2007 Annual Report on Pesticide Residues

according to Article 32 of Regulation (EC) No 396/2005[1]

Prepared by Pesticides Unit (PRAPeR) of EFSA

(Question No EFSA-Q-2008-714)

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SUMMARY

The present Annual Report provides an overview of the results of the monitoring of pesticide residues in food commodities analysed during the calendar year 2007 in the 27 EU Member States and the two EFTA States (Norway and Iceland), who have signed the Agreement on the European Economic Area (EEA agreement). This Report also provides the results of the assessment of the chronic and acute risks to the consumer health due to pesticide residues found in food commodities.

In 2007, in total 74,305 samples of approximately 350 different food commodities were analysed for pesticide residues under the **national and the EU coordinated programmes**. This included 71,936 surveillance samples and 2,369 enforcement samples. Compared with 2006, the total number of samples increased by 12.9%. This increase can be partially attributed to the fact that the two newest EU Member States, Bulgaria and Romania, have reported their data for the first time, but also reflects the efforts made by the reporting countries to enhance the food control in this area.

In 2007, the analytical methods used by the reporting countries for pesticide residue analysis allowed to detect in total 870 different pesticides (including metabolites) in food samples. Compared with 2006, the total number of pesticides sought has increased by 13%. On average, reporting countries tested for 218 different pesticides.

In total, residues of 354 different pesticides were found in measurable quantities in fruit and vegetables, while in cereals residues of 72 different pesticides were observed. As in previous years, the number of different pesticide residues found in fruit and vegetables in 2007 was higher than the number of pesticides found in cereals, which also reflects the greater number of products, used in the fruit and vegetables category.

96.01% of the samples analysed in the framework of the national and the coordinated monitoring programmes were compliant with the legal Maximum Residue Levels (MRLs); in 3.99% of the samples the legal limits were exceeded for one or more pesticide. These figures include the results of both surveillance sampling and targeted enforcement sampling. Targeted enforcement samples are taken when there are suspicions about the safety of a product and as a follow-up of violations found previously. Hence, these figures do not represent the level of MRL non-compliance for food available to consumers through the European market. Furthermore, it should be noticed that for many of the pesticides detected, EU-harmonised MRLs were not yet established in 2007. Thus, an MRL exceedance in one Member State did not necessarily represent an exceedance in all others.

The data indicate that MRLs are more often exceeded in samples imported from Third Countries than in EU products (2.31% of surveillance samples with EU origin and 6.84% of surveillance samples from Third Countries exceeded EC MRLs).

The percentage compliance might be used as a statistical parameter for comparison with the results of previous years and to indicate possible emerging trends, which require further investigation. Over the years, the percentage of samples with residues above the MRL increased from 3.0% in 1996 to 5.5% in 2002/2003. Since 2003, there has been a decrease, with 3.99% of samples non-compliant in 2007. The annual comparability of the data is problematic though. This is because the number of countries reporting data has increased from 16 in 1996 to 29 in 2007 and because the national programmes differ not only from each other but also over time.

For baby food, the European legislation is more restrictive than for other food categories as no more than 0.01 mg/kg of any single pesticide residue is permitted in baby food samples. In 2007, 0.6% of baby food samples exceeded the EC MRLs.

Some of the reporting countries also provided data on organic food. It should be mentioned that at EU level, no specific MRLs have been established for organic products. The MRLs established for conventional produced products therefore apply. As overall result, organic cereals, fruit and vegetables have a lower rate of MRL exceedances (1.24%) in comparison with conventionally grown products (3.99%).

The percentage of samples of fruit, vegetables and cereals with multiple residues has increased over the years from 15.4% in 1997 to 27.7% in 2006. In 2007, the percentage of samples with multiple residues slightly decreased (in 26.2% of the samples two or more pesticide residues were detected). The reasons for multiple residues are versatile. Crops may be attacked by different pests and diseases (insects, fungal diseases, etc). In order to protect them against these threats they may be treated with a number of different pesticides. This results in the occurrence of multiple residues in food samples. In addition to the agricultural practices, the mixing of lots originating from different sources, which have been subject to different pesticide treatment regimes, can also lead to the detection of multiple residues in composite food samples. Reasons for the increased detection of multiple residues in single samples may also be related to the improved sensitivity of the analytical methods which allows the detection of lower residue concentrations and the increased number of pesticides analysed. From the data submitted for pesticide monitoring it is not possible to clarify whether the multiple residues result from the application of different pesticides on the crop or whether the multiple residues result from other sources (e.g. contamination of untreated crops by crops treated with pesticides).

The **EU coordinated control programme** defines a list of pesticides to be monitored in certain food commodities. The aim of this programme is to analyse randomly selected samples in order to collect data on the occurrence of pesticides in fruit, vegetables and cereals representative for the European market, which are appropriate to assess the actual dietary exposure of the European population. Although the participation is not mandatory, all 27 Member States and the two EFTA states reported results for the nine food commodities which were selected in 2007. The list of pesticides to be monitored in the framework of the EU coordinated programme has been extended substantially over the previous 10 years; from 1997 to 2007 the number of pesticides included increased from 13 to 71. In 2007, 17,575 samples of nine food commodities were analysed under the coordinated programme. In 2.3% of the samples the MRLs were exceeded. 52.7% of the samples did not contain measurable residues, whereas in 45% of the samples residues were detected which were in compliance with the MRL legislation. The crop with the highest rates of MRL exceedance were oats (3.8%), peaches (3.4%), strawberries and lettuce (2.9% each). The crops which contained most frequently detectable levels of pesticide residues were strawberries, apples, peaches and lettuce (66%, 60.9%, 47.1%, 44.9%, respectively). On the other hand, head cabbage, oats, rye, leek and tomatoes were the commodities which were most often free of measurable residues (81.1%, 79.7%, 77.2%, 73.2% and 68.5% respectively).

It should be noted that the presence of pesticides, even an exceedance of an MRL, does not imply that this is a food safety concern. To ascertain the latter exposure assessments are required.

The assessment of the consumer exposure to pesticide residues was performed with the residue data generated under the coordinated monitoring programme. The exposure assessment was hampered by the fact that the detailed results of the monitoring programmes were not provided to EFSA. This lack of information was bridged by introducing conservative assumptions in the exposure modelling which bias the results by overestimating the actual consumer exposure. In order to improve the accuracy of the actual consumer exposure calculations, EFSA recommends an amendment to the current pesticide monitoring reporting format to ensure that the detailed results needed for a sound exposure assessment are available.

Even under these conservative model assumptions, the results provide evidence that for all evaluated active substances, except one, the chronic (long-term) exposure does not raise consumer health concerns. Diazinon is the only substance for which a potential health risk could not be excluded definitely. In this regard, it should be noted that by end of 2007 the MRLs for diazinon have been lowered and the use of diazinon containing pesticides is no longer authorised in the EU Member States.

The assessment of the acute (short-term) exposure was based on worst-case scenarios: consumption data for consumers with extreme food consumption habits were combined with the highest residue measured in the coordinated programme. In order to accommodate for a possible non-homogeneous distribution of residues in an analysed food lot a further variability factor was introduced in the calculation by multiplying the highest residue measured with a variability factor (depending on the commodity the factor was between 1 and 7). Assuming a coincidence of these events (high food consumption and high residue concentrations), a potential consumer risk was identified for 52 pesticide/commodity combinations. The highest potential exceedances of the toxicological reference value was indicated for methomyl/thiodicarb on lettuce (6,241% of the ARfD), methamidophos/lettuce (2,242%), propargite/apples (1,959%), procymidone/lettuce (1,683%) and methamidophos/head cabbage (1,526%). However, the critical intake events identified in the acute risk assessment calculations are considered very unlikely, taking into account the low frequency of critical residues and the low frequency of extreme consumption events. For 29 of the pesticide/commodity combinations for which a critical intake situation could not be excluded, risk management actions have already been taken by withdrawing authorisations or by lowering the MRLs.

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BACKGROUND

According to the EU legislation in place in 2007, EU and EEA Member States had to carry out national monitoring programmes on pesticide residues and report the results to the European Commission by end of August 2008. All 27 EU Member States and EEA States[2] (Iceland and Norway) have submitted the results of the 2007 monitoring programme electronically. The last datasets were submitted on 21 November 2008.

The following report provides the overall assessment of the reported control activities implemented in the reporting countries.

Legal basis for the Annual Report on Pesticide Residues

General legal provisions for food inspections and monitoring were established by Regulation (EC) No 882/2004 (EC, 2004) on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare.

The legal basis for the preparation of this Annual Report on the pesticide residues is laid down in Directives 76/895/EEC, 86/362/EEC, 86/363/EEC and 90/642/EEC (EEC, 1976; EEC 1986a; EEC, 1986b; EEC, 1990). These Directives required Member States to establish national control programmes and to carry out regular official controls on pesticide residues in food commodities to check compliance with the Maximum Residues Levels (MRLs) for pesticide residues. Commission Regulation (EC) No 645/2000 (EC, 2000) provides for detailed implementing rules for the monitoring provisions of Directives 86/362/EEC and 90/642/EEC on pesticide MRLs.

In addition to the national monitoring programmes, the Commission has recommended, the participation in a specific EU coordinated monitoring programme. The details for the coordinated monitoring programme for 2007 have been established in Commission Recommendation 2007/225/EC (EC, 2007a). By end of August 2008 the results of the analyses of samples taken during the previous year under the national and coordinated Community monitoring programme had to be submitted to the European Commission.

Directives 76/895/EEC, 86/362/EEC, 86/363/EEC and 90/642/EEC were repealed on 1 September 2008, when Regulation (EC) No 396/2005 (EC, 2005a) became fully applicable. According to Article 32 of this regulation, the responsibility for the Annual Report on pesticide residues was transferred from the European Commission to EFSA. This regulation also contains general provisions regarding the content of the Annual Report.

[2] Liechtenstein, an EFTA State previously reporting its results on the monitoring of pesticide residues to the Commission, from 2007 has been exempted from reporting obligations due to a change in the EEA agreement concerning agricultural issues.

TERMS OF REFERENCE

In accordance with Article 32 of Regulation (EC) No 396/2005 EFSA shall submit to the Commission the Annual Report on pesticide residues concerning the control activities carried out in 2007.

The Annual Report shall at least include the following information:

- An analysis of the result of the controls on pesticide residues provided by EU Member States and EEA States;
- A statement of the possible reasons why the MRLs were exceeded, together with any appropriate observations regarding risk management options;
- An analysis of chronic and acute risks to the health of consumers from pesticide residues;
- An assessment of consumer exposure to pesticide residues based on the information provided under the first bullet point and any other relevant available information, including reports submitted under Directive 96/23/EC.

In addition, the report may include an opinion on the pesticides that should be included in future monitoring programmes.

1. Introduction

The present report provides an overview of the results of the monitoring of pesticide residues in food commodities sampled during the calendar year 2007 in the 27 Member States of the EU and the two EFTA States (Norway and Iceland) who have signed the Agreement on the European Economic Area (EEA agreement)[3].

The objective of this report is not only to summarise the results provided by the reporting countries but also to assess the actual consumer exposure to pesticide residues and to perform an analysis of the chronic and acute risks to the consumer health.

In chapter 2 of the report, key figures on the national and the coordinated control programmes are summarised. It is important to acknowledge that the sampling strategies in national programmes are often risk based aiming to identify non-compliant food consignments/lots. In the national programmes Member States and participating EFTA States often take into account the results and experiences of previous years and focus on samples and commodities with a high probability for non-compliance. The reader should be aware that for this reason the results reported by different countries can not directly be compared with each other.

The results of the coordinated monitoring programme as established in Commission Recommendation 2007/225/EC are reported in chapter 3 of this report. The coordinated programme aims to provide statistically representative data regarding pesticide residues in food accessible by European consumers. Thus, in contrast to the national control programmes, the results obtained in the coordinated programme are considered a better indicator for the MRL compliance rate in food placed on the European common market and the actual consumer exposure. The coordinated monitoring refers to 26 main food commodities which are tested in a three-years cycle. In 2007, samples taken in the framework of the coordinated programme had to be analysed for 71 pesticides by all Member States on nine food commodities.

In the last section of the report (chapter 4), EFSA assessed the dietary exposure of European consumers based mainly on the results of the coordinated programme. However, since the results were provided in aggregated format, accurate calculations could not be performed. Thus, the calculations should be regarded as an approximate indication of the actual short- and long-term exposure of European consumers only. Since an agreed European and/or international methodology for the estimation of actual risks from chronic and acute exposure to pesticide residues measured in monitoring programmes is not available, EFSA adapted the model used to perform consumer risk assessment in the framework of MRL setting.

1.1. Maximum Residue Levels (MRLs) for pesticides

MRLs are defined as the upper legal levels of a pesticide residue in or on food or feed which result from agricultural practices. MRLs are established for raw commodities of plant or animal origin as placed on the market, i.e. fresh or frozen products without processing, in many cases including non-edible parts of the crop such as peel. The description of the

[3] More detailed information about the results of control activities in the individual reporting countries is available from the respective national authorities. The list of web addresses where the results of monitoring plans have been published is reported in Appendix I. It should be noted that upon submission of the data, EFSA validated the data and recoded the names of the food and the pesticide names reported by the participating countries to make the comparable. In case of data inconsistencies countries were asked for corrections. Therefore, small differences in the data published separately by the national authorities and the data reported in the present report may occur.

commodities and the parts of the products to which the MRLs apply can be found in the Annexes of the basic MRL directives (EEC, 1976; EEC, 1990; EEC, 1986a and EEC, 1986b).

Hence, MRLs reflect the use of minimum quantities of pesticides to achieve effective plant protection, applied in such a manner that the amount of residue is the smallest practicable and is toxicologically acceptable. Before a MRL is established, a risk assessment has to prove that the limit is safe for the consumer health. In the past the responsibility for the risk assessment in the MRL setting procedure was a shared responsibility of Member States and the European Commission. Since Regulation 396/2005 entered into force, EFSA has taken over the role as an independent risk assessor for the MRL setting procedure.

MRLs are frequently understood as being toxicological safety limits. This is incorrect; MRLs are established for three key reasons: to ensure that the residues on food do not pose an unacceptable risk for the health of consumers, to ensure that pesticides are used in accordance with the authorised uses, respecting the label instructions and to avoid trade barriers. In most cases the MRLs are well below the toxicologically acceptable residue levels. Thus, if a pesticide residue is found on a given crop at or below the MRL, then the crop can be considered safe for the consumer health. On the other hand, if a residue exceeds the MRL, it is not necessarily true that the consumer is at risk. In the latter case, an estimation of the expected exposure and a comparison with the toxicological reference values is necessary to assess if the food poses a consumer health risk.

At EU level, harmonized MRLs for pesticide residues in food applicable for the reference period 2007 have been established in four basic Directives which cover more than 250 pesticides:

- Council Directive 76/895/EEC establishing MRLs for selected fruits and vegetables (EC, 1976) (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31976L0895:EN:NOT)
- Council Directive 86/362/EEC establishing MRLs for cereals and cereal products (EEC, 1986 a) (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31986L0362:EN:NOT)
- Council Directive 86/363/EEC establishing MRLs in products of animal origin (EEC, 1986b) (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31986L0363:EN:NOT)
- Council Directive 90/642/EEC establishing MRLs in products of plant origin, including fruits and vegetables (EEC, 1990) (http://eur-lex.europa.eu/Notice.do?val=161364:cs&lang=en&list=207318:cs,172256:cs,161364:cs,427350:cs,427349:cs,&pos=3&page=1&nbl=5&pgs=10&hwords=)

For processed or composite food commodities the MRLs as established in the MRL legislation for raw commodities are applicable by taking into account changes in the levels of pesticide residues caused by processing or mixing (processing factors).

It should also be mentioned that no specific MRLs for organic products are established at EU level. For these products the same MRLs as for conventional products apply.

For infant formulae, follow-on formulae and for processed cereal-based foods and baby foods for infants and young children a default MRL of 0.01 mg/kg is applicable, unless a specific lower MRL has been set in Directives 91/321/EEC and 96/5/EC (http://eur-lex.europa.eu/Notice.do?val=172889:cs&lang=en&list=207320:cs,172889:cs,&pos=2&page=1&nbl=2&pgs=10&hwords=

and http://eur-lex.europa.eu/Notice.do?val=344294:cs&lang=en&list=430197:cs,344294:cs,312396:cs,343730:cs,&pos=2&page=1&nbl=4&pgs=10&hwords=).

In addition, for pesticides not covered by the European legislation in the reference period 2007, Member States had the possibility to establish MRLs at national level. However, not all Member States had subsidiary national MRL provisions in place.

Since the MRLs are closely linked to the Good Agricultural Practices (GAP), MRL exceedances may occur in cases where the GAP was not respected, such as

- the use of unauthorised pesticides;
- the use of pesticides not authorised for a specific crop;
- the use of an authorised pesticides on a crop for which an authorisation was granted, but not in compliance with the authorised GAP (e.g. higher application rate or shorter pre-harvest intervals);
- non-harmonised MRLs between Member States (compliant in the Member State of origin but not compliant in the final destination Member State);
- missing import tolerances for products from non-EU countries.

In addition, the following cases may lead to the exceedance of an MRL:

- accidental factors (e.g. drift from neighbour treated fields)
- in exeptional cases, variation of climatic conditions (e.g. unfavourable weather conditions associated with reduced residue decline rate)

1.2. Sampling

1.2.1. Sampling strategies

The sampling strategy is the approach used to select the units of the target population subject to control. The implementation of an efficient targeted sampling strategy would result in a higher percentage of positive findings and non-compliant results. Thus, it is important to stress that for a correct interpretation of the results obtained in control programmes information about the sampling strategy applied is indispensible.

Although no agreed definitions for sampling strategies are established at European level, the following terminology has been used to distinguish between more or less targeted sampling.

Surveillance sampling: samples are collected without any particular suspicion towards a particular producer, consignment, etc. The samples taken in the framework of the EC coordinated programme are considered to be surveillance samples.

Enforcement (or follow-up) sampling: samples are taken in case of suspect about the safety of a product and/or as a follow-up of violations found previously. Follow-up or enforcement sampling is directed to a specific grower/producer or to a specific consignment.

In Appendix II to the Annual Report more details on the general sampling strategies applied at national level are reported.

1.2.2. Sampling methodology

To ensure that a sample taken is representative for a given food lot/consignment, the sampling has to be performed according to the sampling methodology for the official control of pesticide residues as established by Commission Directive 2002/63/EC (EC, 2002).

1.3. Performance of analytical methods used

The number of positive findings and on MRL exceedances is strongly influenced by the scope of the analytical methods and the limit of quantification which can be achieved in routine chemical analysis. If the analytical method applied is not capable to detect a certain active substance applied to the crop, the sample may be considered by mistake to be free of residues. Additionally, if the analytical method is not sensitive enough, the pesticide will not be detected in case the residue occurs at a low concentration. Therefore, the results reported by reporting countries have to be considered in the context of the analytical methods used.

1.3.1. Multi-residue and single-residue methods

The analytical methods used today to detect and quantify pesticide residues in food commodities fall into two general types of methods: multi-residue and single-residue methods. Multi-residue methods are able to analyse a high number of different pesticide residues in the same sample. However, certain pesticides and metabolites can not be included in multi-residue methods because of their physical-chemical properties . In these cases, single-residue methods have to be applied. Single-residue methods allow the identification and quantification of only one or a few pesticide residues in one sample. Since these two kinds of methods require a comparable processing time per sample, multi-residue methods are usually preferred over single-residue methods as they are generally more efficient in terms of cost/benefit ratio. Single-residue methods are thus preferably applied on samples where residues of the pesticides in question are likely to be found, based on previous experience.

1.3.2. LOQ

The Limit of Quantification (LOQ) is the lowest validated residue concentration, which can be quantified and reported by routine monitoring with validated methods (EC, 2005a). In the context of this report, when a residue is reported to be below the LOQ it can mean that no pesticide residue occurs in that sample or that a residue may be present in the sample at a level that cannot be quantified with acceptable certainty. In the present report, the term Reporting Level (RL) is also used as a synonym of the LOQ[4].

1.3.3. Quality assurance

All laboratories performing analysis of pesticide residues in food should be accredited to certain standards (EC, 2004). However, until 31 December 2009, these analyses can also be carried out by non-accredited laboratories, provided that the laboratories have initiated the accreditation procedures, and that quality control schemes are in place (EC, 2005b).

4 In the EU MRL legislation the term LOD (Limit of Determination) is used instead of the term of LOQ. However, EFSA prefers using the term LOQ in order to avoid possible confusion with the term LOD used to indicate the Limit of Detection.

Commission Recommendation 2007/225/EC (EC 2007a) requires Member States to provide information about the details of accreditation of the laboratories which carry out the analyses for the monitoring programme, about the application of the EU Quality Control Procedures for Pesticide Residue Analyses (EC 2007b) and about their participation in proficiency and ring tests. It also requires the reporting countries contributing to the monitoring to provide the accreditation certificates.

2. Overall results of the national and EU coordinated monitoring programmes

The following results relate to the data reported by the 29 EEA and EU Member States within the framework of both the national and the EU coordinated pesticide monitoring programmes carried out in 2007. This year, Bulgaria and Romania contributed for the first time to the European monitoring report.

2.1. Coverage of pesticides by the analytical methods used in monitoring programmes

In 2007, approximately 350 different food commodities were analysed for pesticide residues.

More than 1000 pesticides can potentially be used as plant protection products and may result in residues in food. In 2007, approximately 450 pesticides were authorised for use as plant protection products in EC Member States but further active substances may be used in Third Countries.

In 2007, the analytical methods used by reporting countries for testing food commodities offered the potential to detect in total 870 different pesticides (including metabolites). In 2004 to 2006 the analytical methods used for pesticide monitoring covered 677, 706 and 769 pesticides, respectively. In 2007, samples were tested for 218 different pesticides on average. In Figures 2.1-1 and 2.1-2 the geographical distributions of the number of pesticides analysed and detected by reporting country are represented.

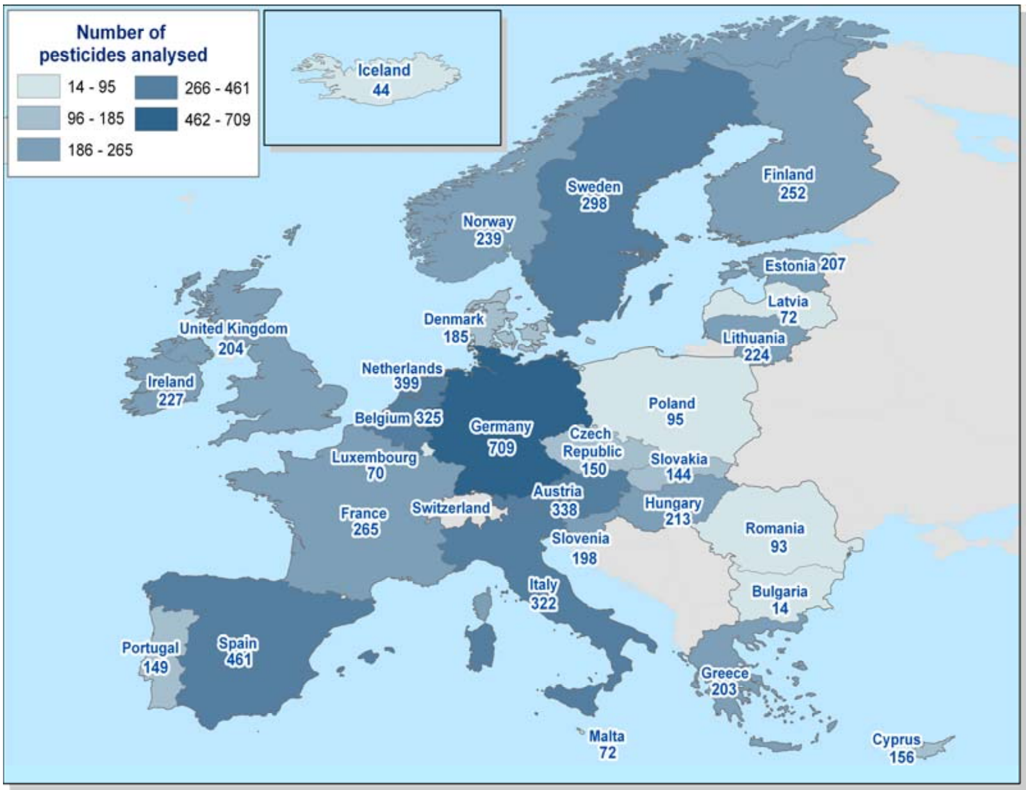


Figure 2.1-1 Number of pesticides analysed in 2007 by each reporting country (surveillance samples of fruit, vegetables and cereals)[5]

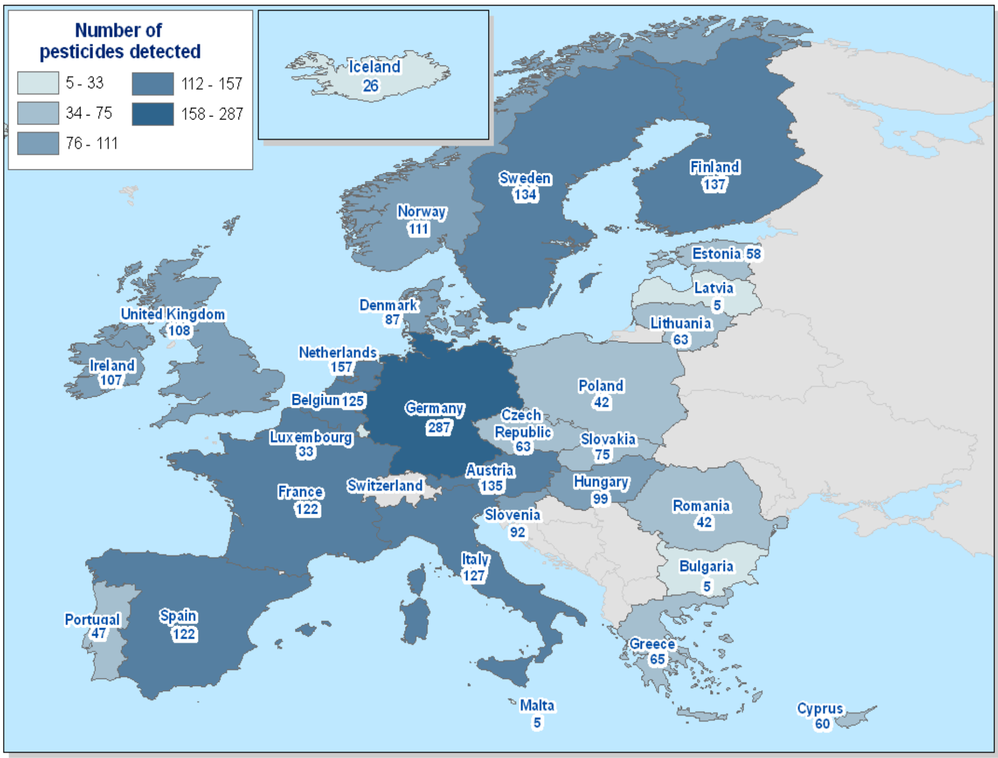


Figure 2.1-2 Number of pesticides detected in 2007 by each reporting country (surveillance samples of fruit, vegetables and cereals)

[5] It should be noted that the reporting countries did not analyse all the pesticides indicated in the figures in all samples.

The number of substances tested for in cereals in the individual EFTA and Member States ranged from 2 to 649 (177 on average); for fruit and vegetables 14 to 727 analytes were sought (218 on average). These findings are reported in Table A to Table G of Appendix III.

The average number of pesticides analysed has increased over the years. In the following figure the trend is illustrated for the pesticides analysed in fruits and vegetables for the 15 EU Member States and EFTA states that have reported results since 1996.

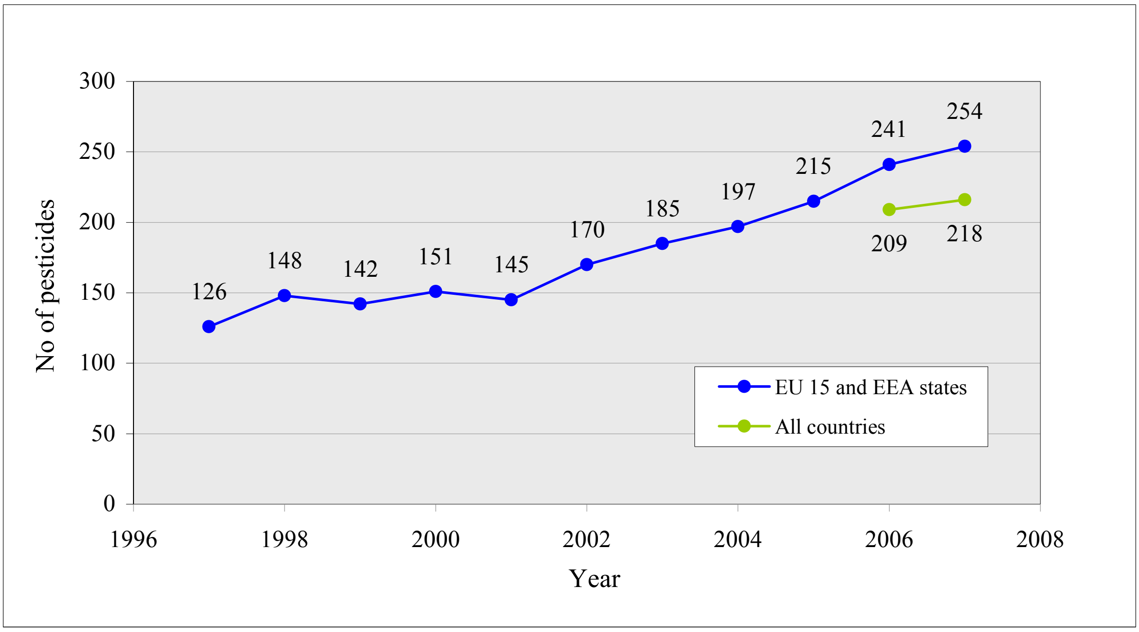


Figure 2.1-3 Average number of pesticides analysed in fruits and vegetables in the reporting countries (EU 15 and EEA states and all reporting countries)

In total, 354 different pesticides were found in fruit and vegetables, while in cereals 72 different pesticides were observed. As in previous years, the total number of pesticides found in fruit and vegetables in 2007 was significantly higher than the number of pesticides found in cereals which reflects the different use pattern of pesticides in these crop groups and the heterogeneity of products included in the fruit and vegetable category.

2.2. Quality assurance

Figure 2.2-1 provides an overview of the situation in relation to the accreditation of monitoring laboratories providing monitoring results in the reporting countries. This figure demonstrates that the proportion of accredited laboratories has increased over the time. In 2007, only one country used non accredited laboratories, 5 reporting countries used at least partially accredited laboratories, while 23 out of 29 (79.3%) used only accredited laboratories.

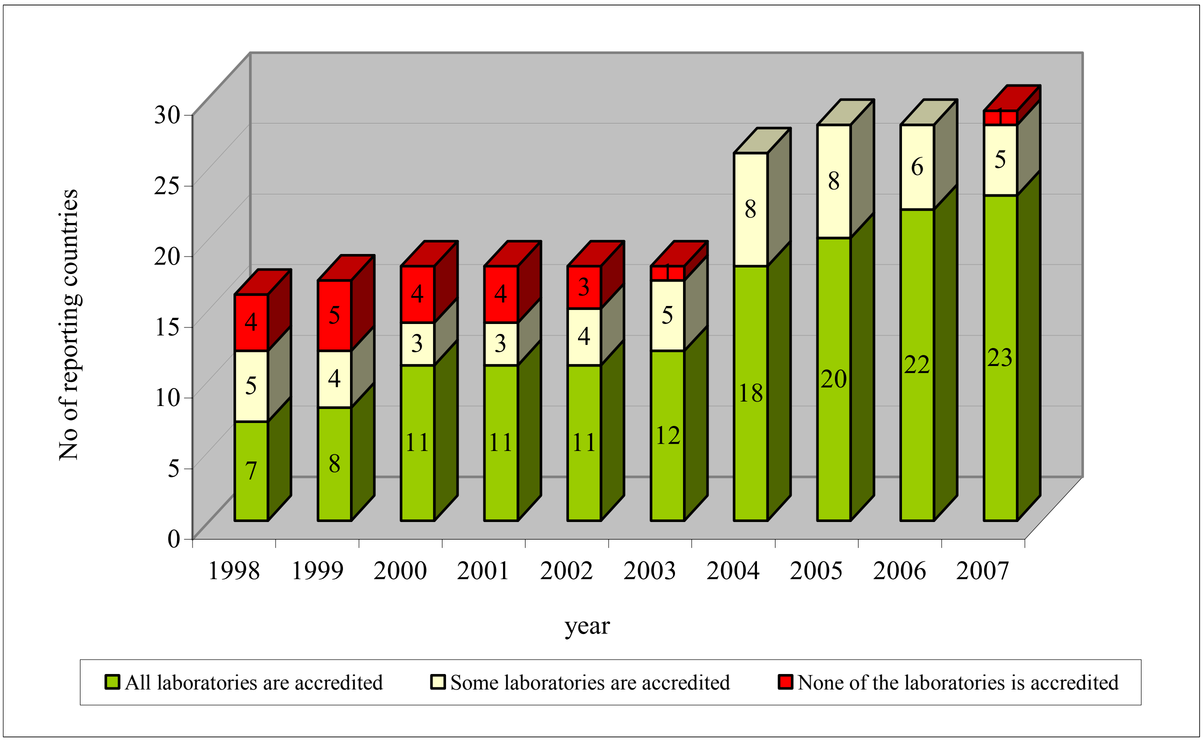


Figure 2.2-1 Proportion of laboratories accredited, 1998 to 2007

Figure 2.2-2 provides information on the proportion of samples analysed by accredited laboratories in the participating countries. Based on the information available 87.6% of the samples reported in 2007 were analysed by accredited laboratories. This percentage is similar to previous years.

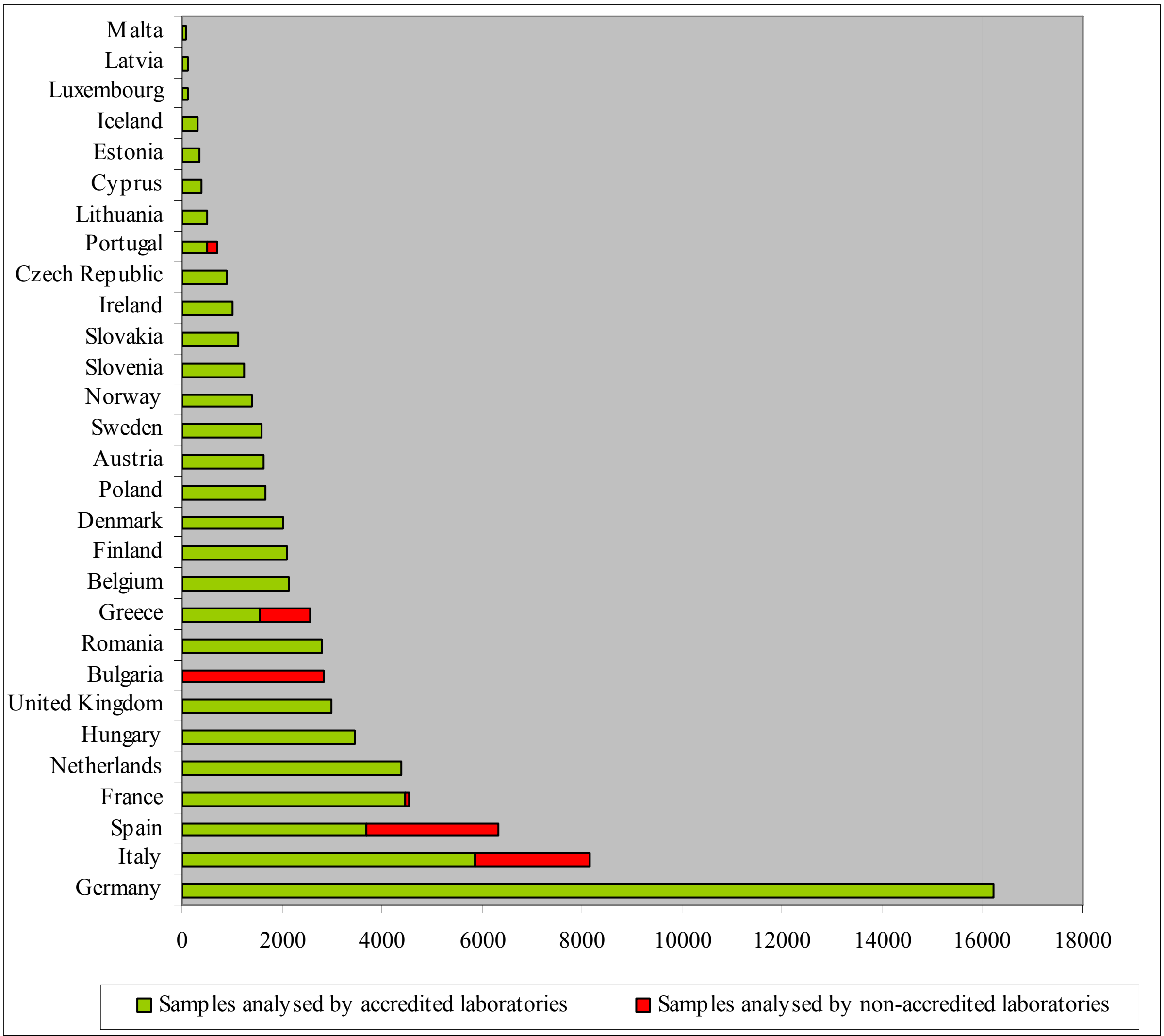


Figure 2.2-2 Numbers of samples analysed by accredited laboratories or by non-accredited laboratories by reporting country in the year 2007

In addition to the information on the accreditation of laboratories, figure 2.2-3 provides a summary of the implementation of the EU Guidelines on Quality Control Procedures for pesticide residues analysis. The EU Guidelines contain requirements for laboratories to ensure the validity of the results produced by laboratories and pertains the following issues, which are described in ten chapters:

1 Accreditation

2 Sampling, transport, processing and storage of samples

3 Pesticide standards, calibration, solutions, etc.

4 Extraction and concentration

5 Contamination and interference

6 Analytical calibration, representative analytes, matrix effects and chromatographic integration

7 Analytical methods and analytical performance

8 Proficiency testing and analysis of reference materials

9 Confirmation of results

10 Reporting of results

In 2007, 186 laboratories contributed to the monitoring programmes. The level of implementation of the quality control procedures varies between the different chapters: Chapters 1, 3, 4, 5, 8, 9 and 10 have been fully implemented by the majority of laboratories (68.8% - 81.2%).

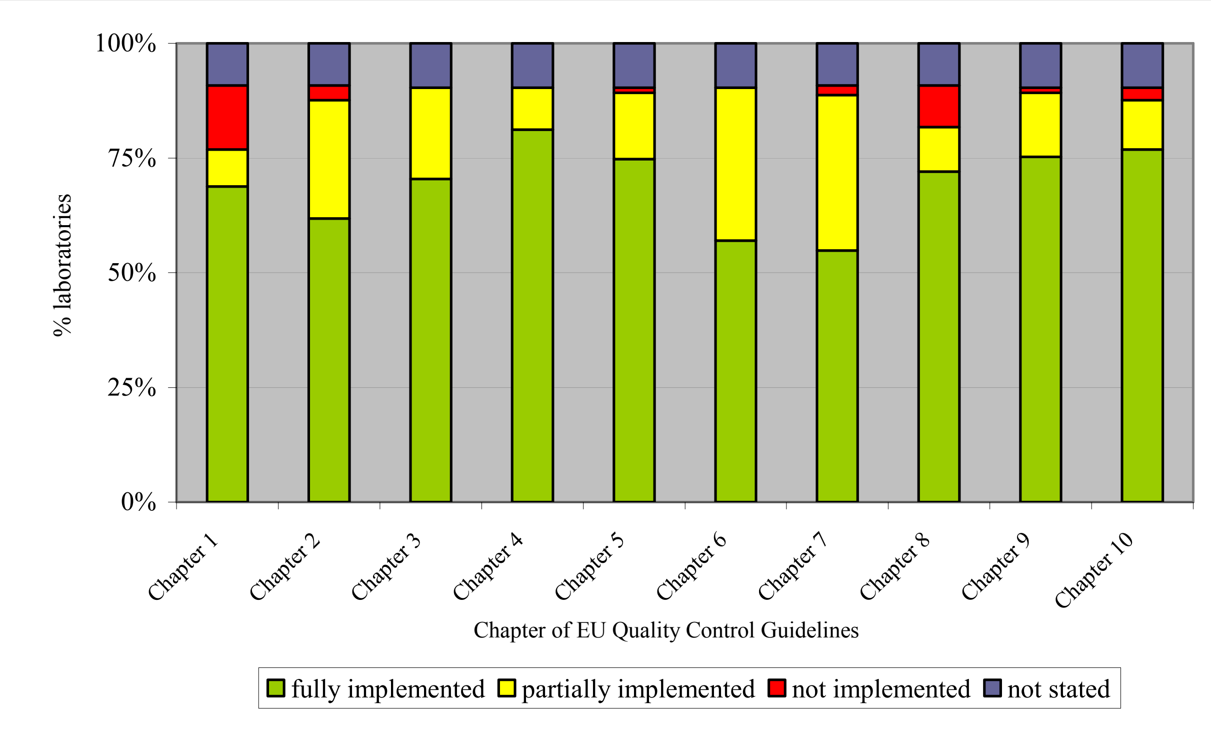


Figure 2.2-3 Percentage of laboratories which have fully, partially, or not implemented the different chapters of the EU Quality Control Guidelines

As proficiency tests are one of the most potent tools for improving the quality level of analytical laboratories, it should be highlighted that 180 of the 186 laboratories (96.8%) reported the participation in at least one proficiency test. Laboratories from 21 countries participated in the EU proficiency test EU PT 9. In addition laboratories took part in other proficiency tests organised at international or national level.

A summary of the information provided by all participating States about accreditation, participation in proficiency tests and implementation of the EU Quality Control Procedures is provided in Table N of Appendix III.

2.3. Number of samples analysed

2.3.1. Overall number of samples taken

The total number of samples analysed in 2007 was 74305. This included 71936 surveillance samples (61982 samples of fruit and vegetables, 3735 samples of cereals, 1822 baby food samples and 4397 samples of processed commodities) and 2369 enforcement samples (2289 samples of fruit and vegetables, 53 samples of cereals, 5 baby food samples and 22 samples of processed commodities).

In 2006, the total number of samples taken for analysis was lower (65810). The increase in 2007 by 8495 samples (12.9% increase) is primarily due to the fact that two additional countries (Bulgaria and Romania) have reported their data for the first time. The total number of samples taken by these two countries was 5644. But the increase also reflects the efforts made by reporting countries to enhance the monitoring in this food safety area.

2.3.2. Number of samples taken by reporting country

The number of samples taken by each reporting country is presented in Figure 2.3.2-1. In Appendix III (Table B to Table F) the figures are provided separately for cereals, fruit and vegetables, regarding surveillance and enforcement samples, respectively.

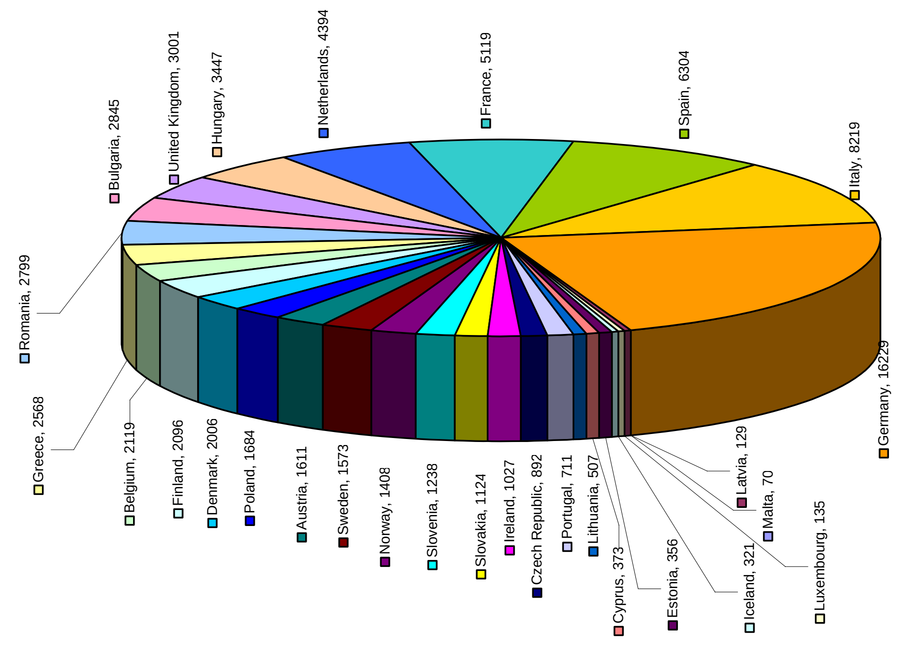


Figure 2.2-3 Number of samples taken in 2007 by each reporting country (surveillance and enforcement samples)

2.3.3. Number of samples taken per 100,000 inhabitants

In Figure 2.3.3-1 the sampling density, normalised according to the 2007 national populations, is depicted. The population figures used are taken from EUROSTAT (EUROSTAT 2009).

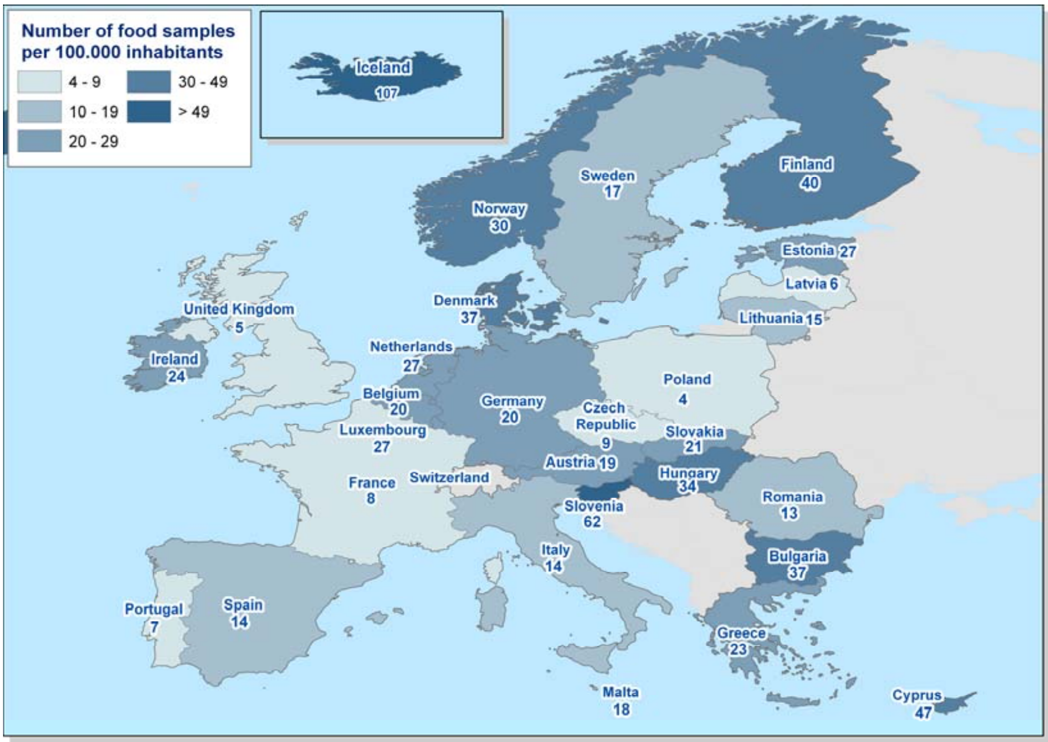


Figure 2.3.3-1 Number of samples taken in 2007 by each reporting country (surveillance and enforcement samples of fruit, vegetables, cereals, processed commodities and baby food) normalised by the national population

In 2007, the average number of samples taken per 100,000 inhabitants was 15, while in 2006 this figure was slightly lower (14). There is a large variation in the number of samples taken per 100,000 inhabitants among the reporting countries. In 2006, it ranged from 4 to 100, while in 2007 it ranged from 4 to 107 samples per 100,000 inhabitants.

2.3.4. Number of samples taken according to the sample origin

The share of domestic and imported samples should reflect the situation in the respective national market. 78% percent of the samples taken were from products of EU origin, whilst 16.8% of samples taken, were from imported produce. The origin of samples was unknown for 5.2% samples. In Figure 2.3.4-1, the breakdown of the total number of samples taken in 2007 according to the place of origin is depicted.

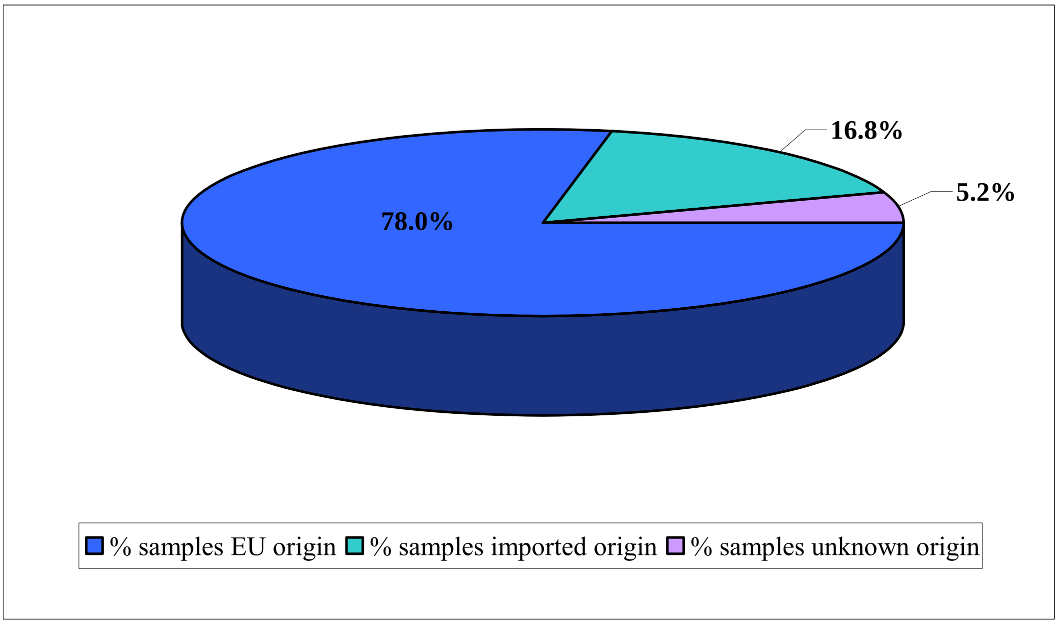


Figure 2.3.4-1 Proportion of samples by place of origin in 2007

2.4. MRL compliance

Table 2.4-1 gives an overview of the results regarding the percentage of samples which were reported to exceed the MRLs[6]. In total, 96.01% of the samples were compliant with the legal MRLs; 3.99% of the samples exceeded the legal limits. However, it is important to note that these figures do not represent the level of non-compliance for food available to consumers through the European market. These figures include the results of both surveillance sampling and targeted enforcement sampling. Targeted enforcement samples are taken in case of suspect about the safety of a product and/or as a follow-up of violations found previously. In certain cases the lots might have been destroyed or withdrawn from the shelves after the results on non-compliance were attested. Furthermore it should be noticed that for many of the pesticides detected by the laboratories, EU harmonised MRLs were not yet established in 2007. Consequently, a MRL exceedance in one Member State was not necessarily an exceedance in all other Member States. The oaverall non-compliance rate may only be used as a statistical parameter for comparison with the results of previous years and to indicate a possible emerging trend which requires further investigation, but should not be understood as the actual non-compliance rate for food placed on the market.

The comparison of the proportion of compliant/non-compliant samples for enforcement and surveillance of cereals, fruit and vegetables, baby food and processed food reveals several significant differences; the highest rate of non-compliant samples was identified for processed products in enforcement samples. Since this finding is based on few observations, there is a high degree of uncertainty associated with this value. The proportion of non-compliant samples observed for fruit and vegetables was 10.62% for enforcement samples and 4.19% for surveillance samples. The proportion of non-compliant samples was significantly lower for cereals, baby food (surveillance and enforcement) and processed products (surveillance). In order to compare different food items or sampling strategies the confidence intervals should be taken into account. Confidence intervals that do not overlap indicate statistically

[6] It should be noted that MRL compliances are reported without taking into account the analytical uncertainties of the measurements.

significant differences, whereas overlapping intervals show that the observed differences may simply be due to the sampling error.

A detailed table with the overall results for each reporting country is provided in Appendix III (Table B to G).

Table 2.4-1 Summary of the results of the national and EU coordinated monitoring programmes for pesticides

Products	Sampling strategy	No samples analysed	No samples with residues below or at the MRL	% of samples with residues below or at the MRL	LCI[1]	UCI[2]	No samples with residues above the MRL	% of samples with residues above the MRL	LCI	UCI
Cereals	Enforcement	53	52	98.11	89.93	99.95	1	1.89	0.05	10.07
Cereals	Surveillance	3735	3684	98.63	98.21	98.98	51	1.37	1.02	1.79
Fruit and vegetables	Enforcement	2289	2046	89.38	88.05	90.62	243	10.62	9.38	11.95
Fruit and vegetables	Surveillance	61982	59382	95.81	95.64	95.96	2600	4.19	4.04	4.36
Baby food	Enforcement	5	5	100.00	54.93	100.00	0	0.00	0.00	45.07
Baby food	Surveillance	1822	1811	99.40	98.92	99.70	11	0.60	0.30	1.08
Processed products	Enforcement	22	16	72.73	49.78	89.27	6	27.27	10.73	50.22
Processed products	Surveillance	4397	4346	98.84	98.48	99.14	51	1.16	0.86	1.52
Total Enforcement		2369	2119	89.45			250	10.55		
Total Surveillance		71936	69223	96.23			2713	3.77		
Total		74305	71342	96.01			2963	3.99		

[1] LCI = Lower Confidence Interval,
[2] UCI = Upper Confidence Interval
The precision of the value is dependant on the sample size. To express the remaining uncertainty of the estimation, additional 95% confidence intervals were calculated using the Clopper Pearson approach with F distribution (Johnson, 2005). The true proportion of samples is most likely equal to the calculated value with 95% confidence that it lies between the upper and lower confidence limits (UCI and LCI). It is important to note that when no exceedance of the MRL was observed there is still the statistical possibility of food items exceeding the MRL existing in the food commodity samples. The one sided confidence interval for no observed exceedance describes this possibility.

Figure 2.4-1 illustrates the proportion of compliant/non-compliant surveillance samples for fruit and vegetables, cereals, processed products and baby food.

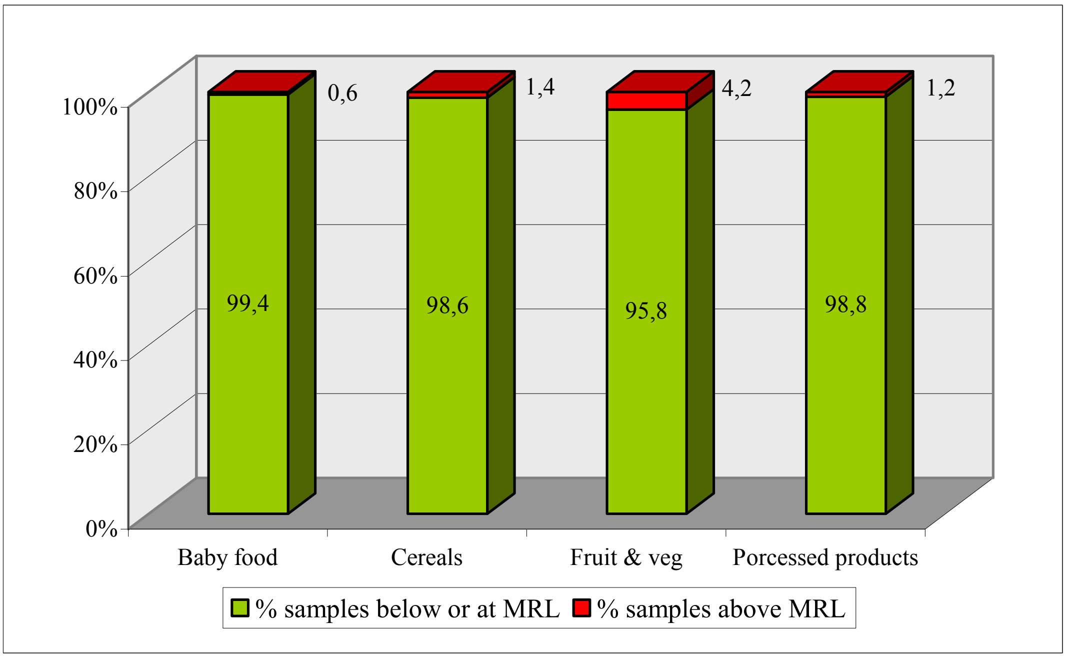


Figure 2.4-1 2007 monitoring results for fruit and vegetables, cereals, processed products (excluding baby food) and baby food (surveillance samples only)

2.4.1. Results for compliant/non-compliant samples compared to previous years

Figure 2.4.1-1 describes the trend in the proportion of compliant and non-compliant samples from the monitoring reports for 1996-2007. These figures comprise surveillance samples from both the national and EU coordinated programmes.

The percentage of samples with residues above the MRL increased from 3.0% in 1996 to 5.5% in 2002/2003. Since 2003, a decrease iss observed, with 4.0% of samples non-compliant in 2007. There is no clear indication of a trend over the 12 years of monitoring. The comparability of the data year on year is problematic, because the number of countries reporting data has increased from 16 in 1996 to 29 in 2007 and that the national monitoring programmes and the analytical methods used for residue detection differ considerably among the reporting countries. It should be mentioned that in the monitoring reports for the previous years the percentage of samples containing residues above the reporting level but below the MRL were reported. Since this figure is very much biased by the sampling strategy, the scope and the sensitivity of analytical methods applied to analyse the samples, the figure is considered to be misleading and is therefore not reported. However, for the results obtained in the framework of the coordinated programme which is intended to provide comparable data from non-targeted sampling this figure is reported (see 3.3.1).

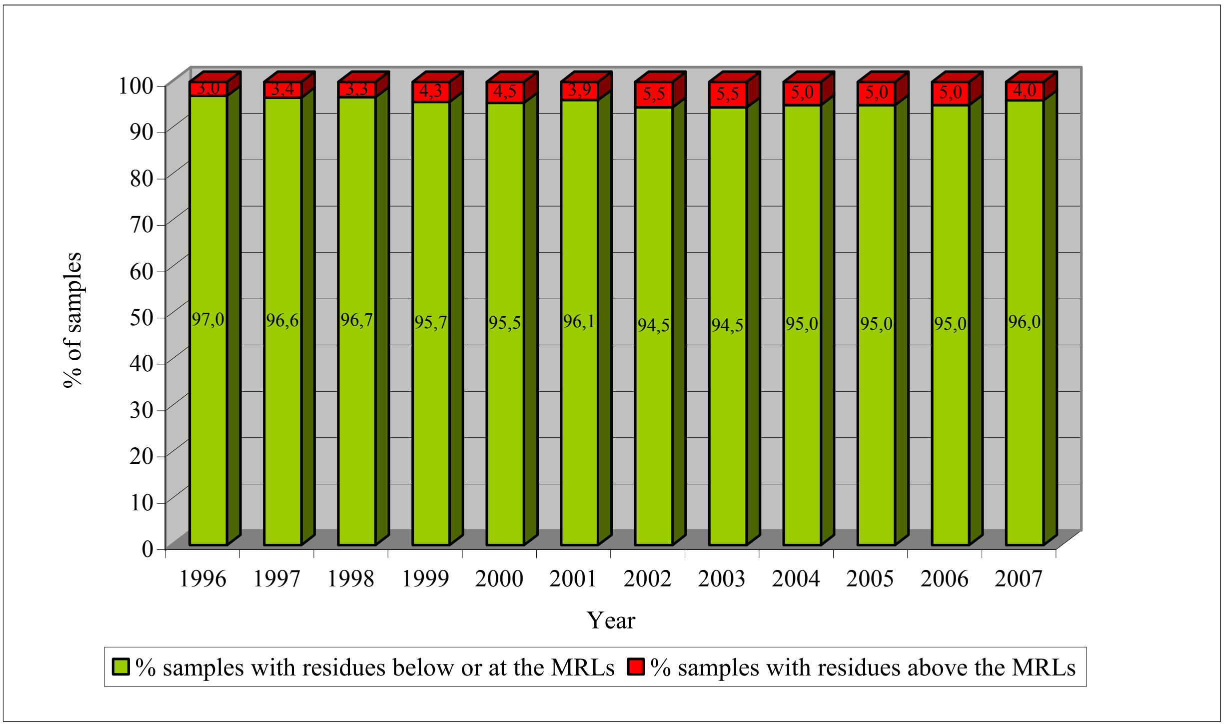


Figure 2.4.1-1 Monitoring results 1996-2007 for fruit, vegetables and cereals and baby food (excluding processed products): percentage of samples with residues compliant and non-compliant with MRLs (national or EC MRLs)

2.4.2. Results for cereals

For cereals, 3735 surveillance samples were analysed in 2007 (see Table 2.3-1). The percentages of samples with residues at or below the MRLs and exceeding the MRLs (national or EC MRLs) were 98.63% and 1.37%, respectively. A breakdown of the results according to each reporting country is provided in Appendix III, Table B.

The number of cereal enforcement samples taken in 2007 was 53; 52 of those contained residues below the MRLs (98.11%) and only one (1.89% of the total enforcement cereal samples) exceeded the MRLs.

2.4.3. Results for fruit and vegetables

In 2007, 61982 surveillance samples of fruit and vegetable were taken. Of those, 95.81% were compliant with MRLs (national or EC MRLs). The samples with residues above the MRLs (national or EC MRLs) accounted for 4.19% of the total surveillance samples. A summary of these results according to the reporting country is provided in Appendix III, Table C.

For fruit and vegetables, 2289 enforcement samples were analysed in 2007. The percentage of samples compliant with MRLs (national or EC MRLs) was 89.38%. The percentage of samples with residues exceeding the MRLs was 10.62%. A summary of the results of the different national programmes is provided in Appendix III, Table D.

The statistical analysis showed that the percentage of fruit and vegetable samples compliant and non-compliant with MRLs was significantly different when surveillance and enforcement samples were compared. The targeted nature of enforcement sampling results in a higher percentage of samples with residues exceeding the MRLs (national or EC MRLs).

2.4.4. Results for processed products

In 2007, 6% of the total samples taken were processed products (surveillance and enforcement samples). Sampling and analyses of processed products were not reported by all countries (4 countries analysed processed samples (enforcement) and 21 countries surveillance samples of processed commodities).

Of the 4419 processed products samples, only 22 (0.5%) were enforcement samples. The remaining samples were taken for surveillance purposes.

The MRLs applicable for processed commodities are normally based on the MRLs established fro raw agricultural commodities taking into account changes in the levels of pesticide residues caused by processing or mixing. Reporting countries notified that 98.84% of the surveillance samples and in 72.73% of the enforcement samples of processed products were below the MRL. It is not reported which processing factors were applied to derive the MRL for processed commodities.

A summary of the results for processed products for the different national programmes is provided in Appendix III (Table E).

2.4.5. Results for baby food

Maximum residue levels for pesticide residues in baby food have been set in Commission Directive 91/321/EEC for infant formulae and follow-on formulae and in Commission Directive 96/5/EC for processed cereal-based foods and baby foods for infants and young children. An overall EC MRL of 0.01 mg/kg is applicable for all active substances unless specific MRLs lower than 0.01 mg/kg were established under this legislation.

In 2007, two countries reported data for analyses of enforcement baby food samples, while results on surveillance samples were provided by 25 reporting countries. Overall, 1827 samples were analysed (see Table 2.4-1).

In 1811 of the surveillance baby food samples (99.4%) the residues were reported to be below or at the MRLs. The breakdown of the baby food results according to the sampling strategy and by the reporting country is provided in Appendix III (Table F). A total of five enforcement samples of baby food were analysed in 2007. All samples were compliant with MRLs.

In table 2.4.5-1 the list of the substances detected at or above the reporting level in surveillance samples of baby food is provided[7].

[7] The format used to report results of baby food samples restricted the validation of baby food results. As a result, some data inconsistencies in the data could not be verified.

Table 2.4.5-1 Pesticides detected at or above the reporting level in surveillance samples of baby food (the reporting level should be at least 0.01 mg/kg) as reported by the participating countries

Pesticide	Number of determinations above the reporting level	No of determinations above the MRL
Acetamiprid	121	0
Aldrin/Dieldrin (sum) (*)	472	0
Azoxystrobin	263	1
Bifenthrin	72	0
Carbendazim/Benomyl	180	2
Carbofuran	54	0
Chlormequat	90	0
Chlorpropham	26	1
Chlorpyrifos	280	0
Chlorpyrifos-methyl	71	0
Copper	11	0
Cypermethrin	110	2
Cyprodinil	115	1
DDT	532	0
Dicofol	71	0
Difenoconazole	49	0
Endosulfan	389	1
Endrin (*)	263	0
Epoxiconazole	49	0
Fenhexamid	200	3
Fipronil (**)	45	0
Fludioxonil	56	1
Flufenoxuron	54	0
HCH (sum of isomers, except the gamma isomer)	493	0
Heptachlor (*)	268	0
Hexachlorobenzene (*)	217	0
Imazalil	76	0
Lambda-Cyhalothrin	70	0
Lindane	531	0
Malathion	93	1
Metalaxyl	69	0
Methomyl	139	0
Methoxyfenozide	54	0
Myclobutanil	72	0
Orthophenylphenol	70	0
Penconazole	72	0
Pirimicarb	162	0
Pirimiphos-methyl	88	0
Procymidone	110	0
Propargite	66	2
Pyrimethanil	111	0
Quinoxyfen	66	0
Tebuconazole	72	0
Tebufenozide	60	0
Thiabendazole	78	0
Thiacloprid	169	0
Tolylfluanid	117	0
Tricyclazole	49	0
Trifloxystrobin	54	0
Vinclozolin	55	0
Total	7239	15

(*) A specific MRL of 0.003 mg/kg applies
(**) MRL for fipronil (including metabolites) is 0.004 mg/kg

It is noted that the proportion of baby food samples not compliant with MRLs varied significantly between the different reporting countries (0% to 9.09%). However, this variation is most likely the result of the different sampling strategies in the national monitoring programmes (see Appendix II for the details of the national monitoring plans).

In comparison with the results for baby food from 2006, the samples taken in 2007 presented an increased percentage of samples with residues exceeding the MRL. In fact, in 2006 and 2007 the percentages of surveillance baby food samples not compliant with MRLs were 0.2% and 0.6%, respectively, but due to the low absolute number of non-compliances the increase is not statistically significant.

EFSA recommends continuing the control of pesticide residues in baby food samples. Additionally, EFSA proposes changing the reporting format for the analytical results in baby food. In particular, in the proposed format, information on the residues occurring above the reporting level (LOQ), but below or up to the MRL, should be provided. Overall, it is noted that the reporting countries need more guidance on the reporting of the results on baby food samples, especially with regard to the MRL compliances.

2.4.6. Results for organic food

Data on organic food were also provided by some of the reporting countries. It should be mentioned that at EU level, no specific MRLs have been established for organic products. The MRLs established for conventional produced products therefore apply. The breakdown of the organic food results according to the food groups (cereals, fruit and vegetables and processed products) is reported in Table 2.4.6-1.

Table 2.4.6-1 Summary of the results of the national and EU coordinated monitoring programmes for pesticide residues in organic food (surveillance and enforcement samples) for 2007

Products	No samples analysed	No samples with residues below or at MRL	% samples with residues below or at MRL	LCI [1]	UCI [2]	No samples with residues above MRL	% samples with residues above MRL	LCI	UCI
Cereals	324	322	99.38	97.79	99.93	2	0.62	0.07	2.21
Fruit and Veg	2394	2368	98.91	98.41	99.29	26	1.09	0.71	1.59
Processed products	190	182	95.79	91.87	98.16	8	4.21	1.84	8.13
Total	2908	2872	98.76			36	1.24		

1 LCI = Lower Confidence Interval,
2 UCI = Upper Confidence Interval

The data on organic food have been provided without distinguishing between surveillance and enforcements samples. In general, samples of organic fruit and vegetables have a lower rate of MRL exceedances (overall 1.24% of all organic samples) in comparison to conventionally grown cereals, fruit and vegetables (3.99% of samples analysed in the EU coordinated and national monitoring programme).

It is noted that some reporting countries were unable to report the results regarding organic food due to deficiencies in the data management system implemented at national level.

2.5. Origin of samples exceeding the EC MRLs

In most cases, the participating countries reported information on the origin of samples that exceeded the MRLs (national or EC MRLs). A summary of the exceedances of the EC MRLs according to the origin of the surveillance samples is shown in Table 2.5-1 and Figure 2.5-1[8]. For enforcement samples, the summary is reported in Table 2.5-2 and Figure 2.5-2.

The data show that EC MRLs are exceeded more frequently in surveillance samples of produce imported from Third Countries than in EU products. Indeed, 6.84% exceedances of EC MRLs were reported for samples of imported fruit, vegetables and cereals, compared to 2.31% exceedances of products from the EU.

[8] It should be noted that the number of EC MRL exceedances in Table 2.5-1 does not correspond to the number of the samples with residue above the MRLs (national and EC MRLs) reported in Table 2.4-1. The discrepancy is also due to the fact that in some samples more than one MRL exceedance was found.

Table 2.5-1 Exceedances of EC MRLs according to origin of sample (surveillance samples of fruit, vegetables and cereals)

Sample origin	No of samples	No of EC MRL exceedances	% of EC MRL exceedances	LCI [1]	UCI [2]
EU	51294	1184	2.31	2.18	2.44
Imported	11017	754	6.84	6.38	7.33
Unknown	3406	67	1.97	1.53	2.49
Total	**65717**	**2005**			

[1] LCI = Lower Confidence Interval,
[2] UCI = Upper Confidence Interval

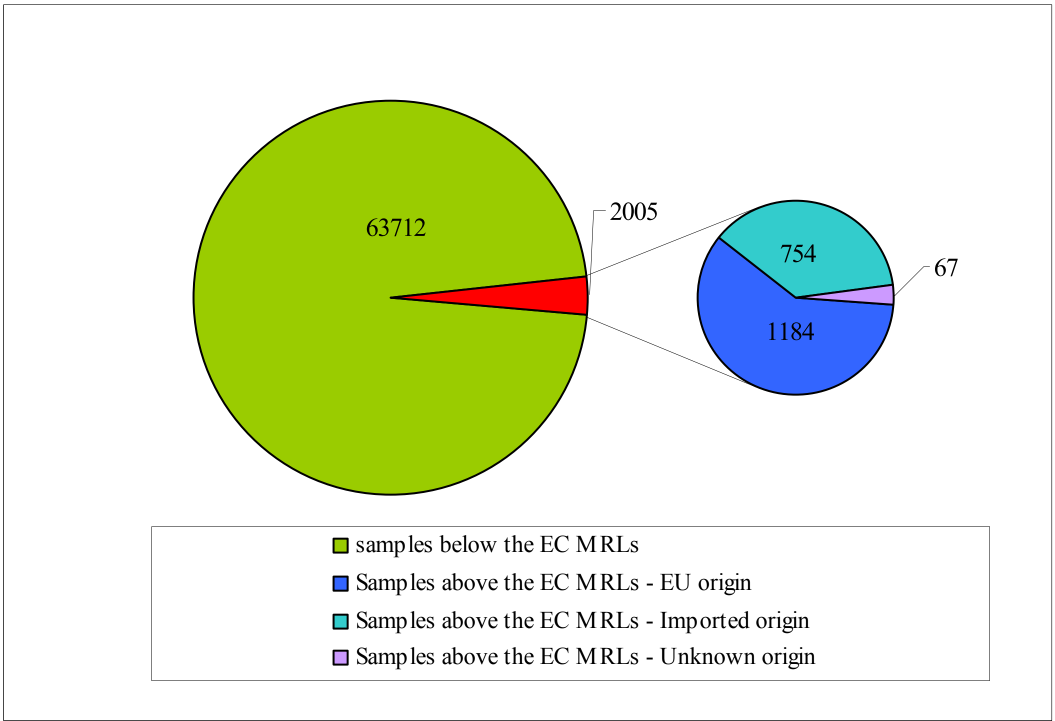


Figure 2.5-1 Number of samples non-compliant with EC MRLs according to origin of sample (surveillance samples of fruit, vegetables and cereals)

2.6. Reasons for MRL exceedances

Regulation (EC) No 396/2005 requests EFSA to provide a statement on the possible reasons for MRLs exceedances and appropriate observations regarding risk management options. When reporting the details of non-compliant samples, the reporting countries were requested to indicate any possible reasons – if known – to explain these exceedances.

In 2007, the MRLs (national or EC MRLs) were exceeded in 2963 samples. The possible reason why the MRL was exceeded was reported for only 85 non-compliant samples (2.9% of the MRL exceedances). The reasons provided by the reporting countries are reported in Table 2.6-1.

Table 2.6-1 Reasons for MRL exceedances as reported by the participating countries

Reasons for MRL exceedances	Number of samples
Pesticide misuses	40
False positive due to naturally occurring substances	13
Differences in national MRLs	10
Lack of registered pesticides (at national or EU level)	7
Incorrect use, e.g. use of too concentrated solution and incorrect dosage	5
Change in EC MRLs	4
Drift	2
Bad practice	2
Post-harvest treatment and crop packed for immediate consumption	1
Organic product	1
Mislabelling	1
Total	85

Due to the limited number of reported explanations for MRL exceedances, these explanations are not considered to be representative for all exceedances recorded in 2007. Consequently, general conclusions on the reasons for MRL exceedances can not be provided and possible risk management options can not be formulated. In order to analyse the reasons for MRL exceedances at European level in samples of crops EC produced, the reporting countries should be encouraged to provide more detailed information in the future.

2.7. Most frequently found pesticides

On the basis of the positive findings (findings above the Limit of Quantification - LOQ) provided by the reporting countries, a list of pesticides found according to their detection frequency was prepared. The top 30 pesticides found in fruit and vegetables according to the number of samples analysed can be found in Figure 2.7-1. For cereals the pesticides found in more than 10 times are shown in Figure 2.7-2. The frequency of the findings for all pesticides is reported in Appendix III (table H) for cereals and fruit/vegetables.

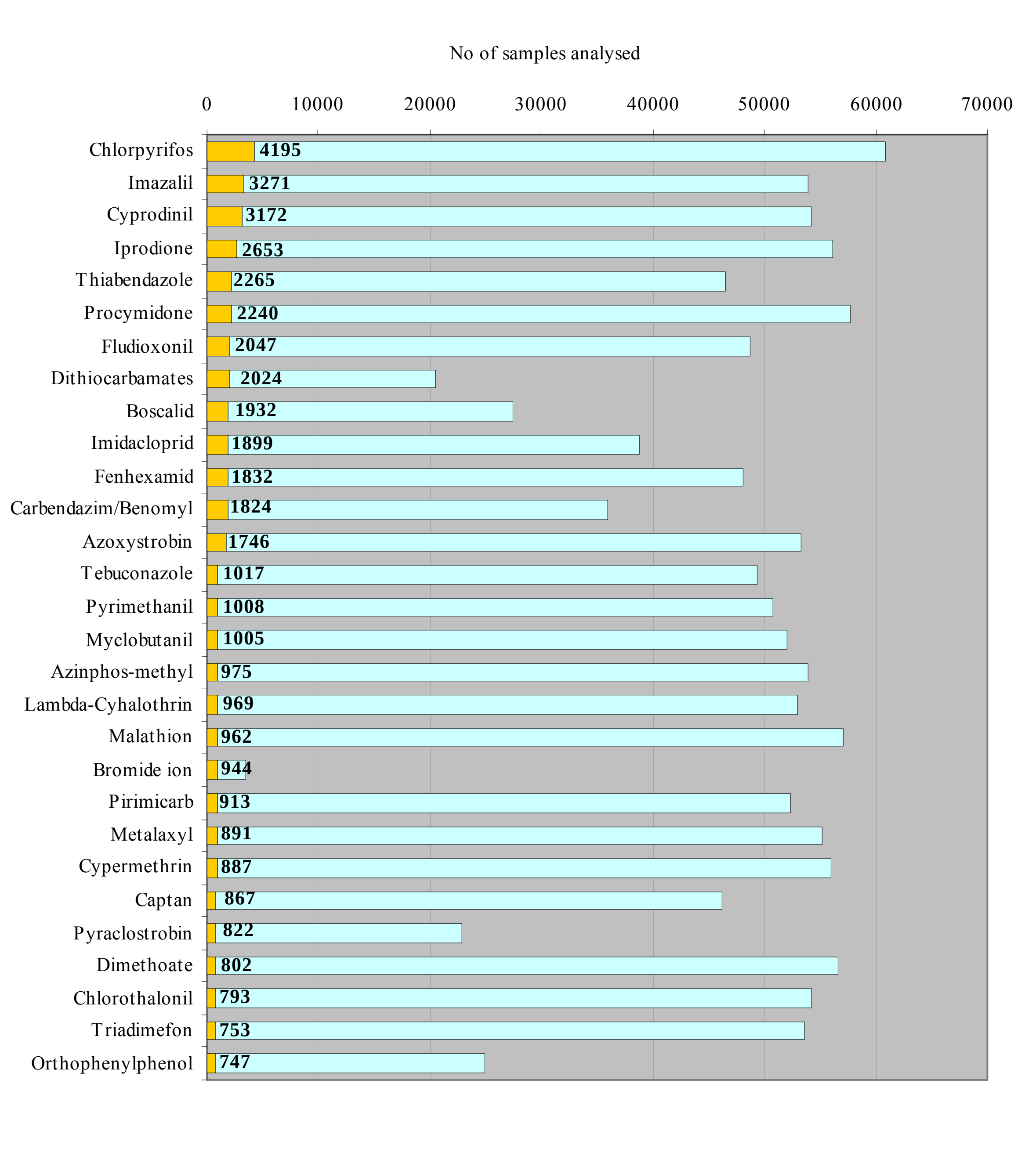
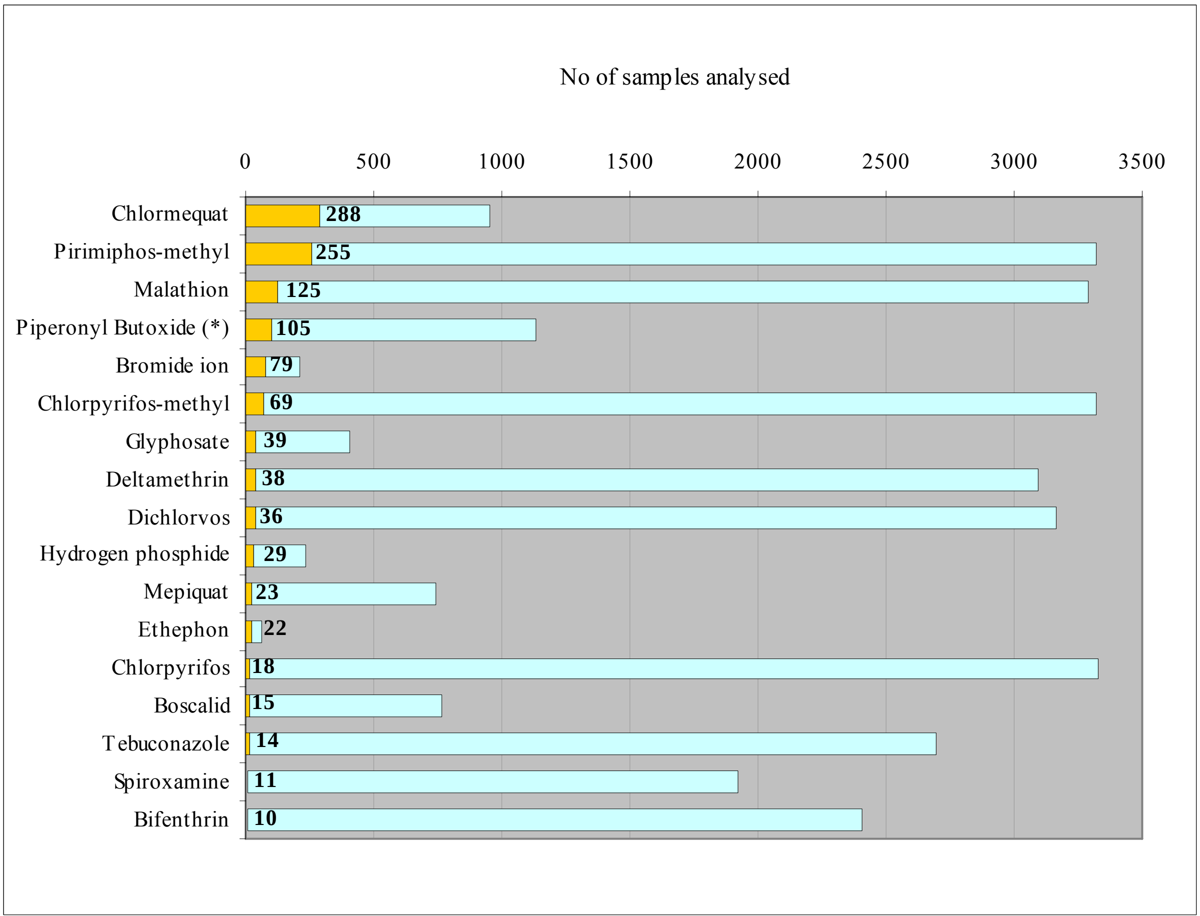


Figure 2.7-1 Most frequently found pesticides in samples of fruit and vegetables compared with the total number of samples analysed for these pesticides (pesticides found in more than 700 samples)



(*) In 2007, national MRLs were in place for pyperonyl butoxide

Figure 2.7-2 Most frequently found pesticides in samples of cereals compared with the total number of samples analysed for these pesticides (pesticides found in 10 or more samples)

In summary, of the 870 pesticides tested for in 2007, a total of 358 different pesticides were detected (41%).

In 2004, 2005 and 2006 the number of pesticides and metabolites sought was 677, 706 and 769, while the corresponding number of pesticides detected in these 3 years was 253 (48%), 346 (49%) and 354 (46%), respectively.

2.8. Samples with multiple residues

Multiple residues in a single sample can result from the application of different types of pesticides which are used to protect the crop against different pests or diseases (insects, fungal diseases, control of weeds, etc). Each of these pests or diseases may require the use of a specific pesticide. In order to reduce the risk of the development of resistance to pesticides by pathogens Member State authorities often recommend the application of different chemicals with different modes of biochemical action. For the same reason, combi-products containing more that one pesticide have been developed and applied. Also these strategies may result in the occurrence of multiple residues in treated crops.

In addition to the reasons for multiple residues justified by agricultural practices as mentioned above, other possible reasons for the occurrence of multiple residues are:

- mixing of lots which were treated with different pesticides, either during the sampling or in the course of sorting of commodities (e.g. sorting for quality classes),
- residues resulting from uptake via soil in case of pesticides with high persistence in soil,
- residues resulting from spray drift of neighbouring plots,
- cross-contamination in the processing of the crops (e.g. by washing practices),
- contamination during the storage,
- use of pesticide formulations that were contaminated with other pesticides (contamination during filling process of pesticide containers).

A key factor determining the proportion of samples identified with two or more residues in a single sample is the analytical methods used for pesticide detection. In recent years, the reporting countries made considerable efforts to increase the scope and the sensitivity of the analytical methods (see section 2.1).

Since the occurrence of multiple residues is an important factor for consideration when assessing the consumer exposure, the reporting countries had to provide information on the presence of more than one pesticide in the samples analysed. These results are reported in Figure 2.8-1.

Considering the results of both, the national and the EU coordinated programmes carried out in 2007 (surveillance and enforcement samples), residues of two or more pesticides were found in 25.9% of the total samples of fruits, vegetables and cereals. The largest contribution to this percentage was due to samples in which two different residues occurred (10.3% of multiple residue samples). The samples containing three pesticides accounted for 6.3% of samples with multiple residues.

A summary of the multiple residue results according to the reporting countries is reported in table G of Appendix III.

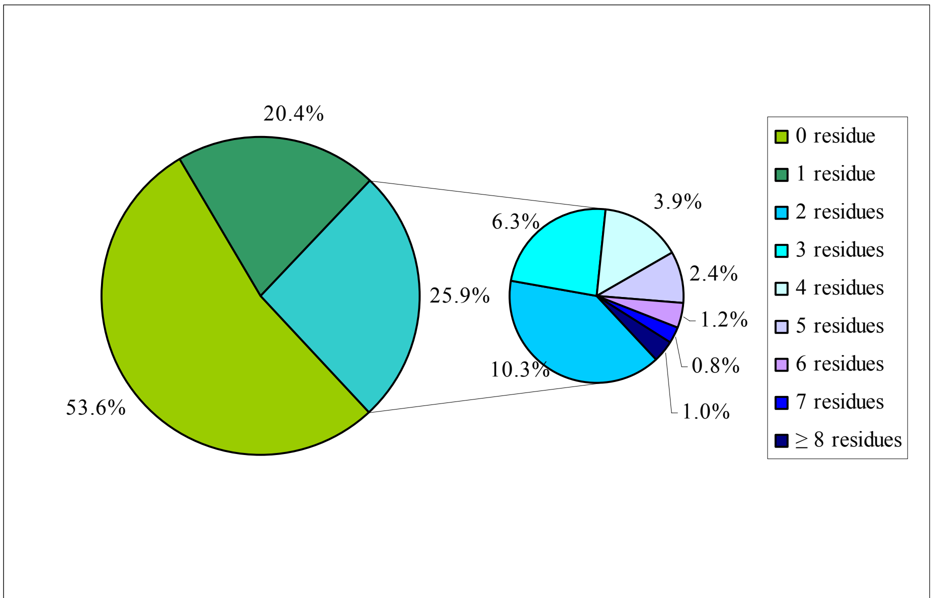


Figure 2.8-1 Multiple residue samples, number of different pesticides detected per sample (samples of fruit, vegetables and cereals)

Over the last years, a general trend towards an increased percentage of samples with multiple residues was observed as depicted in Figure 2.8-2. In 2007 the percentage of samples with multiple residues slightly decreased. The results of the succeeding years will show whether the results of 2007 are the first sign for a reversal trend or whether these data are only an interim depression.

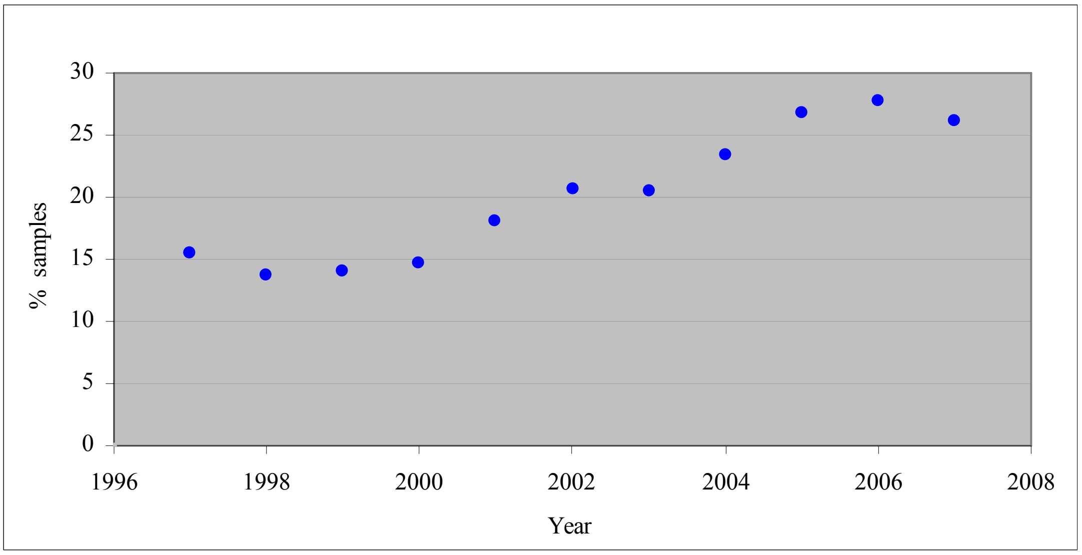


Figure 2.8-2 Percentage of samples with multiple residues from 1997 to 2007 in fruit, vegetables and cereals

The highest number of different pesticides detected in a single sample was observed in a sample of pears which contained 22 different pesticies. The second and third highest number of different pesticides were reported for a sample of peppers (21 residues) and a sample of tomatoes (20 residues). For the period 1997 to 2006 a steady increase in the maximum number of pesticides detected in single samples was observed (see Figure 2.8-3). In 2007, the number of multiple residues detected decreased. However, the comparison of the 2007 data and data from previous monitoring year is impeded by the fact that up to 2006 also processed or composite samples consisting of several lots treated with different pesticides a have been reported as samples with multiple residues (e.g chilli powder). In this case the number of pesticides is expected to be higher than in samples originating from the same source.

In fact, also in 2007 two samples of chilli pepper (dried and ground spices), one produced in Europe and one imported from a third county, containing 30 and 24 different pesticides were reported. These samples were processed products and it is very likely that the lots used to prepare the processed chilli peppers have been bulked prior to or during processing. These samples were not taken into account in identifying the maximum number of pesticide detected in one single sample.

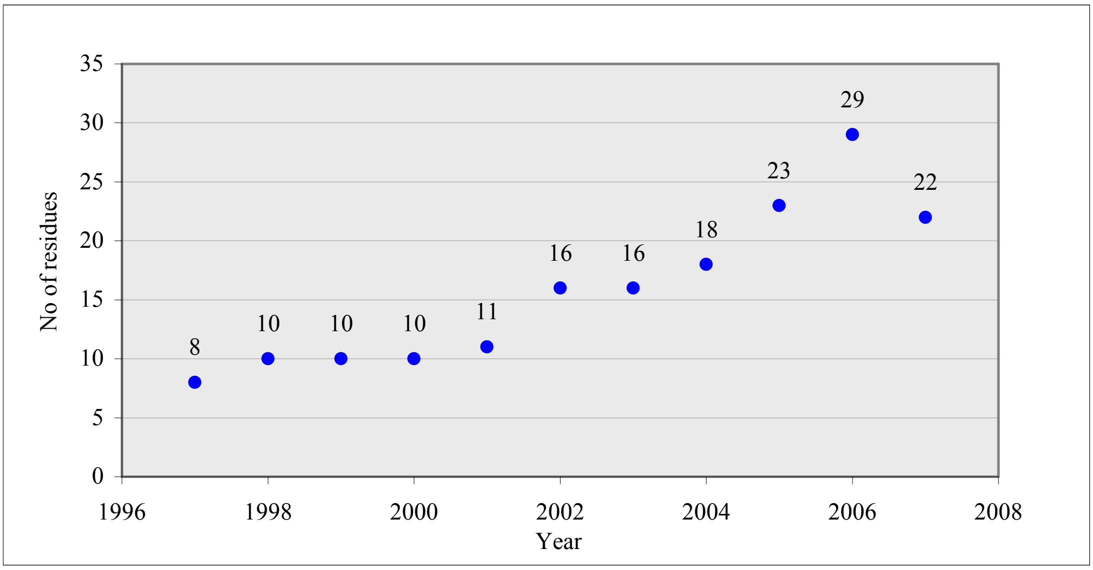


Figure 2.8-3 Highest reported number of different pesticides in a sample from 1997 to 2007 in fruit, vegetables and cereals

In 2007, 17,788 surveillance samples of fruit, vegetables and cereals contained multiple residues. The number of samples which were found non-compliant for two or more EC MRLs was 158 (for a total of 362 EC MRL exceedances). A breakdown of theses 158 samples according to the number of EC MRL exceedances in each sample and according to the food commodity is reported in Table 2.8-1. From table 2.8-1 it is noted that the highest number of EC MRL exceedances in the single sample is eight. This finding relates to a sample of peppers.

Table 2.8-1 Summary of results for samples with multiple EC MRL exceedances

Commodity	No of EC MRL exceedances in the same sample				Total number of samples with multiple MRL exceedances
	2	3	4	8	
Peppers	7	1	3	1	12
Passion fruit	9	2			11
Table grapes	9		1		10
Beans (with pods)	5	2	1		8
Celery	6	2			8
Lettuce	6	2			8
Apples	7				7
Lychee (Litchi)	5	1			6
Peaches	4	1	1		6
Spices: Fruits and Berries	4	2			6
Tea	5				5
Melons	4	1			5
Parsley	4	1			5
Carambola	2	2			4
Currants (red, black and white)	2	2			4
Other miscellaneous fruits with edible peel	3	1			4
Celery leaves	4				4

Commodity	No of EC MRL exceedances in the same sample				Total number of samples with multiple MRL exceedances
	2	3	4	8	
Strawberries	3				3
Kale	3				3
Mangoes	1	1			2
Pears	2				2
Pomegranate	1	1			2
Raspberries	2				2
Ginger	2				2
Basil	1	1			2
Broccoli	1	1			2
Cucumbers	2				2
Lamb's lettuce	2				2
Spinach	1	1			2
Rice	1				1
Figs	1				1
Gooseberries	1				1
Mandarins	1				1
Oranges	1				1
Persimmon	1				1
Plums	1				1
Coriander seed	1				1
Beetroot	1				1
Carrots	1				1
Chives	1				1
Cultivated fungi			1		1
Fresh Herbs	1				1
Other solanacea	1				1
Parsnips	1				1
Scarole (broad-leaf endive)	1				1
Shallots	1				1
Tomatoes	1				1
Watermelons		1			1
Total	**124**	**26**	**7**	**1**	**158**

3. Results of the EU coordinated programme

The EU coordinated programme is aimed to provide statistically representative data regarding the concentrations of pesticides in fruit, vegetables and cereals representative for the European market which is appropriate to assess the actual dietary exposure of the European population. In contrast to the data presented in section 2 on the summary results of the national and EU coordineted programmes, the results presented in section 3, which refer sololey to the EU coordinetd programme, are comparable in term of scope (pesticides sought) and sampling strategies (i.e. non target samples).

The coordinated programme was designed as a rolling programme covering major pesticide/commodity combinations. The first 3-years cycles were concluded in 2003 and 2006. The present annual report is the first report of the third 3-years cycle.

3.1. Scope of the 2007 EU coordinated programme

3.1.1. Food commodities

The food commodities considered in the EU coordinated programme are reported in Table 3.1.1-1 (EC 2007a). The reporting countries are asked to provide residue data detected in unprocessed samples of these commodities. In 2009 also a processed commodity (orange juice) will be included in the sampling plan.

Table 3.1.1-1 Food commodities to be monitored in the calendar years 2007, 2008 and 2009 in the framework of the EU coordinated monitoring programme.

2007	2008	2009
Apples Head cabbage Leek Lettuce Tomatoes Peaches (a) Rye or oats Strawberries	Beans (b) Carrots Cucumbers Oranges Mandarins Pears Potatoes Rice Spinach (b)	Aubergines Bananas Cauliflower Grapes Orange juice (c) Peas (d) Peppers (sweet) Wheat

(a) Peaches including nectarines and similar hybrids;
(b) Fresh or frozen;
(c) For orange juice, Member States should specify the source (concentrate or fresh fruit);
(d) Fresh/frozen, without pods

These food commodities were selected because they are major components of European diets. In Figure 3.1.1-1 the contribution of the selected nine food commodities to the total diets (food of plant origin) of the Member States for which consumption data are available is illustrated[9]. Details of the Member States diets have been reported elsewhere (EFSA, 2007).

From the consumption figures available for the 27 diet sets, it is noted that the 9 crops selected for the 2007 monitoring programme represented 9.1 to 41.3% of the total dietary

[9] The consumption figures for sugar beet have been disregarded as residues of pesticides in sugar are generally not expected.

daily intake of products of plant origin, whereas the total contribution of the crops to be monitored in 2007, 2008 and 2009 ranged from 40.0 to 95.1% of the diets.

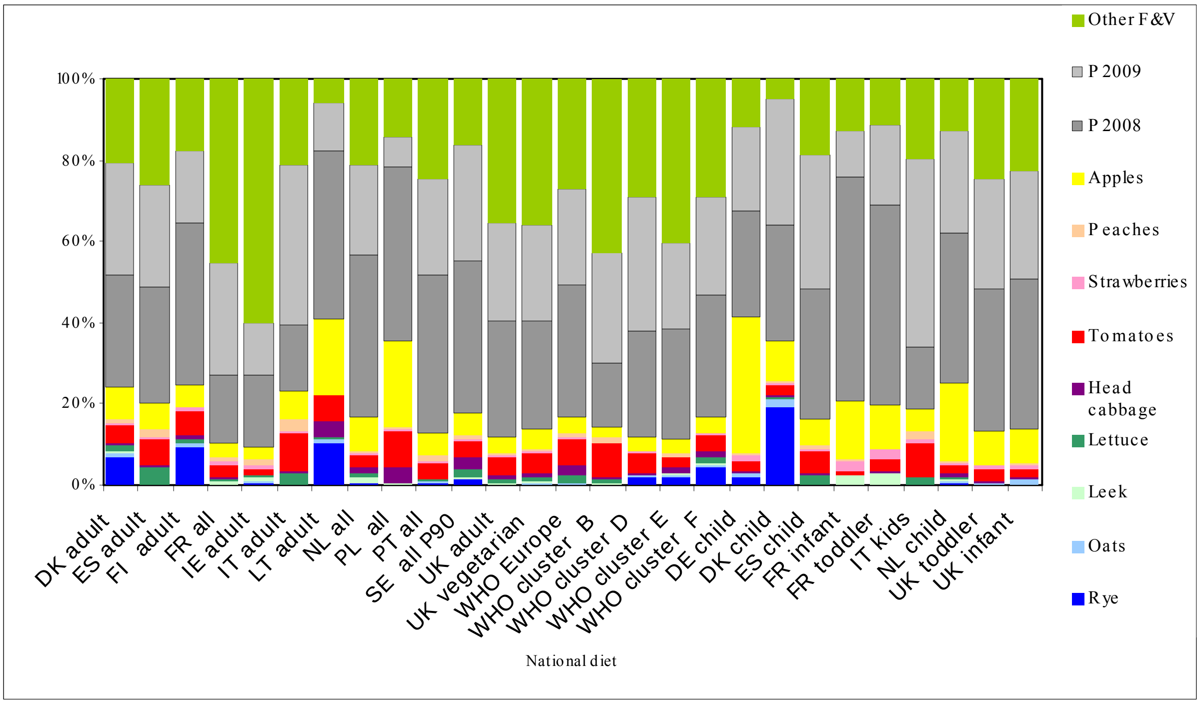


Figure 3.1.1-1 Contribution of the commodities covered by the coordinated monitoring programmes to the total food intake (excluding products of animal origin and sugar beets)

Other F & V = other fruit and vegetables not included in the crop list to be monitored in 3 years cycle EU coordinated programme;

P 2008 = Food commodities included in the monitoring programme in 2008;

P 2009 = Food commodities included in the monitoring programme in 2009

3.1.2. Number of pesticides

The list of the 71 pesticides (including the relevant metabolites as specified in the residue definition) which had to be analysed in 2007 is reported in Table 3.1.2-1. It should be noted that for some pesticides harmonised EU MRLs had not been established in 2007. In these cases national MRL provisions were applicable.

Table 3.1.2-1 List of pesticides analysed in the framework of the 2007 EU coordinated monitoring program

Pesticide	EC MRL
Acephate	✓
Acetamiprid	
Aldicarb (sum of Aldicarb, its sulfoxide and its sulfone, expressed as Aldicarb)	✓
Azinphos-methyl	✓
Azoxystrobin	✓
Bifenthrin	✓
Bromopropylate	✓
Bupirimate	
Buprofezin	
Captan (sum of Captan and Folpet) [10]	✓

[10] For apples, strawberries and tomatoes the MRLs established are expressed as sum of captan and folpet.

Pesticide	EC MRL
Captan [11]	✓
Folpet [12]	✓
Carbaryl	✓
Carbendazim (sum of Benomyl and Carbendazim, expressed as Carbendazim) [13]	✓
Chlormequat[14]	✓
Chlorothalonil	✓
Chlorpropham (Chlorpropham and 3-chloroaniline, expressed as Chlorpropham)	✓
Chlorpyrifos	✓
Chlorpyrifos-methyl	✓
Cypermethrin (Cypermethrin including other mixtures of constituent isomers (sum of isomers))	✓
Cyprodinil	
Deltamethrin (cis-deltamethrin)	✓
Diazinon	✓
Dichlofluanid	✓
Dichlorvos	✓
Dicofol (sum of p, p' and o,p' isomers)	✓
Dimethoate (sum of dimethoate and omethoate, expressed as dimethoate)[15]	✓
Diphenylamine	✓
Dithiocarbamates (expressed as CS_2) [16]	✓
Endosulfan (sum of alpha- and beta-isomers and Endosulfan-sulphate, expressed as Endosulfan)	✓
Fenhexamid	✓
Fenitrothion	✓
Fludioxonil	

[11] For head cabbage, leek, lettuce, peaches, rye and oats separate MRLs have been established for folpet and captan.
[12] See comment on captan
13 Since carbendazim is also a metabolite of the pesticide benomyl, the MRLs were established for the sum of both compounds, after recalculating the benomyl residues to carbendazim.
[14] Only residue results on cereals (oats and rye) and tomatoes were requested.
[15] Since omethoate is also a metabolite of the pesticide dimethoate, the MRLs were established for the sum of both compounds after recalculating the omethoate residues according to the molecular weight to dimethoate.
[16] In 2007, the dithiocarbamates group included by legal definition metiram and zineb, maneb, mancozeb and propineb. For enforcement purposes, the residues of these pesticides are measured as total CS2.

Pesticide	EC MRL
Hexythiazox	
Imazalil	✓
Imidacloprid	
Indoxacarb (sum of the isomers S and R)	
Iprodione	✓
Iprovalicarb	✓
Kresoxim-methyl	✓
Lambda-Cyhalothrin	✓
Malathion (sum of Malathion and Malaoxon, expressed as Malathion)	✓
Mepanipyrim (Mepanipyrim and its metabolite (2-anilino-4-(2-hydroxypropyl)-6-methylpyrimidine) expressed as Mepanipyrim)	
Metalaxyl (metalaxyl including other mixtures of constituent isomers including metalaxyl-M (sum of isomers))	✓
Methamidophos	✓
Methidathion	✓
Methiocarb (aka Mercaptodimethur)	
Methomyl (sum of Methomyl and Thiodicarb, expressed as Methomyl)[17]	✓
Myclobutanil	✓
Oxamyl	✓
Oxydemeton-methyl (sum of Oxydemeton-methyl and Demeton-S-methylsulfone, expressed as Oxydemeton-methyl)	✓
Parathion	✓
Penconazole	✓
Phosalone	✓
Pirimicarb (sum of Pirimicarb and Desmethyl pirimicarb, expressed as Pirimicarb)	
Pirimiphos-methyl	✓
Prochloraz (sum of Prochloraz and its metabolites containing the 2,4,6-Trichlorophenol moiety, expressed as Prochloraz)	✓
Procymidone	✓
Profenofos	✓
Propargite	
Pyrethrins	✓
Pyrimethanil	

[17] Since methomyl is also a metabolite of thiodicarb, the MRLs were established for the sum of both compounds, after recalculating the thiodicarb residues according to the molecular weight to methomyl.

Pesticide	EC MRL
Pyriproxyfen	
Quinoxyfen	✓
Spiroxamine	✓
Tebuconazole	
Tebufenozide	
Thiabendazole	✓
Thiophanate-methyl	✓
Tolclofos-methyl	
Tolylfluanid (sum of Tolylfluanid and Dimethylaminosulfotoluidide, expressed as Tolylfluanid)	
Triadimefon (sum of Triadimefon and Triadimenol)[18]	✓
Vinclozolin (sum of Vinclozolin and all metabolites containing the 3,5-dichloraniniline moiety, expressed as Vinclozolin)	✓

[18] Residues of triadimenol and triadimefon should be expressed as sum of triadimenol and triadimefon

The list of pesticides to be monitored in the framework of the EU coordinated programme has been extended substantially over the previous 10 years; from 1997 to 2007 the number of pesticides included increased from 13 to 71 (see Figure 3.1.2-1).

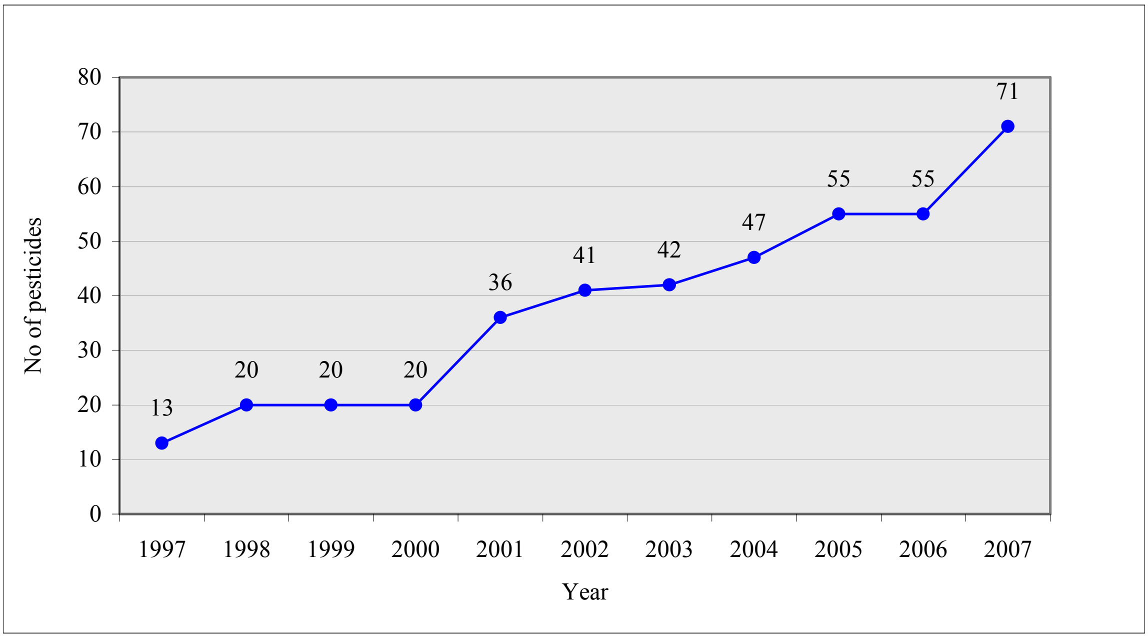


Figure 3.1.2-1 Number of pesticides included the EU coordinated programme for the period 1997-2007

3.1.3. Number of samples

In order to obtain representative information concerning the concentration of pesticides in fruit, vegetables and cereals a statistically based sampling plan proposed by Codex Alimentarius (Codex, 1994) was applied. Based on a binomial probability distribution, it was calculated that examination of 642 samples gives a confidence of more than 99% detecting one sample containing pesticide residues above the LOQ, where less than 1% of products of plant origin contain residues above the LOQ (COM 2007a).

The minimum numbers of samples to be taken of each commodity were fixed at a different level for each reporting country, taking into account the size of the population; the required minimum number of samples for each crop and each reporting country varied from 12 to 93 (Table 3.2-1).

3.2. Number of samples analysed

The participation in the EU coordinated programme is not mandatory. Nevertheless, in 2007 all 27 Member States and the two EFTA states (Iceland and Norway) reported results for this programme. In Table 3.2-1 the total number of samples taken in 2007 by the 29 reporting countries and a summary of the number of samples per country and commodity is shown. In total, 17575 samples were taken for analysis. Thus, the coordinated programme accounted for 24% of the overall number of samples analysed in 2007. The total number for samples taken per commodity ranged from 843 (oats and rye) to 3454 (apples).

Table 3.2-1 Number of samples taken by each reporting country for the 2007 EU coordinated programme by commodity

Country	Minimum no of samples per commodity	Apples	Head cabbage	Leek	Lettuce	Oats	Rye	Peaches	Strawberries	Tomatoes	Total
Austria	12*/15**	14	15	15	15	6	10	16	15	16	122
Belgium	12*/15**	91	60	15	69	24	0	57	76	107	499
Bulgaria	12*/15**	3	4	0	0	0	0	320	0	502	829
Cyprus	12*/15**	31	16	15	33	17	8	26	33	31	210
Czech Republic	12*/15**	42	17	12	29	0	14	32	19	55	220
Denmark	12*/15**	75	1	18	52	22	53	57	52	51	381
Estonia	12*/15**	17	16	15	6	9	6	15	22	19	125
Finland	12*/15**	123	18	18	83	23	105	20	111	86	587
France	66	70	48	61	58	32	42	57	53	71	492
Germany	93	910	160	142	814	0	105	474	1372	790	4767
Greece	12*/15**	31	24	28	29	20	4	26	25	31	218
Hungary	12*/15**	25	12	13	20	8	6	14	6	24	128
Iceland	Not specified	20	11	5	8	0	0	0	15	13	72
Ireland	12*/15**	112	18	15	60	31	0	27	29	21	313
Italy	65	694	69	17	254	4	5	523	209	582	2357
Latvia	12*/15**	15	17	14	14	13	0	15	15	14	117
Lithuania	12*/15**	17	13	13	11	0	13	12	15	22	116
Luxembourg	12*/15**	12	12	11	12	2	2	12	11	12	86
Malta	12*/15**	5	15	0	15	0	0	18	0	15	68
Netherlands	17	128	97	69	261	2	5	83	105	128	878
Norway	Not specified	108	22	26	69	9	8	18	93	53	406
Poland	45	60	50	50	50	1	49	50	50	50	410
Portugal	12*/15**	63	53	36	35	6	7	47	30	68	345
Romania	17	233	115	54	159	0	0	171	156	166	1054

Country	Minimum no of samples per commodity	Apples	Head cabbage	Leek	Lettuce	Oats	Rye	Peaches	Strawberries	Tomatoes	Total
Slovakia	12*/15**	25	14	16	13	6	8	13	14	19	128
Slovenia	12*/15**	93	58	24	78	11	14	82	50	82	492
Spain	45	157	57	82	159	22	3	134	86	245	945
Sweden	12*/15**	135	17	20	28	5	29	42	30	49	355
United Kingdom	66	145	96	72	144	71	3	132	96	96	855
Total		3454	1125	876	2578	843		2493	2788	3418	17575

*/** = Minimum number of samples for each single/multi-residue analytical method applied.

3.3. MRL compliance

3.3.1. Overall results on MRL compliance

The percentage of samples with residue levels above the MRL was 2.3%, while the percentage of samples with residues above the reporting but below or at the MRL was 45.0%. In 52.7% of the samples no measurable pesticide residues were found (Figure 3.3.1-1). Table I in Appendix III provides a summary of the control results of the 2007 EU coordinated monitoring programme for each reporting country.

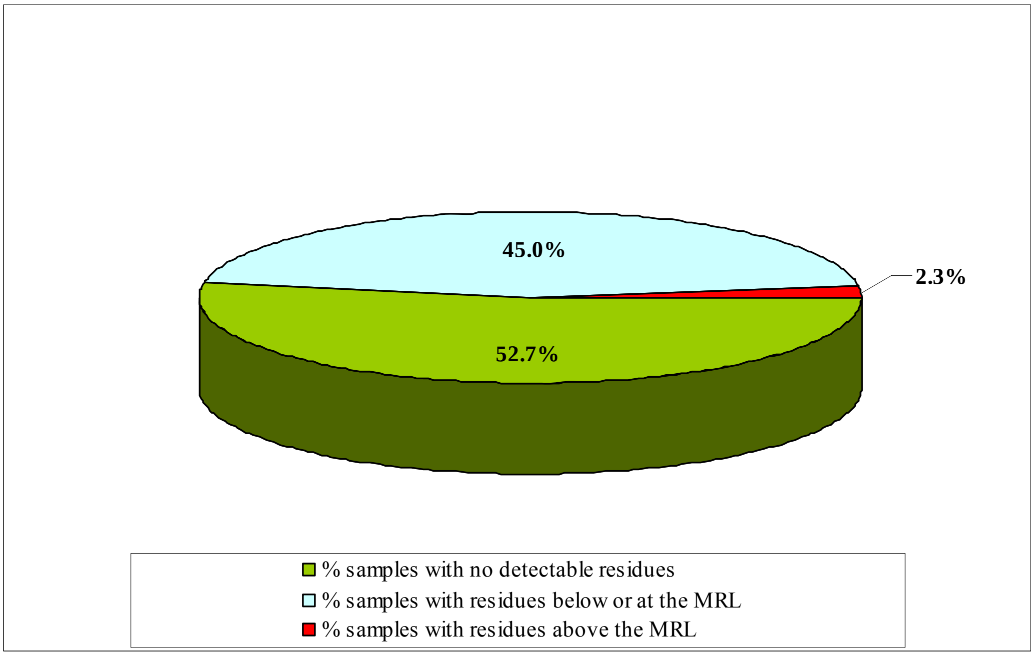


Figure 3.3.1-1 2007 coordinated monitoring programme: overall results

3.3.2. Results by food commodity

Figure 3.3.2-1 depicts the percentages of samples with residues below or at the MRL (national or EC MRLs) and exceeding the MRL (national or EC MRLs) in the nine food commodities analysed in the 2007 EU coordinated monitoring programme. The highest percentage of non-compliant samples was identified for oats (3.8%), followed by peaches (3.4%) and strawberries and lettuce (2.9% each). The lowest percentages of non-compliant samples were observed for leek (0.7%), tomatoes (0.9%), head cabbage (1.5%), rye (2%) and apples (2.7%).

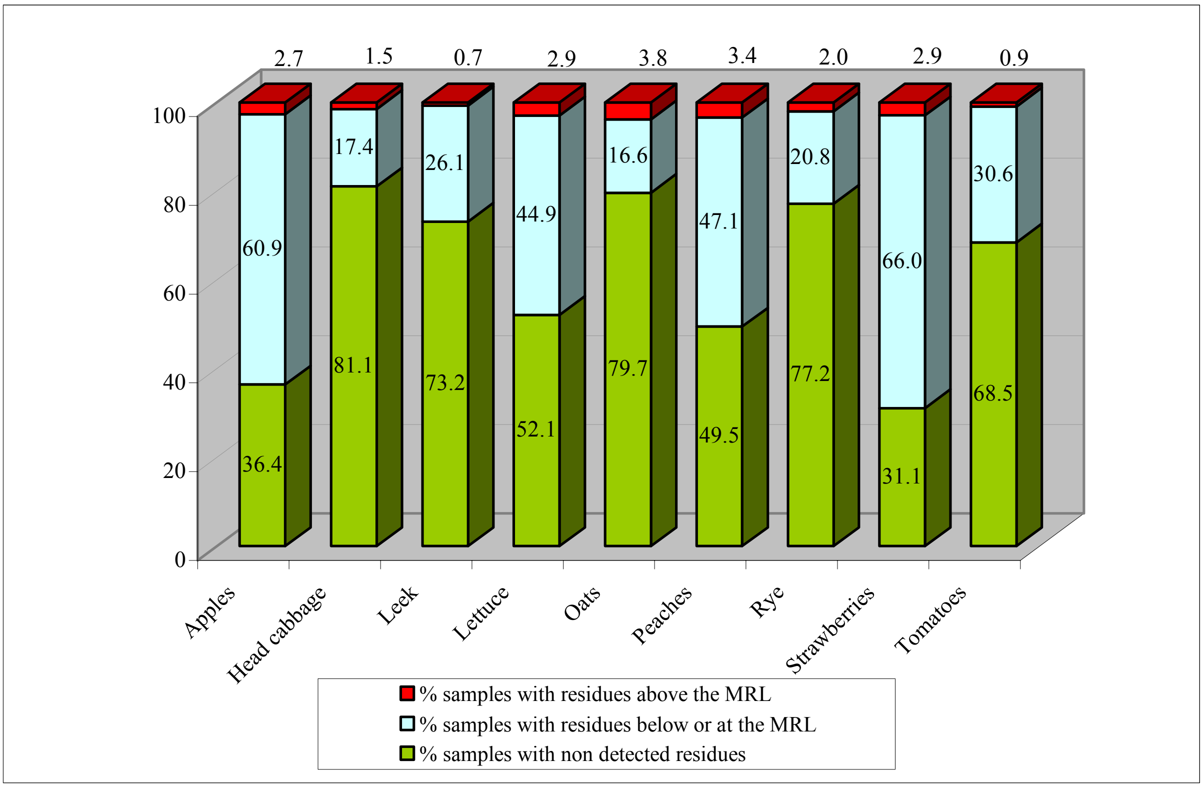


Figure 3.3.2-1 Percentage of samples without residues, with residues at or below the MRL and with residues above the MRL (national or EC MRL) for the 9 food commodities analysed in the 2007 EU coordinated monitoring programme

In the figure above, no differentiation is made with regard to the number of detections of individual pesticides within the same sample. This means that a sample where two or more different pesticides were found would be counted as just one sample with detectable residues. To provide a complementary picture, Table 3.3.2-1 shows the residues found according to individual determinations (i.e. the findings in relation to every single pesticide analysed in a sample). In this table, a sample where two different pesticides were found is counted as two determinations. In this evaluation, residues of a specific pesticide above the MRL (national or EC MRL) were found most often in oats and peaches (0.09% of non-compliant measurements), followed by strawberries and lettuce (0.06% each). These findings are consistent with the results in Figure 3.3.3-1.

Table 3.3.2-1 Residues found in individual determinations in the 9 commodities analysed in the 2007 EU coordinated monitoring programme

Commodity	No of determinations	No of determinations with no residues detected	% determinations with no residues detected	LCI (*)	UCI (**)	No of determinations with detected residues below or at MRL	% determinations with detected residues below or at MRL	LCI	UCI	No of determinations with residues above MRL	% determinations with residues above MRL	LCI	UCI
Apples	191236	186661	97.61	97.54	97.68	4483	2.34	2.28	2.41	92	0.05	0.04	0.06
Head cabbage	63257	62966	99.54	99.48	99.59	273	0.43	0.38	0.49	18	0.03	0.02	0.04
Leek	49465	49180	99.42	99.35	99.49	279	0.56	0.5	0.63	6	0.01	0	0.03
Lettuce	143076	140362	98.1	98.03	98.17	2626	1.84	1.77	1.91	88	0.06	0.05	0.08
Oats	14347	14207	99.02	98.85	99.18	127	0.89	0.74	1.05	13	0.09	0.05	0.15
Peaches	116145	113791	97.97	97.89	98.05	2254	1.94	1.86	2.02	100	0.09	0.07	0.1
Rye	23981	23808	99.28	99.16	99.38	163	0.68	0.58	0.79	10	0.04	0.02	0.08
Strawberries	161832	157090	97.07	96.99	97.15	4652	2.87	2.79	2.96	90	0.06	0.04	0.07
Tomatoes	159271	157035	98.6	98.54	98.65	2200	1.38	1.32	1.44	36	0.02	0.02	0.03
Total	**922610**	**905100**	**98.10**			**17057**	**1.85**			**453**	**0.05**		

(*) LCI = Lower Confidence Interval;
(**) UCI = Upper Confidence Interval

3.3.3. Results by pesticide

In Table 3.3.3-1 the percentages of samples compliant and non-compliant with the MRLs (national or EC MRLs) and the percentage of samples below the reporting level are listed for all pesticides included in the 2007 EU coordinated programme.

Table 3.3.3-1 Results of the 2007 EU coordinated programme: percentage of samples below or at the MRL (national or EC MRL) and percentage of samples above the MRL (national or EC MRL) by pesticide.

Pesticide	% sample with no residue detected	% samples with detected residues below or at MRL	% samples with residues above MRL
Acephate	99.93	0.07	0.00
Acetamiprid	98.47	1.49	0.04
Aldicarb	100.00	0.00	0.00
Azinphos-methyl	96.60	3.36	0.04
Azoxystrobin	95.35	4.63	0.02
Bifenthrin	98.80	1.16	0.04
Bromopropylate	99.35	0.63	0.01
Bupirimate	98.97	0.90	0.14
Buprofezin	99.25	0.72	0.02
Captan	99.52	0.22	0.26
Captan/Folpet (sum)	92.56	7.44	0.00
Carbaryl	99.44	0.35	0.20
Carbendazim/Benomyl	91.80	7.75	0.44
Chlormequat	85.44	14.20	0.36
Chlorothalonil	98.22	1.72	0.06
Chlorpropham	99.94	0.03	0.03
Chlorpyrifos	94.30	5.65	0.05
Chlorpyrifos-methyl	99.29	0.70	0.01
Cypermethrin	98.62	1.38	0.00
Cyprodinil	89.65	10.15	0.20
Deltamethrin	99.20	0.80	0.00
Diazinon	99.61	0.37	0.02
Dichlofluanid	99.90	0.10	0.00
Dichlorvos	99.80	0.07	0.13
Dicofol	99.93	0.05	0.02
Dimethoate	98.89	0.86	0.25
Diphenylamine	96.68	3.30	0.02
Dithiocarbamates	86.57	13.23	0.20
Endosulfan	98.78	1.13	0.09
Fenhexamid	93.88	6.09	0.03
Fenitrothion	99.75	0.10	0.15
Fludioxonil	92.95	6.88	0.17

Pesticide	% sample with no residue detected	% samples with detected residues below or at MRL	% samples with residues above MRL
Folpet	99.69	0.27	0.03
Hexythiazox	99.24	0.74	0.02
Imazalil	99.60	0.40	0.00
Imidacloprid	96.94	2.82	0.25
Indoxacarb	98.63	1.35	0.02
Iprodione	92.69	7.26	0.05
Iprovalicarb	99.92	0.08	0.00
Kresoxim-methyl	98.43	1.57	0.00
Lambda-Cyhalothrin	97.70	2.29	0.01
Malathion	99.32	0.67	0.01
Mepanipyrim	97.99	2.01	0.00
Metalaxyl	98.07	1.93	0.00
Methamidophos	99.86	0.07	0.07
Methidathion	99.99	0.01	0.00
Methiocarb	99.60	0.36	0.03
Methomyl	98.89	1.00	0.12
Myclobutanil	97.70	2.29	0.01
Oxamyl	99.70	0.25	0.04
Oxydemeton-methyl	99.82	0.15	0.03
Parathion	100.00	0.00	0.00
Penconazole	99.54	0.45	0.01
Phosalone	99.19	0.80	0.01
Pirimicarb	96.64	3.35	0.01
Pirimiphos-methyl	99.47	0.53	0.00
Prochloraz	99.94	0.05	0.01
Procymidone	95.02	4.90	0.08
Profenofos	99.96	0.04	0.00
Propargite	98.92	1.00	0.08
Pyrethrins	99.91	0.09	0.00
Pyrimethanil	96.93	3.07	0.00
Pyriproxyfen	99.20	0.79	0.01
Quinoxyfen	99.69	0.31	0.00

Pesticide	% sample with no residue detected	% samples with detected residues below or at MRL	% samples with residues above MRL
Spiroxamine	99.91	0.09	0.00
Tebuconazole	96.99	2.95	0.07
Tebufenozide	99.18	0.82	0.00
Thiabendazole	97.74	2.23	0.03
Thiophanate-methyl	97.89	2.07	0.04

Pesticide	% sample with no residue detected	% samples with detected residues below or at MRL	% samples with residues above MRL
Tolclofos-methyl	99.10	0.89	0.01
Tolylfluanid	97.48	2.52	0.00
Triadimefon	99.02	0.97	0.01
Vinclozolin	99.55	0.44	0.01

In Figure 3.3.3-1 and Figure 3.3.3-2 the percentage of samples with residues above the MRLs (national or EC MRLs) and the percentage of samples with residues detected below or at the MRLs (national or EC MRLs) according to the pesticide are shown. In these figures, the results are only reported where the percentage is greater than 0.01% and 1%, respectively.

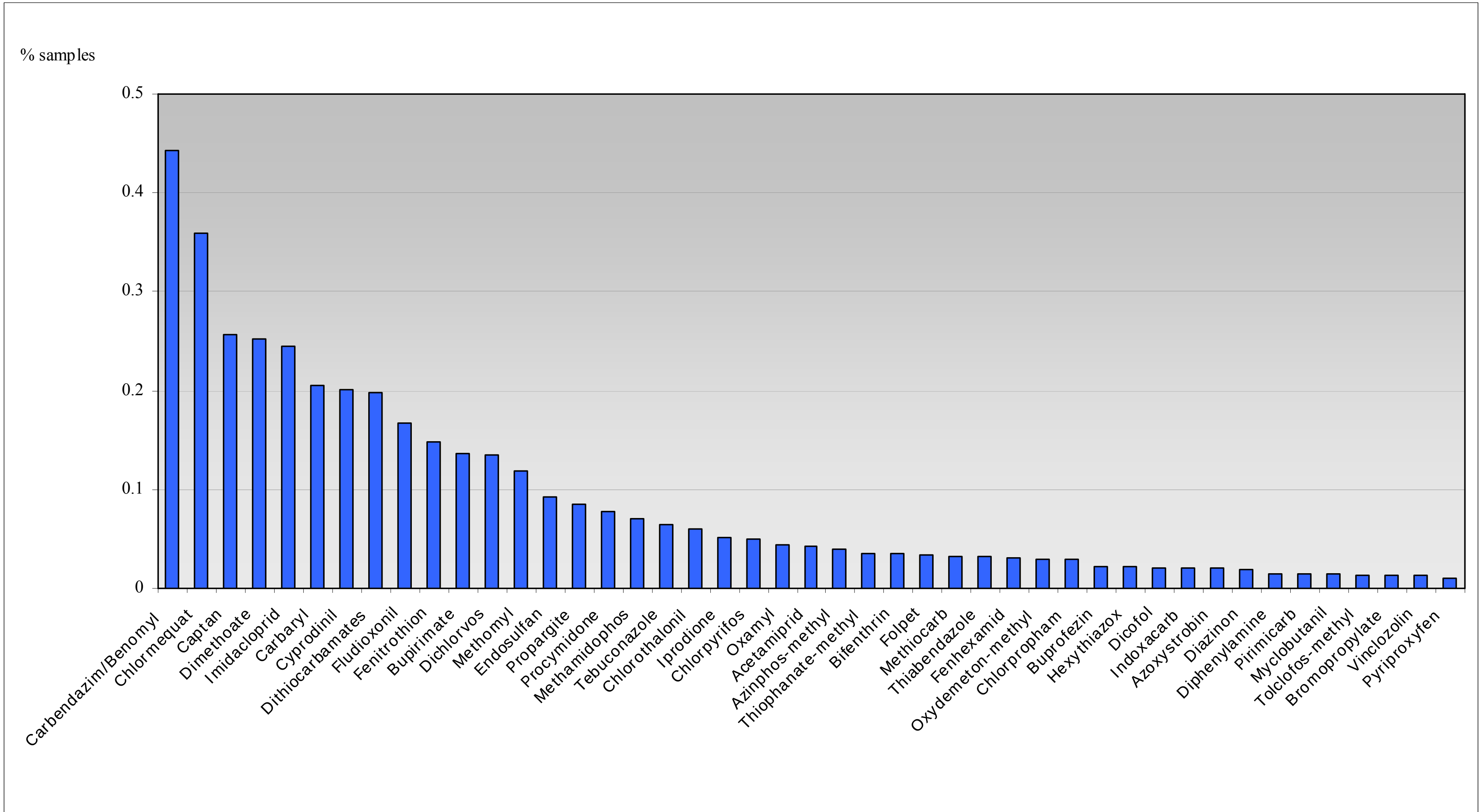


Figure 3.3 3 -1 Percentages of samples with residues above the MRL (national of EC MRL): results by pesticide where percentage is greater than 0.01%

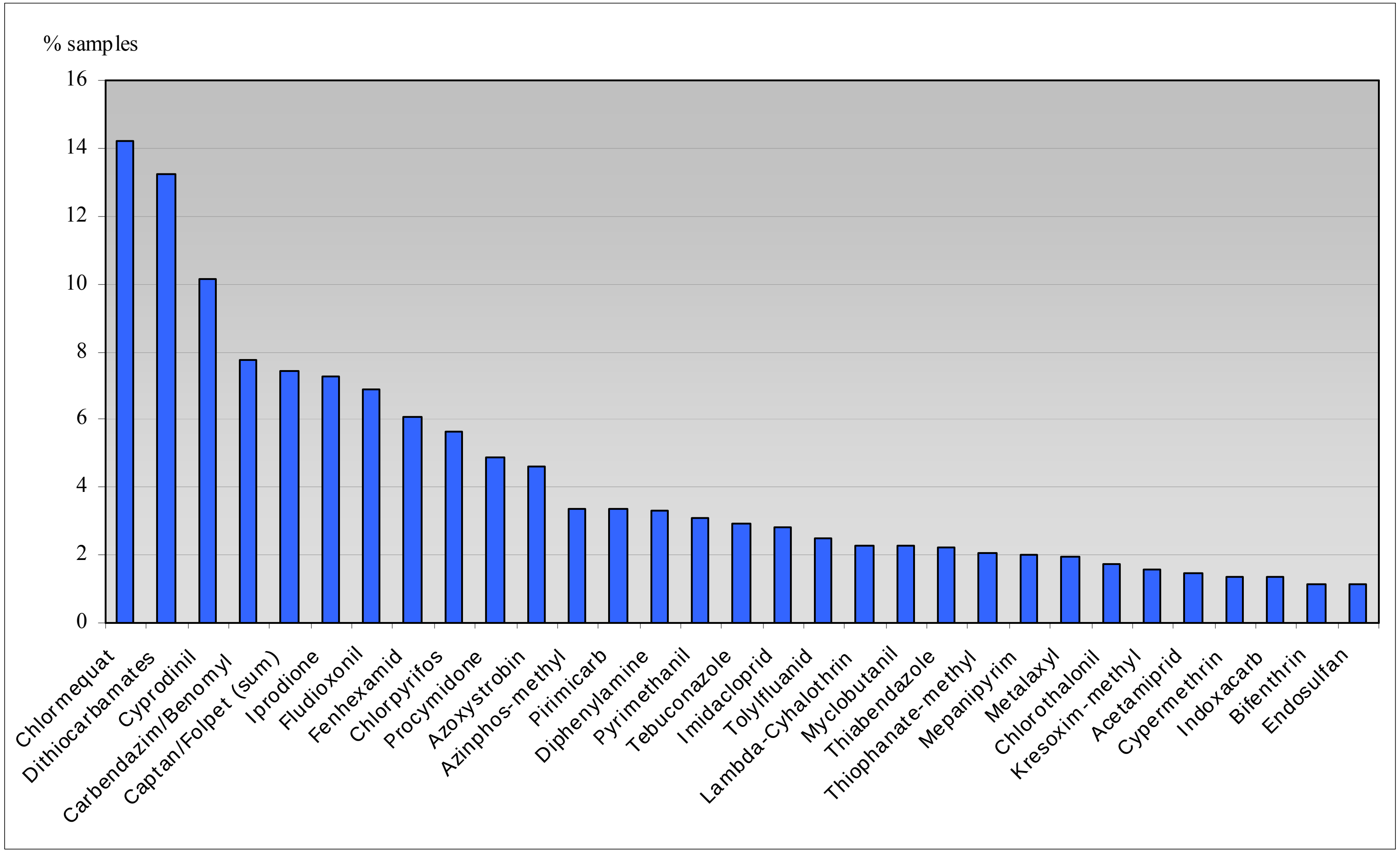


Figure 3.3 3 -2 Percentages of samples with detectable residues, below or at the MRL (national of EC MRL): results by pesticide where percentage is greater than 1%

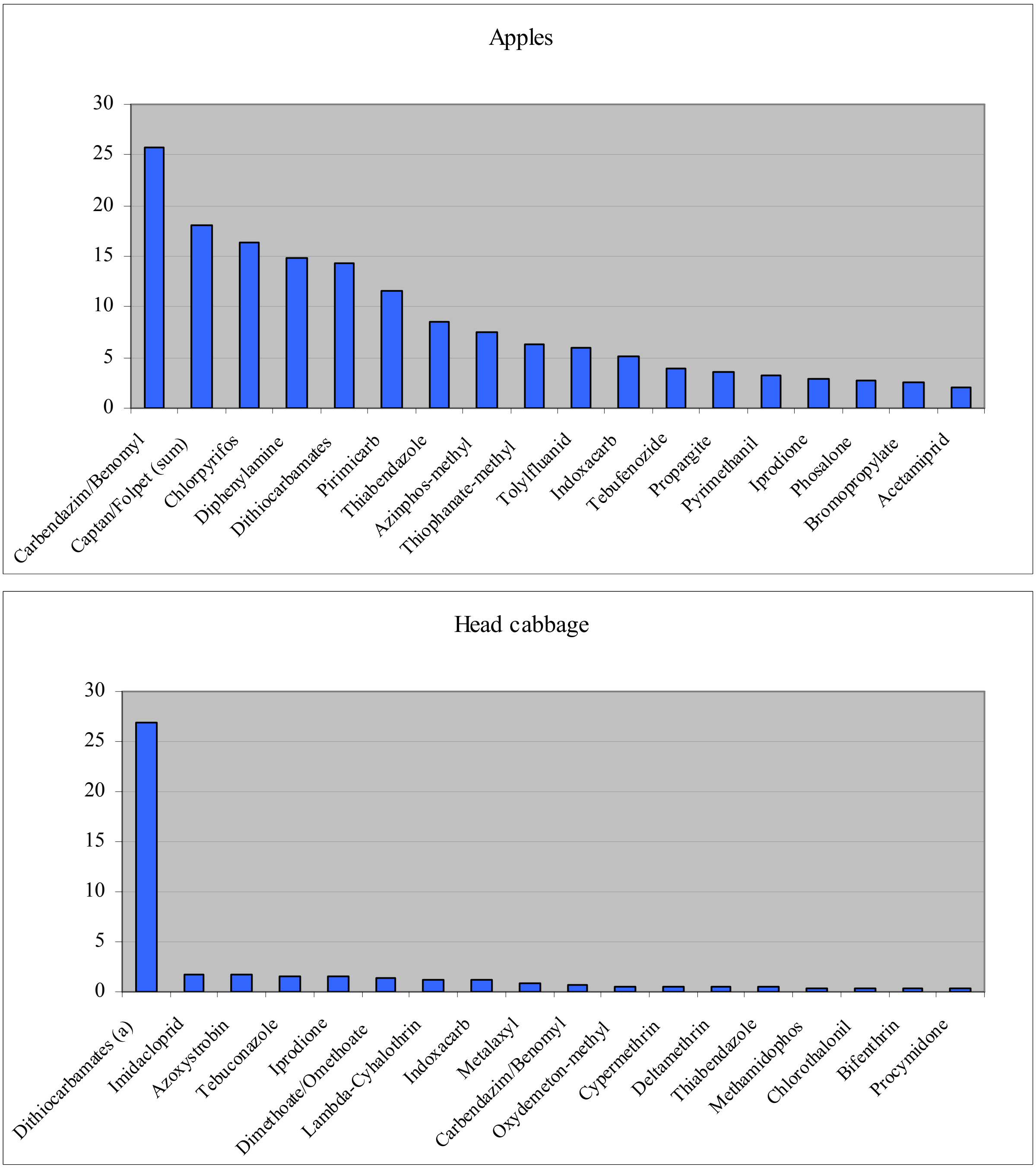
Among all the 71 substances included in the 2007 EU programme the frequencies of MRL exceedances for the single pesticides are all below 0.5% (see Figure 3.3.3-1 and Table 3.3.3-1).

The highest frequency of non-compliance was found for carbendazim/benomyl (0.44% of exceeding samples), followed by chlormequat (0.36% of exceedances) and captan/folpet (0.26%). For 60 out of the 71 pesticides analysed in 2007 the percentage of samples not compliant with MRLs was below 0.1%, for 21 pesticides no residues above the MRLs were detected. More details on these results (including the number of samples taken by pesticide) are reported for all pesticides analysed in Table L in Appendix III.

It should be noted that for two substances (aldicarb and parathion) none of the samples analysed contained residues above the LOQ.

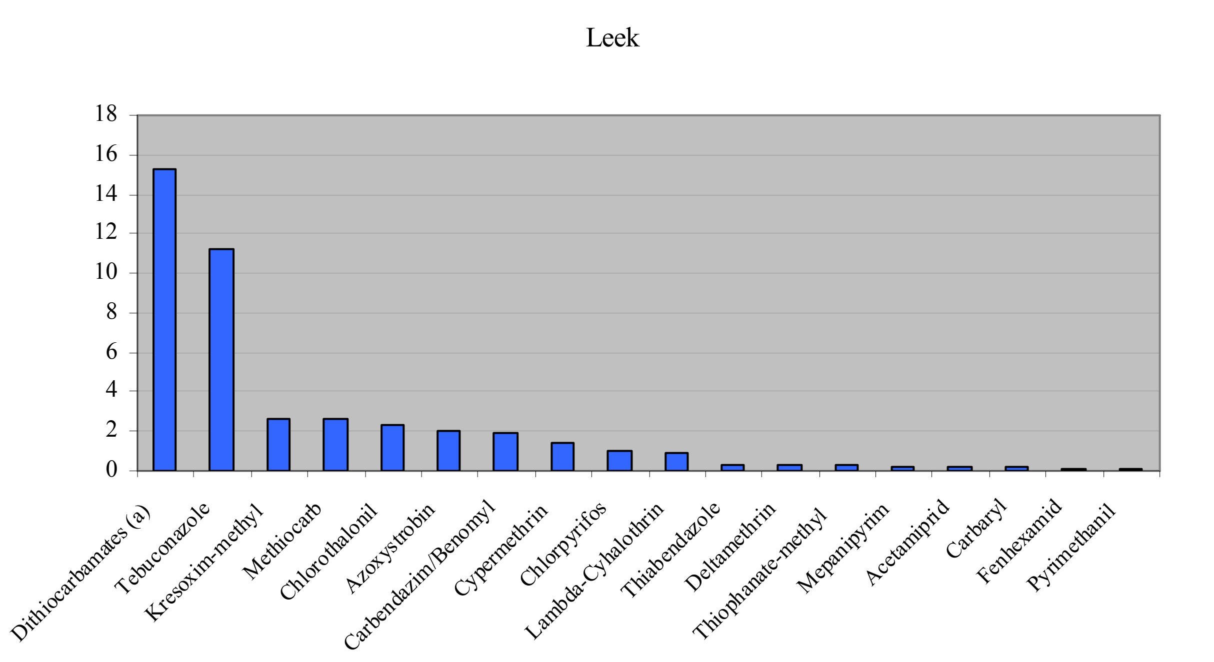
3.4. Most frequently detected pesticide/commodity combinations

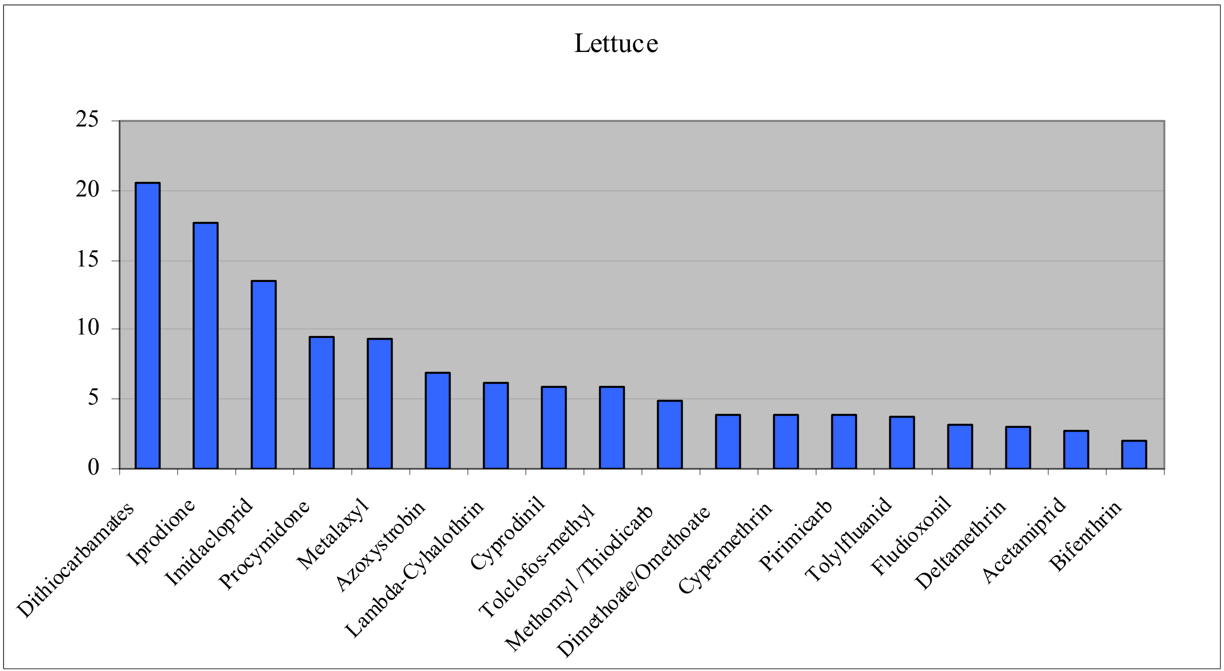
The graphs in Figures 3.4-1 report the percentage of samples containing residues above the reporting level by pesticide/commodity combination. Table M in Appendix III provides a further breakdown of these results by reporting country. From these graphs it is noted that the main pesticide/commodity combinations with positive findings above the reporting level were: cyprodinil/strawberries (40.6%), chlormequat/rye (37.4%), chlormequat/oats (35.3%), fludioxonil/strawberries (28.9%) and dithiocarbamates/head cabbage (27.0%).



(a): The analytical method used to determine residues of dithiocarbamates as CS_2 quantifies also substances naturally occurring in crops and quantifiable as CS_2.

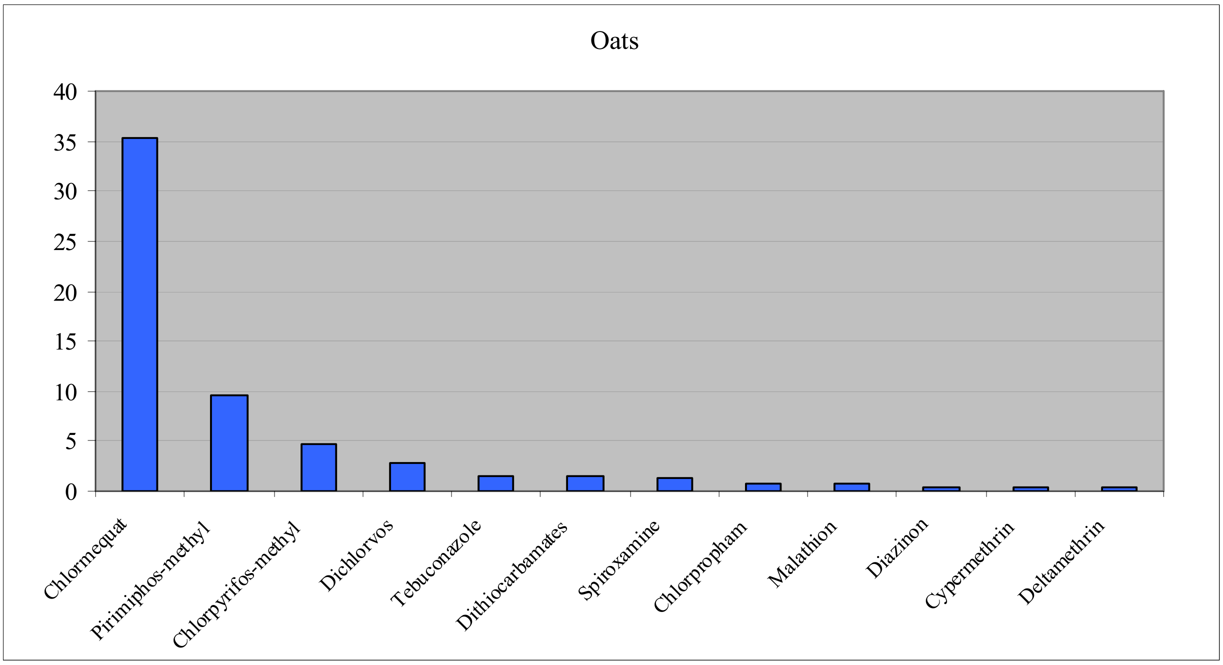
Figure 3.4-1a Percentage of samples above the reporting level by pesticide/commodity combination for the 2007 EU coordinated programme





(a): The analytical method used to determine residues of dithiocarbamates as CS_2 quantifies also substances naturally occurring in crops and quantifiable as CS_2.

Figure 3.4-1b Percentage of samples above the reporting level by pesticide/commodity combination for the 2007 EU coordinated programme



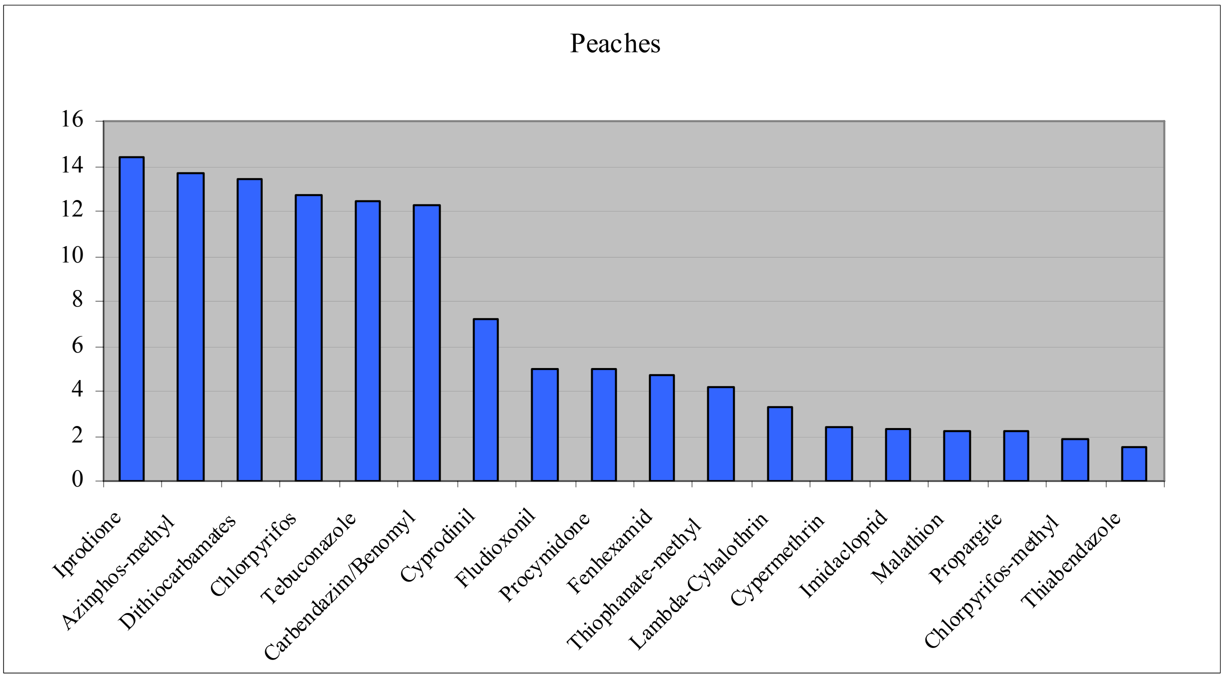
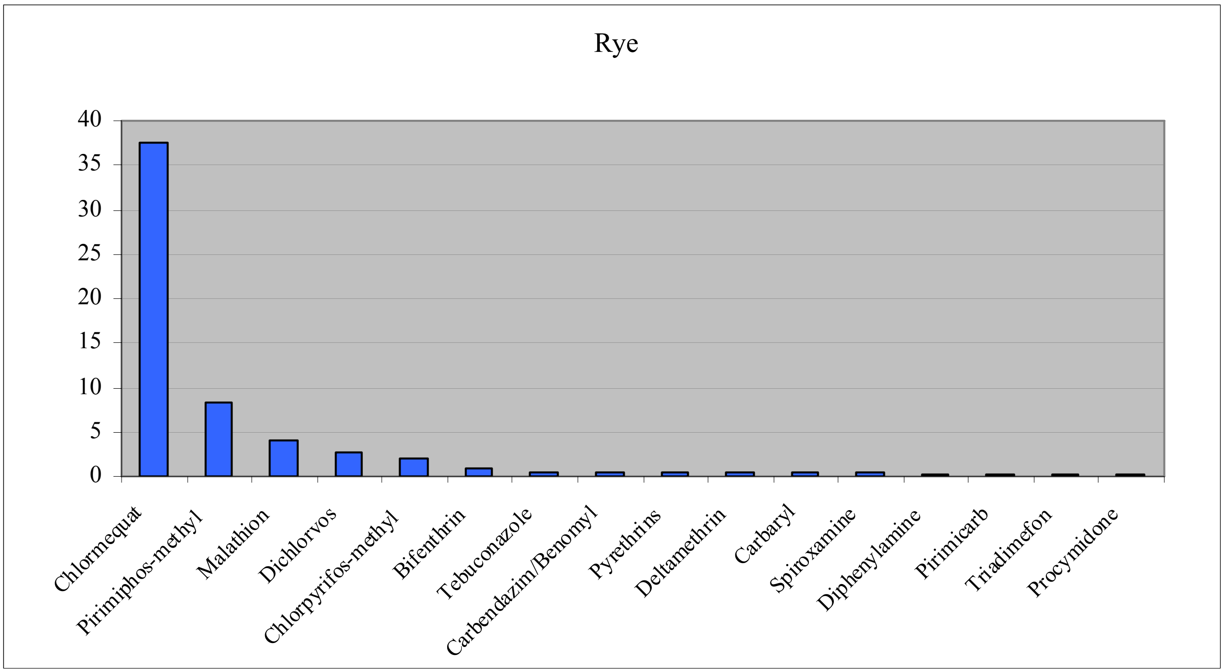


Figure 3.4-1c Percentage of samples above the reporting level by pesticide/commodity combination for the 2007 EU coordinated programme



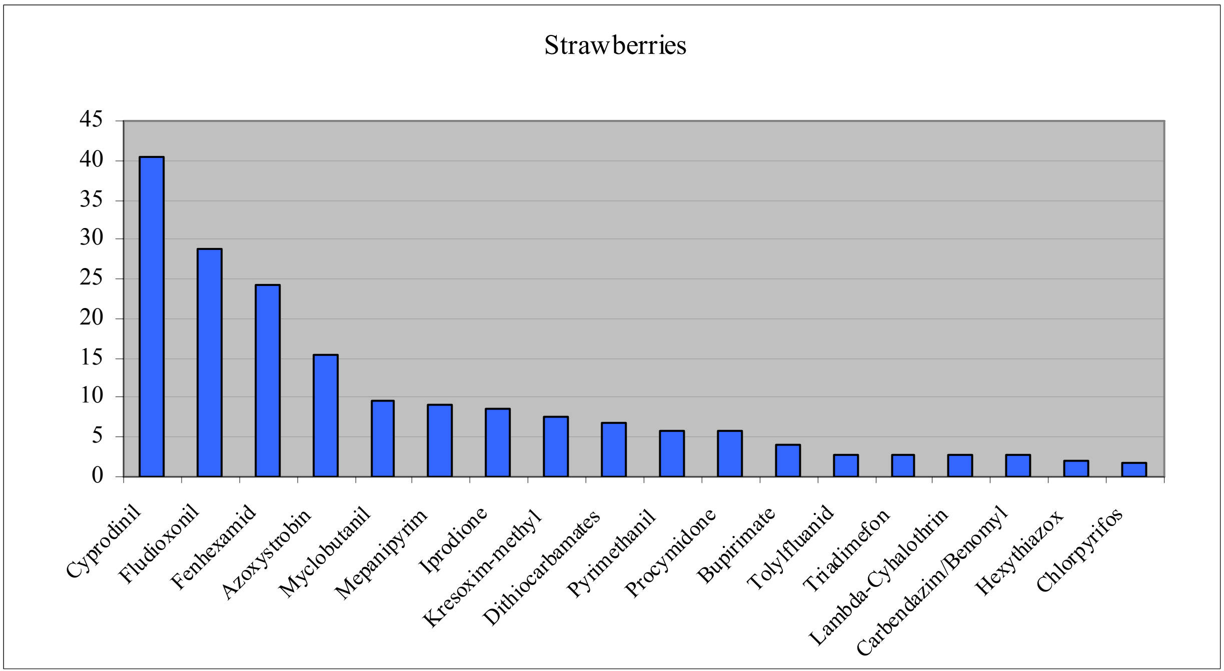


Figure 3.4-1d Percentage of samples above the reporting level by pesticide/commodity combination for the 2007 EU coordinated programme

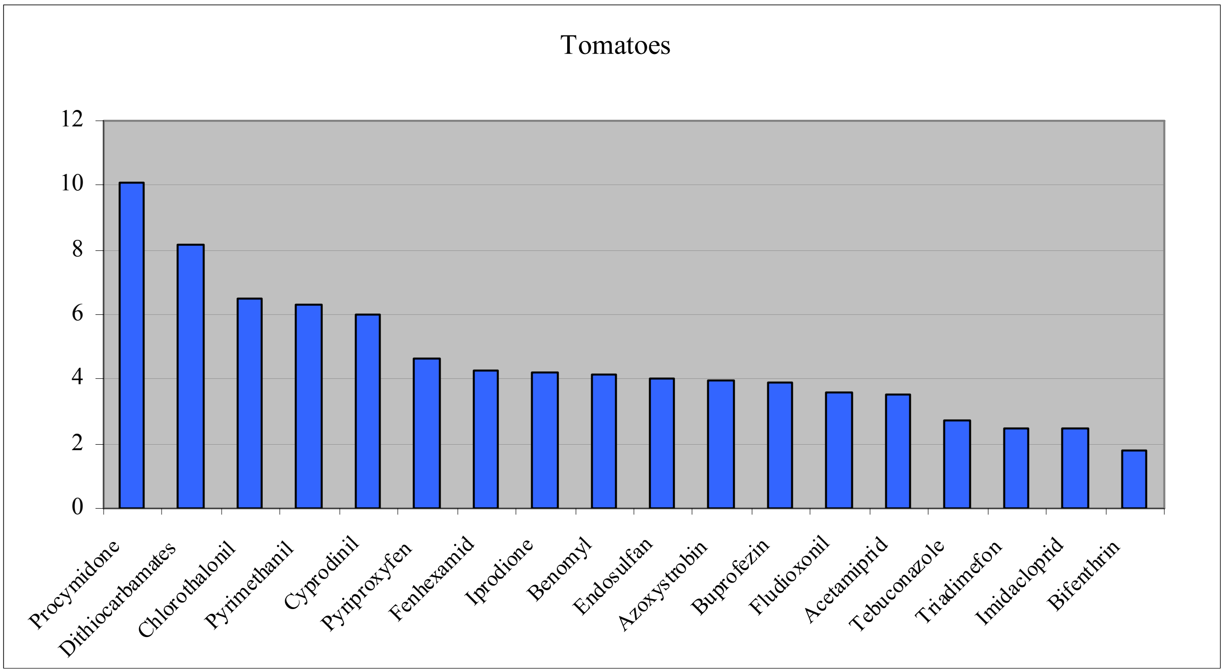


Figure 3.4-1e Percentage of samples above the reporting level by pesticide/commodity combination for the 2007 EU coordinated programme

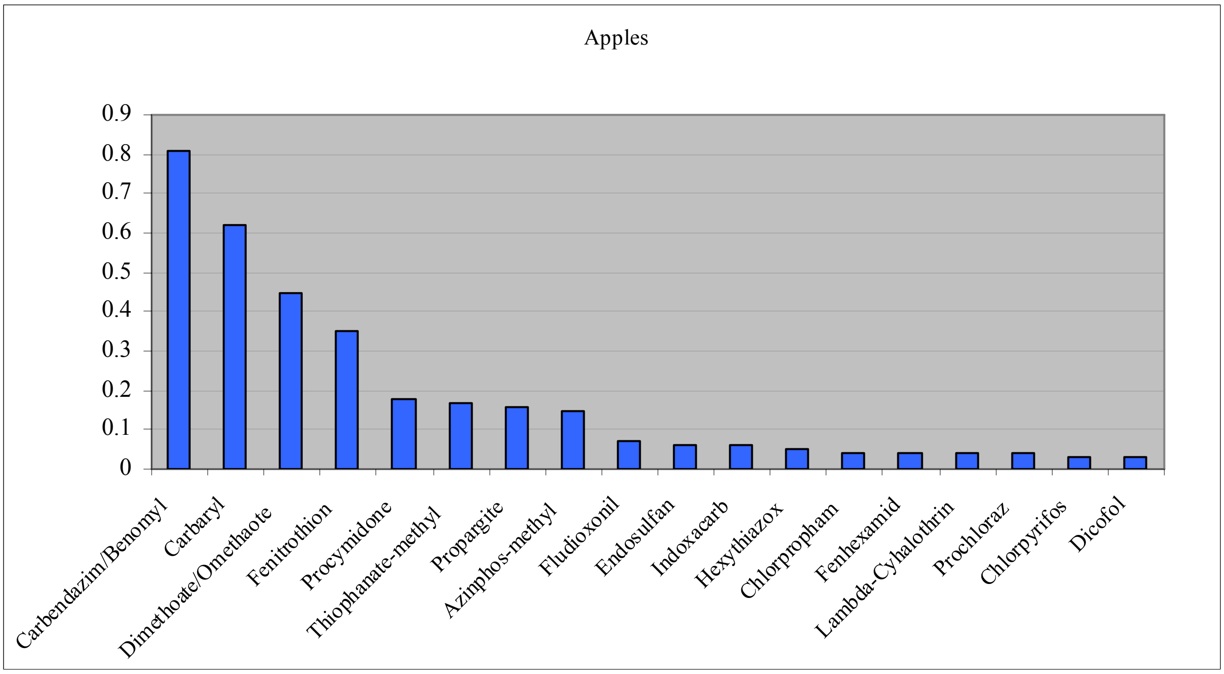
It should be highlighted that the high percentage of dithiocarbamate residues in head cabbage and leek is related to the natural occurrence of CS_2 in these crops and is not necessarily the result of a treatment of these crops with pesticides belonging to the dithiocarbamate group.

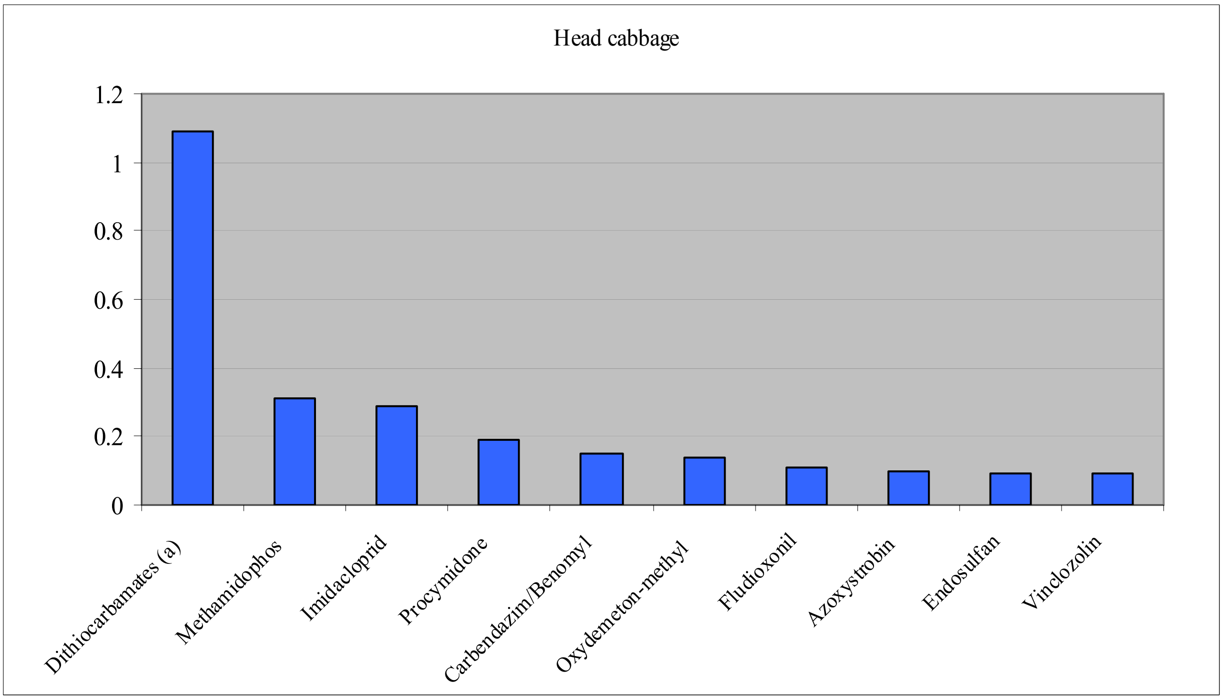
3.5. Most frequently detected pesticide/commodity combinations with MRL exceedances

Figure 3.5-1 reports the percentage of samples by pesticide/commodity combination containing residue levels above the MRL (national or EC MRL). Table M in Appendix III provides a further breakdown of these results by reporting country.

The main pesticide/commodity combinations with findings above the MRL were: dichlorvos/oats (2.5%), dichlorvos/rye (1.6%), chlormequat/oats (1.4%), imidacloprid/lettuce (1.2%) and dithiocarbamates/head cabbage (1.1%). For all the remaining pesticide/crop combinations the percentage of samples exceeding the MRL was below 1%.

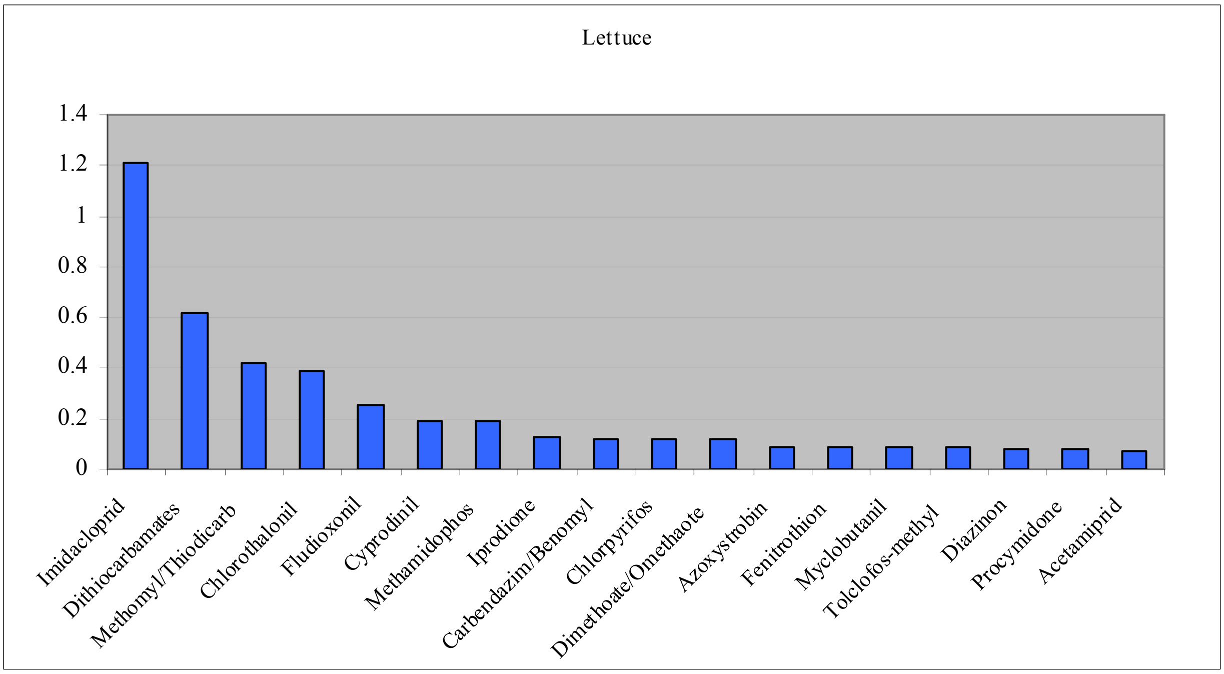
In comparison to other pesticide/crop combinations, the high percentage of positive findings of dithiocarbamates in head cabbage can be partially explained by the fact that pesticides belonging to this chemical group are measured and expressed as CS_2. The analytical method used to quantify the CS_2 can not distinguish between residues from dithiocarbamates applied on the crops and the molecules naturally occurring in the crops that can be equally reduced to CS_2. In fact, it is known that background levels of substances that contribute to total CS_2 measured are found in different crops, especially in members of the Brassica families (e.g. in head cabbage) (Crnogorac 2009).





(a): The analytical method used to determine residues of dithiocarbamates as CS_2 quantifies also substances naturally occurring in crops and quantifiable as CS_2.

Figure 3.5-1a Percentage of samples exceeding the MRL by pesticide/commodity combination in the 2007 EU coordinated programme



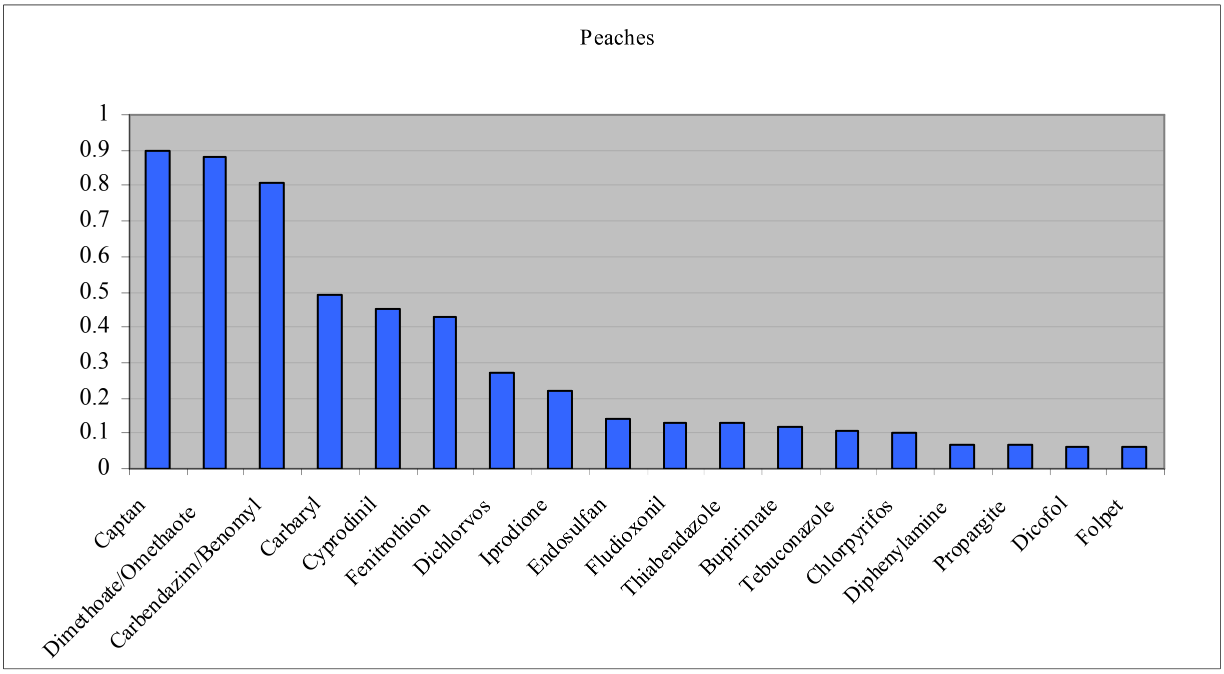
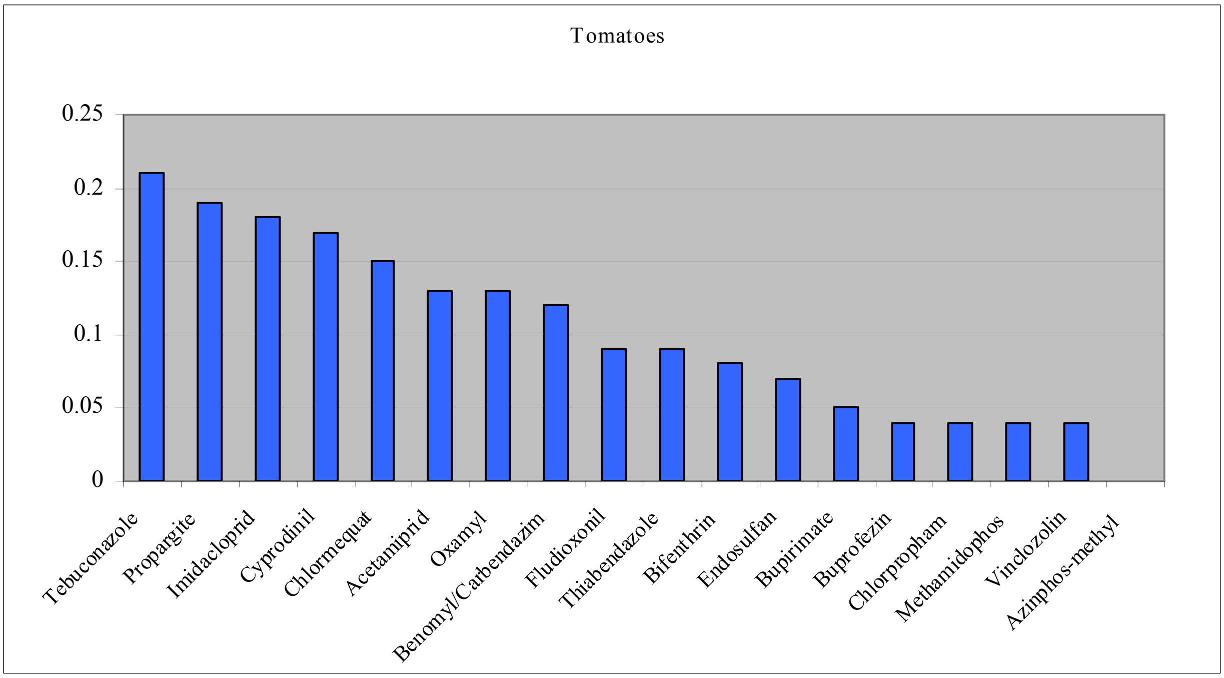


Figure 3.5-1b Percentage of samples exceeding the MRL by pesticide/commodity combination in the 2007 EU coordinated programme



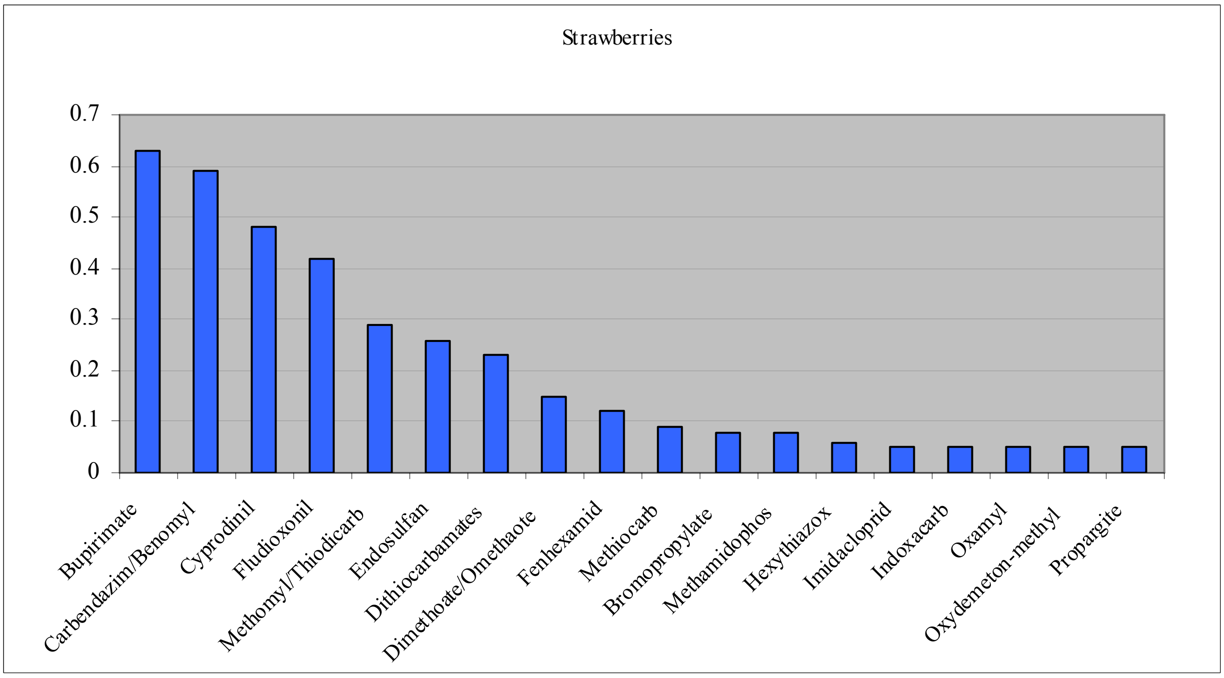


Figure 3.5-1c Percentage of samples exceeding the MRL by pesticide/commodity combination in the 2007 EU coordinated programme

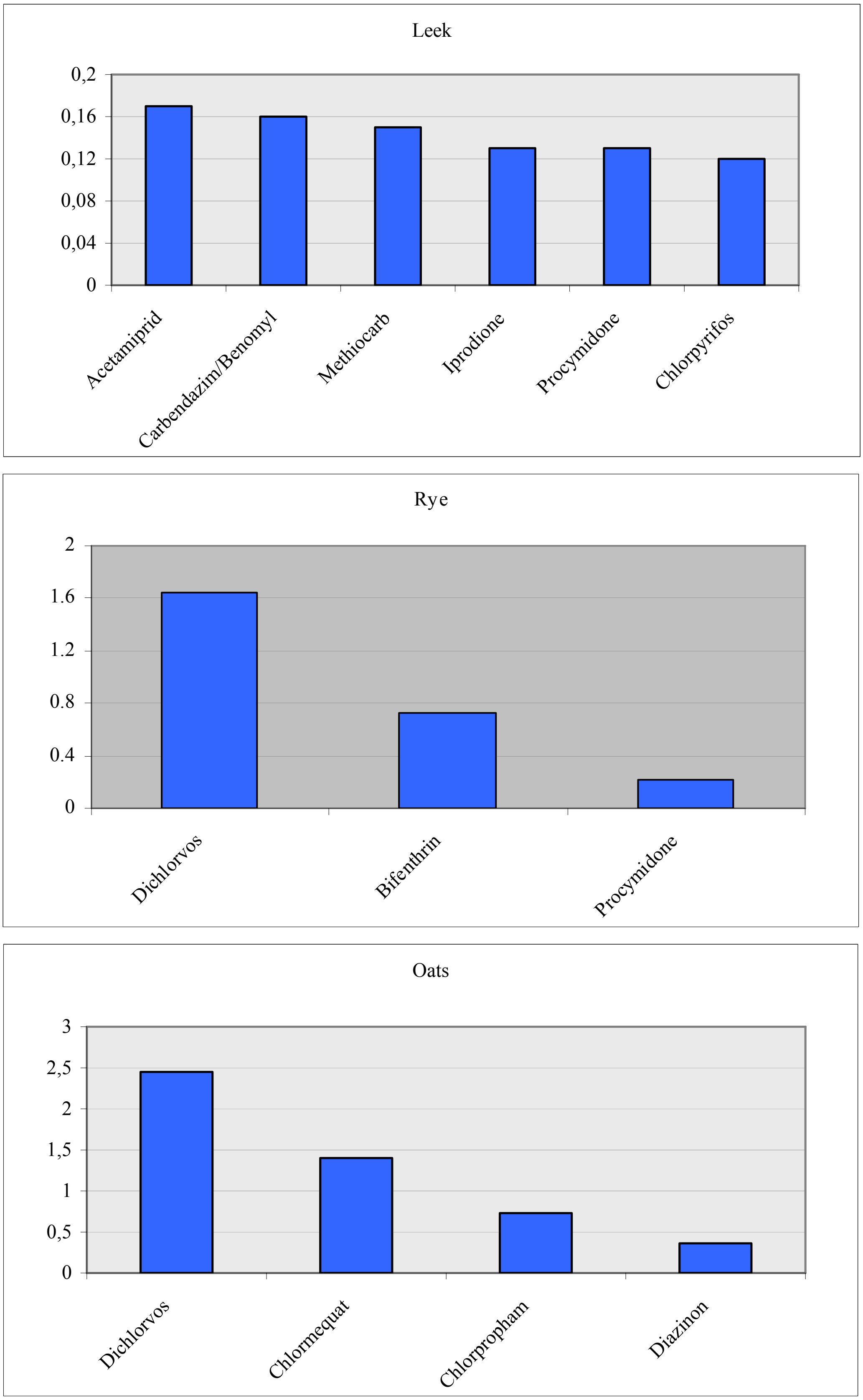


Figure 3.5-1d Percentage of samples exceeding the MRL by pesticide/commodity combination in the 2007 EU coordinated programme

4. Dietary exposure and dietary risk assessment

Dietary exposure assessment is defined by Codex Alimentarius as “the qualitative and/or quantitative evaluation of the likely intake of chemical agents via food as well as exposure from other sources, if relevant” (FAO 2006). Exposure is basically a function of the amount of consumed food and the concentration of the chemical (e.g. pesticide residue concentration) and can be expressed by the following equation:

$$Dietary\ \text{exp}osure = \frac{\sum(\text{residue}\ concentration \times food\ consumption)}{body\ weight}$$

In the chronic (long-term) and acute (short-term) quantitative risk assessment, the estimated dietary exposure is compared with the relevant toxicological reference values, i.e. the acceptable daily intake (ADI) and the Acute Reference Dose (ARfD), respectively (see boxes below).

The consumer is considered to be adequately protected provided that the estimated dietary intake of a pesticide residue does not exceed the ADI or the ARfD. The ADI and ARfD are derived after a full hazard characterization of a compound.

ADI

The “acceptable daily intake” means the estimate of the amount of substance in food, expressed on a body weight basis, that can be ingested daily over a lifetime, without appreciable risk to any consumer on the basis of all known facts at the time of evaluation, taking into account sensitive groups within the population (e.g. children and the unborn).

Source: Regulation (EC) No 396/2005

ARfD

The “acute reference dose” means the estimate of the amount of substance in food, expressed on a body weight basis, that can be ingested over a short period of time, usually during one day, without appreciable risk to the consumer on the basis of the data produced by appropriate studies and taking into account sensitive groups within the population (e.g. children and the unborn).

Source: Regulation (EC) No 396/2005

Risk assessment of pesticides in food can be performed in three main contexts:

1. As pre-regulatory risk assessment, when new MRLs are evaluated before authorisations for a pesticide use is granted;

2. As post-regulatory dietary risk assessment, which is carried in case a food sample is identified to exceed the MRLs in order to decide which risk management actions is necessary (e.g. recall of products, launching a notification in RASFF);

3. In order to assess the "actual exposure" of the consumer to pesticide residues.

EFSA has an active role in carrying out the aforementioned tasks under point 1 and point 3, while the task under point 2 remains under the Member State's responsibility. In the context of this Annual Report, the purpose of the risk assessment is the assessment of the *actual* dietary pesticide exposure of the European population (see point 3). In this case, the residue data needed to calculate the exposure are typically derived from monitoring or surveillance programmes which ideally represent the actual residue concentrations in food consumed by the population. The data generated in the framework of the European coordinated programme (see section 3) fulfil these criteria best because the data generated by the reporting countries are comparable regarding the sampling strategies and the scope of pesticides analysed.

Regulation (EC) No 396/2005 also requires that for the risk assessment, other relevant data sources such as the report submitted under Directive 96/23/EC (EC, 1996) should be taken into account. This report summarises the results of the national monitoring activities for certain veterinary medicinal products in food of animal origin; some of these substances may also be used as plant protection products. If residues of these substances occur in food of animal origin, these could be considered as an additional source of exposure for the estimation of the consumer exposure. However, data submitted by Member States under Directive 96/23/EC for products of animal origin could not considered in the present Report as in most cases only the number of compliant/non-compliant samples was reported but not the residues concentrations measured in the samples. In addition, the data is generated by targeted sampling strategies and therefore is not representative for all products available on the EU market.

As an agreed international or European methodology to estimate actual chronic and acute exposure to pesticide residues measured in monitoring activities is not available, EFSA decided to adapt the risk assessment methodology developed for the pre-regulatory risk assessment (EFSA, 2007) for the assessment in this report. The model implements the principle of the WHO methodologies for short- and long-term risk assessment. The assumptions and considerations made for the development of the new risk assessment methodology are outlined in the next paragraphs.

4.1. Model assumptions for the short term exposure assessment

The calculation of the short-term intake is based on the International Estimation of Short Term Intake (IESTI) equation as described by JMPR (WHO 1997, FAO 2002, FAO/WHO 2003). The model implements the following assumptions on coincidence of the following events:

- A consumer who has **extreme food habits** regarding the food item under consideration (normally 97.5th percentile of the daily food consumption reported in a food survey by persons who have consumed the pertinent food item) consumes a food item belonging to the **lot which contains the highest residue measured** (HRM) in the coordinated programme 2007. In addition, the HRM is multiplied with a factor (variability factor) which accommodates for potential **inhomogeneous residue distribution** among the individual units in the same lot. The variability factors depend on the unit size of the food item: for food commodities with a unit weight between 25 and 250 g a factor of 7[19] is applied (e.g. apples and tomatoes). The underlying assumption is that the consumer may pick out a highly contaminated unit which contains the seven-fold residues compared with the composite sample which was analysed in a monitoring programme. For food commodities with a unit weight of more than 250 g a variability factor of 5 is applied. No variability factor is used for commodities with unit weights less than 25 g. It should be highlighted that the model approach used in EU Member States differs from the currently used JMPR methodology which uses a variability factor of 3 for all commodities with unit weight greater than 25 g.

It should be stressed that the co-occurrence of the three events is very unlikely and the consumer exposure, estimated on the basis of these conservative assumptions leads to an over-estimation of the consumer exposure to pesticide residues.

A total of 19 national diets are included in the EFSA model used for estimating the dietary exposure of consumers (EFSA PRIMo- Pesticide Residue Intake Model). Nine of these diets reflect food consumption habits of children , while the remaining ten concern adult dietary habits.

The short-term assessment is carried out separately for each pesticide/crop combination as it is considered unlikely that a consumer will eat two or more different commodities in large portions within a short period of time and that those commodities will have the highest level of the same pesticide. In the framework of this report the short-term exposure has been performed for the nine food commodities included in the 2007 EU coordinated programme (i.e. apples, head cabbage, leek, lettuce tomatoes, peaches -including nectarines and similar hybrids- rye and oats, and strawberries).

The highest residues measured (HRM) have been identified for each pesticide/crop combination with findings above the limit of quantification reported by EEA and Member States[20].

4.1.1. Residue levels

The residue levels used as input values for the short-term risk assessment are reported in Table 4.1.1-1. The intake calculation was performed with the residue levels reported for the residue definition for enforcement. A re-calculation to the residue definition for risk assessment was not possible because the conversion factors are not available.

[19] At present, the choice of the variability factor to be used for the acute risk assessment at European level is till under discussion. At international level a different factor can be applied.

[20] Four countries proposed alternative residue definitions for certain substances (dimethoate, malathion, mepanipyrim, methiocarb, pirimicarb, tolylfluanid and vinclozolin). For 3 of these substances (dimethoate, malathion and vinclozolin) harmonised EC MRLs, and therefore harmonised residue definitions, were in place in 2007. For mepanipyrim, provisions for EC MRL, and therefore for the residue definition, were in place as of April 2007. For dimethoate, one single Member State has provided residue levels for dimethoate and omethoate separately. In order to assess comparable residue results, it is considered appropriate to disregard the samples reported by Member States pertaining substances for which an alternative residue definition has been applied. The number of samples which were disregarded accounts for a small portion of the total samples analysed by all reporting countries for the same substance (from 0.5 to 5.4% of the samples).

Table 4.1.1-1 Highest residue measured (mg/kg) used as input values for the short-term exposure calculations.

Pesticide	Apples	Head cabbage	Leek	Lettuce	Oats	Peaches	Rye	Straw-berries	Tomatoes
Acephate	0.20	0.20	0.20	0.20		0.20	0.20	0.20	0.20
Acetamiprid	0.07	0.01	0.08	1.09		0.06	0.01	0.01	0.23
Aldicarb									
Azinphos-methyl	0.98					0.44		0.05	
Bifenthrin	0.30	0.07	0.02	0.88		0.06	0.19	0.29	0.80
Buprofezin	0.04			0.03		0.28		0.44	0.42
Captan		0.02	0.34	0.19		1.89	0.04		
Captan/Folpet (sum)	2.10							0.87	0.23
Carbaryl	0.64	0.01	0.05	0.01		0.31	0.09	0.07	0.05
Carbendazim/Benomyl (sum)	2.26	0.04	1.20	0.30		1.60	0.01	0.70	0.33
Chlormequat					8.00		1.80		0.71
Chlorothalonil	0.24	0.40	0.83	0.90		0.69	0.01	1.80	1.80
Chlorpropham	0.36	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Chlorpyrifos	2.45	0.15	0.16	0.79		0.71	0.05	0.29	0.31
Chlorpyrifos-methyl	0.31	0.03	0.03	0.06	0.60	0.30	0.97	0.18	0.14
Cypermethrin	0.44	0.19	0.40	1.60	0.11	0.45	0.02	0.05	0.43
Deltamethrin	0.10	0.06	0.07	0.39	0.08	0.08	0.17	0.05	0.04
Diazinon	0.25	0.02	0.02	0.10	0.03	0.02	0.02	0.02	0.02
Dicofol	0.23	0.04	0.04	0.11		0.96	0.04	0.04	0.16
Dimethoate/Omethoate (sum)	0.74	0.13	0.08	1.60		3.50	0.08	0.10	0.08
Dithiocarbamates (1)	2.70	2.04	1.95	17.40	0.20	1.43		2.50	0.90
Endosulfan	0.16	0.50	0.05	0.06		0.64	0.02	0.26	1.49
Fenitrothion	0.60	0.05	0.05	0.05		1.22	0.05	0.40	0.05
Folpet		0.02	0.02	2.50		0.08	0.02		
Imazalil	0.66	0.02				0.02	0.01	0.01	0.15
Imidacloprid	0.02	0.31	0.01	3.50		0.04	0.01	0.15	0.65
Indoxacarb	0.20	0.06		1.70		0.04		0.21	0.03
Lambda-Cyhalothrin	0.13	0.14	0.04	0.34		0.12	0.01	0.22	0.05
Malathion	0.08	0.06	0.06	0.46	0.03	0.40	2.20	0.57	1.01
Metalaxyl	0.20	0.79	0.20	0.78		0.20	0.20	0.29	0.20
Methamidophos		0.87		2.50				0.26	
Methidathion	0.02	0.02	0.02	0.02		0.02	0.02	0.02	0.02
Methiocarb	0.04	0.01	0.84	0.44		0.05	0.01	2.06	0.05
Methomyl/Thiodicarb (sum)	0.11	0.02	0.01	5.80		0.06	0.01	0.71	0.05
Myclobutanil	0.09	0.05	0.05	0.08		0.05	0.05	0.82	0.10
Oxamyl				0.11				0.94	0.14
Oxydemeton-methyl				0.21					
Parathion	0.01	0.01	0.01	0.01		0.01	0.01	0.01	0.01
Penconazole	0.04			0.02		0.03		0.46	
Phosalone	4.39	0.01	0.01	0.08		0.62	0.01	0.17	0.01
Pirimicarb	0.31	0.20	0.04	0.57		0.84	0.04	0.50	0.04
Pirimiphos-methyl	0.02	0.02	0.02	0.02	1.30	0.02	1.90	0.02	0.17
Prochloraz	0.10	0.01		0.02			0.01		
Procymidone	0.33	0.07	0.03	7.50		1.17	0.18	2.60	2.00
Profenofos	0.01	0.01	0.01	0.04		0.01	0.01	0.04	0.01
Propargite	6.00					2.20			
Pyrethrins	0.09	0.09	0.09	0.65		0.09	0.11	0.11	0.09

Pesticide	Apples	Head cabbage	Leek	Lettuce	Oats	Peaches	Rye	Straw-berries	Tomatoes
Pyriproxyfen	0.03							0.03	0.34
Tebuconazole	0.10	0.57	0.36	3.10	0.05	0.48	0.05	0.07	0.16
Thiophanate-methyl	1.70	0.01	0.02	0.01		0.30	0.01	0.04	0.48
Tolylfluanid	0.57	0.03	0.03	4.90		0.03	0.03	1.30	0.19
Triadimefon/Triadimenol (sum)	0.20	0.20	0.20	0.29		0.20	0.20	0.44	0.20
Vinclozolin	0.11	0.11	0.01	4.34		0.04	0.01	0.23	0.10

(1) In 2007, the residue definition for the dithiocarbamates was established as maneb, mancozeb, metiram, propineb and zineb, expressed as CS_2. For the acute exposure assessment the CS_2 values had to be recalculated to ziram and mancozeb using the molecular weight conversion factor of 2.01 and 1.78.

4.1.2. Acute Reference Dose values (ARfDs)

In order to perform the risk assessment, the calculated exposure for a certain pesticide/crop combination is compared with the ARfD value. In Table 4.1.2-1 the ARfD values used for the acute risk assessment are listed. It should be mentioned that some of the ARfDs values were derived recently and were not in place in 2007 when the monitoring results were generated.

Table 4.1.2-1 ARfDs values used for the short-term risk assessment

Pesticide	ARfD (mg/kg bw)	ARfD evaluation year	ARfD source
Acephate	0.1	2005	JMPR
Acetamiprid	0.1	2004	COM
Aldicarb	0.003	1995	JMPR
Azinphos-methyl	0.01	2006	COM
Bifenthrin	0.03	2008	EFSA
Buprofezin	0.5	2008	EFSA
Captan (1)	0.3	2008	COM
Carbaryl	0.01	2006	EFSA
Carbendazim/Benomyl (7)	0.02	2007	COM
Chlormequat	0.09	2008	EFSA
Chlorothalonil	0.6	2006	COM
Chlorpropham	0.5	2003	COM
Chlorpyrifos	0.1	2005	COM
Chlorpyrifos-methyl	0.1	2005	COM
Cypermethrin (2)	0.04	2005	COM
Deltamethrin	0.01	2002	COM
Diazinon	0.025	2006	EFSA
Dicofol	0.15	2006	DAR
Dimethoate	0.01	2006	EFSA
Dithiocarbamates (3) Ziram Mancozeb	 0.08 0.6	 2004 2005	 COM COM
Endosulfan	0.02	1998	JMPR
Fenitrothion	0.013	2006	EFSA
Folpet (1)	0.2	2008	COM
Imazalil ARfD for children ARfD for adults	 0.1 0.05	2007	EFSA
Imidacloprid	0.08	2008	EFSA
Indoxacarb	0.125	2005	COM
Lambda-Cyhalothrin	0.0075	2001	COM
Malathion	0.3	2006	EFSA
Metalaxyl (4)	0.5	2002	COM
Methamidophos	0.003	2007	COM
Methidathion	0.01	1997	JMPR
Methiocarb	0.013	2006	EFSA
Methomyl (5)	0.0025	2006	EFSA
Myclobutanil	0.31	2007	EFSA
Oxamyl	0.001	2005	EFSA
Oxydemeton-methyl	0.0015	2006	EFSA
Parathion	0.01	1995	JMPR
Penconazole	0.5	2008	EFSA
Phosalone	0.1	2006	EFSA
Pirimicarb	0.1	2006	EFSA
Pirimiphos-methyl	0.15	2005	EFSA
Prochloraz	0.1	2001	JMPR
Procymidone	0.012	2007	DAR
Profenofos	1	2007	JMPR
Propargite	0.03	2007	DAR
Pyrethrins	0.2	2003	JMPR
Pyriproxyfen	10	2005	DAR
Tebuconazole	0.03	2008	EFSA
Thiophanate-methyl	0.2	2005	COM
Tolylfluanid	0.25	2005	EFSA

Triadimefon (6)	0.05	2008	EFSA
Vinclozolin	0.06	2006	COM

(1) For commodities for which an MRL is established as sum of captan and folpet, the ARfD for folpet is used.
(2) ARfD derived for alpha-cypermethrin.
(3) The group of dithiocarbamates includes seven pesticides with different toxicological reference values: A group-ARfD is not available. The risk assesment was performed with both the value for ziram and the value for mancozeb.
(4) ARfD for metalaxyl-M.
(5) ARfD derived for methomyl is used for risk assessment of methomyl and thiodicarb.
(6) ARfD for triadimenol is used for risk assessment of triadimenol and triadimefon.
(7) ARfD for carbendazim is used for risk assessment of carbendazim and benomyl.

4.1.3. Presentation of the results of the short-term consumer exposure

Considering the food consumption of European consumers represented in the EFSA PRIMo and considering the ARfD for the given pesticide, a theoretical threshold residue level has been calculated for each food commodity concerned. Residues at this threshold level correspond to 100% of the ARfD exhaustion and are therfore the maximum residue conscentration where a consumer risk can be excluded.

Residues exceeding the calculated threshold residue level are highlighted as values which may be of theoretical health concern. In the case of a theoretical consumer health risk being identified the results should be interpreted as the result of a very conservative assessment methodology (see section 4.1).

The results of acute exposure assessment are reported individually for each pesticide in an exposure assessment summary report. All the reports are presented in Appendix VI. In these reports, for each pesticide/crop combination the following information is reported:

- the total number of samples analysed for the given pesticide/crop combination
- the percentage of the positive samples below the MRL (EC or national MRL)
- the percentage of the samples above the MRL (EC or national MRL)
- the identified Highest Residue Measured (HRM)
- the number of the diets in which the threshold residue was exceeded
- the maximum acute exposure, expressed in percent of the ARfD
- the most critical diet for which the highest consumer exposure was calculated

The number of samples exceeding the thresholds is taken as an indicator of the frequency of a potential critical consumer exposure. In case the exceedance of the threshold occurred in less than 0.1% of the samples which were analysed for the pesticide, the event was considered to be exceptional, a frequency of 0.1 to 1% was considered to be seldom event, and a frequency above 1% were classified as non seldom.

4.1.4. Limitation and uncertainties affecting the short-term exposure assessment

The routine risk assessment methodology, based on the IESTI calculations, contains several sources of uncertainty. Due to the complexity of combining all the relevant data sources at EU level, a quantification of the uncertainty inherent in the risk assessment methodology cannot be achieved. However, this section attempts to provide a qualitative estimation of uncertainties and to indicate the constraints of the model used for assessing potential acute consumer risks.

Table 4.1.4-1 summarises the most important sources of uncertainty, including an indication of whether the uncertainty results in overestimation ("+" symbol) or underestimation ("-" symbol) of the level of exposure.

Table 4.1.4-1 Major sources and types of uncertainties affecting the short-term risk assessment

Source of uncertainty	Description	Direction
Model uncertainties		
Using the IESTI calculation methodology	For strawberries, oats and rye it is assumed that every single portion consumed contains residues at the HRM level (no unit-to-unit variability factor is applied)	+
	For the other commodities (apples, head cabbage, leek, lettuce, peaches, tomatoes) a single unit consumed contains residues at the 5- or 7- fold level of the HRM (taking into account the variability factor)	+
	The highly contaminated commodity unit is eaten by an extreme consumer representing the 97.5th percentile of the consumption distribution	+
Inaccuracies related to the consumption data		
High consumption at the 97.5th percentile of the consumption distribution	2.5% of the consumers have higher intake	-
	Appropriateness of survey methodology used in Member States to derive consumption figure, including measurement uncertainties	+/-
	In most surveys, no data are available on the edible portion of the commodity (consumption data are expressed on the basis of the raw, unprocessed agricultural commodity)	+/-
Inaccuracies related to the pesticide residue levels used in the short-term risk assessment		
Pesticide residue level	Measurement uncertainty in pesticide concentrations	+/- if applicable
	In certain commodities residues are reduced during storage, preparation, commercial processing and cooking	+
Toxicological reference values		
Selection of the ARfD	Where the residue definition for enforcement comprises more than one pesticide with different toxicities, the lowest ARfD was selected for the risk assessment. This is the case for captan/folpet, cypermethrin, dithiocarbamates, metalaxyl-M, methomyl/thiodicarb, triadimenol/triadimefon.	+

In summary, it is considered that the methodology applied to assess the short-term risk over estimates the actual dietary exposure and the potential consumer risk.

4.2. Model assumptions for the long-term risk assessment

The calculation of the long-term exposure has been performed by calculating the Theoretical Maximum Daily Intake (TMDI) as described by WHO (WHO 1989) for the diets covered by the EFSA PRIMo model (EFSA 2007). Thus, the consumer intake is calculated considering the dietary habits of consumers who are eating average portions of food items containing average pesticide residue levels during their lifetime.

The long-term assessment is performed for each substance estimating the overall intake from the combination of food commodities composing the consumer diets.

In the PRIMo model a total 27 diets are implemented for the chronic risk assessment. As reported in section 3.1.1, the contribution of the 9 food commodities monitored in the 2007 EU coordinated programme represent 9.1 to 41.3% of the total dietary daily intake of the European consumers. In order to be more representative for the total intake, the chronic risk assessment also included commodities of plant origin that will be included in the coordinated programme in 2008 (oranges, mandarins, pears, potatoes, carrots, cucumbers, spinach, beans - with and without pods - and rice) and 2009 (table grapes, bananas, peppers, aubergines, cauliflower, peas -without pods - and wheat)[21] (EC 2007a). With this approach, 40.0% to 95.1% of the total diet will be represented.

The currently used format for reporting the results of the residue analysis requires that reporting countries submit the data in an aggregated form; only the number of samples with residue level falling in one of the 13 predefined residue classes are reported (e.g. samples with residues between 0.02 and 0.05 mg/kg); the individual measured residue concentrations for the samples are not reported. Therefore the input values for the chronic risk assessment could not be calculated as a statistical mean value from all residue results. Instead, for each pesticide/crop combination, the input value for the long-term exposure assessment was determined from the pooled residue data (including the “non-detected” samples) provided by all the reporting countries. For each group of samples within a residue class the residue level was considered to be the upper bound (e.g. for samples between 0.02 and 0.05 concentration level is assumed to be 0.05). The upper bound for the “non-detected” residues corresponded to the LOQ (reporting level). Hence, the chronic exposure assessment was performed using the mean value derived from these “upper bound” concentration values. It should be stressed that this approach is again very conservative and is likely to overestimate the real exposure.

Samples for which the reporting levels were not indicated were disregarded.

If for a given pesticide/crop combination no positive findings were reported among all the reporting countries, then the contribution of these crops to the total dietary intake was not considered since it a “no use” situation was assumed.

The residue values reported according to the residue definition for enforcement (as in the MRL legislation) were not recalculated to the residue definition for risk assessment because no reliable conversion factors are available at the moment.

Residue levels of dimethoate and omethoate have been reported according to the enforcement residue definition established in the MRL directive (*sum of dimethoate and omethoate, expressed as dimethoate)*. However, in order to perform the consumer exposure assessment,

[21] Orange juice has not been included in the exposure calculations.

dimethoate and omethoate should have been reported separately (EFSA 2006b) to accommodate for the different toxicity of the two compounds.

Refinements of the TMDI calculations taking into account e.g. processing factors and the authorised uses of the active substances are not possible as data on these refinement factors are currently not available.

4.2.1. Residue levels

The residue levels used as input values for the calculation of the long-term exposure are reported in Table 4.2.1-1.

Table 4.2.1-1a Residue levels used as input parameters for the long-term exposure calculations (mean residue values derived from upper bound calculations).

Pesticide	Apples	Aubergines	Bananas	Beans (with pods)	Beans (without pods)	Carrots	Cauliflower	Cucumbers	Head cabbage	Leek	Lettuce	Mandarins	Oats
Acephate	0.0166	0.0200	0.0121	0.0202		0.0200	0.0200	0.0200	0.0306	0.0276	0.0147		0.0202
Acetamiprid	0.0121	0.0098		0.0133				0.0182	0.0137	0.0127	0.0186	0.0074	0.0117
Aldicarb	0.0128	0.0500					0.0500		0.0167	0.0149	0.0097		0.0195
Azinphos-methyl	0.0310	0.0500	0.0500	0.0502		0.0500	0.0500	0.0500	0.0373	0.0378	0.0248	0.0516	0.0338
Azoxystrobin	0.0155	0.0116	0.0227	0.0119		0.0143	0.0500	0.0248	0.0201	0.0193	0.0349	0.0151	0.0300
Bifenthrin	0.0167	0.0290	0.0169	0.0249		0.0337	0.0500	0.0282	0.0213	0.0197	0.0197	0.0102	0.0303
Bromopropylate	0.0193	0.0149	0.0500	0.0225		0.0247	0.0500	0.0500	0.0249	0.0224	0.0194	0.0274	0.0311
Bupirimate	0.0361	0.0057	0.0100	0.0100			0.0100	0.0194	0.0538	0.0302	0.0345		0.0564
Buprofezin	0.0144	0.0093	0.0107	0.0102				0.0103	0.0202	0.0169	0.0123	0.0104	0.0434
Captan		0.0500	0.0500			0.0500	0.0500	0.0500	0.0509	0.0412	0.0377		0.0948
Captan/Folpet (sum)	0.0732												
Carbaryl	0.0176	0.0500	0.0541	0.0145		0.0522	0.0500	0.0513	0.0181	0.0163	0.0142	0.0096	0.0320
Carbendazim	0.0401	0.0130	0.0548	0.0292		0.0571	0.0500	0.0178	0.0423	0.0251	0.0164	0.0139	0.0430
Chlormequat						0.0500							1.4427
Chlorothalonil	0.0160	0.0221	0.0155	0.0119		0.0224	0.0145	0.0236	0.0194	0.0203	0.0134		0.0369
Chlorpropham	0.0230	0.0500	0.0500			0.0264	0.0500	0.0500	0.0304	0.0238	0.0207	0.0247	0.0402
Chlorpyrifos	0.0228	0.0282	0.0378	0.0236		0.0205	0.0494	0.0283	0.0195	0.0165	0.0148	0.1129	0.0202
Chlorpyrifos-methyl	0.0150	0.0167	0.0500	0.0500		0.0137	0.0500	0.0500	0.0195	0.0167	0.0137	0.0106	0.0238
Cypermethrin	0.0384	0.0358	0.0199	0.0373	0.1200	0.0500	0.0500	0.0410	0.0524	0.0360	0.0430	0.0351	0.0348
Cyprodinil	0.0133	0.0188	0.0070	0.0118	0.0180	0.0133		0.0162	0.0153	0.0150	0.0250	0.0100	0.0183
Deltamethrin	0.0304	0.0204	0.0500	0.0305		0.0298	0.0383	0.0141	0.0382	0.0292	0.0284	0.0202	0.0317
Diazinon	0.0158	0.0500	0.0123	0.0200		0.0248	0.0200	0.0208	0.0177	0.0165	0.0153	0.0168	0.0211
Dichlofluanid	0.0184	0.0500	0.0500	0.0500		0.0500	0.0500	0.0500	0.0239	0.0212	0.0164		0.0399
Dichlorvos	0.0172	0.0500	0.0500	0.0500			0.0500	0.0102	0.0241	0.0219	0.0178		0.0272
Dicofol	0.0320	0.0135	0.0413	0.0229		0.0200	0.0200	0.0501	0.0315	0.0288	0.0287	0.0761	0.0338
Dimethoate	0.0141	0.0096	0.0341	0.0220		0.0126	0.0285	0.0131	0.0193	0.0138	0.0191	0.0149	0.0219
Diphenylamine	0.2316	0.0101				0.0121	0.0289		0.2355	0.0884	0.1268	0.0217	0.2588
Dithiocarbamates	0.1459	0.2399	0.0528	0.1188		0.0568	0.1547	0.1057	0.2160	0.1479	0.3249	0.0533	0.0963
Endosulfan	0.0162	0.0166	0.0519	0.0154	0.0400	0.0205	0.0500	0.0213	0.0237	0.0194	0.0145	0.0175	0.0295
Fenhexamid	0.0181	0.0227	0.0500	0.0172		0.0500		0.0159	0.0232	0.0216	0.0258	0.0100	0.0345
Fenitrothion	0.0170	0.0500	0.0360	0.0500		0.0534	0.0500	0.0500	0.0204	0.0197	0.0197	0.0443	0.0249
Fludioxonil	0.0153	0.0097		0.0103			0.0100	0.0133	0.0270	0.0167	0.0268		0.0227

Pesticide	Apples	Aubergines	Bananas	Beans (with pods)	Beans (without pods)	Carrots	Cauliflower	Cucumbers	Head cabbage	Leek	Lettuce	Mandarins	Oats
Folpet									0.0515	0.0457	0.0829	0.0205	0.0654
Hexythiazox	0.0136	0.0052	0.0500					0.0102	0.0152	0.0125	0.0109	0.0107	0.0232
Imazalil	0.0166	0.0200	0.1374	0.0200		0.0050	0.0200	0.0109	0.0164	0.0273	0.0116	1.4311	0.0276
Imidacloprid	0.0122	0.0419	0.0100	0.0180			0.0113	0.0218	0.0142	0.0129	0.0195	0.0078	0.0206
Indoxacarb	0.0173	0.0054	0.0245	0.0112			0.0326	0.0100	0.0155	0.0183	0.0188		0.0318
Iprodione	0.0271	0.0196	0.0200	0.0268		0.0221	0.0500	0.0327	0.0374	0.0237	0.2678	0.0099	0.0338
Iprovalicarb	0.0166	0.0500					0.0500	0.0500	0.0197	0.0210	0.0144		0.0271
Kresoxim-methyl	0.0186	0.0120	0.0500	0.0500		0.0500	0.0440	0.0137	0.0245	0.0224	0.0166		0.0279
Lambda-Cyhalothrin	0.0151	0.0358	0.0200	0.0187		0.0200	0.0500	0.0176	0.0194	0.0171	0.0205	0.0115	0.0328
Malathion	0.0168	0.0176	0.0500	0.0177		0.0500	0.0500	0.0139	0.0226	0.0189	0.0148	0.0567	0.0208
Mepanipyrim	0.0127	0.0100	0.0100	0.0050		0.0100		0.0100	0.0147	0.0132	0.0130		0.0173
Metalaxyl	0.0200	0.0500	0.0500	0.0172		0.0137	0.0168	0.0271	0.0282	0.0251	0.0234	0.0126	0.0243
Methamidophos	0.0142	0.0133	0.0100	0.0103		0.0157	0.0500	0.0100	0.0190	0.0192	0.0145		0.0156
Methidathion	0.0197	0.0200	0.0200	0.0200		0.0200	0.0200	0.0128	0.0172	0.0187	0.0158	0.0290	0.0255
Methiocarb	0.0146	0.4007	0.0100	0.0168			0.0100	0.0236	0.0167	0.0178	0.0134	0.0100	0.0298
Methomyl	0.0121	0.0322		0.0194				0.0321	0.0150	0.0144	0.0241		0.0237
Myclobutanil	0.0325	0.0102	0.0156	0.0084			0.0200	0.0136	0.0501	0.0265	0.0311	0.0326	0.0706
Oxamyl	0.0127	0.0289	0.0150	0.0185				0.0346	0.0162	0.0143	0.0123		0.0178
Oxydemeton-methyl	0.0158	0.0200		0.0200		0.0200		0.0200	0.0191	0.0188	0.0163		0.0191
Parathion	0.0164	0.0200	0.0200	0.0200		0.0500	0.0200	0.0200	0.0225	0.0202	0.0150		0.0222
Penconazole	0.0165	0.0500	0.0500				0.0500	0.0500	0.0203	0.0187	0.0145		0.0190
Phosalone	0.0288	0.0100	0.0500	0.0100		0.0165	0.0500	0.0176	0.0356	0.0222	0.0204	0.0293	0.0280
Pirimicarb	0.0179	0.0100	0.0100	0.0079		0.0101	0.0421	0.0102	0.0157	0.0136	0.0164	0.0070	0.0235
Pirimiphos-methyl	0.0158	0.0281	0.0500	0.0392		0.0500	0.0500	0.0500	0.0203	0.0172	0.0160	0.0191	0.0377
Prochloraz	0.0121	0.0077	0.0500						0.0133	0.0127	0.0128	0.0962	0.0140
Procymidone	0.0182	0.0219	0.0285	0.0289	0.0217	0.0136	0.0254	0.0256	0.0236	0.0218	0.0446	0.0200	0.0341
Profenofos	0.0164	0.0237	0.0500	0.0102			0.0500	0.0500	0.0197	0.0190	0.0150		0.0293
Propargite	0.0567	0.0055		0.0074					0.0398	0.0371	0.0266	0.0147	0.0411
Pyrethrins	0.0354								0.0840	0.0819	0.0707		0.1351
Pyrimethanil	0.0156	0.0131	0.0118	0.0176		0.0212		0.0151	0.0162	0.0155	0.0143	0.0367	0.0220
Pyriproxyfen	0.0145	0.0085					0.0100		0.0156	0.0168	0.0146	0.0150	0.0204
Quinoxyfen	0.0943	0.0100							0.1695	0.0665	0.0919		0.2171
Spiroxamine	0.0164	0.0500	0.0156	0.0500					0.0199	0.0192	0.0143		0.0247
Tebuconazole	0.0176	0.0082	0.0100	0.0105		0.0173	0.0193	0.0100	0.0254	0.0252	0.0187	0.0172	0.0254

Pesticide	Apples	Aubergines	Bananas	Beans (with pods)	Beans (without pods)	Carrots	Cauliflower	Cucumbers	Head cabbage	Leek	Lettuce	Mandarins	Oats
Tebufenozide	0.0137	0.0059							0.0113	0.0108	0.0111		0.0095
Thiabendazole	0.0775	0.0133	0.1435	0.0500		0.0250	0.0500	0.0100	0.0282	0.0281	0.0139	0.4902	0.0303
Thiophanate-methyl	0.0187	0.0075	0.1095	0.0265				0.0247	0.0201	0.0136	0.0149	0.0108	0.0374
Tolclofos-methyl	0.0168	0.0100	0.0100	0.0100		0.0109	0.0099	0.0100	0.0203	0.0183	0.0230		0.0262
Tolylfluanid	0.0188	0.0067	0.0100	0.0105		0.0114	0.0100	0.0163	0.0183	0.0159	0.0246		0.0313
Triadimefon	0.0220	0.0074	0.0185	0.0149		0.0145		0.0131	0.0289	0.0243	0.0188	0.0200	0.0292
Vinclozolin	0.0193	0.0362	0.0500	0.0443		0.0189	0.0500	0.0210	0.0257	0.0212	0.0242	0.0101	0.0283

Table 4.2.1-1b Residue levels used as input parameters for the long-term exposure calculations (mean residue values derived from upper bound calculations).

Pesticide	Oranges	Peaches	Pears	Peas (without pods)	Peppers	Potatoes	Rice	Rye	Spinach	Strawberries	Table grapes	Tomatoes	Wheat
Acephate	0.0200	0.0198			0.0104		0.0019	0.0342	0.1375	0.0136	0.0201	0.0185	
Acetamiprid	0.0101	0.0112	0.0079		0.0180	0.0100	0.0125	0.0104	0.0066	0.0110	0.0143	0.0113	
Aldicarb	0.0500	0.0125						0.0206		0.0120	0.0053	0.0114	
Azinphos-methyl	0.0129	0.0403	0.0393		0.0500			0.0330		0.0195	0.0163	0.0293	
Azoxystrobin	0.0202	0.0199	0.0497	0.0120	0.0197	0.0125	0.0221	0.0228	0.0419	0.0424	0.0261	0.0171	
Bifenthrin	0.0163	0.0179	0.0127		0.0235			0.0243		0.0148	0.0158	0.0176	0.0304
Bromopropylate	0.0357	0.0187	0.0110		0.0140			0.0234		0.0149	0.0199	0.0180	
Bupirimate	0.0100	0.0392			0.0102			0.0173		0.0344	0.0201	0.0453	
Buprofezin	0.0117	0.0173	0.0064		0.0102		0.0019	0.0151		0.0134	0.0122	0.0176	
Captan	0.0284	0.0404	0.0791		0.0332			0.0375	0.0124	0.0274	0.0354	0.0345	0.0211
Captan/Folpet (sum)			0.0686							0.0472	0.0398	0.0341	
Carbaryl	0.0315	0.0169	0.0148		0.0108	0.0500		0.0191		0.0128	0.0126	0.0147	0.0630
Carbendazim/Benomyl (sum)	0.0199	0.0306	0.0305	0.0202	0.0140		0.0041	0.0261	0.0104	0.0165	0.0319	0.0185	
Chlormequat			0.0346		0.0500			0.1378				0.0231	0.0493
Chlorothalonil	0.0100	0.0174	0.0079		0.0153			0.0195	0.0556	0.0157	0.0118	0.0250	
Chlorpropham	0.0121	0.0240	0.0102		0.0250	0.3705		0.0233	0.0205	0.0176		0.0238	0.0108
Chlorpyrifos	0.0452	0.0197	0.0171		0.0254	0.0439	0.0107	0.0172	0.0182	0.0137	0.0276	0.0154	0.0237
Chlorpyrifos-methyl	0.0205	0.0166	0.0116		0.0256		0.0087	0.0188	0.0100	0.0133	0.0114	0.0146	0.0206
Cypermethrin	0.0198	0.0374	0.0220		0.0384	0.0090	0.0271	0.0287	0.0337	0.0280	0.0410	0.0393	0.0118
Cyprodinil	0.0092	0.0231	0.0199		0.0131	0.0100		0.0133		0.0746	0.0857	0.0177	0.0134

Pesticide	Oranges	Peaches	Pears	Peas (without pods)	Peppers	Potatoes	Rice	Rye	Spinach	Strawberries	Table grapes	Tomatoes	Wheat
Deltamethrin	0.0500	0.0261	0.0109		0.0165	0.0104	0.0392	0.0232	0.0176	0.0218	0.0212	0.0245	0.0190
Diazinon	0.0179	0.0164	0.0141		0.0109			0.0132		0.0134	0.0117	0.0151	
Dichlofluanid	0.0240	0.0186			0.0101			0.0176		0.0152	0.0500	0.0176	
Dichlorvos		0.0203			0.0442		0.0166	0.0473		0.0149	0.0157	0.0188	0.0169
Dicofol	0.0504	0.0316			0.0612			0.0353		0.0261	0.0496	0.0264	
Dimethoate/Omethoate (sum)	0.0121	0.0207	0.0101		0.0111	0.0100		0.0178	0.0270	0.0118	0.0124	0.0135	
Diphenylamine	0.0176	0.1485	0.0641					0.0192		0.1178	0.0100	0.1845	
Dithiocarbamates	0.0659	0.1315	0.2103		0.0774	0.0514		0.1943	0.1378	0.1211	0.1422	0.1204	
Endosulfan	0.0500	0.0192	0.0126		0.0109	0.0128		0.0230	0.0075	0.0134	0.0082	0.0213	
Fenhexamid	0.0165	0.0253	0.0180		0.0117	0.0100		0.0287		0.1138	0.0904	0.0259	
Fenitrothion	0.0346	0.0185	0.0153		0.0160			0.0224	0.0133	0.0144	0.0213	0.0171	0.0105
Fludioxonil		0.0290	0.0087		0.0129			0.0417		0.0531	0.0527	0.0181	
Folpet	0.1002	0.0334	0.0651		0.0105			0.0472			0.0439		
Hexythiazox	0.0101	0.0107	0.0037		0.0048			0.0104		0.0123	0.0107	0.0126	
Imazalil	1.1783	0.0133	0.0429		0.0079	0.0140	0.0110	0.0180	0.0100	0.0126	0.0074	0.0138	
Imidacloprid	0.0093	0.0149	0.0068		0.0635	0.0060	0.0048	0.0104	0.0106	0.0112	0.0152	0.0120	
Indoxacarb		0.0142	0.0143		0.0249			0.0135	0.0113	0.0136	0.0174	0.0117	
Iprodione	0.0200	0.1564	0.0435		0.0266			0.0205		0.0492	0.0917	0.0289	
Iprovalicarb		0.0144						0.0213		0.0145	0.0170	0.0152	
Kresoxim-methyl	0.0500	0.0214	0.0132		0.0109			0.0214		0.0230	0.0185	0.0199	
Lambda-Cyhalothrin	0.0128	0.0159	0.0125		0.0140			0.0171	0.0317	0.0142	0.0152	0.0156	
Malathion	0.0209	0.0204	0.0135		0.0152		0.0190	0.0379	0.0105	0.0151	0.0159	0.0164	0.0497
Mepanipyrim		0.0132			0.0100			0.0131		0.0294	0.0109	0.0136	
Metalaxyl	0.0124	0.0223	0.0202		0.0175	0.0175	0.0019	0.0318		0.0165	0.0228	0.0200	
Methamidophos	0.0500	0.0154			0.0103			0.0173	0.0445	0.0118	0.0102	0.0150	
Methidathion	0.0364	0.0220	0.0100					0.0154		0.0153	0.0500	0.0146	
Methiocarb	0.0100	0.0123			0.0381			0.0162	0.0150	0.0139	0.0108	0.0144	
Methomyl/Thiodicarb (sum)	0.0511	0.0142	0.0230		0.0330			0.0165		0.0117	0.0161	0.0128	
Myclobutanil	0.0169	0.0386	0.0132		0.0266	0.0050		0.0258		0.0341	0.0510	0.0406	
Oxamyl		0.0135			0.0330			0.0111		0.0117		0.0132	
Oxydemeton-methyl		0.0178					0.0021	0.0214		0.0128		0.0163	
Parathion	0.0206	0.0156	0.0101		0.0123			0.0172		0.0139	0.0119	0.0139	
Penconazole	0.0102	0.0190	0.0061		0.0101			0.0154		0.0169	0.0139	0.0171	
Phosalone	0.0367	0.0229	0.0256		0.0219	0.0208		0.0197	0.1231	0.0157	0.0383	0.0192	

Pesticide	Oranges	Peaches	Pears	Peas (without pods)	Peppers	Potatoes	Rice	Rye	Spinach	Strawberries	Table grapes	Tomatoes	Wheat
Pirimicarb	0.0062	0.0149	0.0060		0.0104			0.0201	0.0085	0.0136		0.0120	0.0101
Pirimiphos-methyl	0.0183	0.0172	0.0101	0.0450	0.0358		0.0352	0.0428		0.0138	0.0500	0.0533	0.0453
Prochloraz	0.0695	0.0124	0.0500	0.0650	0.0102			0.0127		0.0130	0.0115	0.0112	
Procymidone	0.0141	0.0254	0.0228	0.0229	0.0397			0.0152	0.0211	0.0307	0.0437	0.0328	0.0121
Profenofos	0.0136	0.0177			0.0232			0.0166		0.0144	0.0100	0.0164	
Propargite	0.0223	0.0419	0.0498					0.0698		0.0215	0.0163	0.0365	
Pyrethrins		0.1119			0.0051			0.0804		0.0428		0.0779	
Pyrimethanil	0.0148	0.0147	0.0245		0.0181	0.0487		0.0159		0.0250	0.0365	0.0193	
Pyriproxyfen	0.0216	0.0134			0.0100			0.0161		0.0132	0.0066	0.0160	
Quinoxyfen	0.0050	0.1037						0.0171		0.0798	0.0192	0.1335	
Spiroxamine		0.0191				0.0119		0.0236		0.0135	0.0165	0.0168	0.0088
Tebuconazole	0.0134	0.0247	0.0085		0.0247		0.0355	0.0206		0.0195	0.0178	0.0200	0.0105
Tebufenozide		0.0116	0.0077		0.0110	0.0100	0.0103	0.0094		0.0107	0.0104	0.0109	
Thiabendazole	0.4401	0.0177	0.0719		0.0109	0.0136		0.0196	0.0101	0.0135	0.0119	0.0151	0.0202
Thiophanate-methyl	0.0168	0.0168	0.0186		0.0105			0.0178	0.0118	0.0133	0.0201	0.0156	0.0101
Tolclofos-methyl	0.0100	0.0170				0.0089		0.0131		0.0146	0.0100	0.0174	
Tolylfluanid	0.0100	0.0170	0.0536		0.0120			0.0219	0.0099	0.0162	0.0125	0.0171	
Triadimefon/Triadimenol (sum)	0.0200	0.0267			0.0178			0.0216		0.0192	0.0250	0.0249	0.0214
Vinclozolin	0.0148	0.0197	0.0499	0.0475	0.0102			0.0202	0.0160	0.0159	0.0139	0.0194	

4.2.2. Acceptable Daily Intake values (ADIs)

The long-term risk assessment requires a comparison between the exposure calculated with the mean pesticide residue levels consumed and the ADI. The list of the ADIs used for the assessment of the chronic exposure is reported in Table 4.2.2-1.

Table 4.2.2-1 ADI values used as input values for the long-term risk assessment

Pesticide	ADI (mg/kg bw/day)	ADI (*) evaluation year	ADI source
Acephate	0.03	2005	JMPR
Acetamiprid	0.07	2004	COM
Aldicarb	0.003	1995	JMPR
Azinphos-methyl	0.005	2006	COM
Azoxystrobin	0.1	1998	COM
Bifenthrin	0.015	2008	EFSA
Bromopropylate	0.03	1993	JMPR
Bupirimate	0.05	2007	DAR
Buprofezin	0.01	2008	EFSA
Captan	0.1	2006	EFSA
Carbaryl	0.0075	2006	EFSA
Carbedazim (1)	0.02	2007	EFSA
Chlormequat	0.04	2008	COM
Chlorothalonil	0.015	2006	EFSA
Chlorpropham	0.05	2003	COM
Chlorpyrifos	0.01	2005	COM
Chlorpyrifos-methyl	0.01	2005	COM
Cypermethrin (2)	0.015	2005	COM
Cyprodinil	0.03	2005	COM
Deltamethrin	0.01	2002	EFSA
Diazinon	0.0002	2006	EFSA
Dichlofluanid	0.007	2000	NL
Dicofol	0.002	1992	JMPR
Dimethoate	0.001	2006	EFSA
Diphenylamine	0.075	2008	EFSA
Dithiocarbamates (3) Ziram Mancozeb	 0.006 0.05	 2004 2005	 COM COM
Endosulfan	0.006	1998	JMPR
Fenhexamid	0.2	1998	COM
Fenitrothion	0.005	2006	EFSA
Fludioxonil	0.37	2007	EFSA
Folpet	0.1	2006	EFSA
Hexythiazox	0.03	1991	JMPR
Imazalil	0.025	1997	COM
Imidacloprid	0.06	2008	EFSA
Indoxacarb	0.006	2005	COM
Iprodione	0.06	2002	COM
Iprovalicarb	0.015	2002	COM
Kresoxim-methyl	0.4	1998	COM
Lambda-Cyhalothrin	0.005	2001	COM

Pesticide	ADI (mg/kg bw/day)	ADI (*) evaluation year	ADI source
Malathion	0.03	2006	EFSA
Mepanipyrim	0.02	2004	COM
Metalaxyl (4)	0.08	2002	COM
Methamidophos	0.001	2007	COM
Methidathion	0.001	1992	JMPR
Methiocarb	0.013	2006	EFSA
Methomyl (5)	0.0025	2006	EFSA
Myclobutanil	0.025	2007	EFSA
Omethoate	0.0003	2006	EFSA
Oxamyl	0.001	2005	EFSA
Oxydemeton-methyl	0.0003	2006	JMPR
Parathion	0.004	1995	EFSA
Penconazole	0.03	2008	EFSA
Phosalone	0.01	2006	EFSA
Pirimicarb	0.035	2006	EFSA
Pirimiphos-methyl	0.004	2005	JMPR
Prochloraz	0.01	2001	DAR
Procymidone	0.0028	2007	JMPR
Profenofos	0.03	2007	DAR
Propargite	0.007	2007	JMPR
Pyrethrins	0.04	2003	EFSA
Pyrimethanil	0.17	2006	JMPR
Pyriproxyfen	0.1	2001	COM
Quinoxyfen	0.2	2003	COM
Spiroxamine	0.025	1999	EFSA
Tebuconazole	0.03	2008	EFSA
Tebufenozide	0.02	2007	COM
Thiabendazole	0.1	2001	COM
Thiophanate-methyl	0.08	2005	EFSA
Tolclofos-methyl	0.064	2005	EFSA
Tolylfluanid	0.1	2005	EFSA
Triadimefon (66)	0.05	2008	COM
Vinclozolin	0.005	2006	COM

(*) For the long-term risk assessment the most recent ADIs available were used. It should be mentioned that some of the ADI values were derived recently and were not in place in 2007 when the monitoirng results were generated.

(1) ADI derived for carbendazim is used for risk assessment of Carbendazim/Benomyl.
(2) ADI derived for alpha-cypermethrin.
(3) The group of dithiocarbamates includes seven pesticides with different toxicological reference values: A group-ADI is not available. The risk assesment was performed with both the value for ziram which is the lowest ADI and the value for mancozeb which is the most commonly used dithiocarbamate.
(4) ADI for metalaxyl-M.

(5) ADI derived for methomyl is used for risk assessment of methomyl and thiodicarb.
(6) ADI for triadimenol is used for risk assessment of triadimenol and triadimefon.

4.2.3. Presentation of the results of the long-term consumer exposure

For each pesticide, the chronic risk assessment is performed for all 27 diets of the EFSA PRIMo model. The results of the TMDI calculation are reported separately for each pesticide in an exposure assessment summary report. The summary reports can be found in Appendix VI of this Report. For each of the 27 diets, the three commodities representing the largest proportion of the ADI exhaustion are shown together with the total dietary intake for that commodity as a proportion of the ADI. If the ADI was not exceeded in any diet, a chronic consumer risk can be excluded.

4.2.4. Limitations and uncertainties affecting the chronic exposure assessment

The calculation of the TMDI is based on conservative assumptions as explained and is considered to overestimate the real exposure of the population. There are uncertainties associated with each of the data sources used for risk assessment, food consumption data, residue level data and the ADI values.

The major sources of uncertainty are reported in Table 4.2.4-1, including an indication of whether the uncertainty results in an overestimation ("+" symbol) or an underestimation ("-" symbol) of the level of exposure.

Table 4.2.4-1 – Major sources of uncertainties affecting the long-term risk assessment

Source of uncertainty	Description	Direction
Model uncertainties		
	Using the upper bound of the residue classes as the residues concentration since the true value is not reported	+
	Disregarding samples for which no reporting levels have been indicated	+/-
	In certain commodities residues are reduced during storage. In the TMDI calculation this is not considered	+
	Other sources of exposure are not taken into account (e.g. drinking water)	-
	Inaccuracies related to the consumption data	+/-
Pesticide residue level		
	Measurements that were reported as being not quantified were assumed to be at the level of reporting (LOQ). This overestimates a proportion of the larger concentrations actually occurring, and hence overestimates the total intake	+
	For the food commodities covered by the 2008 and 2009 EU coordinated monitoring programs the residue levels measured in national programmes were used, for	+

Source of uncertainty	Description	Direction
	these programmes the sampling scheme is frequently more targeted. It can be assumed that these residue values are higher than from representative random programs and hence overestimate the total intake	
	No processing factors were applied to take into account changes in the residue levels under food processing (washing, peeling, cooking etc.). It can be assumed that this result in overestimation of the total intake	+/-
	The residues are reported according to the residue definition for enforcement. If metabolites of the parent are not considered, the actual toxicological burden might be underestimated	-
Selection of the ADI	Where the residue definition for enforcement comprises more than one pesticide with different toxicity, the lowest ADI was selected for the risk assessment. This is the case for captan/folpet, carbendazim/benomyl, cypermethrin isomers, Metalaxyl-M, methomyl/thiodicarb, triadimenol/triadimefon	+

It can be concluded that TMDI calculations as performed in the context of the risk assessment using monitoring data are conservative and generally overestimate the exposure.

4.3. Results of the short-term risk assessment

The total number of pesticide/crop combinations analysed in the framework of the 2007 EU coordinated programmes was 620. For 19 active substances no ARfD was established because of the low acute toxicity of the substance. For two pesticides no reliable ARfD was available or insufficient data were reported to perform the exposure assessment Consequently, for 189 of the pesticide/crop combinations (21 pesticides*9 commodities) no short-term risk assessment was performed.

The results of the assessment for the remaining 431 pesticide/crop combinations are presented in the following section. In Figure 4.3-1, a summary of the number of the pesticide/crop combinations according to the need to carry out the acute risk assessment is presented.

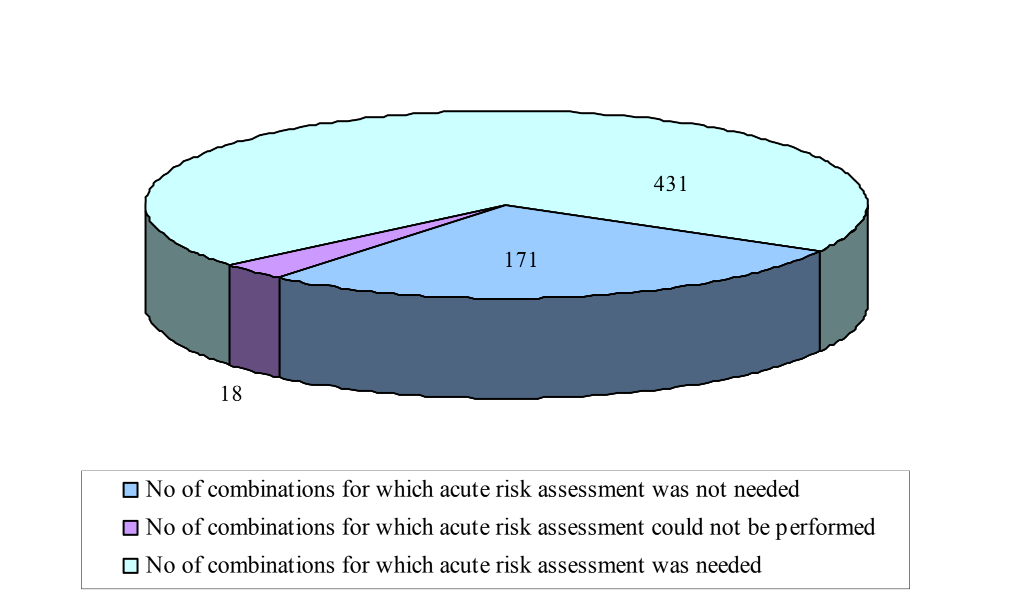


Figure 4.3-1 Summary of the total number of pesticide/crop combinations according to the need to carry out the acute risk assessment

The summary reports of the IESTI calculations for the pesticides for which an acute risk assessment was performed are reported in Appendix VI to the Report.

The estimated exposure was below 100% of the ARfD for 379 combinations. Thus, for the pesticide/crop combinations reported in Table 4.3-1 the residue concentration measured in the coordinated programme did not give cause for short-term consumer concerns.

Table 4.3-1 – Pesticide/crop combinations for which a short-term risk could be excluded or no short-short term risk assessment was necessary (pesticides with a low acute toxicological profile)

Code number (*)	Pesticide	Crops
1	Acephate	All (**)
2	Acetamiprid (1)	All
3	Aldicarb	All
4	Azinphos-methyl	Head cabbage, lettuce, leek, oats, rye, strawberries and tomatoes
5	Azoxystrobin	No short-term risk assessment necessary
6	Bifenthrin	Apples, head cabbage, lettuce, leek, oats, peaches, rye, strawberries
7	Bromopropylate	No short-term risk assessment necessary
9	Buprofezin (1)	All
10	Captan (1)	All
10	Folpet (1)	All
11	Carbaryl	Head cabbage, lettuce, leek, oats, rye, strawberries and tomatoes
12	Carbendazim/Benomyl	Head cabbage, lettuce, oats, rye, strawberries and tomatoes
13	Chlormequat (1)	All
14	Chlorothalonil (1)	All
15	Chlorpropham (1)	All
16	Chlorpyrifos	Head cabbage, lettuce, leek, oats, peaches, rye, strawberries and tomatoes
17	Chlorpyrifos-methyl (1)	All
18	Cypermethrin	Head cabbage, leek, oats, peaches, rye, strawberries and tomatoes
19	Cyprodinil	No short-term risk assessment necessary

Code number (*)	Pesticide	Crops
20	Deltamethrin	Apples, head cabbage, leek, oats, peaches, rye, strawberries and tomatoes
21	Diazinon (1)	All
22	Dichlofluanid	No short-term risk assessment necessary
24	Dicofol (1)	All
25	Dimethoate	Apples, head cabbage, lettuce, leek, oats, peaches, rye, strawberries and tomatoes
26	Diphenylamine	No short-term risk assessment necessary
27	Dithiocarbamates	Oats, rye and strawberries
28	Endosulfan	Apples, lettuce, leek, oats, rye and strawberries
29	Fenhexamid	No short-term risk assessment necessary
30	Fenitrothion	Head cabbage, lettuce, leek, oats, rye, strawberries and tomatoes
31	Fludioxonil	No short-term risk assessment necessary
32	Hexythiazox	No short-term risk assessment necessary
33	Imazalil	All
34	Imidacloprid	Apples, head cabbage, leek, oats, peaches, rye, strawberries and tomatoes
35	Indoxacarb (1)	All
36	Iprodione	No short-term risk assessment necessary
37	Iprovalicarb	No short-term risk assessment necessary
38	Kresoxim-methyl	No short-term risk assessment necessary
39	Lambda-Cyhalothrin	Head cabbage, leek, oats, peaches, rye, strawberries and tomatoes
40	Malathion (1)	All
41	Mepanipyrim	No short-term risk assessment necessary
42	Metalaxyl	All
43	Methamidophos	Apples, leek, oats, peaches, rye and tomatoes
44	Methidathion	All
45	Methiocarb (aka Mercaptodimethur)	Apples, head cabbage, lettuce, oats, peaches, rye and tomatoes
46	Methomyl	Head cabbage, leek, oats and rye
47	Myclobutanil (1)	All
48	Oxamyl	Apples, head cabbage, leek, oats, peaches and rye
49	Oxydemeton-methyl	Apples, leek, oats, peaches, rye, strawberries and tomatoes
50	Parathion	All
51	Penconazole (1)	All
52	Phosalone	Head cabbage, lettuce, leek, oats, peaches, rye, strawberries and tomatoes
53	Pirimicarb (1)	All
54	Pirimiphos-methyl	All
55	Prochloraz (1)	All
56	Procymidone	Head cabbage, leek, oats and rye
57	Profenofos	All
58	Propargite	Head cabbage, lettuce, leek, oats, rye and strawberries
59	Pyrethrins	All
60	Pyrimethanil	No short-term risk assessment necessary
61	Pyriproxyfen (1)	All
62	Quinoxyfen	No short-term risk assessment necessary
63	Spiroxamine	No short-term risk assessment necessary
64	Tebuconazole	Apples, head cabbage, leek, oats, peaches, rye, strawberries and tomatoes
65	Tebufenozide	No short-term risk assessment necessary
66	Thiabendazole	No short-term risk assessment necessary
67	Thiophanate-methyl (1)	All
68	Tolclofos-methyl	No short-term risk assessment necessary
69	Tolylfluanid	All
70	Triadimenol (1)	All

Code number (*)	Pesticide	Crops
71	Vinclozolin	Apples, head cabbage, leek, oats, peaches, rye, strawberries and tomatoes

(*) The code number refers to the numbering of the pesticides used in Appendix IV and V
(**) All = apples, head cabbage, lettuce, leek, oats, peaches, rye, strawberries and tomatoes

It should be noted that for 19 active substances, which are indicated with the footnote (1) in Table 4.3-1, the MRL was exceeded for certain crops, but these non-compliances were of no acute intake concern since 100% of the ARfD was not exceeded.

4.3.1. Pesticide/crop combination for which a theoretical short-term risk could not be excluded

According to the assessment reported in Appendix VI, a theoretical consumer risk could not be excluded for the 52 pesticide/crop combinations listed in Table 4.3.1-1. However, as described in section 4.2, the acute exposure assessment is based on conservative assumptions. It is noted that the highest value of the IESTI calculated for each of the pesticide/crop combination of concern refers always to children/infant diets. For 51 out of 52 pesticide/crop combinations for which a theoretical consumer risk could not be excluded, the potential risk identified was considered to be an exceptional or seldom event; for one single combination (oxamyl/tomatoes) the threshold level was exceeded in more than 1% of the samples analysed for this pesticide/commodity combination (see section paragraph 4.1.3 for the classification of the event frequency).

It should also be mentioned that samples not compliant with MRLs and representing potential concern for the consumer health have not necessarily been placed on the EC market. For example, lots which were found to exceed the MRLs may have been rejected at the border before the import. In other cases where non-compliances were detected, competent authorities may have launched the recall of these lots before they reached the consumers. Thus, the actual consumer exposure risk might have been lower than that described in this report.

Table 4.3.1-1 – Summary results of the short-term risk assessment of the active substances for which an acute risk could not be excluded

Code	Pesticide	Crop	Highest residue measured (HRM) mg/kg	Max IESTI (% of ARfD)	Most critical diet	No of diets for which the threshold residue (*) is exceeded by HRM	No of samples analysed	% samples exceeding the MRL	No of samples above the lowest national threshold	% of samples above the lowest national threshold residue	Exceedances of ARfD are "exceptional", "seldom" or "not seldom" events?
4	Azinphos-methyl	Apples	0.98	960.1	UK infant	18	3262	0.15	10	0.31	seldom
4	Azinphos-methyl	Peaches	0.44	261.1	DE child	9	1926	0.00	3	0.16	seldom
6	Bifenthrin	Tomatoes	0.80	155.1	BE child	4	2420	0.08	1	0.04	exceptional
11	Carbaryl	Apples	0.64	627.0	UK infant	14	2889	0.62	3	0.10	seldom
11	Carbaryl	Peaches	0.31	183.9	DE child	7	1622	0.49	2	0.12	seldom
12	Carbendazim/Benomyl	Apples	2.26	1107.0	UK infant	19	1965	0.81	10	0.51	seldom
12	Carbendazim/Benomyl	Peaches	1.60	474.7	DE child	16	1733	0.81	2	0.12	seldom
12	Carbendazim/Benomyl	Leek	1.20	353.7	BE child	6	643	0.93	1	0.16	seldom
16	Chlorpyrifos	Apples	2.45	240.0	UK infant	7	3401	0.03	1	0.03	exceptional
18	Cypermethrin	Apples	0.44	107.8	UK infant	1	3219	0.00	1	0.03	exceptional
18	Cypermethrin	Lettuce	0.45	107.6	DE child	1	2350	0.00	1	0.04	exceptional
20	Deltamethrin (cis-deltamethrin)	Lettuce	0.39	104.9	DE child	1	2344	0.00	1	0.04	exceptional
27	Dithiocarbamates (ziram)	Apples	2.70	664.9	UK infant	7	1371	0.00	6	0.44	seldom
27	Dithiocarbamates (ziram)	Peaches	1.43	212.1	DE child	1	1044	0.00	1	0.10	seldom
27	Dithiocarbamates (ziram)	Tomatoes	1.81	131.6	BE child	3	1155	0.00	2	0.17	seldom
27	Dithiocarbamates (ziram)	Head cabbage (**)	2.04	269.7	NL child	3	460	1.09	3	0.65	seldom
27	Dithiocarbamates (ziram)	Lettuce	17.40	1176.0	DE child	15	963	0.62	6	0.62	seldom
27	Dithiocarbamates (ziram)	Leek (**)	1.95	288.9	BE child	2	458	0.00	2	0.44	seldom
28	Endosulfan	Peaches	0.64	189.9	DE child	7	2102	0.14	2	0.10	seldom
28	Endosulfan	Tomatoes	1.49	433.2	BE child	12	2944	0.07	4	0.14	seldom
28	Endosulfan	Head cabbage	0.50	131.6	NL child	3	1115	0.09	1	0.09	exceptional
30	Fenitrothion	Apples	0.60	452.1	UK infant	10	3138	0.35	1	0.03	exceptional
30	Fenitrothion	Peaches	1.22	556.8	DE child	17	1876	0.43	2	0.11	seldom
34	Imidacloprid	Lettuce	3.50	117.7	DE child	1	1570	1.21	1	0.06	exceptional
39	Lambda-Cyhalothrin	Apples	0.13	163.3	UK infant	5	2778	0.04	2	0.07	exceptional
39	Lambda-Cyhalothrin	Lettuce	0.34	122.0	DE child	1	2037	0.00	1	0.05	exceptional

Code	Pesticide	Crop	Highest residue measured (HRM) mg/kg	Max IESTI (% of ARfD)	Most critical diet	No of diets for which the threshold residue (*) is exceeded by HRM	No of samples analysed	% samples exceeding the MRL	No of samples above the lowest national threshold	% of samples above the lowest national threshold residue	Exceedances of ARfD are "exceptional", "seldom" or "not seldom" events?
43	Methamidophos	Strawberries	0.26	135.1	DE child	3	2544	0.08	1	0.04	exceptional
43	Methamidophos	Head cabbage	0.87	1526.3	NL child	18	959	0.21	1	0.10	seldom
43	Methamidophos	Lettuce	2.50	2242.0	DE child	19	2146	0.19	1	0.05	exceptional
45	Methiocarb (aka Mercaptodimethur)	Strawberries	2.06	247.4	DE child	4	2281	0.09	1	0.04	exceptional
45	Methiocarb (aka Mercaptodimethur)	Leek	0.84	380.9	BE child	7	628	0.16	2	0.32	seldom
46	Methomyl/Thiodicarb	Apples	0.11	431.0	UK infant	10	2259	0.00	2	0.09	exceptional
46	Methomyl/Thiodicarb	Peaches	0.06	149.5	DE child	5	1489	0.00	1	0.07	exceptional
46	Methomyl/Thiodicarb	Strawberries	0.71	442.8	DE child	7	2073	0.29	1	0.05	exceptional
46	Methomyl/Thiodicarb	Tomatoes	0.05	116.3	BE child	1	1856	0.00	1	0.05	exceptional
46	Methomyl/Thiodicarb	Lettuce	5.80	6241.7	DE child	19	1668	0.42	10	0.60	seldom
48	Oxamyl	Strawberries	0.94	1465.6	DE child	16	1842	0.05	1	0.05	exceptional
48	Oxamyl	Tomatoes	0.14	790.8	BE child	18	1552	0.13	22	1.42	not seldom
48	Oxamyl	Lettuce	0.11	287.9	DE child	14	1526	0.07	10	0.66	seldom
49	Oxydemeton-methyl	Head cabbage	0.08	294.7	NL child	8	692	0.14	1	0.14	seldom
49	Oxydemeton-methyl	Lettuce	0.21	376.7	DE child	15	1655	0.06	3	0.18	seldom
52	Phosalone	Apples	4.39	430.1	UK infant	10	3276	0.03	2	0.06	exceptional
56	Procymidone	Apples	0.33	269.4	UK infant	7	3310	0.18	1	0.03	exceptional
56	Procymidone	Peaches	1.17	578.5	DE child	17	1945	0.00	6	0.31	seldom
56	Procymidone	Strawberries	2.60	337.8	DE child	6	2635	0.00	5	0.19	seldom
56	Procymidone	Tomatoes	2.00	969.1	BE child	18	2775	0.00	12	0.43	seldom
56	Procymidone	Lettuce	7.50	1681.5	DE child	19	2369	0.08	9	0.38	seldom
58	Propargite	Apples	6.00	1959.3	UK infant	19	2520	0.16	10	0.40	seldom
58	Propargite	Peaches	2.20	435.1	DE child	14	1372	0.07	3	0.22	seldom
58	Propargite	Tomatoes	0.56	108.5	BE child	1	2057	0.19	1	0.05	exceptional
64	Tebuconazole	Lettuce	3.10	278.0	DE child	13	2076	0.05	1	0.05	exceptional
71	Vinclozolin	Lettuce	4.34	194.6	DE child	5	2309	0.00	1	0.04	exceptional

(*) The threshold residue is the theoretical calculated residue level that represents the 100% of the ARfD exhaustion. This value is calculated singularly for each pesticide/crop combination and for each diet.
(**) The residue of dithiocarbamates (measured as CS_2) could also be due to naturally occurring compounds generating CS_2.

The summary of the total pesticide/crop combinations analysed for pesticide residues according to results of the acute risk assessment and according to the event classification are reported in Figure 4.3.1-1.

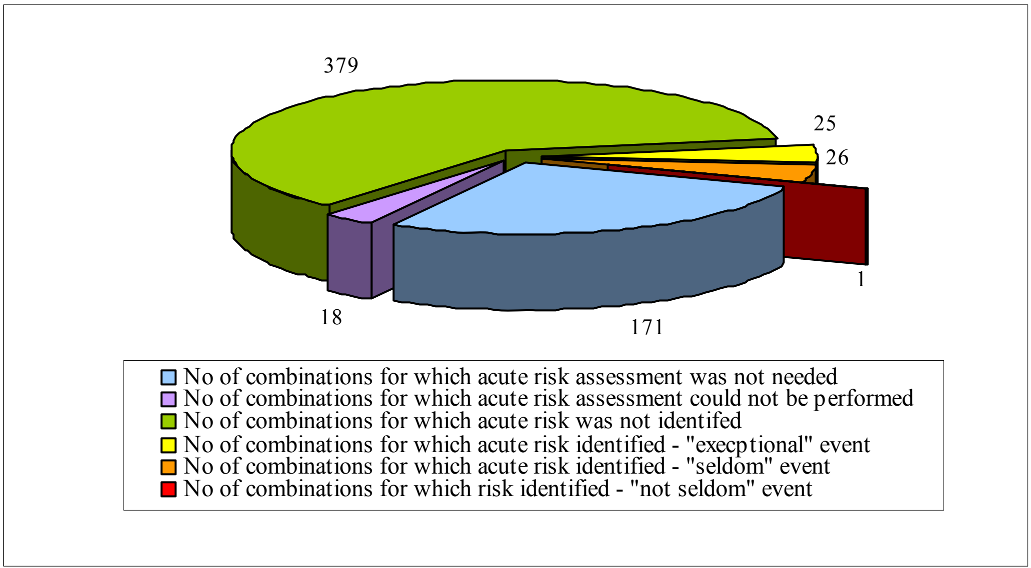


Figure 4.3.1-1 Summary of pesticide/crop combinations according to the need to carry out the acute risk assessment

The pesticides for which the highest number of pesticide/crop combinations exceeding the ARfDs was identified were the dithiocarbamates (ziram) (6 crops out of the 9 crops analysed) and methomyl and procymidone (5 crops out of the 9 crops analysed). More detailed information regarding the individual observed critical events are reported in the following sections (4.3.1.1 to 4.3.1.22).

The exceedances of the ARfD ranged from 105% to 6242%. The highest three exceedances of the ARfD were identified for methomyl/lettuce (6242%), methamidophos/lettuce (2242%) and propargite/apples (1959%).

No exceedance of the ARfD was identified for any pesticide detected in cereals (rye and oats).

4.3.1.1. Azinphos-methyl

The use of azinphos-methyl is no longer authorised in Europe. Authorisations for its use had to be withdrawn by 1 January 2007. Exceedances of the threshold residue level have been identified for 13 samples: ten samples of apples and three samples of peaches. However, it was considered that these exceedances represent seldom events.

For apples, it was also noted that five samples exceeded the EC MRL. For peaches, no exceedances of the MRL were recorded.

It should be noted that EC MRLs have been amended in 2007 and in 2008. The current EC MRL for apples and peaches has been lowered to the LOQ of 0.05 mg/kg.

4.3.1.2. Bifenthrin

A theoretical acute consumer risk could not be excluded for a single sample of tomato. This was considered to be an exceptional event as it represents less than 0.04% of the total tomato samples analysed for bifenthrin in 2007 (2420).

The sample containing a bifenthrin residue at the HRM level was also found to be non-compliant with the MRL; no possible reason is given for the MRL exceedance.

4.3.1.3. Carbaryl

In Europe, the authorizations for use of plant protection products containing carbaryl had to be withdrawn by 21 November 2007.

For three samples of apples and two samples of peaches a potential risk was identified. These five samples have been classified as seldom events as they only account for 0.10% and 0.12% of the total number of apples and peaches taken, respectively.

The five samples mentioned above were found to be non-compliant with regard to the MRLs. It is noted that EC MRLs for carbaryl in apples and peaches were amended by Commission Directive 2006/59/EC, by lowering the previous EC MRLs (3 mg/kg) to the LOQ of 0.05 mg/kg for both crops. The new legal provisions should have been enforced at national level by 30 December 2006.

4.3.1.4. Benomyl/Carbendazim

The use of benomyl is not authorised in Europe since 2002. Since January 2007, carbendazim can only be used as fungicide on the following crops: cereals, rapeseed, sugar beet and maize. The presence of carbendazim residues may also result from the use of thiophanate-methyl.

The enforcement residue definition for benomyl and carbendazim is set to "*benomyl (sum of benomyl and carbendazim, expressed as carbendazim*". Hence, residues of carbendazim and benomyl are measured simultaneously in the same food items and it is not possible to determine the proportion of each substance in the sample.

Residues posing potential acute risks were found in apples, peaches and leek.

For apples, peaches and leek a theoretical acute risk was identified for ten, two and one sample, respectively. It is noted that the exceedance of the threshold residue levels by these samples represent seldom events.

4.3.1.5. Chlorpyriphos

A potential acute risk due to chlorpyriphos residue was only indentified for one apple sample originating from within Europe. This was also the only sample found exceeding the MRLs set for chlorpyriphos.

The analysis of the chlorpyriphos findings in apples indicated that the residue of chlorpyriphos measured that gave rise to potential acute intake concern is an exceptional event.

4.3.1.6. Cypermethrin

For cypermethrin a theoretical consumer risk is identified for two samples if the intake is compared with the lowest ARfD established for the cypermethrin isomers (alpha-cypermethrin): one lettuce and one apple sample. The exceedances of the lowest threshold residue levels were considered as exceptional events and the exceedance of the ARfD was very slight in both cases (108%). This slight exceedance is unlikely to represent an acute intake above safe levels.

The two samples of concern were found compliant with the EC MRLs.

4.3.1.7. Deltamethrin

The only deltamethrin residue found posing a potential risk with regard to acute intake was detected in a single lettuce sample of unknown origin. This sample was found compliant with the EC MRL (0.5 mg/kg). According to the data analysis, the finding above the threshold residue level can be considered as an exceptional event and results in a very slight exceedance of the ARfD (105%).

4.3.1.8. Dithiocarbamates

The ditiocarbamates are a group of active substances which have a comparable chemical structure, but which have different toxicological properties. The analytical method used to analyse the samples for residues resulting from the use of dithiocarbamates, determines the concentration of CS_2, the pesticide applied cannot be identified. For the risk assessment EFSA used the ARfD value established for ziram which is the dithiocarbamate compound with the lowest ARfD and the ARfD for mancozeb, which is the dithiocarbamate which is most commonly used. The risk assessment is not only impeded by the uncertainty regarding the origin of the CS_2 residue but also by the fact that some food commodities are known to give false positive results as CS_2 is a naturally occurring substance in some crops (such as head cabbage or leek).

Assuming that all CS_2 is due to the use of ziram, the residue values reported as CS_2 were recalculated to ziram by using the molecular weight conversion factor of 2.01. According to IESTI calculations, the samples that gave rise to theoretical acute intake concerns were six apple samples, one peach sample, two tomatoes samples, three head cabbage samples, six lettuce sample and two leek samples. All the 20 exceedances of the lowest threshold residue level were considered as seldom events.

Assuming that all CS_2 is due to the use of mancozeb, the residue values reported as CS_2 were recalculated to mancozeb by using the molecular weight conversion factor of 1.78. According to IESTI calculations, the only samples that gave rise to theoretical acute intake concern was lettuce (157.0% of the ARfD). However, a final conclusion regarding the potential health risk related to the observed CS_2 residues can not be drawn as the sources of the CS_2 residues is unknown and therefore the appropriate toxicological reference value could not be identified.

4.3.1.9. Endosulfan

All uses of plant protection products containing endosulfan had to be withdrawn by June 2006. Nevertheless, the use of endosulfan in certain crops, i.e. strawberries and tomatoes was still permitted in certain Member States until 30 June 2007.

According to the results of the short-term exposure calculation, a theoretical acute consumer risk could not be excluded for three crops: peaches (two samples), tomatoes (four samples) and head cabbage (one sample). However, the threshold residue level exceedances were classified as exceptional or seldom events.

The four tomatoes samples and the head cabbage sample were non-compliant with the MRLs. EC MRLs for fruits and vegetables in place in 2007 were set by Directive 2006/59/EC; these provisions have been applicable since 30 December 2006. The MRL for head cabbage had been lowered end of 2007.

4.3.1.10. Fenitrothion

The authorisations for plant protection products containing fenitrothion had to be withdrawn by 25 November 2007 with possible periods of grace granted by Member States expiring on the 25 November 2008.

The maximum estimated acute consumer exposure exceeded 100% of the ARfD in one apple and two peach samples. The exceedances of the threshold residue level were considered an exceptional event (apple sample) or seldom event (peach samples).

The EC MRLs for apples and peaches were lowered from 0.5 mg/kg to 0.01 mg/kg in December 2006. Samples of apples treated in 2006 and complying with the 2006 EC MRLs may still have been available in the EC market in 2007.

4.3.1.11. Imidacloprid

The use of imidacloprid in plant protection products is authorised in Europe. In 2007, EC MRLs for imidacloprid were not yet in place, only national provisions.

A theoretical consumer health risk was identified for only one lettuce sample. This single exceedance of the threshold residue was considered as an exceptional event and the ARfD was slightly exceeded only in one diet (118%).

4.3.1.12. Lambda-Cyhalothrin

Except for two apple and one lettuce sample the residues of lambda-cyhalothrin in the nine crops included in the 2007 EC coordinated monitoring programme did not pose an acute risk for the European consumer. The events in which a potential acute risk could not be excluded were considered exceptional.

The lettuce sample and one apple sample that posed a potential risk were found MRL compliant. The EC MRLs for lambda-cyhalothrin in fruit and vegetables were amended twice in 2007 and once in 2008. The current MRL for apples is the same as the MRL applicable in 2007 (0.1 mg/kg), while the lettuce MRL was lowered from 1 mg/kg to 0.5 mg/kg.

4.3.1.13. Methamidophos

The theoretical acute risk due to residues of methamidophos in strawberries, head cabbage and lettuce could not be excluded. For each of these crops one residue above the lowest threshold residue level was detected. However, it should be noted that these three residues can be considered as exceptional (strawberries and lettuce) or seldom (head cabbage) events.

The three samples with highest residues measured were also found to be non-compliant with the MRL. The EC MRLs have been lowered to the LOQ of 0.01 mg/kg in January 2007.

4.3.1.14. Methiocarb

The use of methiocarb in Europe is authorised. The three samples for which an theoretical acute risk could not be excluded -one strawberry and two leek samples- can be viewed as exceptional and seldom events, respectively.

In 2007, only national MRLs were in place for methiocarb. EC MRLs were set in 2008 by Regulations 149/2008 and 839/2008.

4.3.1.15. Methomyl/thiodicarb

The use of methomyl and thiodicarb in plant protection products is no longer authorised in Europe. Authorisations for thiodicarb uses should have been withdrawn by 25 November 2007 with a period of grace until 25 November 2008. Authorisations for plant protection products containing methomyl were to be withdrawn by 19 March 2008 with a period of grace expiring on the 19 March 2009.

As the residue definition set in the MRL legislation for all commodities of plant origin is "*Sum of methomyl and thiodicarb, expressed as methomyl"* the data received from the participating countries referred to the summed residues. Hence, it is not possible to determine whether the detected residues are related to residues of methomyl and/or thiodicarb.

Following a conservative approach, EFSA based the risk assessment of methomyl/thiodicarb residues on the lowest toxicological reference value, this was for methomyl.

According to these calculations, a theoretical acute risk could not be excluded for several samples: apples (two samples), peaches (one sample), strawberries (one sample), tomatoes (one sample) and lettuce (ten samples). Except for the lettuce findings, the potential acute risks identified for these crops are considered exceptional events. For lettuce, due to the higher number of samples with residues above the threshold residue level, it was considered that the ten samples represent seldom events.

For tomatoes, it was considered that the identified acute risk was due to a residue level equivalent to the LOQ (HRM of 0.05 mg/kg). In the EFSA opinion on "MRLs of concern for the active substances methomyl and thiodicarb" (EFSA 2008a), EFSA recommended to lower the LOQ to 0.02 mg/kg in view of a potential consumer risk.

It was noted that for apple, peach and tomato samples, the theoretical intake concerns could not be excluded for samples which were found compliant with the MRLs in place in 2007. However, MRLs for fruits and vegetables have been lowered in 2007.

4.3.1.16. Oxamyl

Based on the 2007 monitoring data, estimated intakes above safe levels were identified for one strawberry sample, 22 tomato samples and 10 lettuce samples.

For the tomato samples the frequency of exceedance of the threshold residue value was classified as "not seldom" This was the only substance placed in this class for the acute exposure assessment. Some of these samples were also found non-compliant with MRLs.

In 2007 only national MRLs were established for oxamyl. In the meantime EC MRLs have been set by Directive 2006/59/EC; these legal provisions became applicable as of 30 December 2007.

4.3.1.17. Oxydemeton-methyl

The use of oxydemeton-methyl is not longer authorised in Europe. Authorisations for plant protection products containing oxydemeton-methyl had to be withdrawn by 21 November 2007. Nevertheless, considering the possible periods of grace granted by Member States, samples of EU-origin taken in 2007 – and also in 2008- may still contain residues of this substance resulting from legal applications. For imported products the use of demeton-S-methyl, an active substance which is not authorised in the EU, may lead to residues of oxydemeton-methyl.

According to the IESTI calculations, potential acute risks due to oxydemeton-methyl residues could not be excluded for head cabbage (one sample) and lettuce (three samples). For both commodities, the exceedances of the ARfD can be considered seldom events. In particular for the lettuce samples, it is noted that samples which exceed the threshold residue level do not exceed the MRL.

EC MRLs in vegetables for this active substance were set in 2002 by Directive 2002/71/EC and were not amended during the course of the 2007 monitoring year or subsequently. In the reasoned opinion on MRLs of concern for the active substance oxydemeton-methyl released in 2008 (EFSA 2008b), EFSA recommended for head cabbage and lettuce, to delete the current MRL of 0.05 mg/kg and to set a new EC MRL at the LOQ of 0.01 mg/kg since there are no supporting data to justify the current MRLs.

Considering the authorisation status of plant protection products containing oxydemeton-methyl it is expected that in 2008 and 2009 the residues of this pesticide will be less frequently encountered in food commodities of EU-origin.

4.3.1.18. Phosalone

At present, the use of plant protection products containing phosalone is not longer authorised in Europe. Authorisations to use plant protection products containing this active substance should have been withdrawn by 22 June 2007; the period of grace should have expired not later than 22 June 2008. Samples of crops treated legally with phosalone were still on the EC market in 2007.

According to the IESTI calculations, potential intake concerns were only posed by two apple samples out of 3276 apple samples taken. The two exceedances of the ARfD were considered as exceptional events. One of these two samples was found to be non-compliant with the MRL. It should be noted that the MRL for apples was lowered in 2008 to the LOQ of 0.05 mg/kg.

4.3.1.19. Procymidone

Since 1 January 2007, the use of procymidone was restricted to the use on cucumbers in greenhouses and plums (for processing). These provisions expired on 30 June 2008. Treated commodities resulting from those uses may still have been in circulation on the European market in 2007 and 2008. From June 2008 all uses are prohibited.

The assessment of the acute consumer exposure indicated a possible acute intake above safe levels in five crops: apples (one sample), peaches (six samples), strawberries (five samples), tomatoes (twelve samples) and lettuce (nine samples). Considering the total number of samples taken for each of these crops, it was considered that the samples of concern are exceptional or seldom events.

The peach, strawberry and tomato samples of concern were found compliant with regard to the EC MRL in place in 2007. EC MRLs set for procymidone have not been amended since 1998. In its recent opinion, EFSA recommended lowering certain EC MRLs of concern for procymidone (EFSA 2009), including MRLs set for lettuce, peaches, tomatoes and strawberries.

4.3.1.20. Propargite

Uses of propargite are no longer authorised in Europe. Member States have to withdraw authorisations for plant protection products containing this active substance by 31 December 2010 at the latest. Any period of grace granted by Member States will expire on 31 December 2011.

According to the IESTI calculations, a potential acute risk could not be excluded for ten apple samples, three peach samples and one sample of tomatoes. The exceedances of the threshold residue level observed in these samples were considered to be seldom or exceptional events.

With the exception of tea, no EC MRLs were in place during the monitoring year 2007. In 2008 EC MRLs for fruit, vegetables, cereals and animal products have been established.

4.3.1.21. Tebuconazole

According to the IESTI calculation, potential acute risk to the consumer health could not be excluded for only one sample of lettuce out of the 2076 lettuce samples analysed. This single event was considered as exceptional. No EC MRLs for tebuconazole were in place in 2007. It should be noted that the lettuce sample of concern was found to be non-compliant with a national MRL.

4.3.1.22. Vinclozolin

The authorisation for use of vinclozolin on any crop grown in Europe expired on 31 December 2006. Nevertheless, commodities treated with vinclozolin may have been in circulation on the European market during the 2007 monitoring year.

Based on the IESTI calculations, acute concerns were identified for one sample of lettuce (exceptional event).

The lettuce sample with highest measured residue was in compliance with the EC MRL. In the opinion on MRLs of concern for the active substance vinclozolin (EFSA 2008c), EFSA has recommended the deletion of a number of EC MRLs, including the MRL set for lettuce.

4.3.2. Pesticide/crop combinations for which the chronic risk assessment could not be performed

For one pesticide (dichlorvos) no chronic (short-term) risk assessment could be performed because no toxicological reference value was available. Also for dimethoate and omethoate the acute risk assessment could not be performed because of the inappropriate format in which the residue data were reported.

4.3.2.1. Dichlorvos

Dichlorvos is an active substance that is no longer authorised for use in plant protection products in Europe (authorisations for plant protection products containing dichlorvos had to be withdrawn by 6 December 2007).

During the peer review of this substance in the framework of Directive 91/414/EEC, no toxicological reference values could be derived due to insufficient information available. As a consequence, the short-term risk assessment was not carried out. In the nine food commodities analysed in 2007 positive findings for this substance were detected and some samples were found to be non-compliant with the EC MRLs.

4.3.2.2. Dimethoate/omethoate

The use of dimethoate is authorised in Europe, while the use of omethoate has not been authorised since 2003. Nevertheless, residues of omethoate in food commodities may occur as omethoate is a plant metabolite of dimethoate. The results are reported according to the enforcement residue definition; sum of dimethoate and omethoate, expressed as dimethoate. However toxicologically, these substances are distinct, the ARfD value derived for dimethoate is five times higher that the ARfD for omethoate (0.01 mg/kg bw and 0.002 mg/kg body weight, respectively).

Since the reported residue levels were for the sum of omethoate and dimethoate, an indicative assessment was performed, assuming that the measured residues are due to the application of the less toxic dimethoate, this will potentially under estimate the exposure to omethoate. The indicative risk assessment identified residue levels above the threshold residue level in apples (three samples), peaches (three samples) and lettuce (five samples).

In order to be in the position to perform a more accurate risk assessment, EFSA recommends the following:

- To establish separate MRLs for dimethoate and omethoate;
- To request the reporting countries to report separately the measured residue levels of dimethoate and omethoate;
- To amend the residue definition, taking into account the conclusions of the peer review of dimethoate performed in the framework of Directive 91/414/EEC (EFSA, 2006b).

4.4. Results of the long-term risk assessment

The 2007 EU coordinated monitoring programme included 71 active substances. As for dichlorvos no ADI was established, no chronic risk assessment could be performed. Also for dimethoate (and its metabolite omethoate) and the dithiocarbamate group no reliable chronic risk assessment could be performed because the residue definitions comprise substances with different toxicological properties.

The detailed results of the TMDI calculations for the 68 substances for which the risk assessment was carried out are reported separately for each pesticide in Appendix VI to this Report. In Table 4.4-1, the estimated range of the exposure for each pesticide assessed, expressed in percent of the ADI, is reported. In most cases the exposure accounts for less than 25 % of the ADI percentage

Table 4.4-1 Summary results of the long-term risk assessment

Code Number (*)	Pesticide	No of diets TMDI >100% ADI	TMDI min (% of ADI)	TMDI max (% of ADI)
1	Acephate	0	0.2	1.4
2	Acetamiprid	0	0.1	0.4
3	Aldicarb	0	1.3	13.4
4	Azinphos-methyl	0	1.7	15.2
5	Azoxystrobin	0	0.1	0.5
6	Bifenthrin	0	0.6	3.8
7	Bromopropylate	0	0.3	2.1
8	Bupirimate	0	0.1	1.3
9	Buprofezin	0	0.3	3.2
10	Captan	0	0.2	1.5
10	Captan/Folpet (sum)	0	0.1	1
10	Folpet	0	0.1	0.6
11	Carbaryl	0	3	13.6
12	Carbedazim (1)	0	0.4	4.3
13	Chlormequat	0	0.1	3.9
14	Chlorothalonil	0	0.3	2.6
15	Chlorpropham	0	0.7	5.3
16	Chlorpyrifos	0	1.8	9.3
17	Chlorpyrifos-methyl	0	0.8	5.6
18	Cypermethrin (2)	0	0.9	6.2
19	Cyprodinil	0	0.3	1.7
20	Deltamethrin	0	1.5	9.2
21	Diazinon (upper bound)	4	21.8	199
21	Diazinon (middle bound)	1	11.1	102.6
21	Diazinon (lower bound)	0	0.4	4.9
22	Dichlofluanid	0	1	8.6
23	Dichlorvos (3)	-	-	-
24	Dicofol	0	4.8	44.8
25	Dimethoate	-	-	-
26	Diphenylamine	0	0.3	4.4
27	Dithiocarbamates	-	-	-
28	Endosulfan	0	1.5	10.5
29	Fenhexamid	0	0	0.4
30	Fenitrothion	0	1.9	13
31	Fludioxonil	0	0	0.1
32	Hexythiazox	0	0.1	1.1
33	Imazalil	0	0.9	22.5

Code Number (*)	Pesticide	No of diets TMDI >100% ADI	TMDI min (% of ADI)	TMDI max (% of ADI)
34	Imidacloprid	0	0.1	0.5
35	Indoxacarb	0	0.5	5.7
36	Iprodione	0	0.2	1.3
37	Iprovalicarb	0	0.2	2.1
38	Kresoxim-methyl	0	0	0.2
39	Lambda-Cyhalothrin	0	0.9	7.9
40	Malathion	0	0.3	2.5
41	Mepanipyrim	0	0.1	1.3
42	Metalaxyl (5)	0	0.1	0.7
43	Methamidophos	0	5.2	47.7
44	Methidathion	0	5.9	57
45	Methiocarb	0	0.3	2.5
46	Methomyl (6)	0	1.9	17.9
47	Myclobutanil	0	0.3	2.8
48	Oxamyl	0	2.5	24.5
49	Oxydemeton-methyl	0	8.5	92.1
50	Parathion	0	1.3	11.2
51	Penconazole	0	0.2	1.4
52	Phosalone	0	1.1	8.2
53	Pirimicarb	0	0.1	1.1
54	Pirimiphos-methyl	0	3.6	20.7
55	Prochloraz	0	0.7	6.2
56	Procymidone	0	3.1	20.6
57	Profenofos	0	0.2	1.4
58	Propargite	0	1	13.6
59	Pyrethrins	0	0.2	1.7
60	Pyrimethanil	0	0.1	0.3
61	Pyriproxyfen	0	0	0.3
62	Quinoxyfen	0	0.1	0.7
63	Spiroxamine	0	0.2	1.5
64	Tebuconazole	0	0.2	1.5
65	Tebufenozide	0	0.2	1.2
66	Thiabendazole	0	0.3	3.3
67	Thiophanate-methyl	0	0.1	0.8
68	Tolclofos-methyl	0	0.1	0.6
69	Tolylfluanid	0	0	0.4
70	Triadimefon (7)	0	0.2	1.2
71	Vinclozolin	0	1.4	10.6

(*)The code number refers to the numbering of the calculation reports presented in Appendix IV and V. (1) The toxicological reference values used for carbendazim. (2) Toxicological reference values for alpha-cypermethrin. (3) Toxicological reference values not derived as EFSA could no conclude on the reference values due to insufficient data. (4) Toxicological reference values for ziram. (5) Toxicological reference values for metalaxyl-M. (6) Toxicological reference values for methomyl. (7) Toxicological reference values for triadimenol.

With the exception of diazinon, for all assessed substances the estimated exposure was below the ADI value. Based on the current scientifically knowledge, for these compounds a consumer health risk can be excluded.

4.4.1. Pesticides for which a chronic risk could not be excluded

4.4.1.1. Diazinon

The authorisations for plant protection products containing diazinon had to be withdrawn by 6 December 2007 at European level. In December 2007 new lower MRLs entered into force.

The maximum estimated TMDI for diazinon, calculated under the most conservative assumptions (mean residue levels derived with the “upper bound” approach, see section 4.2), was equivalent to 199% of the ADI; the ADI was exceeded in four diets (German child, Dutch child, French toddler and Danish child). EFSA also performed a sensitivity analysis in order to estimate the impact of the calculation methodology. Using the “middle bound” approach one single TMDI slightly exceeds the ADI (103% of the ADI). Finally, if the TMDI was calculated considering input residue value derived from the “lower bound” approach, the ADI was not exceeded by any national/European diets and the maximum TMDI accounted for only 4.9% of the ADI.

These calculations clearly show the impact of the choice of the input residue values on the estimation of the consumer exposure. For chronic risk assessment methodology presented in this report, the use of residue levels reported as the number of samples within a range effects the precision of the TMDI calculation. In response to this problem, EFSA recommends an amendment to the pesticide monitoring reporting format to ensure sufficient information on residue concentrations is available for exposure assessment. In particular, EFSA recommends to report the future results at individual sample level and no longer at aggregated level.

Additionally, there are uncertainties associated with the reporting level of the analytical methods used to quantify residues, which ranged from 0.005 to 0.05 mg/kg. It should be noted that some diazinon MRLs, which were applicable in 2007 (e.g. 0.02 mg/kg for rye), were below the highest reporting level notified. In these cases, the reporting countries were not able to check samples compliance with the legal limits.

The implementation of more sensitive analytical methods would allow the derivation of more accurate – possibly lower - mean residue levels for the calculation of the consumer exposure. This recommendation is particularly important for those pesticides for which a low toxicological reference value (ADI) has been set as in those cases, by applying the “upper bound” approach to estimate the consumer exposure, the ADI would be exceeded even in cases of non-detected samples if the reporting level is not sufficiently low.

4.4.2. Pesticides for which a chronic risk assessment could not be performed

4.4.2.1. Dichlorvos

The toxicological assessment of dichlorvos revealed data gaps in the dossier which did not allow to conclude on toxicological reference values for dichlorvos. Therefore, no long-term risk assessment could not be carried out. However, it should be mentioned that an exposure of 0.5 µg/kg bw was calculated for the most critical diet.

4.4.2.2. Dimethoate/omethoate

Although dimethoate and omethoate belong to the sam chemical group , the toxicological properties differ significantly. (dimethoate: 0.001 mg/kg body weight/day; omethoate: 0.0003 mg/kg body weight /day). For a sound risk assessment the residue concentrations for the two compounds should be reported. In 2007, the residue concerntrations were only reported- in accordance with the enforcement residue definition- as a sum of the two compounds and not separately.

On the basis of the data available, the assessment can only be considered to be exploratory.

If all residues reported are assumed to be dimethoate residues using the "upper bound" approach, 40% of the ADI set for dimethoate was exhausted. This situation does not represent a potential risk for the consumer. Alternatively, if all measured residues were attributed to the more toxic omethoate, the ADI would be exceeded (135% of the omethoate ADI).

EFSA reiterates the recommendations derived in paragraph 4.3.2.2 regarding the need to revise the residue definition and the format for reporting residue results in the framework of the monitoring exercise.

4.4.2.3. Dithiocarbamates

The dithiocarbamate group covers several active substances with different toxicological reference values. The results of analysis for dithiocarbamates are reported as total measured CS_2. It is not possible to determine what proportion of the total CS_2 can be attributed to each pesticide, therefore no conclusive consumer exposure assessment could be made.

In Appendix VI the results of the long-term risk assessment are reported for two scenarios. In the first scenario an unrealistic assumption was made that all measured CS_2 is all attributed to the most toxic dithiocarbamate (ziram). In this case, the exposure calculated on the basis of the most critical diet exceeded 107% of the ADI. In the second scenario, the exposure was compared to the ADI of mancozeb (the less toxic dithiocarbamate). Under this assumption, the maximum expected exposure accounted to 13% of the ADI.

EFSA concludes that further information on the single dithiocarbamate contributing to the total CS_2 residue would be necessary in order to conclude on the long-term risk assessment.

CONCLUSIONS AND RECOMMENDATIONS

The present Annual Report provides an overview of the results of the monitoring of pesticide residues in food commodities analysed during the calendar year 2007 in the 27 EU Member States and the two EFTA States (Norway and Iceland), who have signed the Agreement on the European Economic Area (EEA agreement). This Report also provides the results of the assessment of the chronic and acute risks to the consumer health due to pesticide residues found in food commodities.

In 2007, in total 74,305 samples of approximately 350 different food commodities were analysed for pesticide residues under the **national and EU the co-ordinated programmes**. This included 7,1936 surveillance samples and 2,369 enforcement samples. Compared with 2006, the total number of samples increased by 12.9%. This increase can be partially attributed to the fact that the two newest EU Member States, Bulgaria and Romania, have reported their data for the first time, but also reflects the efforts made by the reporting countries to enhance the food control in this area.

In 2007, the analytical methods used by the reporting countries for pesticide residue analysis allowed to detect in total 870 different pesticides (including metabolites) in food samples. Compared with 2006, the total number of pesticides sought has increased by 13%. On average, reporting countries tested for 218 different pesticides.

In total, residues of 354 different pesticides were found in measurable quantities in fruit and vegetables, while in cereals residues of 72 different pesticides were observed. As in previous years, the number of different pesticide residues found in fruit and vegetables in 2007 was higher than the number of pesticides found in cereal which also reflects the greater number of products used in the fruit and vegetables category.

96.01% of the samples analysed in the framework of the national and the coordinated monitoring programmes were compliant with the legal Maximum Residue Levels (MRLs); in 3.99% of the samples the legal limits were exceeded for one or more pesticide. These figures include the results of both surveillance sampling and targeted enforcement sampling. Targeted enforcement samples are taken when there are suspicions about the safety of a product and as a follow-up of violations found previously. Hence, these figures do not represent the level of MRL non-compliance for food available to consumers through the European market. Furthermore, it should be noticed that for many of the pesticides detected, EU-harmonised MRLs were not yet established in 2007. Thus, an MRL exceedance in one Member State did not necessarily represent an exceedance in all others.

The data indicate that MRLs are more often exceeded in samples imported from Third Countries than in EU products (2.31% of surveillance samples with EU origin and 6.84% of surveillance samples from Third Countries exceeded EC MRLs).

The percentage compliance might be used as a statistical parameter for comparison with the results of previous years and to indicate possible emerging trends, which require further investigation. Over the years, the percentage of samples with residues above the MRL increased from 3.0% in 1996 to 5.5% in 2002/2003. Since 2003, there has been a decrease, with 3.99% of samples non-compliant in 2007. The annual comparability of the data is problematic though. This is because the number of countries reporting data has increased from 16 in 1996 to 29 in 2007 and because the national programmes differ not only from each other but also over time.

For baby food, the European legislation is more restrictive than for other food categories as no more than 0.01 mg/kg of any single pesticide residue is permitted in baby food samples. In 2007, 0.6% of baby food samples exceeded the EC MRLs.

Some of the reporting countries also provided data on organic food. It should be mentioned that at EU level, no specific MRLs have been established for organic products. The MRLs established for conventional produced products therefore apply. As overall result, organic cereals, fruit and vegetables have a lower rate of MRL exceedances (1.24%) in comparison with conventionally grown products (3.99%).

The percentage of samples of fruit, vegetables and cereals with multiple residues has increased over the years from 15.4% in 1997 to 27.7% in 2006. In 2007, the percentage of samples with multiple residues slightly decreased (in 26.2% of the samples two or more pesticide residues were detected). The reasons for multiple residues are versatile: Crops may be attacked by different pests and diseases (insects, fungal diseases, etc). In order to protect them against these threats they may be treated with a number of different pesticides. This results in the occurrence of multiple residues in food samples. In addition to the agricultural practices, the mixing of lots originating from different sources, which have been subject to different pesticide treatment regimes, can also lead to the detection of multiple residues in composite food samples. Reasons for the increased detection of multiple residues in single samples may also be related to the improved sensitivity of the analytical methods which allows the detection of lower residue concentrations and the increased number of pesticides analysed. From the data submitted for pesticide monitoring it is not possible to clarify whether the multiple residues result from the application of different pesticides on the crop or whether the multiple residues result from other sources (e.g. contamination of untreated crops by crops treated with pesticides).

The **EU coordinated control programme** defines a list of pesticides to be monitored in certain food commodities. The aim of this programme is to analyse randomly selected samples in order to collect data on the occurrence of pesticides in fruit, vegetables and cereals representative for the European market, which are appropriate to assess the actual dietary exposure of the European population. Although the participation is not mandatory, all 27 Member States and the two EFTA states reported results for the nine food commodities which were selected in 2007. The list of pesticides to be monitored in the framework of the EU coordinated programme has been extended substantially over the previous 10 years; from 1997 to 2007 the number of pesticides included increased from 13 to 71. In 2007, 17,575 samples of nine food commodities were analysed under the coordinated programme. In 2.3% of the samples the MRLs were exceeded. 52.7% of the samples did not contain measurable residues, whereas in 45% of the samples residues were detected which were in compliance with the MRL legislation. The crop with the highest rates of MRL exceedance were oats (3.8%), peaches (3.4%), strawberries and lettuce (2.9% each). The crops which contained most frequently detectable levels of pesticide residues were strawberries, apples, peaches and lettuce (66%, 60.9%, 47.1%, 44.9%, respectively). On the other hand, head cabbage, oats, rye, leek and tomatoes were the commodities which were most often free of measurable residues (81.1%, 79.7%, 77.2%, 73.2% and 68.5% respectively).

It should be noted that the presence of pesticides, even an exceedance of an MRL, does not imply that this is a food safety concern. To ascertain the latter exposure assessments are required.

The assessment of the consumer exposure to pesticide residues was performed with the residue data generated under the coordinated monitoring programme. The exposure assessment was hampered by the fact that the detailed results of the monitoring programmes were not provided to EFSA. This lack of information was bridged by introducing conservative assumptions in the exposure modelling which bias the results by overestimating the actual consumer exposure. In order to improve the accuracy of the actual consumer exposure calculations, EFSA recommends an amendment to the current pesticide monitoring reporting format to ensure that the detailed results needed for a sound exposure assessment are available.

Even under these conservative model assumptions, the results provide evidence that for all evaluated active substances, except one, the chronic (long-term) exposure does not raise consumer health concerns. Diazinon is the only substance for which a potential health risk could not be excluded definitely. In this regard, it should be noted that by end of 2007 the MRLs for diazinon have been lowered and the use of diazinon containing pesticides is no longer authorised in the EU Member States.

The assessment of the acute (short-term) exposure was based on worst-case scenarios: consumption data for consumers with extreme food consumption habits were combined with the highest residue measured in the coordinated programme. In order to accommodate for a possible non-homogeneous distribution of residues in an analysed food lot a further variability factor was introduced in the calculation by multiplying the highest residue measured with a variability factor (depending on the commodity the factor was between 1 and 7). Assuming a coincidence of these events (high food consumption and high residue concentrations), a potential consumer risk was identified for 52 pesticide/commodity combinations. The highest potential exceedances of the toxicological reference value was indicated for methomyl/thiodicarb on lettuce (6,241% of the ARfD), methamidophos/lettuce (2,242%), propargite/apples (1,959%), procymidone/lettuce (1,683%) and methamidophos/head cabbage (1,526%). However, the critical intake events identified in the acute risk assessment calculations are considered very unlikely, taking into account the low frequency of critical residues and the low frequency of extreme consumption events. For 29 of the pesticide/commodity combinations for which a critical intake situation could not be excluded, risk management actions have already been taken by withdrawing authorisations or by lowering the MRLs.

Based on the evaluation on the 2007 monitoring data EFSA recommends the following:

- To continue monitoring for residues in food commodities for the pesticides for which a theoretical consumer risk could not be excluded
- To continue the control of pesticide residues in baby food samples and to provide the reporting countries with more guidance on the reporting of these results, in particular with regard to the MRL compliances.
- To encourage the reporting countries to investigate further the possible reasons for the high number of multiple residue findings in single samples. In particular, to further investigate if the sample characteristics such as origin, producer and varieties are in line with the Community methods of sampling for the official control.
- To clearly indicate the analytical reporting levels for each pesticide/crop combination analysed. If more than one reporting level is used by different laboratories of the same country and for the same pesticide/crop combinations this should be indicated and the highest level should be reported.

- To indicate if, as a consequence of a sample exceeding the MRL, the non-compliant lot was recalled from the market or was actually available for consumption.
- For pesticides and metabolites which are included in the same residue definition and which have different toxicological profiles (e.g. dimethoate/omethoat) to report separately the individual compounds measured in the samples or to change the enforcement residue definition and establish separate MRLs for the pertinent compounds.
- To derive the toxicological reference values for dichlorvos.

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GLOSSARY AND ABBREVIATIONS

ADI	Acceptable Daily Intake
ARfD	Acute Reference Dose
LCI	Lower Confidence Interval
COM	European Commission
CRA	Cumulative Risk Assessment
CRL	Community Reference Laboratory
DAR	Draft Assessment Report
EU	European Union
EC	European Community
EEA	European Economic Area
EFSA	European Food Safety Authority
FAO	Food and Agricultural Organization
FAPAS	Food Analysis Performance Assessment Scheme
FVO	Food and Veterinary Office
GAP	Good Agricultural Practice
GP	General Population
HR	Highest Residue measured in supervised field trials
HRM	Highest Residue Measured in monitoring samples
IESTI	International Estimated Short Term Intake
JMPR	Joint FAO/WHO Meeting on Pesticide Residues
LCI	Lower Confidence Interval
LOQ	Analytical Limit Of Quantification
MRL	Maximum Residue Level
MS	European Community Member State
PRIMo	Pesticide Residue Intake Model
RL	Reporting Level
RASFF	Rapid Alert System for Food and Feed
RMS	Rapporteur Member State in the framework of Directive 91/414/EEC
STMR	Supervised Trials Median Residue
STMR-p	Supervised Trials Median Residue in processed commodities
TMDI	Theoretical Maximum Daily Intake
UCI	Upper Confidence Interval
WHO	World Health Organization

APPENDIX I – NATIONAL AUTHORITIES AND INSTITUTES IN EEA AND EU MEMBER STATES RESPONSIBLE FOR PESTICIDE RESIDUE MONITORING

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