2017

PESTICIDES RESIDUES IN FOOD

An Roinn Talmhaíochta,
Bia agus Mara
Department of Agriculture,
Food and the Marine

www.agriculture.gov.ie
@agriculture_ie

Department of Agriculture, Food and the Marine

Report of the National Pesticide Residues Control Programme

2017

TABLE OF CONTENTS

LIST OF TABLES

1. SUMMARY REPORT

This report on the National Pesticide Residues Control Programme, carried out in 2017 by the Department of Agriculture, Food and the Marine (DAFM), provides details on pesticide residues detected in food commodities available on the Irish market. The Programme enforces EU legislation establishing the maximum permitted concentration of pesticide residues in food, or Maximum Residue Levels (MRLs), and aims to ensure that consumers are not exposed to unacceptable risks from pesticide residues.

The Programme for 2017 planned for the analysis of 1,394 consignments of fruit, vegetables, cereal, animal products and baby foods for up to 477 pesticide and 7 PCB marker compounds to check for compliance with EU and national legislation for plant protection and veterinary products. The programme consisted of 2 strategies: a *surveillance strategy* consisting of the random sampling of food commodities; and an *enforcement strategy* involving the sampling of food commodities from specific sources where non-compliance with pesticide legislation was suspected or had been detected previously.

The Programme was agreed with the Food Safety Authority of Ireland and sent to the EU Commission as required by European legislation. Sampling of domestic and imported foodstuffs was conducted at wholesalers, retailers, grain mills or at meat plants.

The 1,083 samples taken in 2017 fell short of the planned number, due to staffing constraints within the Pesticide Control Laboratory. New staff have been recruited to address this issue. The sampling requirements of the co-ordinated EU monitoring programme were fulfilled. The samples, comprising of 596 fruits and vegetables, 62 cereals, 390 foods of animal origin and 35 baby foods, were taken and analysed for pesticide and chemical residues at the Pesticide Control Laboratory in Backweston, County Kildare. The laboratory has continued to maintain and extend its accreditation status with the Irish National Accreditation Board.

Overall 98.5% of the 1,083 samples analysed were free of quantifiable residues or contained residues within the legally permitted levels. No residues were detected in 58.6% of the samples, another 39.9% of samples contained residues at levels which were in compliance with the EU legislation and 1.5% (16 samples) contained residues exceeding the MRLs. Taking into account the analytical measurement uncertainty, 0.37% of the samples (4 samples) clearly exceeded these legal limits (non-compliance).

18% of the fruit and vegetable samples analysed were of domestic origin and the rest were imported from the EU and elsewhere. 97.8% of the fruit and vegetables samples either contained no residues or contained residues within the legally permitted levels (31.5% contained no residues and 66.3% of samples contained residues at levels which were in compliance with the EU legislation). The

remaining 2.2% contained residues exceeding the MRLs, however when analytical measurement uncertainty is taken into account this drops to 0.5%.

In the case of the cereal samples, 79% taken were of domestic origin. All cereal samples either contained no residues or contained residues within the legally permitted levels. No residues were detected in 42% of the samples and 58% of the cereal samples had residues in compliance with the EU legislation.

All of the food of animal origin samples originated domestically and 99.2% of the samples either contained no residues or contained residues within the legally permitted levels. No residues were detected in 95.4% of the samples, 3.8% of the samples had residues in compliance with the EU legislation. The remaining 0.8% contained residues exceeding the MRLs, however when analytical measurement uncertainty is taken into account this drops to 0.26%.

No pesticide residues were detected in any of the baby food samples.

Thirty five fruit and vegetable samples were taken under EU Regulations dealing with increased inspection of targeted food commodities from certain countries. No residues were detected in 40% of the samples and 57.1% of the samples had residues in compliance with the EU legislation. There was one MRL breach (2.9%) found in 2017.

In all cases where non-compliant residues are detected, consumer risk assessments, based on the residue level found and national food consumption data are carried out to estimate the risk to consumers and to guide the follow-up action to be taken. In 2017, no breach was found to have an unacceptable risk to consumers.

All breaches involving produce of domestic origin were investigated to establish the reasons for the breaches and for appropriate follow-up. In addition, all produce with MRL breaches, both domestic and imported, were listed for targeted sampling as part of the follow-up enforcement strategy. Twelve such targeted samples were identified and taken in 2017.

2. BACKGROUND

Pesticides comprise plant protection products and biocides. Plant protection products are required to protect crops and plant products from damage caused by insects, fungi, weeds and other pests. Production and distribution of sufficient volumes of food to meet consumer demands of quality at reasonable price is not possible without their use. Biocidal products are essential for disinfection of surfaces, implements and machinery used in the food industry and to inhibit the action of a range of harmful organisms.

The manner of use of many plant protection and biocidal products requires their release into the environment, resulting in potential exposure of workers, consumers and the general public to such products or to residual traces remaining in food. It is therefore necessary that such products be tightly regulated.

Pesticide residues are regulated in Ireland through the implementation of European legislation, Regulation (EC) No. 396/2005, which establishes EU Maximum Residues Levels (MRLs) for all pesticides in and on fruit and vegetables, cereals and in food of animal origin. MRLs are the maximum permissible level of pesticide residue allowed in or on a crop that has been treated in line with good agricultural practice (GAP). Regulation (EC) No. 37/2010 establishes other MRLs for certain pesticides used as veterinary products. Commission Directives 2006/125/EC and 2006/141/EC establish certain MRLs for food intended for babies and young infants.

Pesticides are further controlled through legislation implementing Regulation (EC) No. 1107/2009, which requires that all plant protection products must be registered before being placed on the market. The Irish registration system specifies the timing, frequency, rates and the crops on which the pesticide may be used. Use of non-registered pesticides is an offence.

Where an MRL is exceeded, a dietary intake calculation is carried out to determine if the residue presents a risk to consumers, both adult and children. The results of the assessments are provided to the FSAI to coordinate a harmonised enforcement approach. Where warranted, for example when the pesticide intake exceeds specified toxicological endpoints; a Rapid Alert is issued by the FSAI and officers of the Pesticide Control Division (PCD) of the Department of Agriculture, Food and the Marine (DAFM) take appropriate enforcement action. This may involve removal of the produce concerned from the market and its destruction at the owner's expense. The Minister may also prosecute offenders or apply administrative fines.

All European Union (EU) countries are required to have their own national monitoring plans and to publish their results. The '*Report of the National Pesticide Residues Control Programme 2017*' provides details of the results obtained during 2017 from a national programme monitoring for the presence of pesticide residues in and on food. The results were also sent to the European Food Safety Authority and will be used as part of an EU wide annual report.

3 PLANNING THE PROGRAMME

The national pesticide residue control programme for pesticide residues is undertaken by the PCD (Pesticide Control Division) with laboratory support provided by the Pesticide Control Laboratory (PCL) of the Department of Agriculture, Food and Marine. The programme implements the requirements of Regulation (EC) No. 396/2005, and takes into account the requirements set out in the EU *"coordinated multi-annual Community control programme for 2017, 2018 and 2019 to ensure compliance with maximum levels of, and to assess the consumer exposure to pesticide residues in and on food of plant and animal origin"*, (Commission Implementing Regulation (EU) No. 2016/662). The requirement of the monitoring of food of animal origin for Directive 96/23/EC is also taken into consideration with respect to the determination of organochlorine and organophosphorus pesticides.

The annual control programme is carried out in accordance with contractual arrangements between the DAFM and the FSAI[1] and involves sampling of imported and domestic produce.

The programme ensures that consumers are not exposed to unacceptable pesticide residue levels in and on food, that plant protection products are correctly applied, and that the unauthorised use of such products in Ireland is controlled.

3.1 Programme design

The programme is designed to monitor different food groups for which MRLs have been established: fruit and vegetables, cereals, food of animal origin and baby food. It involves sampling of produce at distribution outlets, collection, storage, processing or slaughter premises and the analysis of those samples for the presence of residues of up 477 pesticides and 7 PCB congeners.

The planned number of samples for the 2017 control programme was agreed with the FSAI. The programme is the primary means of ensuring that plant protection products (pesticides) are used in accordance with *Good Agricultural Practice* and is essential if the misuse of registered products and the use of non-registered products are to be eliminated. Plant protection products, registered under Regulation (EC) No. 1107/2009, can be misused in various ways, e.g. use of excessive dose rates, failure to respect the minimum periods specified between last application and harvest (i.e. pre-harvest intervals) and use for purposes for which they are not authorised (i.e. non-registered uses). When plant protection products are used in accordance with *Good Agricultural Practice*, unacceptable levels of residues should not occur in treated produce.

The pesticide residue monitoring programme for Ireland takes account of the following:

i. the co-ordinated EU monitoring programme
ii. the dietary importance of the foodstuff from a consumer point of view
iii. the residue history of different sample types

[1] Service Contract from 2016 between the Food Safety Authority of Ireland and the Department of Agriculture, Food and the Marine

iv. monitoring results obtained by other Member States

v. the manner in which the food is handled/processed prior to consumption

vi. the monitoring programme for food business operators

vii. the capacity of the laboratory to analyse samples.

4 SAMPLING

4.1 Food of plant origin

Samples were taken using the sampling method outlined in a Commission Directive[2] on the sampling of products of plant origin for the official control of pesticide residues.

The sampling programme consists of 2 strategies, as follows:

- *Surveillance sampling* of fruit and vegetables processed and organically labelled products. The surveillance sampling strategy involves sampling, in an objective manner and independent of the origin, of the food commodities that are available on the Irish market
- *Enforcement sampling* from import controls and follow up to non-compliant samples, such as MRL breaches.

The enforcement sampling strategy involves sampling of food commodities from specific sources where non-compliance with pesticide legislation is suspected or has been detected previously. It includes Import Controls Regulation (EC) No. 669/2009 which lists commodities and countries of origin for additional targeted sampling.

Authorised officers from the Pesticide Control Division (PCD) carry out the sampling of food of plant origin and cereals in accordance with the Commission Sampling Directive 2002/63/EC. This Directive for instance, describes that a minimum of 1 kg or 10 units of a food commodity be taken from a consignment which then constitutes a laboratory sample. The samples are sealed with unique sample identity numbers and brought to the laboratory for analysis.

4.2 Food of animal origin

Random samples of bovine, porcine, ovine, poultry, equine, and venison kidney fat samples are taken at various meat processing plants around the country in accordance with the monitoring plan organised by the Veterinary Medicine Unit of DAFM. The fat samples are taken from individual animals at meat plants by officers of the Veterinary Inspectorate.

In the case of milk, representative samples of particular bulk consignments from milk dairies were taken by officers of the Dairy Inspectorate.

The planned number for food of animal origin was decided in conjunction with the Veterinary Medicine Unit of DAFM, as part of the National Residue Plan required under Directive 96/23/EC[3]. Other types of food of animal produce such as liver and poultry meat were sampled at retail outlets to meet the requirements of the EU multiannual control programme for 2017.

[2] Commission Directive 2002/63(EC)
[3] Council Directive 96/23/EC 29th April 1999 OJ No L125/10

4.3 Infant formula

The samples were taken by officers of the Diary Science Laboratory of DAFM. The legislation and the MRLs governing these infant samples are set in Commission Directive 2006/141/EC[4] with MRLs different to those established for the foods of plant and animal origin.

[4] Commission Directive 2006/141/EC of 22 December 2006 on infant formulae and follow-on formulae, 30.12.2006 OJ No L 401

5 TESTING FOR PESTICIDE RESIDUES

5.1 Analytical procedures

All the samples are brought to the Pesticide Control Laboratory which is based at the DAFM Laboratory campus in Backweston, Co. Kildare.

On receipt, the samples are logged into the laboratory system and prepared for residue analysis. The fruit and vegetable samples are blended or ground with dry ice (solid carbon dioxide), put into labelled sample bags and stored in a freezer at -18 ^{o}C prior to extraction and analysis.

At the extraction stage, the ground up sample is taken out and a measured amount is extracted with organic solvents, cleaned up if required and injected into one of two chromatographic systems- GC/MS/MS (gas chromatography with tandem mass spectrometry) and/or LC/MS/MS (liquid chromatography with tandem mass spectrometry).

These analytical techniques allow a large number of pesticide residues to be analysed at the same time. For these multi residue methods (MRM), mixes containing many pesticide standards are injected onto the chromatographic columns and the details of the individual standards eluting from the columns are recorded as unique mass spectral data.

When a residue in a laboratory sample is identified by matching the retention time and the mass spectrum pattern with a standard, the amount of the residue in the sample is then quantified by running it against a series of standard mixtures of known concentrations. A select number of samples are also analysed for other pesticides which cannot be analysed using the multi-residue methods outlined above. These single residue methods (SRM) which may employ different extraction methods are used to analyse such pesticides as amitraz, glyphosate, paraquat and dithiocarbamates.

References to the analytical methods used in the laboratory are provided in Annex II at the back of this report.

Some pesticides break down to give metabolites and in several cases these are summed to give a combined residue result and compared against the MRL using the residue definition established in legislation. An example is DDT which can consist of up to 6 breakdown products: o,p'-DDD, p,p'-DDD, o,p'-DDE, p,p'-DDE, o,p'-DDT and p,p'-DDT. The residue definition is the sum of these products expressed as DDT. The overall number of 484 pesticides analysed for in 2017 refer to these summed definitions and not to the individual parent and breakdown products listed in Annex III**.**

5.2 Quality assurance

It is obligatory that all Official Control laboratories in the EU involved in the testing for pesticide residues be accredited.

In 2017, the PCL was audited by the Irish National Accreditation Board and its accreditation status to the ISO 17025 standard was confirmed and extended. The pesticides in the scope of the accreditation may be viewed on the Irish National Accreditation Board website at www.inab.ie. The PCL registration number is 121T.

The laboratory participated in all 5 of the EU Proficiency studies organised, on behalf of the EU Commission, by the European Union Community Reference Laboratories (EU-RL) in the pesticide area. Routine quality assurance procedures are followed within the laboratory in accordance with the requirements specified to maintain accreditation to the ISO 17025 standard.

All food of animal origin samples were also analysed for pesticides, metabolites and PCB marker congeners. PCBs are persistent environmental contaminants which in the past were released into the environment from industrial sources, but whose use has been discontinued for many years. They are included in the control programme as marker substances because of concerns related to their presence in food and their association with dioxins (chlorinated dibenzo-dioxins and furans).

6 RESULTS

6.1 Summary of the analytical results

A total of **1,083** samples were taken for analysis under two different types of sampling –

- **1,036** samples were selected under the surveillance strategy
- **47** samples were taken in a targeted manner under the enforcement strategy.

The following tables (1 to 18) provide summary details of all the samples taken in 2017 grouped by the food categories. These categories are based on the way the commodities are arranged and grouped in Annex I of the Residue Regulation (EC) No. 396/2005. The tables include information on the number of samples containing pesticides residues, country of origin and the most commonly detected pesticide in that food category.

Details of the levels of the pesticide residues detected for all samples above the Limit of Quantitation (LOQ) together with sample identification numbers, country of origin (where known), the relevant MRL for each substance detected and notes on the results are presented in Annex IV of this report. Results are expressed in mg/kg and are rounded to different significant figures depending on the concentration. These rounding rules do not reflect the precision of the methods but are used by regulatory laboratories in pesticide residues to harmonise the rounding and reporting of pesticide residue results in the EU.

Table 1: Summary results of fruit samples

Commodity	Residues detected				Origin of samples			
	Total	<LOQ	>LOQ & <MRL	>MRL	Ireland	EU	TC	Unknown
Apples	54	9	42	3	7	28	18	1
Avocados	7	7	0	0	0	2	5	0
Bananas	13	3	10	0	0	0	13	0
Blackberries	2	0	2	0	0	0	2	0
Blueberries	5	2	3	0	0	2	2	1
Cherimoyas	1	1	0	0	0	1	0	0
Cherries	2	0	2	0	0	1	1	0
Figs	1	1	0	0	0	0	1	0
Grapefruits	11	1	9	1	0	1	9	1
Kiwi fruits	17	7	10	0	0	13	4	0
Lemons	8	1	7	0	0	7	1	0
Limes	3	0	3	0	0	0	3	0
Lychees	1	1	0	0	0	0	1	0
Mandarins	40	1	37	2	0	9	31	0
Mangoes	6	2	4	0	0	0	6	0
Oranges	32	6	26	0	0	11	15	6
Dragon Fruit	1	1	0	0	0	0	1	0
Papayas	1	0	1	0	0	0	1	0
Passion Fruits	1	0	1	0	0	0	1	0
Peaches	8	1	7	0	0	6	2	0
Pears	33	4	29	0	0	23	10	0
Pineapples	2	1	1	0	0	0	2	0
Plums	7	1	6	0	0	0	7	0
Pomegranates	3	0	1	2	0	0	3	0
Raspberries	3	1	2	0	0	3	0	0
Strawberries	17	2	15	0	8	9	0	0
Table grapes	23	2	21	0	0	6	17	0
Total	**302**	**55**	**239**	**8**	**15**	**122**	**156**	**9**

Table 2: Summary of fruit samples taken in the surveillance programme

Fruit samples with pesticide residues detected	• 302 fruit surveillance samples were analysed • 18.2% had no residues detected above the LOQ • 79.1% had residues detected above the LOQ and below the MRL • 2.7% had residues detected above the MRL
Origin of samples	• 5.0% of fruit samples were of Irish origin • 40.4% were from EU countries and 51.7% from outside the EU • The origin could not be confirmed for 3.0% due to the processed nature of the product sampled
Most frequently detected pesticides	• Detection rates in all fruit samples: imazalil 29%, fludioxonil 23%, pyrimethanil 19%, thiabendazole 19%, boscalid 18%
Maximum number of multiple residues	• 12 pesticides were found in a pear sample from Portugal and in a strawberry sample from Ireland
Pesticide residues above the MRL	• 8 samples exceeded the MRL. Details are in chapter 7 of this report

Table 3: Summary results of vegetable and fungi samples

Commodity	Residues detected				Origin of samples			
	Total	<LOQ	>LOQ & <MRL	>MRL	IE	EU	TC	Unknown
Asparagus	2	2	0	0	0	1	1	0
Aubergines	10	7	3	0	0	10	0	0
Beans (with pods)	5	1	4	0	0	0	5	0
Broccoli	6	6	0	0	2	2	2	0
Carrots	17	10	7	0	5	11	1	0
Cauliflowers	12	12	0	0	7	5	0	0
Celeries	2	0	2	0	0	2	0	0
Chards	2	0	2	0	1	1	0	0
Chili peppers	1	0	1	0	0	1	0	0
Chinese cabbages	2	0	2	0	1	1	0	0
Courgettes	8	1	7	0	1	7	0	0
Cresses and other sprouts and shoots	1	1	0	0	0	0	0	1
Cucumbers	7	3	4	0	0	7	0	0
Cucurbits with	3	3	0	0	0	2	1	0
Cultivated fungi	11	5	6	0	11	0	0	0
Ginger	2	0	2	0	0	0	2	0
Fennels	1	0	1	0	0	0	1	0
Head cabbages	8	2	6	0	3	5	0	0
Kales	7	4	3	0	6	1	0	0
Lamb's lettuces	1	0	1	0	0	1	0	0
Land cresses	1	0	1	0	0	1	0	0
Leeks	1	1	0	0	1	0	0	0
Lentils (dry)	2	2	0	0	0	0	0	2
Lettuces	20	6	14	0	7	13	0	0
Melons	1	0	1	0	0	0	1	0
Mint	1	0	1	0	0	0	1	0
Onions	14	12	2	0	0	12	2	0
Parsley	1	0	1	0	0	1	0	0
Parsnips	3	1	2	0	3	0	0	0
Peas (with pods)	9	5	4	0	0	1	8	0
Potatoes	26	10	15	1	19	7	0	0
Rucola	3	1	2	0	0	3	0	0
Soyabeans	1	1	0	0	0	0	0	1
Spinaches	6	3	3	0	1	5	0	0
Spring onions	2	1	1	0	0	0	2	0
Stem vegetables	1	1	0	0	0	1	0	0
Swedes	7	6	0	1	7	0	0	0
Sweet peppers	17	6	11	0	0	17	0	0
Sweet potatoes	7	1	6	0	0	0	7	0
Tomatoes	14	5	9	0	4	7	3	0
Turnips	2	2	0	0	1	1	0	0
Total	**247**	**121**	**124**	**2**	**80**	**126**	**37**	**4**

Table 4: Summary of vegetable and fungi samples taken in the surveillance programme

Vegetable and fungi samples with pesticide residues detected	• 247 vegetable and fungi surveillance samples were analysed • 49.0% had no residues detected above the LOQ • 50.2% had residues detected above the LOQ and below the MRL • 0.8% had residues detected above the MRL
Origin of samples	• 32.4% of vegetable and fungi samples were of Irish origin • 51.0% were from EU countries and 15.0% from outside the EU • The origin could not be confirmed for 1.6% of the product sampled due to the processed nature of the product sampled
Most frequently detected pesticides	• Detection rates in all vegetables and fungi: boscalid 10%, fludioxonil 7%
Maximum number of multiple residues	• 8 pesticides were found in a lettuce sample from Ireland
Pesticide residues above the MRL	• 2 samples exceeded the MRL. Details are in chapter 7 of this report

6.2 Key findings of the fruit, vegetable and fungi sample results

In the 2017 programme a total of 549 fruit, vegetable and fungi samples were analysed using the surveillance or random sampling strategy. When compared to previous years, the number of samples with residues detected above the MRL (1.8%) has decreased from 2016 (4.0%) and 2015 (3.2%). The majority of the breaches occur in samples from third countries with different regulations controlling the use of pesticides and where application for higher import MRLs or import tolerances in the EU have yet to be applied for or not granted.

The number of fruit and vegetable samples with detectable residues above the LOQ has reduced slightly to 66% in 2017. The number of pesticides being detected has remained relatively constant.

As in the previous 3 years, imazalil which is mainly used to prevent decay of citrus during storage and transportation was the most commonly detected pesticide in the fruit and vegetables samples during 2017 using the multi reside methods.

Table 5: Summary results of cereal samples

Commodity	Residues detected				Origin of samples			
	Total	<LOQ	>LOQ & <MRL	>MRL	IE	EU	TC	Unknown
Barley	15	10	5	0	15	0	0	0
Oat	12	12	0	0	12	0	0	0
Rice	17	11	6	0	0	1	7	9
Rye	3	2	1	0	1	1	0	1
Wheat	15	1	14	0	14	0	0	1
Total	**62**	**36**	**26**	**0**	**42**	**2**	**7**	**11**

Table 6: Summary of cereal samples taken in the surveillance programme

Cereal samples with pesticide residues detected	• 62 cereal samples were analysed • 58.1% had no residue detected above the LOQ • 41.9% had residues detected above the LOQ and below the MRL • 0.0% with residues above the MRL
Origin of samples	• 67.7% of cereal samples were of Irish origin • 3.2% were from EU countries and 11.3% from outside the EU • The origin could not be confirmed for 17.7% of the product sampled due to the processed nature of the product sampled
Most frequently detected pesticide	• Chlormequat was detected in 54% of the cereal samples analysed using the selective method for that compound
Maximum number of multiple residues	• 8 pesticides were found in a wheat sample from Ireland
Pesticide residues above the MRL	• No cereal samples with residues detected above the MRL

6.3 Key findings of the cereal sample results

Pesticide residues were found in 42% of the cereal samples that were taken in the surveillance programme but there were no samples where the MRL was exceeded. This is a lower frequency than that found in 2016 (54%) and 2015 (88%). Chlormequat was detected in 54% of the cereal samples analysed using the selective method for that compound. 68% of the cereal samples taken were of domestic origin.

Table 7: Summary results of food of animal origin samples

Commodity	Residues detected				Origin of samples			
	Total	<LOQ	>LOQ & <MRL	>MRL	IE	EU	TC	Unknown
Eggs (chicken)	11	11	0	0	11	0	0	0
Fat (bovine)	119	115	4	0	119	0	0	0
Fat (equine)	8	7	1	0	8	0	0	0
Fat (Cervine)	11	11	0	0	11	0	0	0
Fat (poultry)	20	18	2	0	20	0	0	0
Fat (sheep)	81	75	5	1	81	0	0	0
Fat (swine)	61	59	2	0	61	0	0	0
Honey	12	11	1	0	12	0	0	0
Milk (cattle)	64	62	0	2	64	0	0	0
Milk (goat)	2	2	0	0	2	0	0	0
Milk (sheep)	1	1	0	0	1	0	0	0
Total	**390**	**372**	**15**	**3**	**390**	**0**	**0**	**0**

Table 8: Summary of food of animal origin samples taken in the surveillance programme

Food of animal origin samples with pesticide residues detected	• 390 food of animal origin samples were analysed • 95.4% had no residue detected above the LOQ • 3.8% had residues detected above the LOQ and below the MRL • 0.8% had residues detected above the MRL
Origin of samples	• 100% of the food of animal origin samples were of Irish origin
Most frequently detected pesticide	• 2-phenylphenol was detected in 8 of the food of animal origin samples
Maximum number of multiple residues	• No food of origin sample contained multiple residues
Pesticide residues above the MRL	• 3 samples exceeded the MRL. Details are in chapter 7 of this report

6.4 Key findings of the food of animal origin sample results

The percentage of food of animal origin samples with detectable residues remained relatively low over the past three years: - 6% in 2015, 4% in 2016 and 4% in 2017 - despite an increase in the analytical scope and the increased sensitivity of the methods used for these samples. Three samples had MRL exceedances which related to possible contamination from the use of disinfectant or cleaning products. 2-phenylphenol was the most commonly detected pesticide and was found in 8 samples. All of the food of animal origin samples taken were of domestic origin.

Table 9: Summary results of baby food samples

Commodity	Residues detected				Origin of samples			
	Total	<LOQ	>LOQ & <MRL	>MRL	IE	EU	TC	Unknown
Follow-on formulae	5	5	0	0	5	0	0	0
Infant formulae	30	30	0	0	30	0	0	0
Total	**35**	**35**	**0**	**0**	**35**	**0**	**0**	**0**

Table 10: Summary of baby food samples taken in the surveillance programme

Baby food samples with pesticide residues detected	• 35 baby food samples were analysed • 100% had no residue detected above the LOQ
Origin of samples	• 100% of the baby food samples were of Irish origin
Most frequently detected pesticide	• No pesticides detected
Maximum number of multiple residues	• No pesticides detected
Pesticide residues above the MRL	• No baby food sample with residues detected above the MRL

6.5 Key findings of baby food sample results

In line with previous years there continued to be no residues detected in the infant and follow-on formula samples analysed in 2017.

Table 11: Summary results of targeted and follow up enforcement samples

Commodity	Residues detected				Origin of samples			
	Total	<LOQ	>LOQ & <MRL	>MRL	IE	EU	TC	Unknown
Apple	2	0	2	0	0	1	1	0
Broccoli	1	0	1	0	0	1	0	0
Clementine	2	0	2	0	0	0	2	0
Cultivated fungi	2	1	0	1	2	0	0	0
Ginger	1	0	1	0	0	0	1	0
Head Cabbage	1	0	0	1	1	0	0	0
Orange	1	0	1	0	0	0	1	0
Tomato	1	0	1	0	1	0	0	0
Swedes	1	1	0	0	1	0	0	0
Total	**12**	**2**	**8**	**2**	**5**	**2**	**5**	**0**

Table 12: Summary of targeted and follow up samples taken in the enforcement programme

Enforcement samples with pesticide residues detected	• 12 targeted and follow-up enforcement samples were analysed • 16.7% had no residue detected above the LOQ • 66.7% had residues detected above the LOQ and below the MRL • 16.7% had residues detected above the MRL
Origin of samples	• 41.7% of enforcement samples were of Irish origin • 16.7% were from EU countries and 41.7% from outside the EU
Most frequently detected pesticide	• Not relevant due to diverse range of commodities
Maximum number of multiple residues	• 8 pesticides were found in an orange from South Africa
Pesticide residues above the MRL	• 2 samples exceeded the MRL. Details are in chapter 7 of this report

6.6 Key findings of targeted and follow up sample results

Where 2016 samples were found to exceed a statutory MRL the relevant food commodities were targeted for analysis in 2017. Twelve samples were taken and 2 samples had MRL exceedances.

Table 13: Summary results of import control samples

Commodity	Residues detected				Origin of samples			
	Total	<LOQ	>LOQ & <MRL	>MRL	IE	EU	TC	Unknown
Lemons	2	0	1	1	0	0	2	0
Strawberries	25	11	14	0	0	0	25	0
Peas (with pods)	5	1	4	0	0	0	5	0
Sweet peppers	1	1	0	0	0	0	1	0
Teas	2	1	1	0	0	0	2	0
Total	**35**	**14**	**20**	**1**	**0**	**0**	**35**	**0**

Table 14: Summary of import control samples taken in the enforcement programme

Enforcement samples with pesticide residues detected	• 35 import control samples were analysed • 40.0% had no residue detected above the LOQ • 57.1% had residues detected above the LOQ and below the MRL • 2.9% had residues detected above the MRL
Origin of samples	• 100.0% of import control samples were from outside the EU
Most frequently detected pesticide	• Not relevant due to diverse range of commodities
Maximum number of multiple residues	• 6 pesticides were found in 2 pea samples from Kenya and 2 strawberry samples from Egypt
Pesticide residues above the MRL	• 1 sample exceeded the MRL. Details are in chapter 7 of this report

6.7 Key findings of import control sample results

In 2017 35 samples were taken under EU Regulations dealing with increased inspection of targeted food commodities from certain countries. No residues were detected in 40% of the samples and 57.1% of the samples had residues in compliance with the EU legislation. There was one MRL breach (2.9%) found in 2017.

7 MRL BREACHES

7.1 Types of breaches

Sixteen (1.5%) of the 1,083 samples taken in 2017 were found to contain residues above the Maximum Residue Levels set in Regulation (EC) 396/2005. Taking into account the analytical measurement uncertainty, 0.37% of the samples (4 samples) clearly exceeded these legal limits (non-compliance).

Table 15 shows the breakdown of the residues found in all samples by food types, total sample number and % of samples without residues above the LOQ, residues below the MRL and the number exceeding the MRL from the two sampling programmes. As expected, the highest rate of MRL breaches occurred with the samples taken in a targeted manner on samples with known history of non-compliances.

Table 15: Summary of all food types with residues and MRL breaches in 2017

Sampling programmes	Food types	Numbers	< LOQ		<MRL		> MRL	
Surveillance	Fruit Veg	549	176	32.1%	363	66.1%	10	1.8%
Surveillance	Cereal	62	36	58.1%	26	41.9%	0	0.0%
Surveillance	Animal origin	390	372	95.4%	15	3.8%	3	0.8%
Surveillance	Baby food	35	35	100.0%	0	0.0%	0	0.0%
Enforcement	Fruit Veg	12	2	16.7%	8	66.7%	2	16.7%
Import Controls	Fruit Veg	35	14	40.0%	20	57.1%	1	2.9%
Total		**1083**	**635**	**58.6%**	**432**	**39.9%**	**16**	**1.5%**

Table 16 lists all the breaches with details of the origin, commodity, and pesticide detected above the MRL and the residues found.

Table 16: Details of the MRL breaches in 2017

	Source	Commodity	Pesticide	Residue	MRL
Surveillance					
Ireland	Ireland	Fat (sheep)	2-phenylphenol	0.093	0.05
		Milk (cattle)	Benzalkonium chloride	0.14	0.1
		Milk (cattle)	Benzalkonium chloride	0.24	0.1
		Potatoes	Fluazinam	0.068	0.02
		Swedes	Chlorpropham	0.049	0.01
EU	France	Apples	Chlorpyrifos	0.014	0.01
Third Country	Brazil	Apples	Chlorpyrifos	0.015	0.01
		Apples	Chlorpyrifos	0.012	0.01
			Fenitrothion	0.014	0.01
	Israel	Grapefruits	Bromopropylate	0.012	0.01
	India	Pomegranates	Mandipropamid	0.014	0.01
	Morocco	Mandarins	2-phenylphenol	5.4	5
	Peru	Mandarins	Iprodione	0.014	0.01
	Turkey	Pomegranates	Fenvalerate	0.036	0.02
Enforcement					
Ireland	Ireland	Cultivated fungi	Metrafenone	2.1	0.5
		Head cabbages	Thiamethoxam	0.021	0.02
Third Country	Turkey	Lemons	Fenvalerate	0.03	0.02

7.2 Risk Assessments

7.2.1 Acute assessment

An acute risk assessment for Irish consumers, adult and children, was conducted for each MRL exceedance detected in 2017.

The risk assessment is based on the following factors:

- A large portion consumed over a 24 hour period. A very high percentile, 97.5%, is used from the food surveys.
- Body weight of the consumer.
- A variability factor to account for possible uneven distribution of the residues in a consignment or food lot. A factor of 5 is normally used. The mean residue detected in a laboratory sample is multiplied by this factor and is applied to an average weight of a food unit.
- ARfD - Acute reference dose mg /kg bw - toxicological endpoint over a 24 hour period.
- Residue found in the sample exceeding the MRL.
- Refinement such as peel/pulp factors. In the post-harvest application such as dipping citrus fruit in Imazalil, a refinement factor can be used since most of the pesticide resides on the peel and the laboratory result is based on the whole fruit.

The results of the assessments are provided to the FSAI to coordinate a harmonised enforcement approach.

It should be stressed that these assessments based on the combination of a large food portion, highest residue found and a highly uneven distribution of the residue is a very conservative assessment leading to an overestimation of the real exposure of the Irish consumers to pesticide intakes.

The acute or short term pesticide intake for all products which had breaches indicates that all breaches were below the 100% ARfD and therefore are deemed not to represent a short term intake safety concern.

7.2.2 Chronic Assessment

A chronic risk assessment for Irish consumers, adult and children, is conducted for each MRL exceedance. The calculation of the chronic exposure assessment is based on

- Mean portion of food consumed
- Body weight of the consumer
- ADI (acceptable daily intake)
- Residue found in the sample exceeding the MRL

It is assumed that the consumer is eating the same commodity with the residue leading to the MRL breach on a daily basis over a lifetime. This assessment is an overestimate of the real exposure to pesticides.

There was no chronic intake exceedance for any of the 16 MRL breaches encountered in 2017.

8 ENFORCEMENT ACTIONS

Enforcement action is taken when an unacceptable risk to consumers is identified, or where repeated occurrence of excessive residue levels in commodities from the same source occurs. As part of the enforcement programme, commodities of specific country of origin are targeted for further attention. Targeted sampling of produce in the monitoring plan that has previously been found to be in breach of established MRLs is the prime means of determining whether violations are isolated incidents or are a result of systematic pesticides abuse. The enforcement sampling programme is designed to eliminate such abuses and to ensure that they are not repeated.

8.1 Enforcement actions on domestic samples

The PCD Enforcement Officer investigates MRL breaches in samples of domestic origin. In 2017, seven MRL breaches were detected in produce of domestic origin (2 milk, sheep fat, head cabbage, cultivated fungi, potatoes and swedes).

With respect to each reported breach, the following summarises the findings of the follow-up investigation;

- Metrafenone detected in cultivated fungi - Grower applied a product to growing mushrooms in contravention of the label directions.
- 2-phenylphenol detected in sheep fat – possible contamination from use as a disinfectant.
- Thiamethoxam detected in head cabbage – Seedlings sourced from aNorthern Ireland, where a seed dressing product containing thiamethoxam is registered for use on cabbage.
- Benzalkonium chloride detected in 2 milk samples - possible contamination from cleaning products used on farm or in production.
- Fluazinam detected in potatoes – grower applied a product at rate in excess of recommended rate.
- Chlorpropham detected in swedes – possible cross contamination from potato store.

As a result of MRL breaches and invalid uses detected in 2017, a number of follow up targeted samples were taken from domestic growers in 2018.

8.2 Enforcement actions on imported samples

With respect to MRL breaches detected in imported samples, it was not always possible to establish the reasons for breaches in the absence of details on the pesticides authorised for use in the countries of origin. Where an imported product contained a residue in excess of an MRL,

the authorities in the country of origin and the Irish importer were informed of the MRL breach. They are also informed that further produce from the same source encountered on the Irish market would be further targeted for analysis and, if necessary, subjected to statutory actions.

Commission Regulation (EC) No. 669/2009 imposes additional controls on imports from third countries known or considered to be a risk from elevated levels of pesticide residues. Annex I to this legislation lists countries and commodities subject to this legislation, and also details sampling and analysis frequencies. Produce subject to these additional controls can only enter the country through Designated Points of Entry, which for Ireland (with respect to pesticide residues) are Dublin Port and Dublin Airport.

Based on the laboratory result (and risk assessment where appropriate), a consignment is either released (no issues arising), redespatched or destroyed under supervision. The latter options come into play when a MRL is breached with a 50% measurement of uncertainty, and/or a risk assessment indicates that a health concern cannot be ruled out. In all instances a health concern takes precedence over uncertainty guidelines.

In 2017, 35 consignments were randomly selected and analysed for pesticide residues. One sample was found to breach relevant MRLs.

8.3 Concluding remarks

The Pesticide Control Laboratory and Pesticide Controls Division of the DAFM, and the FSAI continue to have an on-going dialogue as part of the service contract between both organisations. The intention is to optimise the annual control programme for pesticide residues in food and assess the possible risk of such residues for consumers. The programme will continue to take account of the opinion of the European Commission with respect to the range of crops and pesticides to be included in the programme.

For the immediate future, DAFM will focus on further increasing the capacity of the laboratory to screen for an ever-increasing number of pesticides, using multi and single residue methods over a wider range of food commodities.

9 ANNEXES

9.1 ANNEX I Scopes and Reporting Level (mg/kg) of the analytical methods used

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**
1-Naphthylacetamide	0.01	2,4,6Trichlorophenol	0.005	1-Naphthylacetamide	0.01	1-Naphthylacetamide	0.01
2,4,5-T	0.01	3,5-Dichloroaniline	0.01	2,4,5-T	0.01	2,4,5-T	0.01
2,4,6Trichlorophenol	0.01	3-Chloroaniline	0.005	2,4,6Trichlorophenol	0.005	2,4,6-Trichlorophenol	0.01
2,4-D	0.02	4,4-	0.005	2,4-D	0.02	2,4-D	0.01
2,4-DB	0.05	Acephate	0.05	2,4-DB	0.05	2,4-DB	0.01
3,5-Dichloroaniline	0.01	Aclonifen	0.02	3,5-Dichloroaniline	0.01	3,5-Dichloroaniline	0.01
3-Chloroaniline	0.01	Acrinathrin	0.005	3-Chloroaniline	0.005	3-Chloroaniline	0.01
4,4-	0.01	Alachlor	0.005	4,4-	0.005	4,4-	0.01
Abamectin	0.1	Aldrin	0.005	Abamectin	0.1	Abamectin	0.01
Acephate	0.01	Ametryn	0.01	Acephate	0.05	Acephate	0.01
Acetamiprid	0.01	Aminocarb	0.01	Acephate	0.01	Acetamiprid	0.01
Acetochlor	0.02	Anthraquinone	0.05	Acetamiprid	0.01	Acetochlor	0.01
Acibenzolar-S-methyl	0.05	Atrazine	0.01	Acetochlor	0.02	Acibenzolar-S-methyl	0.05
Aclonifen	0.01	Azaconazole	0.005	Acibenzolar-S-methyl	0.05	Aclonifen	0.01
Acrinathrin	0.01	Azamethiophos	0.01	Aclonifen	0.02	Acrinathrin	0.01
Alachlor	0.01	Azinphos-ethyl	0.005	Acrinathrin	0.005	Alachlor	0.01
Aldicarb	0.01	Azinphos-methyl	0.01	Alachlor	0.005	Aldicarb	0.01
Aldicarb-sulfone	0.01	Azoxystrobin	0.01	Aldicarb	0.01	Aldicarb-sulfone	0.01
Aldicarb-sulfoxide	0.01	Benalaxyl	0.01	Aldicarb-sulfone	0.01	Aldicarb-sulfoxide	0.01
Aldrin	0.01	Bendiocarb	0.01	Aldicarb-sulfoxide	0.01	Aldrin	0.01
Ametryn	0.01	Bifenthrin	0.005	Aldrin	0.005	Ametryn	0.01
Amidosulfuron	0.01	Biphenyl	0.1	Ametryn	0.01	Amidosulfuron	0.01
Aminocarb	0.01	Bitertanol-I	0.005	Amidosulfuron	0.01	Aminocarb	0.01
Anthraquinone	0.05	Bitertanol-II	0.005	Aminocarb	0.01	Anthraquinone	0.05
Asulam	0.02	Bixafen	0.01	Anthraquinone	0.05	Asulam	0.01
Atrazine	0.01	Boscalid	0.02	Asulam	0.02	Atrazine	0.01
Atrazine-desethyl	0.01	Bromacil	0.01	Atrazine	0.01	Atrazine-desethyl	0.01
Atrazine-desisopropyl	0.01	Bromophos-ethyl	0.005	Atrazine-desethyl	0.01	Atrazine-desisopropyl	0.01
Azaconazole	0.01	Bromophos-methyl	0.005	Atrazine-desisopropyl	0.01	Azaconazole	0.01
Azamethiophos	0.01	Bromopropylate	0.005	Azaconazole	0.005	Azamethiphos	0.01
Azinphos-ethyl	0.01	Bromuconazole	0.01	Azamethiophos	0.01	Azinphos-ethyl	0.01
Azinphos-methyl	0.01	Bupirimate	0.01	Azinphos-ethyl	0.005	Azoxystrobin	0.01
		Buprofezin	0.01	Azinphos-methyl	0.01	Benalaxyl	0.01
Azoxystrobin	0.01	Butocarboxim-	0.01	Azoxystrobin	0.01	Bendiocarb	0.01
BAC10	0.01	Cadusafos	0.01	BAC10	0.01	Bentazone	0.01
BAC12	0.01	Carbaryl	0.01	BAC12	0.01	Benthiavalicarb-	0.01
BAC14	0.01	Carbendazim	0.01	BAC14	0.01	Benzoximate	0.01
BAC16	0.01	Carbofuran	0.01	BAC16	0.01	Bifenthrin	0.01
Benalaxyl	0.01	Carbofuran 3 hydroxy	0.01	Benalaxyl	0.01	Binapacryl	0.01
Bendiocarb	0.01	Carbosulfan	0.01	Bendiocarb	0.01	Bioresmethrin	0.01
Bentazone	0.01	Carboxin	0.01	Bentazone	0.01	Biphenyl	0.05
Benthiavalicarb-	0.01	Chlorbromuron	0.01	Benthiavalicarb-	0.01	Bitertanol	0.01
Benzoximate	0.01	Chlorbufam	0.02	Benzoximate	0.01	Bixafen	0.01
Bifenthrin	0.01	Chlordane-cis	0.005	Bifenthrin	0.005	Boscalid	0.01
Binapacryl	0.01	Chlordane-trans	0.005	Bioresmethrin	0.01	Bromacil	0.01
Bioresmethrin	0.01	Chlorfenapyr	0.02	Biphenyl	0.1	Bromophos-ethyl	0.01
Biphenyl	0.05	Chlorfenvinphos	0.01	Bitertanol-I	0.005	Bromophos-me	0.01
Bitertanol	0.01	Chlorobenzilate	0.005	Bitertanol-II	0.005	Bromopropylate	0.01
Bixafen	0.01	Chlorothalonil	0.005	Bixafen	0.01	Bromoxynil	0.01
Boscalid	0.01	Chlorpropham	0.005	Boscalid	0.01	Bromuconazole	0.01
Bromacil	0.01	Chlorpyrifos methyl	0.005	Bromacil	0.01	Bupirimate	0.01
Bromophos-ethyl	0.01	Chlorpyriphos	0.01	Bromophos-ethyl	0.005	Buprofezin	0.01
Bromophos-methyl	0.01	Chlorthal-dimethyl	0.005	Bromophos-methyl	0.005	Butoxocarboxim-	0.01

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**
Bromopropylate	0.01	Chlozolinate	0.005	Bromopropylate	0.005	Butoxycarboxim	0.02
Bromoxynil	0.01	Clofentezine	0.01	Bromoxynil	0.01	Cadusafos	0.01
Bromuconazole	0.01	Coumaphos	0.005	Bromuconazole I	0.01	Captafol	0.01
Bupirimate	0.01	Cyanazine	0.01	Bromuconazole II	0.01	Captan	0.01
Buprofezin	0.01	Cyanofenphos	0.005	Bupirimate	0.01	Carbaryl	0.01
Butocarboxim	0.01	Cyanophos	0.005	Buprofezin	0.01	Carbendazim	0.01
Butoxycarboxim	0.02	Cyazofamid	0.01	Butocarboxim	0.01	Carbofuran	0.01
Cadusafos	0.01	Cyfluthrin	0.02	Butoxycarboxim	0.02	Carbofuran 3 Hydroxy	0.01
Captafol	0.02	Cyhalothrin-lambda	0.005	Cadusafos	0.01	Carbosulfan	0.01
Captan	0.01	Cypermethrin	0.05	Carbaryl	0.01	Carboxin	0.01
Carbaryl	0.01	Cyproconazole	0.005	Carbendazim	0.02	Carfentrazone-ethyl	0.01
Carbendazim	0.02	Cyprodinil	0.01	Carbofuran	0.01	Chlorantraniliprole	0.01
Carbofuran	0.01	Deltamethrin	0.02	Carbofuran 3 Hydroxy	0.01	Chlorbromuron	0.01
Carbofuran 3 Hydroxy	0.01	Demeton-S-me-sulfone	0.005	Carbosulfan	0.01	Chlorbufam	0.01
Carbosulfan	0.01	Diazinon	0.005	Carboxin	0.01	Chlordane cis	0.05
Carboxin	0.01	Dichlobenil	0.005	Carfentrazone-ethyl	0.01	Chlordane trans	0.05
Carfentrazone-ethyl	0.01	Dichlofluanid	0.005	Chlorantraniliprole	0.01	Chlorfenapyr	0.01
Chlorantraniliprole	0.01	Dichlorvos	0.005	Chlorbromuron	0.01	Chlorfenvinphos	0.01
Chlorbromuron	0.01	Dicloran	0.005	Chlorbufam	0.02	Chlorfluazuron	0.01
Chlorbufam	0.01	Dieldrin	0.01	Chlordane-cis	0.005	Chloridazon	0.01
Chlordane-cis	0.01	Diethofencarb	0.01	Chlordane-trans	0.005	Chlorobenzilate	0.01
Chlordane-trans	0.01	Difenoconazole	0.01	Chlorfenapyr	0.02	Chlorothalonil	0.01
Chlorfenapyr	0.01	Dimethenamid	0.01	Chlorfenvinphos	0.01	Chlorotoluron	0.01
Chlorfenvinphos	0.01	Dimethoate	0.005	Chlorfluazuron	0.01	Chloroxuron	0.01
Chlorfluazuron	0.01	Dimethomorph	0.01	Chloridazon	0.01	Chlorpropham	0.01
Chloridazon	0.01	Dimoxystrobin	0.005	Chlorobenzilate	0.005	Chlorpyrifos	0.01
Chlorobenzilate	0.01	Diniconazole	0.01	Chlorothalonil	0.005	Chlorpyrifos Methyl	0.01
Chlorothalonil	0.01	Diphenylamine	0.05	Chlorotoluron	0.01	Chlorsulfuron	0.05
Chlorotoluron	0.01	Diuron	0.01	Chloroxuron	0.01	Chlorthal-dimethyl	0.01
Chloroxuron	0.01	Endosulfan-alpha	0.01	Chlorpropham	0.005	Chlozolinate	0.05
Chlorpropham	0.01	Endosulfan-beta	0.01	Chlorpyrifos methyl	0.005	Clethodim	0.01
Chlorpyrifos methyl	0.01	Endosulfan-ether	0.005	Chlorpyriphos	0.01	Clodinafop-propargyl	0.01
Chlorpyriphos	0.01	Endosulfan-lacton	0.02	Chlorsulfuron	0.01	Clofentezine	0.01
Chlorsulfuron	0.01	Endosulfan-sulfate	0.02	Chlorthal-dimethyl	0.005	Clomazone	0.01
Chlorthal-dimethyl	0.01	Endrin	0.01	Chlozolinate	0.005	Clopyralid	0.05
Chlozolinate	0.01	EPN	0.005	Clethodim	0.01	Clothianidin	0.01
Clethodim	0.01	Epoxyconazole	0.01	Clethodim	0.01	Coumaphos	0.01
Clodinafop-propargyl	0.01	Ethiofencarb	0.05	Clodinafop-propargyl	0.01	Cyanazine	0.01
Clofentezine	0.01	Ethiofencarb sulfone	0.05	Clofentezine	0.01	Cyanofenphos	0.01
Clomazone	0.01	Ethiofencarb sulfoxide	0.05	Clomazone	0.01	Cyanophos	0.01
Clopyralid	0.05	Ethion	0.01	Clopyralid	0.05	Cyazofamid	0.01
Clothianidin	0.01	Ethofumesate	0.01	Clothianidin	0.01	Cyclanilide	0.01
Coumaphos	0.01	Ethoprophos	0.005	Coumaphos	0.005	Cycloate	0.01
Cyanazine	0.01	Etofenprox	0.01	Cyanazine	0.01	Cycloxydim	0.5
Cyanofenphos	0.01	Etoxazole	0.005	Cyanofenphos	0.005	Cyfluthrin	0.05
Cyanophos	0.01	Etridazole	0.005	Cyanophos	0.005	Cyhalothrin (lambda)	0.01
Cyazofamid	0.01	Etrimfos	0.01	Cyazofamid	0.01	Cymiazol	0.01
Cyclanilide	0.1	Famoxadone	0.01	Cyclanilide	0.1	Cymoxanil	0.01
Cycloate	0.01	Fenamidone	0.005	Cycloate	0.01	Cypermethrin	0.1
Cycloxydim	0.05	Fenamiphos	0.01	Cycloxydim	0.05	Cyproconazole	0.01
Cyfluthrin	0.01	Fenarimol	0.005	Cyfluthrin	0.02	Cyprodinil	0.01
Cyhalothrin-lambda	0.01	Fenazaquin	0.01	Cyhalothrin-lambda	0.005	op DDD	0.01
Cymiazol	0.01	Fenbuconazole	0.005	Cymiazol	0.01	pp DDD	0.01
Cymoxanil	0.01	Fenchlorphos	0.005	Cymoxanil	0.01	op DDE	0.01
Cypermethrin	0.02	Fenhexamid	0.01	Cypermethrin	0.05	pp DDE	0.01
Cyproconazole	0.01	Fenitrothion	0.005	Cyproconazole	0.005	op DDT	0.01
Cyprodinil	0.01	Fenoxycarb	0.01	Cyprodinil	0.01	pp DDT	0.01
DDAC	0.01	Fenpropathrin	0.005	DDAC	0.01	DEET	0.05

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**
DEET	0.05	Fenpropidin	0.01	DEET	0.05	Deltamethrin	0.05
Deltamethrin	0.01	Fenpropimorph	0.01	Deltamethrin	0.02	Demeton-s-methyl	0.01
Demeton-S-me-sulfone	0.01	Fenpyroximate	0.01	Demeton-S-me-sulfone	0.005	Demeton-s-methyl	0.01
Demeton-S-methyl-	0.01	Fenthion	0.01	Demeton-S-methyl-	0.01	Desmedipham	0.01
Desmedipham	0.01	Fenthion sulfone	0.01	Desmedipham	0.01	Diazinon	0.01
Diazinon	0.01	Fenthion sulfoxide	0.01	Diazinon	0.005	Dichlobenil	0.01
Dichlobenil	0.01	Fenvalerate-I	0.01	Dichlobenil	0.005	Dichlofenthion	0.05
Dichlofenthion	0.05	Fenvalerate-II	0.01	Dichlofenthion	0.05	Dichlofluanid	0.01
Dichlofluanid	0.01	Flamprop-isopropyl	0.01	Dichlofluanid	0.005	Dichlorprop	0.01
Dichlorprop	0.01	Flucythrinate-I	0.02	Dichlorprop	0.01	Dichlorvos	0.01
Dichlorvos	0.01	Flucythrinate-II	0.02	Dichlorvos	0.005	Diclobutrazol	0.01
Diclobutrazol	0.01	Fludioxonil	0.005	Diclobutrazol	0.01	Dicloran	0.01
Dicloran	0.01	Flufenacet	0.01	Dicloran	0.005	Dicofol	0.01
Dicofol	0.01	Flufenoxuron	0.01	Dicrotophos	0.01	Dicrotophos	0.01
Dicrotophos	0.01	Fluquinconazole	0.01	Dieldrin	0.01	Dieldrin	0.01
Dieldrin	0.01	Flurtamone	0.005	Diethofencarb	0.01	Diethofencarb	0.01
Diethofencarb	0.01	Flusilazole	0.005	Difenoconazole	0.01	Difenoconazole	0.01
Difenoconazole	0.01	Flutolanil	0.01	Diflubenzuron	0.01	Diflubenzuron	0.01
Diflubenzuron	0.01	Flutriafol	0.01	Diflufenican	0.01	Diflufenican	0.01
Diflufenican	0.01	Fluvalinate-tau-I	0.02	Dimethenamid	0.01	Dimethenamid	0.01
Dimethenamid	0.01	Fluvalinate-tau-II	0.02	Dimethoate	0.005	Dimethoate	0.01
Dimethoate	0.01	Fonofos	0.005	Dimethomorph I	0.01	Dimethomorph	0.01
Dimethomorph	0.01	Formothion	0.005	Dimethomorph II	0.01	Dimoxystrobin	0.01
Dimoxystrobin	0.01	Fosthiazate	0.01	Dimoxystrobin	0.005	Diniconazole	0.01
Diniconazole	0.01	Fuberidazole	0.01	Diniconazole	0.01	Dinitramine	0.1
Dinitramine	0.1	Furalaxyl	0.005	Dinitramine	0.1	Dinoseb	0.01
Dinoseb	0.02	Furathiocarb	0.01	Dinoseb	0.02	Dinoterb	0.02
Dinoterb	0.02	HCH-alpha	0.005	Dinoterb	0.02	Dioxacarb	0.01
Dioxacarb	0.01	HCH-beta	0.005	Dioxacarb	0.01	Diphenamid	0.01
Diphenamid	0.01	HCH-delta	0.005	Diphenamid	0.01	Diphenylamine	0.05
Diphenylamine	0.05	Heptachlor	0.005	Diphenylamine	0.05	Ditalimfos	0.01
Ditalimfos	0.01	Heptachlor endo-	0.005	Ditalimfos	0.01	Diuron	0.01
Diuron	0.01	Heptachlor exo-	0.005	Diuron	0.01	DMSA	0.01
DMSA	0.02	Heptenophos	0.01	DMSA	0.02	DMST	0.01
DMST	0.02	Hexachlorobenzene	0.005	DMST	0.02	DNOC	0.02
DNOC	0.01	Hexaconazole	0.005	DNOC	0.01	Dodine	0.01
Dodine	0.01	Hexythiazox	0.01	Dodine	0.01	Emamectin B1a	0.01
Emamectin B1a	0.01	Imazalil	0.01	Emamectin B1a	0.01	Endosulfan (alpha	0.01
Endosulfan sulfate	0.02	Indoxacarb	0.01	Endosulfan sulfate	0.02	Endosulfan (beta	0.01
Endosulfan-alpha	0.01	Iodofenphos	0.005	Endosulfan-alpha	0.01	Endosulfan ether	0.01
Endosulfan-beta	0.01	Iprovalicarb-I	0.02	Endosulfan-beta	0.01	Endosulfan Lacton	0.01
Endosulfan-ether	0.01	Iprovalicarb-II	0.02	Endosulfan-ether	0.005	Endosulfan sulfate	0.01
Endosulfan-lacton	0.01	Isazophos	0.005	Endosulfan-lacton	0.02	Endrin	0.01
Endosulfan-sulfate	0.02	Isodrin	0.005	Endosulfan-sulfate	0.02	EPN	0.01
Endrin	0.01	Isofenphos	0.01	Endrin	0.01	Epoxyconazole	0.01
EPN	0.01	Isofenphos	0.005	EPN	0.005	EPTC	0.01
Epoxyconazole	0.01	Isofenphos-methyl	0.005	Epoxyconazole	0.01	Ethiofencarb	0.05
EPTC	0.1	Isofenphos-oxon	0.005	EPTC	0.1	Ethiofencarb sulfone	0.05
Esfenvalerate	0.01	Isoprocarb	0.01	Ethiofencarb	0.05	Ethiofencarb sulfoxide	0.05
Ethiofencarb	0.05	Isoprothiolane	0.01	Ethiofencarb-sulfone	0.05	Ethion	0.01
Ethiofencarb-sulfone	0.05	Isoproturon	0.01	Ethiofencarb-sulfoxide	0.05	Ethirimol	0.01
Ethiofencarb-sulfoxide	0.05	Kresoxim-methyl	0.01	Ethion	0.01	Ethofumesate	0.01
Ethion	0.01	Lenacil	0.005	Ethirimol	0.01	Ethoprophos	0.01
Ethirimol	0.01	Lindane	0.005	Ethofumesate	0.01	Etofenprox	0.01
Ethofumesate	0.01	Linuron	0.01	Ethoprophos	0.005	Etoxazole	0.05
Ethoprophos	0.01	Lufenuron	0.01	Etofenprox	0.01	Etridazole	0.01
Etofenprox	0.01	Malaoxon	0.01	Etoxazole	0.005	Etrimfos	0.01
Etoxazole	0.01	Malathion	0.01	Etridazole	0.005	Famoxadone	0.01

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**
Etridazole	0.01	MCPA methyl ester	0.005	Etrimfos	0.01	Fenamidone	0.01
Etrimfos	0.01	Mecarbam	0.005	Famoxadone	0.01	Fenamiphos	0.01
Famoxadone	0.01	Mepanipyrim	0.01	Fenamidone	0.005	Fenamiphos-sulfone	0.01
Fenamidone	0.01	Mepronil	0.01	Fenamiphos	0.01	Fenamiphos-sulfoxide	0.01
Fenamiphos	0.01	Metalaxyl	0.01	Fenamiphos-sulfone	0.01	Fenarimol	0.01
Fenamiphos-sulfone	0.01	Metazachlor	0.01	Fenamiphos-sulfoxide	0.01	Fenazaquin	0.01
Fenamiphos-sulfoxide	0.01	Metconazole	0.01	Fenarimol	0.005	Fenbuconazole	0.01
Fenarimol	0.01	Methacrifos	0.005	Fenazaquin	0.01	Fenchlorphos	0.01
Fenazaquin	0.01	Methamidophos	0.005	Fenbuconazole	0.005	Fenhexamid	0.01
Fenbuconazole	0.01	Methidathion	0.01	Fenchlorphos	0.005	Fenitrothion	0.01
Fenchlorphos	0.01	Methiocarb	0.01	Fenhexamid	0.01	Fenoprop (2,4,5 TP)	0.01
Fenhexamid	0.01	Methiocarb sulfone	0.01	Fenitrothion	0.005	Fenothiocarb	0.01
Fenitrothion	0.01	Methiocarb sulfoxide	0.01	Fenoprop (2,4,5 TP)	0.01	Fenoxaprop-P	0.05
Fenoprop (2,4,5 TP)	0.01	Methomyl	0.01	Fenothiocarb	0.01	Fenoxycarb	0.01
Fenothiocarb	0.01	Methoxychlor	0.02	Fenoxaprop-ethyl	0.05	Fenpiclonil	0.01
Fenoxaprop-ethyl	0.05	Methoxyfenozide	0.01	Fenoxycarb	0.01	Fenpropathrin	0.01
Fenoxycarb	0.01	Metobromuron	0.01	Fenpiclonil	0.01	Fenpropidin	0.01
Fenpiclonil	0.01	Metolachlor	0.01	Fenpropathrin	0.005	Fenpropimorph	0.01
Fenpropathrin	0.01	Metribuzin	0.005	Fenpropidin	0.01	Fenpyroximate	0.01
Fenpropidin	0.01	Mevinphos	0.005	Fenpropimorph	0.01	Fenthion	0.01
Fenpropimorph	0.01	Mirex	0.005	Fenpyroximate	0.01	Fenthion Sulfone	0.01
Fenpyroximate	0.01	Molinate	0.01	Fenthion	0.01	Fenthion Sulfoxide	0.01
Fenthion	0.01	Molinate	0.02	Fenthion Sulfone	0.01	Fenuron	0.05
Fenthion Sulfone	0.01	Myclobutanil	0.01	Fenthion Sulfoxide	0.01	Fenvalerate	0.01
Fenthion Sulfoxide	0.01	Napropamide	0.01	Fenuron	0.05	Fipronil	0.01
Fenuron	0.05	Nitrofen	0.02	Fenvalerate-I	0.01	Fipronil desulfynil	0.01
Fenvalerate-I	0.01	Nonachlor-trans	0.005	Fenvalerate-II	0.01	Fipronil sulfide	0.01
Fipronil	0.01	Nuarimol	0.005	Fipronil	0.01	Fipronil sulfone	0.01
Fipronil desulfynil	0.01	Omethoate	0.005	Fipronil desulfynil	0.01	Flamprop isoropyl	0.01
Fipronil sulfide	0.01	opDDD	0.005	Fipronil sulfide	0.01	Flazasulfuron	0.01
Fipronil sulfone	0.01	opDDE	0.005	Fipronil sulfone	0.01	Flonicamid	0.01
Flamprop-isopropyl	0.01	opDDT	0.01	Flamprop-isopropyl	0.01	Florasulam	0.01
Flazasulfuron	0.01	o-Phenyphenol	0.005	Flazasulfuron	0.01	Fluazifop	0.01
Flonicamid	0.01	Oxadixyl	0.005	Flonicamid	0.01	Fluazifop-P-butyl	0.01
Florasulam	0.01	Oxychlordane	0.005	Florasulam	0.01	Fluazinam	0.01
Fluazifop	0.02	Paclobutrazol	0.01	Fluazifop	0.02	Flubendiamide	0.01
Fluazifop-P-butyl	0.01	Paraoxon ethyl	0.01	Fluazifop-P-butyl	0.01	Flucycloxuron	0.01
Fluazinam	0.01	Paraoxon methyl	0.005	Fluazinam	0.01	Flucythrinate	0.01
Flubendiamide	0.01	Parathion-ethyl	0.005	Flubendiamide	0.01	Fludioxonil	0.01
Flucycloxuron	0.01	Parathion-methyl	0.005	Flucycloxuron	0.01	Flufenacet	0.01
Flucythrinate	0.01	PCB 101	0.005	Flucythrinate-I	0.02	Flufenoxuron	0.01
Fludioxonil	0.01	PCB 118	0.005	Flucythrinate-II	0.02	Fluopicolide	0.01
		PCB 138	0.005	Fludioxonil	0.01	Fluopyram	0.02
Flufenacet	0.01	PCB 153	0.005	Flufenacet	0.01	Fluquinconazole	0.01
Flufenoxuron	0.01	PCB 180	0.005	Flufenoxuron	0.01	Flurochloridone	0.01
Fluopicolide	0.01	PCB 28	0.005	Fluopicolide	0.01	Flurtamone	0.01
Fluopyram	0.02	PCB 52	0.005	Fluopyram	0.02	Flusilazole	0.01
Fluquinconazole	0.01	Penconazole	0.01	Fluquinconazole	0.01	Flutolanil	0.01
Flurochloridone	0.01	Pencycuron	0.01	Flurochloridone	0.01	Flutriafol	0.01
Flurtamone	0.01	Pendimethalin	0.005	Flurtamone	0.005	Fluvalinate-tau	0.01
Flusilazole	0.01	Pentachloroaniline	0.005	Flusilazole	0.005	Fluxapyroxad	0.01
Flutolanil	0.01	Permethrin-I	0.02	Flutolanil	0.01	Folpet	0.01
Flutriafol	0.01	Permethrin-II	0.02	Flutriafol	0.01	Fonofos	0.01
Fluvalinate-tau	0.01	Phenmedipham	0.01	Fluvalinate-tau-I	0.02	Forchlorfenuron	0.01
Fluxapyroxad	0.01	Phenthoate	0.005	Fluvalinate-tau-II	0.02	Formothion	0.01
Folpet	0.01	Phorate sulfoxide	0.01	Fluxapyroxad	0.01	Fosthiazate	0.01
Fonofos	0.01	Phosalone	0.005	Fonofos	0.005	Fubiderazole	0.01
Forchlorfenuron	0.01	Phosmet	0.005	Forchlorfenuron	0.01	Furalaxyl	0.01

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**
Formothion	0.01	Phosphamidon-I	0.005	Formothion	0.005	Furathiocarb	0.01
Fosthiazate	0.01	Phosphamidon-II	0.005	Fosthiazate	0.01	Furmecyclox	0.01
Fuberidazole	0.01	Phoxim	0.01	Fuberidazole	0.01	Haloxyfop	0.01
Furalaxyl	0.01	Picoxystrobin	0.01	Furalaxyl	0.005	Haloxyfop-methyl	0.01
Furathiocarb	0.01	Piperonyl butoxide	0.01	Furathiocarb	0.01	HCH alpha	0.01
Furmecyclox	0.01	Pirimicarb	0.005	Furmecyclox	0.01	HCH beta	0.01
Haloxyfop	0.02	Pirimicarb desmethyl	0.005	Haloxyfop	0.02	HCH-delta	1.01
Haloxyfop-methyl	0.01	Pirimiphos ethyl	0.01	Haloxyfop-methyl	0.01	Heptachlor	0.01
HCH-alpha	0.01	Pirimiphos methyl	0.01	HCH-alpha	0.005	Heptachlor endo	0.01
HCH-beta	0.01	ppDDD	0.005	HCH-beta	0.005	Heptachlor exo	0.01
HCH-delta	0.01	ppDDE	0.005	HCH-delta	0.005	Heptenophos	0.01
Heptachlor	0.01	ppDDT	0.01	Heptachlor	0.005	Hexachlorobenzene	0.01
Heptachlor endo-	0.01	Prochloraz	0.05	Heptachlor endo-	0.005	Hexaconazole	0.01
Heptachlor exo-	0.01	Procymidone	0.005	Heptachlor exo-	0.005	Hexaflumuron	0.01
Heptenophos	0.01	Profenofos	0.005	Heptenophos	0.01	Hexythiazox	0.01
Hexachlorobenzene	0.01	Prometryn	0.01	Hexachlorobenzene	0.005	Imazalil	0.01
Hexaconazole	0.01	Propachlor	0.005	Hexaconazole	0.005	Imazamox	0.01
Hexaflumuron	0.01	Propanil	0.005	Hexaflumuron	0.01	Imazaquin	0.01
Hexythiazox	0.01	Propargite	0.005	Hexythiazox	0.01	Imazethapyr	0.01
Imazalil	0.01	Propetamphos	0.005	Imazalil	0.01	Imidacloprid	0.01
Imazamox	0.01	Propham	0.005	Imazamox	0.01	Indoxacarb	0.01
Imazaquin	0.01	Propiconazole-I	0.005	Imazaquin	0.01	Iodofenphos	0.01
Imazethapyr	0.01	Propiconazole-II	0.005	Imazethapyr	0.01	Iodosulfuron-methyl-	0.01
Imidacloprid	0.01	Propoxur	0.01	Imidacloprid	0.01	Ioxynil	0.01
Indoxacarb	0.01	Propyzamide	0.01	Indoxacarb	0.01	Iprodione	0.01
Iodofenphos	0.01	Prothiofos	0.005	Iodofenphos	0.005	Iprovalicarb	0.05
Iodosulfuron-methyl	0.01	Pyraclostrobin	0.01	Iodosulfuron-methyl	0.01	Isazophos	0.01
Ioxynil	0.01	Pyrazophos	0.01	Ioxynil	0.01	Isocarbofos	0.01
Iprodione	0.01	Pyrethrin	0.05	Iprovalicarb-I	0.02	Isodrin	0.01
Iprovalicarb	0.01	Pyridaben	0.01	Iprovalicarb-II	0.02	Isofenphos	0.01
Isazophos	0.01	Pyridaben	0.005	Isazophos	0.005	Isofenphos-methyl	0.01
Isocarbofos	0.01	Pyridaphenthion	0.01	Isodrin	0.005	Isofenphos-oxon	0.01
Isodrin	0.01	Pyrifenox-I	0.01	Isofenphos	0.02	Isoprocarb	0.01
Isofenphos	0.02	Pyrifenox-II	0.01	Isofenphos-methyl	0.005	Isoprothiolane	0.01
Isofenphos-methyl	0.01	Pyrimethanil	0.01	Isofenphos-oxon	0.005	Isoproturon	0.01
Isofenphos-oxon	0.01	Pyriproxifen	0.01	Isoprocarb	0.01	Kresoxim-methyl	0.01
Isoprocarb	0.01	Quinalphos	0.01	Isoprothiolane	0.01	Lenacil	0.01
Isoprothiolane	0.01	Quinoxyfen	0.01	Isoproturon	0.01	Lindane	0.01
Isoproturon	0.01	Quintozene	0.005	Kresoxim-methyl	0.01	Linuron	0.01
Kresoxim-methyl	0.01	Quizalofop	0.01	Lenacil	0.005	Lufenuron	0.01
Lenacil	0.01	Resmethrin	0.1	Lindane	0.005	Malaoxon	0.01
Lindane	0.01	Rotenone	0.01	Linuron	0.01	Malathion	0.01
Linuron	0.01	Silthiofam	0.005	Lufenuron	0.01	Mandipropamid	0.01
Lufenuron	0.01	Simazine	0.01	Malaoxon	0.01	MCPA	0.01
Malaoxon	0.01	Spirodiclofen	0.02	Malathion	0.01	MCPA Methyl Ester	0.01
Malathion	0.01	Spiroxamine	0.01	Mandipropamid	0.01	MCPB	0.01
Mandipropamid	0.01	Tebuconazole	0.01	MCPA	0.02	Mecarbam	0.01
MCPA	0.02	Tebufenozide	0.01	MCPA methyl ester	0.005	Mecoprop	0.01
MCPA methyl ester	0.01	Tebufenpyrad	0.01	MCPB	0.01	Mefenpyr-Diethyl	0.01
MCPB	0.01	Tecnazene	0.005	Mecarbam	0.005	Mepanipyrim	0.01
Mecarbam	0.01	Tefluthrin	0.005	Mecoprop	0.01	Mephosfolan	0.01
Mecoprop	0.01	Terbuthylazine	0.01	Mefenpyr-Diethyl	0.01	Mepronil	0.01
Mefenpyr-Diethyl	0.01	Tetraconazole	0.005	Mepanipyrim	0.01	Mesosulfuron-methyl	0.01
Mepanipyrim	0.01	Tetradifon	0.005	Mephosfolan	0.01	Metalaxyl	0.01
Mephosfolan	0.01	Tetramethrin-I	0.02	Mepronil	0.01	Metamitron	0.01
Mepronil	0.01	Tetramethrin-II	0.02	Mesosulfuron methyl	0.01	Metazachlor	0.01
Mesosulfuron methyl	0.01	Thiabendazole	0.01	Metalaxyl	0.01	Metconazole	0.01
Metalaxyl	0.01	Thiacloprid	0.01	Metamitron	0.01	Methacrifos	0.01

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**
Metamitron	0.01	Tolclofos-methyl	0.005	Metazachlor	0.01	Methamidophos	0.01
Metazachlor	0.01	Tolyfluanid	0.005	Metconazole	0.01	Methidathion	0.01
Metconazole	0.01	Triadimefon	0.005	Methacrifos	0.005	Methiocarb	0.01
Methacrifos	0.01	Triadimenol-I	0.02	Methamidophos	0.01	Methiocarb Sulfone	0.01
Methamidophos	0.01	Triadimenol-II	0.02	Methidathion	0.01	Methiocarb Sulfoxide	0.01
Methidathion	0.01	Triazophos	0.01	Methiocarb	0.01	Methomyl	0.01
Methiocarb	0.01	Trifloxystrobin	0.01	Methiocarb Sulfone	0.01	Methoprene	0.01
Methiocarb Sulfone	0.01	Triflumizole	0.01	Methiocarb Sulfoxide	0.01	Methoxychlor	0.01
Methiocarb Sulfoxide	0.01	Triflumizole	0.01	Methomyl	0.01	Methoxyfenozide	0.01
Methomyl	0.01	Trifluralin	0.005	Methoprene	0.01	Metobromuron	0.01
Methoprene	0.01	Triticonazole	0.01	Methoxychlor	0.02	Metolachlor	0.01
Methoxychlor	0.01	Vamidothion	0.01	Methoxyfenozide	0.01	Metosulam	0.01
Methoxyfenozide	0.01	Vinclozolin	0.005	Methoxyfenozide	0.01	Metoxuron	0.01
Metobromuron	0.01	Zoxamide	0.01	Metobromuron	0.01	Metrafenone	0.01
Metolachlor	0.01			Metolachlor	0.01	Metribuzin	0.01
Metosulam	0.01			Metosulam	0.01	Metsulfuron-methyl	0.01
Metoxuron	0.01			Metoxuron	0.01	Mevinphos	0.01
Metrafenone	0.01			Metrafenone	0.01	Mirex	0.01
Metribuzin	0.01			Metribuzin	0.005	Molinate	0.01
Metsulfuron-methyl	0.01			Metsulfuron-methyl	0.01	Monocrotophos	0.01
Mevinphos	0.01			Mevinphos	0.005	Monolinuron	0.01
Mirex	0.01			Mirex	0.005	Myclobutanil	0.01
Molinate	0.01			Molinate	0.02	Napropamide	0.01
Monocrotophos	0.02			Monocrotophos	0.02	Naptalam	0.01
Monolinuron	0.01			Monolinuron	0.01	Neburon	0.01
Myclobutanil	0.01			Myclobutanil	0.01	Nicosulfuron	0.01
Napropamide	0.01			Napropamide	0.01	Nitenpryram	0.01
Naptalam	0.01			Naptalam	0.01	Nitrofen	0.01
Neburon	0.01			Neburon	0.01	Nonachlor, trans-	0.01
Nicosulfuron	0.01			Nicosulfuron	0.01	Nuarimol	0.01
Nitenpyram	0.01			Nitenpyram	0.01	Omethoate	0.01
Nitrofen	0.01			Nitrofen	0.02	o-Phenylphenol	0.01
Nonachlor-trans	0.01			Nonachlor-trans	0.005	Oxadiazon	0.01
Nuarimol	0.01			Nuarimol	0.005	Oxadixyl	0.01
Omethoate	0.01			Omethoate	0.005	Oxamyl	0.01
opDDD	0.01			opDDD	0.005		
opDDE	0.01			opDDE	0.005	Oxy-chlordane	0.01
opDDT	0.01			opDDT	0.01	Oxyfluorfen	0.1
o-Phenyphenol	0.01			o-Phenyphenol	0.005	Paclobutrazol	0.01
Oxadiazon	0.01			Oxadiazon	0.01	Paraoxon-ethyl	0.01
Oxadixyl	0.01			Oxadixyl	0.005	Paraoxon-methyl	0.01
Oxamyl	0.01			Oxamyl	0.01	Parathion ethyl	0.01
						Parathion methyl	0.01
Oxychlordane	0.01			Oxychlordane	0.005	PCB 101	0.01
Oxyfluorfen	0.1			Oxyfluorfen	0.1	PCB 118	0.01
Paclobutrazol	0.01			Paclobutrazol	0.01	PCB 138	0.01
Paraoxon methyl	0.01			Paraoxon methyl	0.005	PCB 153	0.01
Paraoxon-ethyl	0.01			Paraoxon-ethyl	0.01	PCB 180	0.01
Parathion-ethyl	0.01			Parathion-ethyl	0.005	PCB 28	0.01
Parathion-methyl	0.01			Parathion-methyl	0.005	PCb 52	0.01
Penconazole	0.01			PCB 101	0.005	Penconazole	0.01
Pencycuron	0.01			PCB 118	0.005	Pencycuron	0.01
Pendimethalin	0.01			PCB 138	0.005	Pendimethalin	0.01
Pentachloroaniline	0.01			PCB 153	0.005	Pentachloroanaline	0.01
Permethrin	0.01			PCB 180	0.005	Permethrin	0.01
Pethoxamid	0.01			PCB 28	0.005	Pethoxamid	0.01
Phenmedipham	0.01			PCB 52	0.005	Phenmedipham	0.01

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**
Phenthoate	0.01			Penconazole	0.01	Phenthoate	0.01
Phorate	0.1			Pencycuron	0.01	Phorate	0.1
Phorate Sulfoxide	0.01			Pendimethalin	0.005	Phorate Sulfoxide	0.01
Phosalone	0.01			Pentachloroaniline	0.005	Phosalone	0.01
Phosmet	0.01			Permethrin-I	0.02	Phosmet	0.01
Phosmet-oxon	0.01			Permethrin-II	0.02	Phosmet-oxon	0.01
Phosphamidon	0.01			Pethoxamid	0.01	Phosphamidon	0.01
Phoxim	0.01			Phenmedipham	0.01	Phoxim	0.01
Picloram	0.1			Phenthoate	0.005	Picloram	0.1
Picoxystrobin	0.01			Phorate	0.1	Picoxystrobin	0.01
Piperonyl butoxide	0.01			Phorate Sulfoxide	0.01	Piperonyl butoxide	0.01
Pirimicarb	0.01			Phosalone	0.005	Pirimicarb	0.01
Pirimicarb desmethyl	0.01			Phosmet	0.005	Pirimicarb desmethyl	0.01
Pirimiphos-ethyl	0.01			Phosmet-oxon	0.01	Pirimiphos-ethyl	0.01
Pirimiphos-methyl	0.01			Phosphamidon-I	0.005	Pirimiphos-methyl	0.01
ppDDD	0.01			Phosphamidon-II	0.005	Prochloraz	0.01
ppDDE	0.01			Phoxim	0.01	Procymidone	0.01
ppDDT	0.01			Picloram	0.1	Profenofos	0.01
Prochloraz	0.01			Picoxystrobin	0.01	Promecarb	0.01
Procymidone	0.01			Piperonyl butoxide	0.01	Prometon	0.01
Profenofos	0.01			Pirimicarb	0.005	Prometryn	0.01
Promecarb	0.01			Pirimicarb desmethyl	0.005	Propachlor	0.01
Promethryn	0.01			Pirimiphos-ethyl	0.01	Propamocarb	0.01
Prometon	0.01			Pirimiphos-methyl	0.01	Propanil	0.01
Propachlor	0.01			ppDDD	0.005	Propaquizafop	0.01
Propamocarb	0.01			ppDDE	0.005	Propargite	0.01
Propanil	0.01			ppDDT	0.01	Propazine	0.01
Propaquizafop	0.01			Prochloraz	0.05	Propetamphos	0.01
Propargite	0.01			Procymidone	0.005	Propham	0.01
Propazine	0.01			Profenofos	0.005	Propiconazole	0.01
Propetamphos	0.01			Promecarb	0.01	Propoxur	0.01
Propham	0.01			Promethryn	0.01	Propoxycarbazone	0.01
Propiconazole	0.01			Prometon	0.01	Propyzamide	0.01
Propoxur	0.01			Propachlor	0.005	Proquinazid	0.01
Propoxycarbazone	0.01			Propamocarb	0.01	Prosulfocarb	0.05
Propyzamide	0.01			Propanil	0.005	Prosulfuron	0.01
Proquinazid	0.01			Propaquizafop	0.01	Prothioconazole	0.01
Prosulfocarb	0.05			Propargite	0.005	Prothiofos	0.01
Prosulfuron	0.01			Propazine	0.01	Pymetrozine	0.01
Prothioconazole	0.01			Propetamphos	0.005	Pyraclostrobin	0.01
Prothiofos	0.01			Propham	0.005	Pyrazaphos	0.01
Pymetrozine	0.02			Propiconazole-I	0.005	Pyrethrins	0.05
Pyraclostrobin	0.01			Propiconazole-II	0.005	Pyridaben	0.01
Pyrazophos	0.01			Propoxur	0.01	Pyridaphenthion	0.01
Pyrethrins	0.05			Propoxycarbazone	0.01	Pyrifenox I	0.01
Pyridaben	0.01			Propyzamide	0.01	Pyrimethanil	0.01
Pyridaphenthion	0.01			Proquinazid	0.01	Pyriproxifen	0.01
Pyrifenox	0.02			Prosulfocarb	0.05	Quinalphos	0.01
Pyrimethanil	0.01			Prosulfuron	0.01	Quinclorac	0.01
Pyriproxifen	0.01			Prothioconazole	0.01	Quinoxyfen	0.01
Quinalphos	0.01			Prothiofos	0.005	Quintozene	0.01
Quinclorac	0.01			Pymetrozine	0.02	Quizalofop	0.01
Quinoxyfen	0.01			Pyraclostrobin	0.01	Quizalofop-ethyl	0.01
Quintozene	0.01			Pyrazophos	0.01	Resmethrin	0.1
Quizalofop	0.02			Pyrethrins	0.05	Rimsulfuron	0.02
Quizalofop-ethyl	0.01			Pyridaben	0.005	Rotenone	0.01
Resmethrin	0.1			Pyridaben	0.01	Silthiofam	0.01
Rimsulfuron	0.01			Pyridaphenthion	0.01	Simazine	0.01

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	LOQ mg kg $^{-1}$	Standards	LOQ mg kg $^{-1}$	Standards	LOQ mg kg $^{-1}$	Standards	LOQ mg kg $^{-1}$
Rotenone	0.01			Pyrifenox-I	0.01	Simetryn	0.01
Silthiofam	0.01			Pyrifenox-II	0.01	Spinosyn A	0.01
Simazine	0.01			Pyrimethanil	0.01	Spinosyn D	0.01
Simetryn	0.01			Pyriproxifen	0.01	Spirodiclofen	0.01
Spinosyn A	0.01			Quinalphos	0.01	Spiromesifen	0.01
Spinosyn D	0.01			Quinclorac	0.01	Spirotetramat	0.01
Spirodiclofen	0.01			Quinoxyfen	0.01	Spiroxamine	0.01
Spiromesifen	0.01			Quintozene	0.005	Sulfentrazone	0.02
Spirotetramat	0.01			Quizalofop	0.02	Sulfotep	0.01
Spiroxamine	0.01			Quizalofop-ethyl	0.01	Sulprofos	0.01
Sulfentrazone	0.01			Resmethrin	0.1	Tebuconazole	0.01
Sulfotep	0.01			Rimsulfuron	0.01	Tebufenozide	0.01
Sulprofos	0.01			Rotenone	0.01	Tebufenpyrad	0.01
Tebuconazole	0.01			Silthiofam	0.005	Tecnazene	0.01
Tebufenozide	0.01			Simazine	0.01	Teflubenzuron	0.01
Tebufenpyrad	0.01			Simetryn	0.01	Tefluthrin	0.01
Tecnazene	0.01			Spinosyn A	0.01	Terbufos	0.05
Teflubenzuron	0.01			Spinosyn D	0.01	Terbumeton	0.01
Tefluthrin	0.02			Spirodiclofen	0.01	Terbuthylazine	0.01
Terbufos	0.05			Spiromesifen	0.01	Terbuthylazine-2-	0.01
Terbumeton	0.01			Spirotetramat	0.01	Terbuthylazine-	0.01
Terbuthylazine	0.01			Spiroxamine	0.01	Terbutryn	0.01
Terbuthylazine-2-	0.01			Sulfentrazone	0.01	Tetraconazole	0.01
Terbuthylazine-	0.01			Sulfotep	0.01	Tetradifon	0.01
Terbutryn	0.01			Sulprofos	0.01	Tetramethrin	0.02
Tetraconazole	0.01			Tebuconazole	0.01	Thiabendazole	0.01
Tetradifon	0.01			Tebufenozide	0.01	Thiacloprid	0.01
Tetramethrin	0.02			Tebufenpyrad	0.01	Thiamethoxam	0.01
Thiabendazole	0.01			Tecnazene	0.005	Thifensulfuron-methyl	0.01
Thiacloprid	0.02			Teflubenzuron	0.01	Thiobencarb	0.01
Thiamethoxam	0.01			Tefluthrin	0.005	Thiodicarb	0.01
Thifensulfuron-methyl	0.05			Terbufos	0.05	Thionazin	0.01
Thiobencarb	0.01			Terbumeton	0.01	Thiophanate-Ethyl	0.01
Thiodicarb	0.01			Terbuthylazine	0.01	Thiophanate-Methyl	0.01
Thionazin	0.02			Terbuthylazine-2-	0.01	Tolclofos-methyl	0.01
Thiophanate-Ethyl	0.01			Terbuthylazine-	0.01	Tolylfluanid	0.01
Thiophanate-Methyl	0.01			Terbutryn	0.01	Topramezone	0.01
Tolclofos-methyl	0.01			Tetraconazole	0.005	Triadimefon	0.01
Tolyfluanid	0.01			Tetradifon	0.005	Triadimenol-I	0.01
Topramezone	0.01			Tetramethrin-I	0.02	Tri-Allat	0.01
Triadimefon	0.01			Tetramethrin-II	0.02	Triasulfuron	0.01
Triadimenol	0.01			Thiabendazole	0.01	Triazophos	0.01
Tri-Allat	0.01			Thiacloprid	0.02	Trichlorfon	0.02
Triasulfuron	0.01			Thiamethoxam	0.01	Triclopyr	0.01
Triazophos	0.01			Thifensulfuron-methyl	0.05	Tricyclazole	0.01
Trichlorfon	0.02			Thiobencarb	0.01	Trifloxystrobin	0.01
Triclopyr	0.01			Thiodicarb	0.01	Triflumizole	0.01
Tricyclazole	0.01			Thionazin	0.02	Triflumuron	0.01
Trifloxystrobin	0.01			Thiophanate-Ethyl	0.01	Trifluralin	0.01
Triflumizole	0.02			Thiophanate-Methyl	0.01	Trisulfuron-methyl	0.01
Triflumuron	0.01			Tolclofos-methyl	0.005	Triticonazole	0.01
Trifluralin	0.01			Tolyfluanid	0.005	Vamidothion	0.01
Triflusulfuron-methyl	0.01			Topramezone	0.01	Vinclozolin	0.01
Triticonazole	0.01			Triadimefon	0.005	Zoxamide	0.01
Vamidothion	0.01			Triadimenol-I	0.02		
Vinclozolin	0.01			Triadimenol-II	0.02		
Zoxamide	0.01			Tri-Allat	0.01		
				Triasulfuron	0.01		

Fruits, Vegs, Cereals, Honey		Animal Fats		Milk		Infant Food	
Standards	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**	**Standards**	**LOQ mg kg $^{-1}$**
				Triazophos	0.01		
				Trichlorfon	0.02		
				Triclopyr	0.01		
				Tricyclazole	0.01		
				Trifloxystrobin	0.01		
				Triflumizole	0.02		
				Triflumuron	0.01		
				Trifluralin	0.005		
				Triflusulfuron-methyl	0.01		
				Triticonazole	0.01		
				Vamidothion	0.01		
				Vinclozolin	0.005		
				Zoxamide	0.01		

Amitraz method		Dithiocarbamate method		Glyphosate method		Chlormequat type method	
Standards	**LOQ mg/kg^{-1}**	**Standards**	**LOQ mg/kg^{-1}**	**Standards**	**LOQ mg/kg^{-1}**	**Standrtds**	**LOQ mg/kg^{-1}**
Amitraz	0.01	Dithiocarbamates	0.05	AMPA	0.08	Chlormequat	0.01
DMA	0.05			Ethephon	0.04	Cyromazine	0.02
DMF	0.01			Glufosinate ammonium	0.08	Daminozide	0.01
DMPF	0.01			Glyphosate	0.08	Mepiquat	0.01
				MPPA	0.08	Paraquat	0.05
				N Acetyl glyphosate	0.08		

9.2 ANNEX II Abbreviations

ADI	Acceptable daily intake
ARfD	Acute Reference Dose
BIP	Border Inspection Post
DAFM	Department of Agriculture, Food and the Marine
EC	European Community
EU	European Union
FSAI	Food Safety Authority of Ireland
IUNA	Irish Universities Nutrition Alliance
LOQ	Limit of Quantitation
mg/kg	milligram per kilogram
MRL	Maximum Residue Level
NCFS	National Children's Food Survey
OJ	Official Journal of the European Union
PCB	Polychlorinated Biphenyl
PCD	Pesticide Controls Division
PCL	Pesticide Control Laboratory
RASFF	Rapid Alert System for Food and Feed
S.I.	Statutory Instrument
TC	Third Country

9.3 ANNEX III Glossary of terms

Acceptable Daily Intake (ADI)	An ADI is an estimate of the amount of a residue in food or drinking water, expressed on a body weight basis that can be ingested daily over a lifetime without appreciable health risk. The particular vulnerability of infants, children, the elderly and those whose systems are under stress because of ill-health, are taken into account, through application of a safety factor, when ADI values are established. ADI values are based on the no-adverse-effect level in the most sensitive animal species used in the toxicological experiments, or if appropriate data are available, in humans. Invariably, a safety factor to account for inter-species and intra-species variations is applied. Studies used as a basis for the identification of the relevant no-adverse-effect levels and hence for deriving ADI values, are conducted using active substance as manufactured. Accordingly the toxicological effects of impurities present in active substances are included in the assessment. Account is also taken of metabolites that may influence the toxicological significance of the residue reaching the consumer.
Acute Reference Dose (ARfD)	An ARfD is similar in nature to an ADI but it relates to intake of residues at one meal or on one day. The particular vulnerability of infants, children, the elderly and those whose systems are under stress because of ill-health, are taken into account, through application of a safety factor, when ARfD values are established. ARfD values are based on the no-adverse effect level in the most sensitive animal species used in the toxicological experimentation, or if appropriate data are available, in humans. ARfD values are derived from the results of those toxicological studies that are most relevant to short term exposure.
Good Agricultural Practice (GAP)	GAP in the use of a plant protection product (pesticide) includes authorised use under practical conditions necessary for effective control of harmful organisms. It encompasses a range of levels of application up to the highest level authorised, applied in a manner that leaves a residue that is the smallest amount practicable.
Limit of Quantitation (LOQ**)**	The LOQ is the lowest concentration of a pesticide residue or contaminant that can be identified and quantitatively measured in specified food, agricultural commodity or animal feed, with an acceptable degree of certainty by a method of analysis.

Maximum Residue Level (MRL)	MRL is the maximum concentration of a pesticide residue, expressed in milligrams per kilogram, legally permitted in or on food commodities and animal feeds. MRLs are based on supervised residues trials data that reflect Good Agricultural Practice (GAP). MRLs established for particular food commodities are such that potential consumer exposure to residues is judged to be toxicologically acceptable. MRLs are fixed at or about the limit of determination, where there are no approved uses. MRLs are established on the basis of sound scientific knowledge. They are only established for those pesticides for which acceptable daily intake (ADI) values exist.
Pesticide Residue	Any trace of a pesticide found in a sample, including any specified derivatives such as degradation and conversion products, metabolites and impurities, which are considered to be of toxicological significance and are included in the residue definition

Results included in the above report were generated by the

Pesticide Control Laboratory,

Department of Agriculture, Food and the Marine Laboratories,

Backweston Campus,

Celbridge,

Co. Kildare.

Ireland.

Telephone: (01) 615 7552
Fax: (01) 615 7575
Email: pcs@agriculture.gov.ie