Environmental Protection Agency

Dioxin Levels in the Irish Environment: Fourth Assessment (Summer 2006)

Based on levels in Cows' Milk

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Environmental Protection Agency

The Environmental Protection Agency (EPA) is a statutory body responsible for protecting the environment in Ireland. We regulate and police activities that might otherwise cause pollution. We ensure there is solid information on environmental trends so that necessary actions are taken. Our priorities are protecting the Irish environment and ensuring that development is sustainable.

The EPA is an independent public body established in July 1993 under the Environmental Protection Agency Act, 1992. Its sponsor in Government is the Department of the Environment, Heritage and Local Government.

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- waste facilities (e.g., landfills, incinerators, waste transfer stations);
- large scale industrial activities (e.g., pharmaceutical manufacturing, cement manufacturing, power plants);
- intensive agriculture;
- the contained use and controlled release of Genetically Modified Organisms (GMOs);
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ENVIRONMENTAL PLANNING, EDUCATION AND GUIDANCE

- Providing guidance to the public and to industry on various environmental topics (including licence applications, waste prevention and environmental regulations).
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- Promoting waste prevention and minimisation projects through the co-ordination of the National Waste Prevention Programme, including input into the implementation of Producer Responsibility Initiatives.
- Enforcing Regulations such as Waste Electrical and Electronic Equipment (WEEE) and Restriction of Hazardous Substances (RoHS) and substances that deplete the ozone layer.
- Developing a National Hazardous Waste Management Plan to prevent and manage hazardous waste.

MANAGEMENT AND STRUCTURE OF THE EPA

The organisation is managed by a full time Board, consisting of a Director General and four Directors.

The work of the EPA is carried out across four offices:

- Office of Climate, Licensing and Resource Use
- Office of Environmental Enforcement
- Office of Environmental Assessment
- Office of Communications and Corporate Services

The EPA is assisted by an Advisory Committee of twelve members who meet several times a year to discuss issues of concern and offer advice to the Board.

Dioxin Levels in the Irish Environment

Fourth Assessment
(Summer 2006)

Based on Levels in Cows' Milk

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January 2008

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EXECUTIVE SUMMARY

Background

In line with the Environmental Protection Agency's intention to maintain surveillance of dioxins, furans and other micro pollutants, the Agency carried out in Summer 2006 a follow-up survey to the 1995, 2000 and 2004 dioxin in cows' milk surveys (EPA 1996, EPA 2001, EPA 2005).

"Dioxins" is a collective term for the category of 75 polychlorinated dibenzo-para-dioxin compounds (PCDDs) and 135 polychlorinated dibenzofuran compounds (PCDFs). Seventeen PCDD and PCDF compounds are likely to be of toxicological significance.[1] The most toxic of these is 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD). The toxic responses include dermal effects, immunotoxicity and carcinogenicity, as well as reproductive and developmental toxicity. These compounds, or congeners, arise mainly as unintentional by-products of incomplete or poorly controlled combustion and from certain chemical processes.

Given that the primary mechanism for dioxins entering the food chain is through atmospheric deposition, cows' milk is considered to be a particularly suitable matrix for assessing their presence in the environment, since cows tend to graze over relatively large areas and these compounds will, if present, concentrate in the fat content of the milk.

In accordance with current practice, testing for dioxin-like polychlorinated biphenyls (PCBs) was included for each sample.

In view of increased international awareness of the issue of the presence in the environment of brominated flame retardants (BFRs) and brominated dioxins, it was decided to take the opportunity to take some samples for these substances at the same time as the dioxin survey. Five samples, representative of different regions, were analysed. Each sample consisted of three pooled samples from the dioxin survey.

Sources of Dioxins

Although PCDDs and PCDFs are not produced intentionally except for research and analysis purposes, their formation is often a by-product of many anthropogenic and natural activities. Some significant sources internationally are:

- Accidental fires
- Backyard burning of household waste and bonfires
- Cement kilns (especially where hazardous waste is co-incinerated)
- Chlorine bleaching of wood pulp
- Coal fired power plants
- Copper production
- Forest fires and other natural fires
- Incineration of medical waste
- Incineration of municipal or hazardous waste
- Production of steel
- Residential combustion (especially where treated wood is used)
- Sinter plants
- Traffic

Brominated dioxins (PBDDs and PBDFs) are also formed unintentionally, mainly through incineration of wastes or accidental fires that include consumer products containing brominated flame retardants (BFRs).

[1] Those 17 compounds with chlorine atoms at the 2,3,7 and 8 positions

Sampling and Results

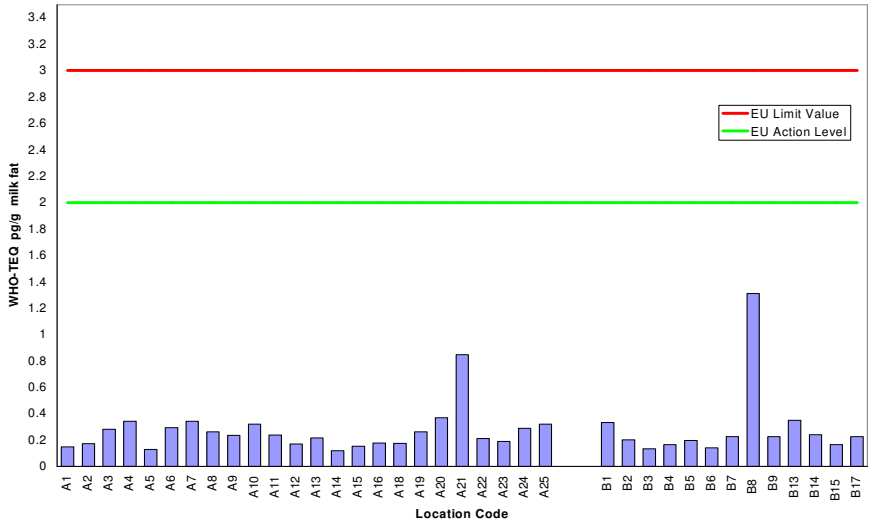
Two types of sampling stations were chosen:

Type A	background stations covering the entire country (24 samples)
Type B	potential impact stations in areas of perceived potential risk (13 samples)

The reported ranges for dioxins in milk fat (37 samples) were 0.118 to 1.31 pg WHO-TEQ/g with a mean of 0.275 WHO-TEQ/g. When PCBs were included, the ranges were 0.241 to 1.83 pg WHO-TEQ and a mean of 0.470 pg WHO-TEQ/g.

These levels are well below the EU limit in milk and milk products of 3.0 pg WHO-TEQ/g for dioxins only, and 6.0 pg WHO-TEQ/g for dioxins and PCBs combined (Figure 1).

Figure 1 Dioxins/Furans
2006 Data.



All levels recorded in this survey compare favourably with those taken from a random selection of similar studies in other EU countries. However for parts of the greater Dublin area, the levels found were somewhat in excess of those found in the 2004 survey. It is probable that these increases are due to sources associated with increased population, such as higher levels of road traffic and increased fuel burning generally. It is also possible that illegal burning of waste may play a role.

There is also little doubt that the trend of reductions observed in the earlier surveys could be attributed to a number of regulatory measures and various technological advances, reflecting the pattern shown in similar surveys across Europe. Examples of measures that were taken in Ireland and which may have had an impact on dioxin levels were the virtual abolition of leaded petrol and the shutting down of all hospital incinerators as they were found to be inadequate and could not meet the high standards required by the EPA under IPC licensing. The shutting down of the iron smelting facility in Cork will also have had an effect. These patterns of continuing reduction could not be expected to continue indefinitely and at some point they could be expected to level off.

Preliminary results from the 2007 survey indicate that the highest values found in 2006 have not been repeated and the 2007 results are more in line with earlier surveys. Further analysis of these data is being currently undertaken and a separate report will be issued in the coming months.

In the case of PCBs, the 2006 mean value of 0.196 pg WHO-TEQ/g differed little from the 2004 mean of 0.187 pg WHO-TEQ/kg.

BFRs and brominated dioxins (PBDD/PBDF) were measured for the first time as part of the main survey. A broad range of the common BFRs was tested but only Polybrominated Diphenyl Ethers (PBDEs) were found. The range for PBDEs (5 samples) was 150 to 265 ng/kg fat with a mean of 200 ng/kg fat. PBDD/PBDF levels were in the range of 0.152 to 1.67 pg WHO-TEQ/g fat, with an overall mean of 0.549 pg WHO-TEQ/g.

1. INTRODUCTION

Background

"Dioxins" is a collective term for the category of 75 polychlorinated dibenzo-para-dioxin compounds (PCDDs) and 135 polychlorinated dibenzofuran compounds (PCDFs). These compounds or congeners arise mainly as unintentional by-products of incomplete or poorly controlled combustion and from certain chemical processes.

In line with the Environmental Protection Agency's intention to maintain surveillance of dioxins, furans (collectively known as PCDD/F) and other micro pollutants, the Agency carried out a follow-up survey to the 1995, 2000 and 2004 dioxin cows' milk surveys (EPA 1996, EPA 2001, EPA 2005) in Summer 2006. 37 samples were taken and, with a few exceptions, the sample locations were nominally the same as for the 2000 and 2004 surveys. However, in some instances, because of the recent rationalisation of the dairy industry, it was not always possible to sample in exactly the same location as previously, so that direct comparison of individual sampling points should be made with caution. As in 2000 and 2004, testing for dioxin-like PCBs was also included in this programme.

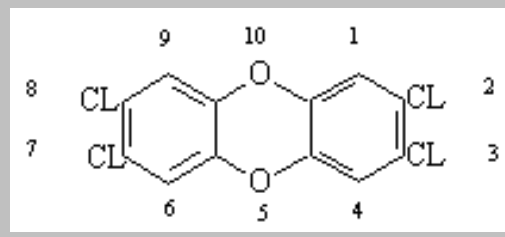
It is generally accepted that the principal mechanism of environmental release of dioxins in this country is by low level emission from multiple sources to the atmosphere. Due to their physical and chemical properties, dioxins tend to be adsorbed onto dust and soot particles. These in turn are deposited by atmospheric sedimentation on soil and vegetation such as grass, which is directly ingested by grazing cows. Due to their lipophilic and persistent properties, PCDD/F are transferred into the milk fat of the lactating cow. Therefore, milk constitutes an efficient and rapid elimination pathway of these contaminants. If milk production is exclusively based on grazing, the resulting PCDD/F levels in cows' milk reflect the atmospheric PCDD/F deposition on the pasture. Dioxin levels in milk samples taken during the grazing season can therefore be used as indicators for the actual average local dioxin exposure by atmospheric deposition.

In view of increased international awareness of the issue of the presence in the environment of brominated flame retardants (BFRs) and brominated dioxins and furans (PBDD/F), it was decided to take the opportunity to sample for these substances at the same time as the dioxin survey. Five samples, representative of different regions, were analysed. Each sample consisted of three pooled sub-samples from the dioxin survey.

Samples were taken in June and July 2006 when the cows could be expected to be grazing outdoors. Details are given in Tables 1 and 2.

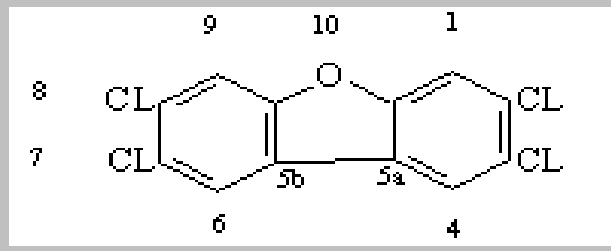
Toxicity of Dioxins

The toxicity of individual dioxin and dibenzofuran compounds (or congeners) varies considerably. PCDDs have two benzene rings connected by two oxygen atoms; in the PCDFs the two rings are connected by one oxygen atom. The PCDD and PCDF congeners which are likely to be of toxicological significance are those 17 congeners with chlorine atoms at the 2,3,7 and 8 positions. The most toxic dioxin is 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD).



2,3,7,8-TCDD

The most toxic dibenzofuran is 2,3,7,8-tetrachloro-dibenzofuran (2,3,7,8-TCDF) which is similar in toxicity to 2,3,7,8-TCDD.



2,3,7,8-TCDF

The toxic responses include dermal effects, immunotoxicity and carcinogenicity, as well as reproductive and developmental toxicity.

Mechanism of Toxicological Action

A broad variety of data, primarily on TCDD but also on other members of the class of dioxin-like compounds, has shown the importance of the Aryl hydrocarbon Ah (dioxin) receptor in mediating the biological effects of dioxin. These data have been collected using many experimental models in multiple species and also from studies on human exposure.

Sources of Dioxins

PCDDs and PCDFs are not produced intentionally except for research and analysis purposes, but their formation is often a by-product of many anthropogenic activities. The manufacture of some chlorinated compounds is known to result in the formation of PCDDs and PCDFs as unwanted by-products. However the manufacture and usage of many such substances, mainly chlorinated pesticides with significant dioxin contamination, is now banned. Internationally the main sources of dioxins in recent years have been identified as a wide range of combustion processes where they may be formed when organic materials and chlorine compounds are burned together. Such sources can include incineration of all types of wastes, metallurgical operations such as smelting and scrap metal recovery furnaces and the burning of fuels such as coal, wood (especially where the wood contains preservatives) and petroleum products. Other sources are motor vehicle emissions especially heavy diesel trucks (U.S. EPA 2006) and emissions from both accidental and natural fires and volcanoes. Emissions from leaded fuels, which were significant in the past, have almost disappeared. Sources such as bonfires and illegal or uncontrolled burning of domestic waste, according to research conducted in the UK (Dyke and Coleman, 1997) and by U.S. EPA (Gullett et al, 2000) are also significant although obviously difficult to quantify.

For many countries in Europe the main source of dioxins in the past was emissions from poorly controlled municipal solid waste (MSW) incinerators. However, the introduction of strict controls on emissions has resulted in the closure of many old incinerators which could not be upgraded. In the UK for example, total emissions from MSW incineration plants, which were the major source of dioxin emissions in 1990 at 600 g I-TEQ, were reduced to around 2 g I-TEQ by 1999, corresponding to less than 1% of all UK releases (DEFRA 2001). There are no municipal solid waste incinerators in Ireland.

Domestic coal fires are also believed to be a relatively significant source of dioxin emissions, particularly when domestic waste, plastic or treated wood is used on these fires. The burning of damp fuel, including unseasoned logs, and of salt-laden wood from coastal areas can give rise to increased dioxin emissions (DEFRA 2006). Dioxins are also found in paper products arising from the bleaching with chlorine of naturally occurring phenols present in wood pulp and in the manufacture of some chlorinated compounds.

A well known example of an accident involving release of dioxins was the explosion in 1976 at Seveso, Italy, where some of the contents of a 2,4,5-trichlorophenol manufacturing plant were released into the atmosphere causing severe local contamination with trichlorophenol and 2,3,7,8- TCDD. Dioxins also attracted particular attention during the Vietnam War where they were found to be present as a contaminant in the defoliant Agent Orange, a mixture of 2,4,5-T and 2,4-D. High levels of dioxins were found in poultry and eggs from Belgium in 1999. The cause of the contamination is thought to have been contamination of animal feed.

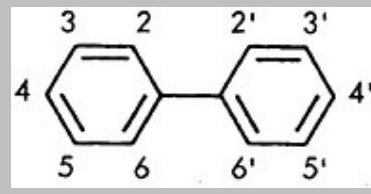
Dioxin compounds have no commercial value and have never been intentionally synthesised other than for laboratory use. Monitoring data for dioxins date only from the 1970s as the analytical capabilities for their detection did not exist before then due to the extremely low concentrations at which they were present in the environment. However, there can be little doubt that dioxins formed from anthropogenic activities have existed, at least to some extent, since the discovery of fire.

Until relatively recently, very little firm information on dioxin emission sources existed for Ireland. Accordingly the EPA commissioned a desk study to provide an estimate of dioxin emissions to air, land and water during the calendar year 2000 and also an estimate of projected emissions in 2010 (Hayes & Marnane 2002). The study also attempted to quantify significant dioxin sources in Ireland. The report estimated that in 2000, not withstanding the inherent uncertainties of the calculations, more than half of all air emissions could be attributed

to domestic burning of waste. In a nationwide investigation by the EPA it was estimated that 287,000 tonnes of household waste, representing 700,000 persons, was uncollected in 2003. In addition 80% of Local Authorities have identified backyard burning as a significant issue, especially in rural areas where a local waste collection may not be available (EPA 2005b). Hayes & Marnane also identified building fires, household heating, cooking with fossil fuel and iron and steel production as the main other sources of dioxin emissions in 2000. The sole iron and steel production facility in the State has since closed.

Toxicity of PCBs

Polychlorinated biphenyls (PCBs) are chlorinated hydrocarbons which were synthesised by direct chlorination of biphenyl but whose production has now been discontinued. PCBs consist of a biphenyl (two benzene rings with a carbon to carbon bond between carbon 1 on one ring and carbon 1' on the second ring) with a varying number of chlorine atoms substituting for hydrogen atoms on the biphenyl rings.



Basic PCB structure

Depending on the number and location of the chlorine atom substituents, there are 209 possible PCB congeners. Some PCB congeners have a “coplanar” structure with the two biphenyl rings lying in the same plane. Of these, there are 12 mono-ortho (chlorine in 2 or 6 position in structure above) and non-ortho substituted PCBs which show similar toxicological properties to dioxins and are often termed “dioxin-like PCBs”.

Unlike dioxins, PCBs have found widespread use in a number of commercial open and closed applications, due to their physical and chemical properties, such as non-flammability, chemical inertness, high boiling points and high dielectric constants. Typical open applications have been their use in pigments, sealants, rubber products and carbonless copy paper. Closed applications have included use of PCBs in hydraulic and heat transfer systems, transformers and capacitors. The production and use of PCBs has been discontinued for some years but because of their persistent qualities they remain in electrical equipment, buildings and the environment. Dioxins and furans are often found in appreciable quantities as contaminants in PCBs.
In conformity with current practice, this survey included analysis of the 12 dioxin-like PCBs.

Toxic Equivalency Factors (TEFs) for Assessing Mixtures of Dioxins and Dioxin-like Compounds

Because real samples containing dioxins are made up of complex mixtures, a system of Toxic Equivalents has been developed in order to address the problem of reporting of differing toxicities and environmental behaviour of these substances. This procedure uses a scheme of weighting factors which expresses the toxicity of each individual PCDD and PCDF in terms of an equivalent amount of the congener 2,3,7,8-TCDD. This weighting factor, called a toxic equivalent factor (TEF), is multiplied by the concentration of the individual compounds in a mixture to give a 2,3,7,8-TCDD toxic equivalent, (TEQ) which is the sum of the concentrations of the individual congeners multiplied by their TEFs. The TEFs for the various congeners are listed in Annex 1.

Systems for Establishing TEFs

A number of different systems for establishing toxic equivalent factors now exist. The NATO/CCMS (North Atlantic Treaty Organisation's Committee on Challenges of Modern Society) I-TEQ system which was used in the EPA 1996 report, defines most of the older data. The newer system devised by the World Health Organisation (WHO) in 1998 also incorporates PCBs. The WHO have also suggested that the TEQ scheme be re-evaluated every five years and that TEFs be reanalysed in the light of any new scientific information. Clearly it is important when comparing data to define correctly the TEQ units and also whether PCBs are being considered. Usually I-TEQ concentrations will be a little lower than WHO-TEQs as some of TEFs have been revised upwards by the WHO. The TEF values for both systems are tabulated in Annex 1. In general, it can be safely assumed that older data will have been calculated according to the I-TEQ system.

Treatment of Levels Below Detection Limits

In calculating TEQs for compounds that are not found in concentrations above the limit of detection, the conventional approach up to relatively recently was to use one half of the detection level for non-detects (congeners not found at the analytical detection level). A recent EC Directive which set maximum levels for dioxins in foodstuffs stipulated that limits of quantification (LOQs) [1] be used instead of limits of detection (LODs)[2] and also that the full LOQ should be taken in the calculation of non-detects (EC 2001). This is a totally conservative approach to estimating TEQs at trace levels, and it can lead to an over-estimation of concentrations in low level samples. This method, which was generally introduced in 2002, has been used in the calculations below and should be borne in mind when making comparisons with older low level studies. As not all reported data consider non-detects, it is important to clarify this issue when comparing low level data from different sources. This approach is in contrast to, for example, that adopted in estimating annual averages of micropollutants under the Water Framework Directive, where the less precautionary approach of taking 50% of the non-detects is taken.

[1]Limit of quantification is commonly defined as:

> *The limit of quantification is the smallest concentration of unknown that can reliably be **quantified** by the instrumental method. The accepted limit is that concentration of analyte, which produces an instrumental response that is ten times as large as the standard deviation S of the instrumental noise level (L.O.Q. = 10 x S/N)*

[2]Limit of detection as used in analytical chemistry is commonly defined as:

> *The limit of detection is the smallest concentration of unknown that can reliably be **detected** by the instrumental method. The accepted limit is that concentration of analyte, which produces an instrumental response that is three times as large as the standard deviation S of the instrumental noise level (L.O.D. = 3 x S/N)*

2. NATIONAL DIOXIN SURVEY

Background

This survey was planned as a follow-up to the national surveys carried out in 1995, 2000 and 2004. As far as possible the same approach was adopted in terms of time of year and location of samples. However, unlike the 1995 survey, the analyses included the 12 dioxin-like PCBs.

Samples were taken in June and July 2006 when the cows could be expected to be grazing outdoors. Details are given in Tables 1 and 2.

Sampling strategy

Two types of sampling stations were chosen:

Type A background stations covering the entire country (24 samples)
Type B potential impact stations in areas of perceived potential risk (13 samples)

Type A samples were normally taken from full milk silos (30,000 to 50,000 gallons) in regional dairies. However there were a number of instances where sampling from silos was not possible and the samples were taken instead from road tankers representative of the area to be covered. Type B samples were taken from road tankers representing the "potential impact" areas.

Sampling procedure

Samples were taken in thick-walled pyrex glass bottles of one litre capacity, which had been washed with detergent and acetone. The sample volume was 800 ml. Duplicate samples were taken with the intention of submitting one sample for analysis and retaining the other sample in the EPA regional laboratories in the event of a repeat analysis being required.

The samples were taken by EPA personnel while the milk was still in its raw state. The samples were then taken to the nearest EPA regional laboratory where they were frozen at –20° C. Shipment of samples was by overnight courier in ice boxes to the laboratory (see below).

Analysis

The laboratory chosen for the analyses was the same one used for previous surveys, Gesellschaft für Arbeitsplatz und Umweltanalytik (GfA) laboratory in Münster, Germany. This laboratory is very experienced in the analysis of dioxins in milk and other food matrices and has undertaken analyses for clients in many countries. The laboratory is fully accredited for the analysis of PCDDs, PCDFs and PCBs in food matrices, including milk.

Analyses were carried out following pre-treatment and extraction from the milk fat, using high resolution gas chromatography and high resolution mass spectrometry with ^{13}C-labelled isomers as internal standards. This method is considered to be the most suitable for low-level dioxin measurements. The analytical methodology is in compliance with the requirement for the analysis of foodstuffs for PCDD/Fs and PCBs as laid down by the EU directive 2002/69 and its amendment 2004/44.

Results and Tables

The data showing I-TEQs and WHO TEQs for milk fat are shown in Tables 1 and 2. Data for whole milk are also available and are shown in Annex 2. However, for comparison purposes it is generally more valid to use the milk fat rather than whole milk data due to the varying composition of fat in milk. Using the fat data also facilitates comparisons with other dairy products such as butter and cheese and also with human milk. The majority of regulatory limits are also expressed in terms of dioxin content in fat.

The detailed analytical results showing the levels for the individual congeners are also given in Annex 2.

The fat content was measured separately and TEQs were determined in fat and then back-calculated to give corresponding levels in the original whole milk sample.

Table 1

Milk fat related PCDD/F and PCB-TEQ values determined in the background samples A 1 - A 25

Sample	Milk supply area	Dioxins		PCBs	Dioxins and PCBs
		I-TEQ incl. LOQ	WHO-TEQ incl. LOQ	WHO-TEQ incl. LOQ	Total WHO-TEQ incl. LOQ
	Unit	*pg/g milk fat*	*pg/g milk fat*	*pg/g milk fat*	*pg/g milk fat*
A1	Mitchelstown Area (T)	0.125	0.148	0.156	0.304
A2	Co. Waterford	0.150	0.172	0.139	0.311
A3	Dublin South.Co./North Wicklow Area (T)	0.246	0.281	0.236	0.517
A4	North Co. Wexford	0.308	0.342	0.281	0.623
A5	Charleville, Co Cork Area	0.110	0.129	0.142	0.271
A6	Ballyragget, Co Kilkenny Area	0.240	0.294	0.178	0.472
A7	Renmore, Co Galway Area	0.288	0.342	0.192	0.534
A8	Moate, Co Westmeath Area	0.221	0.262	0.224	0.486
A9	Tipperary Town/Thurles Areas	0.192	0.234	0.167	0.391
A10	Nenagh, Co. Tipperary Area	0.266	0.319	0.182	0.501
A11	Cavan/Longford/Leitrim	0.214	0.238	0.191	0.429
A12	Drinagh, Co Cork (T)	0.140	0.170	0.148	0.318
A13	Bandon Area (T)	0.194	0.216	0.183	0.399
A14	North Kerry Area	0.107	0.119	0.123	0.242
A15	Co Sligo (T)	0.135	0.152	0.204	0.356
A16	Roscommon/East Galway (T)	0.139	0.176	0.274	0.450
A18	Roscommon/Leitrim (T)	0.157	0.175	0.150	0.325
A19	Co Monaghan	0.166	0.196	0.218	0.414
A20	Co Louth	0.324	0.369	0.264	0.633
A21	North Kildare/West Dublin (T)	0.641	0.846	0.218	1.06
A22	So Kerry Cahirciveen area) (T)	0.178	0.211	0.162	0.373
A23	South Wexford	0.159	0.189	0.146	0.335
A24	SE Co. Mayo	0.239	0.288	0.235	0.523
A25	Co. Donegal (T)	0.279	0.319	0.167	0.489

Sample corresponding to A17 in the 1995 survey was not taken in 2000, 2004 or 2006

(T) Denotes sampling from a road tanker. All other A samples were taken from bulk silos.

Table 2

Milk fat related PCDD/F and PCB-TEQ values determined in the potential impact samples B1 - B 17

Sample No.	Milk supply area	Dioxins		PCBs	Dioxins and PCBs
		I-TEQ incl. LOQ	WHO-TEQ incl. LOQ	WHO-TEQ incl. LOQ	Total WHO-TEQ incl. LOQ
	Unit	*pg/g milk fat*	*pg/g milk fat*	*pg/g milk fat*	*pg/g milk fat*
B1	Carrigtwohill/ Cobh/Great Island	0.283	0.332	0.316	0.648
B2	Ahgada/East Cork Harbour	0.170	0.201	0.220	0.421
B3	Askeaton area	0.113	0.134	0.140	0.274
B4	Tarbert Co. Kerry	0.139	0.165	0.142	0.307
B5	Clarecastle Co.Clare	0.149	0.197	0.129	0.326
B6	Cooraclare Co.Clare	0.117	0.141	0.114	0.255
B7	Ballydine, So. Tipperary	0.177	0.224	0.144	0.368
B8	Castleknock/ Mulhuddart. Co.Dublin	1.04	1.31	0.517	1.83
B9	Grannagh. So.Kilkenny	0.200	0.226	0.215	0.441
B13	Kinsale (Dunderow) Co.Cork	0.319	0.348	0.200	0.548
B14	Ringaskiddy area. Co.Cork	0.214	0.239	0.205	0.444
B15	Crossakiel (nr Kells). Co.Meath	0.143	0.163	0.166	0.329
B17	Carranstown Co.Meath	0.195	0.225	0.159	0.384

Samples corresponding to B10, B11 and B12 in the 1995 survey were not taken in 2000, 2004 or 2006.

Sample corresponding to B16 in the 2000 survey was not taken in 1995, 2004 or 2006.

All “B” samples were taken from road tankers.

Table 3
Summary of Milk Fat Data in pg TEQ/g fat

	"A" Samples				*"B" Samples*				*"A and "B" Samples combined*			
Parameter	**Dioxins**		**PCBs**	**Dioxins & PCBs**	**Dioxins**		**PCBs**	**Dioxins & PCBs**	**Dioxins**		**PCBs**	**Dioxins & PCBs**
	I-TEQ	*WHO-TEQ*	*WHO-TEQ*	*WHO-TEQ*	*I-TEQ*	*WHO-TEQ*	*WHO-TEQ*	*WHO-TEQ*	*I-TEQ*	*WHO-TEQ*	*WHO-TEQ*	*WHO-TEQ*
Minimum	0.107	0.118	0.123	0.241	0.113	0.134	0.114	0.255	0.107	0.118	0.114	0.241
Maximum	0.641	0.846	0.281	1.064	1.04	1.31	0.517	1.827	1.04	1.31	0.517	1.83
Mean	0.220	0.261	0.191	0.451	0.250	0.300	0.205	0.506	0.231	0.275	0.196	0.470
Median	0.204	0.236	0.1825	0.4395	0.177	0.224	0.166	0.384	0.194	0.225	0.182	0.421
Samples	24	24	24	24	13	13	13	13	37	37	37	37
EU Limit		**3.0**		**6.0**		**3.0**		**6.0**		**3.0**		**6.0**
EU Action level		**2.0**	**2.0**			**2.0**	**2.0**			**2.0**	**2.0**	

Discussion

Dioxins

Considering the entire set of samples (Tables 1 and 2), the reported I-TEQ ranges for dioxins in milk fat are 0.107 to 1.04 pg I-TEQ/g and 0.118 to 1.31 pg WHO-TEQ/g. Including PCBs, the ranges are 0.241 to 1.83 pg WHO-TEQ.

A summary of the milk fat data showing a breakdown of the background (type A), and the potential impact (type B) along with the combined data set is presented in Table 3. The highest values were from two of the samples taken in the greater Dublin area, A21 and B8 with PCDD/F levels of 0.846 and 1.31 WHO-TEQ/g respectively. These were over twice as high as the next highest respective A and B samples. Applying the standard Grubbs statistical test gives both as statistical outliers in their respective A and B data sets. Comparing the two groups of samples, the overall mean values for WHO-TEQ "A" and "B" were 0.261 pg WHO-TEQ/g and 0.300 pg WHO-TEQ/g respectively, giving the impression that the B samples are somewhat elevated over the A samples. However, these mean values reduce to 0.235 and 0.216 pg WHO-TEQ/g after discounting the above statistical outliers, and statistical tests show that there is no evidence of statistical difference between the two datasets.

The treatment of samples B8 and A21 as outliers simply means that they are indicative of data points that belong to a different statistical population than the rest of the sample set. It does not imply any measurement error, especially as these particular samples were confirmed by duplicate/triplicate analyses. Sample B8 which was taken from a single farm near Dublin gave the highest level for dioxins although still less than 50% of the EU limit of 3.0 pg WHO-TEQ/g (Figure 1 below) and just over 30% of the EU limit of 6.0 pg WHO-TEQ/g for dioxins and PCBs combined. It was also lower than the EU action level for dioxins of 2.0 pg WHO-TEQ/g. The other higher value sample, A21, was taken from a tanker collecting from seven or eight farms in the West Dublin, North Kildare areas, again well within the greater Dublin area.

However, the set of other East coast samples (A3, A4, A20, A23, B15, B17) have almost the same mean value as that rest of the country when A21 and B8 are excluded.

PCBs

The mean value for dioxin-like PCBs was 0.196 pg WHO-TEQ/g with a range of 0.114 to 0.517 pg WHO-TEQ/g. Again, the highest value was for the B8 sample taken from the Dublin area, or approximately 25% of the EU Action Level. There is no separate EU limit value for dioxin-like PCBs.

Figure 1 Dioxins/Furans
2006 Data.

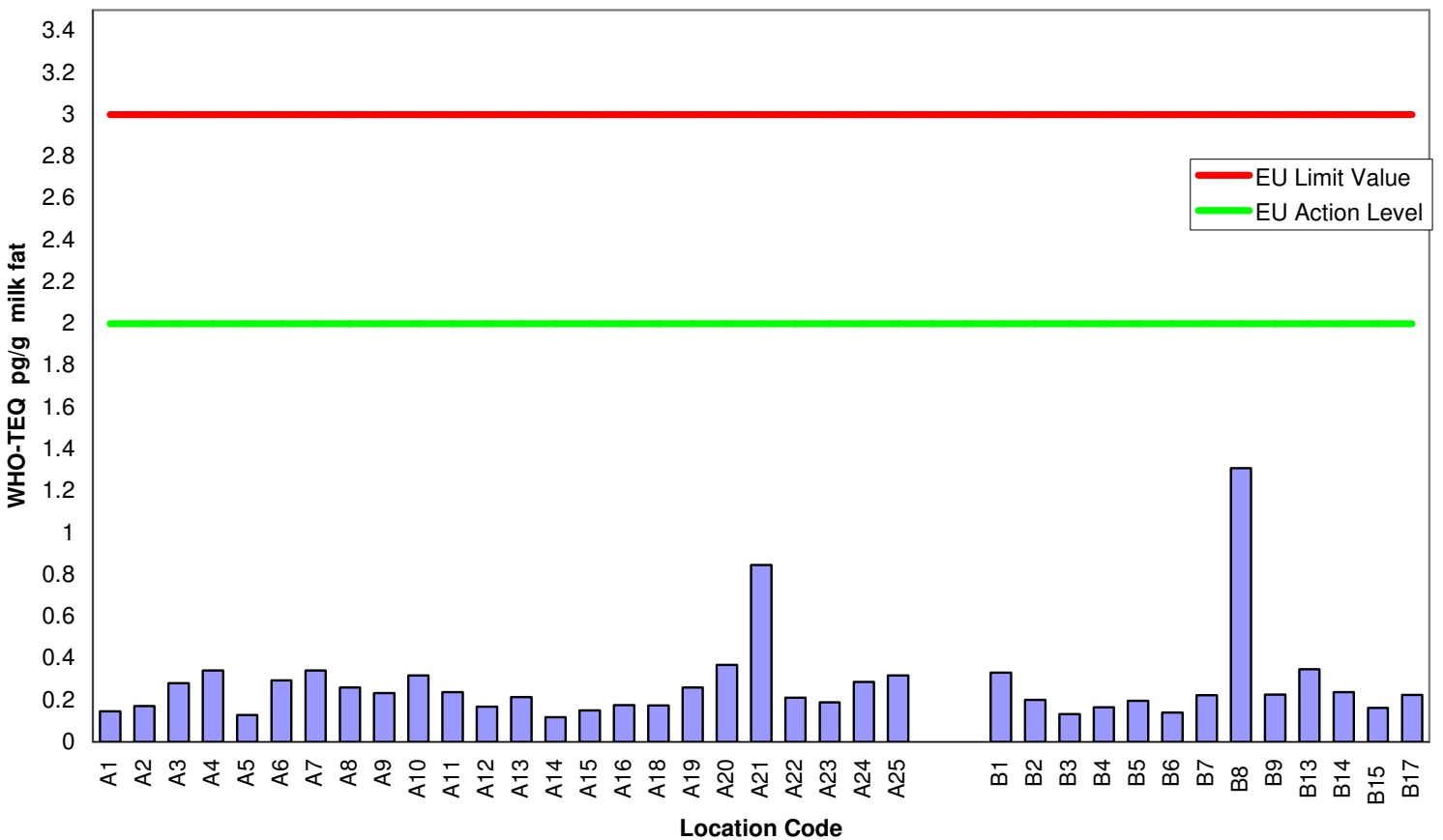


Figure 2 Comparison of 1995, 2000, 2004 & 2006 surveys
A Samples

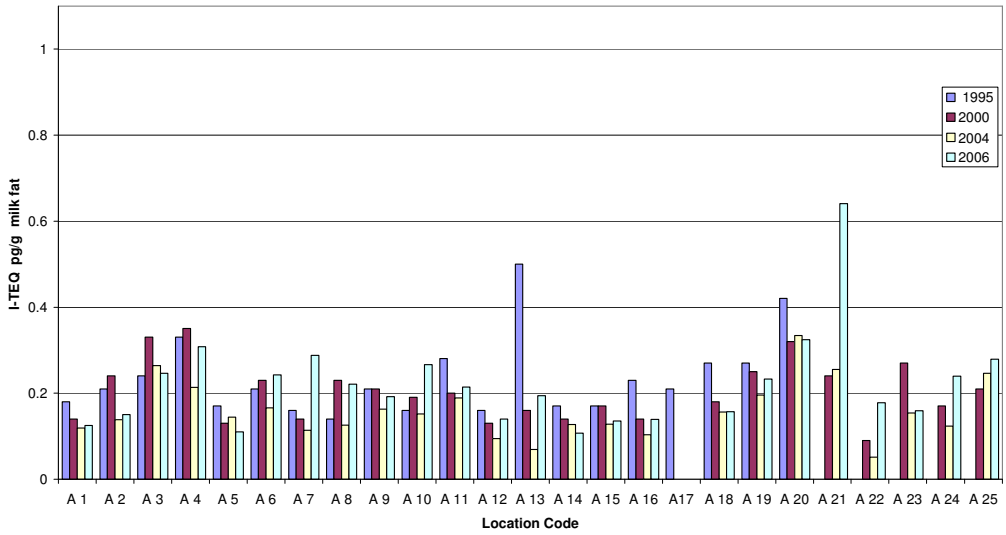
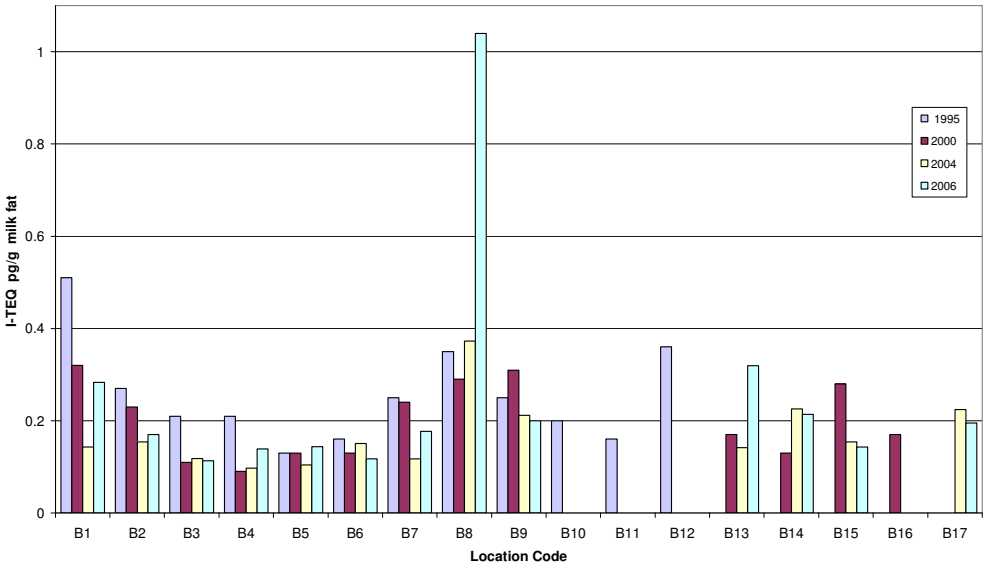


Figure 3 Comparison of 1995, 2000, 2004 & 2006 surveys
B Samples



3. COMPARISON WITH EARLIER DIOXIN SURVEYS

Figures 2 and 3 show a comparison of the I-TEQ milk fat data with the previous three surveys. This may be read in conjunction with Table 4, which shows the average I-TEQ at each station for the four surveys. Comparisons incorporating PCBs are not included, as they were not analysed in the first survey. As previously mentioned, comparisons of low-level data over time should be made with a certain amount of caution. For example, analytical sensitivity has improved and the treatment of amounts reported below the limits of detection has changed (EPA 2005).

In addition, the amalgamation and re-organisation of certain dairies following the rationalisation of the dairy industry can make historical comparisons of individual sample points somewhat problematic. These issues are discussed more fully in earlier reports (EPA 2005).

The mean value for milk fat in the 2006 survey was 0.23 pg I-TEQ/g compared to corresponding mean values of 0.16 for 2004, 0.20 for 2000 and 0.24 pg I-TEQ/g for the 1995 survey. On the face of it this represents a reversal of the downward trend observed in earlier surveys. However, it is important to be clear that this outcome is heavily influence by the high values from the metropolitan B8 and A21 samples. When these values are discounted, this number reduces to 0.196 pg I-TEQ/g, a marginal increase from 2004, especially having regard to the various sampling and analytical uncertainties alluded to above. There is also little doubt that the earlier reductions could be attributed to a number of regulatory measures and various technological advances, reflecting the pattern shown in similar surveys across Europe. Examples of measures that were taken in Ireland and which may have had an impact on dioxin levels were the virtual abolition of leaded petrol and the shutting down of all hospital incinerators as they were found to be inadequate and could not meet the high standards required under IPC licensing. The shutting down of the iron smelting facility in Cork will also have had an effect. These patterns of continuing reduction could not be expected to continue indefinitely and at some point they could be expected to level off. It will be readily seen that sample B8 which was referred to above, also showed the higher result for the 2004 survey. This sample was taken from a farm in the Castleknock area in the north Dublin suburbs: the only sample in the survey to be taken from a single farm.

In the case of PCBs the 2006 mean value of 0.196 pg WHO-TEQ/g was almost identical to the 2004 mean of 0.187 pg WHO-TEQ/kg.

Table 4

Mean Dioxin Values for the Period 1995-2006

I-TEQ pg/g milk fat

Showing locations where two or more samples were taken over the period

A Samples

Sample	Milk supply area	Mean Value
A1	Mitchelstown Area	**0.14**
A2	Co. Waterford	**0.18**
A3	Dublin Sth.Co./North Wicklow Area	**0.27**
A4	North Co. Wexford	**0.30**
A5	Charleville, Co. Cork Area	**0.14**
A6	Ballyragget, Co. Kilkenny Area	**0.21**
A7	Renmore, Co. Galway Area	**0.18**
A8	Moate, Co. Westmeath Area	**0.18**
A9	Tipperary Town/Thurles Areas	**0.19**
A10	Nenagh, Co. Tipperary Area	**0.19**
A11	Cavan/Longford/ Leitrim	**0.22**
A12	Drinagh, Co. Cork	**0.13**
A13	Bandon Area	**0.23**
A14	North Kerry Area	**0.14**
A15	Co. Sligo	**0.15**
A16	Roscommon/East Galway	**0.15**
A18	Roscommon/Leitrim	**0.19**
A19	Co. Monaghan	**0.24**
A20	Co. Louth	**0.35**
A21	North Kildare/West Dublin	**0.38**
A22	So. Kerry Cahirciveen area)	**0.11**
A23	South Wexford	**0.19**
A24	SE Co. Mayo	**0.18**
A25	Co. Donegal	**0.25**

B Samples

Sample	Milk supply area	Mean Value
B1	Carrigtwohill/Cobh/Great Island	**0.31**
B2	Ahgada/East Cork Harbour	**0.21**
B3	Askeaton area	0.14
B4	Tarbert Co. Kerry	**0.13**
B5	Clarecastle Co. Clare	**0.13**
B6	Cooraclare Co. Clare	**0.14**
B7	Ballydine, So. Tipperary	**0.20**
B8	Castleknock/Mulhuddart. Co..Dublin	**0.51**
B9	Grannagh, So. Kilkenny	**0.24**
B13	Kinsale (Dunderow) Co. Cork	**0.21**
B14	Ringaskiddy area. Co. Cork	**0.19**
B15	Crossakiel (nr Kells), Co. Meath	**0.19**
B17	Carranstown, Co. Meath	**0.21**

4. OTHER STUDIES IN MILK AND DAIRY PRODUCTS

Data submitted to the EU Commission on 152 dairy samples (milk and milk products) between 1997 and 2003 from the then 15 member states plus Iceland and Norway as part of an EU-wide survey showed an overall mean of 0.77 pg WHO-TEQ/g fat (Gallani et al, 2004). No upper or lower limits are shown in the study.

A US EPA study of samples taken from eight different regions in the US in July 2000 and January 2001 showed an overall composite mean of 0.71 pg WHO-TEQ/g fat. Again no upper or lower limits are shown in the study. (Schuda et al 2004)

Samples taken on behalf of the UK Food standards Agency in 2005 showed a mean of 0.37 pg WHO-TEQ/g and a range 0 32 to 0.48 pg WHO-TEQ/g A similar 2006 study showed a mean of 0.34 pg WHO-TEQ/g with a range of 0.19 to 0.52 pg WHO-TEQ/g (FSA 2005, FSA 2006, n=4 in each case).

These comparisons are summarised in Table 5.

Dioxin Limits in Milk

The EU limit for dioxins and furans for milk and milk products is set at 3.0 pg WHO-TEQ/g fat. Including PCBs it is 6.0 pg WHO-TEQ/g fat (EC 2006 (1)).

The EU action level for dioxins and furans is 2.0 pg WHO-TEQ/g fat. The action level for PCBs is set at 2.0 pg WHO-TEQ/g fat. There is no separate limit for PCBs, (EC 2006 (2)).
It is clear that the overall mean levels found in all of the Irish surveys are at least an order of magnitude below the above limits.

Table 5:
Comparison of dioxin and PCB WHO-TEQ values from Irish cows' milk samples with data from International monitoring programs

Country	**Period of sampling**	**Number and specification of samples**	**Dioxins/Furans Mean values pg WHO-TEQ/g fat**	**PCBs Mean values pg WHO-TEQ/g fat**	**Dioxin/Furans plus PCB Mean values pg WHO-TEQ/g fat**
Ireland	2000	24 A-samples 13 B-samples	0.24 0.24	0.25 0.24	0.49 0.48
Ireland	2004	24 A-samples 13 B-samples	0.19 0.21	0.18 0.21	0.37 0.41
Ireland	2006	24 A-samples 13 B-samples	0.26 0.30	0.71 0.71	0.45 0.51
UK	2005	4 samples	0.37	0.22	0.59
UK	2006	4 samples	0.34	0.18	0.52
US	2000-2001	16 samples	0.71	Not reported	Not reported
European Union	1997 - 2003	152 Milk and milk products from EC monitoring programmes	0.77	1.65	2.42

5. BROMINATED FLAME RETARDANTS AND BROMINATED DIOXINS

General

Brominated Flame Retardants (BFRs) replaced PCB as the major chemical flame retardant in the late 1970s and are commonly used in furniture, fabrics and electronic products as a means of reducing the flammability of combustible organic materials. They act as radical traps, i.e. in case of fire the pyrolysis products are retarded in their reaction with atmospheric oxygen by reaction with the halogen radicals released from the BFR. The benefit of these chemicals is their ability to slow ignition and rate of fire growth, and as a result increase available escape time in the event of a fire.

Brominated dioxins and furans (PBDD/PBDF) can be formed as a by-product of the combustion of these substances

.

Different types of Brominated Flame Retardants

TBBPA tetrabromo bisphenol A

PBBs: Polybrominated biphenyls (structurally similar to PCBs)

HBCD: Hexabromocyclododecane

PBDEs: Polybrominated diphenyl ethers
- Deca-BDE (Decabromodiphenyl ether or BDE-209)
- Octa-BDE (Octabromodiphenyl ether)
- Penta-BDE (Pentabromodiphenyl ether)

TBBPA, the PBDEs and the PBBs contain two brominated carbon rings, making them very stable and efficient in a large number of plastics. PBBs and PBDE are of greatest environmental interest because they are considered as persistent and bioaccumulative. PentaBDE is considered as very poisonous to water organisms. PBDEs are classified as priority substances according to the EU Water Framework Directive. EU has banned the use of Penta-and OctaBDE since 2004. BDE-47 and BDE-99 are the predominant congeners in environmental samples (FSAI 2005). However, only few estimates of human dietary PBDE exposure are available and little is known about other forms of human exposure (e.g. inhalation, skin contact).

PBBs are also banned.

Brominated dioxins and furans (PBDD/PBDF)

These substances are formed unintentionally, either through, incineration of wastes that include consumer products containing brominated flame retardants like PBDEs, accidental fires or as trace contaminants in mixtures of bromine-containing chemicals.

Results of Study

Five pooled samples were analysed for the above range of BFRs and PBDD/PBDFs. Seventeen PBDE congeners (BDE-17, 28, 47, 49, 66, 71, 77, 85, 99, 100, 119, 126, 138, 153, 154, 183 and 209), some individual PBBs (BB-52, 101, 153 and 209), the totals of Tetra to NonaBBs, hexabromocyclododecane (sum of a-, b- and g-HBCD) and tetrabrombisphenol A (TBBP-A) have been monitored in this study.

Only PBDD/PBDFs and PBDEs were detected in this study.

PBDEs

The range for Σ–PBDEs (N=5) was 150 to 265 ng/kg fat with a mean of 200 ng/kg fat. (Table 6) This contrasts favourably with a 2005 study carried out in the same laboratory for the FSAI where the average concentration for Σ–PBDE was 407 ng/kg fat (N=12) FSAI (2006). Although there are no maximum limits set for PBDEs, these levels are relatively low by international comparisons.

The main contributors to the total PBDE load were BDE-47 and BDE-99 contributing 85 % to the **Σ** -PBDE on average. This is consistent with expectations (see above).

Brominated Dioxins PBDD/PBDFs

WHO-TEQs are in the range of 0.152 to 1.67 pg WHO-TEQ/g fat, with an overall mean of 0.549. (Table 6)

The high value of 1.67 which was found in the "midland" composite sample may be worthy of note and it can be seen bore no relation to the corresponding PBDE levels. However, it is not particularly surprising to find anomalous outliers in a once-off exercise. The PBDD/PBDFs could also have been formed through the incineration of other BFRs not detected in the study. While there are no maximum limits set for PBDD/PBDFs, in view of their structural and toxicological similarities it is usual to adopt for guidance purposes, the equivalent limits for PCDD/PCDFs in milk, as listed in Section 4. None of the PBDD/PBDF samples exceeded these limits.

In view of some of the apparently anomalous data, this sampling has been repeated in 2007. Indicative results from this survey show that for the areas where the higher values were found in 2006 the corresponding values were lower in 2007 and in line with expected trends.

Table 6

	Sample 1	***Sample 2***	***Sample 3***	***Sample 4***	***Sample 5***	***Mean***
	Cork Hbr pg/g fat	***Midlands pg/g fat***	***West pg/g fat***	***East pg/g fat***	***N/NW pg/g fat***	***pg/g fat***
Pooled from	B1 B2 B14	A5 A8 A9	A17 A15 A24	A3 A20 A23	A11 A19 A25	
PBDEs	***224***	***200***	***150***	***195***	***265***	***206***
PBDD/F	***0.152***	***1.67***	***0.172***	***0.179***	***0.571***	***0.549***

6. CONCLUSIONS

1. All levels recorded in this survey compare favourably with those taken from a random selection of similar studies in other EU countries. While assessment of consumer exposure to dioxins through the consumption of milk was not the object of this environmental survey, the highest levels were well below legislative limits.

2. There is evidence of diffuse anthropogenic effects in samples taken near urban areas, especially in the Greater Dublin Area. It is probable that these levels are due to sources associated with increased population, such as higher levels of road traffic and increased fuel burning generally. It is also possible that illegal burning of waste may play a role.

3. The evidence of the Brominated Flame Retardants (BFR) survey where the levels were much lower than the 2005 FSAI survey, for no apparent reason, along with the apparently anomalous nature of some the PBDD/F data, demonstrate the difficulty of over-interpretation of individual environmental surveys where the levels are very low or approaching limits of detection.

4. There was no statistical basis for considering the set of results from the Type A potential impact stations or the Type B background stations as being distinct from each other.

5. As mentioned in previous reports, it is clear that if the trend towards suburbanisation of the countryside continues, very few dairy farms suitable for sentinel monitoring of this nature will remain in existence near urban areas. It is important that some consideration be given to this issue in terms of monitoring close to urban areas, especially in view of the higher levels found in some of the semi- urban samples relative to those found elsewhere in the country in this and earlier surveys.

6. This survey was repeated in its entirety in 2007. Indicative results for the areas where the highest 2006 levels had occurred showed substantially lower levels. Further analysis of these data is being currently undertaken and a separate report will be issued in the coming months.

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Glossary

"A" samples	background samples covering the entire country
"B" samples	potential impact samples from areas of perceived potential risk
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4-D	2,4-dichlorophenoxyacetic acid
BFRs	brominated flame retardants
dielectric constant	capacity to store electrical energy
EPA	Environmental Protection Agency (Ireland)
g	gramme
GfA	Gesellschaft für Arbeitsplatz und Umweltanalytik laboratory, Münster, Germany
IPC	Integrated Pollution Control
I-TEQ	Toxic Equivalent (weighted toxicity of a mixture of dioxin congeners expressed as PCDD) using NATO convention
lipophilic	refers to the tendency of a substance to dissolve in fats or oils
LOD	limit of detection
LOQ	limit of quantification
NATO	North Atlantic Treaty Organisation
PBDEs:	polybrominated diphenyl ethers
PBDD	polybrominated dibenzo-para-dioxin
PBDF	polybrominated dibenzofuran
PCB	polychlorinated biphenyl
PCDD	polychlorinated dibenzo-para-dioxin
PCDF	polychlorinated dibenzofuran
pg	picogram, 10^{-12} of a gramme.
TEF	Toxic Equivalent Factor (toxicity weighting factor for individual congeners)
USEPA	Environmental Protection Agency (United States)
WHO	World Health Organisation
WHO TEQ	Toxic Equivalent (weighted toxicity of a mixture of dioxin congeners expressed as PCDD) using WHO convention

Annex 1

Toxicity Equivalent Factors (TEFs) used for calculation of I-TEQs and WHO-TEQs

PCDD/F parameter	I-TEF	WHO-TEF (1998)
PCDFs		
2,3,7,8-TetraCDF	0,1	0,1
1,2,3,7,8-PentaCDF	0,05	0,05
2,3,4,7,8-PentaCDF	0,5	0,5
1,2,3,4,7,8-HexaCDF	0,1	0,1
1,2,3,6,7,8-HexaCDF	0,1	0,1
2,3,4,6,7,8-HexaCDF	0,1	0,1
1,2,3,7,8,9-HexaCDF	0,1	0,1
1,2,3,4,6,7,8-HeptaCDF	0,01	0,01
1,2,3,4,7,8,9-HeptaCDF	0,01	0,01
OctaCDF	0,001	0,0001
PCDDs		
2,3,7,8-TetraCDD	1,0	1,0
1,2,3,7,8-PentaCDD	0,5	1,0
1,2,3,4,7,8-HexaCDD	0,1	0,1
1,2,3,6,7,8-HexaCDD	0,1	0,1
1,2,3,7,8,9-HexaCDD	0,1	0,1
1,2,3,4,6,7,8-HeptaCDD	0,01	0,01
OctaCDD	0,001	0,0001

ANNEX 2

Annex 2

Laboratory reports from GfA

These can be found at the links below.

Dioxin Results 2006:

http://www.epa.ie/downloads/pubs/other/dioxinresults/pcdd%20&%20pcb%20milk%2020062.pdf

Brominated Flame Retardants 2006:

http://www.epa.ie/downloads/pubs/other/dioxinresults/bfr%20&%20pbdd%202006.pdf

An Ghníomhaireacht um Chaomhnú Comhshaoil

Is í an Gníomhaireacht um Chaomhnú Comhshaoil (EPA) comhlachta reachtúil a chosnaíonn an comhshaol do mhuintir na tíre go léir. Rialaímid agus déanaimid maoirsiú ar ghníomhaíochtaí a d'fhéadfadh truailliú a chruthú murach sin. Cinntímid go bhfuil eolas cruinn ann ar threochtaí comhshaoil ionas go nglactar aon chéim is gá. Is iad na príomh-nithe a bhfuilimid gníomhach leo ná comhshaol na hÉireann a chosaint agus cinntiú go bhfuil forbairt inbhuanaithe.

Is comhlacht poiblí neamhspleách í an Ghníomhaireacht um Chaomhnú Comhshaoil (EPA) a bunaíodh i mí Iúil 1993 faoin Acht fán nGníomhaireacht um Chaomhnú Comhshaoil 1992. Ó thaobh an Rialtais, is í an Roinn Comhshaoil agus Rialtais Áitiúil a dhéanann urraíocht uirthi.

ÁR bhFREAGRACHTAÍ

CEADÚNÚ

Bíonn ceadúnais á n-eisiúint againn i gcomhair na nithe seo a leanas chun a chinntiú nach mbíonn astuithe uathu ag cur sláinte an phobail ná an comhshaol i mbaol:

- áiseanna dramhaíola (m.sh., líonadh talún, loisceoirí, stáisiúin aistrithe dramhaíola);
- gníomhaíochtaí tionsclaíocha ar scála mór (m.sh., déantúsaíocht cógaisíochta, déantúsaíocht stroighne, stáisiúin chumhachta);
- diantalmhaíocht;
- úsáid faoi shrian agus scaoileadh smachtaithe Orgánach Géinathraithe (GMO);
- mór-áiseanna stórais peitreail.

FEIDHMIÚ COMHSHAOIL NÁISIÚNTA

- Stiúradh os cionn 2,000 iniúchadh agus cigireacht de áiseanna a fuair ceadúnas ón nGníomhaireacht gach bliain.
- Maoirsiú freagrachtaí cosanta comhshaoil údarás áitiúla thar sé earnáil - aer, fuaim, dramhaíl, dramhuisce agus caighdeán uisce.
- Obair le húdaráis áitiúla agus leis na Gardaí chun stop a chur le gníomhaíocht mhídhleathach dramhaíola trí comhordú a dhéanamh ar líonra forfheidhmithe náisiúnta, díriú isteach ar chiontóirí, stiúradh fiosrúcháin agus maoirsiú leigheas na bhfadhbanna.
- An dlí a chur orthu siúd a bhriseann dlí comhshaoil agus a dhéanann dochar don chomhshaol mar thoradh ar a ngníomhaíochtaí.

MONATÓIREACHT, ANAILÍS AGUS TUAIRISCIÚ AR AN GCOMHSHAOL

- Monatóireacht ar chaighdeán aeir agus caighdeáin aibhneacha, locha, uiscí taoide agus uiscí talaimh; leibhéil agus sruth aibhneacha a thomhas.
- Tuairisciú neamhspleách chun cabhrú le rialtais náisiúnta agus áitiúla cinntí a dhéanamh.

RIALÚ ASTUITHE GÁIS CEAPTHA TEASA NA HÉIREANN

- Cainníochtú astuithe gáis ceaptha teasa na hÉireann i gcomhthéacs ár dtiomantas Kyoto.
- Cur i bhfeidhm na Treorach um Thrádáil Astuithe, a bhfuil baint aige le hos cionn 100 cuideachta atá ina mór-ghineadóirí dé-ocsaíd charbóin in Éirinn.

TAIGHDE AGUS FORBAIRT COMHSHAOIL

- Taighde ar shaincheisteanna comhshaoil a chomhordú (cosúil le caighdéan aeir agus uisce, athrú aeráide, bithéagsúlacht, teicneolaíochtaí comhshaoil).

MEASÚNÚ STRAITÉISEACH COMHSHAOIL

- Ag déanamh measúnú ar thionchar phleananna agus chláracha ar chomhshaol na hÉireann (cosúil le pleananna bainistíochta dramhaíola agus forbartha).

PLEANÁIL, OIDEACHAS AGUS TREOIR CHOMHSHAOIL

- Treoir a thabhairt don phobal agus do thionscal ar cheisteanna comhshaoil éagsúla (m.sh., iarratais ar cheadúnais, seachaint dramhaíola agus rialacháin chomhshaoil).
- Eolas níos fearr ar an gcomhshaol a scaipeadh (trí cláracha teilifíse comhshaoil agus pacáistí acmhainne do bhunscoileanna agus do mheánscoileanna).

BAINISTÍOCHT DRAMHAÍOLA FHORGHNÍOMHACH

- Cur chun cinn seachaint agus laghdú dramhaíola trí chomhordú An Chláir Náisiúnta um Chosc Dramhaíola, lena n-áirítear cur i bhfeidhm na dTionscnamh Freagrachta Táirgeoirí.
- Cur i bhfeidhm Rialachán ar nós na treoracha maidir le Trealamh Leictreach agus Leictreonach Caite agus le Srianadh Substaintí Guaiseacha agus substaintí a dhéanann ídiú ar an gcrios ózóin.
- Plean Náisiúnta Bainistíochta um Dramhaíl Ghuaiseach a fhorbairt chun dramhaíl ghuaiseach a sheachaint agus a bhainistiú.

STRUCHTÚR NA GNÍOMHAIREACHTA

Bunaíodh an Ghníomhaireacht i 1993 chun comhshaol na hÉireann a chosaint. Tá an eagraíocht á bhainistiú ag Bord lánaimseartha, ar a bhfuil Príomhstiúrthóir agus ceithre Stiúrthóir.

Tá obair na Gníomhaireachta ar siúl trí ceithre Oifig:

- An Oifig Aeráide, Ceadúnaithe agus Úsáide Acmhainní
- An Oifig um Fhorfheidhmiúchán Comhshaoil
- An Oifig um Measúnacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáide

Tá Coiste Comhairleach ag an nGníomhaireacht le cabhrú léi. Tá dáréag ball air agus tagann siad le chéile cúpla uair in aghaidh na bliana le plé a dhéanamh ar cheisteanna ar ábhar imní iad agus le comhairle a thabhairt don Bhord.

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