food product and the problem encountered for the 30 EHS samples designated as non-compliant.

Food	Problem
Carton of infant milk formula	Swollen - microbiological spoilage
"Chemical" taint in milk (carton)	Hydrogen peroxide remained in the milk
Flavoured custard in carton	Spoiled by fermentation
Bottled water.	Sediment of iron & manganese in bottle
Energy drink.	Sediment in cans
Carton of creamed rice	Spoiled by fungal growth
Pack of corn based snack food	Contained oily debris from the environment
Pack of potato crisps	Contained a mass of crisp debris and cooking char
Chicken snack box.	Included a cooked earwig
Take away meal remnant	Brush hairs present
Fresh spinach - ready to eat	Bone and raw flesh present - (wild) bird source
Potato chips	Chip produced from spoiled potato
Frozen ready meal with meat & vegetable	A small snail was included in the meal
Take away rice prawn & vegetable meal.	Aphids were present
Prepared mashed potato dish	A mealworm larva present
Coleslaw	Poor microbiological quality
Pot of infant food	Fungal growth in product
Egg, mayonnaise and Bean salad	Salad was spoiled due to souring
Chicken Burger	Contained a sharp bone fragment
3 Foods, including tuna salad and mackerel fillets	Had elevated level of histamine
Breaded cod fillets	A long human hair was present in the product
Microwaveable prepared rice pack	Fungal growth in product
Pack of bread crumb	Fermenting due to yeast growth
Pack of bread crumb	Fermenting due to yeast growth
Puffed rice cakes	Glass fragments in a rice cake
Toasted breakfast cereal.	A human hair was in a cereal cluster
Sliced brown bread	Blue plastic material baked in the bread
Frozen leaf spinach.	A large moth present
Canned baked beans in tomato sauce	Spoiled resulting from damage to the can

Below are presented some of the problems and the range of products encountered where we were unable to establish the origin of the problem with confidence from our analysis. The range and type of complaint samples received were similar to those received in previous years. Many will have originated at production or in distribution. Some others may 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 rare. Sometimes we are provided with control material that can help us resolve a problem.

Problem	Products
Steel ribbon, metal socket, steel wire, piece of metal, metal aglet, metal pin, aluminium fragments, metal wire	Takeaway (T/A) meals (2), popcorn, breakfast cereal (2), pizza, hamburger, sliced pan
Tablet, capsule	Grapefruit juice, breakfast cereal
Pieces of plastic	T/A meal, jar of cooking sauce, ice cream, tuna salad, pizza, coleslaw
Insects, dead mouse, insect droppings, fly pupa, moth	Baby rice, pasta, raw rice, sliced bread, salad leaves
Broken glass	Fruit conserve, vacuum packed meat, burger, glass of beer
Wood fragments, fruit/vegetable peel, vegetable matter, plant stem material	Marmalade, confectionary, dry baby food, bottled water, coated peanuts, granola
Fungal & yeast spoilage	Flavoured water, canned baked beans, breaded chicken, fruit drink, fruit desert, jar of cooking sauce, cake
Tooth crown	Bread
Stones, concrete	Pasta, Mexican meal, coated peanuts
Meat fibres	Baby food
Whiskey	Tea
Taints	Ice cream, apple tart, milk, smoked mackerel
Bone fragments	Hamburger
Textile fibres, hair	Prepared meal, sushi, confectionary lozenge
Human nail clipping	Dried sausage
Alleged undercooking	Two instances, not confirmed
Pellets of discoloured dough	Bread roll, sliced bread

Occasionally minor problems such as pellets of discoloured dough in bakery products are mistaken for rodent faecal pellets. A hard dried fruit was mistaken for a foreign body while another consumer considered that the network of fibres inside the peel of a mandarin orange was foreign material. Over the years pink areas of cooked fresh meat have often been considered undercooked. Instances in which this is confirmed have occurred but they are unusual.

As in the previous year, none of the allegations concerning microbial food poisoning associated with the consumption of complaint samples were substantiated through examination of the food. In many cases of gastrointestinal illness, food may not be the vector.

	Type	Total samples	Compliant	Not compliant	No designation	% Not compliant
1	Dairy Products	14	4	3	7	21
2	Eggs and Egg Products	1	1	-	-	0
3	Meat, Game and Poultry	33	23	1	9	3
4	Fish, Shellfish and Molluscs	18	12	3	3	17
5	Fats and oils	0	-	-	-	-
6	Soups, Broths and Sauces	5	2	-	3	0
7	Cereals and Bakery Products	33	8	6	19	18
8	Fruits and Vegetables	11	3	2	6	18
9	Herbs and Spices	0	-	-	-	-
10	Non-alcoholic Beverages	10	1	2	7	20
11	Wine	0	-	-	-	-
12	Alcoholic Beverages (other than wine)	2	-	-	2	0
13	Ices and Desserts	4	2	1	1	25
14	Cocoa, Coffee, Tea	0	-	-	-	-
15	Confectionery	9	1	-	8	0
16	Nuts and Nut Products, Snacks	8	3	2	3	25
17	Prepared Dishes	30	8	10	12	33
18	Foodstuffs for Particular Nutritional Uses	8	3	-	5	0
19	Additives	0	-	-	-	-
20	Materials in contact with foodstuffs	1	-	-	1	0
21	Others	1	-	-	1	0
171	Foreign body, no food sample submitted	2	1	-	1	0
	Totals	190	72	30	88	16

Table 25 Complaint samples received from Environmental Health Officers during 2012

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.

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.

Type	Total samples	Compliant	Not compliant	No designation	% Not compliant
1 Dairy Products	2	0	2	0	100
2 Eggs and Egg Products	-	-	-	-	-
3 Meat, Game and Poultry	3	2	1	0	33
4 Fish, Shellfish and Molluscs	3	3	0	0	0
5 Fats and oils	-	-	-	-	-
6 Soups, Broths and Sauces	-	-	-	-	-
7 Cereals and Bakery Products	-	-	-	-	-
8 Fruits and Vegetables	-	-	-	-	-
9 Herbs and Spices	-	-	-	-	-
10 Non-alcoholic Beverages	-	-	-	-	-
11 Wine	-	-	-	-	-
12 Alcoholic Beverages (other than wine)	-	-	-	-	-
13 Ices and Desserts	-	-	-	-	-
14 Cocoa, Coffee, Tea	-	-	-	-	-
15 Confectionery	-	-	-	-	-
16 Nuts and Nut Products, Snacks	-	-	-	-	-
17 Prepared Dishes	2	0	0	2	0
18 Foodstuffs for Particular Nutritional Uses	1	0	0	1	0
19 Additives	-	-	-	-	-
20 Materials in contact with foodstuffs	-	-	-	-	-
21 Others	-	-	-	-	-
171 Foreign bodies, no food sample submitted	2	0	0	2	0
Total:	13	5	3	5	23

Table 26 Complaint samples / complaint investigation samples received from private clients during 2012

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.

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 businesses particularly regarding analysis of food products for Certificates of Free Sale for exporting foodstuffs outside the EU. In 2012 158 samples from numerous different companies were analysed in this category. All were non-programmed which had a major impact on the laboratory resources.

The range of parameters tested for included:

- i) additives (preservatives, antioxidants)
- ii) alcohol, methanol and congeners
- iii) sugars
- iv) labelling analysis
- v) microbiological testing.

Multiple copies of reports/certificates can be requested by customers.

The responsibility for issuing export certificates has changed from the FSAI to the EHS, resulting in an increase in the number of enquiries received by the laboratory regarding analysis required on products for export outside the EU.

There is no guidance available to companies to indicate what parameters are required or are appropriate for analysis in specific products. In the laboratory our decisions are risk based and guided primarily by i) contaminants and additives legislation where there is a statutory limit specifically for the food type in question, ii) what analytes similar products have been analysed for previously and iii) what analytical methods are available in the laboratory.

Some countries importing products from the EU have extra requirements for certificates to be issued. Specific certificates for Brazil, Venezuela and Turkey 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 2012, 7482 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 2007, S.I. No.278 of 2007.

Categories

The water samples were categorised as shown in Table 27.

<i>Category</i>	<i>Number of Samples</i>
<i>Local Authorities & the HSE – Chemical samples</i>	2687
<i>Local Authorities & the HSE – Microbiological samples</i>	3035
<i>Local Authorities & the HSE – Fluoride samples (Note 1)</i>	846
<i>General Public, companies (Private) – Chemical samples</i>	370
<i>General Public, companies (Private) – Microbiological samples</i>	544
Total :	7482

Note 1: Fluoride samples refer to samples submitted for this analysis only and 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 2 Fluoride tables.

Table 27 Water sample categories in 2012

Included in the 7482 samples were the sample/parameter types shown in Table 28.

<i>Type / Parameters</i>	<i>Number of Samples</i>
<i>Trihalomethanes (THMs)</i>	194
<i>Swimming pool (including Spa pool)</i>	92
<i>Effluent - Biochemical Oxygen Demand & other parameters</i>	11
<i>Hospital Renal Dialysis unit samples</i>	18
<i>Environmental Waters (Non-drinking Water Samples)</i>	27
<i>Hydrofluosilicic Acid Samples</i>	22
<i>Bottled/Mineral Water Samples</i>	41
Total :	405

Table 28

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 2012 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 2012, 1804 samples were analysed for nitrate. Of these, 13 had nitrate levels greater than the EU PV of 50mg/l NO₃ and represents 0.72% of the samples analysed.

Trihalomethanes (THMs): **PV 100 µg/l Total THM**

Chlorine is the most important chemical used in the disinfection treatment of water in Ireland. Chlorine is a powerful oxidising agent and it breaks down complex organic molecules, predominantly colour compounds, naturally occurring in the water. The breakdown products react with chlorine, and to a lesser extent with bromine which is formed from the oxidation of naturally present bromide, to give THMs. There is a direct correlation, in chlorinated water, between the amount of colour in the water and the levels of THMs formed. THMs do not occur naturally. Those of most concern are chloroform, bromodichloromethane, dibromochloromethane and bromoform. THMs in water may pose a risk to human health because chloroform is a suspected carcinogen. There must be a balance between controlling THM levels and ensuring adequate disinfection of drinking water. Chloroform is the most common THM and Table 29 gives the chloroform ranges for the 2012 samples. The Total THM results are presented in Table 30.

<i>Chloroform Range µg/l</i>				
	< 50	51 – 100	101 – 150	> 150
<i>No of samples</i>	79	73	30	12

Table 29 Data for chloroform in 2012 samples

<i>Total THM Range µg/l</i>				
	< 50	51 – 100	101 – 150	> 150
<i>No of samples</i>	56	66	48	24

Table 30 Data for Total THMs in 2012 samples

Of the 194 samples tested for THMs, 72 had a concentration of Total THMs that exceeded the EU PV of 100µg/l.

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 2012, 2595 waters were tested for aluminium. Of these 38 had aluminium levels greater than 200µg/l, representing 1.46% of samples tested.

Lead: PV 25 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. A Parametric Value of 10µg/l must be met by 25th December 2013.

Out of a total of 755 tests performed for lead in water in 2012, 6 had lead levels above the EU PV limit of 25µg/l. This represents 0.79% 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 2012 are given in Appendix 2.

Hydrofluosilicic Acid Analysis

Hydrofluosilicic acid (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. In 2012, the laboratory continued the independent analysis of HFSA. 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 12175:2006, are listed in Table 31.

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

Table 31 HFSA Specification

4.3 The Microbiological Examination of Drinking and Other Water, 2012

In the year ended 31st December 2012 the laboratory analysed 3638 microbiological water samples.

The samples consisted of the water categories shown in Table 32.

<i>Water category</i>	<i>Number of Samples</i>
<i>Drinking Water</i>	3295
<i>Bottled water</i>	29
<i>Ice</i>	30
<i>Endoscopy water</i>	132
<i>Swimming / Spa pool</i>	128
<i>Environmental</i>	5
<i>Horticultural water</i>	2
<i>Bathing</i>	8
<i>Tap Swabs</i>	9
Total:	3638

Table 32 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 as implemented by the European Communities (Drinking Water) (No. 2) Regulations 2007, S.I. No. 278 of 2007.

Drinking Water from the HSE / Local Authorities

Table 33 shows the proportion of samples which conformed to the values set out in the European Communities (Drinking Water) (No. 2) Regulations, 2007, S.I. No. 278 of 2007. 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.

<i>Parameter</i>	<i>Limits set by S.I. 278 of 2007</i>	<i>% Samples Conforming with S.I. 278 of 2007</i>	<i>Sample Numbers</i>
Safety Parameters			
<i>Escherichia coli</i>	0 cfu per 100ml	98.47%	2806
Enterococci	0 cfu per 100ml	97.63%	2492
Indicator Parameters			
Coliforms	0 cfu per 100ml	91.10%	2789
<i>Clostridium perfringens</i>	0 cfu per 100ml	98.55%	1591

Table 33

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 278 of 2007 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 a 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. 278 of 2007. Nevertheless the parametric values set out by the regulation provide a useful basis for assessing fitness of a private water sample. Table 34 shows the level of compliance with S.I. No. 278 of 2007 of drinking water submitted into the laboratory from private supplies.

<i>Parameter</i>	<i>Limits set by S.I. 278 of 2007</i>	<i>% Samples Conforming with S.I. 278 of 2007</i>	<i>Sample Numbers</i>
Safety Parameters			
<i>Escherichia coli</i>	0 cfu per 100ml	86.24%	407
Enterococci	0 cfu per 100ml	85.45%	385
Indicator Parameters			
Coliforms	0 cfu per 100ml	65.82%	395
<i>Clostridium perfringens</i>	0 cfu per 100ml	59.52%	42

Table 34

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.

There were 29 bottled water samples submitted for microbiological analysis in 2012 which consisted of 9 mineral/spring waters and 20 other bottled waters.



6 out of the 9 mineral/spring waters were compliant with S.I. No. 225 of 2007 for all microbiological parameters tested. The Coliform, *E. coli* and Enterococci parameters were the only tests performed on one mineral bottled water due to insufficient sample; all were found to be compliant with S.I. No 225 of 2007. One spring water was not compliant for the coliform parameter, (1 cfu per 250ml was detected), while another was not compliant for the Enterococci parameter (1 Enterococci cfu per 250ml was found).

15 other bottled waters were compliant with S.I. No. 225 of 2007 for all microbiological parameters tested. One other bottled water was not compliant for the Coliform parameter (1 cfu/250ml detected) whilst 5 other bottled waters were not compliant for the TVC at 22°C parameter.

Table 35 details microbiological parameters examined and percent compliance with S.I. 225 of 2007.

<i>Microbiological Parameter</i>	<i>Limits set by S.I. 225 of 2007</i>	<i>% Samples Conforming with S.I. 225 of 2007</i>	<i>Sample Numbers</i>
Coliforms	0 in 250ml	93.10%	29
<i>Escherichia coli</i>	0 in 250ml	100.00%	29
Enterococci	0 in 250ml	93.10%	29
<i>Pseudomonas aeruginosa</i>	0 in 250ml	100.00%	28
Sulphite reducing clostridia (Natural mineral and spring water only)	0 in 50ml	100.00%	9

<i>C. perfringens</i>	0 in 100ml	94.44%	18
TVC at 37°C	20 in 1ml	100.00%	28
TVC at 22°C	100 in 1ml	82.14%	28

Table 35

Ice for cooling drinks

30 ice samples were submitted for microbiological analysis in 2012. 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.

24 out of 30 ice samples submitted in 2012 complied with S.I. 278 of 2007 for the microbiological parameters tested. Table 36 lists the parameters tested and conformance with S.I. 278 of 2007 for ice. Such conformance is not a requirement and serves only as a reference point.

<i>Microbiological Parameter</i>	<i>Limits set by S.I. 278 of 2007</i>	<i>% Samples Conforming with S.I. 278 of 2007</i>	<i>Sample Numbers</i>
Coliforms	0 in 100ml	80.00%	30
<i>Escherichia coli</i>	0 in 100ml	100.00%	30
Enterococci	0 in 100ml	90.00%	30

Table 36

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.

128 swimming / spa pool samples were submitted in 2012 which comprised 105 swimming and 23 spa pool waters. The samples are also analysed for Enterococci though there are no guide levels/criteria indicated in the PTWAG guidelines. They are used as secondary indicators of faecal contamination and were not detected from 92.52% and 85.00% of all swimming and spa pool samples respectively.

Table 37 shows the percentage compliance of swimming and spa pool samples with 'The Swimming Pool Water, Treatment and Quality Standard, 2009'.

<i>Microbiological Parameter</i>	<i>Guide level*</i>	<i>% Conforming Swimming Pool Samples</i>	<i>% Conforming Spa Pool Samples</i>
Coliforms	0 in 100ml	90.38%	90.48%
<i>Escherichia coli</i>	0 in 100ml	95.15%	90.48%
<i>Pseudomonas aeruginosa</i>	0 in 100ml	96.04%	100.00%
TVC at 37°C	≤ 10 in ml	63.46%	63.64%

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

Table 37

Miscellaneous Samples.

In addition to the samples described, microbiological testing was carried out on 9 tap swabs for presence / absence of Coliforms and *E. coli*. 132 endoscopy water samples were submitted for TVC at 22 / 37°C. 2 Horticultural water samples were submitted by private customers and analysed for compliance with the Bord Bia Horticulture Quality Assurance Scheme - Water Analysis Requirements 2009.

In addition to the samples listed in Table 32, external proficiency testing scheme samples were tested throughout the year.

5. Clinical samples

In 2012, 1197 samples of biological fluids were analysed for metals. The samples consisted of:

Blood:	144
Serum:	884
Urine:	169

The metal test numbers in the different sample types are given in Table 38.

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

<i>Matrix</i>	<i>Aluminium</i>	<i>Arsenic</i>	<i>Cadmium</i>	<i>Calcium</i>	<i>Copper</i>	<i>Lead</i>	<i>Magnesium</i>	<i>Manganese</i>	<i>Mercury</i>	<i>Selenium</i>	<i>Thallium</i>	<i>Zinc</i>
<i>Blood</i>		2				132		6	8			
<i>Serum</i>	227				317			1		53		306
<i>Urine</i>			120		42				7			
<i>Totals</i>	227	2	120		359	132		7	15	53		306

Total Number of Tests: 1221

Table 38 Metal Tests on Clinical Samples

6. Microbiology of Cosmetics

6.1 Overview

The second annual program of microbiological testing of cosmetics commenced in February 2012 and ran over the planned 10 months. We received 100 scheduled items, some of which were kits or multi-packs, plus 4 follow-up items. Where sample quantity permitted each component of a kit or pack was logged and reported separately. We registered 119 samples and issued 117 reports.



The 2012 microbiological cosmetic sampling program was based on the HSE Mid Western and Dublin North East areas. The extension to the Mid West area resulted in a greater variety of samples. The cosmetic samples were examined and results assessed against the microbiological guidelines contained in the seventh edition of the guidance notes for testing of cosmetic ingredients produced by the EU Scientific Committee on Consumer Safety (SCCS).

We reported on 111 informal cosmetic surveillance programme samples and 1 follow-up sample. Another 2 samples taken under the surveillance programme and 3 related follow-up samples were permanent tattoo inks which are not cosmetics under European Regulations. Outside Europe they are considered to be cosmetics by organisations such as the FDA (USA). These products were examined and reported as general products. Of the 111 cosmetic surveillance samples, 2 were found to be non-compliant and 2 were reported without a designation for technical reasons.

6.2 Accreditation

When we commenced testing we indicated that we would seek accreditation for the work within 2 years. Microbiological cosmetic testing commenced in 2011 with 2 parameters, enumeration of Aerobic Mesophilic Bacteria (AMB) and a test for the presence of *Pseudomonas aeruginosa*. Testing commenced on a non accredited basis.

In 2012 we added a third parameter, enumeration of yeast and mould (Y & M), to the suite of routine tests. At our accreditation surveillance visit in February 2012 we successfully sought accreditation for the 3 parameters. For administrative rather than scientific reasons we were unable to report accredited results until mid October of 2012. Validation work was carried out throughout the year to extend the range of tests available. This has enabled the current programme to include a test for the presence of *S. aureus* wherever possible, on a non-accredited basis. Work towards extending accreditation continues. All the methods in use in the cosmetics laboratory are full implementations of ISO cosmetic methods.

6.3 Sample handling

The general approach to testing has been described in the 2011 Annual Report. In 2012 we modified our approach to testing components of kits. Occasionally very similar items from a kit were composited for testing because of the small quantity of material available. This was done only where the composited components differed in 1 ingredient only such as a colour. This enabled us to report on kit components which otherwise would have been excluded from testing because of insufficient material. When we do this the sensitivity of enumeration tests is reduced, which is reflected in the detection limit when censored values are reported. For example, if we composite 5 x 1g quantities, we would then report a negative result as <50cfu/g rather than <10cfu/g. When we composite samples in this way it is made clear in our report and such a result would not be

accredited. Even when we composite samples for testing, there is usually only sufficient sample to allow testing for 1 parameter.

6.4 Sample quantity

When cosmetic samples are not very inhibitory to microorganisms and we do not need to work with additional dilutions to validate testing we are able to test for the 2013 suite of 4 parameters using 7g of test material. If we encounter problems with 1 or more of the methods or with the product matrix we may be able to return to the original sample if there is sufficient material available or we open a contingency sample. In practice we do not request additional material unless we have reason to suspect the quality of the product. We then report on the parameters for which we have reliable data.

Even where the quantity of product in a pack is large, we request that duplicate containers of product are submitted. One of the duplicates is treated as a contingency sample to be opened only if necessary. When reporting is complete, any unopened product together with suitable opened product is used in our ongoing programme of method validation and development. As we have got more exposure to a greater variety of cosmetic sample types we have improved our ability to anticipate technical problems with particular product types and to take steps to deal with them at an early stage. As we add parameters to the test suite, we need to increase the quantity of sample requested. When the quantity of product is not stated on a container, the quantity of product present will be less than 3g, often very much less.

We reported results for enumeration of AMB on 111 samples, for Y & M on 108 samples and for the presence of *P. aeruginosa* on 102 samples.

Two non-compliant samples were found. An organic face mask was contaminated with substantial numbers of coagulase negative staphylococci (non-pathogenic). A follow-up sample was satisfactory. A sample of henna powder was contaminated with a variety of fungi, resulting in follow-up work.

Occasionally cosmetic products are so inhibitory to some bacteria that the laboratory is unable to demonstrate compliance at a suitable dilution. All cosmetic product testing includes a product specific challenge test to demonstrate the satisfactory performance of the test. Highly inhibitory products can cause the challenge test to fail. In such cases we are usually able to state, within the scope of the ISO procedure, that it is highly unlikely that such products are contaminated.

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 39.

<i>External Quality Control for both accredited and non-accredited Test Methods</i>			
Laboratory Section	PT Scheme	Studies/Parameters	Distribution
<i>Chemistry</i>			
<i>Food Chemistry Including Method Research and Development</i>	FAPAS	FC: 30 rnds* 21para** TEL: 2 rnds, 1para LCMS: 57 rnds, 98 para GCMS: 9 rnds, 31para	April 2012 – March 2013
	Chek	FC: 1 rnd, 1 para LCMS: 3 rnds, 5 para, GCMS: 1 rnds, 4 para	
	DAPs	1 parameter Alcohol By Volume	2 rounds (4 samples per year)
	SCHEMA	7 parameters	1round
	JRC-IRMM (Geel and Ispra)	LCMS: 5 para + to be decided GCMS: 20 para	LCMS: 3 rnds + to be decided GCMS: 4 rnds
	There may be participation in additional schemes throughout the year.		
	Aquacheck Ltd	Groups 1 – 5 Maximum of 33 parameters per Distribution	5 Distributions per year
<i>Water chemistry</i>	EPA	Groups 1 - 4	5 Distributions per year

		Maximum of 26 parameters per Distribution	
<i>Clinical Chemistry</i>	TEQAS	8 parameters	12 (2 blood, 2 serum & 2 urines samples per monthly distribution)
<i>Food Microbiology</i>	SCHEMA	2 parameters	1
	HPA Standard Scheme	For Food Microbiology Examinations (Total 17 parameters)	6 per year
	HPA Pathogenic Vibrio Scheme	<i>Vibrio parahaemolyticus</i> (2 parameters)	2 per year
	Don Whitley Quality Counts Scheme	Spiral Plater counts (1 parameter)	12 per year
<i>Water Microbiology</i>	HPA EQA for Drinking Water	For Coliform, <i>E.coli</i> , Enterococci, <i>P.aeruginosa</i> , <i>C. perfringens</i> and TVC at 37 and 22°C.	Total of 6 distributions, (18 samples)
	HPA EQA – Recreational and Surface Water Scheme	For marine (bathing beach): <i>E.coli</i> , Salmonella and Enterococci.	2 Distributions (4 samples)
		For swimming pool waters: Coliforms, <i>E.coli</i> , Enterococci, <i>P. aeruginosa</i> , TVC at 37°C.	2 Distributions (4 samples)
	HPA Bottled and Mineral Water Scheme	For Coliform, <i>E.coli</i> , Enterococci, <i>P. aeruginosa</i> , <i>C. perfringens</i> , <i>SRC</i> and TVC at 37 and 22°C	3 Distributions (6samples)
	HPA EQA for Food Microbiology (Campylobacter)	For Campylobacter analysis	Total of 4 samples
	LGC standards, QWTAS	For Salmonella analysis 419, (surface waste and bathing water).	Total of 4 samples

* rnds = Rounds. ** para = Parameters.

Table 39 Proficiency Testing Programmes

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 40 shows the extension to the schedule of accreditation which was assessed by the Irish National Accreditation Board in April 2013.

Full details of the scope of accreditation are available at

<http://www.inab.ie/directoryofaccreditedbodies/laboratoryaccreditationtesting/099T-1.pdf>

Extension to the schedule of accreditation, assessed by INAB in April 2013

Test Methods

New methods

SOP PALC 0045# - Determination of Patulin in Apple Products

Extensions to Currently Accredited Methods

SOP PALC 0011 - Determination of sulphur dioxide in food and beverages by distillation and titrimetry

SOP PALC 0028 - The determination of sodium nitrite and sodium nitrate in meat and meat products by anion-exchange high performance liquid chromatography

SOP PALC 0075 - The determination of polycyclic aromatic hydrocarbons in food by gas chromatography and mass selective detection

SOP PALCW 0006 - The determination of total metals in water samples by inductively coupled plasma/mass spectrometry (ICP-MS)

Table 40 Extension to Scope of Accreditation

8. Training

The laboratory is committed to providing continual training of staff in a wide range of aspects 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 2012 staff members attended a diverse variety of training courses and participated in programmes of further education as detailed in Table 41.

<i>Course/Seminar title</i>	<i>Organiser</i>
<i>Skills Development / Technical Training</i>	
<i>Acquity UPLC H-Class Applications Training</i>	Waters Chromatography Ireland Ltd.
<i>ESI OneFAST Sample Introduction system</i>	In-House by External Organiser(Elemental Scientific)
<i>NexION ICP-MS</i>	In-House by External (PerkinElmer)
<i>NexION ICP-MS Chromera Speciation software</i>	In-House by External (PerkinElmer)
<i>NexION ICP-MS Torch Maintenance</i>	In-House by External (PerkinElmer)
<i>NexION ICP-MS</i>	In-House by External (PerkinElmer)
<i>ICP-MS Method Development/Troubleshooting</i>	In-house by Perkin Elmer
<i>GC Workshop</i>	External by Thermo Scientific
<i>Informatics Solutions Seminars featuring NuGenesis 8</i>	Waters Chromatography Ireland Ltd.
<i>Training on Annotation of Quality Analyst Quality Control Charts</i>	In-house
<i>7th Annual Meeting of the NRLs for Mycotoxins</i>	JRC-IRMM
<i>Irish Mass Spectrometry Society Annual Meeting</i>	IMSS
<i>Smarter Spectroscopy</i>	Thermo Scientific
<i>Plenary Meeting of the EU-RL/NRLs for FCMs</i>	FSAI
<i>Mass Spectrometry Training–Mycotoxins</i>	JRC-IRMM
<i>UPC² Seminar and Demonstration</i>	Waters Chromatography Ireland Ltd.
<i>Stepping up to the plate–is your food any safer?</i>	FSAI
<i>Seminar on HPLC, UHPLC and Stationary Phase Design</i>	Advanced Chromatography Technologies, UK
<i>7th PAH NRL Workshop</i>	JRC IRMM external
<i>Food Contact Materials Administrators Advanced training course.</i>	Better training safer food (BTSF)

<i>Agilent Discovery Seminar</i>	Agilent
<i>Seminar on the Provision of food Information to Consumers</i>	FSAI
<i>Gas Phase Chromatography Workshop</i>	Thermo Scientific
<i>Food Allergen Regulation – The New Food Information Regulation</i>	SafeFood Food Allergy & Food Intolerance Network
<i>Flavourings Seminar</i>	FSAI
<i>Induction Training</i>	
<i>General Induction Training</i>	In-house
<i>Induction for students</i>	
<i>Information Technology Training</i>	
<i>LabWare LIMS Version 6–LIMS Administration Training 1</i>	LabWare Europe Ltd.
<i>Accreditation/Auditor Training</i>	
<i>Increased Levels of Official Controls on Certain Feed and Food of Non-Animal Origin</i>	Better Training for Safer Food
<i>FVO Inspection Mission to Azerbaijan–Contaminants (Hazelnuts)</i>	FVO
<i>Chromatography Ireland</i>	Institute of Chemistry of Ireland
<i>Plenary Meeting of the EU-RL/NRLs for FCMs</i>	JRC–Ispra
<i>Health Safety and Welfare</i>	
<i>Fire Safety Training</i>	H.S.E. Consultant
<i>Further Education</i>	
<i>TrainMIC Training for new Trainers</i>	TrainMIC

Table 41 Training Courses, Seminars in 2012

9. External meetings

During 2012 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) Laboratory Information Management System meetings
- xii) 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.

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 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

Fire Safety Training was provided for staff in January 2012.

The training comprised the following:

- i) general fire safety lecture
- ii) fire evacuation training
- iii) use of hand held fire extinguishers.

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 which is concerned with the environmental disposal of waste, as detailed in Table 42.

<i>Waste – 2012</i>	<i>Cost for Disposal € (incl VAT)</i>
<i>General Waste</i>	2344
<i>Solvent/chemical Waste</i>	17927
<i>Clinical Waste including Contaminated Glass</i>	50920
<i>Mercury Waste</i>	-
<i>Paper waste</i>	98
<i>Cardboard</i>	100
<i>Glass waste</i>	120
<i>Obsolete Equipment</i>	-
<i>Specialised Waste- Plastic</i>	166
<i>Total</i>	71675

Table 42 Waste Management Programme

11. Laboratory Staff as of 31st December 2012

Public Analyst	Dr Michael O’Sullivan
Deputy Public Analysts	Mr Vincent Young (Microbiology) Ms Rosemary Hayden. Quality Manager.
Executive Analytical Chemists	Dr Terence McEvoy Dr Elizabeth Horne 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 (A) Ms Elaine Eustace (Microbiology) (A)

Chief Laboratory Technician	Post vacant
Senior Laboratory Technicians	Ms Margaret Murphy Ms Alison Brazil Mr Kevin Smith (Microbiology) (Microbiology) Post vacant Ms Annette D'Arcy Mr Barry Hurley Ms Orna McDaniel (Microbiology) (A)
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 (A)	Mr John Gallagher
Grade IV (A)	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

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

Date of this Report	13/12/12	Time	09:32:56	Samples received since 1st January 2012 - <i>Excludes PT samples</i>						
2012	Number Received	Number Cancelled	Number Reported	Number Not Reported	Number of outstanding samples....			Unreported (within deadline)	Unreported (exceeding deadline)	Memos
					≤ 10 days	11-20 days	21-30 days			
Food Chemistry Section										
FLC	491	6	444	41	10	6	25	37	0	
FPC	59	0	58	1	1	0	0	1	0	
CLF	37	0	36	1	1	0	0	1	0	
CPF	1	0	1	0	0	0	0	0	0	
CLN	10	0	10	0	0	0	0	0	0	
CPN	1	0	1	0	0	0	0	0	0	
Group total	598	6	550	43	12	6	25	39	0	
GC-MS Section										
FLC	449	1	370	78	10	4	39	78	0	
FPC	32	0	32	0	0	0	0	0	0	
FLM	3	3	0	0	0	0	0	0	0	
CLF	1	0	1	0	0	0	0	0	0	
CPF	2	0	2	0	0	0	0	0	0	
HS	120	0	120	0	0	0	0	0	0	
WLC	14	0	14	0	0	0	0	0	0	
Group total	621	4	539	78	10	4	39	78	0	
Trace Element Laboratory										
FLC	40	0	39	1	0	0	0	0	1	1
FLM	1	1	0	0	0	0	0	0	0	0
CLF	11	0	9	2	1	1	0	2	0	0
CLN	1	0	1	0	0	0	0	0	0	0
NLC	36	0	36	0	0	0	0	0	0	0
HS	1054	0	1036	18	13	4	1	18	0	0
Group total	1143	1	1121	21	14	5	1	20	1	1
LC-MS Section										
FLC	357	10	286	61	3	16	2	60	1	1
FPC	9	0	5	4	2	0	2	4	0	0
FLM	3	3	0	0	0	0	0	0	0	0
CLF	9	0	9	0	0	0	0	0	0	0
CPF	2	0	2	0	0	0	0	0	0	0
NLC	61	0	37	24	6	5	3	11	13	13
Group total	441	13	339	89	11	21	7	75	14	14

2012

	Number Received	Number Cancelled	Number Reported	Number Not Reported	Number of outstanding samples....			Unreported (within deadline)	Unreported (exceeding deadline)	Memos
					≤ 10 days	11-20 days	21-30 days			
CLF	9	0	9	0	0	0	0	0	0	0
CPF	2	0	2	0	0	0	0	0	0	0
NLC	61	0	37	24	6	5	3	11	13	13
Group total	441	13	339	89	11	21	7	75	14	14
Chemistry Water										
FPC	2	0	2	0	0	0	0	0	0	
CLF	1	0	1	0	0	0	0	0	0	
WL	2257	16	2089	152	87	32	33	152	0	
WP	252	4	231	17	10	2	5	17	0	
WLC	455	10	441	4	3	1	0	4	0	
WPC	124	2	112	10	1	1	8	10	0	
WLF	850	5	814	31	31	0	0	31	0	
WPF	3	0	3	0	0	0	0	0	0	
Group total	3944	37	3693	214	132	36	46	214	0	
Chemistry										
FLC	10	0	10	0	0	0	0	0	0	
Group total	3	0	10	0	0	0	0	0	0	
Microbiology										
FPC	2	0	2	0	0	0	0	0	0	0
FLM	1311	62	1197	52	37	15	0	52	0	0
FPM	80	0	79	1	1	0	0	1	0	0
CLF	133	3	123	7	4	1	0	5	2	1
CPF	8	0	8	0	0	0	0	0	0	0
CLN	3	0	3	0	0	0	0	0	0	0
NLM	8	0	8	0	0	0	0	0	0	0
WL	2249	7	2186	56	56	0	0	56	0	0
WP	252	6	237	9	9	0	0	9	0	0
WLM	805	13	776	16	16	0	0	16	0	0
WPM	307	13	292	2	2	0	0	2	0	0
KLM	140	4	113	23	3	14	4	21	0	0
Group total	5290	108	5024	166	128	30	4	162	2	1
Microbiology - Food Section										
CLF	1	0	1	0	0	0	0	0	0	
Group total	1	0	1	0	0	0	0	0	0	

Boxed figures indicate number of Memos printed e.g.

3

Appendix 2

FLOURIDATION OF WATER SUPPLIES

Tables

FLUORIDATION OF WATER SUPPLIES
Levels of Fluoride in Drinking Waters Tested in 2012.
DUBLIN CITY AND COUNTY

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2012
MILLIGRAMS PER LITRE (PARTS PER MILLION) OF FLUORIDE

WATER SCHEME	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VARTRY	0.67	0.66	0.67	0.67	0.64	0.65	0.68	0.63	0.63	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride
DODDER	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride	0.67	No Sample Submitted For Fluoride	0.68	0.63	0.70	0.69	0.69	0.65	0.65	0.63
LIFFEY – Poulaphouca	0.60	0.67	0.66	No Sample Submitted For Fluoride	0.74	0.57	0.66	0.68	0.67	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride
LIFFEY - Leixlip	0.64 & 0.67	0.64 & 0.63	0.61 & 0.64	0.64	0.61 & 0.64	0.60	0.62	0.66	0.61 & 0.62	0.58 & 0.60	0.60 & 0.62	0.57
BALLYEDMONDUFF	0.67	0.71	0.69	0.67	0.66	0.68	0.65	0.59	0.64	0.64	0.63	0.61
GLENCULLEN	0.64	0.59 & 0.68	0.79	0.66	0.67	0.66	0.74	0.70	0.66	0.65	0.61	0.53
KILTERNAN	0.70	0.59 & 0.67	0.75	0.63	0.55	0.72	0.72	0.71	0.72	0.71	0.75	0.72
BOG OF THE RING	0.62 & 0.61	0.60 & 0.62	0.62 & 0.64	0.64	0.59	0.59	0.61	0.63	0.59 & 0.63	0.58	0.57 & 0.61	0.55

FLUORIDATION OF WATER SUPPLIES
Levels of Fluoride in Drinking Waters Tested in 2012.
WICKLOW

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2012
MILLIGRAMS PER LITRE (PARTS PER MILLION) OF FLUORIDE

WATER SCHEME	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
BLESSINGTON	0.62	0.69	0.70	0.68	0.68	0.68	0.62	0.65	0.67	0.64	0.65	0.64
LARAGH/ ANNAMOE	0.74	No Sample Submitted For Fluoride	0.66	0.80	0.83	0.72	0.67	0.65	0.51	0.64	0.65	0.72
WICKLOW	0.65	0.74	0.65	0.66	0.69	0.57	0.60	0.63	0.69	0.62	0.61	0.68
ARKLOW	0.62	0.70	0.66	0.64	0.56	0.65	0.64	0.60	0.64	0.59	0.59	0.59
TINAHELY	0.76	0.76	0.81	0.86	0.83	0.72	0.77	0.70	No Sample Submitted For Fluoride	0.75	0.68	0.67

NOTE : Other water samples from Wicklow were submitted for fluoride testing under S.I No.42 of 2007 & S.I. No.278 of 2007.

FLUORIDATION OF WATER SUPPLIES
Levels of Fluoride in Drinking Waters Tested in 2012.
KILDARE

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2012
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	0.63	0.61	0.65	0.62	0.59	0.60	0.59	0.65	0.60	0.56	0.59	0.60
LEIXLIP	0.64	0.66	0.63	0.62	0.59	0.57	0.55	0.65	0.58	0.58	0.59	0.61
KILCOCK	0.61	0.69	0.66		0.69	0.68	0.61	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride	0.64	0.72
STRAFFAN	0.65	0.66	0.64	0.63	0.61	0.58	0.58	No Sample Submitted For Fluoride	0.60	0.57	0.60	No Sample Submitted For Fluoride

POULAPHOUCA REGIONAL SCHEME

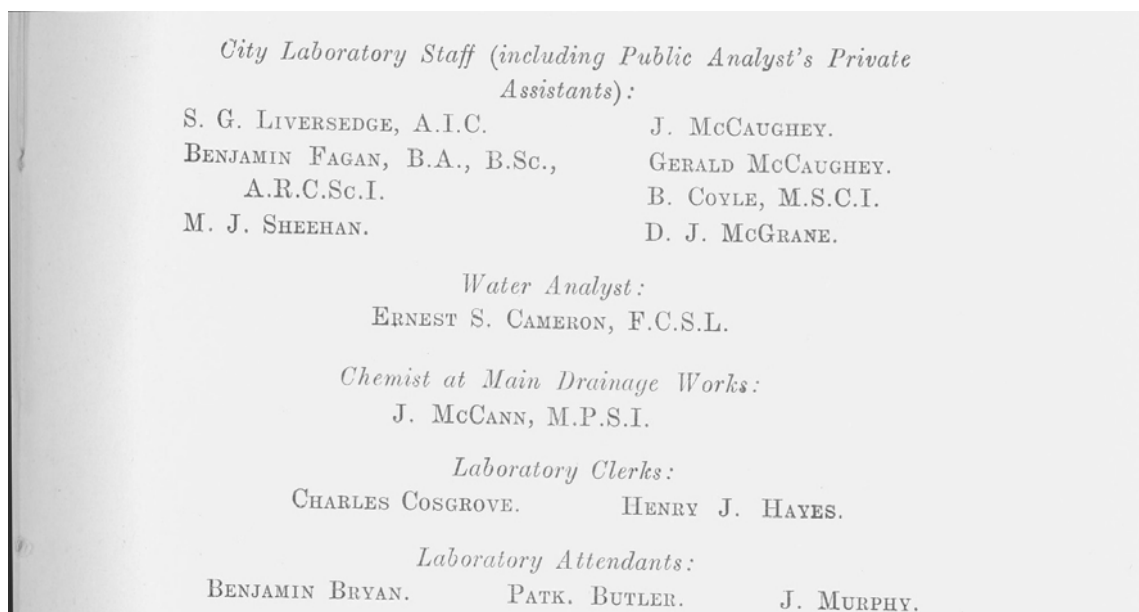
LOCATION	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT.	OCT	NOV	DEC
NAAS	0.62	0.73	0.67	0.65	0.67	0.66	0.65	0.73	0.67	0.62	0.62	0.70
KILDARE TOWN	0.64	0.68	0.67	0.70	0.71	No Sample Submitted For Fluoride	No Sample Submitted For Fluoride	0.65	0.66	0.63	0.65	0.62
NEWBRIDGE	0.62	0.69	0.66	0.69	0.71	0.60	0.72	0.65	0.67	0.64	0.67	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.278 of 2007.

FLUORIDATION OF WATER SUPPLIES
FLUORIDE LEVELS IN PIPED WATER SUPPLIES : JANUARY - DECEMBER 2012

County Supply	Total No. of Samples	% Results <0.8mg/l S.I.278 of 2007 Compliant	Number of Samples Within the Following Ranges (mg/l or ppm)		
			<0.6	0.6-0.8	>0.8
Dublin City & County	169	100.0	21	148	0
Wicklow	140	93.6	28	103	9
Kildare	391	98.0	110	273	8
Meath	389	97.2	123	255	11
Louth	66	92.4	22	39	5
Monaghan	38	97.4	5	32	1
Cavan	52	100.0	14	38	0
Offaly	118	95.8	49	64	5
Westmeath	69	100.0	19	50	0
Longford	53	96.2	16	35	2
Laois	83	95.2	32	47	4
Totals	1568	Average 97.1%	439	1084	45

Appendix 3. 150th Anniversary of the Laboratory



Laboratory staff in 1913.

History of the laboratory

At the beginning of the 19th century the rapid increase in urbanisation and industrialisation brought with it an increased demand among urban dwellers for various different kinds of foodstuffs. However this increase in demand was not accompanied by any protection for the consumer and adulteration of food became quite commonplace. Examples of malpractice included the addition of water to milk, the addition of iron filings to tea and the use of exhausted tea-leaves in the sale of tea. In addition, toxic compounds of lead, arsenic and mercury were often used to improve the appearance of confectionery. The public at the time were becoming increasingly concerned about these activities.

A Parliamentary Committee found that the adulteration of foodstuff was widespread and that people's health was at risk. As a result of the Committee's findings the first Anti-Adulteration Act was passed in 1860. Under this Act a new public official, the Public Analyst, was appointed. The Public Analyst's role was to examine the purity of articles of food and drink which were on sale to the public.

In 1862 Dublin became the third city in these islands, after London and Birmingham, to have a Public Analyst appointed. In the early period the main analytical focus in the laboratory was compositional and adulteration and one of the most important areas was the quality of milk.

Over the last 150 years there has been only six Public Analysts in Dublin. The first, Dr. Charles (later Sir Charles) Cameron, had an extraordinary long tenure from 1862 until 1921. Then Bernard Fagan was Public Analyst from 1921 – 1956, followed by Harold Thornton from 1956 to 1967. Dr. Fergus Hill was Public Analyst for 30 years until 1997 and then Kevin Moyles up until 2005. The current incumbent is the author.

In the early days the Dublin PAL, then known as the City Laboratory, was located in Castle Street. It subsequently moved to the Cornmarket/Lamb Alley area. In the 1970s a microbiology department

was established in Dublin PAL leading to the provision of multidisciplinary testing of food and water.

In 1996, having outgrown its then location, the laboratory relocated to the former Sir Patrick Dun's Hospital in Lower Grand Canal Street Dublin.

THIRTY SECOND ANNUAL REPORT

OF

SIR CHARLES A. CAMERON, M.D.,

City Analyst, *

FOR THE YEAR 1893.

During the year ended on the 31st December, 1893,
the following articles were collected for analysis by the
Inspectors of Food :—

INSPECTOR J. J. MYERS.

Articles.					Number.
Butter	...	...	...	...	15
Milk	...	...	...	...	3
Total				...	18

INSPECTOR P. SHEEHAN.

Articles.					Number.
Butter	...	...	...	...	11
Milk	...	...	...	...	5
Total				...	16

For the House of Industry Hospitals—				
Milk	...	...	...	1 Specimen.
For the Governor of Mountjoy Prison—				
Milk	...	...	...	1 do
For Dr. Norman, Richmond Lunatic Asylum—				
Milk	...	...	...	11 Specimens.
Butter	...	...	...	8 do
For the Mater Misericordiæ Hospital—				
Milk	...	...	...	2 do
For Lieut.-Colonel J. H. Hughes, Royal Infirmary—				
Milk	...	..	...	1 Specimen.
For St. Margaret's College, Mespil-road—				
Milk	..	...		1 do
For Private Persons—				
Milk	...	...	...	9 Specimens.
Butter	...	...	...	1 Specimen.

Of the butter samples collected by Inspector Myers, 2 were adulterated. The other articles were found to be pure.

Of the butter samples collected by Inspector Sheeran, 2 were adulterated.

Of the butter samples collected by Inspector Lyons, 32 were adulterated; of the milk 17; and of the buttermilk 17.

Of the butter samples collected by Inspector Kane, 13 were adulterated; of the milk 16; of the buttermilk 15; and of the coffee 3.

DURING THE YEAR 1893 THE FOLLOWING PERSONS WERE, UNDER THE
PROVISIONS OF THE "SALE OF FOOD AND DRUGS AND MARGARINE
ACTS," SUCCESSFULLY PROSECUTED BY INSPECTOR JOHN J. KANE.

Address	Articles Sold	Adulterated with	Fine		
5 Lower Merrion-street	Milk	18 per cent. water	£	s.	d.
99 Phibsborough-road ...	Coffee	35 per cent. of chicory	0	10	0
111 Lr. Gloucester-st. ...	Breach of Mar- garine Act	—	4	0	0
30 Talbot-street ...	do.	—	2	0	0
26 Stoneybatter	Milk	14 per cent. water	5	0	0
53 Bow-lane, West	do.	13 do.	0	10	0
17 Nicholas-street ...	Breach of Mar- garine Act	—	1	0	0
33 Cuffe-street ...	Milk	40 per cent. water	3	0	0
115 Thomas-street ...	Breach of Mar- garine Act	—	2	0	0
69 Charlemont-street ...	do.	—	5	0	0
8 Wicklow-terrace ...	do.	—	3	0	0
152 Phibsborough-road	Milk	8 per cent. water	2	0	0
11 Grand Canal-street ...	do.	34 do.	1	0	0
7 Poolbeg-street ...	do.	20 do.	5	0	0
93 North King-street ...	do.	13 do.	2	0	0
9 Poplar-row	do.	28 do.	0	10	0
51 & 52 North King-st.	Coffee	35 per cent. of chicory	3	0	0
15 Lower Camden-street	Breach of Mar- garine Act	—	4	0	0
23 Old Kilmainham ...	Milk	Deprived of $\frac{1}{3}$ its cream	5	0	0
2 Charlemont-place ...	do.	10 per cent. water	2	0	0
35 Bow-lane, West	do.	40 do.	1	0	0
42 South King-street ...	do.	12 do.	3	0	0
12 Red Cow-lane	do.	15 do.	1	0	0
95 Talbot-street ...	do.	25 do.	1	0	0
3 Whitefriar-place	do.	11 do.	0	10	0
25 Mayor-street	do.	17 do.	2	0	0
6 Thomas-court	do.	20 do.	2	0	0
45 Bolton-street ...	do.	15 do.	1	0	0
102 Upper Church-street	do.	33 do.	3	0	0
116 Lower Gardiner-st.	do.	13 do.	1	0	0
94 North King-street ...	do.	11 do.	0	10	0
4 Berkeley-road ...	do.	11 do.	0	10	0
32 Upper Tyrone-street	do.	30 do.	costs		
52 Great Britain-street...	do.	25 do.	3	10	6
24 Mabbot-street ...	do.	9 do.	3	0	0
5 Chatham-street ...	Butter	20 do.	0	10	0
141 Townsend-street ...	Coffee	30 per cent. of chicory	3	0	0
			£	80	10 0
Costs ...				0	10 6
Total £				81	0 6

