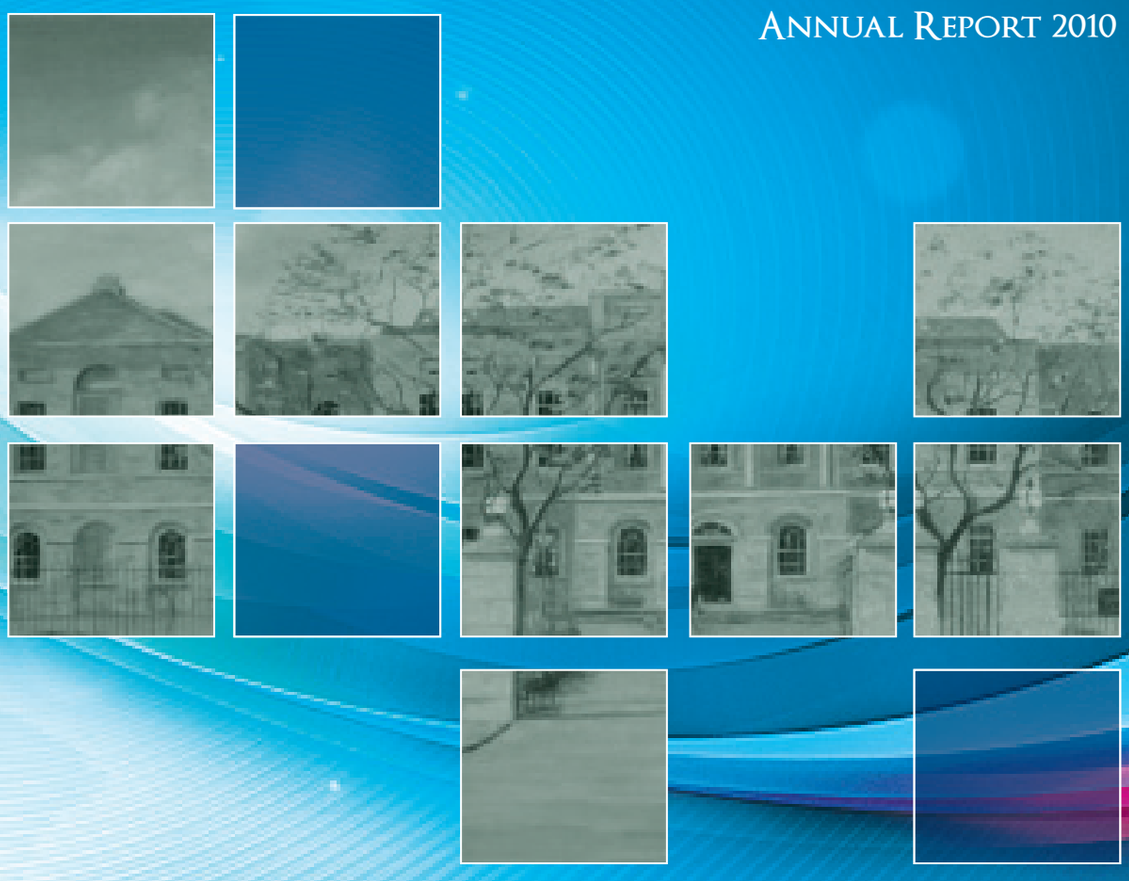
Feidhmeannas Seirbhíse Sláinte
Health Service Executive

Dublin Region
Public Analyst's Laboratory

Annual Report 2010



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Annual Report

for the year ended 31st December 2010

CONTENTS

Acknowledgements

This Annual Report describes the multitude of analytical services that the laboratory provided in 2010. 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 110 accredited analyses, distributed between chemistry and microbiology. This is a major achievement by the staff and I want to fully acknowledge and complement them all for this. The robust quality system that we have in place is entirely due to the staff working to a high standard and complying with all the requirements of the quality system on a daily basis. This enables us to give to our numerous and wide-ranging customers a service with confidence and reliability, which is the fundamental of our role.

Currently we are dealing with a loss of 6.75 Whole Time Equivalents (WTE) in the laboratory that have not been replaced by the HSE.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.

Mr. Liam O'Callaghan, Local Health Manager based in Tullamore Co. Offaly, to whom this laboratory was re-directed in 2005, retired at the end of 2010. I thank Mr O'Callaghan for his assistance and his approvals for laboratory resources since 2005.

At the beginning of 2011 the laboratory transferred to the administrative lead of Ms. Martina Queally, Integrated Service Area Manager for Dublin South/Wicklow. I wish to acknowledge and thank Ms. Queally for the positive working relationship that has developed and for her regular communication with and careful attention to the laboratory. 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 myriad of other activities.

The success of the laboratory arises 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 is an Official Food Control laboratory within the Health Service Executive (HSE). It is administered by the HSE Dublin Mid-Leinster.

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

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

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

The Dublin PAL (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 has implemented 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 HSE Transformation Programme.

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, biological 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) *Safe*food
viii) the general public
ix) hospitals & GPs
x) private food companies
xi) Local Authority Veterinary Inspectors
xii) Sea Fisheries Protection Authority
xiii) other Government Departments (Agriculture, *et al*).

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, SOP PALA 0018 Sample Reporting according to Timeframes and Deadlines Policy, which is reproduced in Appendix 1. The primary monitor is a LIMS Management Report (MR); the December one is shown in Appendix 2. 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.

In the chemical realm of analysis, the comprehensive analytical categories comprise:

i) contaminants
ii) materials in contact with food
iii) allergens
iv) additives
v) compositional
vi) nutritional
vii) 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. 117 of 2010 EC (Official Control of Foodstuffs) Regulations 2010 gives further effect to Regulation 882/2004.

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 fourth HSE-FSAI Contract came into force on the 1st January 2009 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 also 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) brings with it major new 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.

At the time of writing there is a loss of 6.75 WTEs in the laboratory comprising 3 following retirement, 2 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 s*afe*food, the Food Safety Promotions Board.

None of the recommendations of the Reports have been implemented.

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

During 2010 the PALs and PHLs submitted a further 2 position papers to the HSE Laboratory Services Modernisation Group. This Group has been charged with modernising Medical Laboratory Services, prompted by an external review of existing services. The 2008 PALs/PHLs Review Report has been considered by the Modernisation Group regarding the extent to which it falls within the scope of the work underway.

1.5.2 Public Analyst Laboratories Food Chemical Testing Specialisations

Since 2002, by agreement between the PALs, all new chemical food analyses have been specialised, i.e. analytical methods are developed and implemented in 1 PAL only. However there was a legacy of significant replication in chemical food sampling and testing. A key factor permitting this has been the absence of an overall Director of Laboratories, as recommended in the 2 Review Reports described above, coordinating and guiding these efficiencies.

Beginning in autumn 2010 the 3 PALs in Cork, Dublin and Galway agreed a radical programme of food chemical testing specialisations resulting in almost complete elimination of replicated testing for the 2011 and future Programmes. This was an immense undertaking, compressed into a relatively short time, of PALs re-organisation and efficiencies.

A number of key criteria guided the agreements, including:

- **i)** no decrease in quality or diminution in the accredited status of analytical methods in the PAL service. This is fully consistent with the HSE Risk Register with its emphasis on quality in all HSE services and FSAI statements.
- **ii)** NRL roles and responsibilities
- **iii)** PAL capacity
- **iv)** the extent of food types and matrices currently tested
- **v)** regional and local considerations

Additionally it was agreed that "sample numbers" is not the sole measure of laboratory output. Output will be measured by more relevant and modern criteria such as the depth and complexity of work, quality & accreditation, multi-parameter testing.

This undertaking was fully supported by the HSE and promoted by the FSAI whose CEO Professor Alan Reilly publicly emphasised the requirements for such a development.

The specialisations coupled with increasing multi-parameter testing, where a number of parameters are analysed in the one sample, represent substantial cost-effective efficiencies in the PALs service.

To guarantee full National Public Health Protection, a number of matters such as mechanisms to ensure sufficiency of representative samples are submitted to the specialist laboratory are being resolved.

1.5.3 Microbiology of Cosmetics

The Public Analyst's laboratory in Dublin made a commitment to provide a microbiological testing service for official control of cosmetics purposes. Chemical testing of cosmetics has been carried out at the Galway and Cork PALs for several years but there remained a need for microbiological testing to compliment that work to ensure that the public is adequately protected. Although no new staff resources were available for this work and the laboratory was already resource strained, we believed that it was important for the public interest to ensure that a quality microbiological testing service should be provided. Staff resources were therefore reassigned to implement this development.

Testing was planned to commence in February 2011 and to ensure this happened, the microbiology laboratory prepared for this work in 2010. It involved the implementation of new analytical methods. ISO methods were adopted and validation work was commenced to guarantee that the laboratory could demonstrate competence in the methods with a wide variety of product types. LIMS analyses for recording sample details and analytical result data were created and suitable analytical quality control procedures were put in place.

Testing was planed to commence with 2 parameters, Aerobic Mesophillic Bacteria and Pseudomonas aeruginosa. From a review of alerts concerning microbiological contamination of cosmetic products over the previous 5 years, it was clear that these 2 parameters were responsible for many of the problems encountered. Further parameters would be added over time. The EHS facilitated the work, providing us with suitable products to assist our development work. A sampling plan for 2011 was devised by the EHS in consultation with the laboratory and the Irish Medicines Board (IMB). By the end of 2010 we were ready for the programme to commence in 2011.

1.5.4 Human Biomonitoring

The PAL service was invited and has agreed to participate in the COnsortium to Perform Human Biomonitoring on a European Scale (COPHES), a European project which aims to monitor the environmental exposure of humans to certain chemicals by the analysis of biological material such as hair, blood and urine.

As an initial feasibility study, a pilot project called DEMOCOPHES will be run to test whether human biomonitoring can be performed in a coherent and harmonised fashion throughout Europe by means of developing common protocols, strategies and scientific tools. In this pilot study samples of urine and hair will be collected from 120 mother and child pairs from each participating country. The urine samples will be analysed for cadmium, cotinine (a metabolite of nicotine to test for active and passive smoking), phthalates and possibly bisphenol A (BPA) (a chemical used in plastic production). The hair will be analysed for mercury. Many of these analytes are compounds already tested for in food and so human biomonitoring is a natural extension that will provide valuable information on actual exposure.

Dublin PAL will be responsible for the analysis of phthalates, BPA and cadmium in urine.

The bulk of the preparation will take place in 2011 i.e. production of protocols and SOPs, selection of participants and training. The sampling is scheduled to take place in October 2011 and analysis to commence in January – February 2012.

1.5.5 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 2010. In light of the overall increasingly stringent budgetary situation, value-for-money initiatives are a high priority comprising areas such as:

- **i)** the implementation of SAP for all requisitioning in the laboratory
- **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.

1.5.6 EU National Reference Laboratory Responsibilities

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

During 2010 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) testing a number of proficiency samples, including baby food and an edible oil, for 15+1 PAHs

iii) taking part in a proficiency test for ochratoxin A in four food matrices

iv) participating in an initial survey for the gathering of information on LC-MS/MS methods utilised in mycotoxin analysis

v) collaborating in a method validation study for the determination of ochratoxin A in liquorice

vi) analysing for melamine in a proficiency test of four food simulants from melamine kitchenware

vii) determining five photoinitiators in a proficiency test of extracts and food packaging materials

viii) participating in a workshop on migration modelling

ix) taking part in a proficiency test on migration modelling exercises prior to and post the migration modelling training course

x) circulating relevant information to other official laboratories

xi) participating in a workshop on pyrollizidine alkaloids

xii) supplying the European Reference Laboratory (EU-RL) with naturally incurred samples of mycotoxins that were submitted to the laboratory for routine testing or detained at the Irish Designated Points of Entry.

xiii) providing the EU-RL with baby bottles for an EU-wide survey

xiv) supplying the EU-RL with a number of validated methods developed at this laboratory

xv) considerable associated preparatory and post activity work.

The Cork PAL is the NRL for heavy metals.

1.5.7 Method Research and Development

The discovery of new contaminants in food together with new regulations or lower regulatory limits for existing contaminants necessitates the research and development of reliable and robust analytical methods required for response to food alerts, enforcement and for surveys to assess dietary exposure. There is also a requirement to extend existing methods to new food types and to analyse more analytes simultaneously to make more efficient use of decreasing resources.

During 2010 method research and development was performed for the following parameters:

i) residual formaldehyde in kitchenware

ii) bisphenol A in food simulants

iii) melamine in foodstuffs and kitchenware – the latter as a FCM

iv) photo initiators

v) perfluorinated compounds

vi) plasticisers in PVC gaskets

vii) mycotoxins

viii) ergot alkaloids

ix) PAHs (EU 15 PAHs & 1 JEFFA PAH)

x) additional honey parameters

xi) metal speciation

xii) multi-parameter testing of 4 artificial sweeteners using ELSD
xiii) peroxide value of in-use cooking oils
xiv) milk casein allergen involving extending the range of foodstuffs tested utilising an ELISA kit new to the market

Formaldehyde in Kitchenware

The determination of residual formaldehyde in kitchenware is associated with the substantial melamine work already performed in the laboratory. Analytical method development continued during 2010 with the objective of submitting the method for accreditation in 2011. This work was necessitated by the impending introduction of an EU emergency decision in 2011 to control the importation of polyamide and melamine kitchenware from China and Hong Kong. As part of method development a number of kitchenware samples submitted for melamine migration were also analysed for residual formaldehyde.

Bisphenol A in Food Simulants

The laboratory has implemented a method for the analysis of bisphenol A (BPA) in 50% ethanol to fulfil our NRL responsibility in respect of the proficiency project organised by the JRC.
In 2010 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 requires further development and this will be progressed in 2011.

Melamine in Foodstuffs and Kitchenware

Commission Regulation 1135/2009 repealed Decision No. 2008/798/EC and provided for reduced monitoring (20%) since the instances of non-conforming products with melamine exceeding 2.5 mg/kg has greatly decreased.

During 2010 the laboratory accredited the analytical methods for soya and milk products.

The laboratory continued its investigations into the analytical method for the determination of residual melamine in kitchenware with a view to future accrediting this test.

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 migrate from the printed material to the food.

There is no specific EU legislation in place for control of PIs in food. Some such as benzophenone are listed as permitted additives in Commission Directive 2002/72/EC on plastic materials and articles intended to come into contact with foodstuffs and have a specific migration limit. Most however are not mentioned in the legislation and are therefore regarded as not permitted. Since 2009 there have been 22 PI related rapid alert notifications through the RASFF system, involving a wide range of compounds including 4-methyl benzophenone, 4-phenyl benzophenone, 2-methyl-1-[4-(methylthio)-phenyl]-2-morpolinopropan-1-one, 2-hydroxy-2-methyl phenyl propan-1-one, 1-hydroxy-cyclohexyl phenyl ketone, 2,4,6-trimethylbenzoyldiphenyl phospinoxide (TPO) and isopropyl thioxanthone (ITX).

To date in this laboratory 14 PIs have been investigated by both GC-MS and LC-MS/MS, including 4-methyl benzophenone, 4-phenyl benzophenone, 2-methyl-1-[4-(methylthio)-phenyl]-2-morpolinopropan-1-one, 2-hydroxy-2-methyl phenyl propan-1-one, 1-hydroxy-cyclohexyl phenyl ketone, 2,4,6-trimethylbenzoyldiphenyl phospinoxide (TPO) and isopropyl thioxanthone (ITX). This number will be increased with the aim of identifying and quantifying as many PIs as possible particularly those with legislative limits and occurring in the EU RASFF system.. Our own researches have identified in excess of 50 compounds that are commercially available as PIs, not all are regarded as suitable for use in contact with food.

As part of our NRL responsibilities we successfully participated in a proficiency scheme organised by the CRL for FCMs. It involved analysis of unknown solutions plus a paper and board material impregnated with PIs.

Perfluorinated Compounds (PFC)

PFCs 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 disrupting 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 early 2008.

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

Development work continues on a LC-MS/MS method for the testing of PFCs in foods.

Food Contact Materials - 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. Other additives used include fillers, slip agents (which allow the lid to twist off relatively easily), antioxidants and thermal stabilisers that improve its stability with time and allow the gasket to be effective at high temperatures such as during hot filling and sterilising. These additives all have the potential to migrate from the gasket into the food. Legislation is in place which sets maximum limits on the migration of specific plasticisers (ESBO, phthalates, 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 proposed legislative change will introduce a new category of total plasticisers. This

may mean that to test for compliance samples will have to be analysed for a suite of analytes rather than individual compounds.

During 2010 methods were developed for 21 plasticisers in lids, comprising phthalates, adipates, sebacates, DINCH and TBAC.

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 cover a large number of compounds some of which like aflatoxins are highly carcinogenic. Their analysis has been carried out 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 for the analysis of a broader spectrum of mycotoxins continued during 2010 looking particularly at tricothecene toxins such as T-2, HT-2, nivalenone (NIV), deoxynivalenone (DON), zearalenone (ZON) and fumonisins. This involves a large amount of work but there are substantial efficiency advantages of screening a single sample for a wider range of toxins.

During 2010 additional legislation was introduced controlling the ochratoxin A content of chillies, chilli powder, cayenne and paprika, black and white pepper, nutmeg, ginger and turmeric (Commission Regulation 105/2010/EU). As NRL for mycotoxins it is necessary to develop analytical methods for these additional matrices. During 2010 methods were developed for black and white pepper, nutmeg, ginger, and turmeric, and red and white grape juice with a view to seeking accreditation in 2011 for these matrices. Analytical methods for chilli and paprika have already been accredited for a number of years.

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

Zearalenone in sweet corn methods were developed in readiness for submission for accreditation.

Ergot Alkaloids

As ergot alkaloids come under the aegis of the EU-RL for mycotoxins responsibilities of this laboratory, under the chemical specialisations (Section 1.5.2) it has been agreed that these will be transferred from Cork PAL, where they have been analysed for some years, and specialised in this PAL. Thus this laboratory initiated analytical development work during 2010 on ergot alkaloids and carried out analysis of some food products as part of the FSP. It is envisaged that the method will be submitted for accreditation at a future date.

PAHs (EU 15 PAHs & 1 JEFFA PAH)

PAHs are regularly reported through the EU rapid alert system (RASFF). There were 19 alerts in 2010 with most arising from food supplements and smoked fish products.

The laboratory participated in a method validation study organised by the EU-RL. The method involved establishing a system to analyse various food matrices primarily for the 4 PAHs which are to be legislated for but also for the 15+1 priority PAHs where possible. The method comprised solvent extraction utilising a pressurised liquid extraction system, clean-up using gel permeation chromatography and silica solid phase extraction with GC-MS determination.

In 2010 the scope of PAH accreditation was extended to cover beverages (tea, coffee and drinking chocolate) and baby foods in addition to smoked meats, smoked fish, food supplements, herbs & spices, infant formulae and oils & fats.

Honey parameters: Insoluble matter, acidity and pH, diastase number & conductivity

This laboratory has been analysing honey samples for sugars, moisture content and hydroxymethylfurfural (HMF) for many years as part of its FSP and also on request from DAFF. A number of additional tests are listed in Council Directive 110/2001/EC. Methods were developed for these remaining parameters, listed in the heading, and these will be submitted for accreditation in 2011. As part of the development work honey samples submitted under the 2010 FSP for sugars, HMF and moisture content were analysed for some of these parameters with results reported as non-accredited.

Metal speciation

The determination of the various forms or species of metals, both inorganic and organic, is key to understanding and regulating their effects.

The toxicity of mercury and arsenic depends on their physico-chemical form. Speciation also plays a crucial role in metal bioavailability, selenium being a prime example.

In 2010 a method for the determination of 4 arsenic species, *viz* inorganic arsenic, arsenobetaine, monomethylarsonic acid and dimethylarsenic acid, in seafood by ion chromatography – inductively coupled plasma – mass Spectrometry (IC-ICP-MS) was validated and will be submitted for accreditation in 2011.

Mercury speciation work on the determination of methylmercury in fish by isotope dilution GC-ICP-MS is progressing.

1.5.8 EU Food and Veterinary Office Missions

In 2010, in response to invitations, Executive Chemist and Executive Microbiologist staff members accompanied the Food and Veterinary Office (FVO), which is based in Grange, Co. Meath, as National Experts on official missions to Bulgaria and Sweden, respectively.

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.

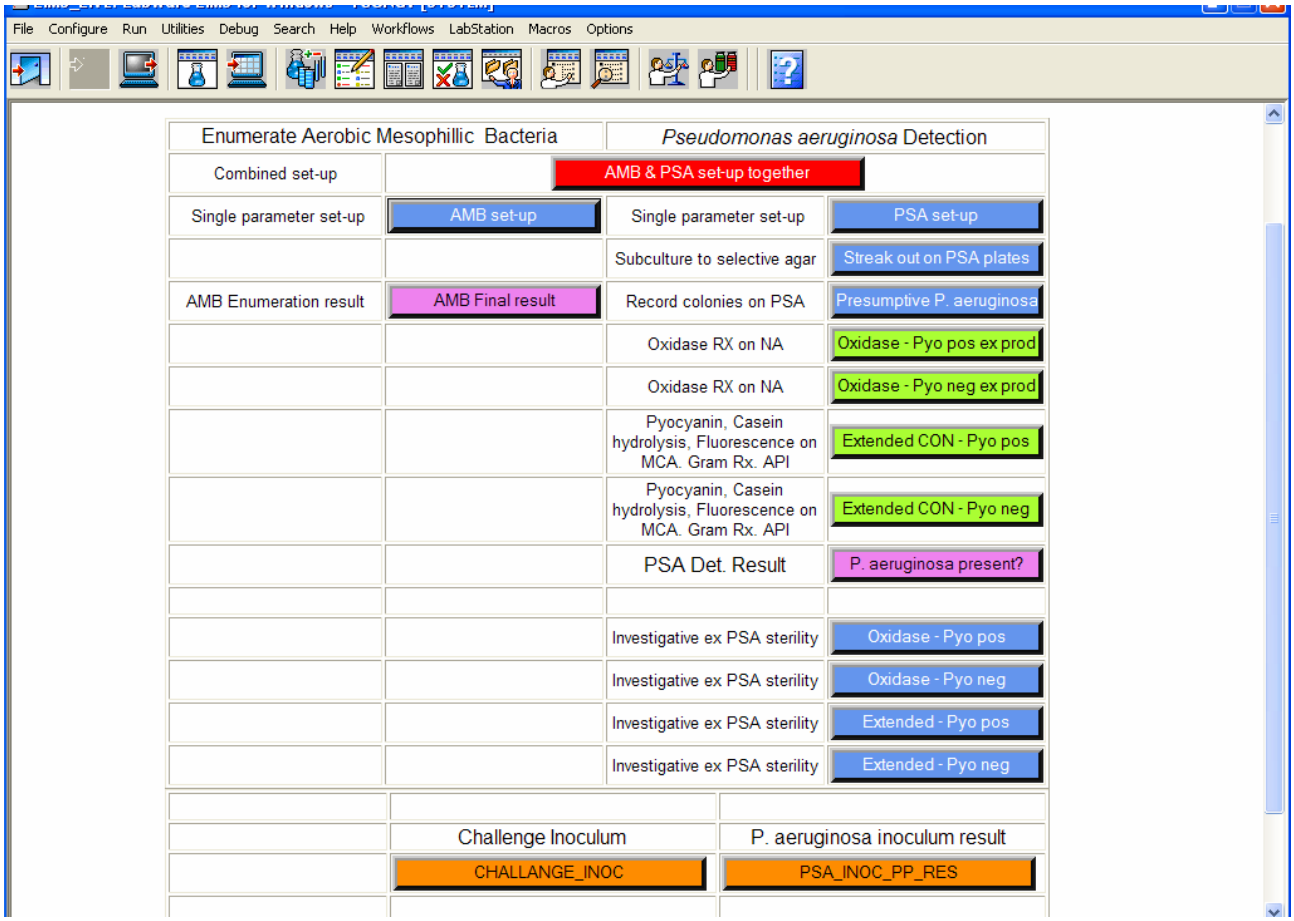
Each year the FVO implements an inspection programme, identifying priority areas and countries for inspection. In order to ensure that the programme remains up to date and relevant, it is reviewed mid-year. The programmes are published on the FVO website.

The purpose of the mission to Bulgaria was to assess the official control systems in place for food contact materials and food additives. The responsibility of the National Expert on this mission was 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 food additive and food contact materials' laboratories for compliance with official sampling and testing, auditing systems, practices and resources.

The mission to Sweden covered food hygiene and natural mineral waters. One of the aims was to assess laboratories performing microbiological tests.

1.5.9 Laboratory Information Management System (LIMS) and IT

LIMS continued to contribute to the efficient working on the laboratory. No new modules were introduced. Workflows and data entry screens were developed to deal with the introduction of cosmetics microbiology testing. An example of one of the new screens is shown below. Routine LIMS maintenance and occasional problem solving were continued in-house throughout the year. The laboratory purchased 3 days LIMS consultancy to deal with minor upgrades and problems which can accumulate over the year and which are most efficiently dealt with by a Labware consultant. At the end of 2009 and extending into 2010, the laboratory upgraded the servers hosting the local area network and the Waters Empower chromatography software.



1.5.10 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.

2. Laboratory workload in 2010

In 2010 the laboratory analysed a total of **14,183** samples, comprising *c.* 75,000 individual tests. The following broad sample types, including both chemical and microbiological testing, were analysed:

Food	4226
Water – Chemical	4448
Water – Microbiological	4106
Biological	1294
Miscellaneous	109
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Total	**14,183**

The total includes 420 samples analysed under Proficiency Schemes and other Quality Control programmes.

3. Food

The food testing performed by the laboratory in 2010 comprised:

- **i)** chemical analysis of Programmed Food Testing for the HSE Dublin Mid-Leinster and the HSE Dublin North East
- **ii)** microbiological examination of Programmed Food Testing and surveys for the HSE Dublin Mid-Leinster and the HSE Dublin North East
- **iii)** foodstuffs arising from the EU RASFF and Emergency Decisions
- **iv)** surveys for the FSAI
- **v)** foodstuffs from other Agencies
- **vi)** complaint samples
- **vii)** food export certification examination and analysis
- **viii)** 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, Fisheries and Food (DAFF).

3.1 Programmed Chemical Food Testing

The Eastern Region 2010 Chemical Food Sampling and Testing Programme was compiled following detailed discussions between the laboratory, the EHS and the FSAI. The discussions included the Public Analyst Laboratories in Cork and Galway, with the result that the three Regional Programmes now form a National Programme. This greater coordination of sampling and analysis reached a new plateau following the Specialisations Project (see 1.5.2 above).

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 2010. 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 repeat follow-up sampling.

In 2010 the laboratory tested a wide range of foodstuffs for the following mycotoxins:
aflatoxins, ochratoxin A, zearalenone, fumonisins, the trichothecenes DON, T-2 & HT-2.

Legislation for mycotoxins

Legislation for currently regulated mycotoxins was consolidated into Regulation EC No 1881/2006 amended by Commission Regulations (EU) No 165/2010 and 105/2010 while the *Fusarium* toxins in maize and maize products were updated in Regulation EC 1126/2007.

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 2010.

121 samples in total were analysed. These samples were mainly taken from shipments entering the State at the designated ports.

484 tests for aflatoxins B1, B2, G1, G2 & Total were carried out on the samples. Additionally 53 samples were tested for aflatoxin M1. Details are given in Table 1.

Foodstuff	*No of samples received*	*No of samples exceeding limits for Aflatoxin B1*
	Aflatoxins B1, B2, G1,G2, Total	
Spices	49	One sample was 1.5 times over the limit.
Whole Nuts	33	3 samples of nuts: One was 2.5 times over the limit, One was 8 times over the limit; the other sample was outside our calibration range but was estimated to be 50 times over the limit.
Nut Products	5	
Cereals	17 Rice 5 Popcorn 2 Wheat flour	
Seeds	4 Melon seeds 4 Sunflower seeds 1 Linseed 1 Pumpkin seed	4 samples of melon seeds: One was 2 times over the limit, the others three samples were outside our calibration range but were estimated to be 15, 30 and 80 times over the limit.
	Aflatoxin M1	
Milk and milk products	33	0
Baby foods	20 (Samples for DAFF)	0

Table 1 Details of aflatoxin testing

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 2010

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

Foodstuff	*No of samples*	*No of samples exceeding limits*
Coffee	11	0
Baby foods	11 (+ 2 follow-up samples)	1
Beer	10	0
Paprika, turmeric, ginger, nutmeg, pepper	10	0
Cereals	11	0
Dried vine fruits	6	0
Wine	10 (incl. 1 under import controls)	0
Liquorice	9	N/A
Chilli powder	6	0
Grape juice	7	0
Chocolate	8	N/A

Table 2 Ochratoxin A analysis

In addition 4 large scale samples were analysed for Ochratoxin A under the National Mycotoxin Sampling Plan. All were satisfactory.

In 2010 due to the implementation of the National Mycotoxin Sampling Plan fewer retail samples of certain matrices were tested for Ochratoxin A compared to 2009.

Other mycotoxins - Zearalenone, Fumonisins, Trichothecenes T-2, HT-2, DON.

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. Zearalenone possesses strong oestrogenic properties. The most important effect of zearalenone is on the reproductive system, particularly of animals.

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

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

Intake estimates indicate that the presence of T-2 and HT-2 can be of concern for public health. Results from the investigations into the trichothecenes and the other fusarium mycotoxins in 2010 are given in Tables 3 and 4 respectively.

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

Foodstuff	*Parameter*	*No of samples*	*No of unsatisfactory results*
Cereals	T-2, HT-2	15	1 (labelling)
Baby foods	T-2, HT-2	16	0
Cereals	DON	15	1 (labelling)
Baby foods	DON	16	0

Table 3 T-2, HT-2 & DON

Mycotoxin	*Foodstuff*	*No of samples*	*No of samples exceeding limits*
Zearalenone	Cereals, cereal products	21	0
Zearalenone	Baby foods	20	2 (labelling)
Fumonisins B_1, B_2	Cereals & cereal products (mainly corn)	21	0
Fumonisins B_1, B_2	Baby foods	20	2 (labelling)

Table 4. Testing for further mycotoxins.

Ergot Alkaloids

In 2010 for the first time some samples of cereal products were analysed for their ergot alkaloid content. Samples were tested for six alkaloids (ergometrine, ergosine, ergotamine, ergocornine, α-ergocryptine and ergocristine). There is currently no EU legislation for ergot alkaloids in cereal products. The details are given in Table 5.

Foodstuff	*Parameter*	*No of samples*	*No of unsatisfactory results*
Cereals	Ergot alkaloids (6)	10	N/A

Table 5 Ergot Alkaloids

Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic aromatic hydrocarbons (PAH) are a class of highly carcinogenic compounds with multiple fused aromatic rings that can be formed during the incomplete combustion of organic material. Because the group comprises hundreds of individual compounds analysis has mostly focused on benzo[a]pyrene (BaP) which had been assumed to be a marker for the total PAH content of food. Legislation currently in place controls the level of BaP in certain foods such as meats and seafood, baby foods and edible oils and fats (Commission Regulation (EC) No 1881/2006), although this regulation will be amended shortly to allow for new limits based on the sum of BaP, chrysene, benzo[b]fluoranthene and benzo[a]anthracene.

This laboratory is the NRL for PAHs and has been INAB accredited for the analysis of the priority 15 PAH since 2007. In 2010 the laboratory's scope of accreditation was extended to cover beverages (tea, coffee and drinking chocolate) and baby foods in addition to smoked meats, smoked fish, food supplements, herbs & spices, infant formulae and oils & fats.

In 2010 73 samples were analysed for PAHs, totalling some 1095 individual tests. This comprised 25 samples of herbs, 21 samples of spices, 6 samples of smoked fish, 16 samples of infant formulae, 4 samples of cocoa butter plus 1 NRL referral. The results are presented in Table 6.

Foodstuff	*Number of samples*	*BaP µg/kg*	*PAH range µg/kg*
Herbs	25		< 0.2– 22.8
Spices	21		< 0.2– 77.2
Smoked fish	6		< 0.2– 0.7
Infant Formula	16		< 0.2– 0.3
Cocoa Butter	4		< 0.2– 1.6
Food supplements (NRL Referral)	1	54.4	0.8 – 139.5
Totals:	**73**	**- resulting in 1095 individual tests.**	

Table 6 Summary of PAH sample results

Inorganic contaminants (heavy metals)

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.

In 2010, 314 samples of a wide range of foodstuffs were analysed for lead, cadmium, total arsenic and total mercury.

The number of metal tests in the different sample types is given in Table 7, a total of 353 tests.

Matrix	*Total Arsenic*	*Cadmium*	*Lead*	*Total Mercury*	*Inorganic arsenic*	*No. exceeding limits*
Alcoholic Beverages (wines/beers)			24			0
Chocolate			24			0
Fish & Shellfish	24			16		0
Cereals		20				0
Herbs	24					0
Seeds	24					0
Nuts	24					0
Rice		24				0
Offal		14	14			0
Spices	24					0
Vegetables		19	19			1 (Cd)
Fruit (Berries & Grapes)			24			0
Gum Bases			24			
Seaweed					2	
Water					1	
Beer Concentrates	2	2	2	2		
Totals	122	79	131	18	3	1 (Cd)

Table 7 Inorganic contaminants

The seaweed samples were analysed for both arsenic and inorganic arsenic. Both samples contained total arsenic in excess of 1 mg/kg which is allowed under S.I. No. 72 of 1992 where arsenic is naturally present.

The inorganic arsenic, which is the toxic form, did not exceed 0.20mg/kg.

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 more recent study in 2007on the dietary intake of acrylamide. There are still no legislative limits on acrylamide in foods.

In 2010 66 samples were analysed covering a range of foods in order to fulfil Ireland's obligations under Commission Recommendation 2007/331/EC. The data is sent to a monitoring database which establishes acrylamide levels in various foods which will ultimately inform the decision whether to implement legislative limits for acrylamide in foodstuffs.

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 e.g. samples of the same brand of oven chips taken in March and November were found to have 130 & 700 µg/kg respectively.

Table 8 presents the range of levels found and additionally an expression of the typical exposure having regard to estimated portion size. Two samples had acrylamide levels exceeding 1000 µg/kg. In order to highlight particularly high levels in certain foods, EFSA intends setting indicative levels in 2011, based on their monitoring data.

EFSA have published a scientific report, http://www.efsa.europa.eu/en/efsajournal/doc/1599.pdf , which gives an update of results on the monitoring of acrylamide levels in food.

Foodstuff	*Number of samples*	*Acrylamide range µg/kg*	*Typical portion size associated with highest level g*	*Typical max exposure µg*
Breakfast cereals	4	30 – 210	40	8
Ginger cake	1	<20	NA	NA
Biscuits	5	180-2250 3 ginger nut at 550, 1440 & 2250	40	90
Crisps, snacks	16	<20 - 980 2 crisps at 860 & 980	25	25
Takeaway French Fries and Oven Chips	16	30 –700 1 oven chips at 700	400	280
Coffee	7	30 – 680 2 Instant at 580 and 680	5	3
Coffee substitute	1	<20	5	NA
Baby foods incl. cereal based babyfood	12	<20 – 470 2 rusk/biscuit samples at 140 & 470; all other samples <25	13	6
Brown bread, soda bread & mixed seed bread.	4	20 – 120	120	14

Table 8. Acrylamide testing in 2010

Nitrate in various foods. Tin in canned foods.

Table 9 summarises the testing for nitrate and tin in 2010.

Maximum levels of nitrate in lettuce, spinach and processed cereal-based foods and baby foods for infants and young children and for tin in canned foods are specified in Regulation EC No.1881/2006.

Parameter	*Foodstuff*	*No of samples*	*Unsatisfactory samples*
Nitrate	Baby foods	14	0
Nitrate	Lettuce and spinach	30	0
Total:		**44**	0
Tin	Canned foods	62	0
Total:		**62**	0

Table 9 Nitrate and Tin

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. Like acrylamide, furan is formed during heating of certain naturally occurring food components under pressure.

There is currently no legislation setting maximum levels for furan.

EFSA has requested data for dietary intake evaluation and has established a monitoring database. Of particular interest is the furan content in the food as prepared. Furan is very volatile and once a container is opened and the food heated furan will evaporate from the food. The aim of the monitoring is to establish the extent of the loss on preparation. This necessitated analysing most samples twice, once as received and again when prepared as directed. This allowed the provision of data on actual consumption levels to EFSA for dietary exposure evaluation as required by Commission Recommendation 2007/196/EC.

In 2010 47 samples were analysed as received. 4 of these are typically not heated prior to consumption and thus were not reanalysed on heating. The other 43 samples were prepared for consumption and reanalysed. Tables 10 and 11 present the results.

Foodstuff	*Number of samples analysed (as received)*	*Furan range µg/kg*
Baby foods	19	<5 – 104
Sauces	5	10 – 31
Soup	1	41
Canned/Jarred fruit	3	<5 – 29
Canned/Jarred vegetables	3	7 – 9
Coffee	11 consisting of	46 – 5184
Espresso	1	3858
Filter	1	5184
Instant	9	46 – 2660
Other	9	<5 – 22

Table 10 Furan - Samples as received

Foodstuff	*Number of samples analysed (after preparation)*	*Furan range µg/kg*
Baby foods	18	< 5 – 91
Sauces	5	9 – 24
Soup	1	36
Canned/Jarred fruit	2	6 – 9
Canned/Jarred vegetables	3	6 – 8
Coffee	11 consisting of	<5 – 322
Espresso	1	322
Filter	1	21
Instant	9	<5

Table 11 Furan - Samples after preparation

The level of furan generally increases with the degree of heating under pressure when the food is manufactured. Canned and jarred baby foods tend to be filled into their containers, sealed and heated at high temperature and pressure for varying lengths of time to sterilise the product. The coffee bean probably behaves as a type of sealed cooker when roasted, hence the high levels in Table 10.

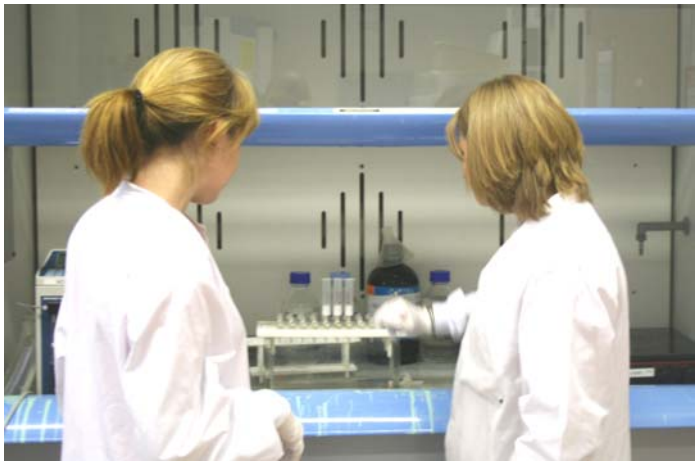
The losses in furan levels associated with cooking prior to consumption were highest in products that were heated to near 100^{o}C, such as coffee. The reduction in baby foods was less as these are usually just warmed.

Furan levels in the prepared product are a good indicator of the levels that consumers are being exposed to. In 20 of the tests where samples had been prepared, furan levels exceeded 20 µg/kg.

EFSA have published a scientific report which gives an update of results on the monitoring of furan levels in food. This can be found at http://www.efsa.europa.eu/en/efsajournal/doc/1702.pdf

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 2010, the laboratory tested a wide range of foodstuffs for the following additives:

- **i)** artificial sweeteners – aspartame, acesulfame-k, saccharin, sucralose.
- **ii)** artificial colours – tartrazine, quinoline yellow, sunset yellow, carmoisine, ponceau 4r, allura red, patent blue, brilliant blue, green s.
- **iii)** the natural colour - annatto
- **iv)** preservatives – sodium nitrite, sodium nitrate, sulphur dioxide, benzoic acid, sorbic acid.
- **v)** flavour enhancer – mono sodium glutamate
- **vi)** caffeine
- **vii)** taurine

In 2010 the Cross Agency Additives Working Group focused on producing a guidance document for sodium nitrite and sodium nitrate sampling and testing in meat products. The group consisted of FSAI, EHS, LAV and PAL staff. Directive 2006/52/EC sets out the maximum permitted limits for sodium nitrite and sodium nitrate in meat products. This Directive is transposed into Irish legislation by S.I. 40 of 2008. The directive allows for the measurement of sodium nitrite and sodium nitrate on in-going amounts as well as providing limits for certain derogated products where residual limits must be measured.

It was anticipated that resulting from the legislation update the majority of samples submitted to the laboratory for analysis would be brine samples in order to determine in-going amounts of the preservatives. However, this was not the case; most samples received in 2010 have been derogated and thus comprised meat samples for the determination of residual levels.

There was an issue regarding corned beef samples as this sample type was not classified under the derogated products. These products are however immersion cured and so the ingoing amount cannot be determined. After discussions between the LAVs and the FSAI it was decided that the corned beef samples could be classified as derogated products as long as the definitions and amounts outlined in footnotes 1 and 1.1 of Directive 2006/52/EC were met, otherwise, products are considered to be non-derogated.

Table 12 gives the results of testing for additives in 2010. Where labelling is presented as the reason for a sample being unsatisfactory, this can indicate either that an undeclared ingredient was detected or that the labelling was not presented in accordance with legislative requirements.

31 samples were unsatisfactory, representing 4.6% of the 614 samples tested. The highest number of these was for the preservatives nitrate & nitrite.

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 2010 28 samples of tuna fish were analysed for carbon monoxide. No positives were found.

Additive	*Foodstuff*	*No of samples*	*No of tests*	*No of unsatisfactory Samples*
Artificial sweeteners other than sucralose - Aspartame Acesulfame-K Saccharin	Non-alcoholic beverages, flavoured bottled waters and sauces	27	81	2 Labelling
Sucralose	Various categories of foodstuffs	86	86	0
Artificial colours	Non-alcoholic beverages and confectionary (sweets) including party and lucky bags.	99	891	3 Labelling
Annatto	Cheese, spreads, smoked fish	41	82	1 Excessive additives 1 Labelling
Sulphur dioxide (SO_2)	Dried fruit, wine, raw crustaceans, prepared vegetables, sausages and burgers	73	73	2 Labelling 3 SO_2 content
Sodium nitrite, sodium nitrate $NaNO_2$, $NaNO_3$	Cured meats and brines	94	188	15 Excessive additives
Benzoic & sorbic acids	Non-alcoholic beverages, cakes, jams & sauces	50	100	0 (8 not analysed due to instrumentation problems)
Mono sodium glutamate (MSG)	Prepared meals, other foodstuffs	79	79	3 (labelling)
Taurine	Infant formula and follow-on formula	25 (incl. 20 from DAFF)	25	0
Caffeine	Soft drinks, teas, coffees	97	97	1 (labelling)
	Totals:	**671**	**1702**	**31**

Table 12 Results of additives testing in 2010.

Compositional / Quality / Labelling analysis

In 2010 the laboratory performed testing for composition (fat and protein in meat and fish products, dairy products, infant formula, follow-on formula and baby food), sodium in cereal based baby foods, minerals in infant formula & follow-on formula and food supplements, free fatty acids in in-use cooking oils. Multi-parameter testing was performed on the samples of cereal based baby foods, being tested for fat, protein and sodium content.

Twenty one samples of honey were tested for sugars, HMF, moisture, diastase number, free acidity, conductivity, insoluble matter and also nitrofuran antibiotic residues. The testing of honey is another excellent example of multi-parameter testing of samples – each sample can be tested for thirteen individual parameters.

Tables 13 and 14 give the data for compositional testing in 2010.

In Table 13 of the 155 samples tested, 13 were unsatisfactory which is 8.4%. This is a high percentage and it illustrates the need for rigorous monitoring and surveillance.

Compositional analysis and checking of labelling is important in the context of the increasing level of lifestyle-related health problems in the Western world, including Ireland. It is paramount that consumers are fully informed of the content of their foods and that the declared nutrient values on labels are accurate. This enables consumers to make an informed choice regarding their food intake and provides the best opportunity for a nutritious diet and healthy lifestyle.

In 2010, 62 samples of a wide range of foodstuffs was analysed for sodium and minerals. Details of the total of 230 tests in the different sample types are given in Table 14.

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.

Labelling analysis in 2010

A substantial amount of labelling analysis was performed.

Dairy products, meat and fish products, infant formula, follow-on formula and baby foods were tested for fat and protein content and the levels determined were compared to declared values to establish the accuracy of the nutrition labelling. The presentation of information on these pre-packaged products was examined to determine compliance with the appropriate labelling legislation.

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 examined.

Foods fortified with minerals were tested to determine the accuracy of nutrition information presented for minerals.

Parameter	*Foodstuff*	*No of samples*	*No of tests*	*No of unsatisfactory samples*
Acid Value	In-use cooking oils	64	65	3 Acid values exceeded the guideline limit of 3.0 mg/g
Compositional tests (fat and protein)	Dairy products	16	32	0
Compositional tests (fat and protein)	Meat and fish products	20	40	8 Labelling (Protein or fat content determined for these samples differed from the declared value) 1 Compositional Fat determined in the sample was greater than that declared on the label.
Compositional tests (fat and protein)	Infant formula and follow-on formula	10	20	0
Compositional tests (fat and protein)	Baby foods	24	48	0
Sugars, HMF, Moisture, Diastase number, free acidity, conductivity, insoluble matter, nitrofurans	Honey	21 (incl. 11 from DAFF)	168	1 (high HMF content)
	Totals:	**155**	**373**	**13**

Table 13 Compositional testing in 2009

Certain ingredients or substances can give rise to allergic reaction or intolerance in consumers. Allergenic ingredients must be declared on the labels of pre-packages foodstuffs so that consumers who have allergies or intolerances can readily identify specific ingredients to which they have sensitivity. In this regard in 2010, a wide range of products was tested (see below) for the presence of peanut and egg and the product labelling was examined for compliance with the legislative requirements.

Tables 12 - 14 and the following section on allergens contain information on labelling analysis in 2010.

Matrix	*Calcium*	*Copper*	*Iron*	*Potassium*	*Magnesium*	*Manganese*	*Phosphorous*	*Selenium*	*Sodium*	*Zinc*	*No. exceeding limits*
Cereal based baby foods									24		0
Infant formula & follow-on formula	19	19	19	19	19	19	19	19		19	0
Food Supplements	16		19								0
Totals	**35**	**19**	**38**	**19**	**19**	**19**	**19**	**19**	**24**	**19**	0

Table 14 Minerals and sodium testing in 2010

Allergens

Food allergy is a major form of adverse reaction to foods. Food allergens are defined as those substances that initiate and provoke the immunological reactions of food allergy. Although any food may cause an allergic reaction in selected individuals, 90% of all food allergic reactions are caused by eight foods: peanuts, eggs, milk, shellfish, wheat, soy, fish and tree nuts. Directive 2007/68/EC lists allergenic ingredients whose presence in pre-packaged foodstuffs must be declared.

As susceptible individuals can react to mere traces of food allergens, accurate food labelling which details the presence of allergens in pre-packaged foodstuffs is vital to allow allergy sufferers to make informed choices about the food they consume.

In 2010, the laboratory undertook testing of samples for egg, and peanut as part of the cross-agency Annual National Labelling Surveillance Programme 2010. The initial plan for this survey was for 150 samples to be submitted for analysis to PALD for peanut, egg, casein and gluten analysis where appropriate, with a view to multi-parameter testing of samples. In the final protocol, however, PALD was allocated 74 samples. 38 samples were analysed for peanut and egg, 27 for peanut only and 9 for egg only.

The samples which consisted of biscuits, cakes, bread, baby food and ready meals were supplied by the FSAI, EHS, LAV and SFPA. The samples were analysed using a sandwich-type enzyme immunoassay technique with a polyclonal antibody to conarachin (peanut protein) and a polyclonal antibody to ovomucoid (egg white protein).

An equal number of Irish produced products and imported products were examined. The Irish produced products were sampled at manufacturing level while the imported products were taken at retail level. The samples were divided into two categories; Category A samples contained no allergen labeling and Category B samples had a ‘may contain’ label for the particular allergen.

One sample of cake was found to contain both peanut and egg in excess of the limits of quantitation of the respective techniques i.e 1.0ppm and 0.5ppm. A follow-up sample subsequently submitted was also positive for both.

Five samples (four cakes and one shepherd's pie) were positive for egg content.

Two samples of bread were positive for peanut content. As part of an intensive investigation, involving the FSAI, EHS, a number of PALD staff and the manufacturer, a further forty follow-up samples were analysed, including breads and ingredients from the manufacturer. Considerable laboratory time and resources were allocated to this investigation. Three ingredients samples were deemed non-analysable as, due to their nature there was interference between the food matrix and the kit used for analysis. Three of the follow-up samples were positive for peanut content.

Other samples analysed for egg content during the year were yoghurt covered raisins. One sample was received from PALG who had received it as a complaint sample. There was no indication on the label that egg was present and the consumer suffered anaphylactic shock as they had previously been diagnosed with egg allergy. Eight follow-up samples were submitted as part of the

investigation, three of which were found to contain egg in excess of the limit of quantitation of the technique.

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 2010 the following biogenic amines were measured in a range of foodstuffs – histamine, tyramine cadaverine, putrescine, spermidine, spermine, agmatine, phenylethylamine, tryptamine and serotonin.

Table 15 gives the details.

Foodstuff	*No of samples*	*Histamine range Ppm*	*Tyramine range Ppm*	*No of unsatisfactory samples*
Fish, crustacean, molluscs	30 * (incl. 5 SFPA)	<10–200	<10–286	3 (labelling)
Soups, broths	20	<10–400	<10–169	0
Sauces	20	<10–430	<10–417	0

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

Table 15 Biogenic Amine analysis in 2010

Lactose

Lactose intolerance is an important allergy in humans. There are an increasing number of 'lactose-free' products on the market. Ten such foods were tested to ensure compliance with Directive 2000/13/EC relating to the labelling, presentation and advertising of foodstuffs. All were found to be lactose-free.

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 Directive 2002/72/EC food contact materials may not release PAAs into food simulant in detectable quantities.

In 2010 the laboratory analysed 25 black nylon kitchen utensils for six common PAAs. 2 samples did not meet the requirements for specific migration and Rapid Alerts were raised with the FSAI for these

A further extensive programme of PAA testing is planned for 2011 and this work will be supplemented by the expected introduction of an EU emergency decision controlling the importation of polyamide and melamine kitchenware into the EU.

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 pertinent to fatty foods.

Legislation (Commission Directive 372/2007 given effect by S.I. No. 587 of 2007) restricts the content of ESBO in food to 60mg/kg or 300mg/kg for foods for which simulant D (rectified olive oil) retesting is required. Commission Directive 2005/79/EC halved the maximum permitted level of ESBO to 30mg/kg for infant food.

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

35 samples of infant food and other jarred foods (Table 16) were analysed in 2010 for ESBO with 5 being at the request of DAFF. The ESBO levels were all less than the legislated Specific Migration Limits (SML) with the exception of 1 baby food sample. Taking the measurement of uncertainty into account the ESBO result for this sample was below the legislative limit.

Foodstuff	*No of samples*	*ESBO range mg/kg*
Infant formula	5	<3
Baby foods	15	< 3 – 31
Sauces	15	<3 – 23

Table 16 ESBO results

Other plasticisers

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

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

The 35 samples analysed for phthalates resulted in 420 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.

Oleamide and erucamide were found in all gaskets many of which also contained the common plasticiser dibutyl sebacate. TBAC was also found. These are permitted additives in plastic materials and articles in contact with food with no SML assigned. Many samples contained traces of adipates which were probably breakdown products from the permitted polyadipate plasticiser.

Traces of diisodecyl phthalate (DIDP) was found in 1 sample of jarred sauce. This additive is legally permitted although there are restrictions on its use consisting of a SML of 9 mg/kg and a maximum quantity (Qm) of 0.1 % w/w in the raw gasket. The limit is based on the sum of the concentrations of DIDP and diisononyl phthalate (DINP). The food itself was analysed revealing that a little migration had taken place but levels found were well below the SML.

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 permitted. No non-permitted additives were found in these samples, thus the samples were deemed satisfactory.

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 2010 a total of 94 samples were submitted to the laboratory for testing under the import control legislation. All were satisfactory.

Melamine in kitchenware

20 Samples of kitchenware were analysed for specific migration of melamine and residual formaldehyde giving 40 analytical tests. Only the melamine results were reported.

Bisphenol A (BPA) in baby bottles and canned foods

Twenty-seven baby bottles were analysed for BPA content. All were satisfactory. Twenty samples of canned foods were analysed for BPA. All were satisfactory but two samples breached labelling legislation.

Migration of lead and cadmium from ware

The laboratory implemented a method for the determination of the migration of lead and cadmium from ceramic ware. Council Directive No. 84/500/EEC specifies maximum levels for lead and cadmium allowed to be transferred from ceramic articles. 24 cups in total were analysed and none were found to exceed the limits.

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 was used in the analysis of these items for the 2009 and 2010 food sampling programmes and it was accredited in 2010. This work is very important in view of the impending introduction of an EU emergency decision in 2011 to control the importation of polyamide and melamine plastic kitchenware from China and Hong Kong.

Other topics focussing on the development of analytical methods for FCM compounds, 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 student was a finalist in a Postgraduate Symposium Competition organised by Waters Chromatography Ireland Ltd. during 2010.

Antibiotic residues in honey

As indicated above, 21 samples of honey were analysed for the 4 nitrofuran antibiotic residues, AOZ, AMOZ, AHD and SEM. All were satisfactory.

3.2 A Review of the Results of the Microbiological Food Sampling Programme 2010

Introduction

The food microbiology laboratory examined 1565 samples submitted by EHOs for Food Control purposes. This number included 1393 food samples, 53 hygiene swab samples and 119 Bottled Water samples. The total number of samples tested was lower than in previous years.

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' and 'NS1', 'NS2' are always significantly represented. In 2010, in addition to the FSAI National Surveys (10NS1 and 10NS2) the HSE performed 4 additional national surveys (10HSE1 – 4). 'Import' was only stated as a sampling reason for one sample in 2010. Ninety samples which were taken at the Port were assigned as 'Port Survey' samples in an effort to collect data on foods which would not normally attract official control attention. Eighty eight 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 results. All 'Port Survey' and 'Follow-up' samples are non-programmed which has a major impact on laboratory time and resources.

Table 17 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 in Table17 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 Satisfactory in this table. Unacceptable/potentially hazardous and unsatisfactory samples under the guidelines are combined as Unsatisfactory in the table. The judgement applied to any sample was determined by the worst result for any of the individual parameters tested for that sample. Samples for which a judgement was not considered appropriate were classed as 'Open'.

Category	*Number*	*OUTCOME*		
		Satisfactory	*Unsatisfactory*	*Open*
Routine	688	547	107	34
Repeat	30	17	10	3
Follow up	80	69	5	6
Follow up(Swabs)	8	N/A	N/A	8
Import	1	N/A	N/A	1
Port Survey	90	90	0	0
10NS1	173	172	1	0
10HSE1	85	N/A	N/A	85
10HSE2(Swabs)	45	N/A	N/A	45
10HSE3	125	122	3	0
10HSE4	121	120	1	0
10NS2(Bottled Water)	119	119	0	0
Total	1565	1256	127	182
Total Foods (excl swabs/Water)	1393	1137	127	129

N/A = Not applicable

Table 17 Microbiology Food Sampling Programme – General data on samples for 2010

Results of food testing

In 2010 9.3% of food samples did not have a judgement assigned compared with 3.2% in 2009. A judgement is not made on samples which have results that fall into the unsatisfactory category but a temperature on receipt is not available. 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 'Open' category food samples, the satisfactory samples represented 90% of the remaining samples. Food samples judged to be unsatisfactory represented 10% of samples analysed against which there is a judgement. The proportion of unsatisfactory food samples was 4.4% lower in 2010 than in 2009 (14.4%). Unsatisfactory samples have been following a consistent downward trend.

Table 18 summarises the results found for each test parameter for routine food samples in 2010.

	Parameter	*Total tests*	*Unsatis-factory (UNSAT)*	*% Unsatis-factory*	*Unsatisfactory level*	*Range cfu/g for UNSAT*
Indicator Organisms (Enumeration)	ACC 30°C	514	89	17.3	N/A	N/A
	Enterobacteriaceae	430	15	3.5	≥1.0E4	N/A
	E. coli	720	9	1.3	≥1.0E2	1.0E2 – 4.9E4
Pathogens (Presence or Absence test)	*Salmonella*	688	0	0	Detected	N/A
	Campylobacter	4	1	25.0	Detected	N/A
Pathogens (Enumeration)	*B. cereus*	645	1	0.2	≥1.0E4	3.0E4
	C. perfringens	645	0	0	≥1.0E2	N/A
	Coagulase-positive Staphylococci	617	8	1.3	≥1.0E2	1.2E2 – 1.4E3
	L. mono'. Enumeration	648	0	0	≥1.0E2	N/A
	V. parahaemolyticus enumeration	3	0	0	≥1.0E2	N/A
	Totals:	4919	123	2.5	N/A	N/A

N/A = Not applicable/available. "….E2" = "… x 10^2"

Table 18 Breakdown of results by parameter (test) for 2010 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 10 routine samples (1.5%) with unsatisfactory results due to food pathogens. These are listed in Table 19 below. The proportion of routine samples tested with unsatisfactory aerobic colony counts was 17.3% in 2010. The range over the past 5 years has varied, the highest being 25.6% in 2006. After ACC, the parameter that provides more unsatisfactory results than any other is *Enterobacteriaceae*. In 2010, 3.5% 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 so high levels of *Enterobacteriaceae* in samples containing raw vegetables are not considered hygienically significant. For this reason we do not examine for this parameter on samples which are known to have a raw vegetable component.

The percentage of unsatisfactory samples found for this parameter may well be an underestimate as in our view the EU specified method used for this parameter performs poorly even though accreditation has so far been maintained for the method. We know from work within the laboratory that productivity and reproducibility of the method can be improved considerably with amendments to the methodology which we are prevented from implementing under our current accreditation/official control regime.

Unsatisfactory *E. coli* results for routine food samples were at 1.3% of samples tested. The level is similar compared to the level found in 2009, which was 1.0%.

Further pathogens

Table 19 shows summary data for some pathogen parameters.

Food	*Analysis Reason*	*Pathogen*	*Unsatisfactory Pathogen Level cfu/g*
CHICKEN WINGS	ROUTINE	Campylobacter spp.	Present
COLESLAW	ROUTINE	Coagulase-positive staphylococci	1.2E2
COLESLAW	ROUTINE	Coagulase-positive staphylococci	1.5E2
TUNA MAYONNAISE	ROUTINE	Coagulase-positive staphylococci	1.5E2
HAM	ROUTINE	Coagulase-positive staphylococci	1.9E2
MEAT DUMPLING	ROUTINE	Coagulase-positive staphylococci	3.1E2
CHICKEN DISH	ROUTINE	Coagulase-positive staphylococci	3.2E2
CHICKEN DISH	ROUTINE	Coagulase-positive staphylococci	6.0E2
BEAN SALAD	ROUTINE	Coagulase-positive staphylococci	1.4E3
BOILED RICE	ROUTINE	Presumptive *Bacillus cereus*	3.0E4

N/A = Not applicable/available. "….E2" = "… x 10^{2}"

Table 19 Unsatisfactory routine food samples containing pathogens

Eight routine samples tested positive for Coagulase-positive Staphylococci, which represented 1.3% of routine food samples tested for the Coagulase-positive Staphylococci parameter. While this percentage shows a slight increase on the 2009 level of 0.5%, the level has ranged from 0.3% (2008) to 1.6% (2005) over the past 5 years. However, 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 2010 ranged from 120cfu/g to 1400cfu/g for the 8 routine samples. *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. This parameter was previously reported as *Staphylococcus aureus;* most Coagulase-positive Staphylococci are *Staphylococcus aureus*.

One routine sample had Presumptive *Bacillus cereus* at the unsatisfactory level of 30,000cfu/g. This pathogen can be found in many foods but is particularly associated with cooked rice. *B. cereus* can grow very rapidly in suitable foods at ambient temperature.

Only four tests for *Campylobacter spp.* were performed on routine foods in 2010. The organism was found in one of these, a sample of cooked chicken wings.

No routine sample had any other pathogen at a level greater than the unsatisfactory level in the FSAI Microbiological Guidelines; see Table 19 for specific unsatisfactory levels for each parameter.

The *Vibrio 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. All 3 samples tested for this parameter were satisfactory.

Coleslaw samples were again a prominent food type in 2010 with 11.9% of the total routine samples submitted. The proportion of coleslaw samples was lower than the 2009 level of16.0%. The proportion of coleslaw samples has ranged from 11.9% (2010) to 20% (2003) over the past 7

years. Table 20 shows some food types that are prominent in the database where the sampling reason was stated as "Routine".

Food Name	*Number*	*% of Total submitted*
Coleslaw	82	11.9
Egg mayonnaise salad	48	7.0
Cooked ham *	43	6.3
Tuna salad	35	5.1
Potato salad	13	1.9

* Excludes samples that had ham in combination with other ingredients

Table 20 Some prominent food types submitted as "Routine" samples.

National Surveys

There were 2 national survey topics for 2010 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 first survey was the bacteriological and chemical safety of RTE dried seeds and RTE nuts (10NS1). The survey ran from April to July, inclusive. The objective was to examine the microbiological safety of RTE dried seeds and nuts with respect to *Salmonella spp.* and *E. coli* in retail samples. For samples taken in establishments importing/wholesaling such foods chemical safety with respect to aflatoxin B1 and total aflatoxins was additionally examined and is described under mycotoxins above. Under 10NS1 173 samples were tested for the microbiological parameters in this laboratory. *Salmonella spp* was detected in one sample. *E. coli* was not detected at an unsatisfactory level in any of the samples tested. Table 21 outlines the criteria used to classify the results for 10NS1.

Micro-organism	*Satisfactory*	*Acceptable*	*Unsatisfactory*	*Unacceptable/potentially hazardous*
Salmonella spp.	Not detected in 25g	N/A	N/A	Detected in 25g
E. coli	<20 cfu/g	20 - <1.0E2 cfu/g	≥1.0E2 cfu/g	N/A

N/A = Not applicable "….E2" = "… x 10^{2}"

Table 21 Classification criteria for 10/NS1

Table 22 summarises the results for the unsatisfactory 10NS1 sample.

Food	*Analysis Reason*	*Unsatisfactory Result*	***Salmonella serotype***
Melon Seeds	10NS1	*Salmonella spp* detected in 25g	*Salmonella marseille*

Table 22 Unsatisfactory 10NS1 samples 2010

The second survey was aimed at examining bottled water, at manufacturing level and on retail sale in Ireland, for the presence of *E. coli*, Enterococci, coliforms and *Ps. aeruginosa*. The survey ran from September to December, inclusive. A total of 119 samples were examined and all were satisfactory for all parameters tested. Table 23 shows the criteria used for interpretation of 10NS2 results.

Micro-organism	*Satisfactory*	*Unsatisfactory*
E. coli	0/250ml	>0/250ml
Enterococci	0/250ml	>0/250ml
Coliforms	0/250ml	>0/250ml
Ps. aeruginosa	0/250ml	>0/250ml

Table 23 Classification criteria for 10/NS2

2010 was the first year in which the HSE performed additional National surveys which were not co-ordinated by the FSAI. These surveys were aimed at targeting specific sample types for specific criteria of concern.

The first National HSE microbiological food survey (10-HSE-1) ran from March to April 2010 with 85 manufacturing/locally produced foodstuffs being tested for a range of parameters including Aerobic colony count, *E. coli*, coagulase positive Staphylococci and Salmonella.

The second HSE survey (10-HSE-2) extended from May to June 2010 with 45 swab samples of food vacuum packing machines tested for *E. coli* and *Salmonella*. All were negative.

The topic of the third survey (10-HSE-3) was the enumeration of *Bacillus cereus* in cold or hot fried rice. The survey ran from July to September with 125 samples being examined. The results were interpreted using the criteria in Table 24. Three 10HSE3 samples were unsatisfactory for *B. cereus* with levels ranging from 140000cfu/g to 350000cfu/g for the 3 samples.

Micro-organism	*Satisfactory* ***cfu/g***	*Acceptable* ***cfu/g***	*Unsatisfactory* ***cfu/g***	*hazardous* ***cfu/g***
B. cereus	<1.0E3	1.0E3-<1.0E4	1.0E4-<1.0E5	≥1.0E5

Table 24 Classification criteria for survey 10HSE3

Table 25 shows summary data for unsatisfactory 10HSE3 samples. The parameter is "presumptive" because the official method of analysis used by the laboratory does not distinguish between *B. cereus* and a number of other species very similar to *B. cereus* but which are expected to be less frequently encountered. Further investigation of the isolates has shown that all the isolates reported by the laboratory as presumptive *B. cereus* were in fact *B. cereus*.

Food	*Analysis Reason*	*Pathogen*	*Unsatisfactory Pathogen Level cfu/g*
Egg-Fried Rice	10HSE3	Presumptive *Bacillus cereus*	1.4E5
Egg-Fried Rice	10HSE3	Presumptive *Bacillus cereus*	1.6E5
Egg-Fried Rice	10HSE3	Presumptive *Bacillus cereus*	3.5E5

Table 25 Unsatisfactory 10HSE3 samples

The fourth HSE survey (10-HSE-4) examined hot held foods for Aerobic colony count, Coagulase positive Staphylococci and Enterobacteriaceae. The sampling period for the survey was October to November, inclusive. 124 samples were examined and only one sample was found unsatisfactory. It failed for 2 of the 3 parameters tested. Table 26 shows summary details for this sample.

Food	*Analysis Reason*	*Micro-Organism*	*Result cfu/g*
Shepherd's Pie	10HSE4	Coagulase positive staphylococci	<20
		Enterobacteriaceae	1.7E4
		Aerobic colony count	3.0E6

Table 26 Unsatisfactory 10HSE4 sample

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 2010.

3.3 Food Complaint samples

A total of 208 consumer complaint samples were submitted by the EHS in 2010, comprising a variety of sample types and allegations including food poisoning, foreign bodies (such as insects, organic and inorganic matter), spoiled food, and complaints of a non-descript nature, for example, allegations that the food 'tasted funny'.

An additional 19 samples were received from private customers; the laboratory's private customer base comprises retail outlets, manufacturers, hospitals, hotels and the general public. The numbers of private complaint samples submitted to the laboratory has decreased steadily over the years.

As highlighted in previous Annual Reports, it should be borne in mind that the figure for unsatisfactory samples understates the real figure since, in many cases, the analyst cannot provide sufficient scientific proof and/or opinion to satisfactorily substantiate the alleged cause of a complaint.

We have previously remarked on a continuing trend of an increase in the number of complaints submitted from the public concerning the safety and quality of food purchased which more reflect the interest of the individual rather than the public interest. These may sometimes be accompanied by attempts by a complainant to restrict the laboratory in relation to sample handling and in particular how much sample is made available. Such restrictions are not acceptable if a genuine complaint is to fully investigated in the public interest. As has been previously stated, information provided with some complaints leads us to believe that the complaints are made with monetary gain as the primary motive and in other cases it is clearly stated that there is an intention to take private action if the outcome of our work supports the complaint. Regardless of the motivation for a complaint it is important that complaints that may be genuine and are potentially serious are investigated in the public interest. A complainant can purchase a laboratory report and unused

sample remnant can be collected after analysis is complete when appropriate arrangements are made.

Some complaints are fanciful or frivolous and perhaps reflect a perception that food quality, safety and production techniques are inherently of dubious standing. Some such 2010 examples comprise, mould on the surface of the contents of a bean can was alleged to be a tarantula; the decomposed tips of a lettuce leaf were stated to be 'worms'; 'my takeaway contains a greater than usual amount of chicken; 'the raw meat has not gone off in the normal way.' In our view many complaints submitted would have been more appropriately addressed directly to the vendor.

The investigation of food complaints in the public interest is a service provided free by the HSE through the EHS and the laboratories. It can be argued that it is less valued because it is free. It may be seen as a route to finding out the result of an analysis before committing a person's own money to legal action or even to simply satisfying one's curiosity. The introduction of charges for entering the process would encourage complainants to think a little more about where it is most appropriate to take a complaint and would help discourage frivolous complaints. Particularly in the current climate of stretched laboratory resources, it is important that laboratory resources are applied to problems that may impact on the safety of the public. It is important that all organisations with an interest in food safety work together to reduce the incidence of minor but resource consuming food complaints that reach the laboratory and ensure that more of our time can be applied to investigating those incidents that are potentially more serious.

The consumer needs to be reassured that the food industry in Ireland is a thriving, well-organised and diligently run industry. The vast majority of data which has been generated by the laboratory over the years supports this view. When we deal with food complaints, the focus shifts towards highlighting the problems that have arisen. This can present the food industry in a disproportionately poor light. Genuine complaints may be considered relatively few having regard to the size of the industry. Furthermore, in the majority of genuine complaints submitted to the laboratory, the offence is of a relatively minor nature. Of course there are rogue operators, as there are in any industry. Extensive legal restraints on such operations have been introduced, particularly at European level; the success of these laws is not in their writing *per se* but in how they are policed. Both the EHS and the laboratories work closely together to enforce such laws; to maintain the high standards both organisations set themselves, with dwindling resources, work of value should only be undertaken.

Regarding the samples submitted to the Laboratory in 2010, the following points are of note. Many of the substantiated complaints involved the presence of insects or larvae in food. Because of the enormous quantities of dried foods purchased by consumers or used as ingredients, it is inevitable that occasionally insects such as weevils or larvae such as moth larvae are found in such foods. Sometimes infestation may have arisen in the consumer's home but there are instances where the problem clearly stems from production or distribution. When it comes to moth larvae (frequently called "worms" by complainants) we have noticed that while it was once common to find larvae of the brown house moth as well as larvae of other species in complaint samples, now the most frequently encountered species is the larva of the Indian meal moth which is a cosmopolitan species established in Ireland. Generally, insects which do not have hygienic significance when found in food and particularly those that are known pests of particular products will be considered to be a

quality issue rather than a safety issue. Flies of hygienic significance such as house flies and blowflies are usually a safety issue.

Mould growth on foods is a common cause of complaints. It is generally a quality issue and can be expected to appear occasionally on some products such as bread, fruits, fruit products and cheese. Complaints of chemical taints in soft drinks frequently can be attributed to spoilage by moulds which have caused fermentation and produced acetate odours.

As in previous years, in 2010 none of the allegations concerning microbial food poisoning were substantiated. It is likely that where illness in a single individual has been due to food consumption the wrong food has been blamed. Of course, in many cases of gastrointestinal illness food is not the vector.

In 2010 no complaint samples were submitted for biogenic amine testing.

Tables 27 and 28 present the sample types obtained for microbiological and chemical analysis from the EHS and private customers respectively, plus the number of complaints received under each heading.

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 2010 233 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 (colours, preservatives, antioxidants)
- **ii)** metals
- **iii)** alcohol, methanol and congeners
- **iv)** sugars
- **v)** labelling analysis
- **vi)** microbiological testing.

Multiple copies of reports/certificates can be requested by customers, either at the time of analysis or subsequently.

3.5 Other / Miscellaneous food samples.

Microbiological examination was performed on 93 food samples from various organisations and private companies.

	Type	Total samples	Satisfactory	Unsatisfactory	Open	% Unsat
1	Dairy Products	18	4	8	6	44
2	Eggs and Egg Products	2	2	0	0	0
3	Meat, Game and Poultry	49	30	5	14	10
4	Fish, Shellfish and Molluscs	9	6	1	2	17
5	Fats and oils	0	0	0	0	0
6	Soups, Broths and Sauces	6	4	2	0	33
7	Cereals and Bakery Products	35	13	7	15	37
8	Fruits and Vegetables	14	3	9	2	64
9	Herbs and Spices	1	0	1	0	100
10	Non-alcoholic Beverages	21	4	5	12	19
11	Wine	0	0	0	0	0
12	Alcoholic Beverages (other than wine)	3	0	0	3	0
13	Ices and Desserts	0	0	0	0	0
14	Cocoa, Coffee, Tea	0	0	0	0	0
15	Confectionery	14	5	5	4	38
16	Nuts and Nut Products, Snacks	1	1	0	0	0
17	Prepared Dishes	28	12	8	8	29
18	Foodstuffs for Particular Nutritional Uses	2	1	0	1	50
19	Additives	0	0	0	0	0
20	Materials in contact with foodstuffs	0	0	0	0	0
21	Others	2	0	0	2	0
171	Foreign bodies, no food sample submitted	3	0	1	2	33
	Total:	**208**	**85**	**52**	**71**	**25**

Table 27 Complaint samples received from EHOs during 2010

Unsatisfactory: 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 nature, quality or substance demanded.

Open: No comment could be made on the basis of the sample provided and the information available.

	Type	Total samples	Satisfactory	Unsatisfactory	Open	% Uunsat
1	Dairy Products	0	0	0	0	0
2	Eggs and Egg Products	1	1	0	0	0
3	Meat, Game and Poultry	4	4	0	0	0
4	Fish, Shellfish and Molluscs	5	2	2	1	40
5	Fats and oils	0	0	0	0	0
6	Soups, Broths and Sauces	0	0	0	0	0
7	Cereals and Bakery Products	4	3	0	1	0
8	Fruits and Vegetables	1	0	0	1	0
9	Herbs and Spices	0	0	0	0	0
10	Non-alcoholic Beverages	0	0	0	0	0
11	Wine	0	0	0	0	0
12	Alcoholic Beverages (other than wine)	0	0	0	0	0
13	Ices and Desserts	0	0	0	0	0
14	Cocoa, Coffee, Tea	0	0	0	0	0
15	Confectionery	0	0	0	0	0
16	Nuts and Nut Products, Snacks	0	0	0	0	0
17	Prepared Dishes	1	0	0	1	0
18	Foodstuffs for Particular Nutritional Uses	0	0	0	0	0
19	Additives	0	0	0	0	0
20	Materials in contact with foodstuffs	0	0	0	0	0
21	Others	0	0	0	0	0
171	Foreign bodies, no food sample submitted	3	0	0	3	0
	Total:	**19**	**10**	**2**	**7**	**11**

Table 28 Complaint samples received from private clients during 2010

Unsatisfactory: 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 nature, quality or substance demanded.

Open: No comment could be made on the basis of the sample provided and the information available.

4. Water / effluent / swimming pool samples

In the year ended 31st December 2010, 8528 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 follows - Table 29.

Category	*Number of Samples*
Local Authorities & Health Boards – Chemical samples	3197
Local Authorities & Health Boards – Microbiological samples	3426
Local Authorities & Health Boards – Fluoride samples (See Note 1)	819
General Public, companies (Private) – Chemical samples	406
General Public, companies (Private) – Microbiological samples	680
Total :	**8528**

Note 1*: *Fluoride samples refers to samples requiring this test only. Fluoride analysis is also performed on other water samples, as shown in the Appendix 3 Fluoride tables.

Table 29 Water sample categories in 2010

Included in the 8528 samples were the sample/parameter types shown in Table 30.

Type / Parameters	*Number of Samples*
Trihalomethanes (THMs)	277
Swimming pool (including Spa pool)	230
Effluent - Biochemical Oxygen Demand & other parameters	15
Hospital Renal Dialysis unit samples	25
Bathing Waters – Quality of Bathing Water Regulations 1992 (S.I. No.155 of 1992)	113
Total :	**660**

Table 30

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 2010 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 2010, 1554 samples were analysed for nitrate. Of these, 15 had nitrate levels greater than the EU PV of 50mg/l NO_3 and represents 0.97% of the samples analysed. The highest concentration reported was 100.2mg/l.

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 31 gives the chloroform ranges for the 2010 samples.

Chloroform Range µg/l				
	< 50	**51 – 100**	**101 – 150**	**> 150**
No of samples	167	93	8	9

Table 31 Data for chloroform in 2010 samples

Of the 277 samples tested for THMs, 17 had a concentration of chloroform that exceeded the EU PV.

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 World Health Organisation (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 2010, 2503 waters were tested for aluminium. Of these 67 had aluminium levels greater than 200µg/l, representing 2.7% 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 950 tests performed for lead in water in 2010, 18 had lead levels above the EU PV limit of 25µg/l. This represents 1.9% 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 2010 are given in Appendix 3.

4.3 The Microbiological Examination of Drinking and Other Water, 2010

In the year ended 31st December 2010 the laboratory analysed 3995 microbiological water samples.

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

Water category	*Number of Samples*
Drinking Water	3375
All Bottled water	137
Ice	2
Endoscopy water	239
Bathing water (Marine)	5
Swimming / Spa pool	208
Environmental water	10
Unfinished water	9
Process water	4
Effluent	0
Horticultural water	3
(Tap swabs)	(3)
Total:	**3995**

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 both public and private supplies.

The basic standards governing the quality of drinking water intended for human consumption are set out in EU Directive 98/83/EC implemented by the European Communities (Drinking Water) (No. 2) Regulations 2007, S.I. No. 278 of 2007.

Drinking Water from the HSE / Local Authorities

The data below should not be used to assess compliance of Irish drinking water with EU law as our data is aggregated data which includes repeat and pre-treatment and private supply samples which would be expected to have a higher incidence of contamination.

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.

Parameter	*Limits set by S.I. 278 of 2007*	*% Conforming with S.I. 278 of 2007*	*Sample Numbers*
Safety Parameters			
Escherichia coli	0 cfu per 100ml	98.04%	2904
Enterococci	0 cfu per 100ml	97.25%	2730
Indicator Parameters			
Coliforms	0 cfu per 100ml	91.11%	2906
Clostridium perfringens	0 cfu per 100ml	98.45%	1740
T.V.C. at 22°C	No abnormal change	N/A	149

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 chlorine residues.

Enterococci are also indicators of faecal contamination. *Clostridium perfringens* is regarded as a secondary indicator 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. Thus *Clostridium perfringens* testing is useful in determining the effectiveness of the chlorination process. However, both *Clostridium perfringens* and Enterococci are 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 incidence of Coliforms, *E. coli*, Enterococci and *C. perfringens* found in private supply samples submitted.

Parameter	*Limits set by S.I. 278 of 2007*	*% Conforming with S.I. 278 of 2007*	*Sample Numbers*
Safety Parameters			
Escherichia coli	0 cfu per 100ml	89.13%	414
Enterococci	0 cfu per 100ml	87.94%	398
Indicator Parameters			
Coliforms	0 cfu per 100ml	69.43%	422
Clostridium perfringens	0 cfu per 100ml	41.94%	31

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 have a bacteriological test performed at least annually to ensure that hygienic quality is maintained. Over the last number of years there has been a reduction in the number of samples submitted by private well owners which may be due to the economic recession.

Bottled Water

There were 136 bottled water samples submitted for microbiological analysis, 119 of which were submitted as part of an FSAI Survey on the Microbiological Safety and Quality of Bottled Water, 10NS2. The aim of the survey was to examine bottled water, at manufacturing level and on retail sale in Ireland, for the presence of *E. coli*, Enterococci, coliforms and *Pseudomonas aeruginosa*. The National legislation governing bottled water is set out in S.I. No. 225 of 2007. Bottled waters include natural mineral waters, spring waters and other waters intended for human consumption supplied in bottles or containers other than waters that are medicinal products. All 119 samples

examined in this laboratory as part of the survey were found to be compliant with S.I. No. 225 of 2007.

Table 35 provides details of parameters examined and percent compliance. The Table also includes other bottled waters submitted in 2010, comprising 11 bottled waters for routine monitoring, 2 complaint samples, 1 control sample and 2 follow-up samples.

Microbiological Parameter	*Limits set by S.I. 225 of 2007*	*% Conforming with S.I. 225 of 2007*	*Sample Numbers*
Coliforms	0 in 250ml	100%	136
Escherichia coli	0 in 250ml	100%	136
Enterococci	0 in 250ml	100%	136
Pseudomonas aeruginosa	0 in 250ml	100%	136
Sulphite reducing clostridia (Natural mineral and spring water only)	0 in 50ml	100%	7

Table 35

Ice for cooling drinks

Two ice samples were submitted for microbiological analysis in 2010.

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. In 2007 a large number of ice samples were processed as part of FSAI surveys. Subsequent years' ice sample numbers have been substantially less. On the basis of so few ice samples we cannot determine whether or not there has been any significant change in the microbiological quality of ice samples since the survey.

Table 36 lists 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.

Microbiological Parameter	*Limits set by S.I. 278 of 2007*	*% Conforming with S.I. 225 of 2007*	*Sample Numbers*
Coliforms	0 in 100ml	100%	2
Escherichia coli	0 in 100ml	100%	2
Enterococci	0 in 100ml	100%	2
Clostridium perfringens (as requested)	0 in 100ml	N/A	0

Table 36

Natural Bathing Waters

Five Bathing Water samples were submitted. The Coliform, *E. coli,* Enterococci and *Salmonella* results obtained were compliant with Statutory Instrument, S.I. No. 155 of 1992, Quality of Bathing Waters Regulations, 1992. Table 37 has the details.

Microbiological Parameter	*Limits set by Regulation**	*No. of samples within specified limits*	*Percentage conforming with Regulation*
Coliforms	≤ 5,000 per 100ml**	5/5	100%
	≤ 10,000 per 100ml***	5/5	100%
Escherichia coli	≤ 1,000 per 100ml**	5/5	100%
	≤ 2,000 per 100ml***	5/5	100%
Enterococci	≤ 300 per 100ml***	5/5	100%
Salmonella	0 per litre***	4/4	100%

* Statutory Instrument, S.I. No. 155 of 1992, Quality of Bathing Water Regulations, 1992.
** To be conformed by 80% of samples.
*** To be conformed by 95% of samples.

Table 37

Swimming and Spa Pool Samples

There are currently no Statutory Irish microbiological 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), 'Swimming Pool Water, Treatment and Quality Standards', 2009 (a UK publication) as an example of good practice. This is an updated version of the previous guidelines issued in 1999 by the same organisation. The guide levels and criteria indicated in the new edition remain the same for swimming and spa pool waters. However the new guidelines specify that *Pseudomonas aeruginosa* should ideally be absent in spa pools so this is referred to in Table 38 below. 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.

Table 38 shows the percentage compliance of swimming and spa pool samples with this guide.

icrobiological Parameter	*Guide level**	*% Conforming Swimming/Spa Pool Samples*
Coliforms	0 cfu per 100ml	92.31%
Escherichia coli	0 cfu per 100ml	96.63%
Pseudomonas aeruginosa		
- swimming pools	≤ 10 cfu per 100ml	97.10%
- spa pools	≤ 10 cfu per 100ml	88.57%
- spa pools	0 cfu per 100ml (ideal)	78.6%
TVC at 37°C	≤ 10 cfu per ml	77.4%
Enterococci	N/A	95.67%
Total no. of samples		208

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

Table 38

Miscellaneous Samples.

In addition to the samples described microbiological testing was carried out on three tap swabs for presence/absence of coliforms and *E. coli*. The environmental waters and process waters listed in Table 32 were all submitted by private customers. Similarly the horticultural waters listed are submitted by private customers and analysed for compliance with the Bord Bia Horticulture Quality Assurance Scheme - Water Analysis Requirements 2009, as requested. 47 Samples were analysed as part of external proficiency testing schemes.

5. Biological samples

In 2010, 1075 samples of biological fluids were analysed for metals. The samples consisted of:

Blood: 189
Serum: 847
Urine: 39

The number of metal tests in the different sample types is given in Table 39.

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

A method for the determination of total mercury in whole blood by cold vapour- atomic absorption spectrophotometry was put forward for accreditation.

6. Miscellaneous samples

Various chemical or microbiological tests were performed on 154 non food/water samples.

Matrix	Aluminium	Arsenic	Cadmium	Calcium	Copper	Lead	Magnesium	Manganese	Mercury	Selenium	Thallium	Zinc
Blood		**3**	**7**			**165**		**3**	**11**			
Serum	**220**				**272**			**3**		**52**		**300**
Urine		**1**	**5**		**29**	**2**			**1**		**1**	
Totals	**220**	**4**	**12**		**301**	**167**		**6**	**12**	**52**	**1**	**300**

Total Number of Tests: 1075

Table 39 Metal Tests on Biological Samples

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 new 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 System

7.2.1 Management

7.2.1.1 Organisation

The operation of the Quality 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 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 system and International Standard ISO 17025.The internal audit programme addresses all elements of the quality system.

Three different types of audits are conducted. A horizontal audit is a detailed check of a quality 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 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 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 40.

External Quality Control for both accredited and non-accredited Test Methods

Laboratory Section	PT Scheme	Studies/Parameters	Distribution
		Chemistry	
Food Chemistry Including Method Research and Development	FAPAS	FC: 18 rnds* 14 para** TEL: 5 rnds, 5 para LCMS: 47 rnds, 79 ps GCMS: 16 rnds, at least 35 ps	April 2011 – March 2012
	Chek	FC: 1 rnd, 1 para LCMS: 4 rnds, 6 paras GCMS: 10 rnds, 2 paras	
	DAPs	1 parameter Alcohol By Volume	2 rounds (4 samples per year)

	Quasimeme	9 parameters	6 Monthly (2 Samples per distribution)
	JRC-IRMM (Geel and Ispra)	To be decided	
Water chemistry	Aquacheck Ltd	Groups 1 – 5 33 parameters per Distribution	5 Distributions 2011/12 : 405, 409, 413, 417, 421
	EPA	Groups 1 - 4 26 parameters per Distribution	5 Distributions for 2011 : 90 – 94 incl.
Clinical Chemistry	TEQAS	Group 1 of 12 parameters	Monthly – 3 samples per month
		Group 2 of 12 parameters	3 Monthly – 3 samples per distribution
	IMEP	5 parameters	2
	National Reference Laboratory in Chemical Metrology - Greece	2 parameters	1
Food Microbiology	HPA Standard Scheme	For Food Microbiology Examinations (Total 11 parameters)	6 per year
	HPA Pathogenic Vibrio Scheme	*Vibrio parahaemolyticus* (1 parameter)	2 per year
	Don Whitley Quality Counts Scheme	Spiral Plater counts	12 per year
Water Microbiology	HPA EQA Drinking Water Scheme	Coliforms by MF Colilert MPN *E.coli* by MF *E.coli* by Colilert MPN Enterococci *C. perfringens* *Ps. aeruginosa* ACC at 37°C ACC at 22°C (Total: 10 parameters)	6 distributions per year
	Health Protection Agency (HPA) Surface Water EQA Scheme	Coliforms by MPN *E.coli* by MPN *Ps. aeruginosa* ACC at 37°C *Salmonella* species (Total: 5 parameters)	3 per year
	LGC Quality in Water Analysis (QWAS) Scheme – Simulated effluent sludge, surface/waste/bathing	*Salmonella* species by VIDAS Detection of *Salmonella* spp. (2 parameters)	4 per year

	water HPA Food EQA Standard Scheme (Flexible)	*Campylobacter* in water (1 parameter)	2 per year

* rnds = Rounds. ** para = Parameters.

Table 40 Proficiency Testing Programmes

Extension to the schedule of accreditation, assessed by INAB March 2011

Test Methods
New methods

SOP PALM 0079# - Enumeration of microorganisms using TEMPO (TVC) Test
SOP PALC 0094# - The determination of the specific migration of melamine from kitchenware by UPLC-electrospray ionisation-tandem MS/MS
SOP PALC 113# - The determination of the diastase activity of honey with Phadebas® by UV/Vis spectrophotometry
SOP PALC 114# - The determination of the electrical conductivity of honey
SOP PALC 115# - The determination of the pH and free acidity of honey by titration to pH 8.30
SOP PALC 117# - The determination of the specific migration of formaldehyde from Kitchenware by UV/Vis spectrophotometry
SOP PALC 118# - The determination of insoluble matter in honey
SOP PALC 108# - Determination of arsenic species – Arsenobetaine (AsB), Dimethylarsonic acid (DMA), Monomethylarsinic acid (MMA) & Inorganic Arsenic (As+3 & As+5) in Fish by HPLC –ICPMS
SOP PALC 85# - The determination of total mercury in whole blood by Cold Vapour Atomic Absorption Spectrophotometry
SOP PALCW 0019# - The measurement of conductivity of waters for potable and domestic purposes
SOP PALCW 0021# - The determination of analytes in water samples by photometric analysis
SOP PALCS 0022# - The measurement of pH of waters for potable and domestic purposes

Extensions to Currently Accredited Methods
SOP PALC 0031 - Determination of aflatoxins in Food by Immunoaffinity Column Extraction, and High Performance Liquid Chromatography
1 Aflatoxin B1 in baby food
2 Addition of the matrix; seeds
3 Addition of the Photo Chemical reactor option into the SOP
SOP PALC 0018 - Determination of ochratoxin A in foodstuffs by HPLC and fluorescence detection
Addition of new matrices

SOP PALC 0022 - Determination of zearalenone in cereals and baby food by HPLC and fluorescence detection
Addition of new matrix

Table 41 Extension to Scope of Accreditation

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 41 shows the extension to the schedule of accreditation which was assessed by the Irish National Accreditation Board in March 2011.

Full details of the scope of accreditation are available at
http://www.inab.ie/directoryofaccreditedbodies/laboratoryaccreditationtesting/099T.pdf

8. Training

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

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

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

8.1 In house Training

Technical

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

8.2 External Training

A review of the training requirements is conducted by the Training Officer annually and a wide range of technical training courses are attended by members of staff each year.

During 2010 staff members attended a diverse variety of training courses and participated in programmes of further education as detailed in Table 42.

Course/Seminar title	*Organiser*
Skills Development / Technical Training	
Masterclass UHPLC '10	Agilent Technologies Ltd.
JRC Workshop on pyrrolizidine alkaloids in food and feed	DG SANCO
5th Workshop for Mycotoxins	JRC-IRMM
Meeting of the Working Group EURL/NRLs for Food Contact Materials	JRC-Ispra
Mathematical Modelling for the Prediction of Migration from Food Contact Materials	JRC-Ispra
Xevo G2 QToF Chemical Analysis Red Carpet Day	Waters (UK) Ltd.
Irish Mass Spectrometry Society Meeting	IMSS
Irish Mass Spectrometry Society Meeting Short Course– 'Method Development in Mass Spectrometry'	IMSS
Charm ROSA Mycotoxin Testing Kit	ISIS Ltd., Bray Co. Wicklow
Update on Mycotoxins	R-Biopharm Rhône Ltd.
High Performance Computing at the Chemistry/Biochemistry Interface	The Institute of Chemistry of Ireland
Meeting of the Working Group EURL/NRLs for Food Contact Materials	JRC-Ispra
Waters Xevo G2 QToF Mass Spectrometer Initial Familiarisation Training	Waters Chromatography Ireland Ltd.
Waters Xevo G2 QToF Mass Spectrometer Basic Initial Familiarisation Training	Waters Chromatography Ireland Ltd.
Waters Xevo G2 QToF Small Molecule Post Installation Visit	Waters Corporation, Manchester, U.K.
Solving Product Contamination Issues	RSSL
Open Access Publishing Event	HSE
FLEP Forum November '10	FLEP
Waters Xevo G2 QTof, Posi±ive Software and ASAP Probe operation	Waters, Sweden AB
Meeting of the Working Group EURL/NRLs for Food Contact Materials	JRC-Ispra
Accelerated solvent Extraction	In house
Nutrition & Health Claims & Food Supplement Training.	Food Safety Authority of Ireland
"Training on Legislation Applicable to Natural Mineral Waters, Spring Waters & Other Waters"	Food Safety Authority of Ireland
Food additive use and control	Food Safety Authority of Ireland
Seminar on food contact materials use and control	Food Safety Authority of Ireland
Allergen Labelling Programme WG	Food Safety Authority of Ireland
Supervisory Issues Meeting	Food Safety Authority of Ireland
Additives Working Group	Food Safety Authority of Ireland
Nutrition and Health Claims and Food Supplements Training - EHS and PAL	Food Safety Authority of Ireland
Fad or Future: Nanotechnology and Food Seminar	Food Safety Authority of

	Ireland
GC-ICP-MS	PerkinElmer
Method Validation: Principles & Practice	Laboratory of the Government Chemist (UK)
The Allergy Fair	RDS/Irish Times
Waters HPLC Troubleshooting & Maintenance Course	Waters
Waters PDA Detector and Empower Course	Waters
GC and GCMS Euro Tour	Agilent
Training on the requirements of:	NSAI/FSAI
Directive 2009/54/EC on the exploitation and marketing of Natural Mineral Water	
Rapid pathogen Food testing	ISIS/Bio-Rad
Seminar	Oxoid/LIP/Fannin
Induction Training	
General Induction Training	In-house
Student Induction Training	In-house
Update on Mycotoxins	R-Biopharm Rhone
Initial Induction by RH	In-house 6 courses
Accreditation/Auditor Training	
Health Safety and Welfare	
Manual Handling Training	Usafety (HSE)
Risk Assessment Training	In-house
Radiological Protection Course	Radiation Safety Ireland

Table 42 Training Courses/Seminars in 2010

9. External meetings

During 2010 laboratory staff participated in numerous committee meetings. These included:

- **i)** Food Safety Authority of Ireland (FSAI) meetings with the Public Analysts
- **ii)** FSAI meetings with the OFMLs
- **iii)** FSAI/OFML/EHS meetings
- **iv)** FSAI Legislation Committee meetings
- **v)** FSAI Working Groups
- **vi)** FSAI Import Control Group
- **vii)** FSAI-Health Service Executive Contract meetings
- **viii)** Regional Food Sampling meetings
- **ix)** Regional Zoonosis meetings
- **x)** National Fluoridation Steering Group meetings
- **xi)** Laboratory Information Management System meetings

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

A risk assessment of the laboratory has been performed by the HSWO in order to identify any hazards.

In performing the risk assessment, hazards were listed according to one of the following five categories of hazard type: Physical, Biological, Chemical, Ergonomic and Psychological.

Following the calculation of the risk, the possible elimination of the risk was investigated. Where this was not possible, an appropriate control measure was indicated. The control measures in order of precedence are: Elimination, Substitution, Housekeeping, Isolation, Environmental Control, Ventilation, Safety Awareness, Training and Supervision, Personal Protective Equipment.

10.2 Safety Statement

The results of the risk assessment were employed in the preparation of the Safety Statement for the laboratory. The Safety Statement is a written programme detailing the plans to be implemented to ensure the safety health and welfare of employees while at work. It represents a total commitment to their protection in this regard.

The aim is to more fully integrate both the operation and documentation of the Health, Safety and Welfare system with the laboratory Quality System.

10.3 Training

Risk Assessment Training was provided for staff in November and December 2010.

The purpose of the Risk Assessment Workshop was as follows;

- **i)** to provide a practical understanding of the hazard identification and risk assessment process
- **ii)** to clarify terms used in the process
- **iii)** to introduce participants to the risk matrix system
- **iv)** to enable participants to undertake a structured approach to risk assessment in the area in which they work.

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 43.

Waste – 2010	*Cost for Disposal €*
Solvent Waste	12076
Clinical Waste including Contaminated Glass	36765 (estimate)
Mercury Waste	694
Paper waste	549
Cardboard	300
Glass waste	180
Obsolete Equipment	445
General Waste - Skip hire	188
Total	51197

Table 43 Waste Management Programme

11. Laboratory Staff as of 31st December 2010

Public Analyst	Dr Michael O'Sullivan
Deputy Public Analysts	Mr Vincent Young (Microbiology) Ms Rosemary Hayden. Quality Manager.
Executive Analytical Chemists	Dr Terence McEvoy Mr John Walshe (Microbiology). Retired 27/01/11. Post vacant. 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 Karen Moore (A) Ms Bernadette Bradley (Microbiology) (A)
Chief Laboratory Technician	Vacant

Senior Laboratory Technicians	Ms Margaret Murphy
	Ms Alison Brazil
	Mr Kevin Smith (Microbiology)
	Ms Annette D'Arcy
	Mr Barry Hurley
	Ms Orna McDaniel (Microbiology) (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 Elaine Eustace (Microbiology)
	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
	Ms Sarah O'Reilly
Laboratory Assistant	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.

SOP PALA 0018
SAMPLE REPORTING ACCORDING TO TIMEFRAMES AND DEADLINES POLICY

1 Principle

This SOP details the protocol to be adopted by members of staff for the reporting of samples.

2 Responsibility

It is the responsibility of all members of staff that samples are managed according to this SOP.

3 Procedure

3.1 Analyse samples and issue analytical reports to customers as soon as possible after sample receipt.

3.2 Apply maximum deadlines as detailed in Table 1 below.

Note: Two weeks for the Christmas period and one week for the Easter period can be added.

3.3 In order to facilitate this, at least two analysts should be trained in the analysis of each high priority parameter (with competency maintained). Ideally this competency should be available in the Section where analysis is normally performed as the analysts will be familiar with the working environment and in working with the other team members.

3.4 If the deadlines at Table 1 are not achieved, inform the EHO or other customer, in writing, of the reasons for the overrun and the expected date for issue of report. Issue the memo as early as possible in the sample cycle. Notification at time of receipt, or before, in writing will fulfil this.

3.5 Issue a preliminary report incorporating the above memo information as appropriate.

3.6 Agree any sample reporting timeframes outside of the above in writing with the customer. This may apply to customer led timeframes, such as pertaining to FSAI-provided survey samples.

3.7 For follow-up/repeat samples it was agreed that SOP PALA 0019 Analysis according to Public Health Risk-based Prioritisation will govern the timeframe given for reporting: 4 weeks deadline for contaminants; 6 weeks for other sample types.

Sample Category	Reference Type	New Timeframe. From date of receipt, except for FLCs. Applicable from 15th August 2007
Foods:		
Chemical Food Programme, incorporating prioritisation of parameters	FLC NLC	1 month from end of sampling period. If samples accepted by agreement beyond sampling period, timeframe applies from receipt date.
Repeat Chemical Food Sampling Programme Samples	FLC NLC	4 weeks for contaminants 6 weeks for other sample types
Microbiological: Food Programme. Swabs. Other non-food and non-water.	FLM NLM NPC NPM	4 weeks
Food Complaints	CLF/CPF/ CLN/CPN	3 weeks
Food Export Certification	FPC/FPM	3 weeks
Import Control Samples	FLC/NLC	15 working days from date of sampling
Waters:	W Categories	4 Weeks for final, combined Chemical /Microbiological reports. 10 Days for Fluoride only waters. 3 Weeks for Microbiological Water 6 weeks for in-house Laboratory Effluent Sample.
Clinical Samples:	HS	4 weeks

Table 1

Appendix 2. Management Report for Monitoring Service delivery to Customers (compiled from the LIMS).

Date of this Report 16/12/10 **Time** 09:35:47

Samples received since 1st January 2010 - ***Excludes PT samples***

2010	Num Rec'd	Num Cancelled	Num Reported	num NotRptd	*Number of outstanding samples....* ≤ 10 days	11-20 days	21-30 days	Unreported Samples within deadline	Unreported Samples exceeding deadline	Memos
Food Chemistry Section										
FLC	672	4	623	45	37	0	0	37	8	8
FPC	87	8	70	9	9	0	0	9	0	0
FLM	2	2	0	0	0	0	0	0	0	0
CLF	36	0	36	0	0	0	0	0	0	0
CLN	1	0	1	0	0	0	0	0	0	0
CPN	1	0	1	0	0	0	0	0	0	0
Group total	*799*	*14*	*731*	*54*	*46*	*0*	*0*	46	8	*8*
GC-MS Section										
FLC	330	6	283	41	0	0	6	41	0	0
FPC	99	0	99	0	0	0	0	0	0	0
CLF	16	0	14	2	0	0	0	0	2	2
WLC	5	0	5	0	0	0	0	0	0	0
WPC	1	0	1	0	0	0	0	0	0	0
Group total	*451*	*6*	*402*	*43*	*0*	*0*	6	41	2	*2*
Trace Element Laboratory										
FLC	355	2	353	0	0	0	0	0	0	
FPC	40	0	40	0	0	0	0	0	0	
CLF	2	0	2	0	0	0	0	0	0	
CPN	2	0	2	0	0	0	0	0	0	
NLC	23	0	23	0	0	0	0	0	0	
HS	1120	1	1070	49	28	19	2	49	0	
Group total	*1542*	*3*	*1490*	*49*	*28*	*19*	2	49	0	
LC-MS Section										
FLC	685	2	652	31	1	0	24	31	0	
FPC	9	0	9	0	0	0	0	0	0	
CLF	2	0	2	0	0	0	0	0	0	
NLC	75	0	75	0	0	0	0	0	0	
NPC	1	0	0	1	0	0	0	1	0	

Page 1

2010	Num Rec'd	Num Cancelled	Num Reported	num NotRptd	*Number of outstanding samples....* ≤ 10 days	11-20 days	21-30 days	Unreported Samples within deadline	Unreported Samples exceeding deadline	Memos
Group total	***772***	*2*	***738***	***32***	***1***	***0***	***24***	32	0	
Chemistry Water										
CLF	2	0	2	0	0	0	0	0	0	0
WL	2438	4	2253	181	101	7	71	141	39	14
WP	273	0	256	17	5	2	9	11	6	0
WLC	757	2	734	21	13	1	5	15	6	1
WPC	133	6	123	4	3	0	1	3	1	0
WLF	799	0	798	1	1	0	0	1	0	0
Group total	***4402***	*12*	***4166***	***224***	***123***	***10***	***86***	171	52	15
Default Group										
FPC	1	0	1	0	0	0	0	0	0	
NLC	4	1	3	0	0	0	0	0	0	
Group total	***5***	*1*	***4***	***0***	***0***	***0***	***0***	0	0	
Microbiology										
FLC	2	0	2	0	0	0	0	0	0	
FPC	10	0	10	0	0	0	0	0	0	
FLM	1472	72	1390	10	6	4	0	10	0	
FPM	70	6	62	2	2	0	0	2	0	
CLF	147	1	146	0	0	0	0	0	0	
CPF	24	8	16	0	0	0	0	0	0	
CLN	1	0	1	0	0	0	0	0	0	
NLM	74	21	53	0	0	0	0	0	0	
WL	2442	9	2344	89	89	0	0	88	0	
WP	275	3	268	5	5	0	0	5	0	
WLM	984	119	844	21	17	4	0	21	0	
WPM	405	4	385	16	16	0	0	16	0	
Group total	***5788***	*243*	***5521***	***143***	***135***	***8***	***0***	142	0	

Appendix 3

FLUORIDATION OF WATER SUPPLIES

Tables

FLUORIDATION OF WATER SUPPLIES
Levels of Fluoride in Drinking Waters Tested in 2010.
DUBLIN CITY AND COUNTY

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2010
MILLIGRAMS PER LITRE (PARTS PER MILLION) OF FLUORIDE

WATER SCHEME	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
VARTRY	0.61	0.65	0.64	0.64	0.65	0.73	0.68	0.67	0.64	0.64	0.66	0.6
DODDER	0.64	0.54	0.51 & 0.63	0.65	0.71	<0.05	No Sample Submitted	0.63	0.65	No Sample Submitted	0.60	0.6
LIFFEY - Poulaphouca	0.71	0.61	0.66	0.65	0.68	0.62	0.68	0.69	0.66	No Sample Submitted	No Sample Submitted	0.7
LIFFEY - Leixlip	0.62	0.59	0.60	0.63	0.64	0.62	0.60	0.62	0.59 & 0.63	0.60	0.63	0.6
BALLYEDMONDUFF	0.70	0.71	0.66	0.74	0.64	0.74	0.69	0.72	0.73	0.68	0.64	0.7
GLENCULLEN	0.73	0.73	0.65	0.70	0.71	0.68	0.77	0.69	0.68	0.71	0.66	0.3
KILTERNAN	0.69	0.75	0.68	0.74	0.69	0.69	0.71	0.67	0.71	0.65	0.65	0.6
BOG OF THE RING	0.56	0.56	0.64	0.62	0.62	0.61	No Sample Submitted	0.61	0.63	0.59	0.62	0.6

FLUORIDATION OF WATER SUPPLIES
Levels of Fluoride in Drinking Waters Tested in 2010.
WICKLOW

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2010
MILLIGRAMS PER LITRE (PARTS PER MILLION) OF FLUORIDE

WATER SCHEME	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
BLESSINGTON	No Sample Submitted	<0.05	<0.05	<0.05	<0.05	0.64	0.61	0.68	0.62	No Sample Submitted	0.57	0.7
LARAGH/ ANNAMOE	No Sample Submitted	0.73	0.69	0.75	0.70	0.74	0.73	0.72	0.71	No Sample Submitted	0.75	0.7
WICKLOW	0.71	0.85	0.69	0.70	0.73	0.68	0.70	0.71	0.63	0.54	0.52	0.7
ARKLOW	0.48	0.78	0.89	0.89	0.89	0.68	0.77	0.67	0.70	0.61	0.70	0.60
TINAHELY	0.72	No Sample Submitted	0.85	0.70	0.75	0.78	0.75	0.76	0.73	0.79	0.83	No Sample Submitted

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 2010.
KILDARE

RESULTS OF MONTHLY TESTS FOR YEAR ENDING 31st DECEMBER 2010
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	0.62	0.61	0.61	0.63	0.59	0.65	No Sample Submitted	0.60	0.60	0.57	0.62	0.6
LEIXLIP	0.59	0.62	0.60	0.63	0.60	0.62	0.60	0.61	0.56	0.61	0.61	0.6
KILCOCK	No Sample Submitted	0.64	0.64	0.63	0.68	0.68	No Sample Submitted	0.69	0.68	0.62	0.62	No Sample Submitted
CELBRIDGE NTH	0.62	0.59	0.60	0.64	0.58	0.61	0.60	0.62	0.55	0.55	0.61	0.6

POULAPHOUCA REGIONAL SCHEME

LOCATION	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT.	OCT	NOV	DEC
NAAS	0.70	0.65	0.64	0.65	0.70	0.60	0.64	0.81	0.66	0.67	0.62	0.8
KILDARE TOWN	No Sample Submitted	0.69	0.64	0.61	0.68	0.63	0.65	0.63	No Sample Submitted	0.69	0.57	0.7
NEWBRIDGE	0.69	0.69	0.65	0.61	0.64	0.62	0.62	0.66	0.66	0.70	0.65	No Sample Submitted

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 2010

County Supply	Total No. of Samples	% Complying with the Regulations	Following Ranges (mg/l or ppm)		
			<0.6	0.6-0.8	>0.8
Dublin City & County	423	81.3	78	344	1
Wicklow	153	68.0	42	104	7
Kildare	383	81.2	65	311	7
Meath	402	64.7	117	260	25
Louth	78	70.5	20	55	3
Monaghan	55	83.6	5	46	4
Cavan	74	75.7	16	56	2
Offaly	194	58.8	63	114	17
Westmeath	100	61.0	26	61	13
Longford	86	74.4	13	64	9
Laois	106	61.3	40	65	1
Totals	**2054**	**Average 72.1%**	**485**	**1480**	**89**

Note : Some the '<0.6mg/l' results may include Background Fluoride result requests.