SCIENTIFIC REPORT OF EFSA

The 2013 European Union report on pesticide residues in food[1]

European Food Safety Authority[2, 3]

European Food Safety Authority (EFSA), Parma, Italy

ABSTRACT

The results of the control activities related to pesticide residues in food carried out in 2013 in the EU Member States, Norway and Iceland (hereafter referred to as reporting countries) are summarised in this report. In total, 80 967 samples of a wide variety of unprocessed raw agricultural commodities and processed food products were analysed for residues of 685 distinct pesticides. A substantial number of samples (8 270) were taken for products from third countries, which are subject to increased import controls under Regulation (EC) No 669/2009. In the framework of the EU-coordinated monitoring programme, which aims to provide statistically representative results for the EU, 11 582 samples of 12 different food commodities were analysed for 209 distinct pesticides. Overall, 97.4 % of the tested food samples fell within the legal limits and 54.6 % of the samples contained no quantifiable residues at all. In general, a higher prevalence of residues exceeding the Maximum Residue Levels (MRL) was observed for products imported from third countries (5.7 % for imported products versus 1.4 % for products produced in reporting countries). The results of the dietary exposure estimations support the conclusion that, in the light of current knowledge, the presence of residues found in the food products covered by the EU-coordinated monitoring programmes was unlikely to have a long-term effect on the health of consumers. The probability of being exposed to pesticide residues in the food products covered by the EU-coordinated programme exceeding the toxicological threshold for short-term exposure that may lead to negative health outcomes was low.

KEY WORDS

pesticide residues, food control, monitoring, maximum residue levels, consumer risk assessment, Regulation (EC) No 396/2005

[1] On request from EFSA, Question No EFSA-Q-2013-00653, approved on 27 February 2015.
[2] Correspondence: pesticides.mrl@efsa.europa.eu
[3] Acknowledgement: EFSA wishes to thank Herman Fontier (Belgium Federal Public Service Health, Food Chain Safety and Environment) for his independent scientific review of this report.

Suggested citation: European Food Safety Authority, 2015. The 2013 European Union report on pesticide residues in food. EFSA Journal 2015;13(3):4038, 169 pp. doi:10.2903/j.efsa.2015.4038

Available online: www.efsa.europa.eu/efsajournal

SUMMARY

This report provides an overview of the official control activities performed by European Union (EU) Member States, Iceland and Norway in order to ensure compliance of food with the legal limits for pesticide residues. It summarises the results provided by the reporting countries and identifies areas of concern regarding sample compliance with the legal limits; EFSA also assessed the actual consumer exposure to pesticide residues and performed an analysis of the chronic and acute dietary risks for European consumers. Since the results of pesticide residue analysis are available only after most of the products have been already consumed, this report is not a tool for informing the public on imminent risks related to food. However, the comprehensive analysis of the results of all reporting countries provides risk managers with a scientifically sound basis for taking appropriate risk management actions for future monitoring programmes, in particular decisions about which pesticides and food products should be targeted in risk-based national monitoring programmes or other necessary risk management measures, such as the need to review or modify existing legal limits.

In 2013, the reporting countries analysed 80 967 samples for a total of 685 different pesticides. On average, samples were analysed for 200 pesticides. The majority of samples (55 253 samples, 68.2 %) originated from the EU and European Economic Area (EEA) countries; 22 400 samples (27.7 %) concerned products imported from third countries. For 3 314 samples (4.1 %) the origin of the products was not reported.

Overall, 97.4 % of the samples analysed fell within the legal limits; 54.6 % of the samples tested were free of detectable residues while 42.8 % of the samples analysed contained measurable residues not exceeding the permitted residue concentrations. 2.6 % of all the samples exceeded the Maximum Residue Levels (MRL) (2 116 samples); 1.5 % of the samples clearly exceeded the legal limits, taking into account the measurement uncertainty.

Among the samples from EU and EEA countries, 57.6 % were free of measurable residues; 41.0 % contained residues above the limit of quantification (LOQ) but within the legal limits. A total of 1.4 % of the samples contained residues that exceeded the permitted concentrations. Administrative or legal actions were imposed on 0.7 % of the samples that clearly exceeded the legal limit (non-compliant samples). Samples from third countries were found to have a higher MRL exceedance rate (5.7 %) and non-compliance rate (3.4 %) than those from the EU and EEA countries. The percentage of samples from third countries free of detectable residues amounted to 46.2 % while 48.1 % of the samples contained residues within the permitted limits. Compared to 2012 the MRL exceedance rate for imported food products declined (2012: 7.5 %).

In unprocessed products MRL exceedances were detected in 2.8 % of the samples; 46.1 % of the samples contained measurable residues but within the legal limits and 51.1 % of the unprocessed products were free of detectable residues. Processed products in general had a lower prevalence of pesticide residues and MRL exceedances (27 % of all processed products contained detectable residues within the legal limit, 1.2 % MRL exceedance rate).

Residues of more than one pesticide (multiple residues) were found in 27.3 % of the samples (22 126 samples).

Among the 2 788 individual determinations that exceeded the legal limit, 878 determinations were reported for pesticides not approved in the EU. In most cases these MRL exceedances for non-approved pesticides were related to imported products (659 cases) while for products produced in the EU and EEA countries non-approved pesticides were less frequent (186 results).

In total, 8 270 samples of products in focus for import controls as specified in Regulation (EC) No 669/2009 were analysed. In this subset of samples, which is targeted towards products with a high non-compliance rate observed in the past, 557 samples (6.7 %) exceeded the legal limit for one or several pesticides.

In total, 1 597 samples of baby food were analysed. In 92.7 % of the samples no detectable residues were found, whereas in 116 samples (7.3 %) residues were above the LOQ. For 11 samples (0.7 % of the analysed baby food samples) the reporting countries noted MRL exceedances.

In 15.5 % of samples of organic products (717 of the 4 620 samples analysed) pesticide residues were detected within the legal limits whereas 0.8 % of the samples exceeded the MRL. In these samples, 134 distinct pesticides were identified. In most cases the detected residues were related to pesticides that are permitted for organic farming, persistent environmental pollutants or residues of substances that are not necessarily related to the use of pesticides but which may come from natural sources.

The majority of samples of animal products (8 257 samples) were free of measurable residues (88 %, 7 265 samples. The most frequently detected pesticides were persistent environmental pollutants, or compounds resulting from sources other than pesticide use.

In the framework of the 2013 EU-coordinated programme under Regulation (EC) No 788/2012, reporting countries were requested to analyse 12 different food products (apples, head cabbage, leek, lettuce, peaches (including nectarines), rye or oats, strawberries, tomatoes, cow's milk, swine meat and wine). The programme covered a total of 209 pesticides, 191 in food of plant origin and 52 in food of animal origin.

In total, 11 582 samples were analysed in the framework of the EU-coordinated monitoring programme. Overall, 0.9 % of the samples exceeded the MRL (113 samples); 0.5 % of the samples were found to be non-compliant with the legal limit, taking into account the measurement uncertainty. The number of samples with measurable residues but within the legally permitted level was 5 353 (46.3 %). In 52.8 % of the samples (6 116 samples), no quantifiable residues were found (residues below the LOQ).

Under the EU-coordinated programme no MRL exceedances were identified for rye, cow's milk and swine meat. The highest MRL exceedance rate was found for strawberries (2.5 % of the samples), followed by lettuce (2.3 %), oats (1.3 %), peaches (1.1 %) and apples (1.0 %). The MRL exceedance rate was below 1 % for the remaining products – head cabbage (0.9 %), tomatoes (0.9 %) leek (0.5 %) and wine (0.1 %).

Samples containing more than one pesticide in individual samples (multiple residues) were found in all food products. The products with the highest percentage of samples with multiple residues were strawberries (63 %), peaches (53 %), apples (46 %) and lettuce (36 %). Lower occurrence levels were recorded for oats (28 %), tomatoes (27 %), wine (23 %), rye (16 %), leek (14 %) and head cabbage (4.8 %). The presence of multiple pesticide residues was low in animal products (3.5 % for milk and 0.5 % for swine meat).

These food products except wine were also analysed in 2010; a comparison of the detection rates and the MRL exceedance rates was performed for 166 pesticides which were also analysed in 2010. Overall, the MRL exceedance rate in 2013 was lower or equal in all products analysed. The pesticide patterns, the detection rates and the MRL exceedance rates detected in 2010 and 2013 in the different food products were comparable. However, EFSA noted a lower number of MRL exceedances related to non-approved pesticides in 2013 in apples, head cabbage, peaches and strawberries. In apples, lettuce and tomatoes some pesticides were found in exceedance of the MRL that were not present or were within the legal limits in 2010.

Considering the frequency of pesticide residues detected in food commonly consumed, a wide range of European consumers are expected to be exposed to these substances via food. To quantify the expected exposure and the related risk, EFSA performed short-term and long-term dietary risk assessments for the pesticides covered by the EU-coordinated programme (EUCP). The methodology used is a screening method which is likely to overestimate the actual exposure because it is based on conservative model assumptions.

The short-term (acute) exposure was calculated for the 12 food products covered by the 2013 EUCP. For the majority of the pesticides assessed, the short-term exposure was found to be negligible or within a range that is unlikely to pose a consumer health concern. The exposure exceeded the toxicological reference value (ARfD) for 218 samples of the total of 18 747 samples taken into account for the short-term dietary exposure assessment (1.16 %), assuming that the product was consumed in high amounts without washing or any processing which would reduce the residues (e.g. peeling). Most of the cases exceeding the ARfD were due to chlorpyrifos residues (145 determinations), mainly in apples and peaches. The high number of exceedances of the ARfD is related to the fact that the toxicological reference value for chlorpyrifos was recently lowered, which triggers the need to re-evaluate the existing MRLs for chlorpyrifos. Excluding the results for chlorpyrifos, 73 samples contained residues exceeding the ARfD.

Given this conservatism, real exposure was expected to be significantly lower. Based on the results of the 2013 EUCP, EFSA concluded that the probability of European citizens being exposed to pesticide residues exceeding concentrations that may lead to negative health outcomes was low.

EFSA also calculated chronic or long-term exposure, predicting lifetime exposure. For all except one pesticide long-term exposure was negligible or within the toxicologically acceptable dose (below the Acceptable Daily Intake – ADI). Thus, residues of these pesticides, according to the current scientific knowledge, are not likely to pose a chronic health risk. Dichlorvos was the only pesticide where the calculated long-term dietary exposure slightly exceeded the toxicological threshold (109 % of the ADI). Considering that dichlorvos is no longer approved in the EU, the risk assessment approach used for screening of potential long-term risks was found to be overly conservative. In an alternative calculation scenario, using less conservative assumptions, the exposure dropped below 1 % of the ADI. Overall, EFSA concluded that dietary exposure to the pesticides covered by the EU-coordinated monitoring programme of 2013, for which toxicological data are available, was not likely to pose a long-term health risk.

EFSA derived a number of recommendations in order to improve the efficiency of the EU-coordinated and national programmes, increase the quality of the data, revise existing MRLs or the pesticide related legislation and reduce uncertainties in the dietary exposure and risk assessments performed by EFSA.

TABLE OF CONTENTS

LEGAL BASIS

Pesticide residues resulting from the use of plant protection products on crops or food products that are used for food or feed production may pose a risk factor for public health. For this reason, a comprehensive legislative framework has been established in the European Union (EU) which defines rules for the approval of active substances used in plant protection products, the use of plant protection products and for pesticide residues in food. In order to ensure a high level of consumer protection, legal limits, so called ‘maximum residue levels’ or briefly ‘MRLs’, are established in Regulation (EC) No 396/2005.[4] EU-harmonised MRLs are set for more than 500 pesticides in over 370 food products and a default MRL of 0.01 mg/kg, a level equal to the limit of quantification (LOQ) achievable with analytical methods used for MRL enforcement, is applicable for pesticides not explicitly mentioned in the MRL legislation. Regulation (EC) No 396/2005 imposes on Member States the obligation to carry out controls to ensure that food placed on the market is compliant with the legal limits. This Regulation establishes both EU and national control programmes:

- The EU-coordinated control programme: this programme defines the 12 food products and 209 pesticides that should be monitored by Member States. The EU-coordinated programme (EUCP) relevant for the calendar year 2013 was set up in Commission Implementing Regulation (EU) No 788/2012,[5,6] hereafter referred to as ‘2013 monitoring regulation’.

- The national control programme: Member States usually define the scope of national control programmes focussing on certain products which are expected to contain residues in concentrations exceeding the legal limits or on products that are more likely to pose risks for consumer safety (Article 30 of Regulation (EC) No 396/2005).

According to Article 31 of Regulation (EC) No 396/2005, Member States are requested to share the results of the official controls and other relevant information with the European Commission, EFSA and other Member States. On the basis of these results, EFSA is in charge of preparing an Annual Report on pesticide residues, analysing the data in view of the MRL compliance of food available in the EU and the exposure of European consumers to pesticide residues.

In addition to the MRLs established under Regulation (EC) No 396/2005 specific MRLs are set in Directives 2006/125/EC[7] and 2006/141/EC[8] for food intended for infants and young children. In general a default MRL of 0.01 mg/kg is applicable for such food unless lower legal limits for the residue levels are defined in the Directives. In 2013, Regulation (EC) No 609/2013[9] was adopted, which repeals the aforementioned Directives. However, as regards pesticide residues, the MRLs of Directive 2006/125/EC and 2006/141/EC were still applicable in 2013. In the framework of the 2013 EUCP, Member States had to take at least 10 samples of food for infants and young children.

[4] Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC. OJ L 070, 16.3.2005, p. 1-16.

[5] Commission Implementing Regulation (EU) No 788/2012 of 31 August 2012 concerning a coordinated multiannual control programme of the Union for 2013, 2014 and 2015 to ensure compliance with maximum residue levels of pesticides and to assess the consumer exposure to pesticide residues in and on food of plant and animal origin. OJ L 235, 1.9.2012, p. 8–27.

[6] The results of the national monitoring programmes have to be reported using the Standard Sample Description, a data reporting format developed by EFSA. The description of the data model and explanations on the coding to be used for the different parameters can be found in a guidance document prepared by EFSA (EFSA, 2014a).

[7] Commission Directive 2006/125/EC of 5 December 2006 on processed cereal-based foods and baby foods for infants and young children. OJ L 339, 6.12.2006, p. 16–35.

[8] Commission Directive 2006/141/EC of 22 December 2006 on infant formulae and follow-on formulae and amending Directive 1999/21/EC. OJ L 401, 30.12.2006, p. 1–33.

[9] Regulation (EU) No 609/2013 of the European Parliament and of the Council of 12 June 2013 on food intended for infants and young children, food for special medical purposes, and total diet replacement for weight control and repealing Council Directive 92/52/EEC, Commission Directives 96/8/EC, 1999/21/EC, 2006/125/EC and 2006/141/EC, Directive 2009/39/EC of the European Parliament and of the Council and Commission Regulations (EC) No 41/2009 and (EC) No 953/2009. OJ L181, 29.6.2013, p. 35–56.

According to the 2013 monitoring regulation Member States had to take at least one sample from organic production for each of the 12 food products in focus. It is noted that for organic products no specific MRLs are established. Thus, the MRLs set in Regulation (EC) No 396/2005 apply equally to organic food and to conventional food. Regulation (EC) No 834/2007[10] and Regulation (EC) No 889/2008[11] on organic production of agricultural products define specific labelling provisions and production methods which entail significant restrictions on the use of pesticides.

Regulation (EC) No 669/2009[12] lays down rules concerning the increased level of official controls to be carried out for imported food and feed originating from certain third countries where repeated violations of the EU food standards have been observed. The food products, the country of origin of the products, the frequency of checks to be performed at the point of entry into the EU territories and the hazards (e.g. certain pesticides, not approved food additives, mycotoxins) are specified in Annex I to this Regulation which is regularly updated; for the calendar year 2013, five updated versions were relevant.[13,14,15,16,17]

Other horizontal legislation relevant for food control and pesticides which have some relevance for the current report are outlined in the 2011 European Union Report on Pesticide Residues in Food (EFSA, 2014c).

TERMS OF REFERENCE

In accordance with Article 32 of Regulation (EC) No 396/2005, EFSA shall prepare an Annual Report on pesticide residues concerning the official control activities for food and feed carried out in 2013.

The Annual Report shall include at least the following information:

- an analysis of the results of the controls on pesticide residues provided by EU Member 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;

[10] Council Regulation (EC) No 834/2007 of 28 June 2007 on organic production and labelling of organic products and repealing Regulation (EEC) No 2092/91. OJ L 189, 20.7.2007, p. 1–23.

[11] Commission Regulation (EC) No 889/2008 of 5 September 2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007 on organic production and labelling of organic products with regard to organic production, labelling and control. OJ L 250, 18.9.2008, p. 1–84.

[12] Commission Regulation (EC) No 669/2009 of 24 July 2009 implementing Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards the increased level of official controls on imports of certain feed and food of non-animal origin and amending Decision 2006/504/EC. OJ L 194, 25.7.2009, p. 11–21.

[13] Commission Implementing Regulation (EU) No 1235/2012 of 19 December 2012 amending Annex I to Regulation (EC) No 669/2009 implementing Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards the increased level of official controls on imports of certain feed and food of non-animal origin. OJ L 350, 20.12.2012, p. 44–50.

[14] Commission Implementing Regulation (EU) No 91/2013 of 31 January 2013 laying down specific conditions applicable to the import of groundnuts from Ghana and India, okra and curry leaves from India and watermelon seeds from Nigeria and amending Regulations (EC) No 669/2009 and (EC) No 1152/2009. OJ L 33, 2.2.2013, p. 2–10.

[15] Commission Implementing Regulation (EU) No 270/2013 of 21 March 2013 amending Annex I to Regulation (EC) No 669/2009 implementing Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards the increased level of official controls on imports of certain feed and food of non-animal origin. OJ L 82, 22.3.2013, p. 47–48.

[16] Commission Implementing Regulation (EU) No 618/2013 of 26 June 2013 amending Annex I to Regulation (EC) No 669/2009 implementing Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards the increased level of official controls on imports of certain feed and food of non-animal origin. OJ L 175, 27.6.2013, p. 34–42.

[17] Commission Implementing Regulation (EU) No 925/2013 of 25 September 2013 amending Annex I to Regulation (EC) No 669/2009 implementing Regulation (EC) No 882/2004 of the European Parliament and of the Council as regards the increased level of official controls on imports of certain feed and food of non-animal origin. OJ L 254, 26.9.2013, p. 12–19.

- an assessment of consumer exposure to pesticide residues based on the information provided by Member States and any other relevant information available, including reports submitted under Directive 96/23/EC.[18]

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

[18] Council Directive 96/23/EC of 29 April 1996 on measures to monitor certain substances and residues thereof in live animals and animal products and repealing Directives 85/358/EEC and 86/469/EEC and Decisions 89/187/EEC and 91/664/EEC. OJ L 125, 23.5.1996, p. 10–32.

1. Introduction

This report provides an overview of the official control activities performed by EU Member States and European Free Trade Association (EFTA) countries[19] in order to ensure compliance of food with the legal limits; EFSA summarised the results provided by the reporting countries, identified areas of concern regarding sample compliance with Maximum Residue Levels (MRLs), assessed the actual consumer exposure to pesticide residues, and performed an analysis of the chronic and acute dietary risks for European consumers. It should be noted that in 2013 Croatia was not yet participating to the EU monitoring programme.

A major objective of this report is to share the findings of official control programmes with the interested public and with all partners who have responsibilities in the food chain, in particular with food business operators. The findings of non-compliant food samples in previous control programmes should help to target future self-control activities of food business operators towards food products which have a higher probability to be non-compliant.[20] The report gives information to enhance efficiency of self-control systems to implement the legal obligations imposed by the general food law.[21] Efficient strategies to identify at an early stage food products that potentially violate the EU food safety standards will reduce non-compliant food being placed on the market and will have an effect on the dietary exposure of European consumers to pesticide residues.

Based on the findings, EFSA derived a number of recommendations to improve the enforcement of legal limits for pesticide residues.

In each EU Member State and EFTA country, two control programmes are in place: an EU-coordinated control programme (EUCP) and a national control programme (NP). The results of the 2013 EU-coordinated programme, as defined in Commission Implementing Regulation (EC) No 788/2012 are summarised in Section 2 of this report. The purpose of this programme is to generate indicator data that are statistically representative of the MRL exceedance rate for food of plant and animal origin placed on the European common market, and which can be used to estimate the actual consumer exposure of the European population.

The national control programmes are complementary to the controls performed in the context of the EU-coordinated programme; the design and results of the national control programmes are reported in Section 3. The results of samples taken in the framework of import control required under Regulation (EC) No 669/2009, as well as results for baby food and for organic products, are also reported in this Section 3.

The results of the dietary exposure assessments for individual pesticides are described in Section 4. This section is intended to identify risks for consumers related to pesticide residues in food.

Additional information and more detailed results related to the 2013 monitoring activities can be found on the EFSA website[22] and on the websites of the national competent authorities (Appendix A). In addition, EFSA compiled a technical report (EFSA, 2015) containing the national summary reports submitted by the reporting countries, where further details on the pesticide monitoring activities at national level are provided.

[19] Among the EFTA countries, Norway and Iceland have provided the results of their national food control activities to be included in the EU Annual Report.

[20] For further details on how non-compliant results are calculated, please see section 1 of the 2011 EU report on pesticide residues (EFSA, 2014c).

[21] Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety. OJ L 31, 1.2.2002, p. 1–24.

[22] Information available at: http://www.efsa.europa.eu/en/multimedia/interactive.htm

2. EU-coordinated control programme

2.1. Design of the EU-coordinated control programme

In the framework of the 2013 EU-coordinated programme, reporting countries were requested to analyse in total 12 different food products. Most of these were unprocessed raw food products (apples, head cabbage, leek, lettuce, peaches (including nectarines), rye or oats,[23] strawberries, tomatoes, cow's milk and swine meat); in addition one processed product (wine) had to be analysed. The number of samples per food product to be analysed by each reporting country varied from 15 to 93, depending on the population of the reporting country.

The 2013 monitoring regulation (Commission Implementing Regulation (EU) No 788/2012) defined a total of 209 pesticides to be analysed; including 191 in food of plant origin and 52 in food of animal origin. The list of pesticides covered by the 2013 EUCP, including further details on the pesticides that are to be analysed on food of plant or animal origin, is presented in Appendix B, Table B1. The 2013 monitoring regulation provides that the analysis of some pesticides is not mandatory for certain commodities.

The same food products were analysed in 2010 as in 2013 with the exception of wine which was analysed in 2013 for the first time in the framework of the EUCP. Concerning the pesticides, the 2013 programme covered all the pesticides analysed in 2010 except cadusafos and dinocap in plant products and camphechlor, quintozene and tecnazene in animal products (the analysis of these substances was voluntary in 2010). In 2010, 43 pesticides were not yet part of the monitoring programme as they were in 2013. For the overlapping commodities and pesticides, EFSA performed a comparative assessment of results reported in 2013 and 2010.

In total, 11 582 samples were analysed in the framework of the 2013 EUCP by the 29 reporting countries, of which 586 samples were from products reported as being organically produced. The breakdown of the number of samples taken by each country is reported in Figure 2-1.

An additional 678 samples of food for infants and for young children were analysed. A comprehensive analysis of the results for baby food and for organic food is reported in Section 3.2.5.1 and Section 3.2.5.2 of this report, respectively, together with the results for these commodities from the national programmes.

[23] Rye and oats were alternative products to be analysed. EFSA assessed them separately since different MRLs are established for the two products.

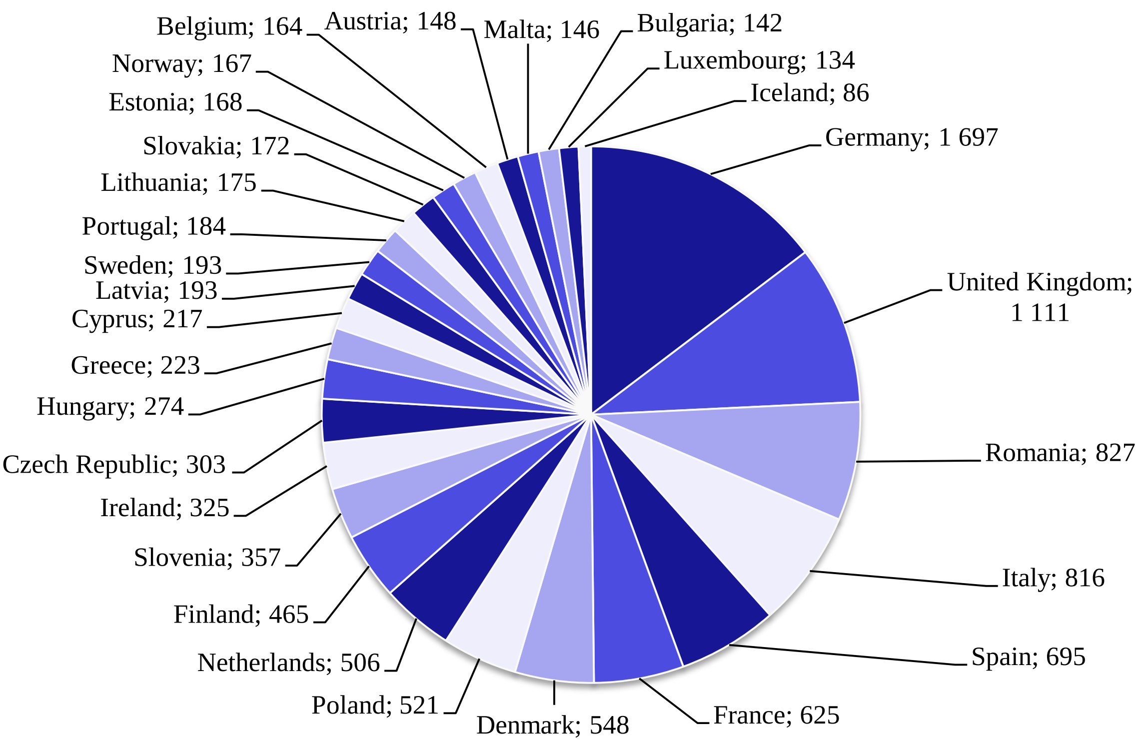


Figure 2-1: Number of samples taken by reporting country under the EUCP, excluding baby food

2.2. Results by pesticide

For 30 of the pesticides which were to be analysed in all the plant products of the EUCP, not a single positive determination was reported[24] (the figures in brackets refer to the total number of samples analysed for the pertinent pesticide): diazinon (9 495), bromopropylate (9 270), triazophos (9 202), chlorfenvinphos (8 870), parathion (8 859), fenitrothion (8 833), fenpropathrin (8 799), monocrotophos (8 738), ethoprophos (8 688), acephate (8 432), methamidophos (8 298), trifluralin (8 037), phenthoate (7 987), dicloran (7 866), EPN (7 778), bromuconazole (7 574), carbofuran (complex residue definition (RD)[25] (7 445), parathion-methyl (RD) (7 330), fosthiazate (7 299), aldicarb (RD) (7 218), triticonazole (7 195), oxydemeton-methyl (RD) (6 972), tefluthrin (6 946), methoxychlor (6 939), metconazole (6 855), phoxim (6 605), fipronil (RD) (6 526), biphenyl (6 146), pyrethrins (4 473) and amitrole (379). For another 17 pesticides no results above the LOQ were reported for any of the products analysed; for these pesticides the number of determinations is in general lower, since the analysis was not mandatory for all plant products (see last column of Appendix B, Table B1) These pesticides are tetradifon (8 678), prothiofos (7 760), isofenphos-methyl (7 611), diniconazole (7 337), dicofol (RD) (7 000), trichlorfon (6 895), propoxur (6 878), dicrotophos (6 634), tolylfluanid (RD) (6 408), nitenpyram (6 317), carbosulfan (5 999), isocarbophos (5 620), formothion (5 428), benfuracarb (5 039), isoprocarb (4 871), rotenone (4 637) and meptyldinocap (RD) (784).

[24] According to the monitoring regulation at least 642 samples should be analysed for each pesticide/commodity combination. This number of samples is required to derive a statistically sound database which would allow, with a certainty of more than 99 %, the detection of a sample containing pesticide residues above the LOQ, provided that not less than 1 % of the products contain residues above that limit. For pesticides that were not mandatory, the number of results mostly did not reach the level of 642 determinations. Also for mandatory substances, the number of determinations was lower for certain pesticide/crop combinations because of analytical problems encountered by enforcement laboratories. In these cases the statistical uncertainty is greater.

[25] Pesticides with complex residue defintions (i.e. residue defintions that do not only contain the parent compound but also metabolite(s) and/or degradation products) are labelled with the suffix (RD). The full residue definitions (RD) for the pesticides covered by the 2013 monitoring regulation can be found in Appendix B, Table B1.

Regarding animal products, 43 pesticides were not detected in any of the samples analysed (ordered by the total number of samples analysed): fenvalerate (RD) (2 034), hexachlorocyclohexane (alpha) (1 701), endrin (1 676), diazinon (1 623), chlorpyrifos-methyl (1 602), permethrin (1 598), chlorpyrifos (1 592), parathion (1 584), methoxychlor (1 497), endosulfan (RD) (1 489), methidathion (1 478), bifenthrin (1 454), profenofos (1 426), pyrazophos (1 404), chlorobenzilate (1 350), parathion-methyl (RD) (1 339), triazophos (1 339), dieldrin (RD) (1 280), cyfluthrin (RD) (1 200), resmethrin (RD) (1 165), fenthion (RD) (845), chlordane (RD) (677), tetraconazole (526), tau-fluvalinate (470), etofenprox (466), indoxacarb (422), fluquinconazole (417), famoxadone (368), prochloraz (RD) (340), boscalid (RD) (256), carbendazim (RD) (200), metaflumizone (153), chlorpropham (RD) (131), flusilazole (RD) (119), fluazifop-P-butyl (RD) (118), bixafen (RD) (98), fenpropimorph (RD) (96), haloxyfop-R (RD) (91), spiroxamine (RD) (90), ioxynil (RD) (86), chlormequat (68), fluopyram (RD) (42), maleic hydrazide (RD) (15).

In plant products, 137 different substances were found in measurable concentrations. Residues exceeding the legal limits were related to 58 different pesticides. Pesticides which were detected in at least 1 % of the samples of plant products, or for which an exceedance was identified, are presented in Figure 2-2. The pesticides are ordered by the total number of determinations reported for the pesticide. The figures in brackets next to the name of the pesticide refer to the number of samples without measurable residues, the number of samples with residues within the legally permitted concentrations and the number of samples exceeding the MRLs, respectively. Among the pesticides that had to be analysed in all plant products, boscalid (RD), captan (RD), chlorpyriphos, cyprodinil (RD), dithiocarbamates (RD), fenhexamid, fludioxonil, folpet (RD), iprodione (RD), pyraclostrobin and tebuconazole were the most frequently detected pesticides present in more than 4 % of the samples analysed. Further details on the pesticides analysed under the EU-coordinated monitoring programme are reported in Appendix B (Table B1) and Section 2.3. Further details on pesticides found and sought by the reporting countries on the national programmes are given in Appendix C (Table C1).

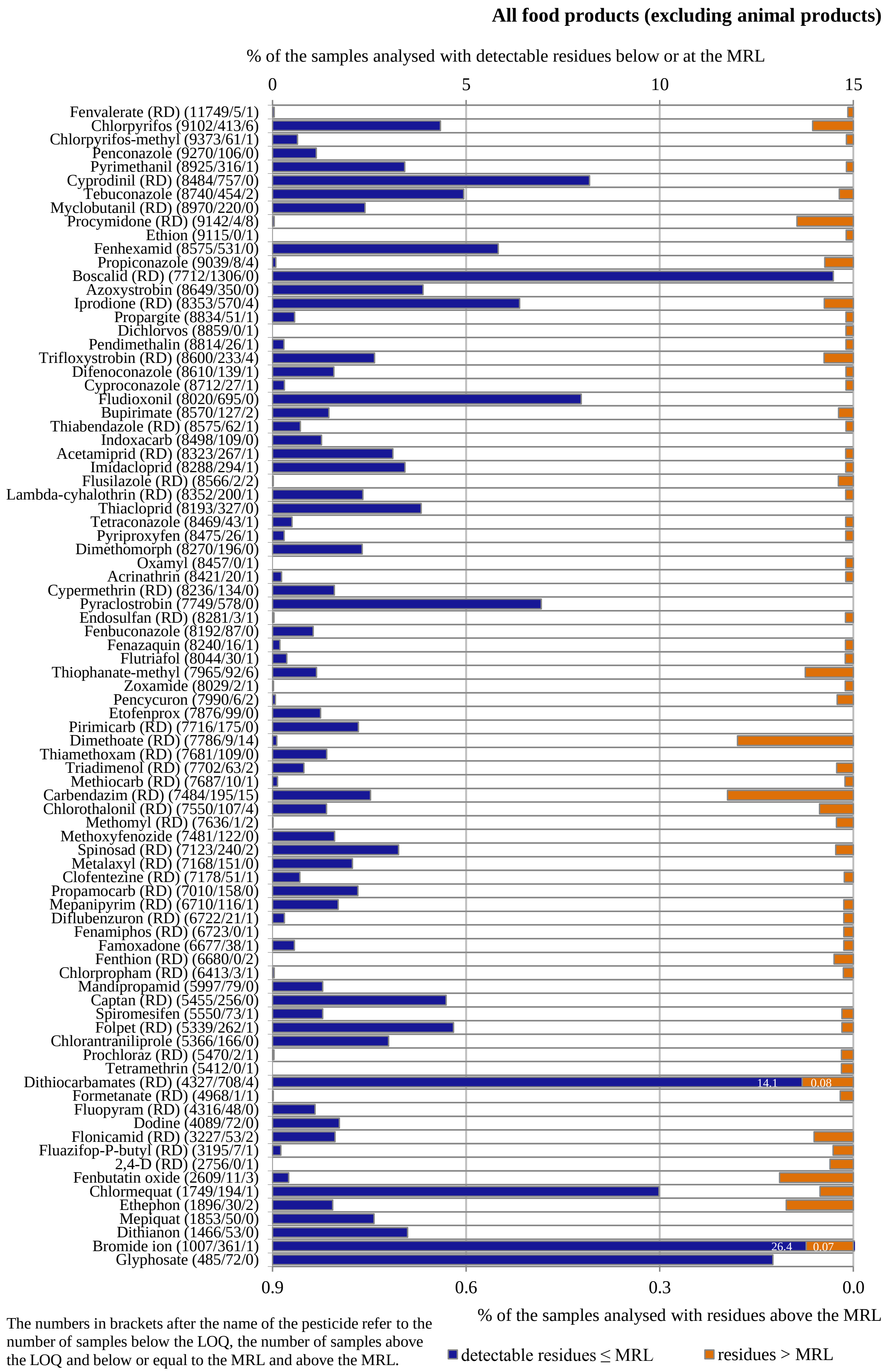


Figure 2-2: Pesticides detected in plant products (detection rate > 1 % and/or MRL exceedance rate > 0 %)

2.3. Results by food product

This section reports detailed information on the results concerning the 12 food products covered by the 2013 EU-coordinated programme. For each food product, the following analyses are presented:

- The number of samples analysed, the frequency of samples with multiple residues and samples free of detectable residues, the number of samples exceeding the legal limit and number of samples found to be to be non-compliant, the number of pesticides detected, the most frequently found pesticides and the number of pesticides in exceedance of a MRL; the number of samples and the country of origin are given for pesticides that most frequently exceeded the MRL.

- A pie chart presenting the percentage of samples free of detectable residues and of samples with single and multiple residues.

- A chart presenting the pesticides found sorted according to the frequency of detection in 2013.[26] The percentages of samples with residues below or equal to the MRL are included on the left part of the chart (blue bars; upper x-axis scale). In the same chart, the percentages of samples with residues exceeding the MRLs are included on the right part of the chart (orange bars; lower x-axis scale). As in Figure 2-2, the figures in brackets next to the name of the pesticide, refer to the number of samples without measurable residues, the number of samples with residues within the legally permitted concentrations and the number of samples exceeding the MRLs, respectively. In the context of this section, the results exceeding the MRL always refer to the numerical exceedances of the regulated MRLs, not taking into account measurement uncertainties (see EFSA, 2014c). The light bars refer to the results of 2010, while the bars in the darker shade refer to the results of 2013. A maximum of 40 pesticides are plotted for each food product. The pesticides with no detections in 2013 but where MRL exceedances were observed in 2010, are plotted at the bottom of the bar chart. Pesticides in the scope of the 2013 monitoring programme and not in the 2010 programme are marked with an asterisk.

- Further information on the pesticides most frequently found in the concerned food products (pesticides found in at least 5 % of the samples, unless stated differently).

- A figure presenting the distribution of the measured residue levels, expressed as a percentage of the MRL applicable for the specific pesticide/crop combination.[27] The figures in brackets next to the name of the pesticide refer to the number of samples without measurable residues, the number of samples with residues within the legally permitted concentrations and the number of samples exceeding the MRLs,[28] respectively. Each result above the LOQ is depicted as a dot in the respective figure. Pesticides that were not analysed in the specific crop or where no detectable results were found are not reflected in this presentation.

In Appendix B (Table B2) the full list of samples exceeding the MRLs can be found, including information on the measured residue concentrations and the origin of the samples, together with the short-term exposure calculated as percentage of the ARfD.

[26] It should be noted that not all samples were analysed for all pesticides included in the EUCP; thus, the values reported vary to a certain extent.

[27] In case the MRL for a given pesticide/food combination changed during the monitoring year, EFSA compared the numerical value of the pesticide residue measured in the sample with the MRL applicable on 01 January 2013.

[28] The number of samples exceeding the MRL was derived from the information provided by the reporting countries. In exceptional cases EFSA noted that the residue concentration reported exceeded the MRL numerically whereas the reporting country reported the result as being within the legal limit.

2.3.1. Apples

In 2013, 1 610 samples of apples were analysed; in 533 samples (33 %) no pesticide residues were detected, while 1 077 samples contained one or several pesticides in measurable concentrations. Multiple residues were reported in 739 samples (46 %); up to seventeen different pesticides were detected in an individual apple sample (Figure 2-3).

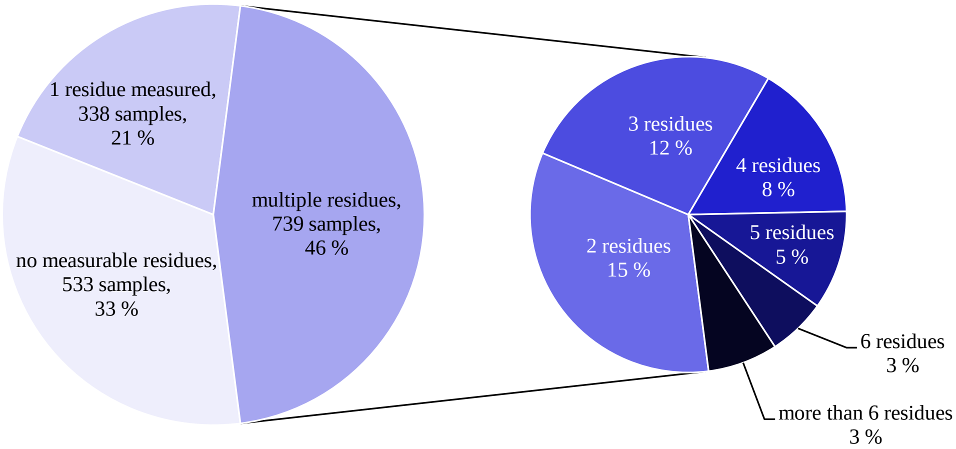


Figure 2-3: Number of detectable residues in individual apple samples

In 1.0 % of the samples (16 samples concerning 17 individual determinations) the residue concentrations exceeded the MRLs related to nine pesticides, and 0.6 % of the samples (nine samples) were reported as non-compliant, taking into account the measurement uncertainty.

In total, 55 different pesticides were detected.[29] The most frequently found pesticides were captan/folpet (RD) (detected in 27.9 % of the tested samples), dithianon (23.0 %) and dithiocarbamates (17.7 %). The MRL was exceeded most frequently for dimethoate (RD) (five samples from Portugal and one each from France, Latvia and FYRM) and methomyl (RD) (one sample from Chile and one from Portugal).

Figure 2-4 depicts the results for all pesticides with MRL exceedances and the most frequently detected pesticides with residues below or at the MRL. Compared to 2010, the detection rate was slightly lower or in the same range for most pesticides, except for acetamiprid (RD), boscalid (RD) and captan/folpet (RD) where an increased detection rate was observed. The detection rate for diphenylamine and thiabendazole (RD) has decreased in 2013 compared to 2010. Diphenylamine is an active substance that was used for the treatment of stored apples. The decreasing trend for diphenylamine is probably resulting from the decision not to approve this active substance under Regulation (EC) No 1107/2009, a decision which entered into force in July 2012 and which triggered the lowering of MRLs for diphenylamine from 5 mg/kg to 0.1 mg/kg in 2014. An increased number of MRL exceedances was noted for some insecticides/acaricides (i.e. dimethoate (RD), methomyl, fenbutatinoxide, fenvalerate (RD) and chlorpyrifos) compared to 2010. It should be also highlighted that no MRL exceedances were reported in 2013 for non-approved pesticides which were found to exceed the legal limit in 2010 (e.g. propargite, azinphos-methyl, phosalone, diazinon, dichlorvos, dicofol (RD), fenitrothion, fenpropathrin and oxydemethon-methyl (RD)).

Further information on the most frequently detected pesticides found in apples in 2013 in at least 5 % of the samples is compiled in Table 2-1.

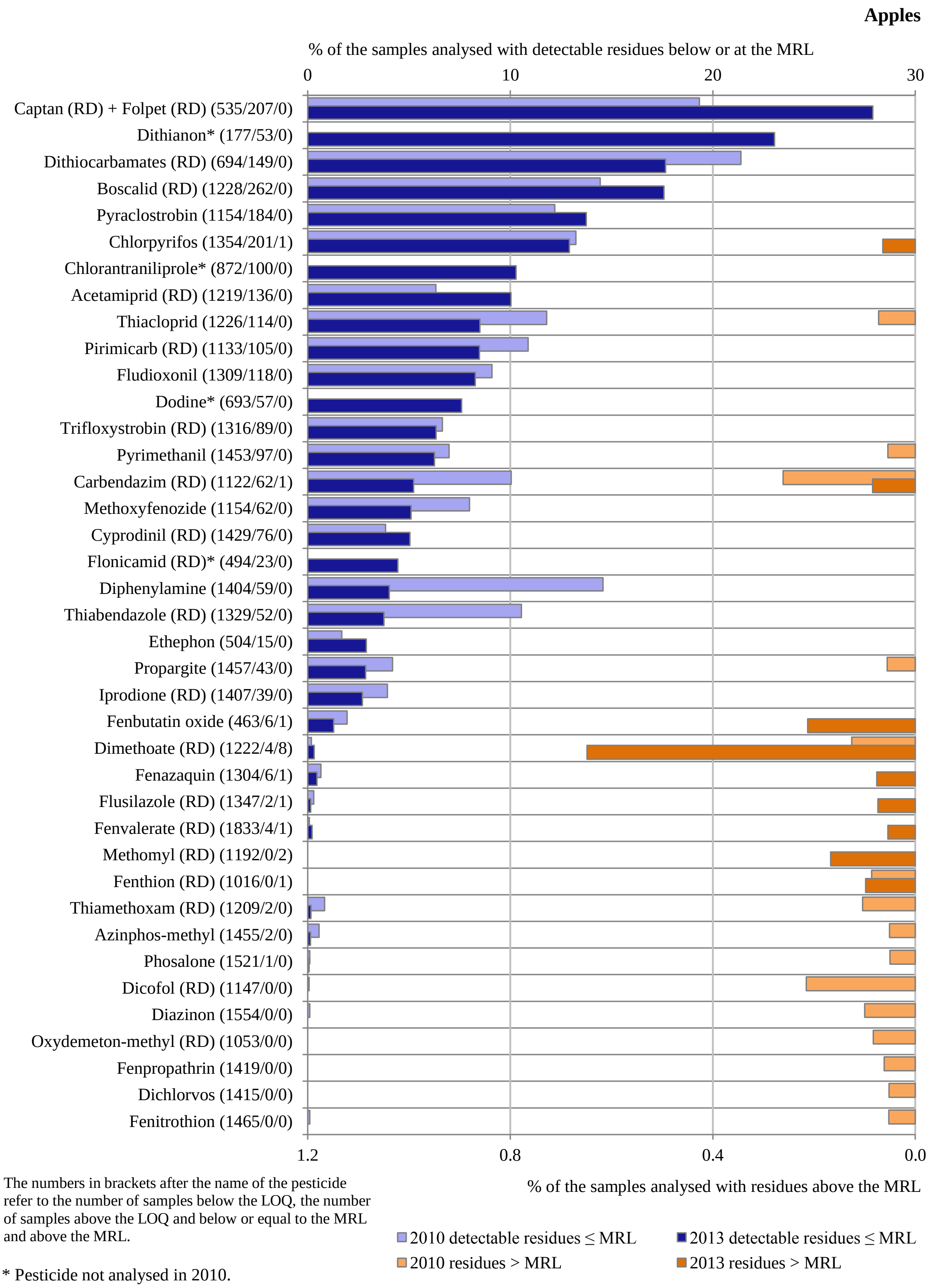
[29] Captan and folpet are counted as one pesticide since the residue definition for apples is expressed as sum of captan and folpet. In the results it was not specified if only one or both pesticides were actually present in the sample analysed.

The individual residue concentrations, expressed as a percentage of the respective MRL for the pesticide are plotted in Figure 2-5.[30]

Table 2-1: Pesticides most frequently detected in apples in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Captan/folpet (RD)	27.9	Non-systemic fungicides, both substances approved in the EU
Dithianon	23.0	Approved non-systemic fungicide
Dithiocarbamates (RD)	17.7	Approved group of non-systemic fungicides
Boscalid (RD)	17.6	Approved systemic fungicide
Pyraclostrobin	13.8	Approved systemic fungicide
Chlorpyrifos	13.0	Approved non-systemic insecticide
Chlorantraniliprole	10.3	Approved insecticide
Acetamiprid (RD)	10.0	Approved neonicotinoid insecticide
Thiacloprid	8.5	Approved neonicotinoid insecticide
Pirimicarb (RD)	8.5	Approved insecticide
Fludioxonil	8.3	Approved non-systemic fungicide
Dodine	7.6	Approved systemic fungicide
Trifloxystrobin (RD)	6.3	Approved fungicide
Pyrimethanil	6.3	Approved non-systemic fungicide
Carbendazim (RD)	5.3	Approved systemic fungicide
Methoxyfenozide	5.1	Approved insecticide
Cyprodinil (RD)	5.0	Approved systemic fungicide

[30] The extreme results beyond the scale are mentioned on the right side of the figure without being reflected in the graph.



The numbers in brackets after the name of the pesticide refer to the number of samples below the LOQ, the number of samples above the LOQ and below or equal to the MRL and above the MRL.

* Pesticide not analysed in 2010.

Figure 2-4: Percentage of apple samples with detectable residues below or equal to the MRL and with residues above the MRL

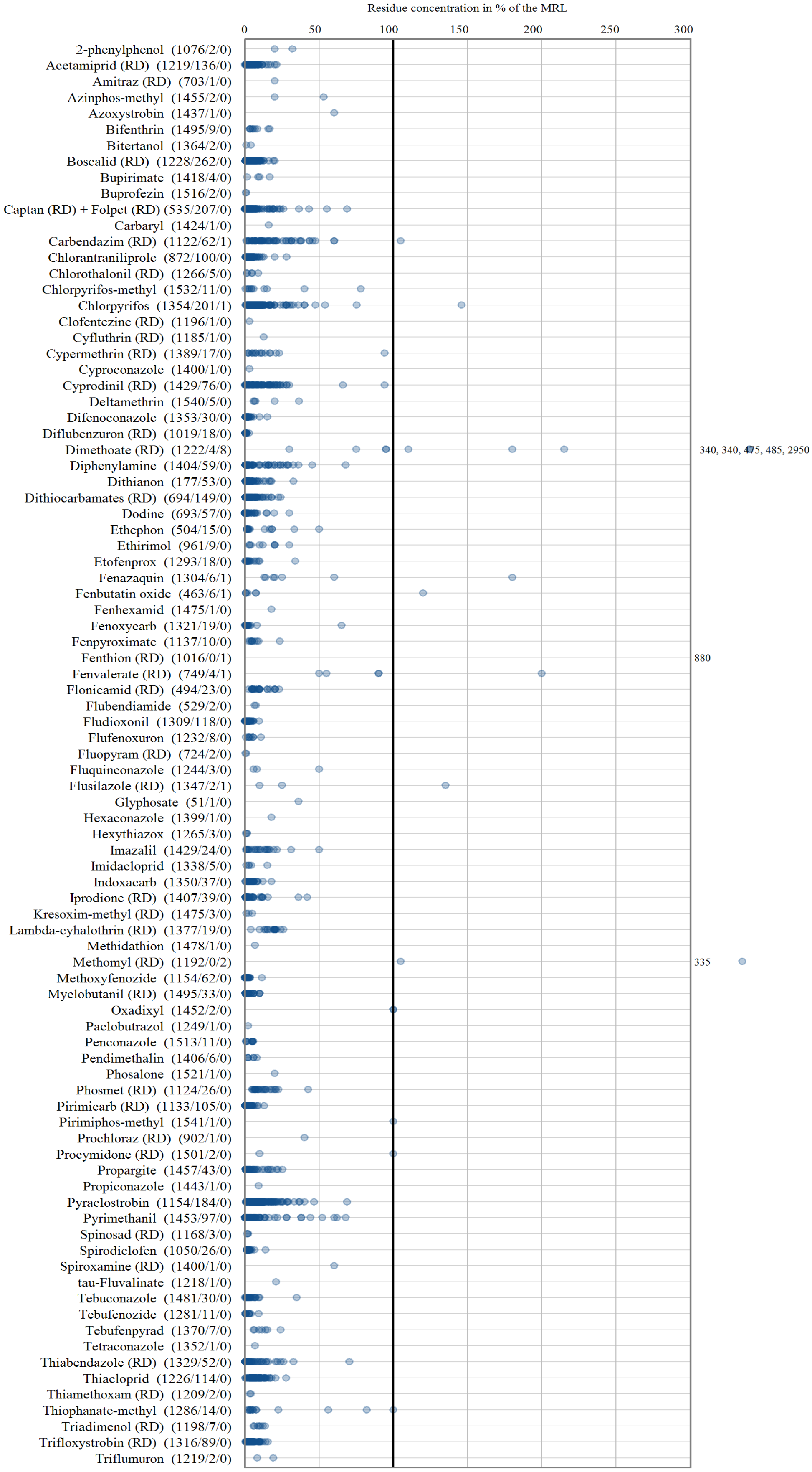


Figure 2-5: Residue concentrations measured in apple, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.2. Head cabbage

In 2013, 917 samples of head cabbage were analysed; in 701 samples (76.4 %) no pesticide residues were detected, while 216 samples contained one or several pesticides in measurable concentrations. Multiple residues were reported for 44 samples (4.8 %); head cabbage samples were found with up to six different pesticides (Figure 2-6).

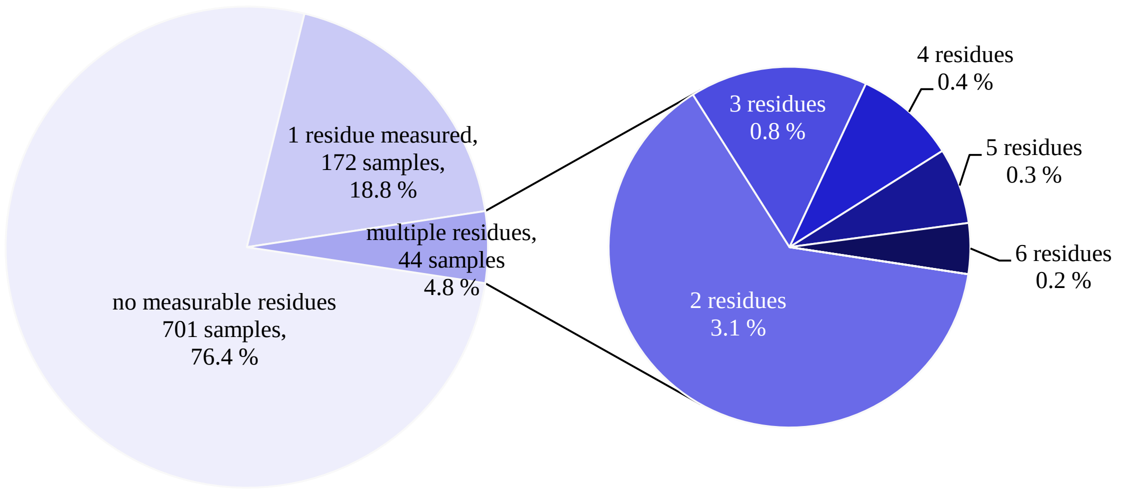


Figure 2-6: Number of detectable residues in individual head cabbage samples

In 0.9 % of the samples (eight samples), the residue concentration exceeded the MRL; six samples were non-compliant (0.7 %).

In total, 35 different pesticides were detected. Dithiocarbamates (RD) were detected in 37.3 % of the tested samples, but these findings do not necessarily represent the use of a pesticide but may be related to naturally occurring compounds in brassica vegetables which give positive detections. The most frequently found compounds resulting from the use of pesticides were boscalid (2.7 %) and iprodione (2.7 %). The MRL exceedances were related to eight pesticides: chlorpropham (RD) and prochloraz (RD) (found in two samples from Cyprus), fluazifop-P-butyl (RD) and methiocarb (RD), both pesticides present in the same sample from Ireland), dimethoate (RD) (found in two samples from Austria and from Lithuania), difenoconazole (in a sample from France), pyrimethanil (in a sample from Poland) and thiophanate-methyl (in a sample from Lithuania).

The most frequently found pesticides in 2013 in head cabbage are listed in Figure 2-7, ranked according to the detection rate. The detection rates in 2013 and 2010 were comparable except for dithiocarbamates (RD) where the frequency of detection decreased in 2013. The MRL exceedances of 2013 show a different pesticide pattern than that of 2010 with the exception of difenoconazole and dimethoate (RD). Non-approved pesticides exceeding the MRLs in 2010 such as ethion and procymidone were no longer present in the samples analysed in 2013.

The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-8.

Figure 2-7: Percentage of head cabbage samples with detectable residues below or equal to the MRL and with residues above the MRL

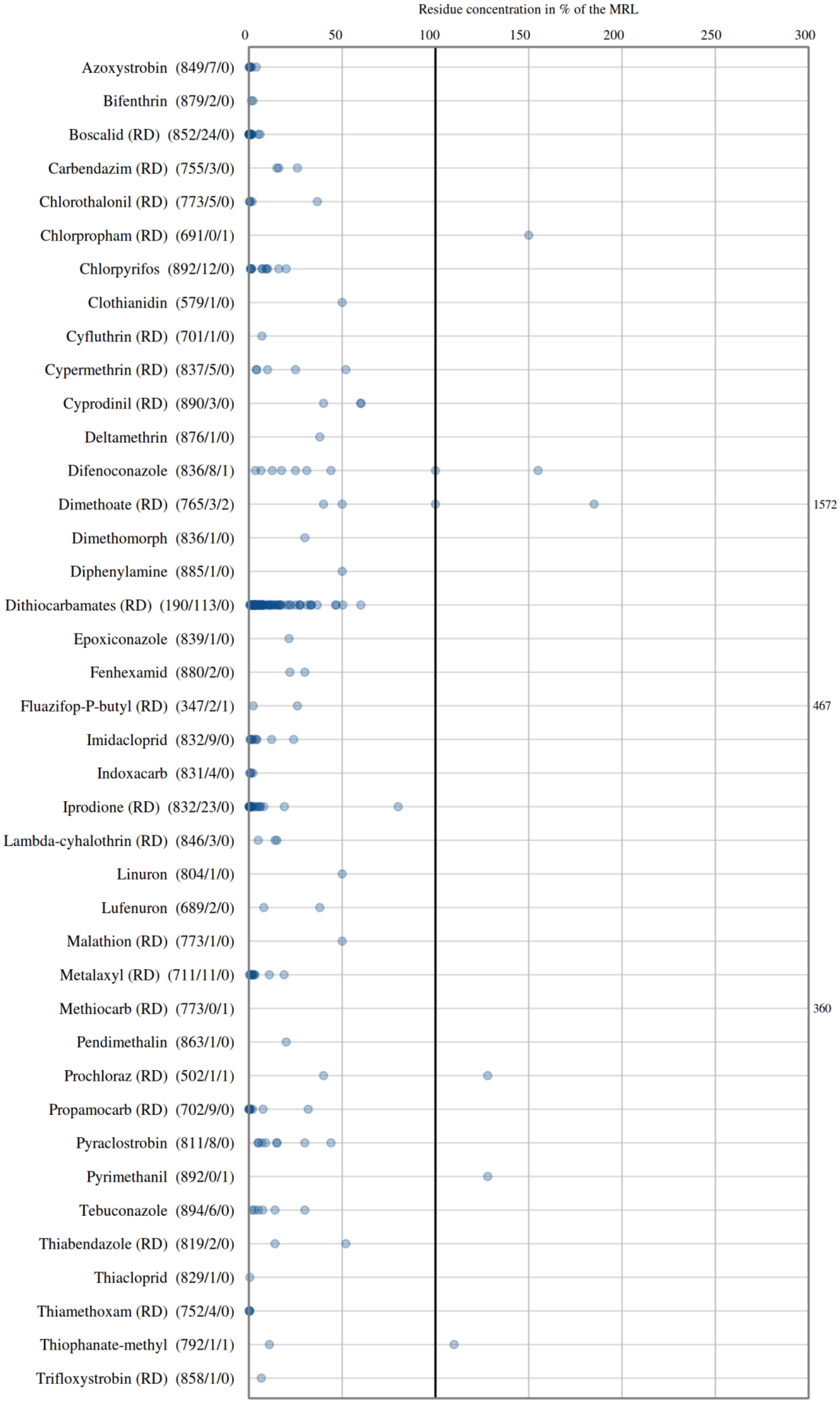


Figure 2-8: Residue concentrations measured in head cabbage, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.3. Leek

In 2013, 837 samples of leek were analysed. In 560 samples (67 %) no pesticide residues were detected, while 277 samples contained one or several pesticides in measurable concentrations. Up to seven different pesticides were detected in individual leek samples (Figure 2-9).

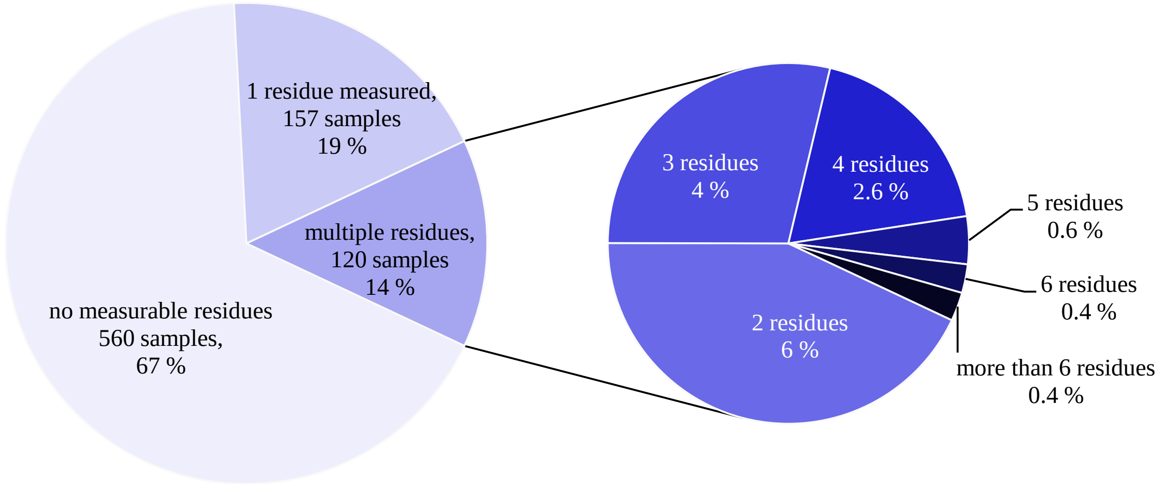


Figure 2-9: Number of detectable residues in individual leek samples

In 0.5 % of the samples (four samples), the residue concentration exceeded the MRL; 0.4 % (three samples) were non-compliant samples. In total, 35 different pesticides were detected. The most frequently found pesticides were dithiocarbamates (RD) (detected in 16.0 % of the tested samples), tebuconazole (detected in 10.7 % of the samples) and boscalid (RD) (detected in 10.6 %). Similar to head cabbage, the detection of dithiocarbamates in leek does not necessarily resulting from the use of dithiocarbamates pesticides, but may be linked to naturally occurring compounds. The MRL exceedances were related to four pesticides: iprodione (RD) (one sample from Spain), fenbutatin oxide (one sample from Cyprus), pendimethalin (one sample from Portugal) and zoxamide (one sample from France).

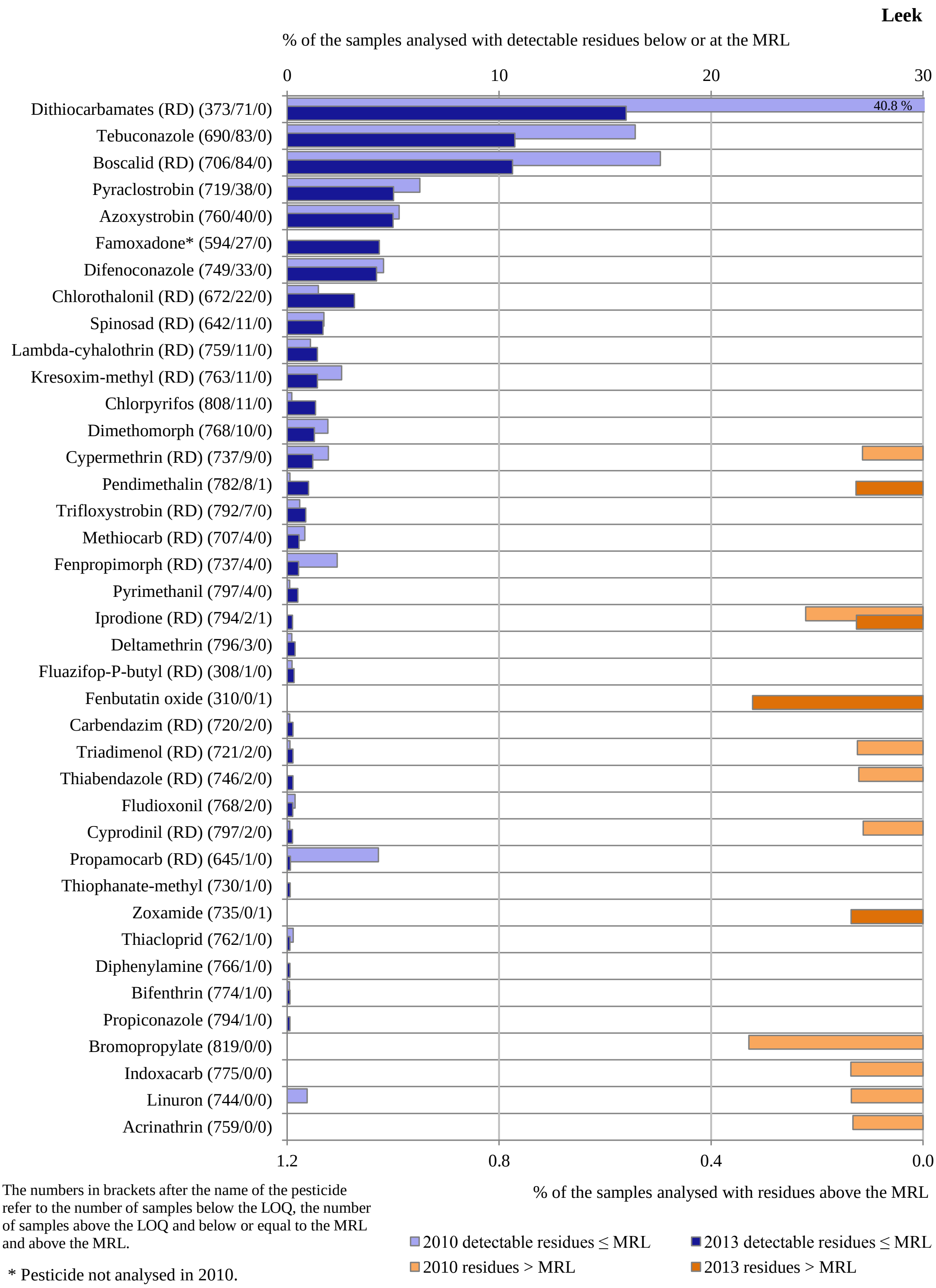
All pesticides found in leek in 2013 are listed in Figure 2-10, ranked according to the frequency of detection.[31] For most of the pesticides the detection rates were similar or lower in 2013 compared to 2010. The MRL exceedances of 2013 are due to pesticides for which no MRL exceedances were found in 2010, with the exception of iprodione (RD).

Further information on the most frequently detected pesticides found in leek in 2013 is summarised in Table 2-2. The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-11.

Table 2-2: Pesticides most frequently detected in leek in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Dithiocarbamates (RD)	16.0	Approved group of non-systemic fungicide. Probably false positive results arising from natural occurring substances in *Alliaceae* such as leek, which mimic the presence of dithiocarbamates
Tebuconazole	10.7	Approved systemic fungicide
Boscalid (RD)	10.6	Approved systemic fungicide
Pyraclostrobin	5.02	Approved systemic fungicide
Azoxystrobin	5.00	Approved fungicide.

[31] For diphenylamine, the reported residue concentration numerically exceeded the MRL while the reporting country considered the residue concentration as below the MRL. Thus, this results in a discrepancy between Figure 2-11 and Figure 2-10, which is based on the information provided by the reporting country.



The numbers in brackets after the name of the pesticide refer to the number of samples below the LOQ, the number of samples above the LOQ and below or equal to the MRL and above the MRL.

* Pesticide not analysed in 2010.

Figure 2-10: Percentage of leek samples with detectable residues below or equal to the MRL and with residues above the MRL

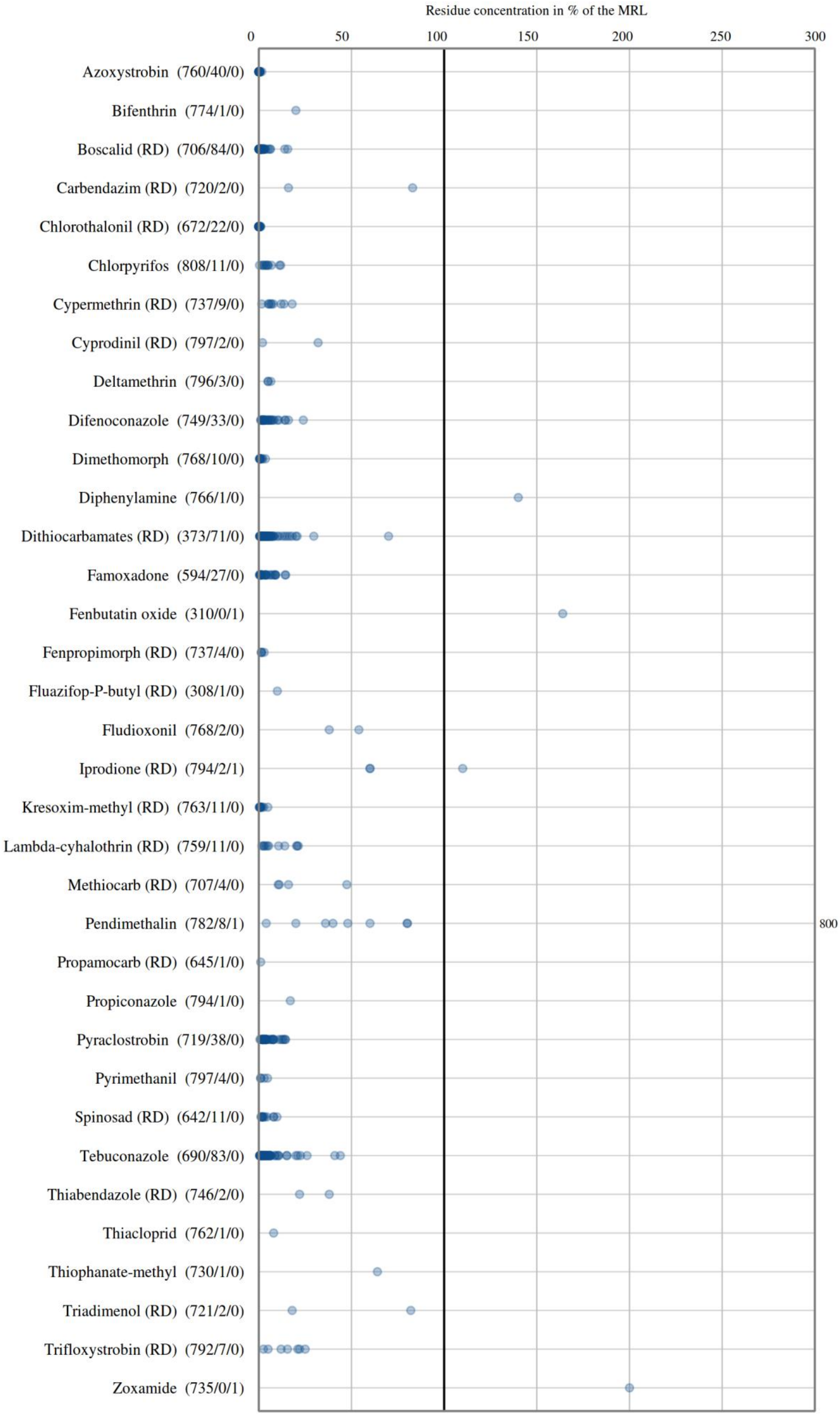


Figure 2-11: Residue concentrations measured in leek, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.4. Lettuce

In 2013, 1 194 samples of lettuce were analysed; in 502 samples (42 %) no pesticide residues were detected, while 692 samples contained one or several pesticides in measurable concentrations. 430 samples (36 %) contained multiple residues; up to 13 different pesticides were detected in individual lettuce samples (Figure 2-12).

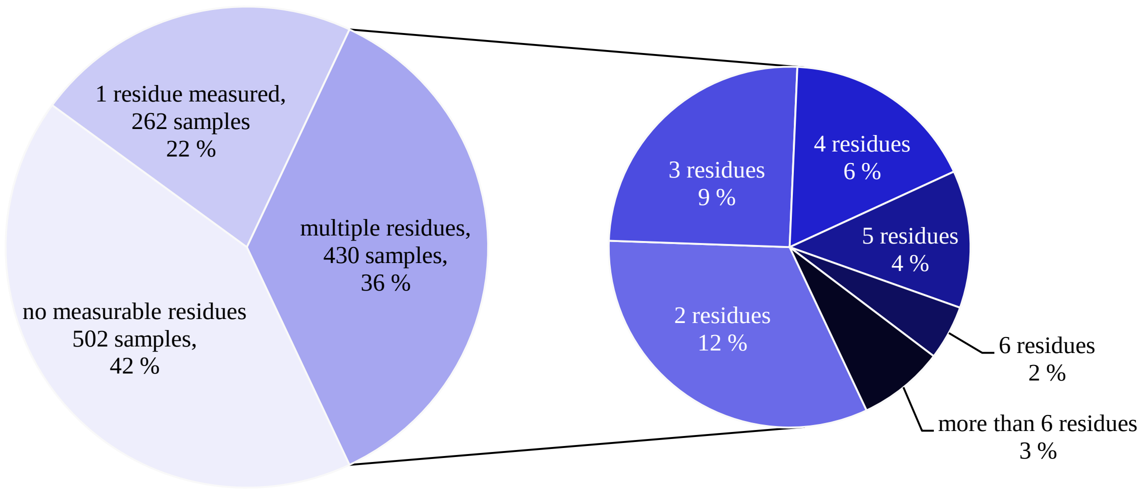


Figure 2-12: Number of detectable residues in individual lettuce samples

In 2.3 % of the samples (27 samples), the residue concentration exceeded the MRL; 1.8 % of the samples were reported as non-compliant (21 samples).

In total, 68 different pesticides were detected. Bromide ion was detected most frequently (detected in 27.9 % of the tested samples), but since this compound is naturally occurring in plants it is not an unambiguous marker for the use of the pesticide methyl bromide. Boscalid (RD), imidacloprid, dithiocarbamates (RD), propamocarb (RD) and iprodione (RD) were detected in more than 10 % of the samples analysed. The MRL exceedances were related to 17 pesticides, with carbendazim (RD) found most frequently found in concentrations above the MRL (in total six samples, five from Bulgaria and one from Italy), followed by thiophanate-methyl (five samples, four from Bulgaria, one from Italy), chlorothalonil (RD) (four samples, one from the Netherlands and three from Romania), and dithiocarbamates (RD) (four samples, two from Bulgaria, one from Cyprus and one from Germany) and procymidone (RD) (three samples, from Spain, France and Romania).

The most frequently found pesticides in 2013 in lettuce are listed in Figure 2-13, ranked according to the frequency of detection.[32] The detection rates of 2013 were in general lower compared with the findings of 2010, except for boscalid (RD), imidacloprid and azoxystrobin. Comparing the pesticides exceeding the MRLs in 2010 and 2013 a different pattern of occurrence is found.

Further information on the most frequently detected pesticides found in lettuce in 2013 is summarised in Table 2-3. The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-14.

[32] For azoxystrobin, the reported residue concentration numerically exceeded the MRL while the reporting country considered it as below the MRL. Thus, this results in a discrepancy between Figure 2-14 and Figure 2-13 which is based on the information provided by the reporting country.

Table 2-3: Pesticides most frequently detected in lettuce in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Bromide ion	27.9	Naturally occurring substance and metabolite of the pesticide methyl bromide, which since 2009 is no longer approved in the EU
Boscalid (RD)	18.3	Approved systemic fungicide
Imidacloprid	15.8	Approved systemic insecticide
Dithiocarbamates (RD)	13.9	Approved group of non-systemic fungicides
Propamocarb (RD)	12.2	Approved systemic fungicide
Iprodione (RD)	11.8	Approved non-systemic fungicide
Thiamethoxam (RD)	8.6	Approved systemic neonicotinoid insecticide
Cyprodinil (RD)	8.1	Approved systemic fungicide
Mandipropamid	8.0	Approved fungicide
Azoxystrobin	7.1	Approved fungicide
Dimethomorph	6.3	Approved systemic fungicide
Fludioxonil	5.7	Approved non-systemic fungicide

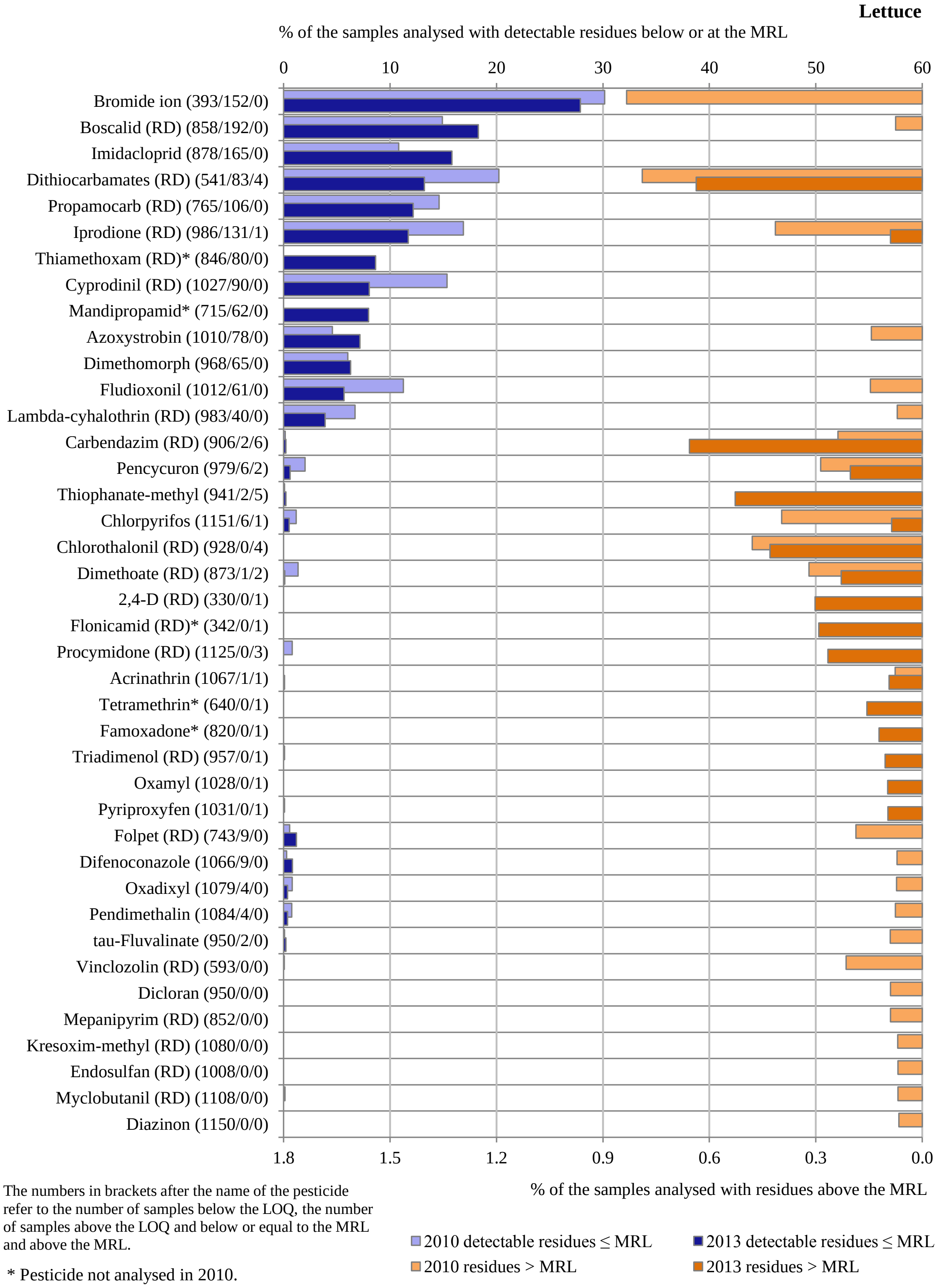


Figure 2-13: Percentage of lettuce samples with detectable residues below or equal to the MRL and with residues above the MRL

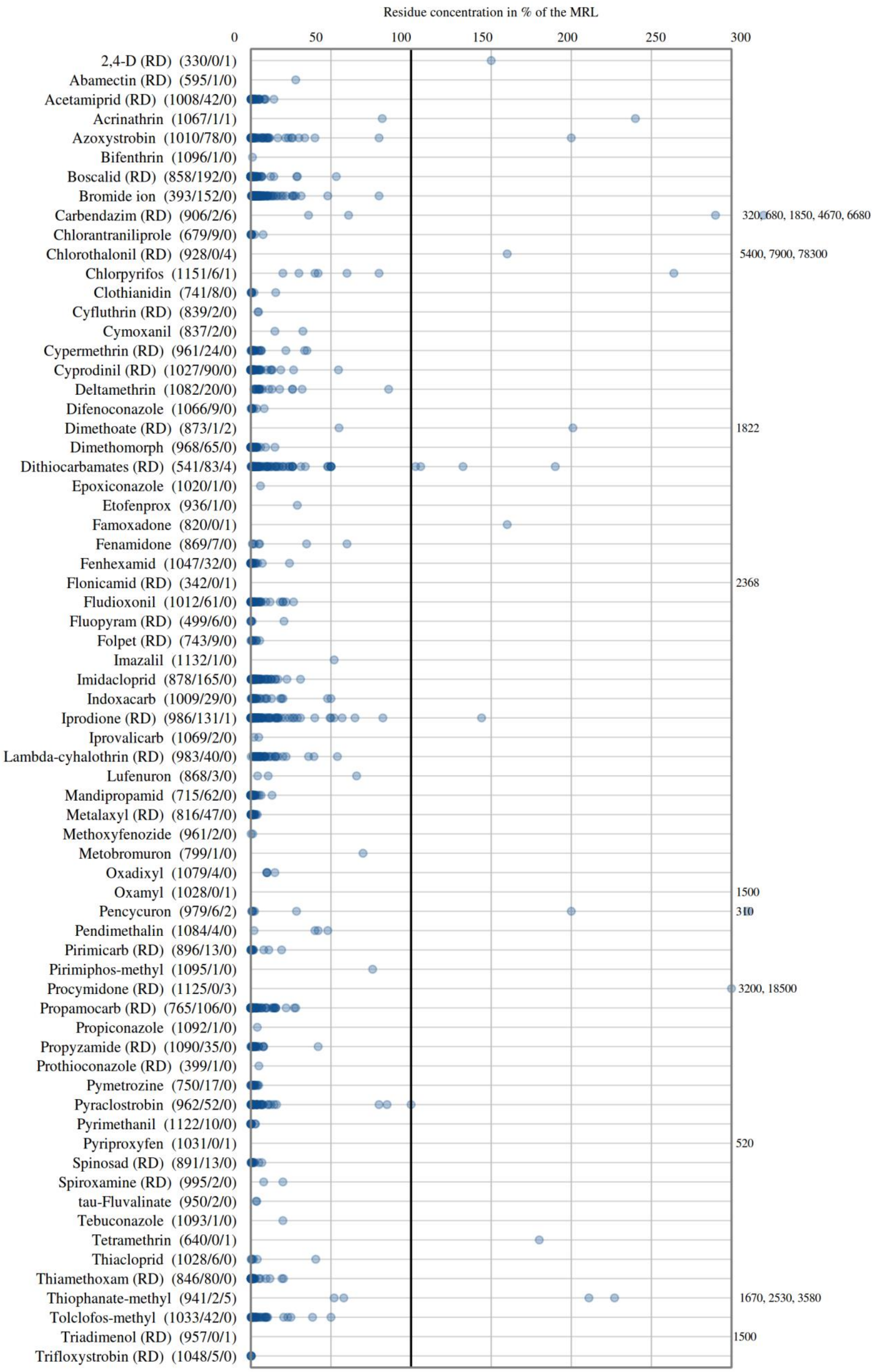


Figure 2-14: Residue concentrations measured in lettuce, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.5. Peaches

In 2013, 1 051 samples of peaches were analysed; in 261 samples (25 %) no pesticide residues were detected, while 790 samples contained one or several pesticides in measurable concentrations. 559 samples (53 %) contained multiple residues; up to 15 different pesticides were detected in individual samples of peaches (Figure 2-15).

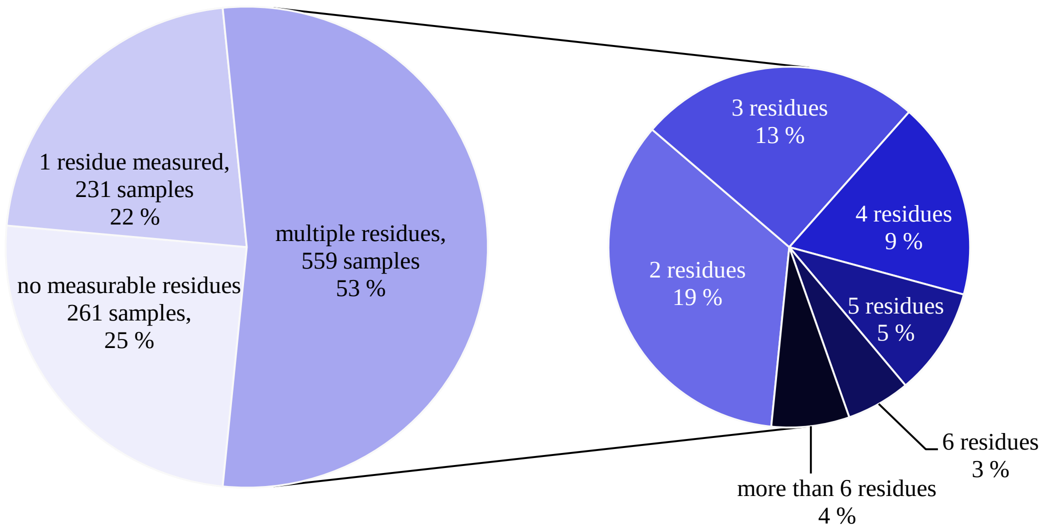


Figure 2-15: Number of detectable residues in individual peach samples

In 1.1 % of the samples (12 samples), the residue concentration exceeded the MRL; 0.5 % were non-compliant samples (five samples).

In total, 80 different pesticides were detected. The most frequently found pesticides were tebuconazole (detected in 26.0 % of the tested samples) and dithiocarbamates (RD) (20.1 %). The MRL exceedances were related to eight pesticides. The MRL was most frequently exceeded for chlorpyrifos (in three samples from Greece, Italy and Spain), carbendazim (RD) (in two samples, from Cyprus and Spain) and iprodione (RD) (in two samples, from Chile and South Africa).

The most frequently detected pesticides found in 2013 in peaches are listed in Figure 2-16, ranked according to the frequency of detection. Compared to 2010, most pesticides had slightly higher or comparable detection rates except bifenthrin. A number of non-approved pesticides that were found in 2010 in concentrations exceeding the MRL were not detected in peaches in 2013 (i.e. acephate, dichlorvos, endosulfan, fenpropathrin, fenthion, hexaconazole and procymidone).

Further information on the most frequently detected pesticides found in peaches in 2013 in more than 5 % of the samples is summarised in Table 2-4. The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-17.

Table 2-4: Pesticides most frequently detected in peaches in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Tebuconazole	26.0	Approved systemic fungicide
Dithiocarbamates (RD)	20.1	Approved group of non-systemic fungicides
Iprodione (RD)	16.6	Approved non-systemic fungicide
Chlorpyrifos	15.5	Approved non-systemic insecticide
Spinosad (RD)	12.9	Approved insecticide. Permitted for use in organic farming
Boscalid (RD)	12.4	Approved systemic fungicide

Pesticide	% samples above LOQ	Further information on the pesticides found
Lambda-cyhalothrin (RD)	10.4	Approved insecticide
Fenbuconazole	9.5	Approved fungicide
Imidacloprid	9.0	Approved systemic insecticide
Cyprodinil (RD)	8.8	Approved systemic fungicide
Fludioxonil	8.7	Approved non-systemic fungicide
Etofenprox	8.3	Approved insecticide
Cypermethrin (RD)	7.8	Approved non-systemic insecticide
Thiacloprid	7.4	Approved neonicotinoid insecticide
Carbendazim (RD)	6.3	Approved systemic fungicide
Fenhexamid	5.9	Approved fungicide
Flonicamid (RD)	5.6	Approved systemic insecticide

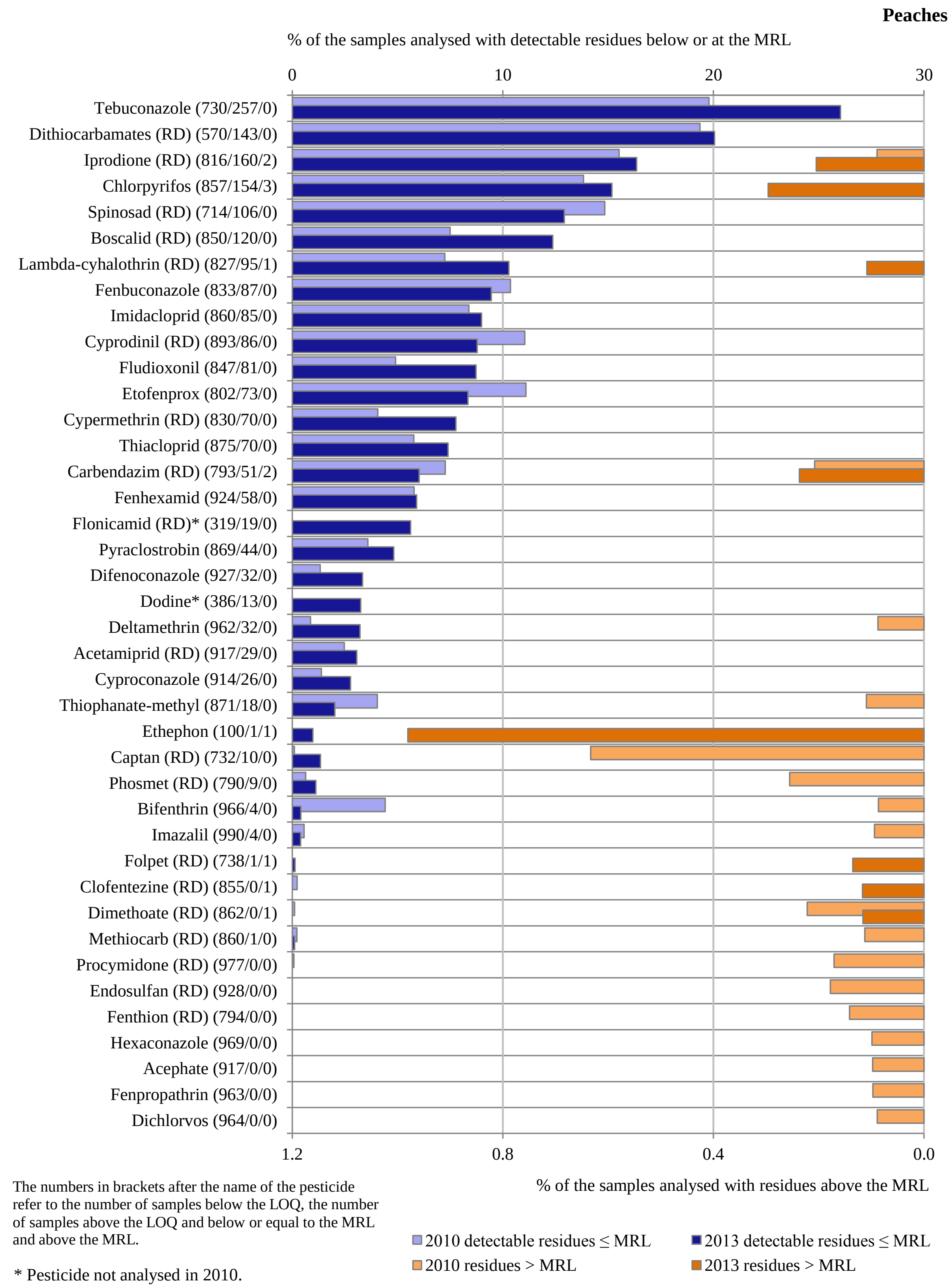


Figure 2-16: Percentage of peach samples with detectable residues below or equal to the MRL and with residues above the MRL

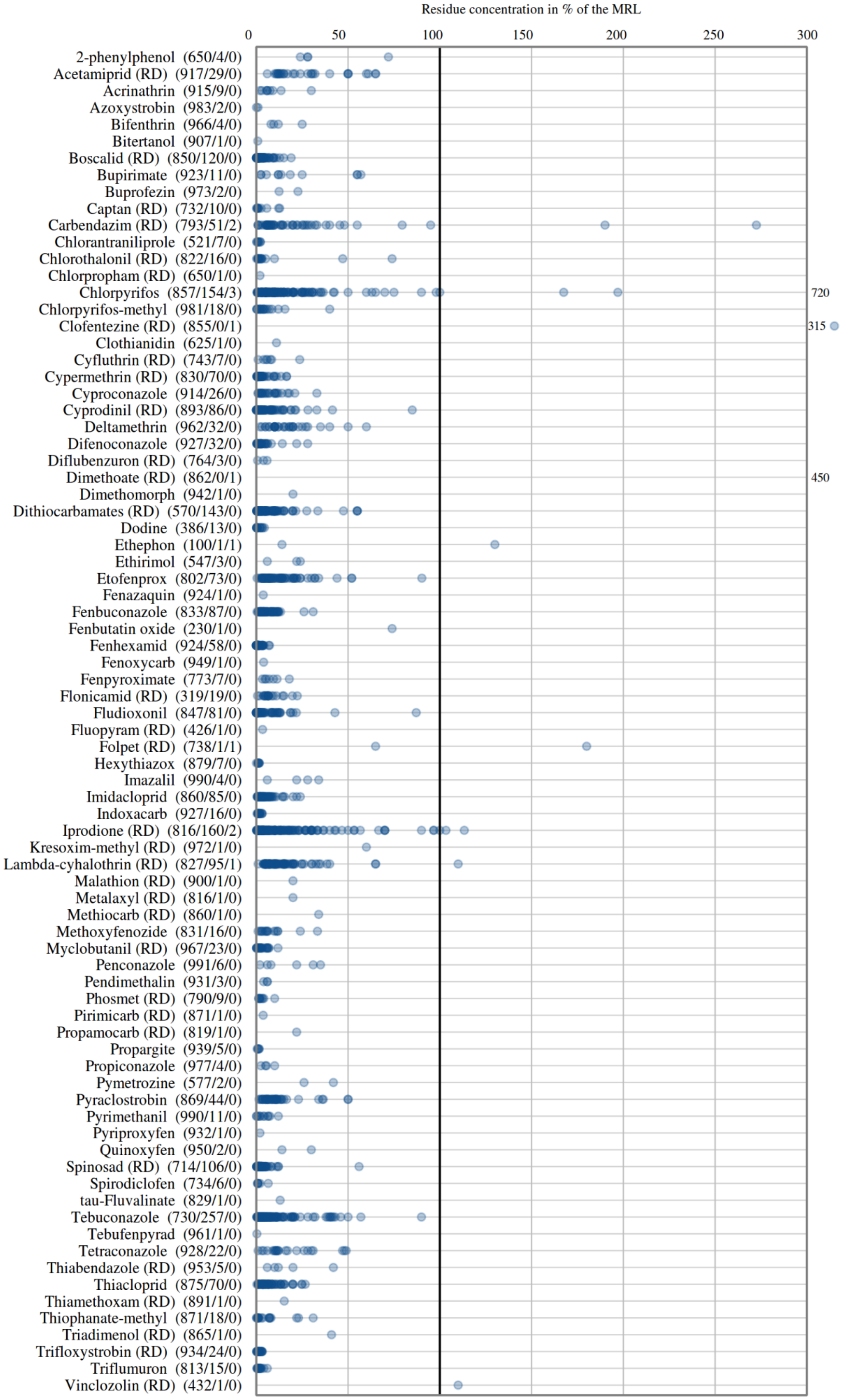


Figure 2-17: Residue concentrations measured in peaches, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.6. Strawberries

In 2013, 1 151 samples of strawberries were analysed; in 272 samples (24 %) no pesticide residues were detected, while 879 samples contained one or several pesticides in measurable concentrations. 726 samples (63 %) contained multiple residues; up to 15 different pesticides were detected in individual strawberry samples (Figure 2-18).

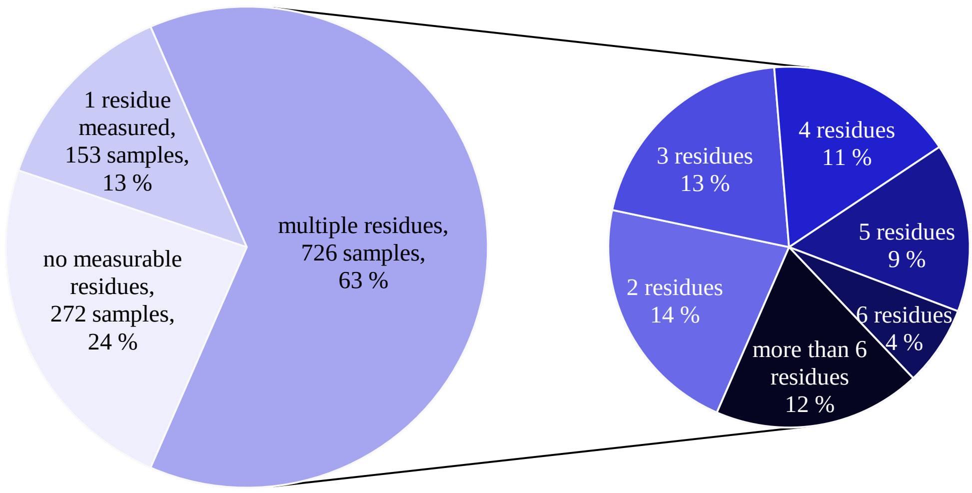


Figure 2-18: Number of detectable residues in individual strawberry samples

In 2.5 % of the samples (29 samples), the residue concentration exceeded the MRL. The proportion of non-compliant samples was 1.2 % samples (14 samples).

In total, 84 different pesticides were detected.[33] The most frequently found pesticides were boscalid (RD) (detected in 35.3 % of the tested samples), cyprodinil (RD) (detected in 35.1 % of the tested samples), fludioxonil (detected in 34.4 % of the tested samples), fenhexamid (detected in 25.9 % of the tested samples) and pyraclostrobin (detected in 21.0 % of the tested samples). The MRL exceedances were related to 20 pesticides, with the highest frequency for carbendazim (RD) (in four samples from Bulgaria, China, Italy and Lithuania), propiconazole (four samples from Estonia), trifloxystrobin (RD) (four samples, two from Belgium and one from Spain and the Netherlands) and procymidone (RD) (three samples, from Bulgaria, China and Malta).

The most frequently detected pesticides in 2013 in strawberries are listed in Figure 2-19.[34] Compared to the control programme of 2010, the same pesticides were found in 2013, but most of them with higher detection rates. In 2013, MRL exceedances were noted for some pesticides that were not leading to exceedances in 2010 (i.e. mepanipyrim, trifloxystrobin, fenbutatin oxide, flutriafol, tetraconazole, propiconazole, formetanate, fenthion, flusilazole and propargite). Some of the non-approved pesticides leading to MRL exceedances in 2010 were not detected in 2013 (i.e. endosulfan, methomyl, profenofos, dichlorvos, methamidophos and monocrotophos).

Further information on the most frequently detected pesticides found (greater than 5 % of samples) in strawberries in 2013 is summarised in Table 2-5. The individual residue concentrations, expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-20.

[33] Captan and folpet are counted as one pesticide since the residue definition for apples is expressed as sum of captan and folpet. In the results it was not specified if only one or both pesticides were actually present in the sample analysed.

[34] Discrepancies are noted between the number of samples numerically exceeding results (represented in Figure 2-19) and the number of samples reported by the reporting country as exceeding the MRL (Figure 2-18) for the pesticides dichlofluanid, indoxacarb and procymidone.

Table 2-5: Pesticides most frequently detected in strawberries in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Boscalid (RD)	35.3	Approved systemic fungicide
Cyprodinil (RD)	35.1	Approved systemic fungicide
Fludioxonil	34.4	Approved non-systemic fungicide
Fenhexamid	25.9	Approved systemic fungicide
Pyraclostrobin	21.0	Approved systemic fungicide
Azoxystrobin	12.7	Approved fungicide
Mepanipyrim (RD)	12.5	Approved fungicide
Myclobutanil (RD)	12.5	Approved fungicide
Thiacloprid	11.4	Approved neonicotinoid insecticide
Iprodione (RD)	10.0	Approved non-systemic fungicides
Bupirimate	9.7	Approved fungicide
Trifloxystrobin (RD)	9.7	Approved fungicide
Spinosad (RD)	9.2	Approved insecticide allowed to be used in organic farming
Penconazole	7.9	Approved fungicide
Pyrimethanil	7.4	Approved non-systemic fungicide
Captan (RD) + Folpet (RD)	7.2	Non-systemic fungicides, both substances approved in the EU
Pirimicarb (RD)	5.9	Approved insecticide

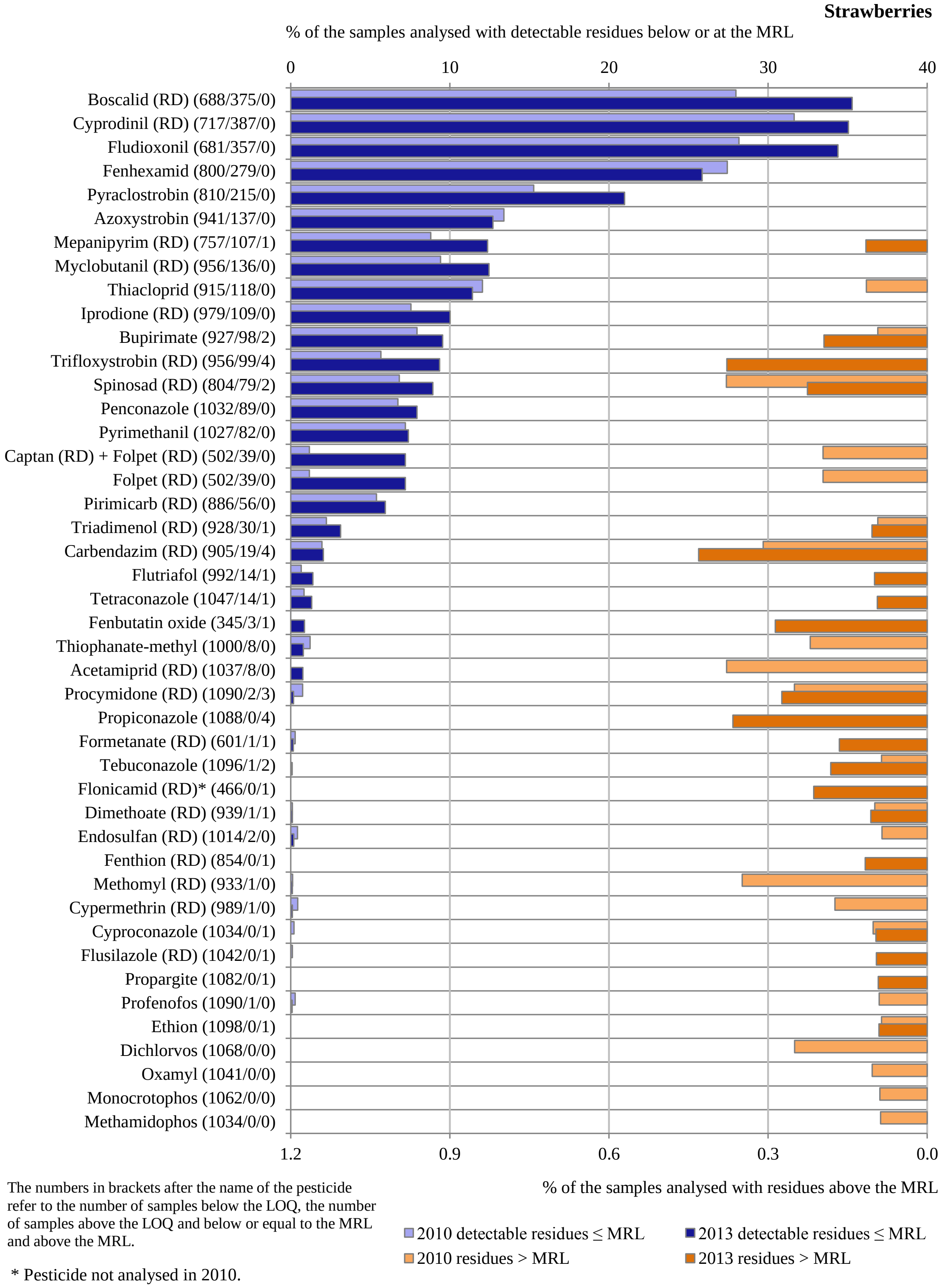


Figure 2-19: Percentage of strawberry samples with detectable residues below or equal to the MRL and with residues above the MRL

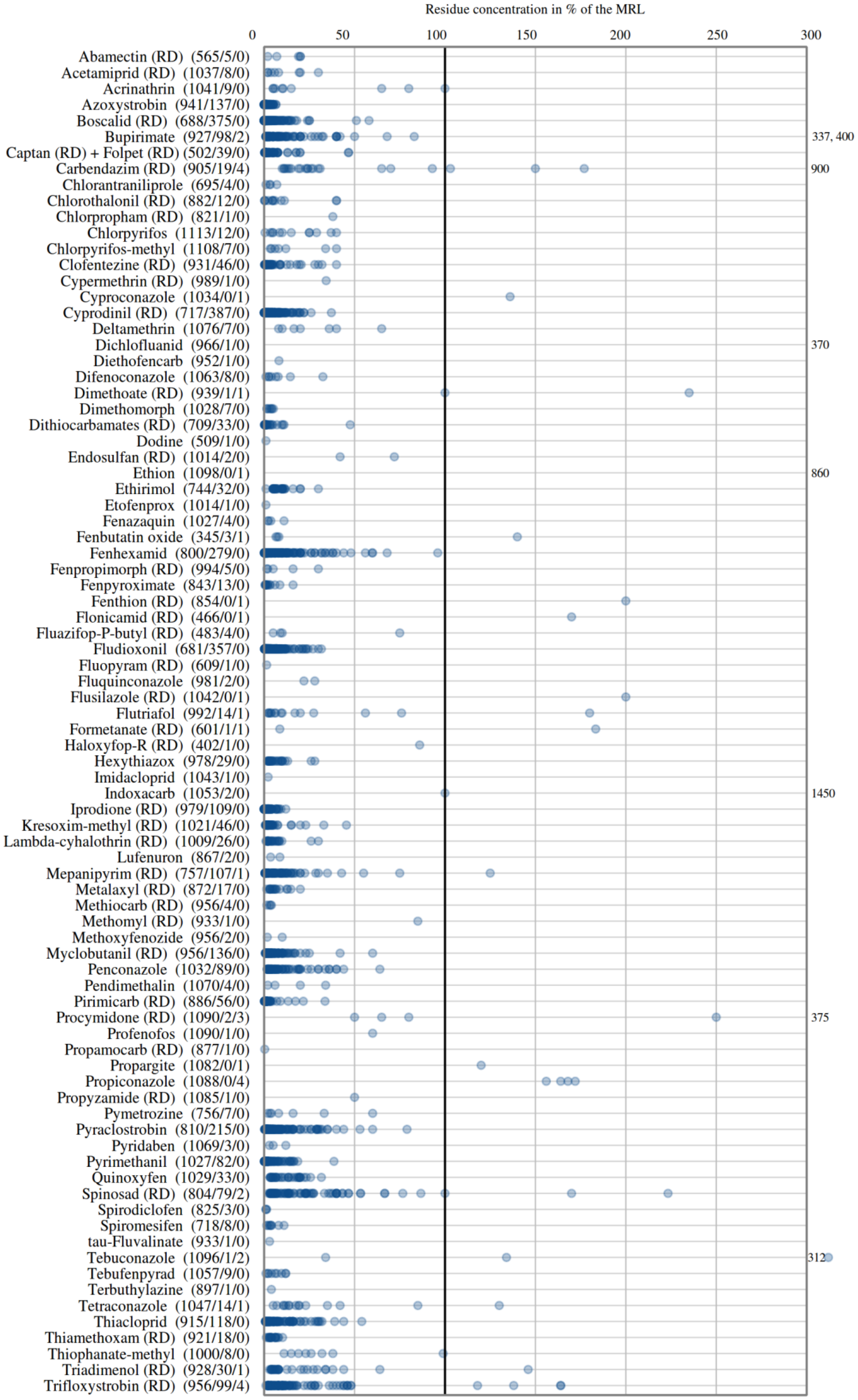


Figure 2-20: Residue concentrations measured in strawberries, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.7. Tomatoes

In 2013, 1 451 samples of tomatoes were analysed; in 717 samples (49 %) no pesticide residues were detected, while 734 samples contained one or several pesticides in measurable concentrations. Of these, 390 samples (27 %) contained multiple residues; up to 13 different pesticides were detected in individual tomato samples (Figure 2-21).

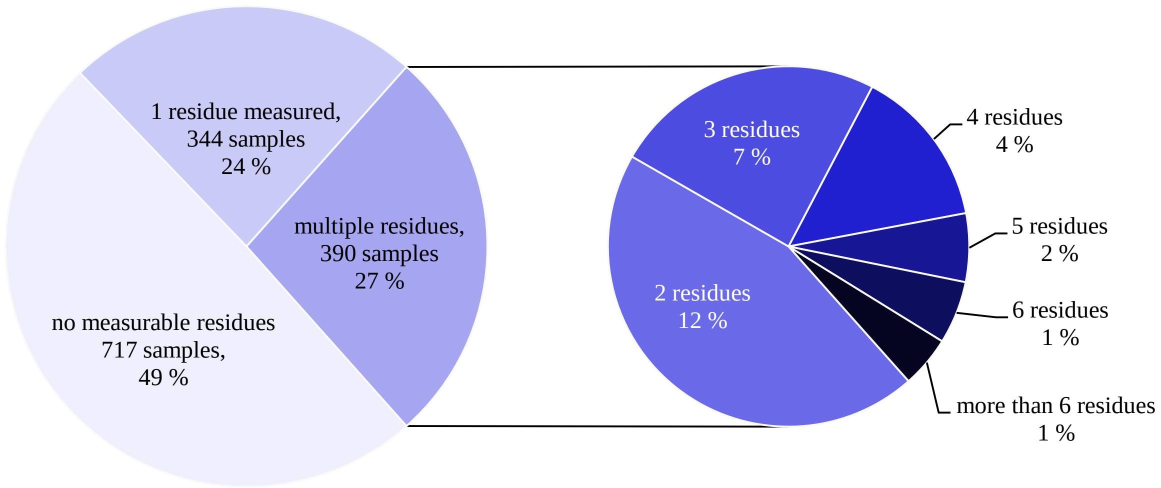


Figure 2-21: Number of detectable residues in individual tomato samples

In 0.9 % of the samples (13 samples), the residue concentration exceeded the MRL. The rate of non-compliant samples was 0.3 % samples (five samples).

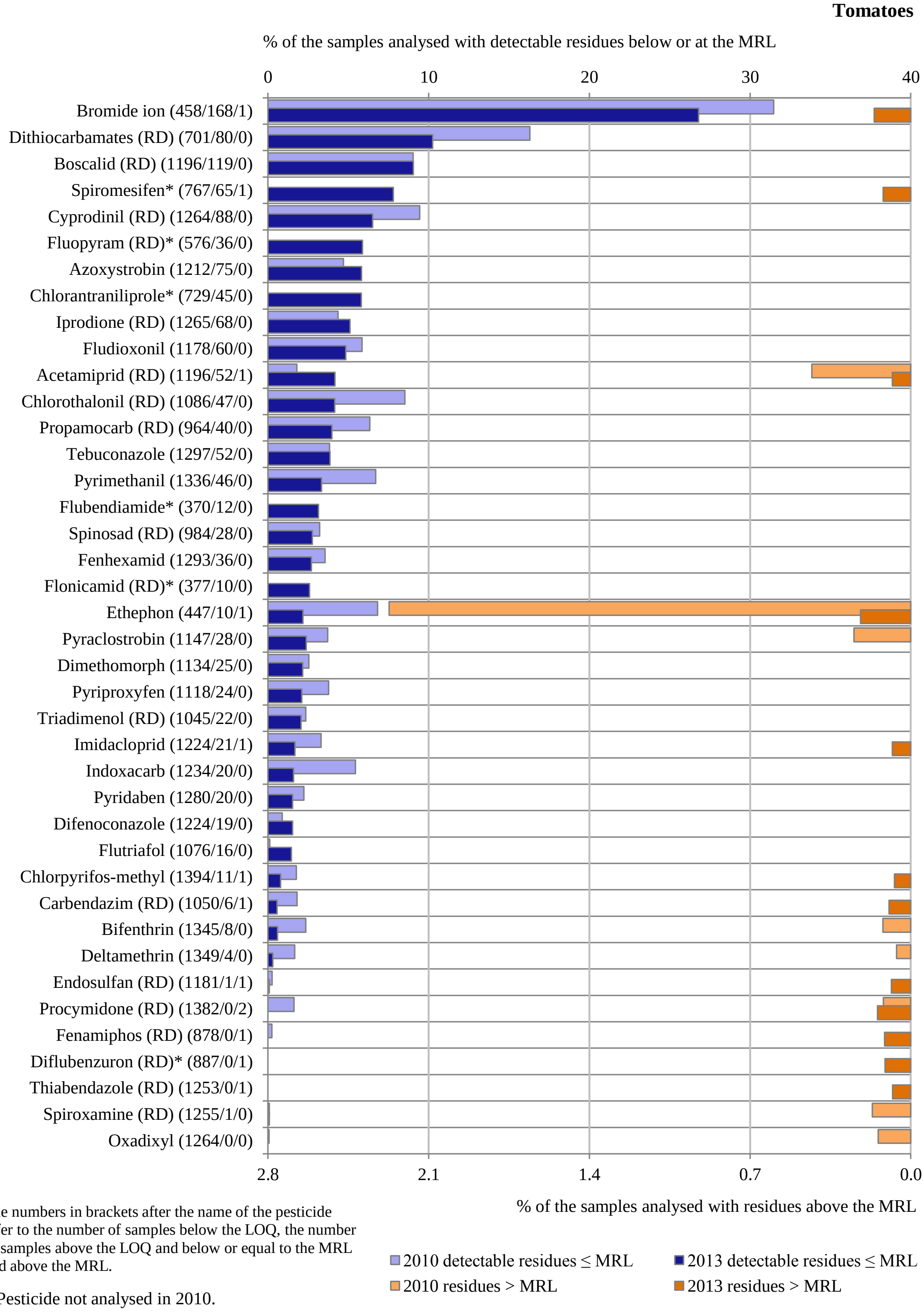
In total, 82 different pesticides were detected. The most frequently found residue was bromide ion (detected in 27.0 % of the tested samples), which is a naturally occurring substance and is not an unambiguous marker for the use of the pesticide methyl bromide. In addition, dithiocarbamates (RD) and boscalid were frequently detected in 10.2 % and 9.0 % of the samples analysed, respectively. The MRL exceedances were related to 12 pesticides with the highest number of samples exceeding the legal limit related to procymidone (RD) (in two samples, from Morocco and Italy).

The pesticides most frequently detected in tomatoes in 2013 are listed in Figure 2-22. Compared to the control programme of 2010, practically the same pesticide pattern was found with slightly lower detection rates for most pesticides. It is noted that for ethephon, the MRL exceedance rate significantly decreased from 2.3 % in 2010 to 0.2 % in 2013.

Further information on the most frequently detected pesticides found in tomatoes in 2013 is summarised in Table 2-6. The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-23.

Table 2-6: Pesticides most frequently detected in tomatoes in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Bromide ion	27.0	Naturally occurring substance, is a metabolite of the pesticide methyl bromide, which since 2009 is no longer approved in the EU
Dithiocarbamates (RD)	10.2	Approved group of non-systemic fungicides
Boscalid (RD)	9.0	Approved systemic fungicide
Spiromesifen	7.9	Approved non-systemic insecticide
Cyprodinil (RD)	6.5	Approved systemic fungicide
Fluopyram (RD)	5.9	Approved fungicide
Azoxystrobin	5.8	Approved fungicide
Chlorantraniliprole	5.8	Approved insecticide
Iprodione (RD)	5.1	Approved non-systemic fungicide



The numbers in brackets after the name of the pesticide refer to the number of samples below the LOQ, the number of samples above the LOQ and below or equal to the MRL and above the MRL.

* Pesticide not analysed in 2010.

Figure 2-22: Percentage of tomato samples with detectable residues below or equal to the MRL and with residues above the MRL

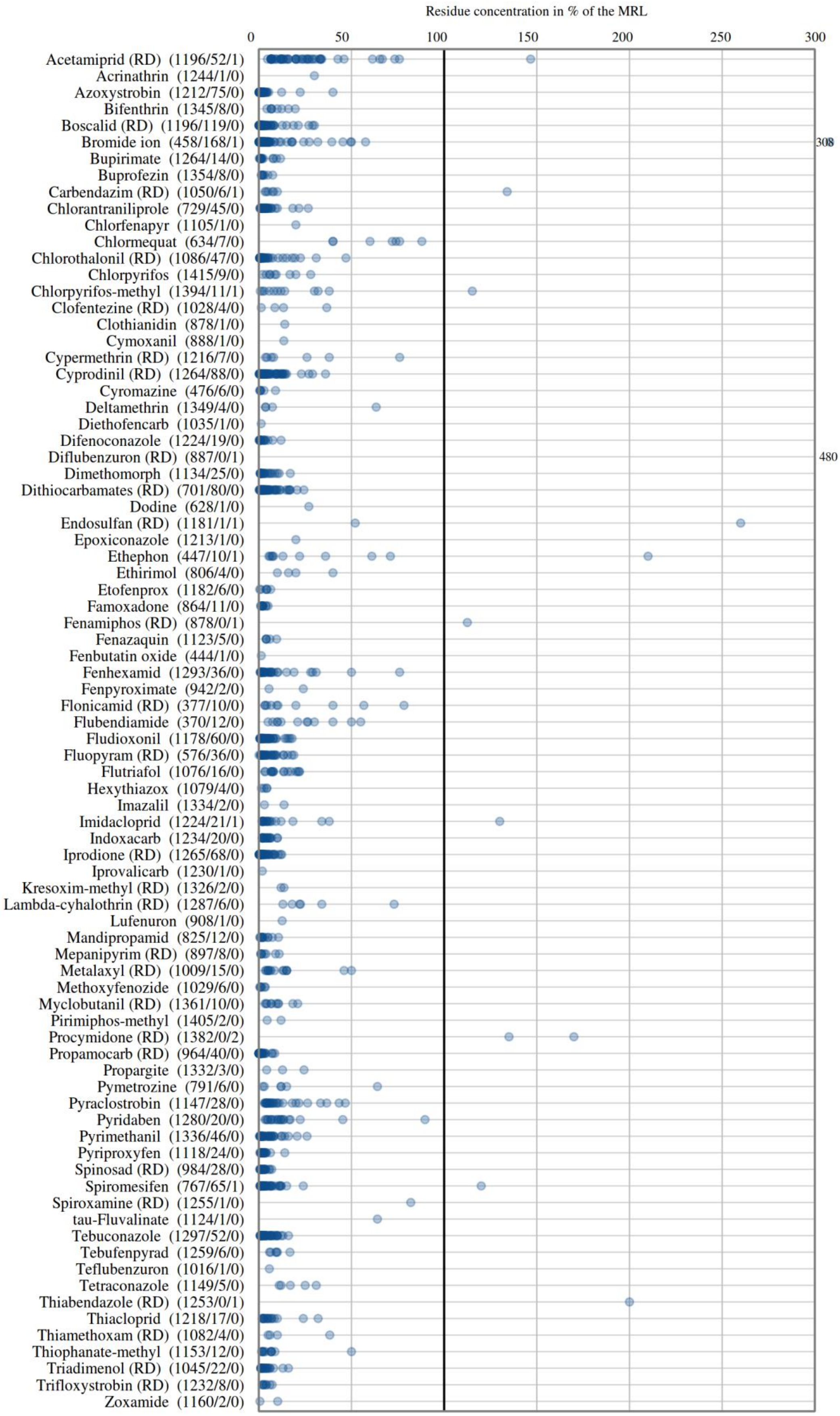


Figure 2-23: Residue concentrations measured in tomatoes, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.8. Oats

In 2013, 232 samples of oats were analysed. Compared to other food products covered by the EU-coordinated programme, the number of samples is lower, since the 2013 monitoring regulation defined oats and rye as alternative products to be analysed.[35] In 126 samples (54 %) no pesticide residues were detected, while 106 samples contained one or several pesticides in measurable concentrations. Multiple residues were found in 65 samples (28 %); up to three different pesticides were detected in individual oat samples (Figure 2-24).

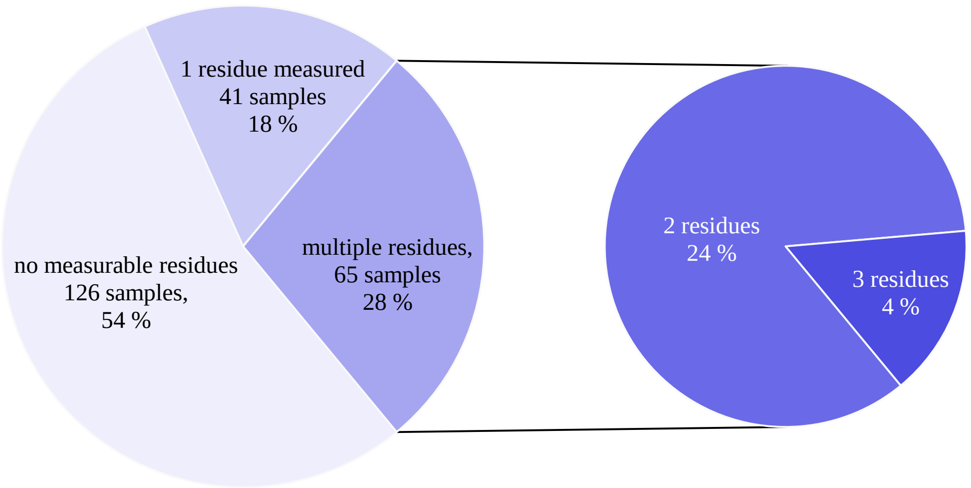


Figure 2-24: Number of detectable residues in individual oat samples

In 1.3 % of the samples (three samples), the residue concentration exceeded the MRL, whereas in 0.9 % of the samples (two samples), the residue concentration was reported as non-compliant.

In total, 17 different pesticides were detected. The most frequently found pesticides were chlormequat (detected in 61.8 % of the tested samples) and glyphosate (in 44.4 % of the samples). The MRL exceedances were related to three different pesticides: chlormequat (one sample from the United Kingdom), dichlorvos (one sample from Italy) and chlorpyrifos (one sample from Bulgaria).

All pesticides detected in oats in 2013 are listed in Figure 2-25, ranked according to the frequency of detection. Compared to 2010, the pesticide pattern detected in oats was comparable with some higher detection rates for chlormequat and glyphosate in 2013. It is noted that for chlormequat the MRL exceedance rate significantly decreased from 8.1 % in 2010 to 0.8 % in 2013.

Further information on the most frequently detected pesticides found in oats in 2013 is summarised in Table 2-7. The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-26.

Table 2-7: Pesticides most frequently detected in oats in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Chlormequat	61.8	Approved plant growth regulator
Glyphosate	44.4	Approved non-systemic herbicide. In cereals it is used pre-harvest as desiccant
Dithiocarbamates (RD)	6.0	Approved group of non-systemic fungicides

[35] Due to the lower number of samples, the results for oat are affected by a higher level of statistical uncertainty.

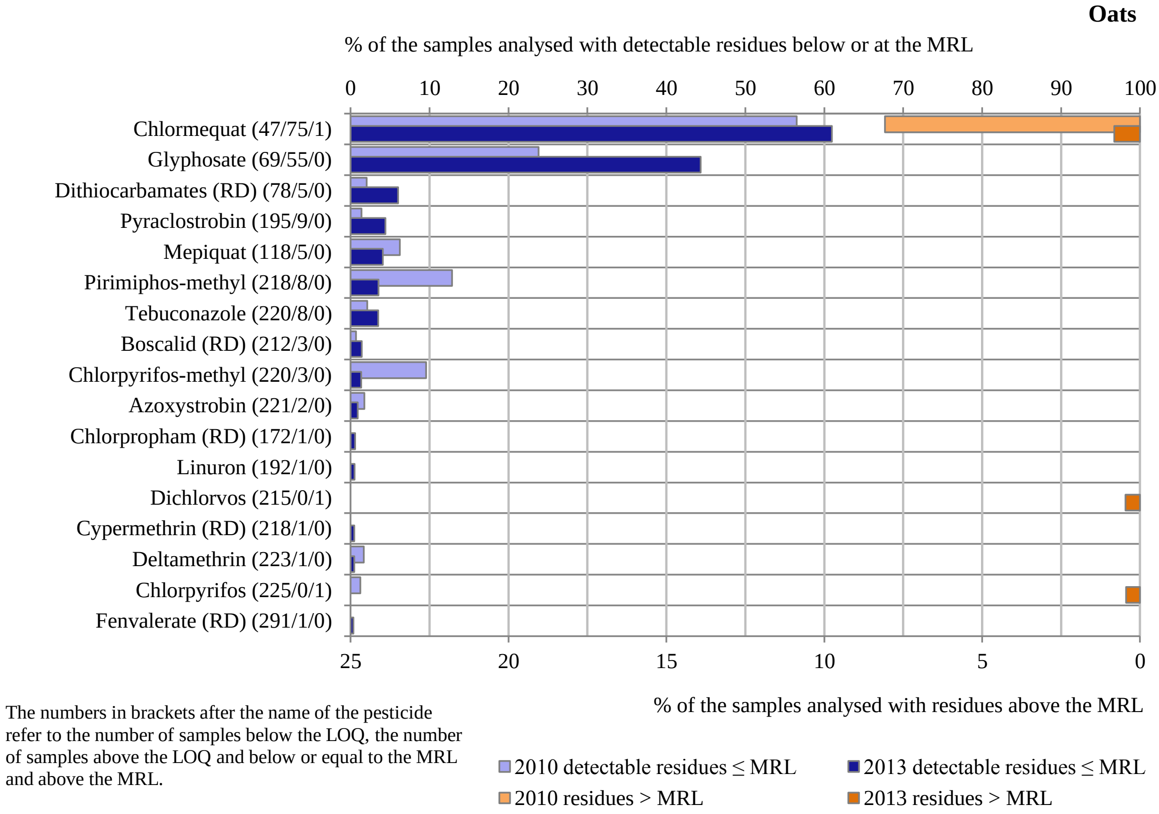


Figure 2-25: Percentage of oats samples with detectable residues below or equal to the MRL and with residues above the MRL

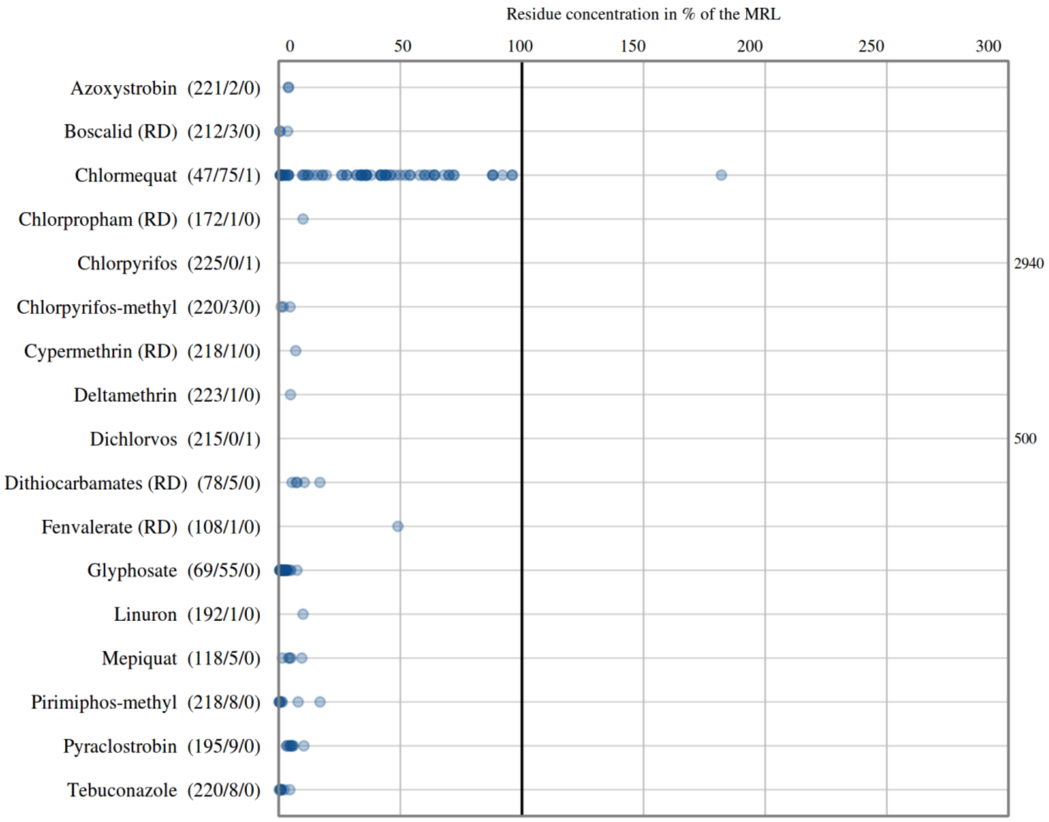


Figure 2-26: Residue concentrations measured in oats, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.9. Rye

In 2013, 424 samples of rye were analysed. Compared to other food products covered by the EU-coordinated programme, the number of samples is lower, since the 2013 monitoring regulation defined rye and oats as alternative products to be analysed.[36] In 249 samples (59 %) no pesticide residues were detected, while 175 samples contained one or several pesticides in measurable concentrations. Multiple residues were detected in 68 samples (16 %); up to three different pesticides were detected in the same sample of rye (Figure 2-27).

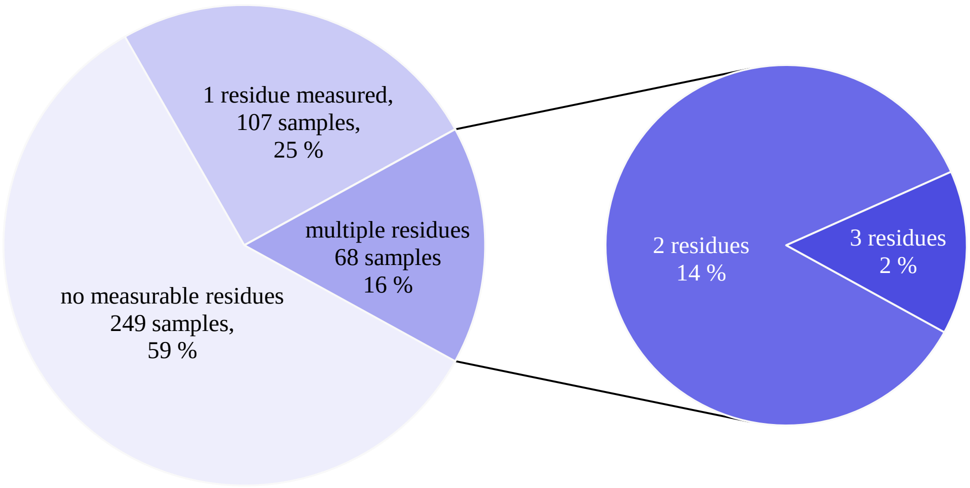


Figure 2-27: Number of detectable residues in individual rye samples

In total, 16 different pesticides were detected. The most frequently found residues were chlormequat (detected in 40.3 % of the analysed samples), bromide ion (37.3 %) and mepiquat (16.8 %). There were no samples exceeding the MRL in 2013.

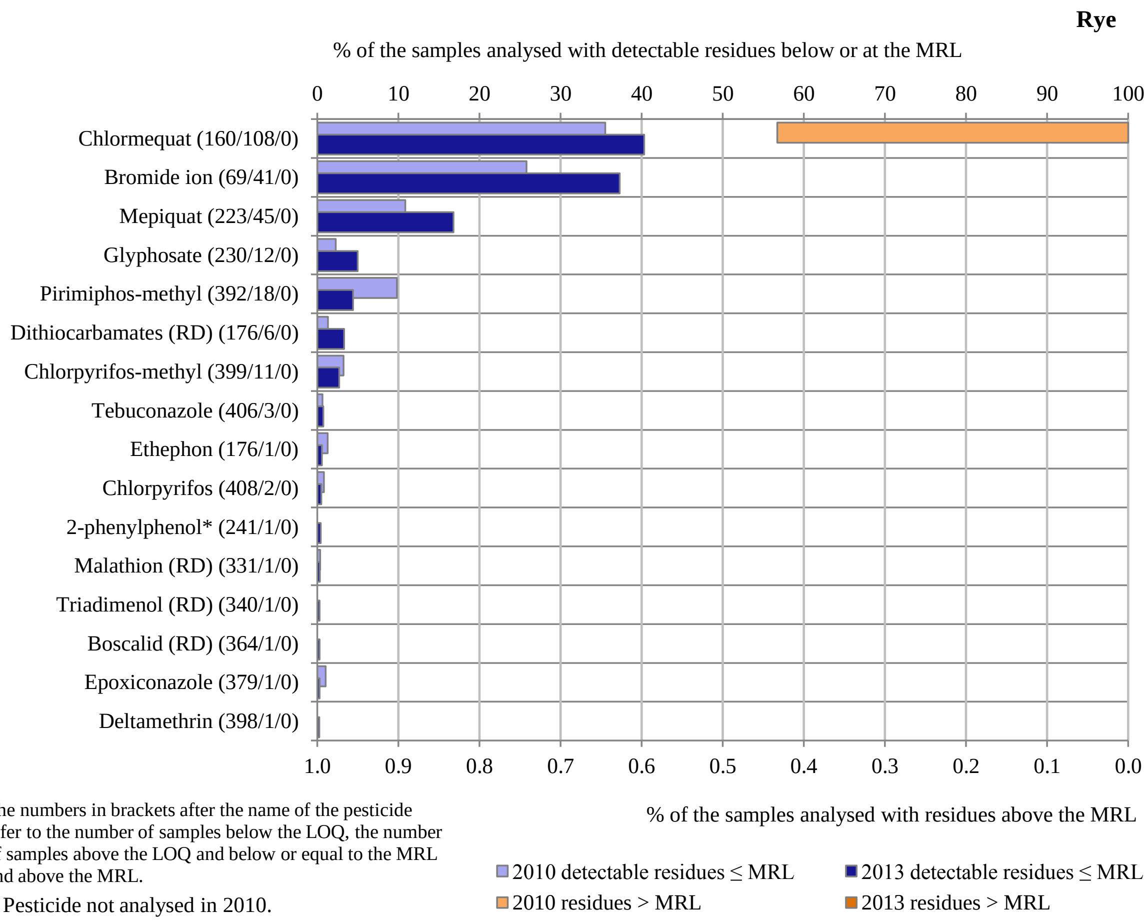
All pesticides found are listed in Figure 2-28, ranked according to the frequency of detection in 2013. For most of the detected pesticides the detection rate was higher in 2013 compared to 2010. Comparing the results for oats and rye it is noted the frequency of glyphosate residues was significantly higher for oats whereas bromide ion was only found in rye.

Further information on the most frequently detected pesticides found in 2013 in rye is summarised in Table 2-8. The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-29.

[36] Due to the lower number of samples, the results for rye are affected by a higher level of statistical uncertainties.

Table 2-8: Pesticides most frequently detected in rye in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Chlormequat	40.3	Approved plant growth regulator
Bromide ion	37.3	Naturally occurring substance and metabolite of the pesticide methyl bromide, which since 2009 is no longer approved in the EU
Mepiquat	16.8	Approved plant growth regulator
Glyphosate	5.0	Approved non-systemic herbicide. Used as a pre-harvest as desiccant in cereals



The numbers in brackets after the name of the pesticide refer to the number of samples below the LOQ, the number of samples above the LOQ and below or equal to the MRL and above the MRL.

* Pesticide not analysed in 2010.

Figure 2-28: Percentage of rye samples with detectable residues below or equal to the MRL and with residues above the MRL

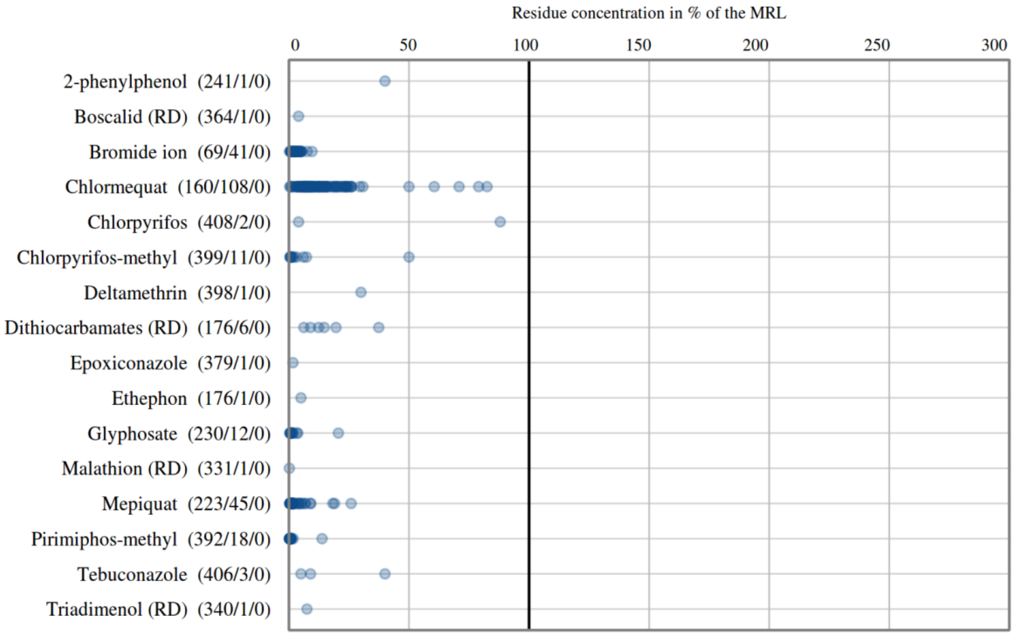


Figure 2-29: Residue concentrations measured in rye, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.3.10. Wine (red or white)

In 2013, 941 samples of wine (made from wine grapes) were analysed; in 518 samples (55 %) no pesticide residues were detected, while 423 samples contained one or several pesticides in measurable concentrations. 213 samples (23 %) contained multiple residues; up to 11 different pesticides were detected in individual wine samples (Figure 2-30).

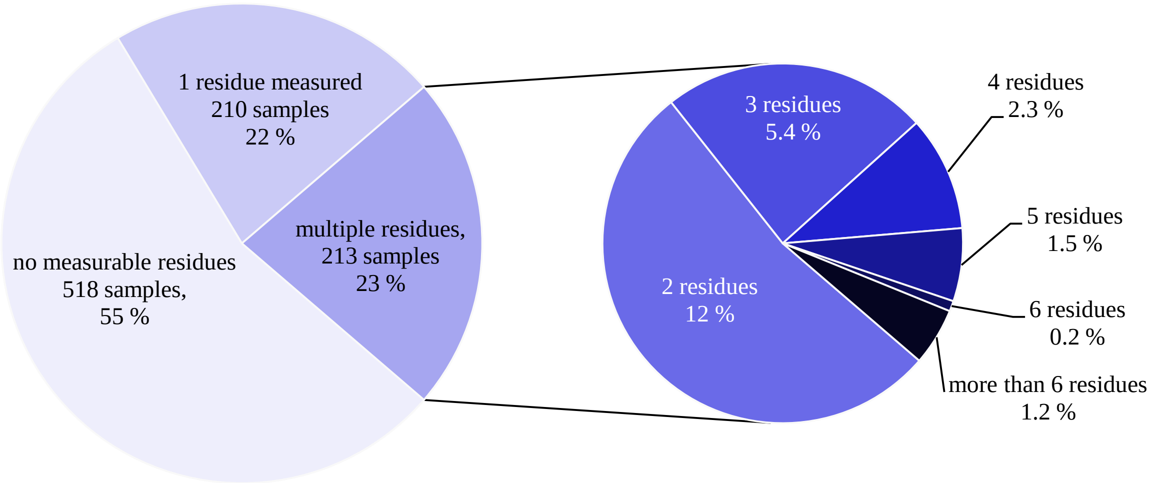


Figure 2-30: Number of detectable residues in individual wine samples

In one sample originating from Argentina (0.1 % of the samples analysed), the residue concentration for carbendazim (RD) exceeded the MRL. This finding was considered as a non-compliance. In total, 37 different pesticides were detected. The most frequently found pesticides were boscalid (RD) (detected in 14.3 % of the tested samples), fenhexamid (13.7 %) and dimethomorph (10.6 %).

All pesticides found in 2013 in wine are listed in Figure 2-31, ranked according to the frequency of detection. Since wine was not included in previous EU-coordinated monitoring programmes, no comparison of the 2013 results with previous years is possible. Differences between white and red wine production leading to significant number of detections could not be concluded.

Further information on the most frequently detected pesticides found in wine in 2013 is summarised in Table 2-9. The individual residue concentrations expressed as a percentage of the MRLs of the respective pesticide established for wine grapes, are plotted in Figure 2-32.[37]

Table 2-9: Pesticides most frequently detected in wine in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
Boscalid (RD)	14.3	Approved systemic fungicide
Fenhexamid	13.7	Approved systemic fungicide
Dimethomorph	10.6	Approved systemic fungicide
Metalaxyl (RD)	9.1	Approved systemic fungicide
Pyrimethanil	7.9	Approved non-systemic fungicide
Dithiocarbamates (RD)	7.8	Approved group of non-systemic fungicides
Carbendazim (RD)	7.4	Approved systemic fungicide
Glyphosate	7.3	Approved non-systemic herbicide
Iprovalicarb	7.2	Approved systemic fungicide
Methoxyfenozide	5.2	Approved insecticide
Iprodione (RD)	5.2	Approved non-systemic fungicides

[37] No processing factors were taken into account. The residues measured in the wine were directly compared with the MRL established for wine grapes.

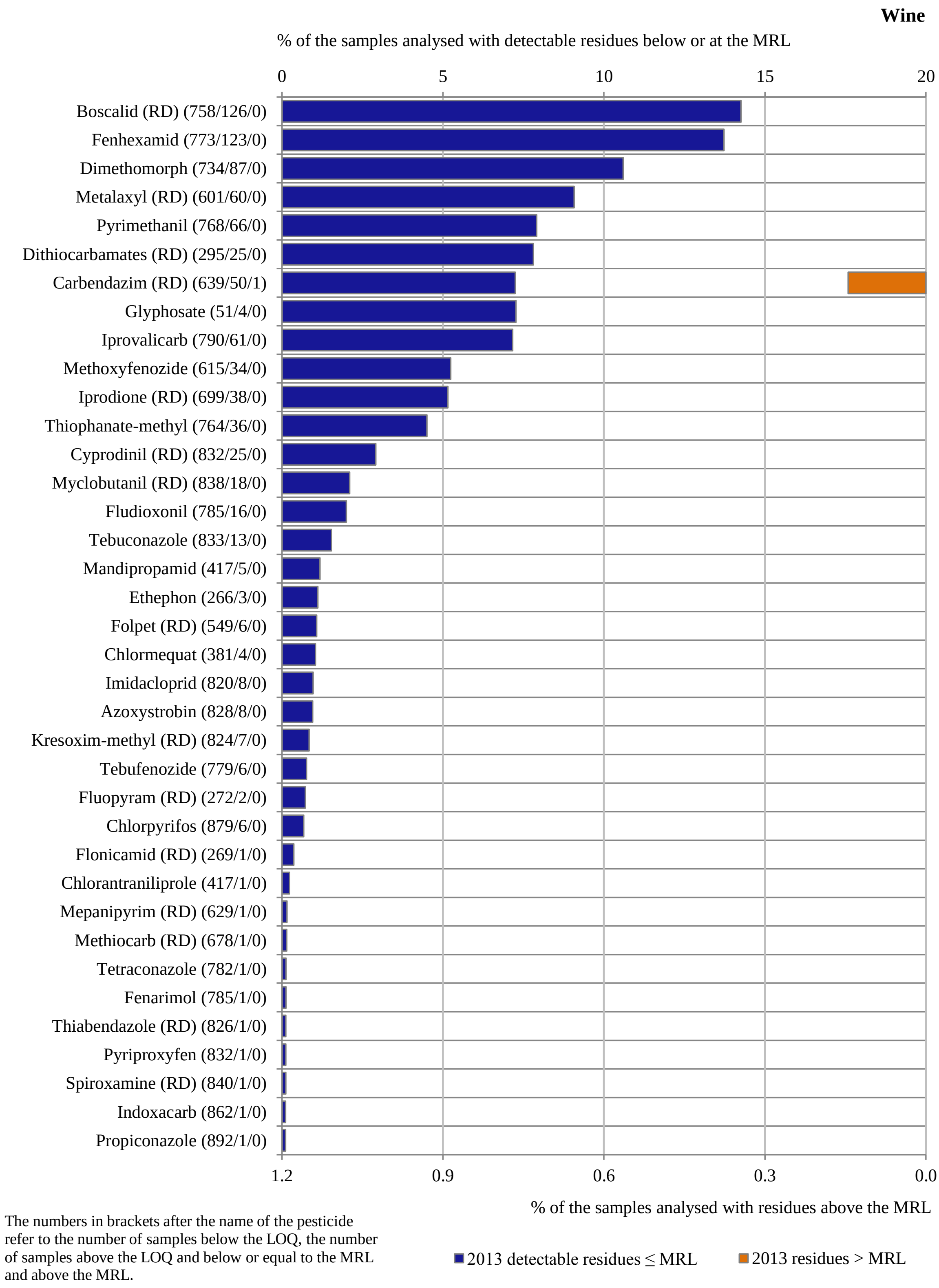


Figure 2-31: Percentage of wine samples with detectable residues below or equal to the MRL and with residues above the MRL set for wine grapes (processing factors were not taken into account)

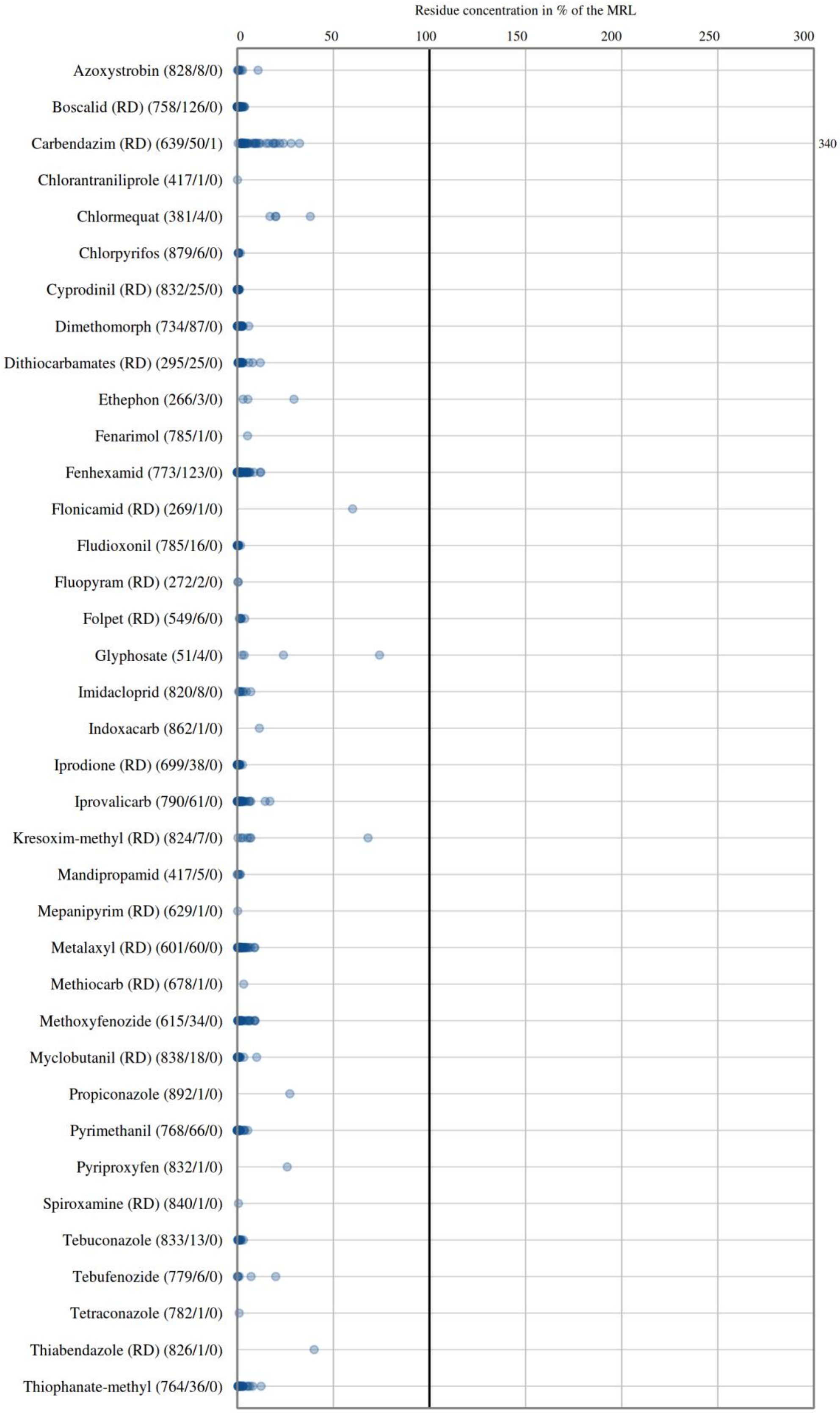


Figure 2-32: Residue concentrations measured in wine, expressed as a percentage of the MRL for wine grapes (only samples with residues > LOQ)

2.3.11. Cow's milk

In 2013, 1 021 samples of cow's milk were analysed; in 942 samples (92.3 %) no pesticide residues were detected, while 79 samples contained one or several pesticides in measurable concentrations. 36 samples (3.5 %) contained multiple residues; up to three different pesticides were detected in individual cow's milk samples (Figure 2-33).

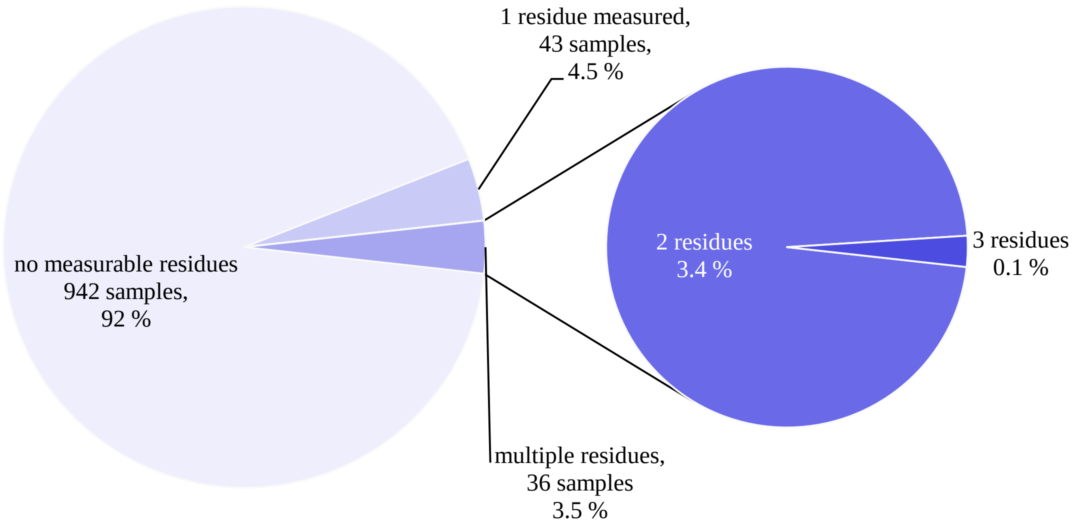


Figure 2-33: Number of detectable residues in individual cow's milk samples

No sample exceeded the legal limits. In total, five different pesticides were detected. All of them are persistent pollutants present in the environment due to their use as pesticides in the past. The most frequently found pesticides were DDT (RD) (detected in 6.0 % of the tested samples) and hexachlorobenzene (5.9 %). DDT was previously used as a pesticide, but it is banned since 1979 in Europe. Due to its persistence in the environment and its accumulation in the food chain it is still detectable in food of animal origin, mainly in fat.

All pesticides found in 2013 in cow's milk are listed in Figure 2-34, ranked according to the frequency of detection. Comparing the 2010 results with 2013, the detection rate for DDT (RD) declined from 10.5 % to 6.0 % in 2013. Lindane and heptachlor (RD) were not detected in 2010 whereas they were found sporadically in 2013.

Further information on the most frequently detected pesticides found in cow's milk in 2013 is summarised in Table 2-10. The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-35.

Table 2-10: Pesticides most frequently detected in cow's milk in 2013

Pesticide	% samples above LOQ	Further information on the pesticides found
DDT (RD)	6.0	Persistent organic pollutant, the use as pesticide is banned in Europe since 1979
Hexachlorobenzene	5.9	Persistent organic pollutant, the use as pesticides is banned in Europe since 1979

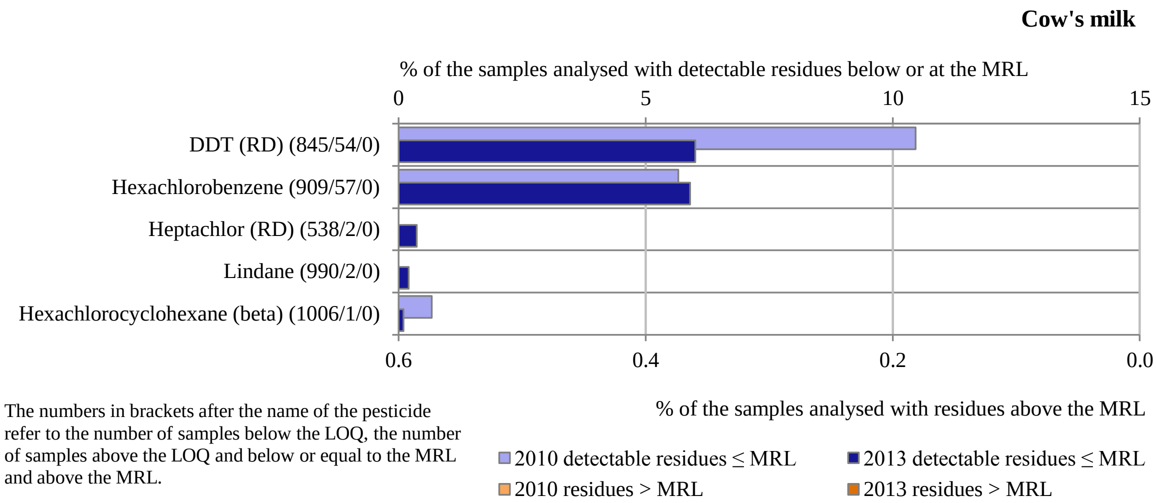


Figure 2-34: Percentage of cow's milk samples with detectable residues below or equal to the MRL. None of the samples exceeded the MRL

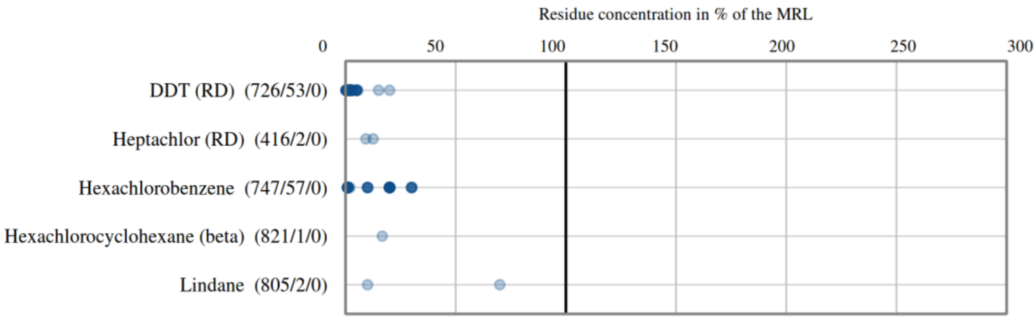


Figure 2-35: Residue concentrations measured in cow's milk, expressed as a percentage of the MRL set for milk (only samples with residues > LOQ)

2.3.12. Swine meat

In 2013, 753 samples of swine meat were analysed; in 735 samples (97.6 %) no pesticide residues were detected, while 18 samples contained one or several pesticides in measurable concentrations. Four samples (0.5 %) contained multiple residues; a maximum of two different pesticides were detected in individual swine meat samples (Figure 2-36).

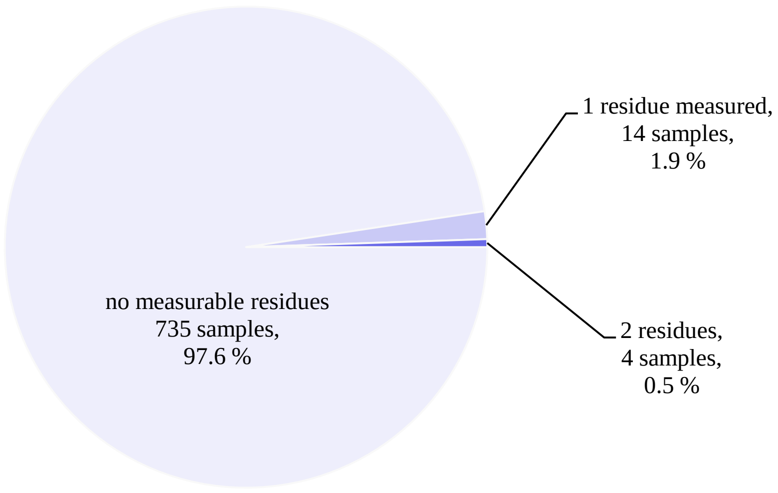


Figure 2-36: Number of detectable residues in individual swine meat samples

No MRL exceedances were identified in swine meat. In total, seven different pesticides were detected. The most frequently found pesticide was DDT (RD) (detected in 1.6 % of the tested samples). Due to its persistence in the environment and its accumulation in the food chain it is still detectable in food of animal origin, mainly in fat.

All pesticides found in swine meat are listed in Figure 2-37, ranked according to the frequency of detection in 2013. The pesticide pattern detected in 2013 was comparable with the findings of 2010. However, the frequency of detections was lower in 2013 for DDT (RD), lindane and hexachlorobenzene. Azinphos-ethyl and deltamethrin were only detected in 2013, but not in 2010.

The individual residue concentrations expressed as a percentage of the MRL of the respective pesticide, are plotted in Figure 2-38.

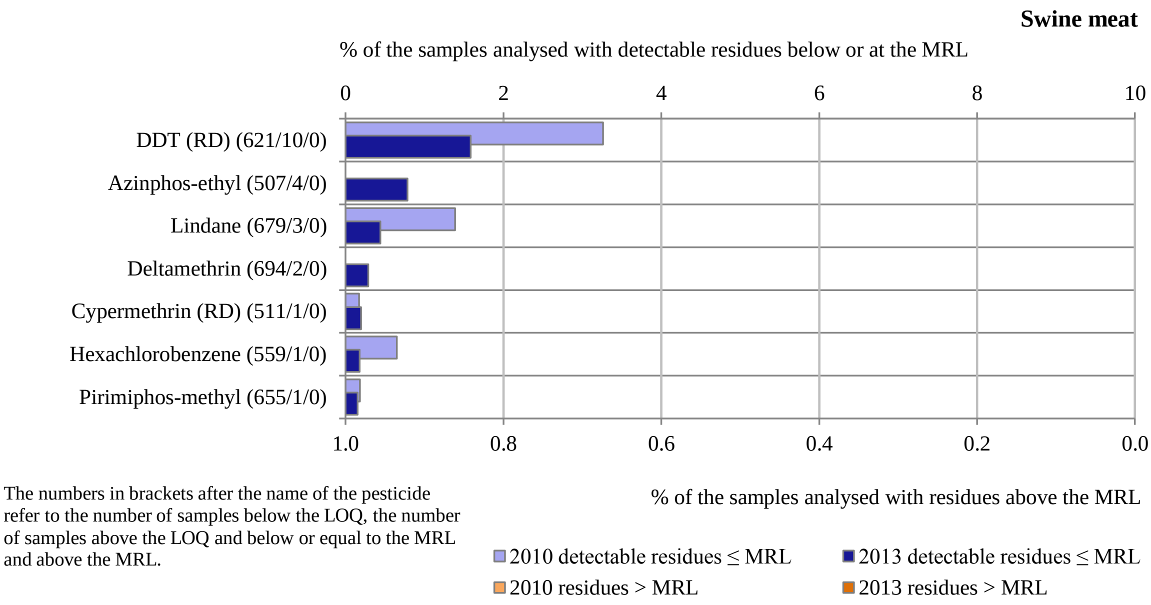


Figure 2-37: Percentage of swine meat samples with detectable residues below or equal to the MRL. None of the pesticides exceeded the MRL

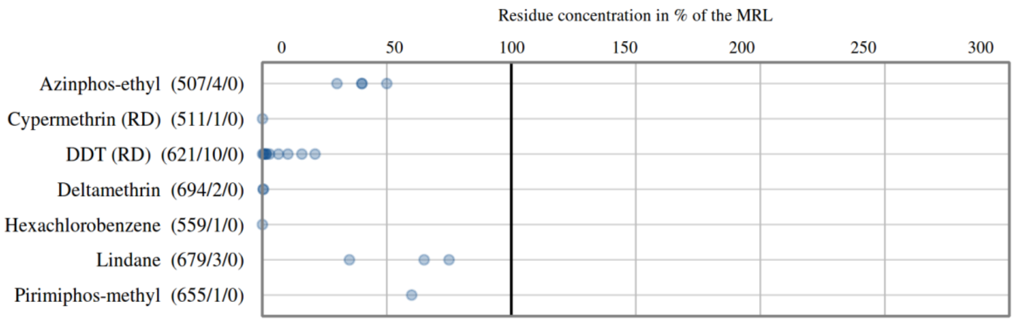


Figure 2-38: Residue concentrations measured in swine meat, expressed as a percentage of the MRL (only samples with residues > LOQ)

2.4. Results by country of origin

Table 2-11 shows the percentages of samples with detectable residues below the MRL and the percentage of samples above the MRL for each food product of the EUCP, clustered by country where the food products were produced (country of origin). In the upper part of the table the results for samples originating from EU Member States and EFTA countries are summarised, while the results for third countries can be found in the lower part of the table.

Table 2-11: Detection rate and MRL exceedance rate by country of origin and food product

Sample origin	Overall number of samples	% above the LOQ and below the MRL														% above the MRL													
		Number of samples	Apples	Head cabbage	Leek	Lettuce	Peaches	Strawberries	Tomatoes	Oats	Rye	Wine	Cow's milk	Swine meat	Total in %	Number of samples	Apples	Head cabbage	Leek	Lettuce	Peaches	Strawberries	Tomatoes	Oats	Rye	Wine	Cow's milk	Swine meat	Total in %
EU Member States and EFTA countries																													
Austria	121	43	85	23	17	14	0	100	33		0	63	15	0	36	1	0	7.7	0	0	0	0	0		0	0	0	0	0.8
Belgium	293	189	91	24	61	92		88	56		100	100	0	0	65	2	0	0	0	0		3.9	0		0	0	0	0	0.7
Bulgaria	129	57	73	100	100	33	70	36	31	50	50	80	0	0	44	9	0	0	0	42	0	18	6.3	25	0	0	0	0	6.2
Croatia	6	3	100	0					100				0		50	0	0	0					0				0		0
Cyprus	192	69	43	6	0	50	43	33	78			30	7	0	36	11	7.1		11	8.3	4.3	11	0			0	0	0	5.7
Czech Republic	131	54	100	80	0	58	67	100	100	0	21	63	0	6	41	0	0	0	0	0		0	0	0	0	0	0	0	0
Denmark	283	63	18	0	17	45		75	26	0	5		0	0	22	0	0	0	0	0		0	0	0	0		0	0	0
Estonia	112	55	17	88	40	20		50	75	33	89		0	31	49	4	0	0	0	0		22	0	0	0		0	0	3.6
Finland	159	45	47	0	13	0		77	10	6	35		0		28	0	0	0	0	0			0	0	0		0		0
France	570	306	66	9	39	64	86	73	53	47	22	43	0	0	54	8	1.5	4.5	1.1	4.3	0	2.2	0	0	0	0	0	0	1.4
Germany	1169	643	87	21	53	81	33	92	89	0	55	67	36	1	55	2	0	0	0	1.4	0		0	0	0	0	0	0	0.2
Greece	276	113	60	0	13	52	67	48	40	0		28	0	0	41	3	0	0	0	0	1.8	3.7	2.3	0		0	0	0	0.7
Hungary	260	97	59	26	0	40	45	67	55		50	75	0	0	37	2	3.1	0	0	2.5	0	0	0		0	0	0	0	0.8
Iceland	15	2		0		0		50	13						13	1		0		0		50	0						6.7
Ireland	157	59	75	36	36	82		100	67	52			0		38	1	0	9.1	0	0		0	0	0			0		0.6
Italy	1221	634	55	13	11	62	77	72	39	9	0	41	0	0	52	10	0	0	0	2.5	0.4	2.7	2.1	9.1	0	0	0	0	0.6
Latvia	96	14	27	15	8	0		31	0	25	40		0	0	15	1	9.1	0	0	0		0	0	0	0		0		1.0
Lithuania	117	30	38	12	29	38		53	50	25	38		0	0	26	3	0	12	0	0		5.9	0	0	0		0	0	2.6
Luxembourg	67	18	100	33	25	20			50		100	73	0	0	27	0	0	0	0	0			0		0	0	0	0	0
Malta	89	38		21	50	43	63	64	47			64	0	0	43	1		0	0	0	0	9.1	0			0	0	0	1.1
Netherlands	681	333	80	9	38	57	100	92	49	25	0	62	0	13	49	5	0	0	0	3.3	0	2.4	0.5	0	0	0	0	0	0.6
Norway	90	15	43	0	0	25		33	33	18	100		0	0	17	0	0	0	0	0		0	0	0	0		0	0	0
Poland	485	216	77	19	18	69	80	72	63	20	38	0	0	0	45	5	1.0	1.9	0	3.1	0	1.7	2.5	0	0	0	0	0	0.8
Portugal	189	109	67	66	50	62	60	63	54	0	0	60			58	9	25	0	3.8	0	0	4.2	4.2	0	0	0			4.2
Romania	563	133	44	6	9	22	20	17	15	0	13	45	16	14	24	4	0	0	0	6.9	0	0	0	0	0	0	0	0	0.7
Slovakia	92	57	76	92		43	100	33	71	33	43	60	87	0	62	0	0	0		0	0	0	0	0	0	0	0	0	0
Slovenia	228	106	83	0	0	35	82	92	60		0	70	0	0	46	2	0	0	0	2.5	9.1	0	0		0	0	0	0	0.9
Spain	1773	1016	41	45	10	56	77	77	61	0	13	24	2	0	57	16	0	0	1.6	1.0	1.0	1.6	0.9	0	0	0	0	0	0.7
Sweden	103	30	86	8	33	25		100	25	0	93		0	0	29	0	0	0	0	0		0	0	0	0		0	0	0
United Kingdom	695	194	72	31	11	55		98	17	97		0	0	2	28	2	0	0	0	0		2.2	0	1.5		0	0	0	0.3
EU (not specified)	7	3								0	0	75			43	1							0	0	0			0	0
Total	**10 369**	**4744**	**64**	**23**	**33**	**56**	**74**	**75**	**48**	**45**	**44**	**46**	**8**	**3**	**46**	**102**	**1.0**	**0.9**	**0.5**	**2.3**	**1.0**	**3.0**	**0.9**	**1.3**	**0**	**0**	**0**	**0**	**0.9**
Third countries																													
Argentina	46	24	57									36			52	1	0									9.1			2.2
Australia	27	19										70			70	0										0			0
Brazil	40	38	95									100			95	0	0									0			0
Chile	124	105	88				97	100				63			85	2	1.7				3	0				0			1.6
China	16	12	80					60				100			75	2	10					20				0			13
Egypt	17	8					0	46	100						47	0					0	0	0						0
FYRM [(a)]	51	18	27	25			100		67			63			35	1	9.1	0			0		0			0			2
Moldova	10	4	33									50			40	0	0									0			0

Sample origin	Overall number of samples	% above the LOQ and below the MRL														% above the MRL													
		Number of samples	Apples	Head cabbage	Leek	Lettuce	Peaches	Strawberries	Tomatoes	Oats	Rye	Wine	Cow's milk	Swine meat	Total in %	Number of samples	Apples	Head cabbage	Leek	Lettuce	Peaches	Strawberries	Tomatoes	Oats	Rye	Wine	Cow's milk	Swine meat	Total in %
Morocco	119	81			50		25	92	65						68	2			0		0	0	2.4						0
New Zealand	41	24	62									43			59	0	0									0			0
Russian Federation	11	0									0				0	0									0				0
South Africa	112	81	92				90					23			72	1	0				3.2					0			0.9
Turkey	161	57	33	0	14		29	19	43						35	1	0	0	0		4.8	0	0						0.6
United States	42	28	74			0		100				56			67	0	0			0		0				0			0
Others	396	110	80	19	27	69	85	75	75	29	23	24	3	0	28	1	0	0	0	0	0	5	0	0	0	0	0	0	0.3
Total	**1 213**	**609**	**76**	**22**	**29**	**65**	**75**	**60**	**58**	**29**	**17**	**42**	**3**	**0**	**50**	**11**	**1.1**	**0**	**0**	**0**	**2.9**	**2.2**	**0.9**	**0**	**0**	**0.5**	**0**	**0**	**0.7**
OVERALL	**11 582**	**5353**	**66**	**23**	**32**	**56**	**74**	**74**	**50**	**44**	**41**	**45**	**8**	**2**	**46**	**113**	**1.0**	**0.9**	**0.5**	**2.3**	**1.1**	**2.5**	**0.9**	**1.3**	**0**	**0.1**	**0**	**0**	**0.9**

(a): The Former Yugoslav Republic of Macedonia

No results
0
0 < % ≤ 10
10 < % ≤ 50
50 < % < 100
% = 100

No results
0
0 < % ≤ 1
1 < % ≤ 5
5 < % ≤ 10
% > 10

2.5. Overall results

Overall, 0.9 % of the 11 582 samples analysed in 2013 in the framework of the EU-coordinated monitoring programme exceeded the MRL (113 samples). Taking into account the measurement uncertainty, 0.5 % of the samples (66 samples) were considered to be non-compliant while the remaining samples exceeded the MRL numerically but were considered to be compliant. The number of samples with measurable residues above the reporting limit, but within the legally permitted level (above the LOQ but below the MRL) was 5 353 (46.3 %). The number of samples with no residues above the limit of quantification was 6 116 (52.8 %) (Figure 2-39).

Compared with 2010, the MRL exceedance rate declined (1.6 % of the samples analysed in 2010 in the framework of the EUCP exceeded the legal limit in place); the percentage of samples with detectable residues (above the LOQ and below the MRL) was in the same range (47.7 % in 2010 versus 46.2 % in 2013).

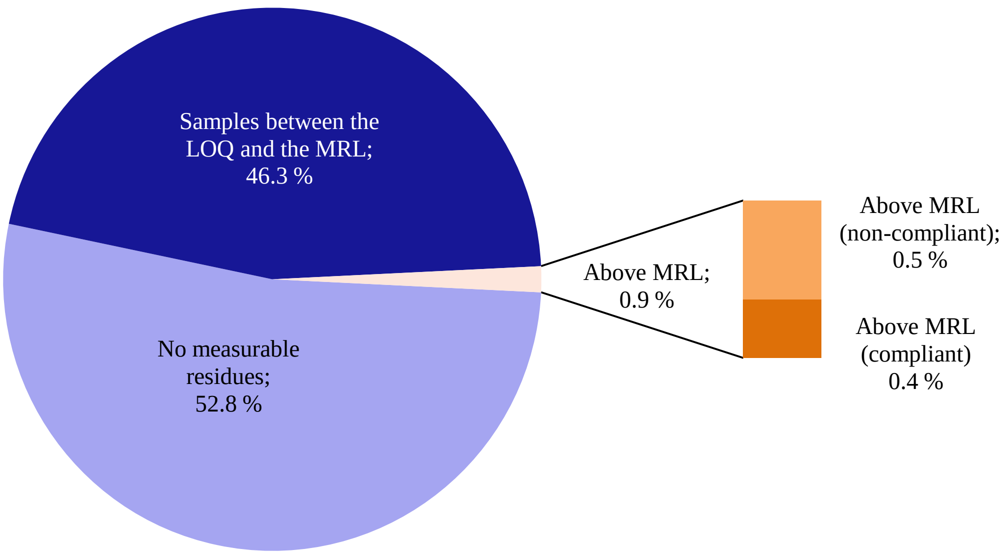


Figure 2-39: Overall proportion of EUCP samples with and without measurable residues, residues exceeding the MRL and non-compliant

Among the plant products (unprocessed) analysed in the 2013 EU-coordinated control programme, the lowest occurrence of MRL exceedance was in rye which had no MRL exceedance out of 424 samples, followed by wine (0.1 % out of 941 samples), leek (0.5 % out of 837 samples), head cabbage (0.9 % out of 917 samples) and tomatoes (0.9 % out of 1 451). The ascending ranking of plant products exceeding the MRL is continued with apples (1.0 % out of 1 610 samples), peaches (1.1 % out of 1 051), oats (1.3 % out of 232 samples), lettuce (2.3 % out of 1 194 samples) and strawberries (2.5 % out of 1 151 samples). The non-compliant rate of MRL exceedance followed the same ranking except for tomatoes (that was lower than leeks) and strawberries (that was lower than tomatoes). No MRL exceedance was identified in animal products (1 021 samples of cow's milk and 753 samples of swine meat).

SUMMARY CHAPTER 2

The 2013 monitoring regulation defined 12 food commodities to be analysed by the reporting countries. The programme covered a total of 209 pesticides, 191 in food of plant origin and 52 in food of animal origin. In total, 11 582 samples were analysed in the framework of the EU-coordinated monitoring programme.

No MRL exceedances were identified for rye (424 samples), cow's milk (1 021 samples) and swine meat (753 samples). The highest MRL exceedance rate was found for strawberries (2.5 % out of 1 151 samples), followed by lettuce (2.3 % out of 1 194 samples), oats (1.3 % out of 232 samples), peaches (1.1 % out of 1 051) and apples (1.0 % out of 1 610 samples). The MRL exceedance rate was below 1 % for the remaining products (head cabbage (0.9 %), tomatoes (0.9 %) leek (0.5 %) and wine (0.1 %)).

Overall, 0.9 % of the samples exceeded the MRL (113 samples); 0.5 % of the samples were found to be non-compliant with the legal limit, taking into account the measurement uncertainty. The number of samples with measurable residues but within the legally permitted level was 5 353 (46.3 %). In 52.8 % of the samples (6 116 samples), no quantifiable residues were found (residues below the LOQ).

The widest pattern of different pesticides was detected in strawberry samples (84 pesticides), tomatoes (82 pesticides) and peaches (80 pesticides), followed by lettuce (68 pesticides), apples (55 pesticides) and wine (37 pesticides); 35 different pesticides were found in head cabbage and leek samples, respectively. In oats and rye only a limited number of different pesticides were detected (17 and 16 pesticides, respectively). The number of different pesticides detected in swine meat and cow's milk was low (seven and five pesticides, respectively). Thus, the carry-over of pesticide residues to these animal products is of minor relevance.

Samples containing more than one pesticide (multiple residues) were found in all food products. The products with the highest percentage of samples with multiple residues were strawberries (63 %), peaches (53 %), apples (46 %) and lettuce (36 %). Lower occurrence levels were recorded for oats (28 %), tomatoes (27 %), wine (23 %), rye (16 %), leek (14 %) and head cabbage (4.8 %). The presence of multiple pesticide residues was low in animal products (3.5 % for milk and 0.5 % for swine meat).

All food products analysed in the 2013 EUCP except wine were also analysed in 2010; a comparison of the detection rates and the MRL exceedance rates was performed for 166 pesticides. Overall, the MRL exceedance rate in 2013 was lower or equal to that of 2010. The pesticide patterns detected in the different food products were comparable in 2010 and 2013; variations were noted for some pesticides but in most cases the results remained within the same range. It is noted that, on the one hand, the MRL exceedances related to certain non-approved pesticides have decreased or disappeared in 2013 (for apples, head cabbage, peaches and strawberries) but on the other hand, some new pesticides that were not present or that were within the legal limits in 2010, were found to exceed the MRLs in 2013, in particular in apples, lettuce and tomatoes.

3. National control programmes

In general, the national control programmes are risk based, focussing on products which are likely to contain pesticide residues or for which MRL infringements were previously identified in monitoring programmes. These programmes are not designed to provide statistically representative results for residues expected in food placed on the European market. The reporting countries define the priorities for their national control programmes taking into account the importance of food products in trade or in the national diets, the products with high residue prevalence or non-compliance rates in previous years, the use pattern of pesticides and the laboratory capacities. The number of samples and/or the number of pesticides analysed by the participating countries is determined by the capacities of national control laboratories and the available budget resources. Considering the specific needs in the reporting countries and the particularities of national control programmes, the results of national control programmes are not directly comparable.

In the framework of the national control programmes, reporting countries also provided the results of import controls as required by Regulation (EC) No 669/2009. These specific import controls are consequential of previously observed high incidences of non-compliant products imported from certain countries.

The first part of this chapter (Section 3.1) describes the design of the national programmes highlighting the differences in the approaches chosen by reporting countries. In the second part of the chapter (Section 3.2) the results of the national control activities are analysed in detail with regard to the main parameters describing the national programmes (food products/pesticides/countries of origin).[38] In these analyses, EFSA put specific emphasis on MRL exceedances for the reason that these findings may give indications of agricultural practices that give rise to potential consumer risk. However, it should be stressed again that since the national control programmes are targeted sampling strategies, the identified cases of MRL exceedances should not be considered as being statistically representative of the food available to European consumers.

3.1. Design of the national control programmes

In 2013, in total 80 967 samples were analysed for pesticide residues in the reporting countries. Thus, the total number of samples analysed under the national control programmes increased slightly compared with the previous reporting year (+ 3.3 %), where results for 78 390 samples were reported. The majority of samples (72 228 samples, 89.2 %) were surveillance samples, meaning that the samples were taken without targeting specific growers/producers/importers or consignments which were likely to be non-compliant.

The number of samples per reporting country and the sampling frequency per 100 000 inhabitants of the reporting country are illustrated in Figure 3-1 and Figure 3-2. It should be highlighted that some countries made efforts to increase the number of samples compared with 2012 (+124.9 % samples analysed in Lithuania, +34.5 % in Romania, +17.8 % in Hungary, +12.7 % in Italy, +11.5 % in Slovenia, +11.3 % in Sweden, and +10.9 % in Cyprus).

No major changes were noticed in the national control programmes of 2012 and 2013 as regards the ratio of samples from domestic production, other EEA countries and third countries (EFSA, 2014d); the data on the 2013 programme are presented in Figure 3-3. The countries with the highest rates of samples of imported products are Bulgaria (92.8 %), the Netherlands (65.1 %) and Lithuania (57.5 %); Portugal, Greece, Spain, Italy, Cyprus and Hungary focussed their national control programmes mainly on domestic products where more than 70 % of the samples analysed were of domestic produce.

[38] Samples taken in the framework of the EU-coordinated programme were often analysed for more pesticides than required according to the monitoring regulation. Thus, these results are considered as results of the national control programmes. Consequently it is not possible to clearly separate the results referring to samples taken in the framework of the EU coordinated programme and national control programmes. EFSA therefore included all samples analysed in the EU coordinated programme also in the analysis of the national control programmes reported in Section 3.

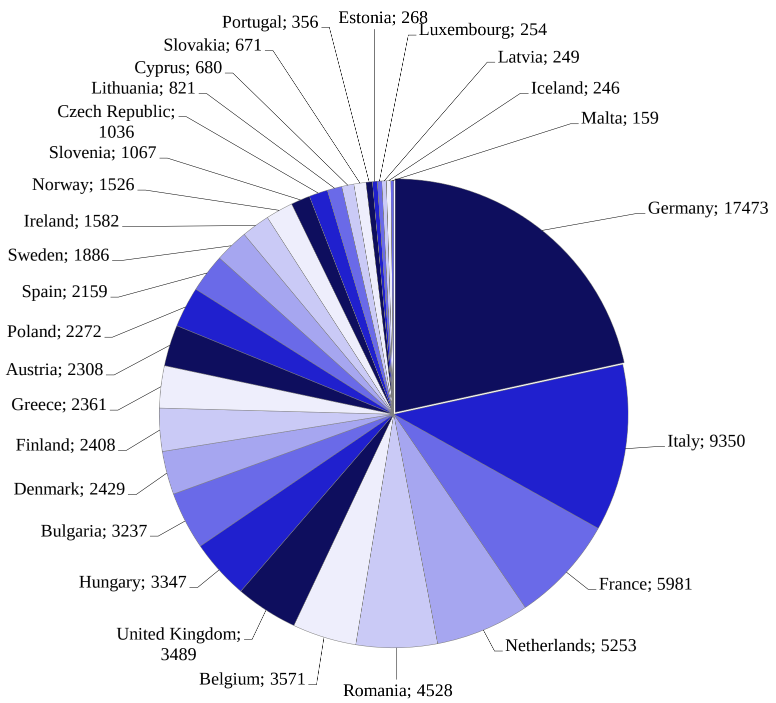
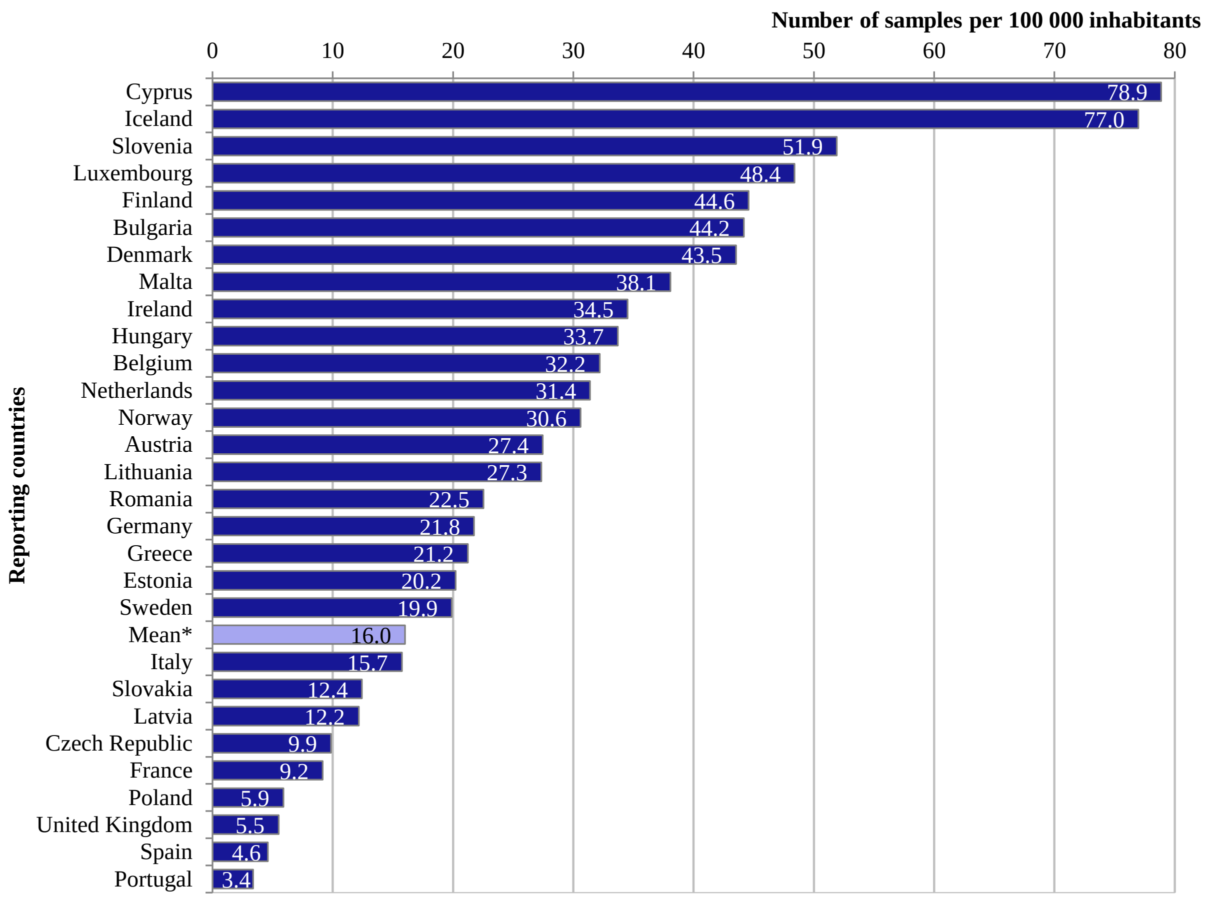


Figure 3-1: Number of samples analysed by each reporting country (surveillance and enforcement samples)



* Overall mean of all reporting countries

Figure 3-2: Number of samples normalised by number of inhabitants (surveillance and enforcement samples)

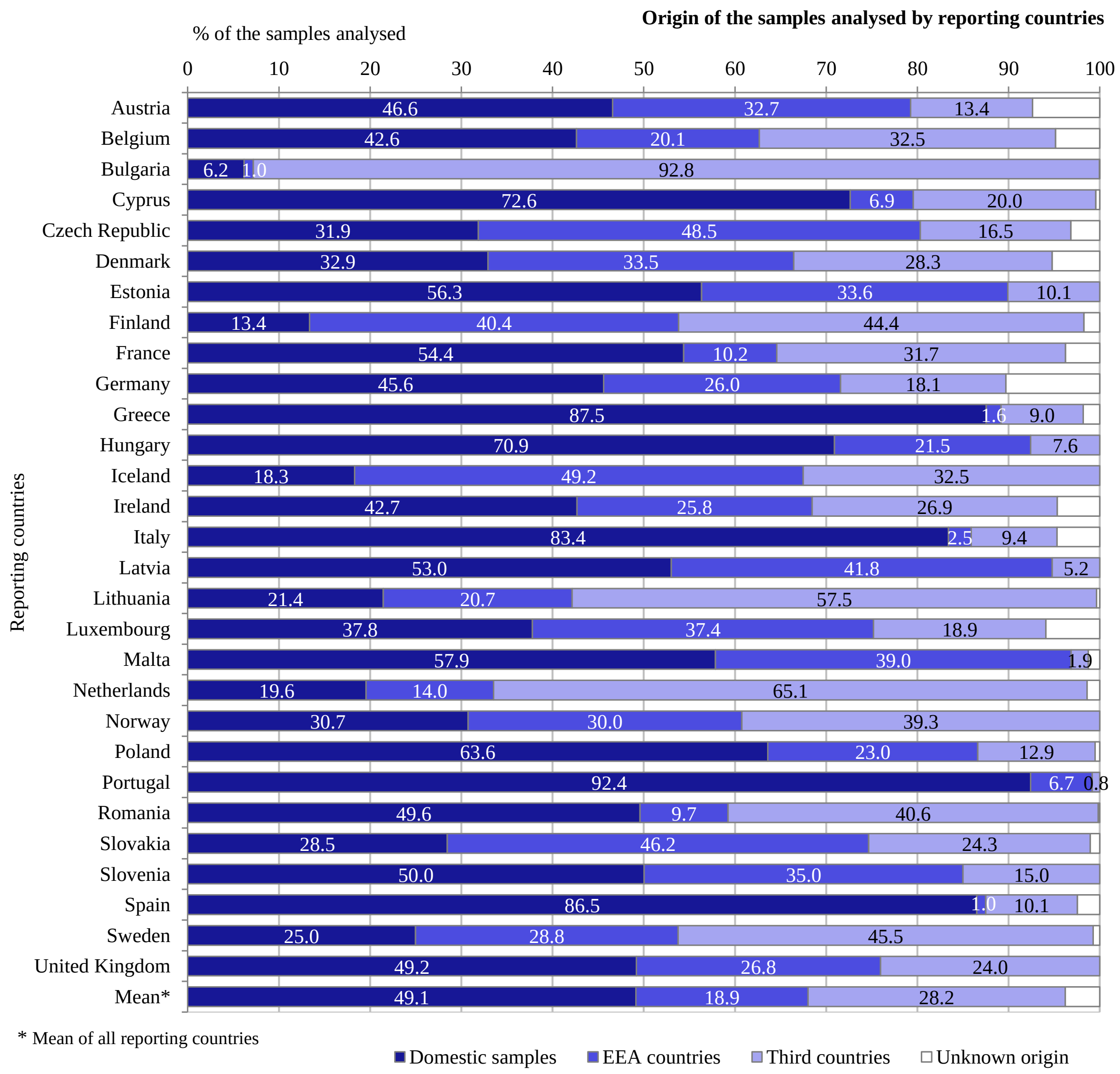
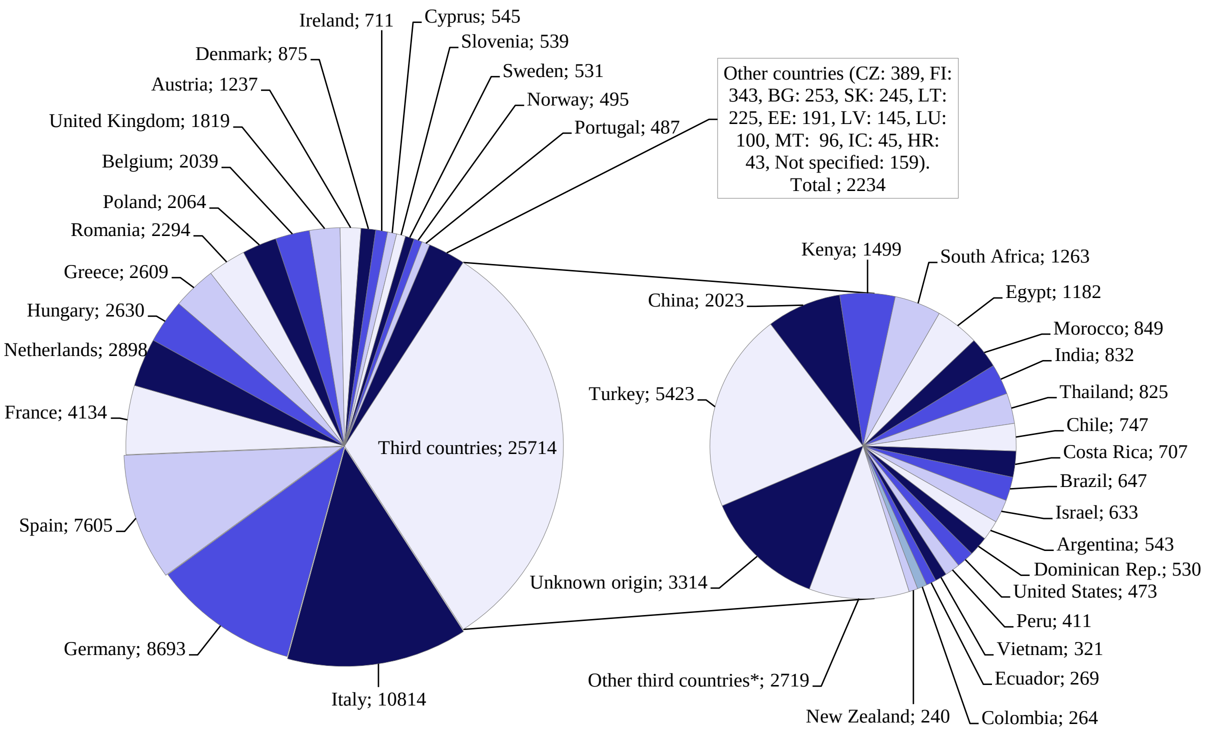


Figure 3-3: Comparison of sample origin analysed by reporting countries (surveillance and enforcement samples)

A more detailed analysis of the origin of the samples is presented in Figure 3-4. Overall, 55 253 samples analysed originated from the EU and EEA countries[39] (68.2 %). 22 400 samples (27.7 %) concerned products imported from third countries; of which approximately one third (8 270 samples) were taken for products subject to an increased level of official controls under Regulation (EC) No 669/2010 (see Section 3.2.4). The origin of the sample was not reported for 3 314 samples (4.1 %).

[39] Including Croatia.



* 102 countries with less than 200 samples

Figure 3-4: Distribution of samples originating from reporting countries and third countries (surveillance and enforcement samples)

Typically, national control programmes show a wide diversity regarding the number of pesticides (analytical scope; see also Appendix C, Table C1) and the number of different food products analysed. Overall, the reporting countries analysed samples taken in the framework of the national control programmes for a total of 685 different pesticides.[40] The broadest analytical scopes were noted for the German control laboratories which covered 623 pesticides, followed by Belgium and France (499 pesticides), Spain, Austria, Luxembourg and the Netherlands (all analysed for more than 400 distinct pesticides). On average, in the framework of the national control programmes, samples were analysed for 200 different pesticides; Ireland, Luxembourg, Sweden, Belgium, Germany, the Czech Republic and Norway analysed on average for more than 250 pesticides per sample. The complete picture regarding the number of pesticides analysed under the national control programmes can be found in Figure 3-5.

All reporting countries covered in total 220 unprocessed agricultural food products[41] and a wide variety of different processed products derived from 136 agricultural products (e.g. wine, fruit and vegetable juices, canned fruits and vegetables, milk products, cereal products such as flour, dried fruits such as raisins, pickled vegetables, etc.).

Analysis of the national control programmes reveals the diversity of national approaches. Additional elements, such as the proportion of organic and conventional product samples as well as the types of food products sampled (e.g. products which are more likely to exceed the legal limits, such as certain fruits and vegetables, or the proportion of products with a lower probability of MRL exceedance, such as animal products and cereals), contribute to the overall variability of the national control

[40] The number of pesticides analysed by the reporting countries is not directly comparable with the numbers reported in the previous report, because EFSA changed the way of counting: in 2013 different residue definitions allocated to different food products or metabolites were not counted separately. Deviating residue definitions reported under the baby food legislation or other legal frameworks were not taken into account. Thus, the total number of pesticides reported in this analysis is lower than the previous year although the analytical scope in the reporting countries was not reduced.

[41] The unprocessed food products are defined in Annex I of Regulation (EC) No 396/2005. The products subsumed under one food code are not counted separately (e.g. grapefruit and pomelos, for which the same food product code is applicable, are not counted as separate food products).

programmes. The fact that different control approaches and strategies are implemented in national control programmes needs to be borne in mind for the analysis of the results.

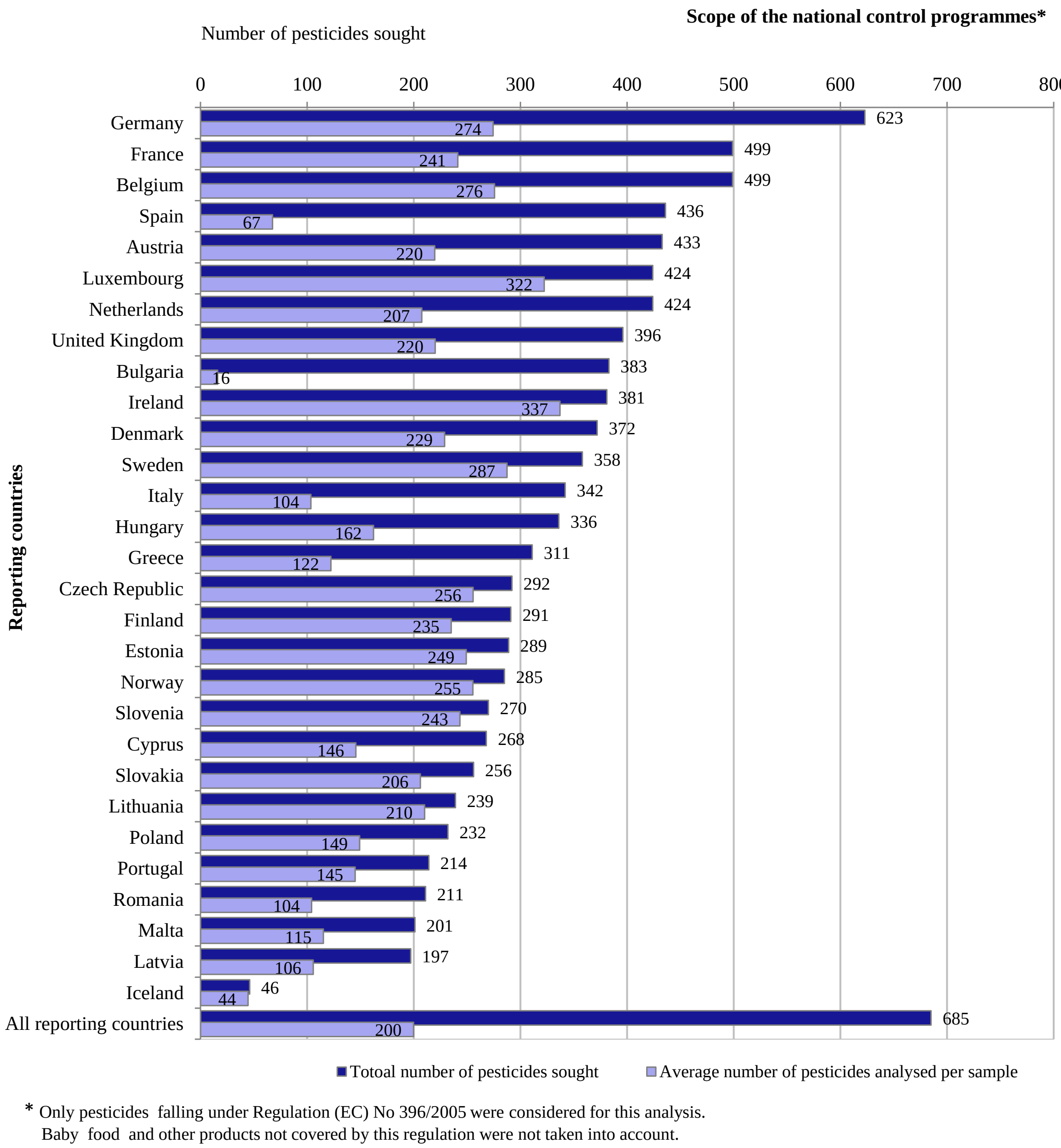


Figure 3-5: Comparison of the analytical scope (number of pesticides analysed) in reporting countries

3.2. Results of the national control programmes

Overall, 97.4 % of the samples analysed in 2013 fell within the legal limits; 54.6 % of the samples tested were free of detectable residues while 42.8 % of the samples analysed contained measurable residues not exceeding the legal limits. MRLs were exceeded in 2.6 % of the samples analysed in 2013 (2 116 samples; Figure 3-6). It is normal practice that the uncertainty of the analytical measurement is taken into account before legal or administrative sanctions are imposed on food business operators for infringement of the MRL legislation.[42] In 2013, in 1.5 % of the samples the pesticide residues clearly exceeded the legal limit taking into account the measurement uncertainty, thus triggering the abovementioned actions; these samples are considered as non-compliant with the legal limits.

[42] Usually a measurement uncertainty of ± 50 % of the measured residue concentration is applied.

Considering only surveillance samples (samples taken without targeting towards samples which are expected to be non-compliant), 2.0 % of the samples analysed in 2013 contained residues exceeding the limits set in the MRL legislation; for enforcement samples the MRL exceedance rate was 7.4 %.

The overall the MRL exceedance and non-compliance rates declined slightly compared with 2012, where 2.9 % of the samples exceeded the legal limits numerically and 1.7 % of the samples were non-compliant.

The overall findings on MRL exceedance (blue bars) and MRL non-compliance (orange bars) in 2012 and 2013 are depicted in Figure 3-6. The graph details the results for surveillance and enforcement samples, and for samples originating from EU/EEA countries, third countries and samples where the origin was not reported.

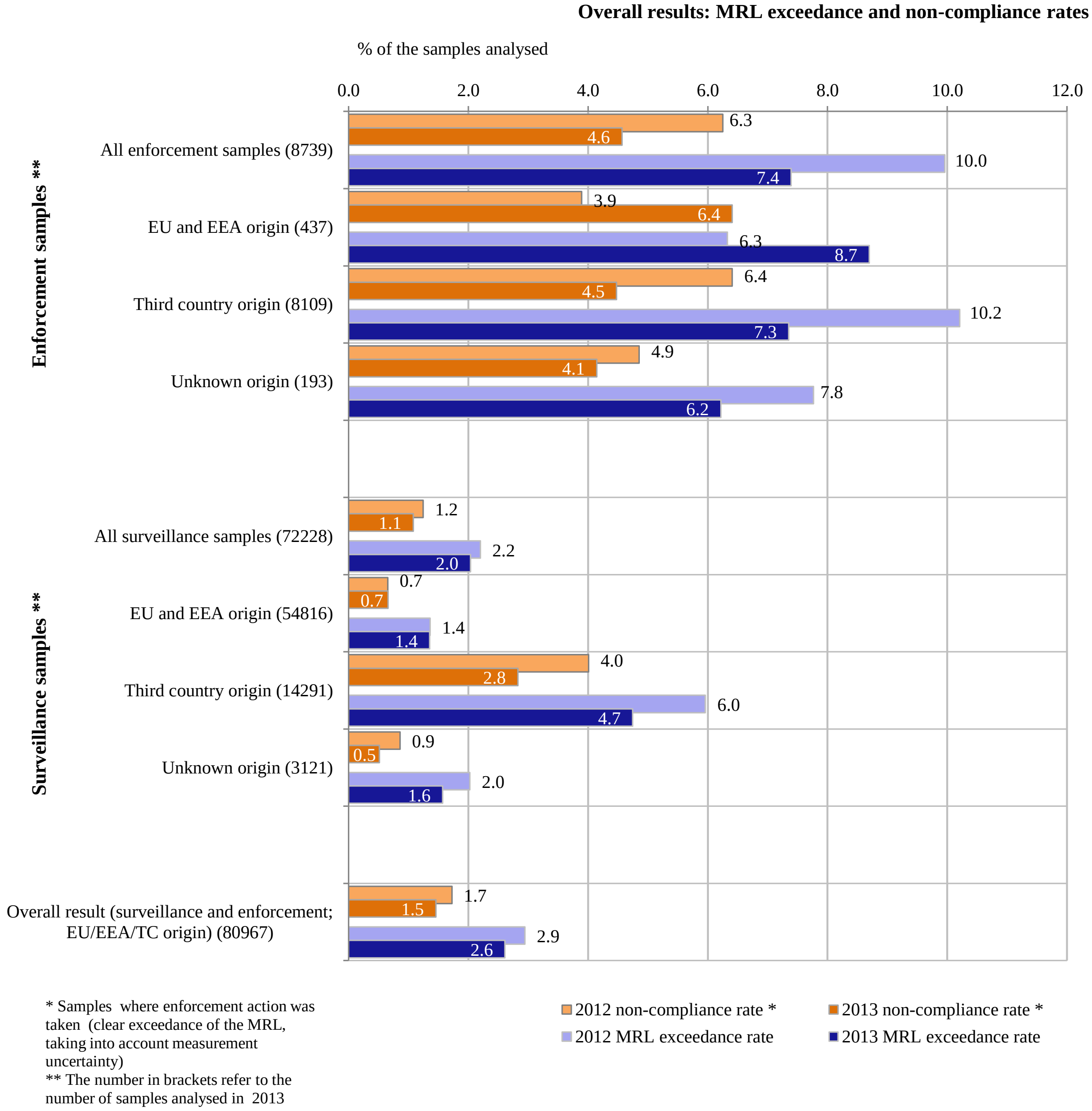


Figure 3-6: Percentage of samples compliant and non-compliant with the MRL

The results presented in the following sections refer to the complete data set, comprising results of surveillance and enforcement samples as well as unprocessed and processed products, unless specifically indicated that the analysis was restricted to a subset of the results.

3.2.1. Results by country of food origin

Overall, 57.6 % of the samples originating from EU/EEA countries were free of measurable residues; 41.0 % of the samples contained residues above the LOQ but below the MRL, while 1.4 % of the samples exceeded the legal limit. 0.7 % of the samples were considered non-compliant with the legal limits. Samples from third countries were found to have a higher MRL exceedance rate and non-compliance rate compared to food produced in the EU and EEA countries (MRL exceedance rate for food produced in third countries: 5.7 %; non-compliance rate: 3.4 %). The percentage of samples from third countries that were free of detectable residues amounted to 46.2 % while 48.1 % of the samples contained residues within the permitted limits.

The MRL exceedance rates and the percentage of samples containing measurable residues originating from reporting countries and from third countries are presented in Figure 3-7 and Figure 3-8; to allow a comparison with the previous reporting year these two charts contain also the results for 2012.

Regarding samples originating from the reporting countries, the highest MRL exceedance rates were reported for products originating from Iceland, Bulgaria and Portugal. Iceland, Romania, Denmark, Latvia, Ireland, Austria and Finland are on top of the ranking of countries with samples free of detectable residues (more than 75 % of the samples).

Among the third countries with at least 60 samples analysed, the highest MRL exceedance rate was found for Uganda, Cambodia, Malaysia, Vietnam, India, Thailand, Jordan, the Dominican Republic, China and Sri Lanka (all above 10 %). Other third countries with a substantial number of samples (more than 60 samples) and MRL exceedances above the average were Ethiopia, Pakistan, Kenya, Morocco, Serbia, Canada, Russia, and Israel.

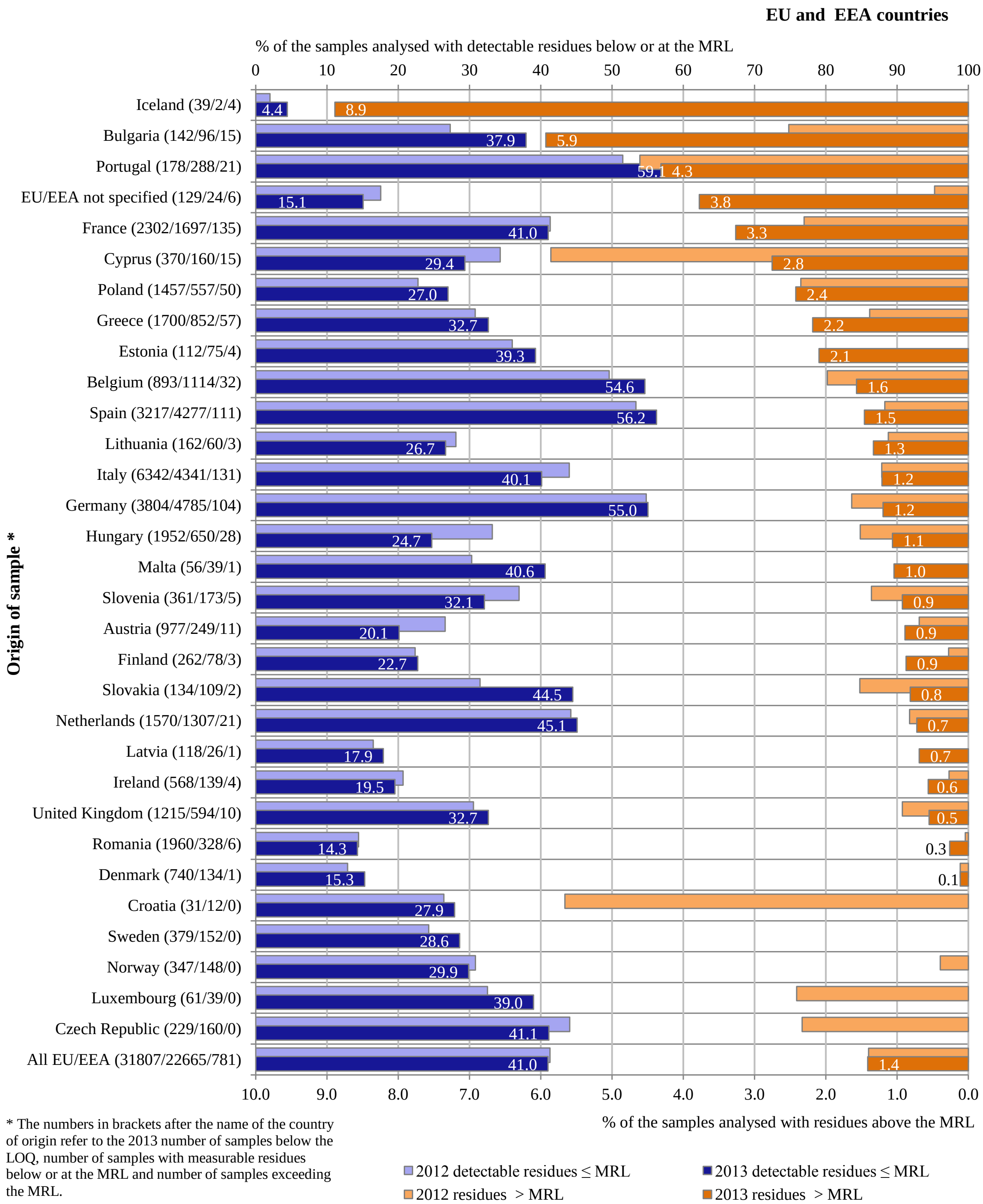
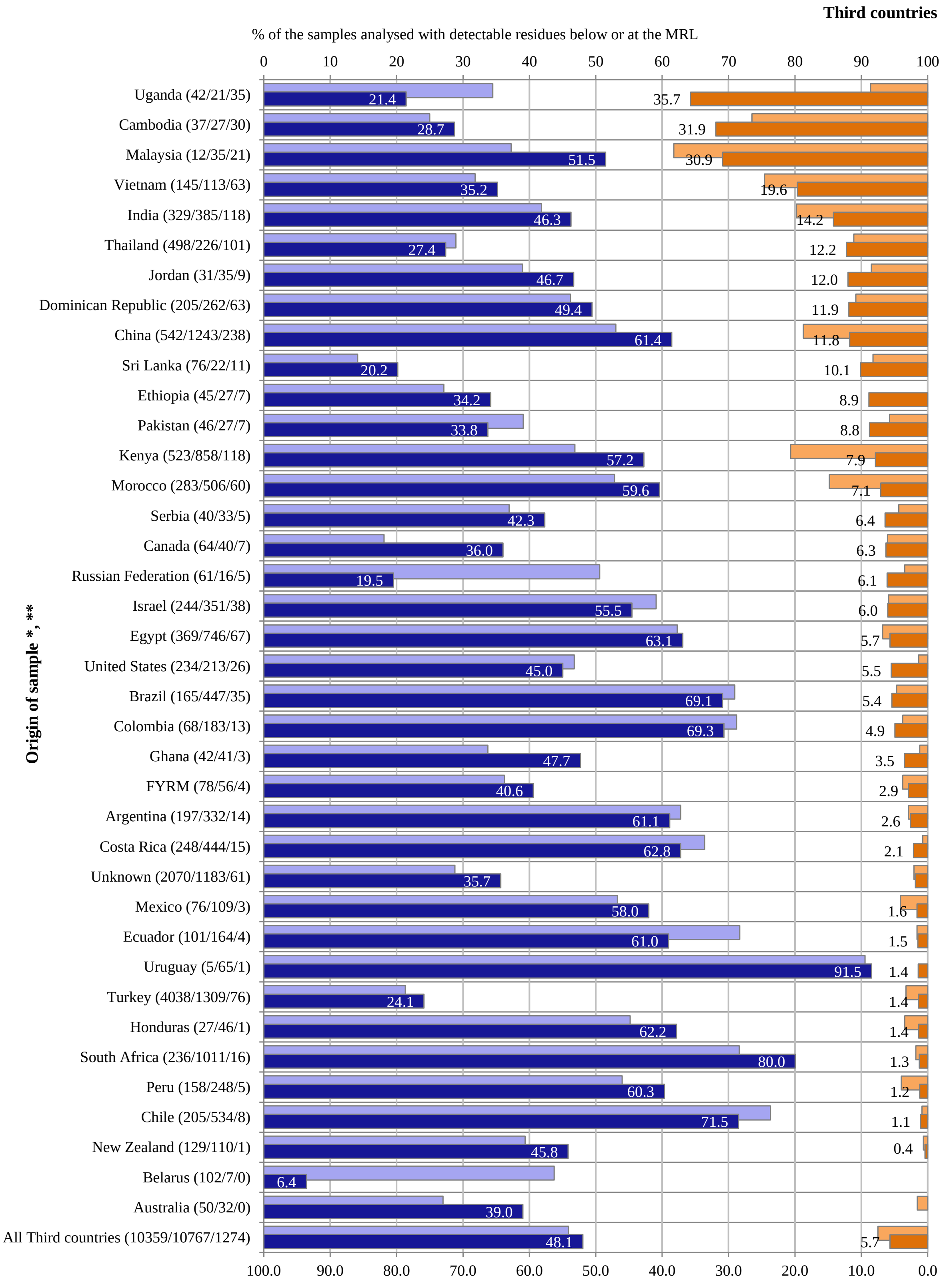


Figure 3-7: EU and EEA countries: MRL exceedance rate and residue detection rate by country of origin (surveillance and enforcement samples)



* The numbers in brackets after the name of the country of origin refer to the 2013 number of samples below the LOQ, number of samples with measurable residues below or at the MRL and number of samples exceeding the MRL.
** Only countries with at least 60 samples were included

Figure 3-8: Third countries: MRL exceedance rate and residue detection rate by country of origin (enforcement and surveillance samples)

3.2.2. Results by food products

The MRL exceedance rate for unprocessed products[43] amounted to 2.8 % of the samples analysed; 45.2 % of the samples contained measurable residues that were within the legal limits, and 51.1 % of the unprocessed products were free of detectable residues. Among the unprocessed products with at least 50 samples analysed, MRL exceedances were most frequently identified for guava, lychee, passion fruit, tea leaves, okra, basil, parsley, spinach type vegetables, turnips, papaya, cassava, leafy vegetables (not further specified) and pomegranates. More detailed information on the MRL exceedance and pesticide detection rates for unprocessed food products is presented in Figure 3-9. Some of the food products with MRL exceedance rates above the average are products which were subject to increased import control under Regulation (EC) No 669/2009 (e.g. tea leaves, okra, basil, parsley, beans and peas with pods, aubergines, celery leaves, oranges, grapefruit, strawberries). Thus, the results for these products may be biased due to the targeted sampling in the framework of border inspections. More details on results for this specific sampling programme can be found in Section 3.2.4.

No MRL exceedances (products with at least 50 samples analysed) were reported for unprocessed sweet corn, hazelnuts, watermelons, peanuts, rhubarb, beetroots, pumpkins, avocados, parsnip, linseeds and a number of products of animal origin such as poultry and bovine liver, goat milk, swine and goat meat.

The results for processed products are presented in Figure 3-10. It is noted that the overall MRL exceedance rate was lower (1.2 %) compared with unprocessed products.[44] Processed wild fungi, tea leaves, peas with pods, peppers, herbal infusions (not further specified), tomatoes, beans with pods, pomegranates, table grapes, rice, grapefruit and rye were found most frequently exceeding the MRLs.

In the following processed food products no MRL exceedances were identified (with at least 20 samples analysed): pineapples, cocoa beans, sunflower seeds, beans (without pods), rape seed, sweet corn, soya beans, buckwheat, carrots, oats, dates, apples, linseed, peas (without pods), barley, plums, figs, apricots, potatoes, pears, pumpkin seeds, and a number of products of animal origin (e.g. processed honey, meat).

[43] Samples that comply with the description of the food product in Annex I of Regulation (EC) No 396/2005 are considered as unprocessed (e.g. fermented dried tea leaves).

[44] In general, for processed products specific processing factors need to be taken into account to reflect changes in the levels of pesticide residues caused by processing before the measured residue concentration is compared with the MRL which is established for the unprocessed products.

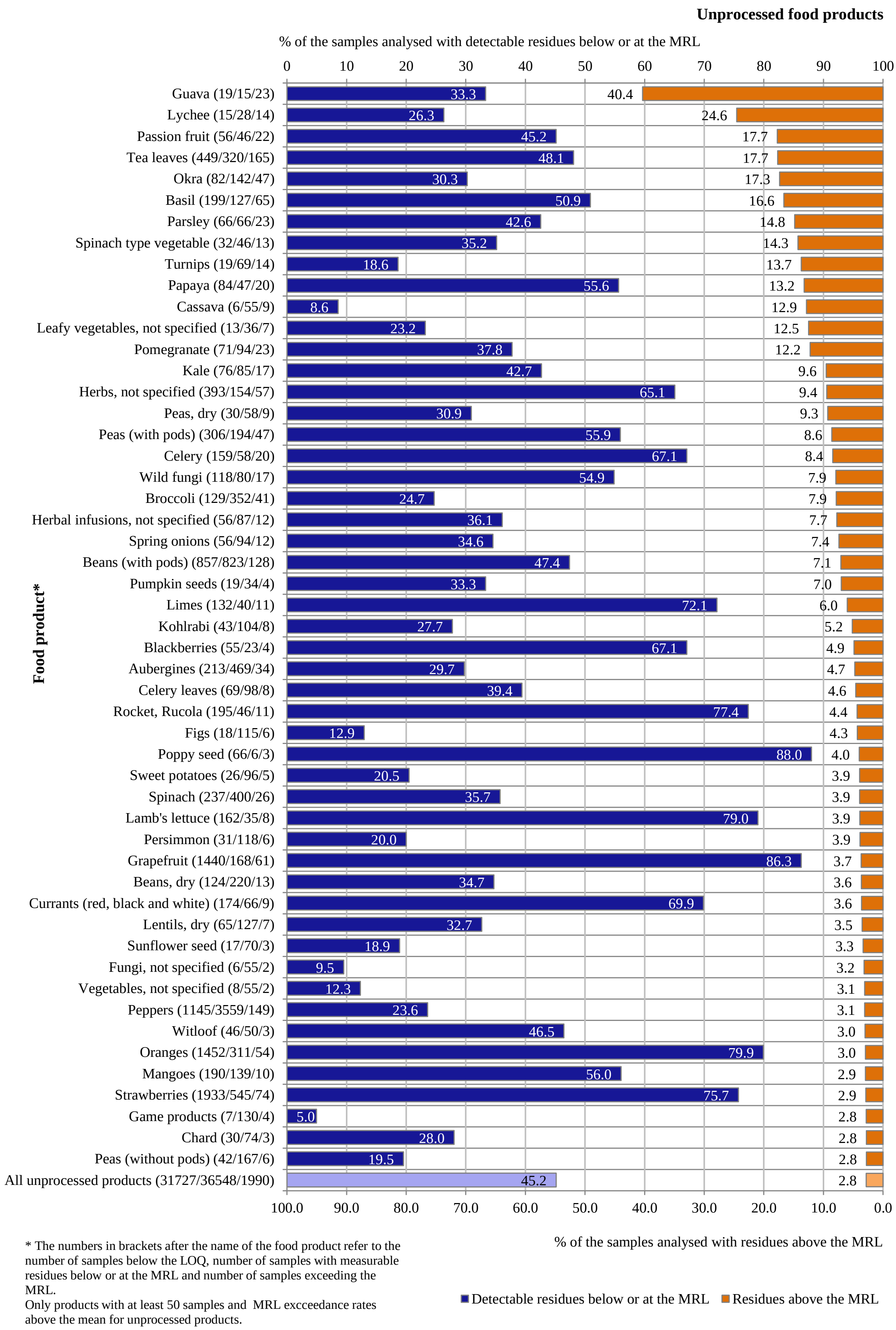


Figure 3-9: MRL exceedance rate and residue detection rate for unprocessed food products (surveillance and enforcement samples)

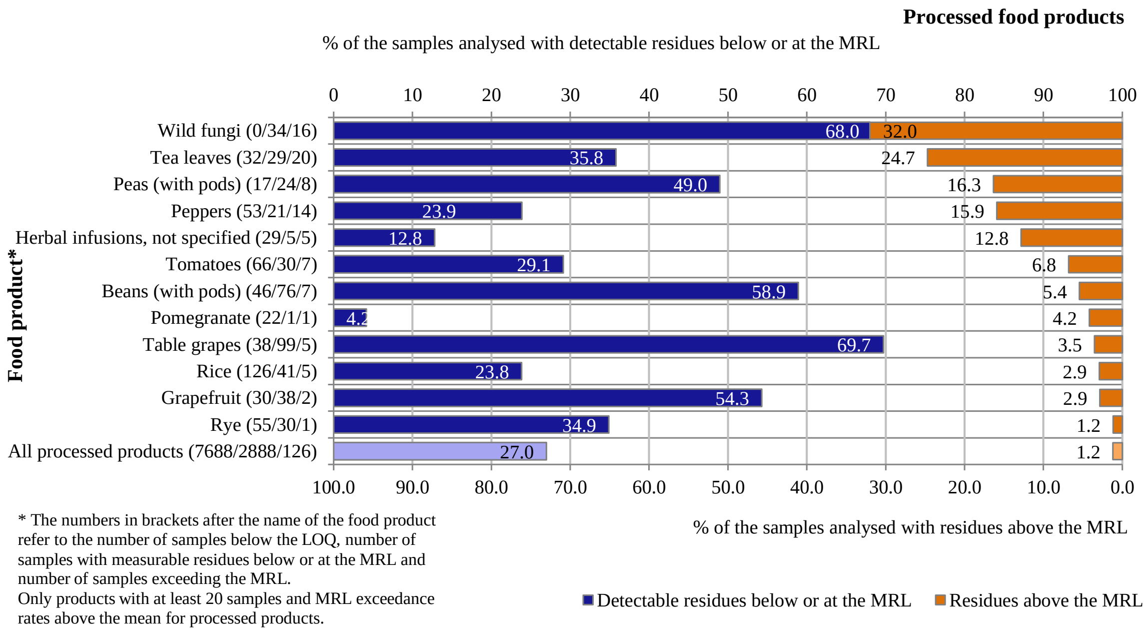


Figure 3-10: MRL exceedance rate and residue detection rate for processed food products (surveillance and enforcement samples)

3.2.3. Results by pesticide

Overall, 2 788 determinations were reported with concentrations exceeding the legal limit. The pesticides found most frequently violating the MRL are presented in Figure 3-11. On products produced in one of the reporting countries, at least 20 MRL violations were identified for the following pesticides: dimethoate (RD), chlorpyrifos, dithiocarbamates (RD), carbendazim (RD), mercury (RD), folpet (RD) and iprodione (RD). The top ranked pesticides on products from third countries (with at least 20 MRL exceedances) are dimethoate, carbendazim, acetamiprid, imidacloprid, chlorpyrifos, profenofos, buprofezin, triazophos, acephate, methomyl (RD), cypermethrin (RD), methidathion, methamidophos, hexaconazole, fenvalerate (RD), carbofuran (RD), malathion (RD), fipronil (RD), ethion and imazalil.

In total, 878 MRL exceedances were reported for pesticides not or no longer approved in the EU. In most cases these MRL exceedances for non-approved pesticides were related to imported products (659 cases) while for products produced in the EU and EFTA countries, a minority of MRL exceedances was resulting from non-approved pesticides (186 results); 684 cases of MRL exceedances were related to approved pesticides.

A comprehensive list of the number of analysis and the number of detection per pesticide can be found in Appendix C, Table C2.

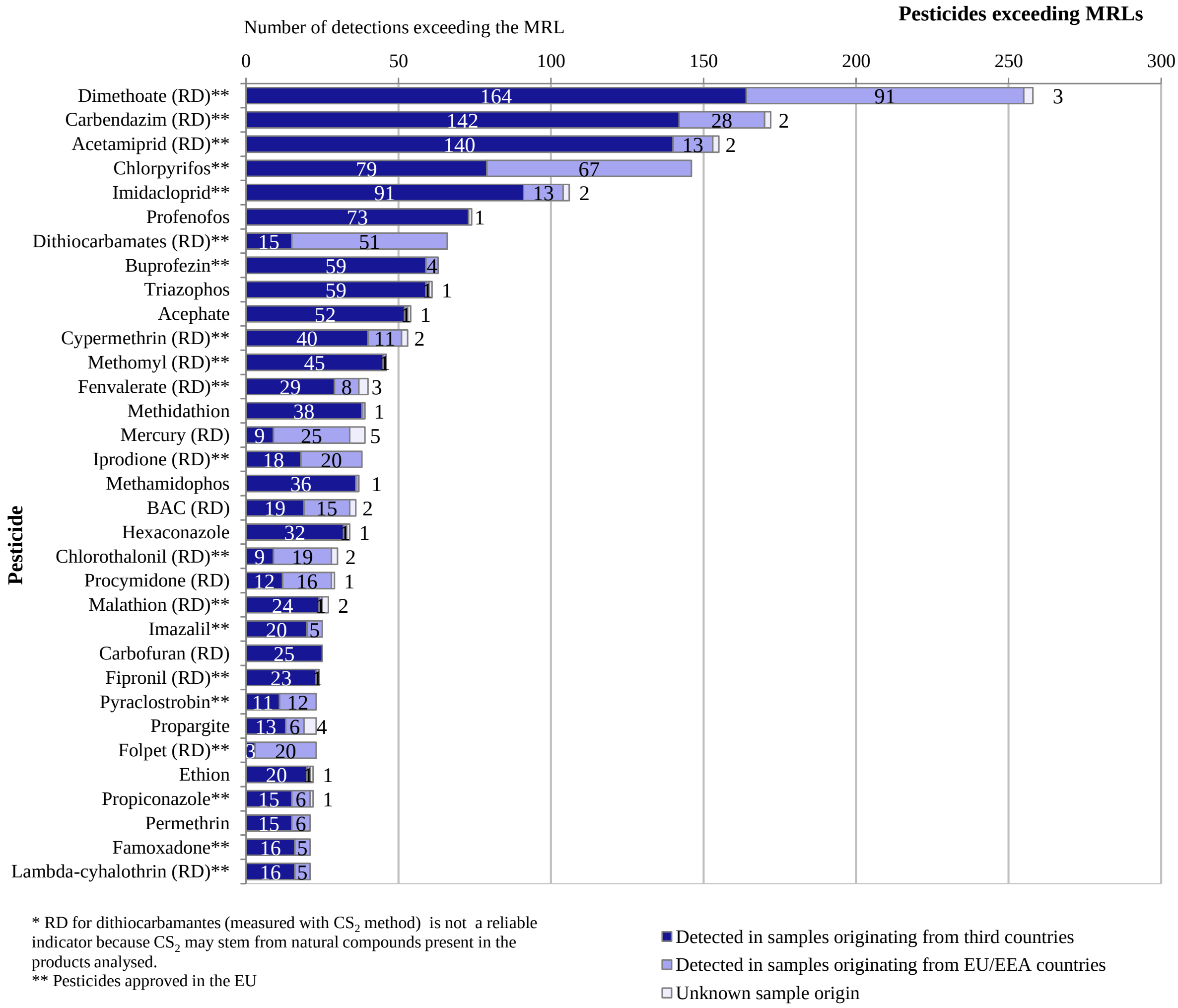


Figure 3-11: Pesticides detected in concentrations exceeding the MRL by sample origin (surveillance and enforcement samples)

3.2.4. Results on import controls under Regulation (EC) No 669/2009

According to the provisions of Regulation (EC) No 669/2009, certain food products from China, the Dominican Republic, Egypt, Kenya, Morocco, Nigeria, India, Thailand, Turkey and Vietnam were subject to an increased level of official controls for certain pesticides at the point of entrance into the EU territory. A description of the required controls (type of products, countries of origin, the type of hazard[45] and the frequencies of controls) relevant for the calendar year 2013 can be found in Appendix C, Table C2.

In total, 8 270 samples of products in focus for import controls were analysed; the major amount of these samples (almost 80 %) were analysed by Bulgaria (2 969 samples), the Netherlands (2 079 samples), France (1018 samples) and Belgium (507 samples). The number of samples for each product and each country of origin are reported in Table 3-1.

Overall, 557 samples (6.7 %) of products relevant for import controls exceeded the legal limit for one or several pesticides; 816 individual residues determinations were above the legal limit. It should be highlighted that usually, when non-compliant products are identified in the framework of import controls, the products are rejected at the border and are not placed on the EU market. More details on

[45] The pesticides legislation does not give an exhaustive list of pesticides that have to be checked, but describes the analytical methods that should be used for controls (usually multi-residue methods based on GC-MS and LC-MS) and provides a list of examples of pesticides which were found previously in concentrations exceeding the MRL.

the pesticides found in concentrations exceeding the legal limit are summarised in Table 3-1. The highest number of MRL exceedances were detected in Chinese tea (261 determinations exceeding the MRLs), beans with pods from Kenya (65 MRL exceedances), grapefruit (including pomelos) from China (50 MRL exceedances) and okra from India (45 MRL exceedances).

Table 3-1: Results of import controls in the framework of Regulation (EC) No 669/2009

Country of origin/country	Number of samples analysed/ exceeding MRLs[(a)]	Number of determinations exceeding the MRL	Pesticides most frequently exceeding the MRL	Residue concentrations measured (mg/kg)	MRL (mg/kg)
China	**1497/194**	**344**			
Grapefruit, including pomelos	930/48 (5.2 %)	30	Methidathion	0.021–0.15	0.02*
		12	Triazophos	0.012–0.035	0.01*
		4	Famoxadone	0.022–0.029	0.02*
		4	Others		
Broccoli, including Chinese broccoli	12/11 (92 %)	7	Acetamiprid (RD)	0.73–6.2	0.3/0.4[(b)]
		4	Chlorfenapyr	0.093–0.26	0.05* / 0.01*[(b)]
		3	Carbendazim (RD)	0.32–2.3	0.1*
		3	Flusilazole (RD)	0.095–1.1	0.02*
		3	Pyridaben	0.071–6.7	0.05*
		13	Others		
Tea leaves	555/135 (24.3 %)	57	Acetamiprid (RD)	0.11–1.4	0.1*
		50	Imidacloprid	0.051–0.55	0.05*
		50	Buprofezin	0.051–0.8	0.05*
		15	Triazophos	0.023–0.077	0.02*
		14	Fenvalerate (RD)	0.052–0.082	0.05*
		8	Methomyl (RD)	0.12–0.58	0.1*
		8	Chlorpyrifos	0.121–1.2	0.1*
		7	Dimethoate (RD)	0.052–1.625	0.05*
		6	Carbendazim (RD)	0.1–1.3	0.1*
		6	Fipronil (RD)	0.046–0.56	0.005*
		40	Others		
Dominican Republic	**383/58**	**71**			
Peppers	102/15 (14.7 %)	3	Cypermethrin (RD)	0.64–0.96	0.5
		3	Carbendazim (RD)	0.31–1	0.1*
		16	Others		
Aubergines	103/8 (7.8 %)	2	Acetamiprid (RD)	0.18–0.2	0.15/0.2[(b)]
		6	Others		
Cucurbits, not specified, including bitter melons	29/4 (13.8 %)	3	Spinosad (RD)	0.21–0.35	1
		1	Cypermethrin (RD)	0.25	0.2
Beans (with pods), including yardlong beans	149/31 (20.8 %)	12	Endosulfan (RD)	0.055–0.51	0.05*
		4	Spinosad (RD)	0.75–6.6	0.5
		3	Spinetoram	0.34–1.4	0.1
		3	Diazinon	0.039–0.086	0.01*
		15	Others		
Egypt	**778/52**	**62**			
Oranges	565/29 (5.1 %)	14	Dimethoate (RD)	0.026–0.13	0.02*
		6	2-phenylphenol	5.7–15.04	5
		5	Diazinon	0.014–0.12	0.01*
		3	Profenofos	0.055–0.17	0.05*/0.01*[(b)]
		7	Others		

Country of origin/country	Number of samples analysed/ exceeding MRLs[(a)]	Number of determinations exceeding the MRL	Pesticides most frequently exceeding the MRL	Residue concentrations measured (mg/kg)	MRL (mg/kg)
Strawberries	177/20 (11.3 %)	4	Carbendazim (RD)	0.13–0.49	0.1*
		4	Oxamyl	0.037–0.083	0.01*
		4	Methomyl (RD)	0.025–0.16	0.02*
		3	Pyridalyl	0.03–0.26	0.01*
		8	Others		
Pomegranate	3/1 (33.3 %)	1	Lambda-cyhalothrin (RD)	0.04	0.02 *
Peppers	33/2 (6.1 %)	1	Chlorfenapyr	0.19	0.05*/0.01*[(b)]
		1	Chlorpyrifos	0.59	0.5
		1	Flusilazole (RD)	0.061	0.02*
India	**168/33**	**50**			
Okra	163/30 (18.4 %)	8	Acetamiprid (RD)	0.011–0.24	0.01*/0.2*[(b)]
		7	Acephate	0.03–0.4	0.02*/0.01*[(b)]
		5	Profenofos	0.065–0.68	0.05*/0.01*[(b)]
		4	Triazophos	0.014–0.15	0.01*
		4	Dimethoate (RD)	0.03–0.36	0.02*
		4	Methamidophos	0.015–0.063	0.01*
		13	Others		
Basil, including curry leaves	5/3 (60 %)	2	Carbendazim (RD)	0.44–0.46	0.1*
		3	Others		
Kenya	**1345/88**	**105**			
Beans (with pods)	974/51 (5.2 %)	16	Dimethoate (RD)	0.025–2.32	0.02*
		9	Chlorpyrifos	0.054–0.85	0.05*
		6	Acephate	0.015–2.36	0.02*/0.01*[(b)]
		5	Methamidophos	0.018–0.88	0.01*
		5	Carbendazim (RD)	0.25–2.94	0.2
		3	Methomyl (RD)	0.034–0.2	0.02*
		3	Propargite	0.02–0.6	0.01*
		3	Acetamiprid (RD)	0.08–0.15	0.06/0.15[(b)]
		15	Others		
Peas (with pods)	371/37 (10 %)	25	Dimethoate (RD)	0.022–0.38	0.02*
		4	Famoxadone	0.031–0.29	0.02*
		3	Carbendazim (RD)	0.3–1.3	0.2
		3	Metalaxyl (RD)	0.058–0.08	0.05*
		5	Others		
Morocco	**199/29**	**36**			
Basil, including mint	199/29 (14.6 %)	10	Chlorpyrifos	0.06–1.9	0.05*
		6	Permethrin	0.053–0.19	0.05*
		4	Flubendiamide	0.04–0.95	0.01*
		4	Carbendazim (RD)	0.13–0.82	0.1*
		12	Others		
Nigeria	**0/0**	**0**			
Dry beans	0	0	-		
Thailand	**406/35**	**53**			
Peppers, including chilli peppers	74/13 (17.6 %)	4	Profenofos	0.12–1.5	0.05*/0.01*[(b)]
		4	Triazophos	0.084–1.4	0.01*
		3	Ethion	0.052–2.1	0.01*
		11	Others		
Aubergines	106/10 (9.4 %)	6	Dimethoate (RD)		0.02*
		5	Others		

Country of origin/country	Number of samples analysed/ exceeding MRLs[(a)]	Number of determinations exceeding the MRL	Pesticides most frequently exceeding the MRL	Residue concentrations measured (mg/kg)	MRL (mg/kg)
Celery leaves, including coriander leaves	84/2 (2.3 %)	1	Carbendazim (RD)	3.1	0.1*
		1	Carbofuran (RD)	0.17	0.02*
		1	Chlorpyrifos	0.29	0.05*
Basil	54/3 (5.6 %)	3	Chlorpyrifos	0.07–0.31	0.05*
		3	Others		
Beans (with pods), including yardlong beans	77/7 (10 %)	3	Amitraz (RD)	0.72–1.2	0.05*
		3	Methomyl (RD)	0.3–0.81	0.02*
		5	Others		
Brassica vegetables	11/0 (0 %)	0	-		
Turkey	**3378/30**	**33**			
Tomatoes	554/2 (0.4 %)	1	Malathion (RD)	0.039	0.02*
		1	Oxamyl	0.026	0.02*
Peppers, including sweet peppers	2824/28 (1 %)	9	Malathion (RD)	0.023–0.288	0.02*
		4	Clofentezine (RD)	0.024–0.09	0.02*
		3	Methomyl (RD)	0.023–0.206	0.02*
		3	Carbendazim (RD)	0.172–0.567	0.1*
		3	Tetradifon	0.021–0.144	0.01*
		9	Others		
Vietnam	**116/33**	**62**			
Peppers, including chilli peppers	68/14 (20.6 %)	6	Carbendazim (RD)	0.15–1.6	0.1*
		5	Profenofos	0.014–0.28	0.05*/0.01*[(b)]
		16	Others		
Celery leaves, including coriander leaves	4/1 (25 %)	1	Flubendiamide	0.012	0.01*
Parsley	9/7 (77.8 %)	5	Chlorpyrifos	0.053–0.43	0.05*
		4	Profenofos	0.17–1.1	0.05*
		3	Hexaconazole	0.029–0.16	0.02*
		2	Phenthoate	0.04–0.58	0.01*
		5	Others		
Okra	1/0 (0 %)	0	-		
Basil, including mint and holy sweet basil	34/11 (32.4 %)	6	Carbendazim (RD)	0.17–10	0.1*
		9	Others		

(*): Limit of quantification
(a): Due to multiple MRL exceedances on individual samples the number of samples exceeding the MRL does not correspond to the sum of determinations exceeding the MRLs (reported in the next column)
(b): MRL changed during the 2013 calendar year

The findings reported in Table 3-1 serve risk managers to decide whether the increased frequency of import control should be maintained; these findings are also relevant for food business operators to decide on the necessary internal control measures needed to ensure that the products placed on the EU market comply with the legal limits.

3.2.5. Results on specific food product groups

3.2.5.1. Baby food

Reporting countries analysed 1 597 samples of baby food (i.e. infant formulae, follow-on formulae, processed cereal-based foods and baby foods for infants and young children). The 678 samples of food for infants and young children taken in the framework of the EUCP are comprised in this figure. In 116 samples (7.3 %), pesticide residues above the LOQ were found while the majority of samples were free of any detectable residues (92.7 %). It is noted that 40 pesticide detections were related to organically produced baby food. In 26 samples more than one pesticide was detected. For a total of 11 samples (0.7 % of the analysed baby food samples) the reporting countries noted MRL exceedances; multiple MRL exceedances occurred in four samples. Compared with the overall results for other products the detection and MRL exceedance rate was significantly lower in baby food samples (detection rate: 7.3 % in baby food versus 42.8 % for all food groups; MRL exceedance rate: 0.7 % in baby food versus 2.6 % in all food groups).

In total, 36 different pesticides were detected in concentrations above the LOQ. These pesticides and further details on these samples are compiled in Table 3-2. The most frequent compound detected in baby food was copper, a substance that is naturally occurring, but since copper compounds are also used for plant protection purposes because of the fungicidal activities copper falls under the pesticide MRL legislation.[46] However, copper residues may also result from the use of copper compounds as feed additives or from other sources of contamination. It is noted that only Germany analysed baby food for copper residues. Thus, the reported results regarding the occurrence of copper residues in baby food, including organic baby food may not be fully representative. Similar to the previous reporting year, the biocidal products DDAC and BAC (RD) were among the most frequently detected compounds in baby food. In some of the samples residues of compounds were detected that were used as pesticides in the past but which are still present in the environment due to their persistence in the environment (endrin, lindane, hexachlorocyclohexane (beta)). In addition, pirimiphos-methyl and dichlorvos were again detected in 2013 in individual samples, which gives an indication of contaminations with products that are frequently used for post-harvest treatment of crops such as cereals.

Since some of the detected pesticides reported in Table 3-2 were analysed only by a limited number of reporting countries (copper, mercury (RD) and fosetyl-Al (RD) were analysed only in Germany and DDAC and BAC (RD) were analysed only in Germany and the United Kingdom), the findings of these pesticides are biased and should not be understood fallaciously as a phenomenon for the reporting countries actually analysing for them.

[46] It is noted that the legal limits set under Regulation (EC) No 396/2005 for copper in food range from 2 mg/kg for milk and eggs, 5 mg/kg for certain fruits and vegetables where copper containing plant protection products are not used and up to 1000 mg/kg for hops. For fruit and vegetables where copper is used according to the GAP the residues are expected to occur in concentrations between 20 mg/kg to 100 mg/kg.

Table 3-2: Details on baby food samples containing measurable residues and residues that exceed the MRL

Pesticide	Total number of detections above LOQ / thereof in organic samples	Number of detections above MRL / non-compliant	Origin of the products exceeding MRL[(b)]	Range of measured residue levels (mg/kg)	Comment
Copper	35/7	0/0		0.367–4.75[(a)]	Copper is a naturally occurring substance. The current MRL of 0.01 mg/kg should be reconsidered, taking into account the natural background concentrations.
DDAC	15/7	4/1	2 DE, 1 UK, 1 CH	0.008–0.1	Used as a biocide for disinfection of machines in contact with food, e.g. in dairy factories.
BAC (RD)	9/4	3/2	1 DE, 1 UK, 1 unknown	0.01–0.099	See comment on DDAC.
Endrin	4/4	0/0		0.0006–0.001	Environmental contaminant resulting from past use as a pesticide.
Lindane	4/4	0/0		0.00037–0.0017	Environmental contaminant resulting from past use as a pesticide.
Pirimiphos-methyl	4/0	0/0		0.004–0.017[(a)]	Used for post-harvest treatment of cereals, approved in the EU.
Cypermethrin (RD)	4/1	0/0		0.002–0.003	Insecticide used in a wide range of crops, approved in the EU.
Tebuconazole	4/1	0/0		0.004–0.007	Widely used fungicide, approved in the EU.
Lambda-cyhalothrin (RD)	3/0	0/0		0.002–0.002	Insecticide, approved in the EU.
Fenvalerate (RD)	2/0	0/0		0.002–0.002	Esfenvalerate is an approved insecticide in the EU.
Fosetyl-Al (RD)	2/2	0/0		0.087–0.68[(a)]	Approved fungicide.
Boscalid (RD)	2/0	0/0		0.008–0.01	Approved fungicide.
Chlorpropham (RD)	2/2	2/2	2 BG	0.039–0.044	Widely used to suppress sprouting of potatoes, but also for other purposes. Approved in the EU.
Diazinon	2/2	0/0		0.0012–0.0016	Insecticide, not approved in the EU.
Tricyclazole	2/0	2/0	1 EL, 1 unknown	0.015–0.02	Fungicide used mainly in rice. Not approved in the EU.
Flufenoxuron	1/0	0/0		0.001	Insecticide, not approved in the EU.
Biphenyl	1/0	0/0		0.013[(a)]	Not approved in the EU

Pesticide	Total number of detections above LOQ / thereof in organic samples	Number of detections above MRL / non-compliant	Origin of the products exceeding MRL[(b)]	Range of measured residue levels (mg/kg)	Comment
Hexachloro-cyclohexane (beta)	1/0	0/0		0.002	Pesticide no longer used in the EU, persistent in the environment.
Spinosad (RD)	1/1	0/0		0.002	Approved pesticide that is also permitted for organic farming.
Dichlorvos	1/0	1/0	unknown	0.017	Non-approved insecticide with high toxicity, used in the past mainly for post-harvest treatment of cereals.
Mercury (RD)	1/0	0/0		0.0001	A number of mercury compounds were used as pesticides in the past; between 1979 and 1991, the use of all mercury compounds was banned, depending on the type of use and the chemical substance. Natural sources and other anthropogenic causes may lead to measurable mercury residues in certain food.
Cyromazine	1/0	0/0		0.01	Insecticide, approved in the EU.
Metalaxyl	1/1	0/0		0.001	Metalaxyl-M is an approved fungicide
Cyfluthrin (RD)	1/0	0/0		0.0029	Approved insecticide
Phenthoate	1/1	0/0		0.004	Pesticide not approved in the EU
Linuron	1/0	0/0		0.031[(a)]	Approved herbicide
Azoxystrobin	1/0	0/0		0.004	Approved fungicide
Cyprodinil (RD)	1/0	0/0		0.002	Approved fungicide
Methoxyfenozide	1/0	0/0		0.004	Approved insecticide
Carbendazim (RD)	1/0	0/0		0.005	Pesticide still approved in 2013; approval expired in November 2014.
Chlorpyrifos	1/0	0/0		0.002	Approved insecticide
Fenhexamid	1/0	0/0		0.001	Approved fungicide
Fenpropimorph (RD)	1/0	0/0		0.001	Approved fungicide
Dicloran	1/1	0/0		0.003	Non-approved fungicide
2-phenylphenol	1/1	0/0		0.01	Approved fungicide
Difenoconazole	1/1	1/0	HU	0.011	Approved fungicide

(a): Although the reported concentration clearly exceeded the legal limit taking into account the default measurement uncertainty, the samples was not reported as non-compliant by the reporting country.

(b): For country codes to be found in Section Abbreviations

In general, the detected pesticides in baby food samples occurred in low concentrations, mostly below the legal limit, which gives an indication of contaminations or the mixing of treated and untreated food products. The majority of detected residues relates to approved pesticides or to environmental contaminations (e.g. endrin, lindane). However, a number of non-approved pesticides were detected in different baby food samples (diazinon, tricyclazole, flufenoxuron, biphenyl, dichlorvos, mercury, phenthoate, dicloran). Although in most cases the found concentrations did not exceed the legal limits, further investigations should be performed to identify the source of the residue in order to effectively avoid that in future food intended for infants and young children contains these residues. The presence of dichlorvos and mercury compounds is of particular concern due to the high toxicity of the substances. Food business operators need to take effective measures to ensure that baby food containing these compounds is not placed on the market.

3.2.5.2. Organic food

In total 4 620 samples of organic food were taken (5.7 % of the total number of samples). 717 samples of organic products contained detectable residues within the legally permitted concentrations (15.5 %); MRL exceedances were identified in 37 samples (0.8 % of the organic samples analysed); multiple MRL exceedances were found in six samples. For all major food product groups the detection rate and MRL exceedance rate was lower for organic products compared to conventionally produced food except for baby food where both parameters were higher for organic food (Figure 3-12). The relatively higher overall detection and MRL exceedance rate for baby food is mainly due to results reported by Germany, Romania, Bulgaria and the Netherlands. The detailed analysis of baby food results, in particular which pesticides were detected and which were found in concentrations exceeding the legal limit, are reported in Section 3.2.5.1.

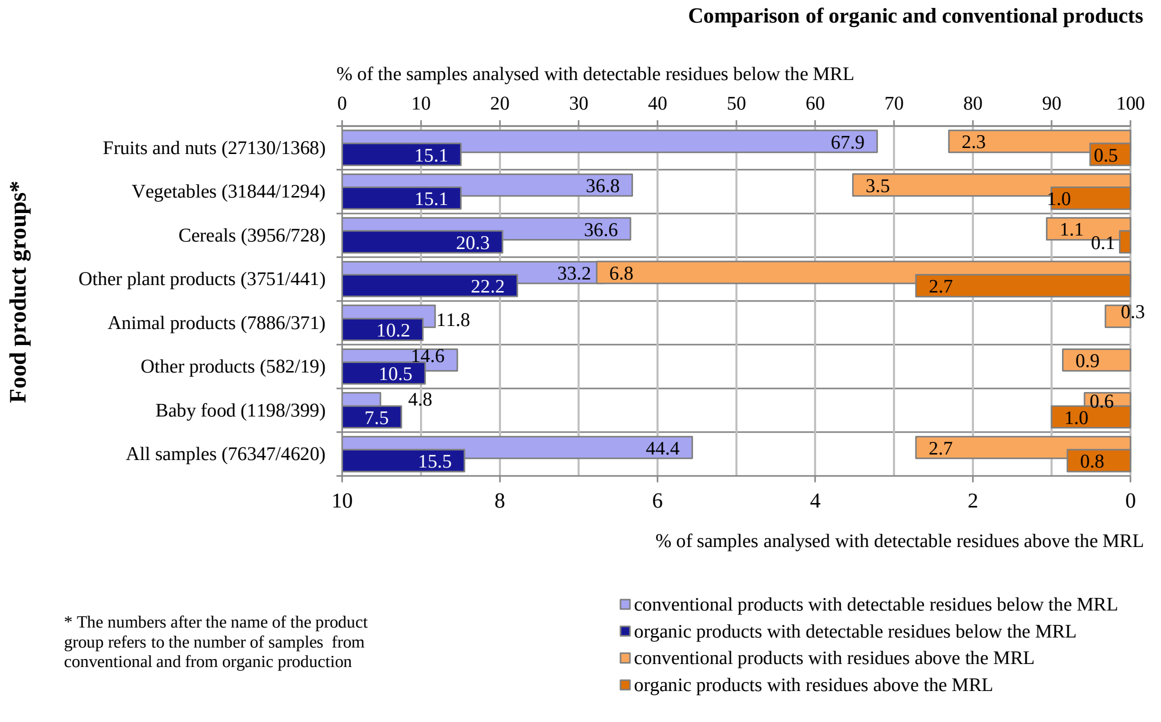


Figure 3-12: Comparison of organic and conventional foods: detection and MRL exceedance rates for main food product groups

In products produced organically, 134 different pesticides were found in measurable concentrations (above the LOQ); 37 thereof were found only in trace amounts (less than or equal 0.01 mg/kg). The pesticides detected most frequently (found in at least five samples) are presented in Figure 3-13. In this figure the number of detections in trace concentrations (less than 0.01 mg/kg) was presented separately (light blue bars). The most frequently quantified pesticide residues were copper, bromide ion, spinosad and fosetyl-Al (RD). It needs to be highlighted that copper and spinosad are allowed in organic farming; thus, the presence of residues of these compounds is not linked to agricultural practices not permitted in organic farming. Residues of hexachlorobenzene and DDT are resulting from environmental contaminations in soil, due to the use of these persistent compounds in the past. Detections of bromide ion and dithiocarbamates in certain commodities[47] may result from naturally occurring plant products and are not necessarily related to the use of pesticides. DDAC and BAC are quaternary ammonium compounds that nowadays are widely used as disinfectants, but since they have been used as pesticides in the past they fall under the remit of the pesticide MRL regulation. The detection of the remaining pesticides reported in Figure 3-13 gives an indication that pesticides not permitted for use in organic farming were used; that contaminations occurred during handling, packaging or processing of organic products; or that conventionally produced food has been placed on the market as organic food.

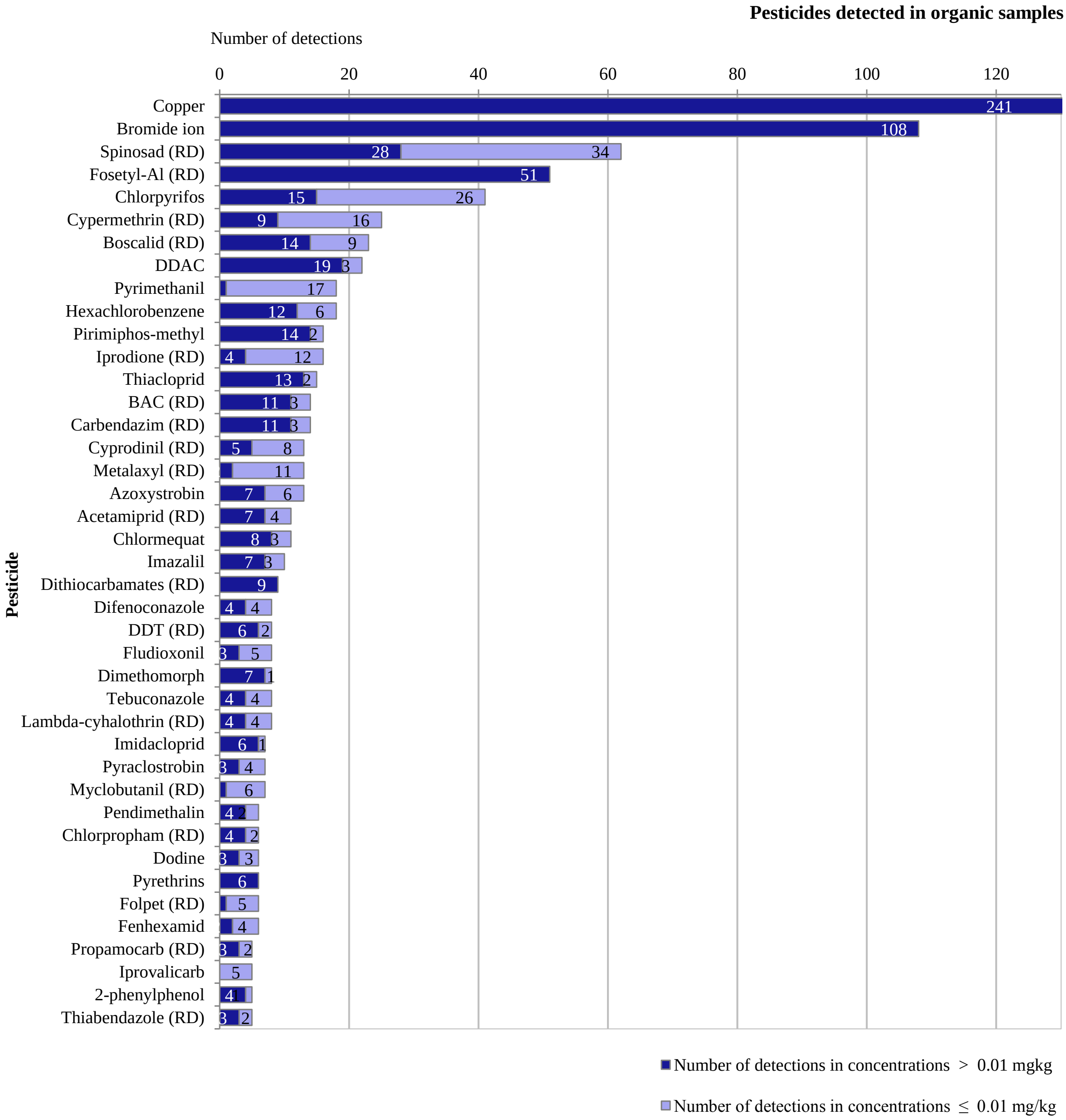


Figure 3-13: Pesticides detected most frequently in organic samples (at least five detections)

[47] Dithiocarbamates were reported for broccoli, cauliflower, kale, rucola, apricots, bananas, parsley and wheat. Brassica vegetables are known to contain certain sulphur compounds that give a positive result in the analysis for dithiocarbamates. Therefore the positive results for organically produced brassica vegetables are most likely not due to the use of dithiocarbamates.

Table 3-3 presents more details on organic samples that exceeded the legal limit, including the MRL which is also applicable for organic products. The most frequent MRL exceedances were reported for DDAC and BAC.[48] For both compounds the default MRL of 0.01 mg/kg is applicable. In 2014, an amendment of the legal limit for these two compounds was discussed at the EU level, to allow marketing of food that contained residues of these biocidal products.

Table 3-3: Details on organic samples exceeding the MRL

Pesticide/food product	Origin of the products	Number of detections exceeding the MRL	Range of measured residue levels (mg/kg)	MRL (mg/kg)
DDAC		**5**		(c)
Strawberries	Unknown	1	0.043	0.01*
Baby food	Switzerland	1	0.1	0.01*
Table grapes	South Africa	1	0.02	0.01*
Lettuce	Germany	1	0.062	0.01*
Peas (without pods)	Unknown	1	0.038	0.01*
BAC (RD)		**4**		(c)
Tomatoes	Colombia	2	41–69	0.01*
Baby food, not specified	Unknown	1	0.011	0.01*
Celery	Spain	1	0.059	0.01*
Imidacloprid		**3**		
Oilseeds, not specified	United States	1	0.087	0.05*
Tea leaves	China	1	0.098	0.05*
Spinach	Spain	1	0.053	0.05*
Acetamiprid (RD)		**2**		
Papaya	Sri Lanka	1	0.042	0.01*
Oilseeds, not specified	United States	1	0.32	0.01*–0.7(a)
Diazinon		**2**		
Poppy seed	Turkey	2	0.028–0.034	0.02*
Pendimethalin		**2**		
Lettuce	Greece	1	0.14	0.05*
Leek	Portugal	1	0.4	0.05*
Chlorpropham (RD)		**2**		
Baby food, not specified	Bulgaria	2	0.039–0.044	0.01*
2-phenylphenol		**2**		
Tea leaves	India	2	0.55–0.66	0.1
Phorate (RD)		**1**		
Scarole	Spain	1	0.13	0.05*/0.01*(b)
Carbendazim (RD)		**1**		
Herbal infusions, not specified	Spain	1	0.15	0.1*
Pyridaben		**1**		
Tea leaves	China	1	0.14	0.05*
Chlorothalonil (RD)		**1**		
Cherries	Serbia	1	0.023	0.01*
Buprofezin		**1**		
Tea leaves	China	1	0.1	0.05*
Azoxystrobin		**1**		
Guava	Thailand	1	0.083	0.05*
Propoxur		**1**		
Fungi, not specified	China	1	2.6	0.05*
Cypermethrin (RD)		**1**		
Bananas	Unknown	1	0.079	0.05*
Quintozene (RD)		**1**		

[48] DDAC and BAC are substances that were previously used as pesticides. Currently they are widely used as biocides for disinfection of machineries, surfaces or equipment, leading to residues in food.

Pesticide/food product	Origin of the products	Number of detections exceeding the MRL	Range of measured residue levels (mg/kg)	MRL (mg/kg)
Tea leaves	India	1	0.15	0.05*/0.1*[(b)]
Acephate		**1**		
Papaya	Thailand	1	0.066	0.02*/0.01*[(b)]
Methamidophos		**1**		
Papaya	Thailand	1	0.011	0.01*
Bifenazate		**1**		
Celery	Spain	1	0.011	0.01*
Permethrin		**1**		
Herbs, not specified	Germany	1	0.53	0.05*
Dimethoate (RD)		**1**		
Cherries	Serbia	1	0.353	0.2
Pirimiphos-methyl		**1**		
Lentils, dry	France	1	0.15	0.05*
Triadimenol (RD)		**1**		
Scarole	Spain	1	0.58	0.1*
Propyzamide (RD)		**1**		
Herbal infusions, not specified	Italy	1	0.57	0.05*
Fipronil (RD)		**1**		
Tea leaves	China	1	0.046	0.005*
Pyrimethanil		**1**		
Cherries	Serbia	1	0.088	0.05*
Heptachlor (RD)		**1**		
Pumpkin seeds	Austria	1	0.011	0.01*
Tetramethrin		**1**		
Fungi, not specified	China	1	1.4	0.01*
Bromide ion		**1**		
Herbal infusions, not specified	Romania	1	106	50–100[(a)]
Mercury (RD)		**1**		
Rye	Germany	1	0.035	0.01*
Dithiocarbamates (RD)		**1**		
Leafy brassica, not specified	Portugal	1	0.8	0.5

(*): Limit of quantification
(a): MRLs for individual crops of the food group are set at different levels.
(b): MRL changed during the reporting period
(c): MRL changed in 2014 to 0.1 mg/kg

3.2.5.3. Animal products

In total, 8 257 samples of animal products were analysed. The majority of these samples (88 %, 7 265 samples) were free of measurable residues; 25 samples (0.3 %) exceeded the MRL. Overall, 47 different pesticides were found in concentrations above the LOQ; the most frequently detected pesticide residues (detected in at least 20 samples) were hexachlorobenzene, DDT (RD), copper, thiacloprid, hexachlorocyclohexane (beta), endosulfan (RD), amitraz (RD), pirimiphos-methyl, mercury (RD) and DDAC (Figure 3-14). Most of these compounds are no longer used as pesticides in Europe, but they are still found in the food chain due to their persistence in the environment. It is noted that copper residues in animal products are not necessarily linked to the use of copper as pesticide but may result from the use of feed supplements which contain copper compounds. Certain pesticides were repeatedly detected in honey, e.g. thiacloprid, dimoxystrobin, azoxystrobin, boscalid, lambda-cyhalothrin; they are due to the use of the pesticides in crops that are foraged by bees. Coumaphos and amitraz residues were also detected in honey, but these compounds more likely originate from treatments of bee hives with veterinary drugs rather than from the use of pesticides since both substances are no longer authorised as pesticides in the EU. It is noted that the legal limits set for coumaphos under Regulation (EC) No 396/2005 and under Regulation (EC) No 96/23 should be checked for consistency.

Residues of mercury compounds were detected in a number of samples[49]. There is evidence that residues of mercury compounds occur in animal products in concentrations exceeding the current legal limits set under Regulation (EC) No 396/2005. Data on the presence of mercury residues in different food commodities have been evaluated previously be EFSA (EFSA, 2012b). EFSA recommended that further efforts should be made to increase the number of methylmercury and inorganic mercury data in all food groups that contribute significantly to overall exposure. The residue definition under Regulation (EC) No 396/2005 is specified as "mercury compounds (sum of mercury compounds expressed as mercury)" and does not differentiate between organic or inorganic mercury residues. Thus, when revising the reisude legislation, the residue definition should be reconsidered, since this is essential for performing appropriate dietary risk assessments.

In Table 3-4 further details on the pesticide/commodity combinations are reported which were found to exceed the legal limits.

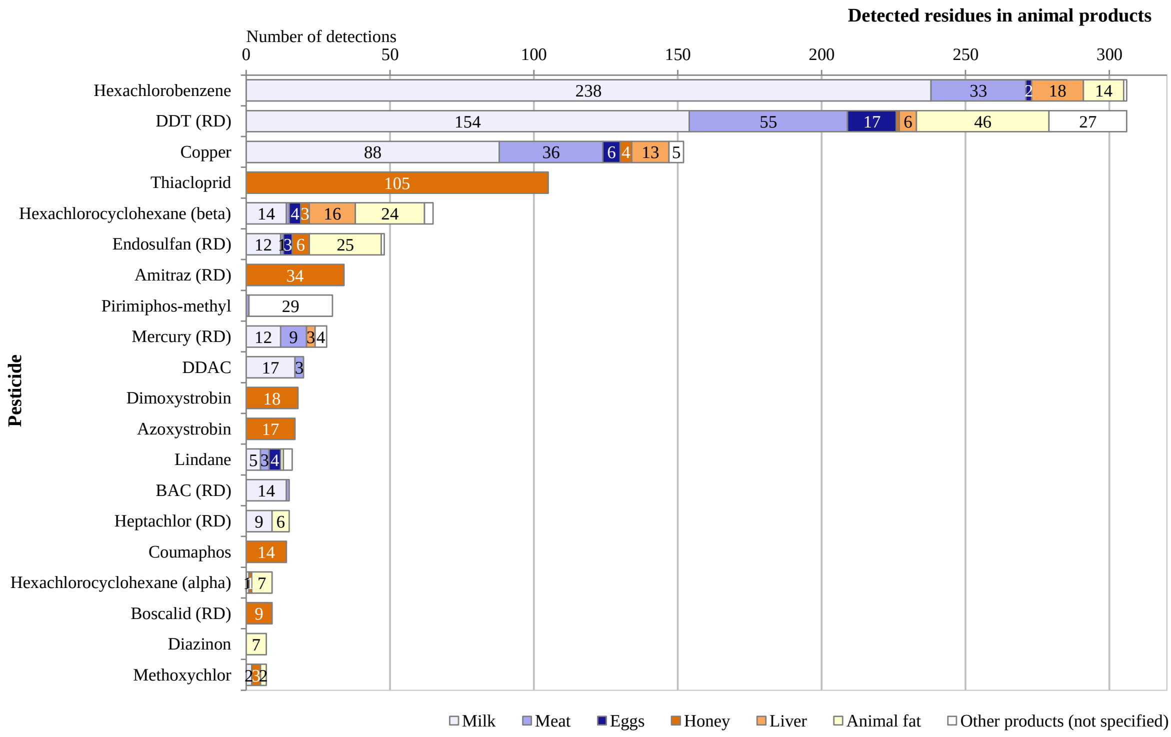


Figure 3-14: Pesticides detected most frequently in animal products

Table 3-4: Details on samples of animal products exceeding the MRL

Product/pesticide	Origin of the products	Number of detections exceeding the MRL/non-compliant	Range of measured residue levels (mg/kg)	MRL (mg/kg)
Honey		**6/2**		
Azoxystrobin	DE	5/2	0.011–0.086	0.01*
Thiacloprid	AT	1/0	0.233	0.2
Game products		**4/0**		
DDT (RD)	DE	4/0	0.057–0.095	0.05*
Chicken eggs		**3/3**		
Lindane	AT	2/2	0.254–0.295	0.01*
DDT (RD)	DE	1/1	0.209	0.05

[49] A carry-over from feed containing mercury compounds might be an explanation for these findings. It is noted that legal limits for mercury compounds in feed are established under Directive 2002/32/EC of the European Parliament and of the Council of 7 May 2002 on undesirable substances in animal feed. OJ L 140, 30.5.2002, p. 10-21.

Product/pesticide	Origin of the products	Number of detections exceeding the MRL/non-compliant	Range of measured residue levels (mg/kg)	MRL (mg/kg)
Poultry meat		**3/3**		
Mercury compounds	Brazil	3/3	0.023–0.024	0.01*
Fat of swine, bovine, poultry		**5/4**		
Permethrin	ES	3/3	0.077–0.183	0.05*
Methoxychlor	ES, BE	2/1	0.018–0.021	0.01*
Bovine meat		**1/0**		
Mercury compounds (RD)	unknown	1/0	0.013	0.01*
Liver and kidney of swine and bovine		**3/2**		
Mercury compounds(RD)	DE	3/2	0.015	0.01*

Country codes can be found on page 109.
(*) MRL set at the limit of quantification (LOQ)

3.2.6. Multiple residues in the same sample

Residues of more than one pesticide (multiple residues) were found in 27.3 % of the samples (22 126 samples) (Figure 3-15); multiple MRL exceedances were found in 385 samples (0.47 %). Multiple MRL exceedances were mainly found in tea (83 samples), peppers (46 samples) and beans with pods (32 samples).

Focussing on unprocessed food products, the highest frequency of multiple residues was found in gooseberries (85 % of the samples analysed contained multiple pesticide residues), followed by grapefruit (76.9 %), oranges (69.3 %), table grapes (68.1 %), mandarins (66.7 %) and lamb's lettuce (66.3 %). Also currants, rucola, strawberries, guava, blackberries, raspberries, celery, pears, tea leaves, limes and peaches were found to contain multiple residues in more than 50 % of the samples analysed. In Figure 3-16 the results for the top 40 food products with multiple residues are presented, broken down by the number of detected residues; products which were analysed only seldom (less than 20 samples) were not included in the analysis.

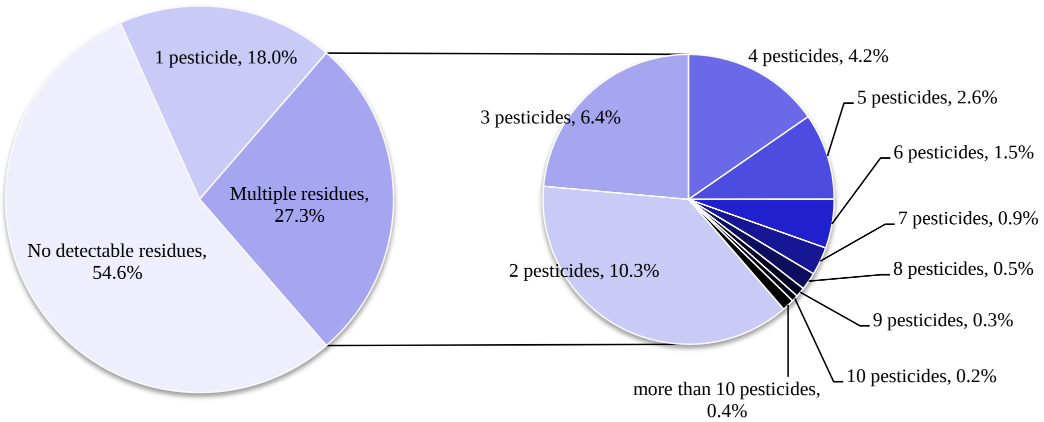


Figure 3-15: Multiple residues detected in surveillance samples (surveillance samples only)

Multiple residues in one single sample may result from the application of different types of pesticides on a crop or from pesticides formulations that contain more than one active substance. Besides these agricultural practices, multiple residues may also be due to mixing of lots with different treatment histories, contaminations during food processing, uptake of persistent residues via soil, or spray drift on the field. According to current EU legislation, the presence of multiple residues in a sample is not considered as an infringement of the MRL legislation as long as the individual residues do not exceed the individual MRLs. However, the presence of multiple residues in food should be assessed with regard to possible associated consumer health risks.

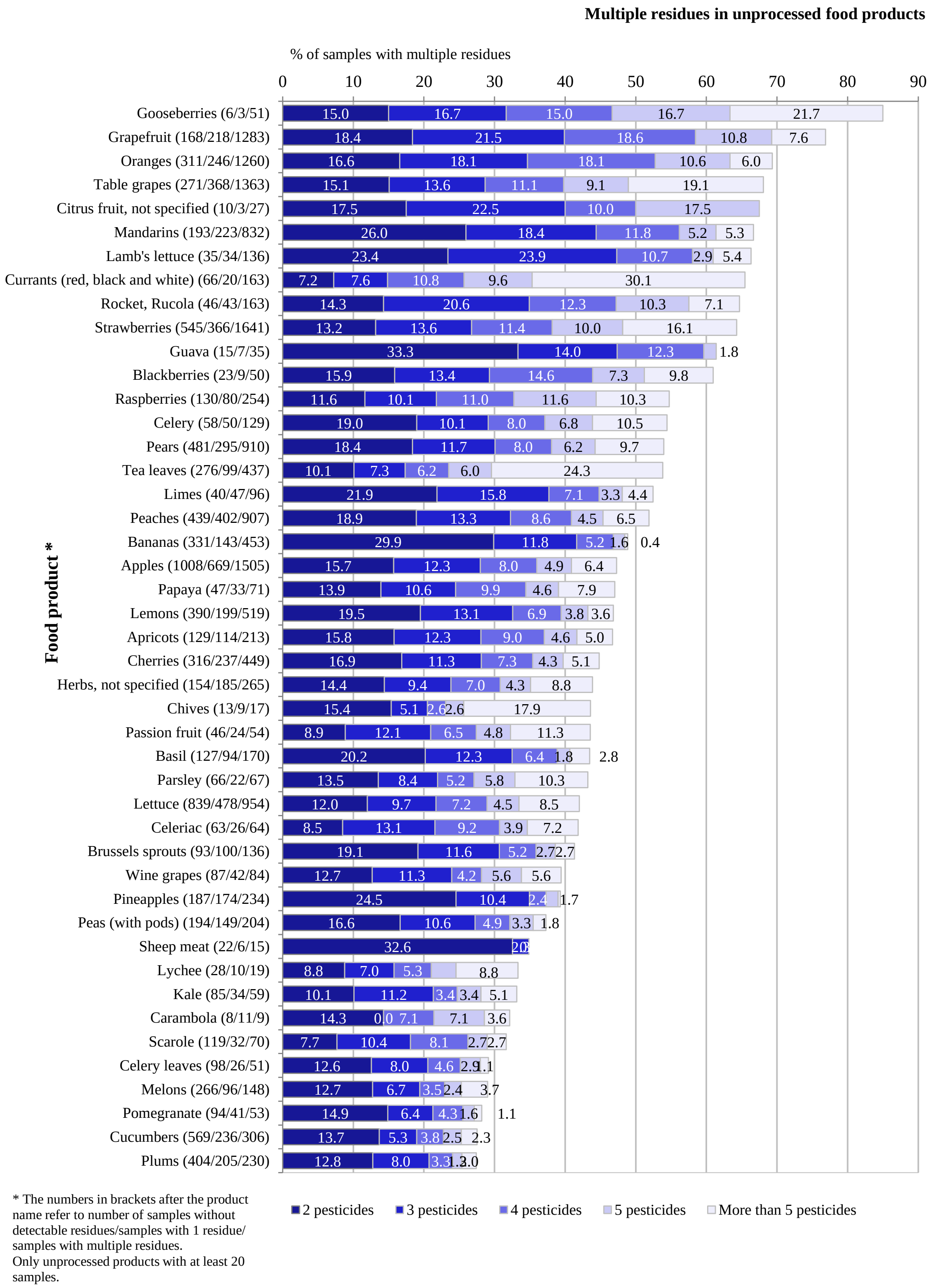


Figure 3-16: Food products most frequently containing multiple residues

3.3. Reasons for MRL exceedances

In total, 2 116 samples exceeded the legal limit (2.6 % of samples analysed). Considering samples with multiple MRL exceedances, the MRL breaches were reported for 2 788 individual determinations. It needs to be borne in mind that MRLs are established on the basis of supervised residue trials that should reflect the residue behaviour under conditions that are expected to occur in practice. The level of the MRL is calculated using statistical methodologies. The MRL usually is established to cover at least the upper confidence interval of the 95th percentile of the expected residue distribution. Thus, a low percentage of approximately 1 % MRL exceedances is expected to occur even if the approved Good Agricultural Practices are fully respected. To identify the possible reasons for MRL exceedances that go beyond that MRL exceedance rate, EFSA analysed separately the results referring to samples originating from the EU/EEA countries and from third countries.

Among the samples with one or more MRL exceedance, 1 274 samples originated from third countries. In these products a total of 1 854 determinations exceeded the legal limits; 888 determinations were resulting from targeted sampling (enforcement samples). 44 % of these MRL exceedances in products from third countries (816 determinations) were related to products that were in focus of import controls under Regulation (EC) No 669/2009 (see Section 3.2.4). In general, approximately one third of the MRL exceedances (659 determinations) in imported products were related to pesticides that are not or no longer approved in the EU and for which the EU MRLs are set at the limit of quantification. It is noted that most of the MRL exceedances on imported products concerned insecticides. A significant number of MRL exceedances were related to products that are mainly produced outside Europe (e.g. tropical fruit, okra, tropical root and tuber vegetables, tea, spices and rice).

The possible reasons for MRL exceedances in products imported from third countries are summarised as follows:

- Use of pesticides that are not or no longer approved in the EU on crops for which no import tolerances have been requested by the importers, as foreseen in Article 6 of Regulation (EC) No 396/2005;
- Use of pesticides that are approved in the EU, but on crops for which no import tolerances have been requested by the importers;
- Environmental contaminants in concentrations exceeding the legal limit (e.g. mercury in wild fungi);
- MRL exceedance due to natural background levels (e.g. dithiocarbamates may be detected in crops such as passion fruit or lychee for which information on possible false positive results is not available);
- Addition of biocides to water used for washing products prior to marketing (e.g. BAC/cassava).

781 samples with 870 individual MRL exceedances concerned products produced in one of the reporting countries, 186 of these exceedances were linked to active substances that are not approved in the EU while the majority of the MRL breaches (684 determinations) concerned pesticides that are approved. The product groups most frequently exceeding the legal limits were lettuce and salad plants, pome fruit, stone fruit, strawberries, solanacea (such as peppers, tomatoes) and stem vegetables (mostly celery) and herbs. A substantial amount of MRL exceedances in brassica vegetables was noted, but in many cases these findings were related to residues of CS_2, the marker compound for dithiocarbamates.

The origin of the product was not reported for 61 cases where residues were found in concentrations that exceeded the legal limit.

Possible reasons for MRL exceedances in products produced in the EU and EEA countries are summarised as follows:

- Use of approved pesticides but not in accordance with the prescribed Good Agricultural Practices; in particular the use of plant protection products on crops for which no authorisation was granted (e.g. dimethoate in cherries, or use of folpet on table grapes while the authorisation was limited to wine grapes), or through not respecting the application rate, the pre-harvest interval, the number of applications, or the method of application.

- To a lesser extent, the use of pesticides that are not approved or no longer approved.

- MRL exceedance due to natural background levels (e.g. dithiocarbamates in crops that are known to give false positive results such as brassica).

- Environmental contaminants exceeding the MRLs (e.g. mercury/wild fungi, chlormequat/pears).

- Certain substances that fall under the pesticide legislation are also used for other purposes (e.g. as biocides/disinfectants, feed additives, or veterinary medicinal products) and the MRLs set under Regulation (EC) No 396/2005 do not reflect the other sources of residues (e.g. BAC used as an additive to wash water for spinach or apples).

- In addition, cases of MRL exceedances were identified for products that are not directly treated with the pesticide, but where legally permitted uses result in the contamination of non-target food products (e.g. residues in honey that result from treatment of crops attractive for bees or residues in vine leaves that result from treatment of table or wine grapes).

More details on pesticide/crop combinations with a high frequency of MRL exceedances are compiled in Appendix C, Table C3.[50]

[50] The results related to import control samples are not included in this table. Details on this subset of samples with MRL exceedances can be found in Table 3-1.

SUMMARY CHAPTER 3

In 2013, the reporting countries analysed 80 967 samples for a total of 685 different pesticides. On average, samples were analysed for 200 pesticides. The majority of samples (55 253 samples, 68.2 %) originated from the EU and EEA countries; 22 400 samples (27.7 %) concerned products imported from third countries. For 3 314 samples (4.1 %) the origin of the products was not reported.

Overall, 97.4 % of the samples analysed fell within the legal limits; 54.6 % of the samples tested were free of detectable residues while 42.8 % of the samples analysed contained measurable residues not exceeding the permitted residue concentrations. 2.6 % of all the samples exceeded the MRL (2 116 samples); 1.5 % of the samples were found to be non-compliant, taking into account the measurement uncertainty.

Among the samples from EU/EEA countries, 57.6 % were free of measurable residues; 41.0 % contained residues above the LOQ but within the legal limits. 1.4 % of the samples contained residues that exceeded the permitted concentrations. However, administrative or legal actions were imposed on 0.7 % of the samples that clearly exceeded the legal limit (non-compliant samples). Samples from third countries were found to have a higher MRL exceedance rate (5.7 %) and non-compliance rate (3.4 %) than those from the EU and EEA countries. The percentage of samples from third countries free of detectable residues amounted to 46.2 % while 48.1 % of the samples contained residues within the permitted limits. Compared to 2012 the MRL exceedance rate for imported food products declined (2012: 7.5 %).

In unprocessed products MRL exceedances were detected for 2.8 % of the samples; 46.1 % of the samples contained measurable residues within the legal limits and 51.1 % of the unprocessed products were free of detectable residues. Processed products in general had a lower prevalence of pesticide residues and MRL exceedances (27 % of all processed products contained detectable residues within the legal limit, 1.2 % exceeded the MRL).

Residues of more than one pesticide (multiple residues) were found in 27.3 % of the samples (22 126 samples). Multiple residues were most frequently found in gooseberries, grapefruit, oranges, table grapes, mandarins and lamb's lettuce. Also currants, rucola, strawberries, guava, blackberries, raspberries, celery, pears, tea leaves, limes and peaches were found to contain multiple residues in more than 50 % of the samples analysed.

Among the 2 788 individual determinations that exceeded the legal limit, 878 determinations were reported for pesticides not approved in the EU. In most cases these MRL exceedances for non-approved pesticides were related to imported products (659 cases) while non-approved pesticides were less frequent for products produced in the EU and EFTA countries (186 results).

In total, 8 270 samples of products in focus for import controls as specified in Regulation (EC) No 669/2009 were analysed; the majority of these samples were analysed in Bulgaria, the Netherlands, France and Belgium. 557 samples (6.7 %) exceeded the legal limit for one or several pesticides. The highest number of MRL exceedances were detected in Chinese tea, beans with pods from Kenya, grapefruit (including pomelos) from China and okra from India.

1 597 samples of baby food were analysed. In 92.7 % of the samples no detectable residues were found, whereas in 116 samples (7.3 %) residues were above the LOQ. The most frequently detected compounds were copper, a naturally occurring substance, and the biocidal products DDAC and BAC (RD). In addition, persistent pesticides such as endrin, lindane and hexachlorocyclohexane (beta) were found in individual samples. In addition, other pesticides such as pirimiphos-methyl and dichlorvos, which are used for post-harvest treatment, were detected sporadically; but in general at low concentrations which might be as a result of contaminations. For 11 samples (0.7 % of the analysed baby food samples) the reporting countries noted MRL exceedances.

In 15.5 % of organic products (717 of the 4 620 samples analysed) pesticide residues were detected but within the legal limits, whereas 0.8 % of samples exceeded the MRL. In total, 134 distinct pesticides were identified; 37 thereof were found only in trace amounts (less than or equal 0.01 mg/kg). The most frequently quantified pesticide residues in organic products were copper, spinosad and fosetyl-Al (RD) as well as residues of hexachlorobenzene and DDT. In addition, bromide ion, dithiocarbamates, DDAC and BAC were found; these compounds are not necessarily related to the use of pesticides but may come from natural sources or from the use of biocides.

The majority of samples of animal products (8 257 samples) were free of measurable residues (88 %, 7 265 samples). 25 samples of animal products (0.3 %) exceeded the MRL. The most frequently detected pesticides (detected in at least 20 samples) were hexachlorobenzene, DDT (RD), copper, thiacloprid, hexachlorocyclohexane (beta), endosulfan (RD), amitraz (RD), pirimiphos-methyl, mercury (RD), and DDAC. MRL exceedances were noted for azoxystrobin, thiacloprid, DDT (RD), lindane, mercury compounds (RD), permethrin and methoxychlor.

4. Dietary exposure and dietary risk assessment

EFSA calculated the short-term and long-term dietary exposure for estimating the consumer health risks resulting from pesticide residues in and on food in a manner similar to previous years.[51]

In the acute or short-term exposure assessment, the uptake of pesticide residues via food consumed within a short period of time, usually within one meal or one day, is estimated. The chronic or long-term exposure assessment aims to quantify the pesticide intake by consumers over a long period, predicting the lifetime exposure. A comparison of the estimated chronic and acute dietary exposure with the relevant toxicological reference values for long-term and short-term exposure (i.e. the acceptable daily intake (ADI) and the Acute Reference Dose (ARfD)), gives an indication of whether consumers are exposed to pesticide residues that may pose a health risk. As long as the dietary exposure is lower than or equal to the toxicological reference values, based on current scientific knowledge, a consumer health risk can be excluded with a high probability. However, if the calculated exposure exceeds the toxicological reference values, a more refined calculation should be performed to verify whether the consumption of the food might lead to negative health outcomes (e.g. more realistic estimations of residues in edible part of the crop such as exposure to residues present in the edible part of oranges without peel). In case the refined exposure calculation still exceeds the ARfD or the ADI, further investigations are necessary to conclude on possible adverse effects on the consumer health.

For estimating the actual acute and chronic exposure to pesticide residues measured in monitoring programmes, EFSA used the deterministic risk assessment methodology that was originally developed for the risk assessment in the context of pesticide authorisations (EFSA PRIMo) (EFSA, 2007). The model implements the principles of the WHO methodologies for short-term and long-term risk assessment (FAO, 2009), taking into account the food consumption data available for the European population. The methodologies are risk assessment screening methodologies which are considered to be conservative, meaning that the calculations are likely to overestimate the actual exposure. The calculation tool (adapted version of EFSA PRIMo revision 2) is available on the EFSA website to recalculate the dietary exposure assessments presented in this report.[52] This calculation tool comprises all the relevant input values required for acute and chronic risk assessment.

EFSA is currently working on the implementation of the methodology for the assessment of risks related to cumulative dietary exposure of pesticide residues via food (EFSA, 2008, 2009, 2012, 2013b). Since the cumulative exposure assessment goes beyond the scope of this report, separate reports on this subject will be presented by EFSA in the near future.

4.1. Short-term (acute) exposure assessment – individual pesticides

The methodology used to calculate the short-term exposure is described in detail in the 2010 European Union report on pesticide residues (EFSA, 2013a). For all food products of the 2013 EUCP except wine, the food consumption data used for the short-term dietary intake assessment in the EFSA PRIMo are higher for children (expressed in g per kg body weight) than for adults. Thus, the exposure calculations for these products are therefore performed for children since this subgroup of the population is more exposed to pesticide residues via food. It should be highlighted that the calculations were performed with assumptions which are likely to overestimate the actual exposure of European consumers.[53] Thus, the results should be understood as a risk screening exercise which might require

[51] According to Article 32 (1)(d) of Regulation (EC) No 396/2005 the consumer exposure should be calculated on the basis of the monitoring results reported for pesticides, and for dual use substances which are used also as veterinary medicinal products, also taking into account the residue concentrations reported in the framework of Council Directive 96/23/EC. However, since the results on residues of veterinary medicinal product residues in animals are not available in a format suitable for dietary exposure calculations, this source of information cannot be used.

[52] The PRIMo file is provided as an Annex to this report in the EFSA Journal.

[53] Coincidence of the following events: 1) consumption of a large portion of the pertinent food (normally the 97.5th percentile of the daily food consumption reported in food surveys, considering only persons who have consumed the food product in focus, 2) exposure resulting from the sample with the highest residue measured, 3) assumption that the residues are not

more detailed assessments in case a consumer health risk was identified with the screening methodology.

The short-term exposure assessments were performed for the pesticides covered by the 2013 EU-coordinated programme, considering the 12 food products (i.e. apples, head cabbage, leek, lettuce, peaches, oats, rye, strawberries, tomatoes, wine, cow's milk and swine meat). The exposure was calculated for the 11 582 samples taken in the framework of the EUCP and additional 7165 samples of the 12 food products where results were reported under the national control programmes. The calculations were carried out separately for each pesticide/crop combination as it is considered unlikely that a consumer will eat two or more different food products in large portions within a short period of time and that all of these food products contain residues of the same pesticide at the highest level observed during the reporting year.

The short-term (acute) consumer exposure was calculated using the following input parameters:

- For each pesticide/crop combination the highest residue measured (HRM) was identified among all the results reported in the framework of the 2013 EU-coordinated and the national programmes (surveillance samples only).
- For pesticide/crop combinations where all reported results were below the LOQ, no acute exposure assessment was performed, assuming a no residue/no exposure situation.
- The exposure calculation for the unprocessed products (apples, head cabbage, leek, lettuce, peaches, oats, rye, strawberries, tomatoes, cow's milk and swine meat) was based on the large portion food consumption implemented in the EFSA PRIMo (EFSA, 2007).
- The unit weight for the individual food products is retrieved from the EFSA PRIMo (EFSA, 2007).
- Results that were not compliant with the residue definition were omitted.
- The residue values reported according to the residue definition for enforcement (in accordance with the EU MRL legislation) were not recalculated to the residue definition for risk assessment, lacking a comprehensive list of conversion factors.

The residue concentrations used for the short-term exposure assessment (HRMs) are reported in Appendix D, Table D2. Shaded cells refer to pesticide/food product combinations for which no analysis was required in the framework of the 2013 EUCP (see also Appendix B, Table B1).

In order to perform the risk assessment, the exposure estimated for the pesticide/crop combination was compared with the toxicological reference value, usually the ARfD value. For six pesticides with results above the LOQ, the short-term risk assessment has been performed with the ADI instead of the ARfD because these have not been evaluated with regard to the setting of the ARfD and/or the setting of the ARfD was not finalised (i.e. dichlofluanid, ethion, heptachlor, hexaconazole, methoxychlor and oxadixyl). The use of the ADI instead of the ARfD is an additional conservative element in the risk assessment. The ARfD/ADI values are compiled in Appendix D, Table D1. It should be noted that some of the ARfD values were recently lowered and were not in place when the monitoring results were generated in 2013 (e.g. chlorpyrifos).

As the residue definition for dimethoate[54] contains compounds with significantly different toxicities, it is not possible to perform an unambiguous risk assessment. Thus, for this compound EFSA calculated two scenarios: the optimistic dimethoate scenario where it is assumed that the determined residues are

evenly distributed on the individual units analysed in the composite sample, 4) no reduction of the residues e.g. by washing, peeling, cooking.

[54] Residue definition: dimethoate (sum of dimethoate and omethoate, expressed as dimethoate).

related only to the less toxic compound dimethoate, and the pessimistic omethoate scenario, where the total residue concentration reported is assumed to refer to the more toxic compound omethoate.

Similarly, the residue definitions for fenvalerate (RD), methomyl (RD) and triadimenol (RD) contain compounds with different toxicological profiles. To perform the acute risk assessment, it was assumed that the residue found consistend solely of the authorised active substance.

For dithiocarbamates, an unambiguous risk assessment is not possible since pesticides falling in the class of dithiocarbamates have different toxicological properties. As the analytical methods used do not distinguish which active substances were originally applied on the crop no clear conclusion can be derived whether the residue concentrations measured in the samples are likely to pose a consumer health concern.[55]

For 39 substances included in the EU-coordinated monitoring programme the setting of an ARfD was not necessary because of the low acute toxicity of the substances. These pesticides are therefore not relevant for acute exposure assessment.

4.1.1. Results of the short-term (acute) risk assessment – individual pesticides

The results of the short-term risk assessment, expressed as a percentage of the toxicological reference values, are presented in Table 4-1. Grey cells represent pesticide/crop combinations for which results were not reported (combinations not covered by the EUCP; see also Appendix B, Table B1), while cells containing an asterisk refer to pesticide/crop combinations with detectable residues but where a risk assessment could not be performed since no toxicological reference values are available. Empty cells in the grid refer to pesticide/crop combinations where the exposure was negligible because none of the samples analysed contained measurable residues. The calculated exposure, expressed as a percentage of the toxicological reference value, is stated for pesticide/crop combinations where detectable residues were reported and where an ARfD or ADI was available. Pesticide/crop combinations where the calculated dietary exposure exceeded the ARfD are highlighted in orange (exposure between 100 % and 1 000 %: light orange, exposure above 1 000 %: dark orange); whereas pesticide/crop combinations where exposure was calculated to be below the toxicological reference values are indicated in yellow.

Overall, for 49 pesticides (pesticides relevant for acute exposure assessments) not a single result above the LOQ was reported for any of the food products tested. Thus, for these pesticides the short-term dietary exposure was considered negligible for all of the food products covered by the EUCP (aldicarb (RD), amitrole, benfuracarb, biphenyl, bixafen (RD), bromopropylate, bromuconazole, carbofuran (RD), carbosulfan, chlordane (RD), chlorfenvinphos, chlorobenzilate, diazinon, dicrotophos, dieldrin (RD), diniconazole, endrin, EPN, ethoprophos, fenitrothion, fenpropathrin, fipronil (RD), formothion, fosthiazate, hexachlorocyclohexane (alpha), ioxynil (RD), isocarbophos, isofenphos-methyl, isoprocarb, meptyldinocap (RD), metaflumizone, metoconazole, methamidophos, monocrotophos, nitenpyram, oxydemeton-methyl (RD), parathion-methyl (RD), permethrin, phenthoate, phoxim, propoxur, prothiofos, pyrazophos, resmethrin (RD), rotenone, tefluthrin, tetramethrin, trichlorfon, and triticonazole).

For 90 pesticides, residues were found in concentrations above the LOQ, but the exposure was below the toxicological reference values (i.e. 2,4-D (RD), abamectin (RD), acephate, acrinathrin, amitraz (RD), azinphos-methyl, bifenthrin, bitertanol, buprofezin, captan (RD), carbaryl, chlorfenapyr, chlormequat, chlorothalonil (RD), chlorpropham (RD), chlorpyrifos-methyl, clothianidin, cyfluthrin (RD), cymoxanil, cypermethrin (RD), cyproconazole, cyromazine, dichlofluanid, dichlorvos, dicloran, dicofol (RD), difenoconazole, dimethomorph, dithianon, endosulfan (RD),

[55] Regulation (EC) No 396/2005 contains some indications on which pesticide the MRLs for dithiocarbamates are based (mancozeb for head cabbage; maneb and mancozeb for leek, oats and rye; maneb, mancozeb, metiram and propineb for tomatoes; maneb, mancozeb, metiram, propineb and thiram for wine grapes; mancozeb, metiram and thiram for lettuce, mancozeb and thiram for peaches; thiram for strawberries; no indication for apples). However, this information is not sufficiently reliable to derive a conclusion which pesticide was actually present in the crops.

epoxiconazole, ethion, etofenprox, famoxadone, fenarimol, fenazaquin, fenbuconazole, fenoxycarb, fenpropimorph (RD), fenpyroximate, fenthion (RD), fenvalerate (RD), flubendiamide, fluopyram (RD), fluquinconazole, flusilazole (RD), flutriafol, haloxyfop-R (RD), hexaconazole, indoxacarb, lindane, linuron, malathion (RD), mepanipyrim (RD), mepiquat, metalaxyl (RD), methidathion, methoxychlor, methoxyfenozide, metobromuron, myclobutanil (RD), oxadixyl, paclobutrazol, parathion, penconazole, phosalone, phosmet (RD), pirimicarb (RD), pirimiphos-methyl, prochloraz (RD), profenofos, propamocarb (RD), propiconazole, prothioconazole (RD), pymetrozine, pyrethrins, pyridaben, pyriproxyfen, spiromesifen, spiroxamine (RD), tau-fluvalinate, tebufenpyrad, terbuthylazine, tetraconazole, thiamethoxam (RD), thiophanate-methyl, tolylfluanid (RD), triadimenol (RD), triazophos and vinclozolin (RD)). According to the current scientific knowledge the presence of these pesticides in the food products assessed was not likely to pose a short-term health risk to consumers.

For 25 pesticides the screening for potential short-term consumer risks was positive for one or several of the food products in focus, meaning that the estimated short-term exposure exceeded the ARfD (i.e. acetamiprid (RD), carbendazim (RD), chlorpyrifos, deltamethrin, dimethoate (RD), dodine, ethephon, fenamiphos (RD), fenbutatin oxide, flonicamid (RD), fluazifop-P-butyl (RD), folpet (RD), formetanate (RD), heptachlor (RD), imazalil, imidacloprid, lambda-cyhalothrin (RD), methiocarb (RD), methomyl (RD), oxamyl, procymidone (RD), pyraclostrobin, tebuconazole, thiabendazole (RD) and thiacloprid).

A total of 225 determinations (corresponding to 218 samples) were calculated to exceed the ARfD in the risk assessment screening.[56] None of these samples were organic products. Further details on the origin of the samples that were identified in the risk screening as potentially posing a short-term health risk to consumers are given in Table 4-2. The individual results of the short-term dietary exposure assessment for the detected residues in the 12 food products, including the 225 cases where an exceedance of the ARfD was noted, are presented in Appendix D, Table D3. In this presentation the residue concentrations are presented individually expressed as percentage of the ARfD. The blue dots refer to results reported under the EUCP, whereas the orange dots refer to findings in samples that were analysed in the framework of the national control programmes programmes. The figures in brackets next to the name of the pesticides represent the number of samples with residues below the LOQ, number of samples with detectable residues below the MRL, and the number of samples with residues above the MRL.

Out of these 225 exceedances of the ARfD, 49 determinations were reported as exceeding the legal limit; 32 thereof were considered as non-compliant with the legal limit taking into account the measurement uncertainty. For six samples a notification under the Rapid Alert System of the European Commission was launched. It should be highlighted that 145 determinations exceeding the ARfD were related to chlorpyrifos residues (106 determinations in apples, 30 in peaches, four in head cabbage, two in tomatoes, one in oats, leek and lettuce, respectively). As mentioned before, the toxicological properties of chlorpyrifos were recently re-assessed by EFSA (EFSA, 2014b) and resulted in a new ARfD proposal which was 20 times lower than the ARfD set by the European Commission in consultation with the Member States in 2005 (EC, 2005). The highest exposure for chlorpyrifos residues was estimated to be 1 709 % of the new ARfD. Since most of the results for chlorpyrifos exceeding the ARfD refer to samples that did not exceed the legal limit, the new toxicological reference value triggers a revision of the existing MRLs and the authorised uses for chlorpyrifos to ensure that the use of chlorpyrifos in accordance with the legal provisions does not lead to residues in food that might give rise to consumer health risks.

[56] Dithiocarbamates were excluded from this analysis since an unambiguous risk assessment is not possible without knowing which pesticide was applied to the crop. It is noted that none of the samples that lead to an exceedance of the ARfD using the most conservative approach exceeded the legal limit.

For the following additional pesticide/food combinations exceedances of the ARfD were noted for samples that were compliant with the MRL in place in 2013: dodine, folpet[57], tebuconazole and thiabendazole in apples; acetamiprid, deltamethrin, lambda-cyhalothrin and pyraclostrobin in lettuce; lambda-cyhalothrin and tebuconazole in peaches; deltamethrin in tomatoes; and heptachlor in milk. Thus, these findings give an indication that the MRLs were not sufficiently protective and should be reconsidered. Similarly to chlorpyrifos, the ARfD values were also recently lowered for lambda-cyhalothrin, thiabendazole, tebuconazole, acetamiprid and folpet. As a consequence, the MRLs for acetamiprid and tebuconazole were reviewed by EFSA and lowered in the EU MRL legislation. The MRL review for deltamethrin and lambda-cyhalothrin is currently on-going. The MRLs for dodine were also reviewed and amended since 2013. Based on the findings for heptachlor in milk (exceedance of the ARfD while the sample was within the legal limit), a review of the existing MRL should be considered.

The 12 highest results for the exposure calculation, expressed as percentage of the ARfD, were obtained for carbendazim (RD) in lettuce in two samples from Bulgaria (899 % and 628 % of the ARfD), procymidone in lettuce from France (830 %), dimethoate in a Portuguese sample of apples (578 % of the ARfD), oxamyl in lettuce from France and Italy (457 % and 403 %), fluazifop-P-butyl in two Irish head cabbage samples (433 % and 380 %), thiabendazole in a Chilean and a US apple sample (431 % and 344 % of the ARfD), tebuconazole on a sample of Chilean peaches (376 % of the ARfD) and oxamyl on a sample of tomatoes from Morocco (326 %). For the remaining samples the calculated exposure was below 300 % of the ARfD.

Among the 225 cases exceeding the ARfD, in 57 cases the toxicological thresholds were only slightly exceeded (less than 120 % of the ARfD).

It should be stressed again that the calculations were performed without taking into account that the residues expected in the edible part of the crops (e.g. processed cereal products) or after processing (e.g. washing, cooking) might be significantly lower. Therefore the results of the acute risk assessment have to be understood as a conservative screening for potential risks which is likely to overestimate the actual exposure situation that occurred in practice. Given this conservatism, real exposure was expected to be significantly lower. Based on these results, EFSA concluded that the probability of being exposed to pesticide residues exceeding concentrations that may lead to negative health outcomes was low.

[57] The residue definition for folpet in apples is 'sum of captan and folpet'. If it is assumed that the reported residue concentration results only from folpet, the ARfD for folpet is exceeded. However, if the residues result from the use of captan, no exceedance of the ARfD is noted, since the ARfD for captan is higher.

Table 4-1: Results of short-term (acute) dietary risk assessment (expressed as a percentage of the toxicological reference value)

Pesticide	Food product [e]											
	Ap	Hc	Le	Lt	Pe	St	To	Ot	Re	Wi	Sw	Mi
2,4-D (RD)		0.16		0.27								
2-phenylphenol[a]												
Abamectin (RD)			47.2	52.7		15.0	23.3					
Acephate							1.57					
Acetamiprid (RD)	70.5			151	22.5	9.35	51.2					
Acrinathrin				32.3	40.3	46.8	17.4					
Aldicarb (RD)												
Amitraz (RD)	9.8				29.2							
Amitrole												
Azinphos-ethyl											*	
Azinphos-methyl	26.0											
Azoxystrobin[a]												
Benfuracarb												
Bifenthrin	16.3	3.86	1.96	20.6	9.89	1.92	11.4					
Biphenyl												
Bitertanol	78.4				52.2							
Bixafen (RD)												
Boscalid (RD) [a]												
Bromide ion[a]												
Bromopropylate												
Bromuconazole												
Bupirimate[a]												
Buprofezin	0.59				1.89		1.16					
Captan (RD)	67.3				10.1	19.6	0.78			0.16		
Carbaryl	7.84									4.74		
Carbendazim (RD)	103	6.84	24.5	899	162	70.2	117			202		
Carbofuran (RD)												
Carbosulfan												
Chlorantraniliprole[a]												
Chlordane (RD)												
Chlorfenapyr							6.98					
Chlorfenvinphos												
Chlormequat							3.65	51.8	14.9	0.64		
Chlorobenzilate												
Chlorothalonil (RD)	1.47	9.65	3.93	35.1	7.32	7.80	11.8					
Chlorpropham (RD)		0.79		0.12	0.01	0.06		0.002				
Chlorpyrifos	1 430	211	118	269	1 709	37.4	163	117	5.56	28.5		
Chlorpyrifos-methyl	38.2				19.6	6.86	33.5	2.99	9.48			
Clofentezine (RD) [a]												
Clothianidin		0.53		8.34	1.25		2.56					
Cyfluthrin (RD)	27.4	7.89		6.46	21.1							
Cymoxanil				2.19			13.1					
Cypermethrin (RD)	46.0	13.7	2.65	10.5	9.79	0.19	11.1	0.28			0.01	
Cyproconazole	1.47			4.04	9.79	5.30	2.91					
Cyprodinil (RD) [a]												
Cyromazine							23.3					
DDT (RD) [a]												
Deltamethrin	71.5	20.0	7.66	116	35.6	20.3	110	3.86	37.9		0.17	
Diazinon												
Dichlofluanid						0.19						
Dichlorvos						13.3		9.95				
Dicloran							4.65					
Dicofol (RD)						0.31						
Dicrotophos												
Dieldrin (RD)												
Diethofencarb[a]												
Difenoconazole	5.39	10.2	4.42	4.20	5.19	1.27	8.72					
Diflubenzuron (RD) [a]												
Dimethoate (RD) – dimethoate	578	165		98.0	172	7.33	58.1		0.32	1.42		
Dimethoate (RD) – omethoate[c]	2 890	827		490	860	36.6	291		1.58	7.12		
Dimethomorph		7.89	0.53	26.0	0.10	0.18	1.65			1.26		
Diniconazole												
Diphenylamine[a]												
Dithianon	89.8				0.84							
Dithiocarbamates (RD) – maneb scenario[d]	107	86.1	113	232	59.3	67.5	38.6	1.23	2.15	12.9		
Dithiocarbamates (RD) – thiram scenario[d]	30.9	24.9	32.6	67.3	17.2	19.5	11.2	0.36	0.62	3.75		
Dithiocarbamates (RD) – ziram scenario[d]	294	237	309	639	163	186	106	3.37	5.91	35.6		
Dithiocarbamates (RD) – propineb scenario[d]	222	179	234	482	123	140	80.1	2.55	4.46	26.9		
Dithiocarbamates (RD) – mancozeb scenario[d]	34.9	28.1	36.7	75.8	19.4	22.0	12.6	0.40	0.70	4.22		
Dodine	147				14.8	0.78	3.14					
Endosulfan (RD)						5.20	50.4					19.0
Endrin												
EPN												
Epoxiconazole		9.84		0.35			2.53		0.27			
Ethephon	58.8				7.71		244		0.63	28.0		
Ethion[b]						67.0						

Pesticide	Food product [e]											
	Ap	Hc	Le	Lt	Pe	St	To	Ot	Re	Wi	Sw	Mi
Ethirimol	*				*	*	*					
Ethoprophos												
Etofenprox	3.33			2.34	4.75	0.02	0.37					
Famoxadone	0.98		8.55	0.43		0.12	2.35					
Fenamidone[a]												
Fenamiphos (RD)							156					
Fenarimol						0.78				1.90		
Fenazaquin	17.6				1.13	3.59	6.40					
Fenbuconazole					6.72							
Fenbutatin oxide	235		4.83		2.20	21.8	1.57					
Fenhexamid[a]												
Fenitrothion												
Fenoxycarb	3.18				0.12	0.0008						
Fenpropathrin												
Fenpropimorph (RD)			31.6			15.6						
Fenpyroximate	34.3				16.0	17.2	14.8					
Fenthion (RD)	86.2					3.12						
Fenvalerate (RD)	22.4				7.12			2.23				
Fipronil (RD)												
Flonicamid (RD)	23.5	14.7		127	15.9	5.30	54.7			2.85		
Fluazifop-P-butyl (RD)		433	6.94			13.8						
Flubendiamide	5.88						6.40					
Fludioxonil[a]												
Flufenoxuron[a]												
Fluopyram (RD)	1.92	0.01		16.7	0.28	0.19	2.67			0.07		
Fluquinconazole	24.5					1.09						
Flusilazole (RD)	52.9					12.5						
Flutriafol						28.1	9.30					
Folpet (RD)	101			174	1.07	29.4	1.16			2.29		
Formetanate (RD)						172						
Formothion												
Fosthiazate												
Glyphosate[a]												
Haloxyfop-R (RD)			3.93			0.89						
Heptachlor (RD) [b]												174
Hexachlorobenzene											*	*
Hexachlorocyclohexane (α)												
Hexachlorocyclohexane (β)												*
Hexaconazole[b]	35.3											
Hexythiazox[a]												
Imazalil	196			1.40	2.25	0.56	7.91					
Imidacloprid	12.3	10.5	3.05	151	14.8	0.78	63.0			2.78		
Indoxacarb	7.05	2.69	8.49	21.5	1.52	3.62	2.33			4.36		

Pesticide	Food product [e]											
	Ap	Hc	Le	Lt	Pe	St	To	Ot	Re	Wi	Sw	Mi
Ioxynil (RD)												
Iprodione (RD) [a]												
Iprovalicarb[a]												
Isocarbophos												
Isofenphos-methyl												
Isoprocarb												
Kresoxim-methyl (RD) [a]												
λ-cyhalothrin (RD)	56.8	42.1	75.3	199	261	56.1	84.9					
Lindane											0.21	0.14
Linuron		4.39		0.09				0.07				
Lufenuron[a]												
Malathion (RD)		0.18			0.22	0.88		0.04	0.03			
Maleic hydrazide (RD) [a]												
Mandipropamid[a]												
Mepanipyrim (RD)				0.18	3.16	13.0	5.45			0.05		
Mepiquat								0.33	2.14			
Meptyldinocap (RD)												
Metaflumizone												
Metalaxyl (RD)		1.99	0.12	1.45	0.36	1.12	1.16			0.71		
Metconazole												
Methamidophos												
Methidathion	1.96											
Methiocarb (RD)		146	72.6	91.1	31.0	8.40				1.82		
Methomyl (RD)	263					12.5						
Methoxychlor[b]												4.32
Methoxyfenozide	11.3			0.63	2.97	1.56	2.04			1.78		
Metobromuron				0.09								
Monocrotophos												
Myclobutanil (RD)	8.85				1.13	3.02	5.63			0.77		
Nitenpyram												
Oxadixyl[b]	9.80			11.8								
Oxamyl				457		79.5	326					
Oxydemeton-methyl (RD)												
Paclobutrazol	0.98					0.19						
Parathion		2.11										
Parathion-methyl (RD)												
Penconazole	0.39				0.42	1.25	0.29					
Pencycuron[a]												
Pendimethalin[a]												
Permethrin												
Phenthoate												
Phosalone	0.98											
Phosmet (RD)	43.8				22.6							

Pesticide	Food product (e)											
	Ap	Hc	Le	Lt	Pe	St	To	Ot	Re	Wi	Sw	Mi
Phoxim												
Pirimicarb (RD)	34.3	0.58		59.2	4.45	15.8						
Pirimiphos-methyl	3.27			0.68			4.65	2.26	11.2		0.17	
Prochloraz (RD)	7.84	13.5										
Procymidone (RD)	16.3			830		13.0	16.5			1.98		
Profenofos						0.05						
Propamocarb (RD)		19.9	0.70	73.7	0.16	0.06	9.69					
Propargite	*				*	*	*					
Propiconazole	0.46		0.33	0.02	0.44	0.45				0.65		
Propoxur												
Propyzamide (RD) (a)												
Prothioconazole (RD)				0.27								
Prothiofos												
Pymetrozine		0.53		21.3	1.25	4.68	18.6					
Pyraclostrobin	84.9	15.4	18.1	179	75.2	41.1	27.1	0.41				
Pyrazophos												
Pyrethrins					2.14		0.58					
Pyridaben	7.84					3.74	31.3		0.28			
Pyrimethanil(a)												
Pyriproxyfen				0.07	0.01		0.08			0.003		
Quinoxyfen(a)												
Resmethrin (RD)												
Rotenone												
Spinosad (RD) (a)												
Spirodiclofen(a)												
Spiromesifen	0.08					0.44	3.49					
Spiroxamine (RD)	2.94			0.27	0.18		2.38			0.24		
tau-Fluvalinate	6.27			0.59	3.32	0.47	7.44					
Tebuconazole	114	52.6	86.5	77.1	376	8.11	44.6	1.21	1.69	5.09		
Tebufenozide(a)												
Tebufenpyrad	23.5				0.30	10.9	25.3			6.76		
Teflubenzuron(a)												
Tefluthrin												
Terbuthylazine				4.37	2.22	0.39						
Tetraconazole	7.45				5.81	8.11	4.65			0.24		
Tetradifon(a)												
Tetramethrin												
Thiabendazole (RD)	431	1.37	1.12		1.78	0.69	5.81			0.47		
Thiacloprid	101	14.9	1.57	72.6	15.8	52.0	31.0					
Thiamethoxam (RD)	0.56	0.27		6.28	0.54	0.28	1.07					
Thiophanate-methyl	24.5	2.89	1.89	48.2	18.4	0.77	14.5			4.40		
Tolclofos-methyl(a)												
Tolylfluanid (RD)						7.25						
Triadimenol (RD)	5.29		9.67	80.7	4.87	25.9	18.6		0.19			
Triazophos						9.35						
Trichlorfon												
Trifloxystrobin (RD) (a)												
Triflumuron(a)												
Trifluralin(a)												
Triticonazole												
Vinclozolin (RD)				5.43	5.44				0.11			
Zoxamide(a)												

(*): Samples with detectable residues but where an acute risk assessment was not performed because an ADI or ARfD value was not available.
(a): No ARfD necessary.
(b): Acute risk assessment was performed using the ADI.
(c): Most unrealistic scenario.
(d): The underlined results of the exposure calculation refer to the pesticides that were considered for setting the MRL for dithiocarbamates (see Regulation (EC) No 396/2005).
(e): Ap: apples; Hc: head cabbage; Le: leek; Lt: lettuce; Pe: peaches; St: strawberries; To: tomatoes; Ot: oats; Ry: rye; Wi: wine (red or white) made from grapes; Mi: cow's milk; Sw: swine meat.

Not analysed under 2013 EUCP
All results below LOQ
Exposure below 1 % of ARfD
Exposure up to 10 % of ARfD
Exposure up to 100 % of ARfD
Exposure up to 1000 % of ARfD
Exposure above 1000 % of ARfD

Table 4-2: Details on samples exceeding the ARfD in acute risk assessment screening

Food product/pesticide (total number of samples analysed)	Number of samples/ detections exceeding the ARfD	Origin of the products[(a)]	Comment
Apples (3 152)	**130/134**		
Chlorpyrifos	106	41 IT, 22 EL, 8 RO, 6 FR, 4 ES, 4 SI, 4 PL, 3 CY, 3 Argentina, 2 unknown, 2 PT, 1 BG, 1 Morocco, 1 UK, 1 Turkey, 1 Albania, 1 AT, 1 IE	The risk assessment is based on the ARfD derived by EFSA in 2014. Considering that the ARfD in place in 2013 was 20 times higher, none of the samples reported caused an exceedance of the ARfD. Two samples exceeded the MRL (1 IT, 1 CY).
Thiabendazole (RD)	14	6 Chile, 4 Argentina,2 USA, 1 PT, 1 FR	None of the samples exceeded the MRL. The risk assessment is based on the ARfD derived in 2014.
Dimethoate (RD)	4	2 FR, 1 PT, 1 Brazil	All samples exceeded the MRL.
Imazalil	2	1 PT, 1 EL	None of the samples exceeded MRL.
Dodine	2	2 IT	
Tebuconazole	1	1 CY	
Methomyl	1	1 PT	Sample exceeded the MRL
Folpet (RD)	1	1 DE	Sample did not exceed the MRL
Thiacloprid	1	1 EL	All samples exceeded the MRL
Carbendazim (RD)	1	1 China	
Fenbutatin oxide	1	1 CY	
Peaches (1 748)	**40/40**		
Chlorpyrifos	30	18 IT, 8 EL, 2 ES, 1 PT, 1 unknown	See comment on apples/chlorpyrifos. Eight samples exceeded the MRL (6 IT, for 2 of them a RASFF notification was launched, 1 EL, 1 ES)
Tebuconazole	4	4 Chile	One sample exceeded the MRL.
Lambda-cyhalothrin (RD)	3	3 ES	One sample exceeded the MRL.
Carbendazim (RD)	2	1 ES, 1 CY	All samples exceeded the MRL.
Dimethoate (RD)	1	1 EL	All samples exceeded the MRL.
Lettuce (2 253)	**26/27**		
Lambda-cyhalothrin (RD)	8	4 FR, 2 IT, 1 BE,1 HU	None of the samples exceeded the MRL.
Pyraclostrobin	4	2 IT, 1 SI, 1 DK	None of the samples exceeded the MRL.
Carbendazim	3	3 BG	All samples exceeded the MRL
Acetamiprid	3	1 ES, 1 IT, 1 FR	None of the samples exceeded the MRL.
Oxamyl	2	1 IT, 1 FR	All samples exceeded the MRL

Food product/pesticide (total number of samples analysed)	Number of samples/ detections exceeding the ARfD	Origin of the products(a)	Comment
Proxymidone (RD)	2	1 RO, 1 FR	All samples exceeded the MRL For the Romanian sample a RASFF notification was launched.
Chlorpyrifos	1	1 EL	See comment on apples/chlorpyrifos
Deltamethrin	1	1 PL	Sample did not exceed the MRL.
Folpet (RD)	1	1 FR	All samples exceeded the MRLFor sample exceeding the MRL for folpet a RASFF notification was launched.
Imidacloprid	1	1 IT	
Flonicamid	1	1SI	Sample exceeded the MRL, the non-compliant lot was not released to the market.
Tomatoes (2 581)	**10/10**		
Ethephon	2	1 FR, 1 Morocco	All samples exceeded the MRL For the sample from Morocco exceeding the MRL for oxamyl a RASFF notification was launched.
Fenamiphos	2	2 IT	
Oxamyl	2	1 IT, 1 Morocco	
Chlorpyrifos	2	1 ES, 1 Morocco	See comment on apples/chlorpyrifos. Samples did not exceed the MRL
Carbendazim	1	1 ES	Sample exceeded the MRL.
Deltamethrin	1	1 Senegal	Sample did not exceed the MRL
Head cabbage (1 101)	**7/9**		
Chlorpyrifos	4	3 ES, 1 IE	See comment on apples/chlorpyrifos. Samples did not exceed the MRL
Fluazifop-P-butyl (RD)	3	2 IE, 1 DE	All samples exceeded the MRL
Methiocarb	1	1 IE	
Dimethiocarb (RD)	1	1 AT	
Cow's milk (1 369)	**2/2**		
Heptachlor	2	2 BE	Samples did not exceed the MRL
Oats (267)	**1/1**		
Chlorpyrifos	1	1 BG	See comment on apples/chlorpyrifos. Sample exceeded the MRL.
Wine (1 588)	**1/1**		
Carbendazim	1	1 Argentina	Sample exceeded the MRL
Leek (992)	**1/1**		
Chlorpyrifos	1	1 EL	See comment on apples/chlorpyrifos
Strawberries (2 398)	**1/1**		
Formetanate (RD)	1	1 EL	Sample exceeded the MRL

(a): Country codes are explained in Section 'Abbreviations'.

For azinphos-ethyl, ethirimol, hexachlorobenzene, hexachlorocyclohexane (beta) and propargite, no acute risk assessment could be performed although detectable residues were reported because appropriate toxicological reference values are not available (no ADI or ARfD). Due to the lack of reliable toxicological assessments for these compounds, a possible consumer health risk resulting from the presence of these pesticides in food cannot be ruled out at present.

4.2. Long-term (chronic) risk assessment – individual pesticides

The chronic or long-term exposure assessment estimates the expected exposure of an individual consumer over a long period, predicting the lifetime exposure. The underlying model assumptions for the long-term risk assessment are explained in detail in the 2010 and 2011 EU report on pesticide residues (EFSA, 2013a, 2014c).

The exposure calculations are based on the most commonly consumed food commodities, the food products covered by the three year cycle of the EU-coordinated monitoring programme. For each pesticide/crop combination, the residue concentration used as the input value in the chronic exposure estimations was derived according to the following approach:

- For each pesticide/crop combination an overall mean value was calculated, using the actual values measured in the individual samples of surveillance samples. For samples with residues below the LOQ, EFSA used as a conservative assumption the numerical value of the LOQ to calculate the overall mean.[58]

- For the food products covered by the 2013 EU-coordinated monitoring programme (i.e. apples, head cabbage, leek, lettuce, peaches, strawberries, tomatoes, oats, rye, wine, cow's milk and swine meat), the mean residue concentration was calculated from the results presented in Section 2.3 of this report.[59]

- For the remaining food products considered in the long-term exposure assessment, the residue input figures were derived from the results of the 2013 national programmes (surveillance samples only). This applies to oranges, mandarins, pears, table grapes, bananas, potatoes, carrots, peppers, aubergines, cucumbers, broccoli, cauliflower, spinach, beans with pods, peas (without pods), olive oil, rice, wheat, liver (see comment below), poultry meat and chicken eggs.

- All the results reported for liver samples (bovine, goat, sheep, swine and poultry liver) were pooled to calculate the mean residue concentrations. The exposure was assessed on the basis of the consumption of bovine liver.

- Results concerning samples analysed with analytical methods for which the LOQ was greater than the corresponding MRL were disregarded, unless the result exceeded the legal limit.

- Results that were not compliant with the residue definition were omitted.

- If no positive findings were reported for any of the samples analysed for a given pesticide/crop combination (i.e. all results were reported below the LOQ), the contribution of these crops to the total dietary intake was not considered, assuming a 'no use/no residue' situation.

[58] The approach used to calculate the input values for the exposure assessment (also referred to as upper bound approach) leads to conservative estimates. In order to make more realistic calculations, alternative approaches would be possible (e.g. calculating the mean residue concentration on the basis of results above the limit of detection assuming a zero-residue concentration for samples with residues below the LOQ (lower bound approach) or taking into account information on percent crop treated or pesticide approvals granted in the different Member States).

[59] For these products the results reported under the national control programmes have not been considered to derive the input values for long-term exposure assessment because samples taken under the more targeted sampling strategy of the national programmes are expected to bias the long-term exposure.

- The residue values reported according to the residue definition for enforcement (in accordance with the EU MRL legislation) were not recalculated to the residue definition for risk assessment, lacking a comprehensive list of conversion factors.

The residue levels used as input values for the calculation of the long-term exposure are reported in Appendix D, Table D4. Empty cells in the table concern pesticides/commodity combinations for which none of the samples tested contained quantifiable residues.

The toxicological reference values used for the risk assessment are reported in Appendix D, Table D1.

Since the residue definition for dimethoate contains two compounds with significantly different toxicities (i.e. dimethoate and omethoate), it is not possible to perform an unambiguous risk assessment. Thus, for this compound EFSA calculated two scenarios: the optimistic dimethoate scenario where it is assumed that the calculated mean residue concentrations are related only to the less toxic dimethoate, while in the pessimistic omethoate scenario the total residue concentration reported is assumed to refer to the more toxic omethoate.

Also the residue definitions for fenvalerate, methomyl and triadimenol contain compounds with different toxicities. To perform the chronic risk assessment, it was assumed that the residues found are related to the use of the authorised substance only (fenvalerate, methomyl and triadimenol, respectively).

For dithiocarbamates, five scenarios were calculated, assuming that the measured CS_2 concentration refers exclusively to maneb, mancozeb, propineb, thiram and ziram.

4.2.1. Results of the long-term (chronic) risk assessment – individual pesticides

The results of the long-term dietary exposure assessments for each pesticide are reported in Table 4-3 (maximum exposure among the 27 diets included in the PRIMo model). The results are expressed as a percentage of the ADI.

Table 4-3: Results of long-term dietary risk assessment

Pesticide	**Long-term exposure** (% of ADI)
2,4-D (RD)	0.29
2-phenylphenol	0.25
Abamectin (RD)	2.13
Acephate	0.18
Acetamiprid (RD)	0.98
Acrinathrin	1.11
Aldicarb (RD)	0.40
Amitraz (RD)	8.94
Amitrole	No detectable residues
Azinphos-ethyl*	Detectable residues in one or several commodities
Azinphos-methyl	4.59
Azoxystrobin	0.24
Benfuracarb	No detectable residues
Bifenthrin	2.31
Biphenyl	0.04
Bitertanol	8.11
Bixafen (RD)	No detectable residues
Boscalid (RD)	1.78
Bromide ion	6.49
Bromopropylate	0.05
Bromuconazole	0.14
Bupirimate	0.45

Pesticide	**Long-term exposure** (% of ADI)
Buprofezin	2.92
Captan (RD)	0.75
Carbaryl	2.45
Carbendazim (RD)	1.94
Carbofuran (RD)	29.2
Carbosulfan	1.26
Chlorantraniliprole	0.01
Chlordane (RD)	6.21
Chlorfenapyr	0.67
Chlorfenvinphos	No detectable residues
Chlormequat	4.38
Chlorobenzilate	0.12
Chlorothalonil (RD)	2.04
Chlorpropham (RD)	3.15
Chlorpyrifos	54.6
Chlorpyrifos-methyl	3.62
Clofentezine (RD)	1.23
Clothianidin	0.21
Cyfluthrin (RD)	10.9
Cymoxanil	0.37
Cypermethrin (RD)	1.24
Cyproconazole	1.13

Pesticide	Long-term exposure (% of ADI)
Cyprodinil (RD)	1.73
Cyromazine	0.53
DDT (RD)	3.25
Deltamethrin	4.39
Diazinon	16.1
Dichlofluanid	0.00
Dichlorvos	108.6
Dicloran	0.68
Dicofol (RD)	3.70
Dicrotophos*	No detectable residues
Dieldrin (RD)	72.8
Diethofencarb	0.01
Difenoconazole	3.51
Diflubenzuron (RD)	0.25
Dimethoate (RD) - dimethoate	31.4
Dimethoate (RD) - omethoate	104.7
Dimethomorph	0.36
Diniconazole*	Detectable residues in one or several commodities
Diphenylamine	0.82
Dithianon	9.41
Dithiocarbamates (RD) - maneb scenario	10.3
Dithiocarbamates (RD) - thiram scenario	49.7
Dithiocarbamates (RD) - ziram scenario	99.4
Dithiocarbamates (RD) - propineb scenario	74.5
Dithiocarbamates (RD) - mancozeb scenario	10.7
Dodine	0.47
Endosulfan (RD)	2.73
Endrin	3.48
EPN*	Detectable residues in one or several commodities
Epoxiconazole	2.18
Ethephon	2.16
Ethion	0.80
Ethirimol*	Detectable residues in one or several commodities
Ethoprophos	9.55
Etofenprox	0.80
Famoxadone	1.82
Fenamidone	0.08
Fenamiphos (RD)	4.13
Fenarimol	0.48
Fenazaquin	4.07
Fenbuconazole	1.22
Fenbutatin oxide	0.96
Fenhexamid	0.25
Fenitrothion	0.13
Fenoxycarb	0.38
Fenpropathrin	0.24
Fenpropimorph (RD)	3.32
Fenpyroximate	2.28

Pesticide	Long-term exposure (% of ADI)
Fenthion (RD)	1.74
Fenvalerate (RD)	1.38
Fipronil (RD)	35.3
Flonicamid (RD)	1.73
Fluazifop-P-butyl (RD)	0.93
Flubendiamide	0.87
Fludioxonil	0.14
Flufenoxuron	2.05
Fluopyram (RD)	1.69
Fluquinconazole	11.7
Flusilazole (RD)	10.2
Flutriafol	0.73
Folpet (RD)	0.76
Formetanate (RD)	0.54
Formothion*	No detectable residues
Fosthiazate	1.90
Glyphosate	0.51
Haloxyfop-R (RD)	2.76
Heptachlor (RD)	42.4
Hexachlorobenzene*	Detectable residues in one or several commodities
Hexachlorocyclohexane (alpha)*	Detectable residues in one or several commodities
Hexachlorocyclohexane (beta)*	Detectable residues in one or several commodities
Hexaconazole	3.43
Hexythiazox	0.93
Imazalil	16.6
Imidacloprid	0.66
Indoxacarb	3.69
Ioxynil (RD)	No detectable residues
Iprodione (RD)	1.02
Iprovalicarb	0.88
Isocarbophos*	No detectable residues
Isofenphos-methyl*	No detectable residues
Isoprocarb*	No detectable residues
Kresoxim-methyl (RD)	0.06
Lambda-cyhalothrin (RD)	12.4
Lindane	1.77
Linuron	3.51
Lufenuron	0.42
Malathion (RD)	0.42
Maleic hydrazide (RD)	4.32
Mandipropamid	0.05
Mepanipyrim (RD)	0.32
Mepiquat	0.18
Meptyldinocap (RD)	No detectable residues
Metaflumizone	0.07
Metalaxyl (RD)	0.21
Metconazole	No detectable residues
Methamidophos	3.54
Methidathion	19.4
Methiocarb (RD)	0.54
Methomyl (RD)	5.86
Methoxychlor	0.11
Methoxyfenozide	0.32
Metobromuron	0.06

Pesticide	Long-term exposure (% of ADI)
Monocrotophos	1.93
Myclobutanil (RD)	1.30
Nitenpyram*	No detectable residues
Oxadixyl	1.47
Oxamyl	5.73
Oxydemeton-methyl (RD)	No detectable residues
Paclobutrazol	0.64
Parathion	6.63
Parathion-methyl (RD)	No detectable residues
Penconazole	0.64
Pencycuron	0.04
Pendimethalin	0.20
Permethrin	0.33
Phenthoate	0.16
Phosalone	2.23
Phosmet (RD)	1.99
Phoxim	2.15
Pirimicarb (RD)	0.61
Pirimiphos-methyl	10.3
Prochloraz (RD)	3.87
Procymidone (RD)	8.54
Profenofos	0.19
Propamocarb (RD)	0.19
Propargite*	Detectable residues in one or several commodities
Propiconazole	0.83
Propoxur	0.27
Propyzamide (RD)	0.18
Prothioconazole (RD)	0.24
Prothiofos*	Detectable residues in one or several commodities
Pymetrozine	0.20
Pyraclostrobin	1.14
Pyrazophos	No detectable residues
Pyrethrins	1.06
Pyridaben	2.51
Pyrimethanil	0.60
Pyriproxyfen	0.15
Quinoxyfen	0.02
Resmethrin (RD)	No detectable residues

Pesticide	Long-term exposure (% of ADI)
Rotenone*	No detectable residues
Spinosad (RD)	0.96
Spirodiclofen	1.27
Spiromesifen	0.54
Spiroxamine (RD)	1.07
tau-Fluvalinate	5.08
Tebuconazole	1.49
Tebufenozide	1.07
Tebufenpyrad	2.50
Teflubenzuron	2.18
Tefluthrin	0.92
Terbuthylazine	1.79
Tetraconazole	6.61
Tetradifon	0.28
Tetramethrin*	Detectable residues in one or several commodities
Thiabendazole (RD)	2.04
Thiacloprid	1.93
Thiamethoxam (RD)	1.15
Thiophanate-methyl	0.38
Tolclofos-methyl	0.19
Tolylfluanid (RD)	0.02
Triadimenol (RD)	0.58
Triazophos	6.41
Trichlorfon	0.32
Trifloxystrobin (RD)	0.26
Triflumuron	1.34
Trifluralin	0.26
Triticonazole	0.33
Vinclozolin (RD)	1.66
Zoxamide	0.02

*: no ADI available

Negligible exposure	Exposure ≤ 100 % of ADI
Exposure ≤ 1 % of ADI	Exposure > 100 % of ADI or no exposure calculation due to absence of ADI
Exposure ≤ 10 % of ADI	

For 18 pesticides, no quantifiable residues were reported in any of the crops/food products considered in the chronic exposure assessment; these pesticides are amitrole, benfuracarb, bixafen (RD), chlorfenvinphos, dicrotophos, formothion, ioxynil (RD), isocarbophos, isofenphos-methyl, isoprocarb, meptyldinocap (RD), metconazole, nitenpyram, oxydemeton-methyl, parathion-methyl (RD), pyrazophos, resmethrin (RD) and rotenone. Thus, for these pesticides the long-term exposure is considered negligible.

For another 165 pesticides, the calculated long-term exposure amounted to less than 10 % of the ADI. Based on the current scientific knowledge it is concluded that no long-term risk is expected for these pesticides. For 14 pesticides the exposure was between 10 % and 100 % of the ADI (ranked in ascending order of the exposure these pesticides are flusilazole (RD), pirimiphos-methyl (RD), cyfluthrin (RD), fluquinconazole, lambda-cyhalothrin, diazinon, imazalil, methidathion, carbofuran (RD), dimethoate (RD), fipronil (RD), heptachlor (RD), chlorpyrifos and dieldrin (RD). Also the dithiocarbamates scenarios fall in this category. Considering the overall conservative approach in the dietary exposure calculations, EFSA concludes that also for these 165 pesticides the dietary exposure was in a range that is not likely to pose a consumer health concern.

As regards dimethoate, where alternative risk assessment options were calculated, a slight exceedance of the ADI was noted in the more conservative scenario (105 % of the ADI). However, also for this pesticide a long-term consumer health risk can be excluded with a high probability, taking into account the conservatism of the calculation and the marginal exceedance of the toxicological reference value.

Dichlorvos was the only pesticide where the calculated long-term dietary exposure exceeded the toxicological threshold (109 %). The food product that was the major contributor to the overall long-term exposure, with 101.5 % of the ADI, was wheat, which had a calculated mean residue concentration of 0.0095 mg/kg. It should be borne in mind that the calculations were performed with very conservative assumptions, supposing dichlorvos residues being present on each food produced from strawberries, peppers, oats and wheat, i.e. the food products where at least one sample contained measurable residues of dichlorvos. Considering that dichlorvos is no longer approved in the EU, the assumptions used for the risk screening are not very realistic, since it would postulate systematic illegal uses of dichlorvos on the four food products mentioned. EFSA calculated the input value for an alternative exposure scenario, assuming samples to be free of residues of dichlorvos where reporting countries did not detect measurable residues above the LOQ (lower-bound approach). Under this assumption, the exposure dropped below 1 % of the ADI. Although the lower-bound exposure calculation might underestimate the actual exposure, it provides some evidence that the high exposure to this very toxic compound was mainly driven by the conservatism of the exposure calculation.

For ten pesticides (azinphos-ethyl, diniconazole, EPN, ethirimol, hexachlorobenzene, hexachlorocyclohexane (alpha), hexachlorocyclohexane (beta), propargite, prothiofos and tetramethrin), measurable residues were detected in food but no long-term dietary risk assessment could be performed as there are no internationally agreed toxicological reference values available for these compounds. It is noted that none of these pesticides are approved in Europe but residues may be present in food due to either persistence of the pesticides in the environment (e.g. hexachlorobenzene, hexachlorocyclohexane alpha and beta) or due to their use in third countries (diniconazole, ethirimol, propargite, prothiofos and tetramethrin). The estimated exposure to these pesticides, using the food consumption data of EFSA PRIMo rev. 2, was low (see Table 4-4).

Table 4-4: Results of exposure assessment for active substances without ADI values

Pesticide	Long-term exposure (in mg/kg bw per day)
Azinphos-ethyl	0.000014
Diniconazole	0.000018
EPN	0.000014
Ethirimol	0.00015
Hexachlorobenzene	0.00011
Hexachlorocyclohexane (alpha)	0.000048
Hexachlorocyclohexane (beta)	0.000093
Propargite	0.00038
Prothiofos	0.000037
Tetramethrin	0.000084

It is noted that the risk assessment methodology used for this exercise should be considered as a conservative screening. Higher-tier calculations could be performed by means of probabilistic modelling, using the distributions of the individual food consumptions reported by the respondents of food consumption surveys and the distribution of the measured residue concentrations identified in the monitoring programmes or by introducing other elements for refinement, e.g. residues in processed products. EFSA has developed a methodology for probabilistic calculations (EFSA, 2008, 2009a, 2012a, 2013a) and currently discussions are on-going concerning the practical implementation.

However, as long as the conservative screening does not identify an exceedance of the toxicological reference values, no further assessments are considered necessary.

Overall, based on the results of the 2013 monitoring programmes (EUCP and NP), it is concluded that dietary exposure to those pesticides covered by the EU coordinated monitoring programme for which toxicological data are available was not likely to pose a health risk to consumers. For the ten pesticides without reliable toxicological assessments where detectable residues were reported sporadically, a consumer health concern cannot be fully excluded, but considering the inherent conservatism of the calculation and the low exposure estimates the risk to consumer health was considered to be low.

SUMMARY CHAPTER 4

EFSA calculated the short-term (acute) exposure for the twelve food products (i.e. apples, head cabbage, leek, lettuce, peaches, oats, rye, strawberries, tomatoes, wine, cow's milk and swine meat) related to the pesticides in focus of the 2013 EUCP. The residue concentrations found in 11 582 samples taken in the framework of the EUCP and additional 7 165 samples of the 12 food products where results were reported under the national control programmes were used for this exercise. No acute risk assessment was performed for 39 substances for which the setting of an ARfD was not necessary due to the low acute toxicity of the substances. For five pesticides residues were detected in some of the food products analysed (azinphos-methyl, ethirimol, hexachlorobenzene, HCH (beta) and propargite), but due to the lack of toxicological reference values, no short-term dietary risk assessment could be performed. Dithiocarbamates were also excluded from the acute risk assessment since an unambiguous risk assessment is not possible without knowing which of the pesticides belonging to the group of dithiocarbamates was applied on the crop.

Overall, 49 pesticides were not found at concentrations above the LOQ in any of the food products tested. Consequently, the short-term dietary exposure was considered negligible for these pesticides.

For 90 pesticides, residues were found in concentrations above the LOQ but the exposure was below the toxicological reference values, and thus, the residue concentrations found were not likely to pose a risk to consumer health.

For a total of 225 determinations (corresponding to 218 samples out of the 18 747 samples), the estimated short-term dietary exposure exceeded the ARfD in the risk assessment screening. Most of the cases exceeding the ARfD were due to chlorpyrifos residues (145 determinations), mainly in apples and peaches. The toxicological properties of chlorpyrifos were recently assessed by EFSA and the proposed new ARfD is 20 times lower than that which was agreed by Member States in 2005. The new toxicological reference value, that still needs to be formally approved, triggers a revision of the existing MRLs and the authorised uses of chlorpyrifos to ensure that the use of chlorpyrifos does not lead to residues in food that might cause consumer health risks.

Excluding the results for chlorpyrifos, 73 samples contained residues exceeding the ARfD. Among those samples, 12 samples were identified where the theoretical exposure calculation amounted to more than 300 % of the ARfD, assuming that the product was consumed in high amounts without washing or any processing which would reduce the residues (e.g. peeling). Thus, bearing in mind the inherent conservatism, the actual exposure was expected to be significantly lower. For the pesticides and food products covered by the EUCP, EFSA concluded that the probability of being exposed to pesticide residues exceeding concentrations that may lead to negative health outcomes following short-term exposure via food was low.

EFSA also calculated the chronic or long-term dietary risk which estimates the exposure over a long period, predicting the lifetime exposure. For a total of 18 pesticides, the long-term exposure was negligible (no detectable residues in any of the samples analysed); for 165 pesticides, the exposure did not exceed 10 % of the toxicologically acceptable dose rate. The exposure was between 10 % and 100 % of the ADI for 15 pesticides (including dithiocarbamates). Thus, residues of these pesticides, according to the current scientific knowledge, are not likely to pose a chronic consumer health risk. Although a slight exceedance of the ADI was noted for dimethoate in the scenario calculated for the more toxic metabolite omethoate, EFSA does not expect that the residues present in food in 2013 caused a long-term consumer risk, taking into account the conservative assumptions of the calculation which were likely to overestimate the exposure.

Dichlorvos was the only pesticide where the calculated long-term dietary exposure exceeded the toxicological threshold (109 % of the ADI). Considering that dichlorvos is no longer approved in the EU, the risk assessment approach used for estimating the long-term dietary exposure was found to be overly conservative. In an alternative calculation scenario, using the lower-bound approach, the exposure dropped below 1 % of the ADI. Although the lower-bound exposure calculation might underestimate the actual exposure, it provides some evidence that the high estimated exposure for this very toxic compound was mainly driven by the conservatism of the exposure calculation.

Overall, based on the results of the 2013 monitoring programmes (EUCP and NP), it is concluded that long-term dietary exposure to the pesticides covered by the EU coordinated monitoring programme for which toxicological data are available was not likely to pose a long-term health risk to consumers. For the ten pesticides without reliable toxicological assessments where detectable residues were reported sporadically, a consumer health concern cannot be fully excluded, but considering the inherent conservatism of the calculation and the low exposure estimates the risk to consumer health was considered to be low.

CONCLUSIONS

Pesticide residues in food are perceived by the public as a risk factor for public health. An approval and authorisation system for pesticides has been set up in the European Union which is aimed to ensure a high level of protection for European consumers. The applicants/manufacturers of the pesticides are requested to provide a wide range of scientific studies for hazard assessment and the estimation of the nature and magnitude of residues in food. Scientists of the national food safety authorities in Member States together with EFSA scrutinise the data and using risk assessment models, assess whether expected residues in food are likely to pose a health risk to consumers. Therefore, pesticides are a group of chemical substances which are well investigated as regards the hazards, the expected exposure and the risks for the European population. The pesticide monitoring programme is an additional instrument for collecting data, which enables objective analysis of the pesticide residues for food placed on the market in Europe and verification of whether the legal limits are appropriate.

In accordance with the terms of reference, EFSA analysed in this report the results on pesticide residues in food generated by the national authorities responsible for food control. The assessments focused on whether the residues detected in food in 2013 were within the legal limits and which products were likely to pose a chronic or acute consumer health concern. Since the results of pesticide residue analysis are normally available only after most of the products have been already consumed, the EU report on pesticide residues is not a tool for informing the public on imminent risks related to food. However, the comprehensive analysis of the results of all reporting countries provides risk managers with a scientifically sound basis for taking appropriate risk management actions for future monitoring programmes, in particular decisions about which pesticides and food products should be targeted in risk-based national monitoring programmes or other necessary risk management measures, such as the need to review or modify existing legal limits.

Quantity of the data

Overall, EU Member States and the two EFTA countries Norway and Iceland analysed 80 967 samples in 2013; this is an increase of 3.3 % compared to 2012. It covers both domestic and imported food products placed on the EU market. In total, 16 237 827 individual determinations were reported to EFSA, a valuable source of information for dietary exposure assessment. It is acknowledged that a high quantity of occurrence data on pesticide residues are generated by the reporting countries and, compared with other food sectors with less rigorous requirements of food controls and less systematic monitoring regimes, the amount of montiroing data seems to be incomparably high. However, it should be borne in mind that pesticides are a heterogeneous group of substances which require differentiated assessment, taking into account the specific hazards of the individual pesticides. From previous monitoring results it is known that the frequency of samples exceeding the legal limit is in general low. Thus, to be able to derive statistically sound conclusions on consumer health risks related to pesticide residues and on the compliance rate with the legal limits, detailed information on the individual pesticides and food products is indispensable.

Quality of the data

Since 2009, a significant effort has been put into setting up and implementing a system of reporting chemical occurrence data such as pesticide residues (Standard Sampling Description – SSD) which makes it easier to manage a large volume of data and to retrieve the essential information needed to perform exposure assessments, as well as to estimate compliance rates. Particular focus was put on the harmonisation of terminology, to make data from different data providers compatible. In addition, detailed background information to characterise the samples analysed (e.g. description of the food product analysed, production type, origin of the sample, etc.) and information relevant for correct interpretation of the results (e.g. sampling strategy, details on sensitivity of analytical methods used to analyse the samples, legal framework of the samples, interpretations of the results as non-compliant/compliant) were collected. The information submitted by reporting countries to EFSA using the SSD data format was linked to other databases containing relevant information on the pesticides (e.g. authorisation status of the pesticides, MRLs in place during the reference period, toxicological reference values) to further increase the usefulness of the data. Overall the quality of the data for pesticide residues in food has significantly increased during the last five years, using a well-structured data reporting format and adhering to agreed terminology.

Nature of the hazard (hazard identification/characterisation)

As mentioned before, pesticides are an inhomogeneous group of chemicals with different toxicological profiles. Comparing the ADI values for the pesticides covered by the EUCP, which is a measure of the long-term toxicity of the pesticides, it becomes evident that the toxicological potencies of pesticides span over four orders of magnitude (most hazardous substances with regard to long-term exposure reflected by the lowest ADI of 0.00008 mg/kg body weight per day for dichlorvos, 0.0001 mg/kg body weight per day for dieldrin and heptachlor; highest ADI for chlorantraniliprole with 1.56 mg/kg body weight per day). Also with regard to short-term exposure the spectrum of pesticides covers substances which are considered as having no short-term toxicity, through to substances such as carbofuran which have a high acute toxicity reflected by a very low ARfD (0.00015 mg/kg body weight). Not only do the toxicological potencies of pesticides show a wide variation, but the nature of the effects resulting from exposure are expected to be very diverse for the individual substances: effects may be reversible or irreversible, effects may occur after a single exposure or only after repeated exposure, causing short-term and long-term health effects, and the severity of the effects may be very different. Thus, the heterogeneity of the group of chemicals covered by the pesticide legislation does not allow a simple blanket judgement on the hazard of pesticides.

Exposure and risk assessment

Considering the frequency of pesticide residues detected in food commonly consumed, a wide range of European consumers are expected to be exposed to these substances via food. The frequency of exposure to the individual pesticides may vary depending on the type of products consumed (e.g. consumption of food products with a lower probability of containing the pertinent residue, such as organic products, food produced for infants and young children, food of animal origin, cereal-based products, etc.). The amount of exposure of an individual is also determined by the type of food products consumed and can be influenced to a certain extent by avoiding certain products which are likely to contain residues. The exposure level is to a large extent also influenced by the processing of food prior to consumption, e.g. a reduction of the residue level in food can be achieved by washing or by removing the peel, in particular for non-systemic pesticides or by other forms of processing types such as cooking, boiling, baking. Since children in general have a higher food intake per kg body weight, this sub-group of the population is expected to be more exposed if children consume the same food products as adults. Thus, this consumer group needs particular attention in the dietary risk assessment.

Dietary risk is dependent on the frequency and magnitude of exposure in terms of intake of the pesticides per kg bodyweight, but is mainly determined by the toxicity of the substance. After performing a risk assessment with a methodology that is considered sufficiently conservative to identify possible risks for consumers, EFSA concluded that the probability of European citizens being exposed to pesticide residues exceeding the toxicological threshold for adverse effects after short-term exposure (via a single eating event or during one day) was low. Although in most cases a higher exposure was calculated for children, the risk was also low for this group of consumers. With regard to the long-term exposure, adverse effects for the consumer health risk were found to be unlikely for both the general population and for the sub-groups of the population for which food consumption data are available. However, considering the inherent uncertainties of the calculation model and the lack of certain information that would be required to reduce the uncertainties, EFSA derived a number of recommendations how to reduce the uncertainties.

RECOMMENDATIONS

Acknowledging the limited capacities and resources available for pesticide residue analysis in the competent national food authorities, a proper planning of the national and EU-wide monitoring programmes is necessary to enable better targeting of resources. Based on the experience gained from the 2013 data collection and analysis, EFSA has made the following recommendations in order to improve the efficiency of the EU-coordinated and national programmes run by the official food safety authorities, increase the quality of the data, revise MRLs or the existing legislation and reduce uncertainties in the dietary exposure and risk assessments performed by EFSA.

- For planning national control programmes a particular focus should be put on pesticides/food products where MRL exceedances were found in 2013 (see Section 3.2.2, 3.2.3, 3.2.4 and 3.2.5). Samples originating from countries with repeated MRL violations should also be included in the risk based monitoring programmes (see Section 3.2.1).
- Similar to previous years, EFSA noted that for certain pesticides covered by the 2013 EUCP the number of determinations reported was significantly below the number needed to derive statistically sound conclusions. This is true in particular for 2,4-D, amitraz, amitrole, bixafen, bromide-ion, chlordane, cyromazine, dithianon, dodine, ethephon, fenbutatin-oxide, flonicamid, fluazifop-p-butyl, flubendiamide, glyphosate, maleic hydrozide, meptyldinocap and prothioconazole (RD) (see Appendix C, Table C1, Section 2.2. and 2.3). Thus, reporting countries should extend the scope of the analytical methods used for enforcement of MRLs to make sure that the detection rate and the MRL exceedance rate is not biased by the low number of determinations or lack of data from certain countries.
- In the framework of the national control programmes the analytical scope differed significantly for reporting countries (see Section 3.1). For national competent authorities of reporting countries at the lower end of the ranking further assistance should be provided by European Reference Laboratories to extend the scope of the national monitoring programmes. This measure would increase the efficiency of the EU wide monitoring by closing gaps in the legal enforcement of pesticide MRLs.
- In 2013, mercury residues were detected in food products such as wild fungi and animal products exceeding the MRLs indicating that the existing legislation need to be reconsidered. Data on the presence of mercury residues in different food commodities have previously been evaluated by EFSA (EFSA, 2012b). EFSA recommended that further efforts should be made to increase the number of methylmercury and inorganic mercury data in all food groups that contribute significantly to overall exposure. The residue definition under Regulation (EC) No 396/2005 does not differentiate between organic or inorganic mercury residues. Thus, when revising the reisude legislation, the residue definition should be reconsidered to allow separate risk assessments for the different forms of mercury residues in food.
- A number of non-approved pesticides were detected in baby food samples (diazinon, tricyclazole, flufenoxuron, biphenyl, dichlorvos, mercury compounds, phenthoate, dicloran, see Section 3.2.5.1). Although in most cases the concentrations did not exceed legal limits, further investigations should be performed to identify the source of the residue to avoid that in future food intended for infants and young children contains these residues. Food business operators producing baby food should be informed of these findings and asked to test specifically for the presence of these compounds.
- For the major food products consumed in Europe a sufficient number of samples were analysed to derive conclusions on the residue situation. However, minor food products that constitute a smaller proportion of the diet, should be included in national control programmes where there are indications of MRL exceedances (see Section 3.2.2).
- EFSA noted that reporting countries used different approaches to report the results for pesticides with complex residue definitions (residue definitions which contain more than one component) where the individual components are measured separately. It is recommended to

harmonise the approach since the current practice does not allow comparison of results from different reporting countries.

- EFSA noted that in certain cases where the numerical residue concentration clearly exceeded the MRL, the reporting country considered the samples as being within the legal limit. For these cases it would be desirable that reporting countries provide additional explanations as to why the sample was found to be compliant with legal limits. In general, a harmonised approach should be used to classify samples being non-compliant.
- EFSA should update the guidance document on the use of the Standard Sample Description (SSD) for reporting of data on the control of pesticide residues in food, including clear recommendations on the coding of data on elements where inconsistencies were identified (e.g. food product treatment, programme legal reference, sampling strategy, type of sampling programme, parameter analysed, type of parameter, expression of results, evaluation of the result, action taken).
- EFSA and the European Commission should continue to work on the project to make the database on pesticide authorisation and the database on the legal limits for residues in food compatible with the database on pesticide monitoring data.
- In the methodology used by EFSA for chronic risk assessment, the exposure is driven by the high number of samples without measurable residues (results < LOQ). As this conservative approach overestimates real exposure, more refined calculations should be performed. For the risk assessment of individual substances, this conservatism does not lead to major problems, but in future cumulative risk assessments will be performed for groups of chemicals which share a common mechanism of toxicological effects (cumulative assessment groups). Thus, to avoid drastic overestimations of exposure for the cumulative risk assessment, additional information needs to be made available to EFSA, e.g. information on the limit of detection of the analytical method used, and information on whether the pertinent pesticide was detected. Other possible refinements would require information on the authorisation status of the pesticides in the reporting countries including information about which crops the pesticide is authorised to be used on.
- For highly toxic substances the control laboratories should be consulted if there is a possibility to reduce the LOQ and/or the analytical measurement uncertainty. This measure would reduce the uncertainties in risk assessment and enforcement.
- Work should be continued to find a solution on a way to take into account the background levels of CS_2 for the analysis of dithiocarbamates.
- Most of the cases exceeding the ARfD (145 out of 225 determinations) were related to chlorpyrifos residues, mainly in apples and peaches (see Section 4.1.1). For this active substance the toxicological properties were recently assessed by EFSA, which resulted in a new ARfD proposal that is 20 times lower than the ARfD agreed among Member States in 2005. The existing MRLs for chlorpyrifos should be revised to ensure that the use of chlorpyrifos does not lead to residues in food that might cause consumer health risks.
- MRL exceedances were identified for dual use substances, i.e. substances that are used in biocides and also covered by the MRL legislation for pesticides due to its use as a pesticide. Food business operators need to be made aware that the use of this type of products may lead to conflicts with the pesticide MRL legislation.
- The legal limits set for coumaphos in honey under Regulation (EC) No 396/2005 and under Regulation (EC) No 96/23 should be checked for consistency.

REFERENCES

EC (European Commission), 2005. Review report for the active substance chlorpyrifos. Finalised in the Standing Committee on the Food Chain and Animal Health at its meeting on 3 June 2005 in view of the inclusion of chlorpyrifos in Annex I of Council Directive 91/414/EEC. SANCO/3059/99–rev. 1.5, 3 June 2005, 70 pp.

EFSA (European Food Safety Authority), 2007. Reasoned opinion on the potential chronic and acute risk to consumers' health arising from proposed temporary EU MRLs. EFSA Journal 2007;5(3):RN32. doi:10.2903/j.efsa.2007.32r

EFSA (European Food Safety Authority), 2008. Scientific Opinion of the Panel on Plant Protection Products and their Residues (PPR Panel) to evaluate the suitability of existing methodologies and, if appropriate, the identification of new approaches to assess cumulative and synergistic risks from pesticides to human health with a view to set MRLs for those pesticides in the frame of Regulation (EC) 396/2005. EFSA Journal 2008;6(5):704, 84 pp. doi:10.2903/j.efsa.2008.705

EFSA (European Food Safety Authority), 2009. Scientific Opinion on Risk Assessment for a Selected Group of Pesticides from the Triazole Group to Test Possible Methodologies to Assess Cumulative Effects from Exposure through Food from these Pesticides on Human Health. EFSA Journal 2009;7(9):1167, 187 pp. doi:10.2903/j.efsa.2009.1167

EFSA (European Food Safety Authority), 2012a. Guidance on the Use of Probabilistic Methodology for Modelling Dietary Exposure to Pesticide Residues. EFSA Journal 2012;10(10):2839, 95 pp. doi:10.2903/j.efsa.2012.2839

EFSA (European Food Safety Authority), 2012b. Scientific Opinion on the risk for public health related to the presence of mercury and methylmercury in food. EFSA Journal 2012;10(12):2985, 241 pp. doi:10.2903/j.efsa.2012.2985

EFSA (European Food Safety Authority), 2013a. The 2010 European Union Report on Pesticide Residues in Food. EFSA Journal 2013;11(3):3130, 808 pp. doi:10.2903/j.efsa.2013.3130

EFSA (European Food Safety Authority), 2013b. Scientific Opinion of the Panel on Plant Protection Products and their Residues (PPR) on the identification of pesticides to be included in cumulative assessment groups on the basis of their toxicological profile. EFSA Journal 2013;11(7):3293, 131 pp. doi:10.2903/j.efsa.2013.3293

EFSA (European Food Safety Authority) 2014a. Use of the EFSA Standard Sample Description for the reporting of data on the control of pesticide residues in food and feed according to Regulation (EC) No 396/2005 (2013 Data Collection). EFSA Journal 2014;12(1):3545, 60 pp. doi:10.2903/j.efsa.2014.3545

EFSA (European Food Safety Authority), 2014b. Conclusion on the peer review of the pesticide human health risk assessment of the active substance chlorpyrifos. EFSA Journal 2014;12(4):3640, 34 pp. doi:10.2903/j.efsa.2014.3640

EFSA (European Food Safety Authority), 2014c. The 2011 European Union Report on Pesticide Residues in Food. EFSA Journal 2014;12(5):3694, 511 pp. doi:10.2903/j.efsa.2014.3694

EFSA (European Food Safety Authority), 2014d. The 2012 European Union Report on Pesticide Residues in Food. EFSA Journal 2014;12(12):3942, 156 pp. doi:10.2903/j.efsa.2014.3942

EFSA (European Food Safety Authority), 2015. National summary reports on pesticide residue analysis performed in 2013. EFSA supporting publication 2015:EN-755. 162 pp.

FAO (Food and Agriculture Organization of the United Nations), 2009. Submission and evaluation of pesticide residues data for the estimation of Maximum Residue Levels in food and feed. Pesticide Residues. 2nd Ed. FAO Plant Production and Protection Paper 197, 2009.

ABBREVIATIONS

EU/EEA country codes

AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
EL	Greece
ES	Spain
FI	Finland
FR	France
HR	Croatia
HU	Hungary
IE	Ireland
IS	Iceland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
MT	Malta
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovak Republic
UK	United Kingdom

Other abbreviations

ADI	Acceptable Daily Intake
ARfD	Acute Reference Dose
BAC	Benzalkonium Chloride
CAG	Cumulative Assessment Group
CS_2	Carbon disulfide
DDAC	Didecyldimethylammonium chloride
EC	European Commission
EEA	European Economic Area
EFSA	European Food Safety Authority
EFTA	European Free Trade Association
EU	European Union
EUCP	EU-coordinated programme
EURL	European Union Reference Laboratory
FAO	Food and Agriculture Organization of the United Nations
FYRM	The Former Yugoslav Republic of Macedonia
GAP	Good Agricultural Practice
HCH	Hexachlorocyclohexane
HRM	Highest Residue Measured
LOD	Limit of Detection
LOQ	Limit of Quantification
MRL	Maximum Residue Level
NP	National control programme
PRIMo	Pesticide Residue Intake Model
RD	Residue Definition
SSD	Standard Sample Description
WHO	World Health Organization

APPENDICES

Appendix A: authorities responsible in the reporting countries for pesticide residue monitoring

Country	National competent authority	Web address for published national monitoring reports
Austria	Austrian Federal Ministry of Health	https://www.verbrauchergesundheit.gv.at/lebensmittel/lebensmittelkontrolle/monitoring/pestizid.html
	Austrian Agency for Health and Food Safety	http://www.ages.at/ages/ernaehrungssicherheit/rueckstaende-kontaminanten/pflanzenschutzmittel-rueckstaende-in-lebensmittel/pestizidmonitoring/
Belgium	Federal Agency for the Safety of the Food Chain	http://www.afsca.be
Bulgaria	Bulgarian Food Safety Agency	http://www.babh.government.bg/en/
Cyprus	Pesticides Residues Laboratory of the State General Laboratory of Ministry of Health	http://www.moh.gov.cy/sgl
Czech Republic	Czech Agriculture and Food Inspection Authority	http://www.szpi.gov.cz/lstDoc.aspx?nid=11386
	State Veterinary Administration	http://www.svscr.cz
Denmark	Danish Veterinary and Food Administration	http://www.foedevarestyrelsen.dk/Kontrol/Kontrolresultater/CKL-projekter/Pesticidrester/Sider/forside.aspx
	National Food Institute, Technical University of Denmark	http://www.food.dtu.dk/Publikationer/Foedevaresikkerhed/Kemiske_forureninger/Pesticidrester
Estonia	Veterinary and Food Board and Agricultural Board	http://www.vet.agri.ee
Finland	Finnish Food Safety Authority Evira and Finnish Customs	http://www.evira.fi/portal/fi/evira/asiakokonaisuudet/vierasaineet/kasvinsuojeluainejaamat/valvonta/
France	Ministère de l'Économie et des finances. Direction générale de la concurrence, de la consommation et de la répression des fraudes	http://www.economie.gouv.fr/dgccrf/securite/produits-alimentaires
	Ministère de l'Agriculture et de l'Agroalimentaire et de la Foret. Direction générale de l'alimentation	http://agriculture.gouv.fr/dispositif-surveillance-controle-securite-sanitaire-aliments-564
Germany	Federal Office of Consumer Protection and Food Safety	http://www.bvl.bund.de/berichtpsm
Greece	Ministry of Rural Development and Food. General Directorate of Plant Products. Directorate of Plant Protection Products. Department of Pesticides.	http://www.minagric.gr/index.php/en/citizen-menu/foodsafety-menu http://www.minagric.gr/index.php/el/for-citizen-2/food-and-sequre/845-asfaleiatwntrofimvnefsa
Hungary	National Food Chain Safety Office	http://www.nebih.hu
Iceland	Food and Veterinary Authority. The Environmental and Public Health office in Reykjavik	http://www.mast.is
Ireland	Department of Agriculture Food and the Marine	http://www.pcs.agricultire.gov.ie

Country	National competent authority	Web address for published national monitoring reports
Italy	Ministry of Health	http://www.salute.gov.it/portale/temi/p2_5.jsp?lingua=italiano&area=fitosanitari&menu=vegetali
Latvia	Ministry of Agriculture. Food and Veterinary Service of Latvia	http://www.zm.gov.lv
Lithuania	National Food and Veterinary Risk Assessment Institute	http://www.nmvrvi.lt
Luxembourg	Food Safety Service Administration of Veterinary Services	http://www.securite-alimentaire.public.lu/organisme/pcnp/sc/cs9_prod_phyto/ppp_residus_pesticides/index.html
Malta	Malta Competition and Consumer Affairs Authority	http://www.mccaa.org.mt
Netherlands	Dutch Food and Consumer product Safety Authority	http:// www.nvwa.nl
Norway	Norwegian Food Safety Authority	http://www.mattilsynet.no/planter_og_dyrking/plantevernmidler/rester_av_plantevernmidler_i_mat/#overvakings_og_kartleggingsprogrammer
Poland	The State Sanitary Inspection	http://www.gis.gov.pl
Portugal	The General Directorate for Food and Veterinary	http://www.dgav.pt
Romania	National Sanitary Veterinary and Food Safety Authority	http://www.ansvsa.ro
	Ministry of Agriculture and Rural Development	http://www.madr.ro
	Ministry of Health	-
Slovakia	State Veterinary and Food Administration of the Slovakian Republic Public Health Authority of the Slovakian Republic	http://www.svps.sk/
Slovenia	Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection	http://www.uvhvvr.gov.si/si/delovna_podrocja/ostanki_pesticidov/uradni_nadzor/
Spain	Spanish Agency for Consumer Affairs, Food Safety and Nutrition	http://aesan.msssi.gob.es/AESAN/web/control_oficial/seccion/planes_nacionales_especificos.shtml
Sweden	National Food Agency	http://www.slv.se
United Kingdom	Health and Safety Executive – Chemicals Regulation Directorate	http://www.pesticides.gov.uk/guidance/industries/pesticides/advisory-groups/PRiF/Latest+results+and+reports/2013++Programme

Appendix B: Background information on EU-coordinated programme

Table B1: Description of 2013 EU-coordinated control programme

Pesticide	Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]	Type of food to be analysed[(b)]	Analysis not mandatory for the following food products[(c)]
2,4-D (RD)	2,4-D (sum of 2,4-D and its esters expressed as 2,4-D)	P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry
2-phenylphenol		P	
Abamectin (RD)	Abamectin (sum of avermectin B1a, avermectinB1b and delta-8,9 isomer of avermectin B1a)	P	
Acephate		P	
Acetamiprid (RD)	Acetamiprid (P), Acetamiprid and IM-2-1 metabolite (A)	P	
Acrinathrin		P	
Aldicarb (RD)	Aldicarb (sum of aldicarb, its sulfoxide and its sulfone, expressed as aldicarb)	P	
Amitraz (RD)	Amitraz (amitraz including the metabolites containing the 2,4 -dimethylaniline moiety expressed as amitraz)	P	Hc, Le, Lt, Pe, St, Ot, Ry, Wi
Amitrole		P	
Azinphos-ethyl		A	
Azinphos-methyl		P	
Azoxystrobin		P	
Benfuracarb		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Bifenthrin		PA	
Biphenyl		P	
Bitertanol		P	
Bixafen (RD)	Bixafen (P), Bixafen (sum of bixafen and desmethyl-bixafen, expressed as bixafen) (A)	A	Mi, Sw
Boscalid (RD)	Boscalid (P), Boscalid (sum of boscalid and M 510F01(2-chloro-N-(4′-chloro-5-hydroxybiphenyl-2-yl)nicotinamide including its conjugates) (A)	PA	Mi, Sw
Bromide ion		P	Ap, Hc, Le, Pe, St, Ot, Ry, Wi
Bromopropylate		P	
Bromuconazole	Bromuconazole (sum of diasteroisomers)	P	
Bupirimate		P	
Buprofezin		P	
Captan (RD)	Captan Captan/Folpet (sum) for beans, pome fruits, strawberries and tomatoes	P	
Carbaryl		P	
Carbendazim (RD)	Carbendazim and benomyl (sum of benomyl and carbendazim expressed as carbendazim) (P), Carbendazim and thiophanate-methyl, expressed as carbendazim (A)	PA	Mi, Sw

Pesticide	Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]	Type of food to be analysed[(b)]	Analysis not mandatory for the following food products[(c)]
Carbofuran (RD)	Carbofuran (sum of carbofuran and 3-hydroxy-carbofuran expressed as carbofuran)	P	
Carbosulfan		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Chlorantraniliprole	Chlorantraniliprole (DPX E-2Y45)	P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Chlordane (RD)	Chlordane (sum of cis- and trans-chlordane) (P), Chlordane (sum of cis- and trans-isomers and oxychlordane expressed as chlordane) (A)	A	
Chlorfenapyr		P	
Chlorfenvinphos		P	
Chlormequat		PA	Ap, Hc, Le, Lt, Pe, St, Mi, Sw
Chlorobenzilate		A	Mi, Sw
Chlorothalonil (RD)	Chlorothalonil (P), Chlorothalonil expressed as SDS-3701 (4-hydroxy-2,5,6-trichloroisophthalonitrile) (A)	P	
Chlorpropham (RD)	Chlorpropham (chlorpropham and 3-chloroaniline, expressed as chlorpropham) (P except potatoes) Chlorpropham (for potatoes), Chlorpropham and 4-hydroxychlorpropham-*O*-sulphonic acid (4-HSA),expressed as chlorpropham (A)	PA	Mi, Sw
Chlorpyrifos		PA	
Chlorpyrifos-methyl		PA	
Clofentezine (RD)	Clofentezine (P), Clofentezine (sum of all compounds containing the 2-chlorobenzoyl moiety expressed as clofentezine) (C and A)	P	Ot, Ry
Clothianidin		P	
Cyfluthrin (RD)	Cyfluthrin (cyfluthrin including other mixtures of constituent isomers (sum of isomers))	PA	
Cymoxanil		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Cypermethrin (RD)	Cypermethrin (cypermethrin including other mixtures of constituent isomers (sum of isomers))	PA	
Cyproconazole		P	
Cyprodinil (RD)	Cyprodinil (P), Cyprodinil (sum cyprodinil and metabolite CGA 304075) (A)	P	
Cyromazine		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
DDT (RD)	DDT (sum of *p,p'*-DDT, *o,p'*-DDT, *p,p'*-DDE and *p,p'*-TDE (DDD) expressed as DDT)	A	
Deltamethrin	Deltamethrin (cis-deltamethrin)	PA	
Diazinon		PA	
Dichlofluanid		P	
Dichlorvos		P	

Pesticide	**Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]**	**Type of food to be analysed[(b)]**	**Analysis not mandatory for the following food products[(c)]**
Dicloran		P	
Dicofol (RD)	Dicofol (sum of p,p' and o,p' isomers)	P	Ot, Ry
Dicrotophos		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Dieldrin (RD)	Aldrin and dieldrin (aldrin and dieldrin combined expressed as dieldrin)	A	
Diethofencarb		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Difenoconazole		P	
Diflubenzuron (RD)	Diflubenzuron (P), Diflubenzuron (sum of diflubenzuron and 4-chlorophenylurea expressed as diflubenzuron) (A)	P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Dimethoate (RD)	Dimethoate (sum of dimethoate and omethoate expressed as dimethoate)	P	
Dimethomorph		P	Ot, Ry
Diniconazole		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Diphenylamine		P	
Dithianon		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Dithiocarbamates (RD)	Dithiocarbamates (dithiocarbamates expressed as carbon disulphide (CS_2), including maneb, mancozeb, metiram, propineb, thiram and ziram)	P	
Dodine		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Endosulfan (RD)	Endosulfan (sum of alpha- and beta-isomers and endosulfan-sulfate expresses as endosulfan)	PA	
Endrin		A	
EPN		P	
Epoxiconazole		P	
Ethephon		P	Hc, Le, Lt, Pe, St
Ethion		P	
Ethirimol		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Ethoprophos		P	
Etofenprox		PA	Mi, Sw
Famoxadone		PA	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi, Mi, Sw
Fenamidone		P	
Fenamiphos (RD)	Fenamiphos (sum of fenamiphos and its sulphoxide and sulphone expressed as fenamiphos)	P	
Fenarimol		P	Ot, Ry
Fenazaquin		P	Ot, Ry
Fenbuconazole		P	

Pesticide	Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]	Type of food to be analysed[(b)]	Analysis not mandatory for the following food products[(c)]
Fenbutatin oxide		P	Hc, Le, Lt, Pe, St, Ot, Ry, Wi
Fenhexamid		P	
Fenitrothion		P	
Fenoxycarb		P	
Fenpropathrin		P	
Fenpropimorph (RD)	Fenpropimorph (P), Fenpropimorph carboxylic acid (BF 421-2) expressed as fenpropimorph (A)	PA	Mi, Sw
Fenpyroximate		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Fenthion (RD)	Fenthion (fenthion and its oxigen analogue, their sulfoxides and sulfone expressed as parent)	PA	
Fenvalerate (RD)	Fenvalerate and esfenvalerate (sum of RR & SS isomers), Fenvalerate and esfenvalerate (sum of RS & SR isomers), Fenvalerate (sum of RR, SS, RS and SR isomers), Fenvalerate/Esfenvalerate (sum)	PA	
Fipronil (RD)	Fipronil (sum Fipronil and sulfone metabolite (MB46136) expressed as Fipronil)	P	
Flonicamid (RD)	Flonicamid (sum of flonicamid, TNFG and TNFA) (P), Flonicamid and TFNA-AM, expressed as flonicamid (A)	P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Fluazifop-P-butyl (RD)	Fluazifop-P-butyl (fluazifop acid (free and conjugate))	PA	Ap, Le, Lt, Pe, To, Ot, Ry, Wi, Mi, Sw
Flubendiamide		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Fludioxonil		P	
Flufenoxuron		P	
Fluopyram (RD)	Fluopyram (P), Fluopyram (sum fluopyram and fluopyram-benzamide (M25) expressed as fluopyram) (A)	PA	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi, Mi, Sw
Fluquinconazole		PA	Mi, Sw
Flusilazole (RD)	Flusilazole (P), Flusilazole (sum of flusilazole and its metabolite IN-F7321 ([bis-(4-fluorophenyl)methyl]silanol) expressed as flusilazole) (A)	PA	Mi, Sw
Flutriafol		P	
Folpet (RD)	Folpet Captan/Folpet (sum) for beans, pome fruits, strawberries and tomatoes	P	
Formetanate (RD)	Formetanate (sum of formetanate and its salts expressed as formetanate(hydrochloride))	P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Formothion		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi

Pesticide	Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]	Type of food to be analysed[(b)]	Analysis not mandatory for the following food products[(c)]
Fosthiazate		P	
Glyphosate		P	Ap, Hc, Le, Lt, Pe, St, To, Wi
Haloxyfop-R (RD)	Haloxyfop including haloxyfop-R (haloxyfop-R methyl ester, haloxyfop-R and conjugates of haloxyfop-R expressed as haloxyfop-R) (P), Haloxyfop-R and conjugates of haloxyfop-R expressed as haloxyfop-R (A)	PA	Ap, Le, Lt, Pe, To, Ot, Ry, Wi, Mi, Sw
Heptachlor (RD)	Heptachlor (sum of heptachlor and heptachlor epoxide expressed as heptachlor)	A	
Hexachlorobenzene		A	
Hexachlorocyclohexane (alpha)	Hexachlorocyclohexane (HCH), alpha-isomer	A	
Hexachlorocyclohexane (beta)	Hexachlorocyclohexane (HCH), beta-isomer	A	
Hexaconazole		P	
Hexythiazox		P	Ot, Ry
Imazalil		P	
Imidacloprid		P	
Indoxacarb	Indoxacarb as sum of the isomers S and R	PA	Mi, Sw
Ioxynil (RD)	Ioxynil, including its esters expressed as ioxynil	A	Mi, Sw
Iprodione (RD)	Iprodione (P), Vinclozolin, iprodione, procymidone, sum of compounds and all metabolites containing the 3,5-dichloroaniline moiety expressed as 3,5 dichloroaniline (A)	P	
Iprovalicarb		P	
Isocarbophos		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Isofenphos-methyl		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Isoprocarb		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Kresoxim-methyl (RD)	Kresoxim-methyl (P), 490M1 expressed as kresoxim-methyl (A: meat) 490M9 expressed as kresoxim-methyl (A: milk)	P	
Lambda-cyhalothrin (RD)	Lambda-cyhalothrin (P), Lambda-cyhalothrin, including other mixed isomeric consituents (sum of isomers) (A)	P	
Lindane	Lindane (gamma-isomer of hexachlorociclohexane (HCH))	A	
Linuron		P	
Lufenuron		P	

Pesticide	Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]	Type of food to be analysed[(b)]	Analysis not mandatory for the following food products[(c)]
Malathion (RD)	Malathion (sum of malathion and malaoxon expressed as malathion)	P	
Maleic hydrazide (RD)	Maleic hydrazide (P), Maleic hydrazide and its conjugates expressed as maleic hydrazide (A: milk)	A	Mi, Sw
Mandipropamid		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Mepanipyrim (RD)	Mepanipyrim (sum of mepanipyrim and its metabolite (2-anilino-4-(2-hydroxypropyl)-6-methylpyrimidine) expressed as mepanipyrim) (P),	P	
Mepiquat		P	Ap, Hc, Le, Lt, Pe, St, Wi
Meptyldinocap (RD)	Meptyldinocap (sum of 2,4 DNOPC and 2,4 DNOP expressed as meptyldinocap)	P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Metaflumizone	Metaflumizone (sum of *E*- and *Z*- isomers)	A	Mi, Sw
Metalaxyl (RD)	Metalaxyl and metalaxyl-M (metalaxyl including other mixtures of constituent isomers including metalaxyl-M (sum of isomers))	P	
Metconazole		P	
Methamidophos		P	
Methidathion		PA	
Methiocarb (RD)	Methiocarb (sum of methiocarb and methiocarb sulfoxide and sulfone, expressed as methiocarb)	P	
Methomyl (RD)	Methomyl and thiodicarb (sum of methomyl and thiodicarb expressed as methomyl)	P	
Methoxychlor		PA	
Methoxyfenozide		P	
Metobromuron		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Monocrotophos		P	
Myclobutanil (RD)	Myclobutanil (P), α-(3-hydroxybutyl)-α-(4-chloro-phenyl)-1H-1,2,4-triazole-1-propanenitrile (RH9090) expressed as myclobutanil (A)	P	
Nitenpyram		P	Ap, Hc, Le, Lt, St, To, Ot, Ry, Wi
Oxadixyl		P	
Oxamyl		P	
Oxydemeton-methyl (RD)	Oxydemeton-methyl (sum of oxydemeton-methyl and demeton-S-methylsulfone expressed as oxydemeton-methyl)	P	
Paclobutrazol		P	
Parathion		PA	
Parathion-methyl (RD)	Parathion-methyl (sum of parathion-methyl and paraoxon-methyl expressed as parathion-methyl)	PA	
Penconazole		P	

Pesticide	Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]	Type of food to be analysed[(b)]	Analysis not mandatory for the following food products[(c)]
Pencycuron		P	
Pendimethalin		P	
Permethrin	Permethrin (sum of isomers)	A	
Phenthoate		P	
Phosalone		P	
Phosmet (RD)	Phosmet (phosmet and phosmet oxon expressed as phosmet) (P), Phosmet (A)	P	
Phoxim		P	
Pirimicarb (RD)	Pirimicarb (sum of pirimicarb and desmethyl pirimicarb expressed as pirimicarb)	P	
Pirimiphos-methyl		PA	
Prochloraz (RD)	Prochloraz (sum of prochloraz and its metabolites containing the 2,4,6-trichlorophenol moiety expressed as prochloraz)	PA	Mi, Sw
Procymidone (RD)	Procymidone (P), see iprodione (RD) (A)	P	
Profenofos		PA	
Propamocarb (RD)	Propamocarb (sum of propamocarb and its salt expressed as propamocarb) (P)	P	Le, Pe, St, Ot, Ry
Propargite		P	
Propiconazole		P	
Propoxur		P	
Propyzamide (RD)	Propyzamide (P), Propyzamide (sum of propyzamide and all metabolites containing the 3,5-dichlorobenzoic acid fraction expressed as propyzamide) (A)	P	
Prothioconazole (RD)	Prothioconazole (prothioconazole-desthio) (P), Prothioconazole (sum of prothioconazole-desthio and its glucuronide conjugate, expressed as prothioconazoledesthio) (A)	P	
Prothiofos		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Pymetrozine		P	Ap, Le, Pe, Ot, Ry, Wi
Pyraclostrobin		P	
Pyrazophos		A	
Pyrethrins		P	
Pyridaben		P	
Pyrimethanil		P	
Pyriproxyfen		P	
Quinoxyfen		P	

Pesticide	Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]	Type of food to be analysed[(b)]	Analysis not mandatory for the following food products[(c)]
Resmethrin (RD)	Resmethrin (resmethrin including other mixtures of consituent isomers (sum of isomers))	A	
Rotenone		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Spinosad (RD)	Spinosad (sum of spinosyn A and spinosyn D)	P	
Spirodiclofen		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Spiromesifen		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Spiroxamine (RD)	Spiroxamine (P), Spiroxamine carboxylic acid expressed as spiroxamine (A)	PA	Mi, Sw
tau-Fluvalinate		PA	Mi, Sw
Tebuconazole		P	Mi, Sw
Tebufenozide		P	
Tebufenpyrad		P	Ot, Ry
Teflubenzuron		P	
Tefluthrin		P	
Terbuthylazine		P	
Tetraconazole		PA	Mi, Sw
Tetradifon		P	Ot, Ry
Tetramethrin		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Thiabendazole (RD)	Thiabendazole (P), Thiabendazole (sum of thiabendazole and 5-hydroxythiabendazole) (A)	P	
Thiacloprid		P	
Thiametoxam (RD)	Thiametoxam (sum of thiametoxam and clothianidin expressed as thiametoxam)	P	
Thiophanate-methyl		P	
Tolclofos-methyl		P	
Tolylfluanid (RD)	Tolylfluanid analysed as dimethylaminosulfotoluidide and expressed as tolylfluanid	P	Ot, Ry
Triadimenol (RD)	Triadimefon and triadimenol (sum of triadimefon and triadimenol)	P	
Triazophos		PA	
Trichlorfon		P	Ap, Hc, Le, Lt, Pe, St, To, Ot, Ry, Wi
Trifloxystrobin (RD)	Trifloxystrobin (P), Trifloxystrobin (sum of trifloxystrobin and its metabolite (*E*,*E*)-methoxyimino- {2-[1-(3-trifluoromethyl-phenyl)-ethylideneamino-oxymethyl]-phenyl}-acetic acid (CGA 321113)) (A)	P	
Triflumuron		P	

Pesticide	Residue definition according to Regulation (EC) No 396/2005 on EU MRLs[(a)]	Type of food to be analysed[(b)]	Analysis not mandatory for the following food products[(c)]
Trifluralin		P	
Triticonazole		P	
Vinclozolin (RD)	Vinclozolin (sum of vinclozolin and all metabolites containing the 3,5-dichloraniline moiety, expressed as vinclozolin) (P), see iprodione (RD) (A)	P	Ot, Ry
Zoxamide		P	

(a): If not specifically mentioned, the residue definition comprises the parent compound only. Otherwise, the residue definition given is the one applicable to plant products (P), cereals (C) or animal products (A).

(b): Pesticide to be analysed on plant products (P) and/or animal products (A) according to Commission Implementing Regulation (EU) No 788/2012.

(c): Ap: apples; Hc: head cabbage; Le: leek; Lt: lettuce; Pe: peaches; St: strawberries; To: tomatoes; Ot: oats; Ry: rye; Wi: wine (red or white) made from grapes; Mi: cow’s milk; Sw: swine meat.

Table B2: Detailed information on products exceeding the MRL as reported by reporting countries

Food product	Pesticide	Country of origin(a)	Reported concentration (mg/kg)	Non-compliant(b)	MRL	Short-term exposure (% of ARfD)
Apples	Carbendazim (RD)	China	0.21		0.2	103
Apples	Chlorpyrifos	Cyprus	0.73	yes	0.5	1430
Apples	Dimethoate (RD)	France	0.022		0.02*	22(c)
Apples	Dimethoate (RD)	Latvia	0.068	yes	0.02*	67(c)
Apples	Dimethoate (RD)	Portugal	0.095	yes	0.02*	93(c)
Apples	Dimethoate (RD)	Portugal	0.043	yes	0.02*	42(c)
Apples	Dimethoate (RD)	Portugal	0.097	yes	0.02*	95(c)
Apples	Dimethoate (RD)	Portugal	0.036		0.02*	35(c)
Apples	Dimethoate (RD)	Portugal	0.59	yes	0.02*	578(c)
Apples	Dimethoate (RD)	FYRM	0.068	yes	0.02*	67(c)
Apples	Fenazaquin	Poland	0.18		0.1	18
Apples	Fenbutatin oxide	Cyprus	2.4	yes	2	235
Apples	Fenthion (RD)	Portugal	0.088	yes	0.01*	86
Apples	Fenvalerate (RD)	Hungary	0.04		0.02*	22
Apples	Flusilazole (RD)	France	0.027		0.02*	53
Apples	Methomyl (RD)	Chile	0.021		0.02*	82
Apples	Methomyl (RD)	Portugal	0.067	yes	0.02*	263
Head cabbage	Chlorpropham (RD)	Cyprus	0.075	yes	0.05*	0.79
Head cabbage	Difenoconazole	France	0.31		0.2	10
Head cabbage	Dimethoate (RD)	Austria	0.3144	yes	0.02*	165(c)
Head cabbage	Dimethoate (RD)	Lithuania	0.037	yes	0.02*	19(c)
Head cabbage	Fluazifop-P-butyl (RD)	Ireland	1.4	yes	0.3	433
Head cabbage	Methiocarb (RD)	Ireland	0.36	yes	0.1*	146
Head cabbage	Prochloraz (RD)	Cyprus	0.064	yes	0.05*	13
Head cabbage	Pyrimethanil	Poland	0.064		0.05*	not relevant(e)
Head cabbage	Thiophanate-methyl	Lithuania	0.11	yes	0.1*	3
Leek	Fenbutatin oxide	Cyprus	0.082	yes	0.05*	5
Leek	Iprodione (RD)	Spain	0.022		0.02*	not relevant(e)
Leek	Pendimethalin	Portugal	0.4	yes	0.05*	not relevant(e)
Leek	Zoxamide	France	0.04	yes	0.02*	not relevant(e)
Lettuce	2,4-D (RD)	Netherlands	0.075		0.05*	0.27
Lettuce	Acrinathrin	Spain	0.12	yes	0.05*	32
Lettuce	Carbendazim (RD)	Bulgaria	1.85	yes	0.1*	249
Lettuce	Carbendazim (RD)	Bulgaria	6.68	yes	0.1*	899
Lettuce	Carbendazim (RD)	Bulgaria	0.29	yes	0.1*	39
Lettuce	Carbendazim (RD)	Bulgaria	0.68	yes	0.1*	91
Lettuce	Carbendazim (RD)	Bulgaria	4.67	yes	0.1*	628
Lettuce	Carbendazim (RD)	Italy	0.32	yes	0.1*	43

Food product	Pesticide	Country of origin[(a)]	Reported concentration (mg/kg)	Non-compliant[(b)]	MRL	Short-term exposure (% of ARfD)
Lettuce	Chlorothalonil (RD)	Netherlands	0.016		0.01*	0.07
Lettuce	Chlorothalonil (RD)	Romania	0.79	yes	0.01*	4
Lettuce	Chlorothalonil (RD)	Romania	0.54	yes	0.01*	2
Lettuce	Chlorothalonil (RD)	Romania	7.83	yes	0.01*	35
Lettuce	Chlorpyrifos	Bulgaria	0.132	yes	0.05*	71
Lettuce	Dimethoate (RD)	Germany	0.0402		0.02*	11[(c)]
Lettuce	Dimethoate (RD)	Hungary	0.36432	yes	0.02*	98[(c)]
Lettuce	Dithiocarbamates (RD)	Bulgaria	5.138	yes	5	36[(d)]
Lettuce	Dithiocarbamates (RD)	Bulgaria	6.62	yes	5	47[(d)]
Lettuce	Dithiocarbamates (RD)	Cyprus	9.5	yes	5	67[(d)]
Lettuce	Dithiocarbamates (RD)	Germany	5.3		5	38[(d)]
Lettuce	Famoxadone	France	0.032		0.02*	0.43
Lettuce	Flonicamid (RD)	Slovenia	1.184	yes	0.05*	127
Lettuce	Iprodione (RD)	Poland	14.4		10	not relevant[(e)]
Lettuce	Oxamyl	Italy	0.15	yes	0.01*	404
Lettuce	Pencycuron	France	4	yes	2	not relevant[(e)]
Lettuce	Pencycuron	France	6.2	yes	2	not relevant[(e)]
Lettuce	Procymidone (RD)	Spain	0.06	yes	0.02*	13
Lettuce	Procymidone (RD)	France	3.7	yes	0.02*	830
Lettuce	Procymidone (RD)	Romania	0.64	yes	0.02*	143
Lettuce	Pyriproxyfen	Cyprus	0.26	yes	0.05*	0.07
Lettuce	Tetramethrin	Italy	0.018		0.01	not relevant[(e)]
Lettuce	Thiophanate-methyl	Bulgaria	0.227	yes	0.1*	3
Lettuce	Thiophanate-methyl	Bulgaria	1.67	yes	0.1*	22
Lettuce	Thiophanate-methyl	Bulgaria	3.58	yes	0.1*	48
Lettuce	Thiophanate-methyl	Bulgaria	0.211	yes	0.1*	3
Lettuce	Thiophanate-methyl	Italy	2.53	yes	0.1*	34
Lettuce	Triadimenol (RD)	Spain	1.5	yes	0.1*	11
Peaches	Carbendazim (RD)	Cyprus	0.38	yes	0.2	113
Peaches	Carbendazim (RD)	Spain	0.545	yes	0.2	162
Peaches	Chlorpyrifos	Spain	0.335		0.2	398
Peaches	Chlorpyrifos	Greece	1.44	yes	0.2	1709
Peaches	Chlorpyrifos	Italy	0.394		0.2	468
Peaches	Clofentezine (RD)	Turkey	0.063	yes	0.02*	not relevant[(e)]
Peaches	Dimethoate (RD)	Slovenia	0.09	yes	0.02*	53[(c)]
Peaches	Ethephon	Spain	0.065		0.05*	8
Peaches	Folpet (RD)	Spain	0.036		0.02*	1
Peaches	Iprodione (RD)	Chile	3.1		3	not relevant[(e)]
Peaches	Iprodione (RD)	South Africa	3.4		3	not relevant[(e)]
Peaches	Lambda-cyhalothrin (RD)	Spain	0.22		0.2	261

Food product	Pesticide	Country of origin[a]	Reported concentration (mg/kg)	Non-compliant[b]	MRL	Short-term exposure (% of ARfD)
Strawberries	Bupirimate	United Kingdom	4	yes	1	not relevant[e]
Strawberries	Bupirimate	Iceland	3.37	yes	1	not relevant[e]
Strawberries	Carbendazim (RD)	Bulgaria	0.177	yes	0.1*	14
Strawberries	Carbendazim (RD)	China	0.15		0.1*	12
Strawberries	Carbendazim (RD)	Italy	0.103		0.1*	8
Strawberries	Carbendazim (RD)	Lithuania	0.9	yes	0.1*	70
Strawberries	Cyproconazole	Cyprus	0.068	yes	0.05*	5
Strawberries	Dimethoate (RD)	Spain	0.047	yes	0.02*	7[c]
Strawberries	Ethion	Unknown	0.086	yes	0.01*	not relevant[e]
Strawberries	Fenbutatin oxide	Cyprus	1.4	yes	1	22
Strawberries	Fenthion (RD)	Portugal	0.02		0.01*	3
Strawberries	Flonicamid (RD)	France	0.085		0.05*	5
Strawberries	Flusilazole (RD)	Poland	0.04	yes	0.02*	12
Strawberries	Flutriafol	Spain	0.9		0.5	28
Strawberries	Formetanate (RD)	Greece	0.55		0.3	172
Strawberries	Mepanipyrim (RD)	Netherlands	2.5		2	13
Strawberries	Procymidone (RD)	Bulgaria	0.075	yes	0.02*	10
Strawberries	Procymidone (RD)	China	0.016		0.02*	2
Strawberries	Procymidone (RD)	Malta	0.05	yes	0.02*	6
Strawberries	Propargite	Unknown	0.012		0.01*	not relevant[e]
Strawberries	Propiconazole	Estonia	0.086		0.05*	0.45
Strawberries	Propiconazole	Estonia	0.084		0.05*	0.44
Strawberries	Propiconazole	Estonia	0.078		0.05*	0.41
Strawberries	Propiconazole	Estonia	0.082		0.05*	0.43
Strawberries	Spinosad (RD)	Italy	0.67	yes	0.3	not relevant[e]
Strawberries	Spinosad (RD)	Belgium	0.51		0.3	not relevant[e]
Strawberries	Tebuconazole	Spain	0.156	yes	0.05*	8
Strawberries	Tebuconazole	Spain	0.067		0.05*	3
Strawberries	Tetraconazole	Spain	0.26		0.2	8
Strawberries	Triadimenol (RD)	Cyprus	0.73	yes	0.5	23
Strawberries	Trifloxystrobin (RD)	Belgium	0.82		0.5	not relevant[e]
Strawberries	Trifloxystrobin (RD)	Spain	0.69		0.5	not relevant[e]
Strawberries	Trifloxystrobin (RD)	Belgium	0.59		0.5	not relevant[e]
Strawberries	Trifloxystrobin (RD)	Netherlands	0.82		0.5	not relevant[e]
Tomatoes	Acetamiprid (RD)	Greece	0.22		0.15	51
Tomatoes	Bromide ion	Bulgaria	154	yes	50	not relevant[e]
Tomatoes	Carbendazim (RD)	Spain	0.402		0.3	117
Tomatoes	Chlorpyrifos-methyl	Spain	0.576		0.5	33
Tomatoes	Diflubenzuron (RD)	Poland	0.24	yes	0.05*	not relevant[e]

Food product	Pesticide	Country of origin[(a)]	Reported concentration (mg/kg)	Non-compliant[(b)]	MRL	Short-term exposure (% of ARfD)
Tomatoes	Endosulfan (RD)	Italy	0.13	yes	0.05*	50
Tomatoes	Ethephon	Morocco	2.1	yes	1	244
Tomatoes	Fenamiphos (RD)	Italy	0.045		0.04	105
Tomatoes	Imidacloprid	Portugal	0.65		0.5	63
Tomatoes	Procymidone (RD)	Morocco	0.034		0.02*	16
Tomatoes	Procymidone (RD)	Italy	0.027	yes	0.02*	13
Tomatoes	Spiromesifen	Netherlands	1.2		1	3
Tomatoes	Thiabendazole (RD)	Spain	0.1		0.05*	6
Oats	Chlormequat	United Kingdom	9.1		5	52
Oats	Chlorpyrifos	Bulgaria	1.47	yes	0.05*	117
Oats	Dichlorvos	Italy	0.05	yes	0.01*	10
Wine grapes	Carbendazim (RD)	Argentina	1.7	yes	0.5	141

(a): Country of origin as stated by the reporting country.
(b): Identified as non-compliant sample by the reporting country.
(c): The risk assessment was calculated for dimethoate.
(d): The risk assessment was calculated for thiram.
(e): Not relevant since the pesticide is not acutely toxic (no ARfD allocated/ARfD not necessary)
*: MRL set at the LOQ.

Appendix C: Background information on national programme results reported

Table C1: Scope of pesticide analysis (pesticides sought and detected)

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
1,1-dichloro-2,2-bis(4-ethylphenyl)ethane	4 854	0	5	No
1-naphthylacetamide	5 765	15	5	No
1-naphthylacetic acid	3 463	0	4	No
2,4,5-T	13 438	0	13	No
2,4,5-TP	8 925	0	6	No
2,4-D (RD)	16 934	213	20	Yes (P)
2,4-DB (RD)	11 387	1	11	No
2-phenylphenol	37 225	813	27	Yes (P)
4-CPA	12 073	3	9	No
6-Benzyladenin	3 431	0	7	No
8-hydroxyquinoline (RD)	26	0	1	No
Abamectin (RD)	31 776	55	22	Yes (P)
Acephate	60 318	71	29	Yes (P)
Acequinocyl	1 084	0	1	No
Acetamiprid (RD)	58 648	1936	28	Yes (P)
Acetochlor	12 132	0	16	No
Acibenzolar-S-methyl (RD)	16 449	0	13	No
Acifluorfen	2 389	0	3	No
Aclonifen	32 749	20	19	No
Acrinathrin	59 495	134	28	Yes (P)
Alachlor	23 116	1	18	No
Alanycarb	4 580	0	3	No
Aldicarb (RD)	49 285	3	27	Yes (P)
Aldimorph	19	0	1	No
Allethrin	12 043	0	11	No
Alloxydim	71	0	1	No
Ametoctradin (RD)	7 434	7	6	No
Ametryn	21 440	1	14	No
Amidosulfuron (RD)	12 885	0	9	No
Aminopyralid	1 628	0	2	No
Amisulbrom	3 702	0	6	No
Amitraz (RD)	23 110	58	19	Yes (P)
Amitrole	1 414	0	6	Yes (P)
Ancymidol	6 147	0	3	No
Anilazine	889	0	2	No
Anilofos	5 012	0	4	No
Anthraquinone	12 184	12	8	No
Aramite	10	0	1	No
Asulam	11 460	0	8	No
Atrazine	42 634	8	24	No
Azaconazole	21 062	1	15	No
Azadirachtin	9 977	8	10	No
Azafenidin	736	0	1	No
Azamethiphos	10 117	0	10	No
Azimsulfuron	7 675	0	9	No
Azinphos-ethyl	49 268	8	28	Yes (A)
Azinphos-methyl	63 175	16	29	Yes (P)
Aziprotryne	6 158	0	5	No
Azoxystrobin	64 426	2947	28	Yes (P)
BAC (RD)	7 257	124	4	No
Barban	1 250	0	2	No
Beflubutamid	9 075	0	11	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Benalaxyl (RD)	39 190	10	18	No
Benazolin	3 075	1	2	No
Bendiocarb	19 669	1	16	No
Benfluralin	22 675	1	13	No
Benfuracarb	34 263	1	23	Yes (P)
Benfuresate	3 073	0	4	No
Benodanil	3 696	0	5	No
Bensulfuron	17	0	1	No
Bensulide	4 661	0	3	No
Bensultap	2 284	0	1	No
Bentazone (RD)	13 659	3	14	No
Benthiavalicarb (RD)	13 379	1	8	No
Benzoximate	3 678	0	7	No
Benzoylprop	82	0	1	No
Benzthiazuron	67	0	2	No
Bifenazate	29 468	74	13	No
Bifenox	22 494	1	14	No
Bifenthrin	68 349	716	28	Yes (P and A)
Binapacryl	14 027	2	15	No
Bioallethrin	3 764	0	5	No
Bioresmethrin	3 086	0	5	No
Biphenyl	41 888	26	26	Yes (P)
Bis(tributyltin) oxide	42	0	1	No
Bispyribac	4 367	0	6	No
Bitertanol	58 509	33	29	Yes (P)
Bixafen (RD)	14 861	3	14	Yes (A)
Boscalid (RD)	63 525	5877	28	Yes (P and A)
Brodifacoum	9	0	1	No
Bromacil	21 220	0	15	No
Bromadiolone	104	0	2	No
Bromide ion	25 22	788	21	Yes (P)
Bromocyclen	5 008	0	5	No
Bromofenoxim	1	0	1	No
Bromophos	42 532	0	23	No
Bromophos-ethyl	45 580	2	23	No
Bromopropylate	64 358	7	29	Yes (P)
Bromoxynil (RD)	14 206	1	15	No
Bromuconazole	50 166	1	28	Yes (P)
Bupirimate	61 927	319	29	Yes (P)
Buprofezin	63 354	519	29	Yes (P)
Butachlor	5 392	0	9	No
Butamifos	4 213	0	4	No
Butocarboxim	15 680	0	10	No
Butoxycarboxim	9 948	0	7	No
Butralin	14 880	1	12	No
Butylate	9 700	0	10	No
Cadusafos	47 895	2	27	No
Cafenstrole	2 284	0	1	No
Camphechlor (RD)	394	0	1	No
Captafol	21 003	2	17	No
Captan (RD)	41 765	913	27	Yes (P)
Carbaryl	62 919	30	29	Yes (P)
Carbendazim (RD)	58 866	1695	27	Yes (P and A)

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Carbetamide	15 174	0	10	No
Carbofuran (RD)	55 138	50	26	Yes (P)
Carbon tetrachloride	96	0	1	No
Carbophenothion	23 380	0	14	No
Carbosulfan	36 968	3	28	Yes (P)
Carboxin	34 184	3	25	No
Carfentrazone-ethyl (RD)	12 589	0	8	No
Carpropamid	1 376	0	3	No
Carvone	1 662	0	1	No
Chinomethionat	25 830	0	21	No
Chloramben	10	0	1	No
Chlorantraniliprole	41 215	792	22	Yes (P)
Chlorbenside	9 015	0	13	No
Chlorbromuron	15 280	0	13	No
Chlorbufam	9 419	0	10	No
Chlordane (RD)	23 332	7	18	Yes (A)
Chlordecone	1 689	18	2	No
Chlorfenapyr	53 368	259	28	Yes (P)
Chlorfenson	25 058	0	20	No
Chlorfenvinphos	62 826	2	29	Yes (P)
Chlorfluazuron	15 062	6	11	No
Chlorflurenol	277	0	1	No
Chloridazon	19 871	4	16	No
Chlorimuron	105	0	2	No
Chlormephos	19 436	0	15	No
Chlormequat	6 892	691	26	Yes (P and A)
Chlorobenzilate	39 202	2	28	Yes (A)
Chloroneb	4 438	0	10	No
Chloropropylate	15 355	0	11	No
Chlorothalonil (RD)	54 897	470	28	Yes (P)
Chlorotoluron	20 833	0	14	No
Chloroxuron	14 566	0	15	No
Chlorpropham (RD)	47 748	476	25	Yes (P and A)
Chlorpyrifos	70 943	4908	29	Yes (P and A)
Chlorpyrifos-methyl	70 101	501	29	Yes (P and A)
Chlorsulfuron	6 446	0	11	No
Chlorthal-dimethyl	35 470	4	19	No
Chlorthiamid	4 084	0	2	No
Chlorthiophos	12 924	2	11	No
Chlozolinate	35 426	0	21	No
Chromafenozide	5 926	0	3	No
Cinidon-ethyl (RD)	8 577	0	8	No
Cinosulfuron	6 894	0	4	No
Clethodim (RD)	13 054	0	8	No
Clodinafop (RD)	3 483	0	4	No
Clofentezine (RD)	54 260	133	27	Yes (P)
Clomazone	33 502	11	17	No
Clopyralid	19 309	19	15	No
Clothianidin	38 993	122	27	Yes (P)
Copper	2 536	2018	1	No
Coumachlor	3 401	0	2	No
Coumaphos	22 752	14	21	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Coumatetralyl	1 965	0	3	No
Crimidine	3 240	0	8	No
Cyanamide (RD)	59	0	1	No
Cyanazine	22 691	0	14	No
Cyazofamid	40 980	51	19	No
Cyclanilide	6 610	0	6	No
Cycloate	7 908	0	13	No
Cycloxydim (RD)	14 855	0	13	No
Cycluron	3 769	0	3	No
Cyenopyrafen	2 201	0	1	No
Cyflufenamid	15 620	23	8	No
Cyflumetofen	2 244	0	1	No
Cyfluthrin (RD)	51 968	108	26	Yes (P and A)
Cyhalofop-butyl (RD)	9 542	0	9	No
Cyhalothrin	1 519	22	4	No
Cyhalothrin, gamma-	98	0	2	No
Cyhexatin (RD)	872	0	2	No
Cymoxanil	45 825	24	26	Yes (P)
Cypermethrin (RD)	63 790	2024	28	Yes (P and A)
Cyproconazole	60 035	93	28	Yes (P)
Cyprodinil (RD)	63 975	3260	29	Yes (P)
Cyprofuram	736	0	1	No
Cyromazine	23 805	62	19	Yes (P)
Dalapon	2 284	0	1	No
Daminozide (RD)	1 296	2	3	No
Dazomet (RD)	3 033	0	2	No
DDAC	7 580	212	9	No
DDT (RD)	53 493	368	27	Yes (A)
Deltamethrin	67 911	675	29	Yes (P and A)
Demeton-S-methyl	29 139	0	22	No
Demeton-S-methyl sulfone	33 879	0	22	No
Desmedipham	20 177	0	14	No
Desmetryn	9 685	0	12	No
Diafenthiuron	25 866	3	16	No
Dialifos	15 554	0	13	No
Diallate	4 974	0	9	No
Diazinon	70 084	91	29	Yes (P and A)
Dicamba	12 406	0	13	No
Dichlobenil	29 468	0	18	No
Dichlofenthion	18 010	0	14	No
Dichlofluanid	58 566	1	28	Yes (P)
Dichlone	65	0	2	No
Dichlorprop (RD)	22 222	20	14	No
Dichlorvos	63 253	13	28	Yes (P)
Diclobutrazol	21 237	0	13	No
Diclofop (RD)	11 139	0	6	No
Dicloran	56 305	18	28	Yes (P)
Dicofol (RD)	48 082	74	26	Yes (P)
Dicrotophos	43 817	0	27	Yes (P)
Dieldrin (RD)	48 206	62	27	Yes (A)
Dienochlor	10	0	1	No
Diethatyl	736	0	1	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Diethofencarb	51 285	18	27	Yes (P)
Difenoconazole	61 604	1293	28	Yes (P)
Difenoxuron	3 413	0	7	No
Difenzoquat	1 088	0	1	No
Diflubenzuron (RD)	44 981	130	26	Yes (P)
Diflufenican	30 376	2	17	No
Dikegulac	3 507	0	6	No
Dimefox	2 559	0	3	No
Dimefuron	9 050	0	6	No
Dimepiperate	2 282	0	2	No
Dimethachlor	16 584	0	14	No
Dimethenamid–p (RD)	13 590	3	10	No
Dimethipin	3 372	0	3	No
Dimethirimol	2 334	0	2	No
Dimethoate (RD)	60 910	551	27	Yes (P)
Dimethomorph	58 451	1109	28	Yes (P)
Dimethylvinphos	4 531	0	5	No
Dimoxystrobin	31 233	21	21	No
Diniconazole	52 884	13	26	Yes (P)
Dinitramine	6 787	0	7	No
Dinobuton	5 167	0	7	No
Dinocap (RD)	11 117	5	16	No
Dinoseb	5 744	1	8	No
Dinotefuran	23 759	5	16	No
Dinoterb	6 872	0	8	No
Dioxacarb	10 074	0	9	No
Dioxathion	22 728	0	12	No
Diphenamid	10 971	0	12	No
Diphenylamine	59 641	203	29	Yes (P)
Diquat	1 277	10	5	No
Disulfoton (RD)	33 020	1	19	No
Ditalimfos	20 526	0	17	No
Dithianon	12 927	219	12	Yes (P)
Dithiocarbamates (RD)	14 108	1751	27	Yes (P)
Dithiopyr	4 651	0	2	No
Diuron (RD)	16 636	4	13	No
DNOC	4 743	0	6	No
Dodemorph	11 503	1	13	No
Dodine	31 903	250	20	Yes (P)
Edifenphos	11 324	0	10	No
Emamectin	6 540	8	8	No
Endosulfan (RD)	63 880	337	28	Yes (P and A)
Endrin	46 574	7	28	Yes (A)
EPN	53 867	5	28	Yes (P)
Epoxiconazole	59 022	38	28	Yes (P)
EPTC	10 259	0	13	No
Esprocarb	4 556	0	1	No
Etaconazole	10 031	0	9	No
Ethalfluralin	7 706	0	9	No
Ethametsulfuron-methyl	3 250	0	7	No
Ethephon	4 956	307	21	Yes (P)
Ethidimuron	1 980	0	2	No
Ethiofencarb	38 457	0	19	No
Ethion	64 062	46	29	Yes (P)

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Ethiprole	6 596	0	7	No
Ethirimol	40 357	93	25	Yes (P)
Ethofumesate (RD)	24 892	4	17	No
Ethoprophos	60 732	10	28	Yes (P)
Ethoxyquin	24 337	30	15	No
Ethoxysulfuron	6 106	0	5	No
Ethylene oxide (RD)	27	1	1	No
Etofenprox	55 528	466	28	Yes (P and A)
Etoxazole	28903	63	16	No
Etridiazole	25 259	4	16	No
Etrimfos	37 519	1	25	No
Famoxadone	50 471	181	25	Yes (P and A)
Fenamidone	52 495	38	27	Yes (P)
Fenamiphos (RD)	44 443	3	27	Yes (P)
Fenarimol	64 169	16	29	Yes (P)
Fenazaflor	569	0	1	No
Fenazaquin	57 030	54	28	Yes (P)
Fenbuconazole	57 110	292	28	Yes (P)
Fenbutatin oxide	16 903	93	19	Yes (P)
Fenchlorazole-ethyl	2 272	0	1	No
Fenchlorphos (RD)	23 178	0	18	No
Fenfuram	6 868	0	3	No
Fenhexamid	62 438	2147	28	Yes (P)
Fenitrothion	63 481	2	28	Yes (P)
Fenobucarb	11 878	5	12	No
Fenothiocarb	8 256	0	7	No
Fenoxaprop	12 944	0	3	No
Fenoxaprop-P	6 554	0	9	No
Fenoxycarb	59 889	85	28	Yes (P)
Fenpiclonil	17 206	2	12	No
Fenpropathrin	62 715	122	28	Yes (P)
Fenpropidin (RD)	37 041	24	26	No
Fenpropimorph (RD)	54 515	59	28	Yes (P and A)
Fenpyrazamine	9	0	1	No
Fenpyroximate	51 486	162	27	Yes (P)
Fenson	21 126	0	12	No
Fenthion (RD)	52 240	9	27	Yes (P and A)
Fentin acetate	410	0	6	No
Fentin hydroxide	337	0	3	No
Fenuron	9 645	1	11	No
Fenvalerate (RD)	91 181	164	23	Yes (P and A)
Fipronil (RD)	46 217	32	26	Yes (P)
Flamprop	3 223	0	4	No
Flazasulfuron	9 762	1	9	No
Flocoumafen	1 770	0	1	No
Flonicamid (RD)	22 432	225	14	Yes (P)
Florasulam	14 223	0	13	No
Fluacrypyrim	5 017	1	4	No
Fluazifop-P-butyl (RD)	22 647	38	19	Yes (P and A)
Fluazinam	34 416	7	21	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Fluazolate	10	0	1	No
Flubendiamide	20 758	48	15	Yes (P)
Flubenzimine	6 256	0	3	No
Flucycloxuron	6 105	0	6	No
Flucythrinate (RD)	27 078	0	18	No
Fludioxonil	59 582	2920	28	Yes (P)
Flufenacet (RD)	12 198	0	11	No
Flufenoxuron	52 372	47	28	Yes (P)
Flufenzin	1 274	0	2	No
Flumetralin	10 467	0	10	No
Flumetsulam	5	0	1	No
Flumioxazine	11 494	0	8	No
Fluometuron	6 470	0	8	No
Fluopicolide	45 028	232	24	No
Fluopyram (RD)	31 528	325	22	Yes (P and A)
Fluorodifen	2 240	0	2	No
Fluoroglycofen	5 701	0	2	No
Fluoroglycofene	736	0	1	No
Fluoxastrobin	19 454	1	12	No
Flupyrsulfuron-methyl	6 520	0	7	No
Fluquinconazole	52 677	16	28	Yes (P and A)
Flurenol	55	0	1	No
Fluridone	1 117	0	2	No
Flurochloridone	19 253	2	13	No
Fluroxypyr (RD)	23 132	5	14	No
Flurprimidole	2 774	1	3	No
Flurtamone	19 899	0	11	No
Flusilazole (RD)	59 964	49	27	Yes (P and A)
Flusulfamide	5 104	0	2	No
Flutolanil	43 856	19	24	No
Flutriafol	56 374	367	28	Yes (P)
Fluxapyroxad	3 548	4	3	No
Folpet (RD)	41 298	905	27	Yes (P)
Fomesafen	8 710	0	7	No
Fonofos	30 838	0	21	No
Foramsulfuron	6 480	0	6	No
Forchlorfenuron	16 126	13	10	No
Formetanate (RD)	34 326	26	21	Yes (P)
Formothion	35 250	0	25	Yes (P)
Fosetyl-Al (RD)	1 387	468	3	No
Fosthiazate	47 988	6	28	Yes (P)
Fosthietan	10	0	1	No
Fuberidazole	15 774	1	13	No
Furalaxyl	20 231	0	13	No
Furathiocarb	39 560	0	23	No
Furfural	7	5	1	No
Furmecyclox	1 538	0	4	No
Gibberellic acid	2 301	16	2	No
Glufosinate (RD)	1 606	4	5	No
Glyphosate	2 866	227	21	Yes (P)
Halfenprox	3 306	0	5	No
Halosulfuron methyl	967	0	1	No
Halosulfuron-methyl	3 174	0	1	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Haloxyfop-R (RD)	20 753	15	22	Yes (P and A)
Heptachlor (RD)	35 452	19	23	Yes (A)
Heptenophos	37 647	0	25	No
Hexachlorobenzene	50 169	406	28	Yes (A)
Hexachlorocyclohexane (alpha)	41 658	9	28	Yes (A)
Hexachlorocyclohexane (beta)	40 986	68	28	Yes (A)
Hexachlorocyclohexane (RD)	37 449	0	24	No
Hexaconazole	62 187	62	28	Yes (P)
Hexaflumuron	32 064	2	19	No
Hexazinone	17 418	0	15	No
Hexythiazox	56 420	277	28	Yes (P)
Hydrogen phosphide	164	19	2	No
Hymexazol	697	0	2	No
Imazalil	61 859	4572	29	Yes (P)
Imazamethabenz	6 469	0	9	No
Imazamox	10 590	2	8	No
Imazapyr	14 420	2	11	No
Imazaquin	12 158	0	7	No
Imazethapyr	10 631	0	7	No
Imazosulfuron	7 677	0	7	No
Imibenconazole	9 098	1	6	No
Imidacloprid	59 381	2558	28	Yes (P)
Iminoctadine	8	0	1	No
Indoxacarb	61 493	670	28	Yes (P and A)
Iodosulfuron-methyl (RD)	11 157	0	10	No
Ioxynil (RD)	12 067	1	15	Yes (A)
Ipconazole	3 599	0	6	No
Iprobenfos	9 641	1	11	No
Iprodione (RD)	62 282	2313	29	Yes (P)
Iprovalicarb	59 935	206	28	Yes (P)
Isazofos	10 302	0	11	No
Isocarbamid	1 757	0	2	No
Isocarbophos	36 341	3	24	Yes (P)
Isofenphos	36 942	0	24	No
Isofenphos-methyl	51 449	5	28	Yes (P)
Isoprocarb	33 611	2	23	Yes (P)
Isopropalin	5 254	0	5	No
Isoprothiolane	33 388	42	26	No
Isoproturon	39 762	0	23	No
Isopyrazam	473	0	2	No
Isoxaben	18 118	0	10	No
Isoxaflutole (RD)	8 327	0	9	No
Isoxathion	9 477	0	6	No
Karbutilate	1 189	0	1	No
Kasugamycin	47	0	1	No
Kresoxim-methyl (RD)	63 153	346	28	Yes (P)
Lactofen	4 489	0	3	No
Lambda-cyhalothrin (RD)	61 036	2012	27	Yes (P)
Lenacil	26 324	11	15	No
Lindane	57 800	24	29	Yes (A)
Linuron	56 828	284	28	Yes (P)
Lufenuron	49 288	39	27	Yes (P)
Malathion (RD)	61 724	69	28	Yes (P)
Maleic hydrazide (RD)	3 142	92	5	Yes (A)

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Mandipropamid	40 190	283	24	Yes (P)
MCPA (RD)	20 468	19	13	No
Mecarbam	48 450	2	27	No
Mecoprop (RD)	13 826	2	14	No
Mefenacet	6 992	0	5	No
Mefluidide	4 556	0	1	No
Mepanipyrim (RD)	48 552	196	24	Yes (P)
Mephosfolan	9 454	0	8	No
Mepiquat	6 424	144	25	Yes (P)
Mepronil	33 533	0	20	No
Meptyldinocap (RD)	3 918	0	6	Yes (P)
Mercury (RD)	1 040	209	1	No
Merphos	244	0	3	No
Mesosulfuron	8 226	0	6	No
Mesotrione (RD)	7 638	0	7	No
Metaflumizone	31 427	20	23	Yes (A)
Metalaxyl (RD)	55 089	1066	24	Yes (P)
Metaldehyde	4 807	6	4	No
Metamitron	36 696	18	19	No
Metazachlor	35 805	2	22	No
Metconazole	46 419	4	27	Yes (P)
Methabenzthiazuron	22 517	3	13	No
Methacrifos	36 615	0	27	No
Methamidophos	59 766	47	29	Yes (P)
Methfuroxam	1 662	0	1	No
Methidathion	67 745	91	29	Yes (P and A)
Methiocarb (RD)	54 795	100	28	Yes (P)
Methomyl (RD)	58 827	131	28	Yes (P)
Methoprene	2 570	0	7	No
Methoprotryne	8 181	0	8	No
Methoxychlor	51 555	10	28	Yes (P and A)
Methoxyfenozide	54 163	533	28	Yes (P)
Metobromuron	41 705	6	26	Yes (P)
Metolachlor (RD)	16 382	8	14	No
Metolcarb	11 950	0	9	No
Metominostrobin	3 765	1	2	No
Metosulam	13 044	0	11	No
Metoxuron	22 153	0	17	No
Metrafenone	38 726	102	20	No
Metribuzin	51 610	16	26	No
Metsulfuron-methyl	14 290	0	11	No
Mevinphos	52 355	0	27	No
Milbemectin (RD)	5 610	2	3	No
Mirex	11 383	0	13	No
Molinate	13 390	0	13	No
Monalide	6 186	0	3	No
Monocrotophos	59 715	12	28	Yes (P)
Monolinuron	22 460	0	17	No
Monuron	14 449	0	11	No
Myclobutanil (RD)	62 864	1479	29	Yes (P)
Naled	8 190	0	8	No
Napropamide	29 300	3	18	No
Naptalam	5 312	0	3	No
Neburon	6 115	0	7	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Nicosulfuron	11 640	0	11	No
Nicotine	862	16	7	No
Nitenpyram	43 549	0	26	Yes (P)
Nitralin	4 899	0	9	No
Nitrofen	34 002	1	25	No
Nitrothal	14 320	0	12	No
Norflurazon	3 425	0	9	No
Novaluron	19 063	26	14	No
Nuarimol	35 116	0	21	No
Octhilinone	186	0	1	No
Ofurace	19 440	0	12	No
Orbencarb	4 400	0	5	No
Oryzalin	4 455	0	5	No
Oxadiargyl	5 919	0	7	No
Oxadiazon	24 410	5	13	No
Oxadixyl	59 696	17	29	Yes (P)
Oxamyl	60 881	26	28	Yes (P)
Oxasulfuron	2 746	0	3	No
Oxycarboxin	12 646	0	10	No
Oxydemeton-methyl (RD)	49 670	0	25	Yes (P)
Oxyfluorfen	22 536	52	15	No
Paclobutrazol	51 120	21	28	Yes (P)
Paraquat	1 273	0	4	No
Parathion	63 942	3	28	Yes (P and A)
Parathion-methyl (RD)	58 525	4	26	Yes (P and A)
Pebulate	4 769	0	9	No
Penconazole	64 639	586	29	Yes (P)
Pencycuron	55 161	69	28	Yes (P)
Pendimethalin	61 870	297	28	Yes (P)
Penoxsulam	7 751	0	7	No
Pentachlorophenol	3 201	1	6	No
Pentanochlor	5 413	0	5	No
Permethrin	64 423	95	29	Yes (A)
Pethoxamid	14 276	0	13	No
Phenmedipham (RD)	36 126	23	21	No
Phenothrin	7 001	1	10	No
Phenthoate	56 988	4	28	Yes (P)
Phorate (RD)	38 289	10	22	No
Phosalone	65 023	12	29	Yes (P)
Phosmet (RD)	54 801	174	25	Yes (P)
Phosphamidon	42 883	2	26	No
Phosphines and phosphides (RD)	59	5	2	No
Phoxim	43 215	2	27	Yes (P)
Picloram	5 160	0	8	No
Picolinafen	17 083	0	12	No
Picoxystrobin	43 804	3	21	No
Pinoxaden	7 753	0	10	No
Pirimicarb (RD)	59 231	652	27	Yes (P)
Pirimiphos-ethyl	36 499	4	24	No
Pirimiphos-methyl	68 222	605	29	Yes (P and A)
Pretilachlor	3 851	0	7	No
Primisulfuron	470	0	3	No
Probenazole	2 284	0	1	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Prochloraz (RD)	41 614	864	24	Yes (P and A)
Procymidone (RD)	66 378	71	29	Yes (P)
Profenofos	64 222	109	28	Yes (P and A)
Profoxydim	6 609	0	4	No
Prohexadione (RD)	2 527	2	3	No
Promecarb	28 751	2	15	No
Prometryn	38 960	2	22	No
Propachlor	25 488	1	13	No
Propamocarb (RD)	50 571	1235	24	Yes (P)
Propanil	20 896	6	15	No
Propaphos	3 155	0	4	No
Propaquizafop	20 137	0	16	No
Propargite	59 066	262	29	Yes (P)
Propazine	17 172	0	16	No
Propetamphos	18 696	0	13	No
Propham	41 204	4	26	No
Propiconazole	63 297	179	28	Yes (P)
Propineb	84	0	1	No
Propisochlor	1 043	0	1	No
Propoxur	47 274	8	28	Yes (P)
Propoxycarbazone (RD)	6 198	0	5	No
Propyzamide (RD)	61 900	114	28	Yes (P)
Proquinazid	28 676	42	17	No
Prosulfocarb	3 3948	92	17	No
Prosulfuron	8 354	0	9	No
Prothioconazole (RD)	27 383	22	20	Yes (P)
Prothiofos	54 435	6	28	Yes (P)
Prothoate	3 082	0	4	No
Pymetrozine	45 465	173	25	Yes (P)
Pyraclofos	3 387	0	6	No
Pyraclostrobin	57 920	2577	28	Yes (P)
Pyraflufen-ethyl	9 107	0	12	No
Pyrasulfotole	10	0	1	No
Pyrazophos	55 331	1	28	Yes (A)
Pyrazoxyfen	574	0	1	No
Pyrethrins	26 968	38	23	Yes (P)
Pyridaben	60 172	196	29	Yes (P)
Pyridafol	1 445	1	1	No
Pyridalyl	10 466	11	5	No
Pyridaphenthion	38 653	4	21	No
Pyridate (RD)	15 556	4	9	No
Pyrifenox	38 551	3	21	No
Pyrimethanil	63 515	2048	29	Yes (P)
Pyrimidifen	3 541	1	6	No
Pyriproxyfen	58 272	626	28	Yes (P)
Pyroquilon	6 124	0	6	No
Pyroxsulam	2 803	0	3	No
Quinalphos	54 282	5	26	No
Quinclorac	11 055	0	13	No
Quinmerac	11 525	1	9	No
Quinoclamine	5 787	0	7	No
Quinoxyfen	59 966	332	28	Yes (P)
Quintozene (RD)	45 305	4	23	No
Quizalofop	22 928	4	12	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Quizalofop-P-ethyl	948	0	2	No
Resmethrin (RD)	16 249	0	25	Yes (A)
Rimsulfuron	19 786	0	15	No
Rotenone	32 148	1	23	Yes (P)
Secbumeton	774	0	5	No
Siduron	4 316	0	5	No
Silafluofen	5 263	0	7	No
Silthiofam	8 534	0	8	No
Simazine	37 714	0	23	No
Simeconazole	10	0	1	No
Spinetoram	8 198	11	7	No
Spinosad (RD)	51 046	956	27	Yes (P)
Spirodiclofen	48 047	153	27	Yes (P)
Spiromesifen	39 661	182	22	Yes (P)
Spirotetramat (RD)	20 127	145	10	No
Spiroxamine (RD)	56 702	305	28	Yes (P and A)
Streptomycin	161	0	1	No
Sulcotrione	10 131	0	9	No
Sulfentrazone	5 272	0	7	No
Sulfosulfuron	4 481	0	6	No
Sulfotep	34 499	0	21	No
Sulphur	1 621	24	3	No
Sulprofos	8 024	0	12	No
tau-Fluvalinate	54 576	47	27	Yes (P and A)
TCMTB	3 537	0	5	No
Tebuconazole	63 419	2071	29	Yes (P)
Tebufenozide	55 875	88	28	Yes (P)
Tebufenpyrad	60 973	201	28	Yes (P)
Tebutam	2 213	0	6	No
Tebuthiuron	2 629	0	2	No
Tecnazene	43 410	0	27	No
Teflubenzuron	52 600	15	27	Yes (P)
Tefluthrin	49 777	34	27	Yes (P)
Tembotrione (RD)	4 837	0	1	No
Temephos	1 558	0	7	No
TEPP	3 650	0	6	No
Tepraloxydim	20 631	3	9	No
Terbacil	11 483	0	13	No
Terbufos	32 518	1	25	No
Terbumeton	7 734	0	10	No
Terbuthylazine	51 097	45	26	Yes (P)
Terbutryn	35 306	2	20	No
Tetrachlorvinphos	25334	0	19	No
Tetraconazole	60 920	207	28	Yes (P and A)
Tetradifon	63 295	12	29	Yes (P)
Tetramethrin	37 045	13	24	Yes (P)
Tetrasul	11 474	0	8	No
Thiabendazole (RD)	60 484	2780	28	Yes (P)
Thiacloprid	59 532	1583	28	Yes (P)
Thiamethoxam (RD)	55 723	571	27	Yes (P)
Thiazafluron	77	0	1	No
Thiazopyr	2 379	0	2	No
Thidiazuron	2 376	0	3	No

Pesticide	Number of determinations	Number of detections	Number of countries analysing	Included in the 2013 EUCP
Thiencarbazone	1 662	0	1	No
Thifensulfuron-methyl	14 153	1	10	No
Thiobencarb	13 054	0	11	No
Thiocyclam	4 091	0	4	No
Thiofanox	7 819	0	7	No
Thiometon	23 972	0	17	No
Thionazin	7 778	0	7	No
Thiophanate-ethyl	1 977	0	4	No
Thiophanate-methyl	57 321	413	28	Yes (P)
Thiram	69	0	3	No
Tiocarbazil	3 543	0	6	No
Tolclofos-methyl	63 719	123	29	Yes (P)
Tolfenpyrad	6 673	5	10	No
Tolylfluanid (RD)	49 262	4	25	Yes (P)
Topramezone	7 090	0	4	No
Tralkoxydim	11 559	0	9	No
Tralomethrin	2 057	0	5	No
Triadimenol (RD)	56 608	738	26	Yes (P)
Tri-allate	23 330	0	17	No
Triapenthenol	2 380	0	2	No
Triasulfuron	7 420	0	11	No
Triazamate	12 739	0	9	No
Triazophos	64 971	107	28	Yes (P and A)
Tribenuron-methyl	5 695	0	10	No
Trichlorfon	50 475	3	27	Yes (P)
Trichloronat	16 162	0	12	No
Triclopyr (RD)	19 041	7	10	No
Tricyclazole	36 682	134	26	No
Tridemorph	8 074	1	9	No
Trietazine	2 219	0	3	No
Trifenmorph	57	0	2	No
Trifloxystrobin (RD)	62 711	1083	28	Yes (P)
Triflumizole (RD)	26 646	24	10	No
Triflumuron	49 880	69	27	Yes (P)
Trifluralin	56 052	18	27	Yes (P)
Triflusulfuron	247	0	1	No
Triforine	27 983	0	20	No
Trimethyl-sulfonium cation	1 121	11	1	No
Trinexapac	4 903	14	3	No
Triticonazole	50 269	4	27	Yes (P)
Tritosulfuron	5 209	0	2	No
Uniconazole	2 932	1	5	No
Valifenalate	11	0	2	No
Valiphenal	71	0	1	No
Vamidothion	25 190	0	21	No
Vernolate	2 339	0	1	No
Vinclozolin (RD)	30 471	13	25	Yes (P)
Warfarin	56	0	2	No
XMC	3 115	0	3	No
Ziram	5	0	1	No
Zoxamide	56 166	41	27	Yes (P)

P: Pesticides to be analysed in plant products; A: Pesticides to be analysed in animal products.

Table C2: Import control programme for 2013

Country of origin	Food and feed	Examples of pesticides to be checked	Frequency of checks
China	*Brassica oleracea* (other edible Brassica, 'Chinese broccoli') [(a)]	Chlorfenapyr, fipronil, carbendazim, acetamiprid, dimethomorph, propiconazole	20 %
	Pomelos [(b)]	Triazofos, triadimefon and triadimenol, parathion-methyl, phenthoate, methidathion	20 %
	Tea leaves (whether or not flavoured)	Buprofezin; imidacloprid; fenvalerate and esfenvalerate; profenofos; trifluralin; triazophos; triadimefon and triadimenol, cypermethrin	10 %
Dominican Republic	Yardlong beans (*Vigna unguiculata spp. sesquipedalis*) [(c)]	Amitraz, acephate, aldicarb, benomyl, carbendazim, chlorfenapyr, chlorpyrifos, CS_2 (dithiocarbamates), diafenthiuron, diazinon, dichlorvos, dicofol, dimethoate, endosulfan, fenamidone, imidacloprid, malathion, methamidophos, methiocarb, methomyl, monocrotophos, omethoate, oxamyl, profenofos, propiconazole, thiabendazol, thiacloprid	20 %
	Peppers (sweet and other than sweet) (*Capsicum spp.*)		
	Bitter melon (*Momordica charantia*) [(d)]		10 %
	Aubergines		
Egypt	Oranges (fresh or dried)	Carbendazim, cyfluthrin, cyprodinil, diazinon, dimethoate, ethion, fenitrothion, fenpropathrin, fludioxonil, hexaflumuron, lambda-cyhalothrin, methiocarb, methomyl, omethoate, oxamyl, phenthoate, thiophanate-methyl	10 %
	Pomegranates		
	Strawberries		
	Peppers (sweet and other than sweet) (*Capsicum spp.*)	Carbofuran, chlorpyrifos, cypermethrin, cyproconazole, dicofol, difenoconazole, dinotefuran, ethion, flusilazole, folpet, prochloraz, profenofos, propiconazole, thiophanate-methyl and triforine	
Kenya	Peas with pods (unshelled)	Dimethoate, chlorpyriphos, acephate, methamidophos, methomyl, diafenthiuron, indoxacarb	10 %
	Beans with pods (unshelled)		
Morocco	Mint [(e)]	Chlorpyriphos, cypermethrin, dimethoate, endosulfan, hexaconazole, parathion-methyl, methomyl, flutriafol, carbendazim, flubendiamide, myclobutanil, malathion	10 %
Nigeria	Dried beans	Dichlorvos	50 %

Country of origin	Food and feed	Examples of pesticides to be checked	Frequency of checks
India	Curry leaves (*Bergera/Murraya koenigii*) [(f)]	triazophos, oxydemeton-methyl, chlorpyriphos, acetamiprid, thiamethoxam, clothianidin, methamidophos, acephate, propargite, monocrotophos	20 %
	Okra	Acephate, methamidophos, triazophos, endosulfan, monocrotophos	20 %
Thailand	Peppers (other than sweet) (*Capsicum spp.*)	Carbofuran, methomyl, omethoate, dimethoate, triazophos, malathion, profenofos, prothiofos, ethion, carbendazim, triforine, procymidone, formetanate	10 %
	Coriander leaves [(g)]	Acephate, carbaryl, carbendazim, carbofuran, chlorpyriphos, chlorpyriphos-methyl, dimethoate, ethion, malathion, metalaxyl, methamidophos, methomyl, monocrotophos, omethoate, prophenophos, prothiophos, quinalphos, triadimefon, triazophos, dicrotophos, EPN, triforine	10 %
	Basil (holy, sweet) [(e)]		
	Yardlong beans (*Vigna unguiculata spp. sesquipedalis*) [(c)]		20 %
	Aubergines		
	Brassica vegetables [(h)]		10 %
Turkey	Sweet Peppers (*Capsicum annuum*)	Methomyl, oxamyl, carbendazim, clofentezine, diafenthiuron, dimethoate, formetanate, malathion, procymidone, tetradifon, thiophanate-methyl	10 %
	Tomatoes		
Vietnam	Coriander leaves[(g)]	Dimethoate, chlorpyriphos, acephate, methamidophos, methomyl, diafenthiuron, indoxacarb	20 %
	Basil (holy sweet) [(e)]		
	Mint [(e)]		
	Parsley		
	Okra		
	Peppers (other than sweet)		

(a): Chinese broccoli is classified in Regulation (EU) No 600/2010[60] under broccoli (Code 0241010).
(b): Pomelos are classified in Regulation (EU) No 600/2010 under grapefruit (Code 0110010).
(c): Yaredlong beans are classified in Regulation (EU) No 600/2010 under beans with pods (Code 0260010).
(d): Bitter melons are not explicitly mentioned in Regulation (EU) No 600/2010; in Regulation (EU) No 212/2013[61] bitter melons were classified under courgettes (Code 0232030).
(e): Mint, holy basil and sweet basil are classified in Regulation (EU) No 600/2010 under basil (Code 0256080).
(f): Curry leaves were not explicitly mentioned in Regulation (EU) No 600/2010; in 2013 curry leaves and holy basil were classified under basil (Code 0256080).
(g): Coriander leaves are classified in Regulation (EU) No 600/2010 under celery leaves (Code 0256030).
(h): All brassica vegetables classified in Regulation (EU) No 600/2010 under Code 0240000.

[60] Commission Regulation (EU) No 600/2010 of 8 July 2010 amending Annex I to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards additions and modification of the examples of related varieties or other products to which the same MRL applies (Text with EEA relevance). OJ L 174, 9.7.2010, p. 18–39.
[61] Commission Regulation (EU) No 212/2013 of 11 March 2013 replacing Annex I to Regulation (EC) No 396/2005 2005 of the European Parliament and of the Council as regards additions and modification of the examples of related varieties or other products to which the same MRL applies (Text with EEA relevance). OJ L 68, 12.3.2013, p. 30–52.

Table C3: Details on the most frequently detected MRL exceedances on products originating from EU/EFTA and from third countries[62]

Product/pesticide [(a)]	Number of detections exceeding the MRL	Origin of the products	Range of measured residue levels (mg/kg)	MRL (mg/kg)	Comment on the pesticide exceeding the MRL	Possible reason for MRL exceedance
Products originating from third countries (excluding results for food products/countries covered by import control, see Section 3.2.4)						
Peppers/Profenofos	23	Uganda (7), India (6), Cambodia (5), Malaysia (3), Bangladesh (1), Sri Lanka (1)	0.011–3.14	0.05*/ 0.01*[(b)]	Insecticide no longer approved in the EU	Use of a pesticide no longer approved at EU level on a crop for which no import tolerance is established.
Peppers/Dimethoate (RD)	17	Uganda (17)	0.025–0.48	0.02*	Insecticide approved in the EU	Use of a pesticide on a crop for which no import tolerance is set.
Beans (with pods)/Dimethoate (RD)	14	India (9), China (2), Morocco (1), Cambodia (1), Egypt (1)	0.03–0.7573	0.02*	Insecticide approved in the EU	Use of a pesticide on a crop for which no import tolerance is set.
Passion fruit/Carbendazim (RD)	11	Colombia (4), Vietnam (3), Kenya (1), Thailand (1), Cambodia (1), Ecuador (1)	0.143–3.1	0.1*	Fungicide, in 2013 still approved in the EU	Use of a pesticide no longer approved at EU level
Aubergines/Dimethoate (RD)	11	Malaysia (5), Uganda (4), Vietnam (1), Cambodia (1)	0.024–0.23	0.02*	Insecticide approved in the EU	
Peppers/Carbendazim (RD)	10	Cambodia (4), Uganda (3), Malaysia (2), China (1)	0.12–0.82	0.1*	Fungicide, in 2013 still approved in the EU	
Pomegranate/Acetamiprid (RD)	10	Turkey (8), India (2)	0.011–0.071	0.01*	Insecticide approved in the EU	
Tea leaves/Acetamiprid (RD)	10	Vietnam (3), India (3), Taiwan (2), Sri Lanka (2)	0.11–0.65	0.1*	Insecticide approved in the EU	
Tea leaves/Imidacloprid	10	Vietnam (5), India (2), Turkey (1), Sri Lanka (1), Taiwan (1)	0.12–0.91	0.05*	Insecticide approved in the EU	
Peppers/Ethion	9	India (7), Sri Lanka (1), Bangladesh (1)	0.019–1.6	0.01*	Insecticide no longer approved in the EU	
Passion fruit/Cypermethrin (RD)	8	Thailand (3), Colombia (2), Kenya (2), Vietnam (1)	0.07–0.14	0.05*	Insecticide approved in the EU	

[62] The MRL exceedances detected on products subject to increased import controls in the framework or Regulation (EC) No 669/2005 are not included in this table. More details on these products can be found in section 3.2.4.

Product/pesticide [(a)]	Number of detections exceeding the MRL	Origin of the products	Range of measured residue levels (mg/kg)	MRL (mg/kg)	Comment on the pesticide exceeding the MRL	Possible reason for MRL exceedance
Tea leaves/Fenvalerate (RD)	7	India (3), Sri Lanka (2), Vietnam (1), China (1)	0.044–0.09	0.05*	Esfenvalerate is approved in the EU, while the mixture of isomers (fenvalerate) is no longer approved. The analytical methods used for enforcement do not distinguish between fenvalerate and esfenvalerate.	
Tea leaves/Buprofezin	7	Vietnam (3), India (2), Switzerland (1), Sri Lanka (1)	0.074–0.27	0.05*	Insecticide approved in the EU	
Rice/Carbendazim (RD)	7	India (4), Vietnam (2), Pakistan (1)	0.012–0.041	0.01*	Fungicide, in 2013 still approved in the EU	
Beans, dry/Dimethoate (RD)	7	United States (7)	0.03–0.10753	0.02*	Insecticide approved in the EU	
Okra/Acetamiprid (RD)	7	Jordan (3), Pakistan (3), Thailand (1)	0.018–0.4	0.01*/0.2[(b)]	Insecticide approved in the EU	
Herbs, not specified/Profenofos	7	India (5), Vietnam (1), Sri Lanka (1)	0.31–68	0.05*	Profenofos is no longer approved in the EU	Use of pesticides that are not approved or no longer approved
Beans, dry/Acephate	7	United States (4), Canada (2), Thailand (1)	0.03–0.64	0.02* / 0.01*[(b)]	Acephate is no longer approved in the EU	
Guava/Iprodione (RD)	7	Vietnam (7)	0.021–0.8	0.02*	Fungicide approved in the EU	
Wild fungi/Mercury (RD)	6	Serbia (4), China (1), Russian Federation (1)	Dried products: 1.31–4.71	0.01*	The use of mercury compounds has been banned in the EU since 1991. In certain plant commodities and in animal products, mainly fish the occurrence of a natural background level of mercury is observed.	Environmental contaminations in concentrations exceeding the legal limit
Peppers/Hexaconazole	6	Cambodia (2), Kenya (2), India (2)	0.015–0.069	0.02* / 0.01*[(b)]	Fungicide approved in the EU	
Beans (with pods)/Profenofos	6	India (5), Uganda (1)	0.04–0.6	0.05* / 0.01*[(b)]	Insecticide no longer approved in the EU	
Herbs, not specified/Chlorpyrifos	6	Morocco (1), Vietnam (1), Thailand (1), India (1), Cambodia (1), Kenya (1)	0.06–1.5	0.05*	Insecticide approved in the EU	
Lychee/Carbendazim (RD)	6	Thailand (5), Vietnam (1)	0.13–1.6	0.1*	Fungicide, in 2013 still approved in the EU	

Product/pesticide [(a)]	Number of detections exceeding the MRL	Origin of the products	Range of measured residue levels (mg/kg)	MRL (mg/kg)	Comment on the pesticide exceeding the MRL	Possible reason for MRL exceedance
Cassava/BAC (RD)	6	Costa Rica (4), China (1), Colombia (1)	0.05–37	0.01	BAC was previously used as a pesticide. Currently BAC is widely used as a biocide for disinfection of machineries, surfaces, which may be in contact with food during processing or packaging. BAC may be added to water used for washing the crops.	Addition of biocides to water used for washing products prior to marketing
Herbs, not specified/Imidacloprid	6	Israel (5), India (1)	2.7–51	2	Insecticide approved in the EU	
Guava/Carbendazim (RD)	6	Thailand (3), Vietnam (2), Cambodia (1)	0.18–0.71	0.1*	Fungicide, in 2013 still approved in the EU	
Lemons/Carbendazim (RD)	6	Argentina (6)	0.74–1.5	0.7	Fungicide, in 2013 still approved in the EU	
Herbal infusions, not specified/Carbendazim (RD)	6	United States (3), China (3)	0.11–3.3	0.1*	Fungicide, in 2013 still approved in the EU	
Lychee/Chlorpyrifos	6	Thailand (3), China (3)	0.073–0.4	0.05*	Insecticide approved in the EU	
Lychee/Dithiocarbamates (RD)	6	China (5), Vietnam (1)	0.2–2.2	0.05*	Group of fungicides approved in the EU	
Peppers/Carbofuran (RD)	5	Cambodia (2), Jordan (1), Malaysia (1), India (1)	0.021–0.1	0.02* / 0.01*[(b)]	Insecticide, no longer approved in the EU	
Peas (with pods)/Dimethoate (RD)	5	Guatemala (3), China (1), Egypt (1)	0.046–0.35	0.02*	Insecticide approved in the EU	
Peppers/Triazophos	5	India (2), Bangladesh (1), Sri Lanka (1), Malaysia (1)	0.012–1.03	0.01*	Insecticide, no longer approved in the EU	
Herbs, not specified/Tetramethrin	5	Morocco (5)	0.015–0.022	0.01*	Insecticide, no longer approved in the EU	
Beans, dry/Methamidophos	5	Canada (2), United States (2), Thailand (1)	0.012–0.093	0.01*	Insecticide, no longer approved in the EU	
Guava/Cypermethrin (RD)	5	Vietnam (3), Dominican Republic (1), Thailand (1)	0.058–0.55	0.05*	Insecticide approved in the EU	
Lychee/Pyraclostrobin	5	China (5)	0.03–0.1	0.02*	Fungicide and plant growth regulator, approved in the EU	
Products originating from EU and EEA countries						
Apples/Dimethoate (RD)	26	France (18), Portugal (5), Germany (2), Latvia (1)	0.021–0.59	0.02*	Approved insecticide	Use of an approved pesticide on a crop where use was not permitted.

Product/pesticide [(a)]	Number of detections exceeding the MRL	Origin of the products	Range of measured residue levels (mg/kg)	MRL (mg/kg)	Comment on the pesticide exceeding the MRL	Possible reason for MRL exceedance
Wild fungi/Mercury (RD)	20	Germany (16), Poland (4)	Unprocessed: 0.0133–0.47 dried products: 1.25–4.26	0.01*	The use of mercury compounds was banned in the EU in 1991. In certain plant commodities and in animal products, mainly fish the occurrence of a natural background level of mercury is observed.	Environmental contaminations in concentrations exceeding the legal limit
Broccoli/Dithiocarbamates (RD)	20	Poland (11), Spain (5), Italy (4)	1.03–2	1	Group of fungicides analysed as CS_2. Naturally occurring substances in brassica vegetables give false positive results for CS_2.	Natural background concentrations may exceed the existing MRLs
Cherries/Dimethoate (RD)	10	France (6), Germany (2), Italy (1), Hungary (1)	0.21–2.25	0.2	Approved insecticide	Use of approved pesticides on a crop where use was not permitted
Peaches/Chlorpyrifos	8	Italy (6), Spain (1), Greece (1)	0.23–1.44	0.2	Approved insecticide	Use of approved pesticides but not respecting the Good Agricultural Practices
Table grapes/Folpet (RD)	7	Hungary (6), Germany (1)	0.023–0.079	0.02*	Approved fungicide widely used in wine grapes.	Use of approved pesticides on a crop where use was not permitted
Turnips/Chlorpyrifos	6	France (5), Portugal (1)	0.059–0.19	0.05*	Approved insecticide	Use of approved pesticides on a crop where use was not permitted
Strawberries/Bupirimate	6	Iceland (4), United Kingdom (1), France (1)	1.3–4	1	Approved insecticide	Use of approved pesticides but not respecting the Good Agricultural Practices
Potatoes/Chlorpyrifos	6	Italy (3), Greece (3)	0.054–0.077	0.05*	Approved insecticide	Use of approved pesticides on a crop where use was not permitted
Pears/Chlormequat	6	Spain (3), Belgium (3)	0.12–0.61	0.1	Plant growth regulator that was previously authorised for use on pears. Since the use on pears has been withdrawn, the MRLs have been lowered stepwise, but residues still found due to persistence of the substance in treated orchards.	

Product/pesticide [(a)]	Number of detections exceeding the MRL	Origin of the products	Range of measured residue levels (mg/kg)	MRL (mg/kg)	Comment on the pesticide exceeding the MRL	Possible reason for MRL exceedance
Cauliflower/Dithiocarbamates (RD)	6	France (4), Italy (2)	1.1–1.66	1	Group of fungicides analysed as CS_2. Naturally occurring substances in brassica vegetables give false positive results for CS_2.	Natural background concentrations may exceed the existing MRLs
Lettuce/Carbendazim (RD)	6	Bulgaria (5), Italy (1)	0.29–6.68	0.1*	Fungicide, no longer approved in the EU since 2014. In 2013 restricted to uses in cereals, rape seed, sugar/fodder beets and maize.	Use of approved pesticides on a crop where use was not permitted
Lettuce/Dithiocarbamates (RD)	6	France (2), Bulgaria (2), Germany (1), Cyprus (1)	5.14–9.5	5	Approved fungicide	Use of approved pesticides but not respecting the Good Agricultural Practices
Parsley/Chlorpyrifos	5	Greece (2), Italy (1), Belgium (1), France (1)	0.053–0.33	0.05*	Approved insecticide	Use of approved pesticides on a crop where use was not permitted
Tea leaves/Imidacloprid	5	European Union (2), Poland (2), France (1)	0.059–0.4	0.05*	Approved insecticide. The origin of the tea is not reported, only the country of packaging.	Use of a pesticide approved in the EU, without requesting import tolerance for tea
Peaches/Dimethoate (RD)	5	Greece (3), Slovenia (1), Germany (1)	0.073–0.29	0.02*	Approved insecticide	Use of approved pesticides on a crop where use was not permitted
Spinach and similar, not specified/BAC (RD)	5	Spain (4), Portugal (1)	0.1–1.4	0.01	BAC was previously used as a pesticide. Currently BAC is widely used as a biocide for disinfection of machineries, surfaces, which may be in contact with food during processing or packaging. BAC may be added to water used for washing the crops.	Use of BAC for other purposes than pesticides (e.g. addition of biocides to water used for washing products prior to marketing)
Turnips/Dithiocarbamates (RD)	5	Portugal (4), France (1)	0.4–2.1	0.05*	Group of fungicides analysed as CS_2. Naturally occurring substances in brassica vegetables give false positive results for CS_2.	Natural background concentrations may exceed the existing MRLs
Honey/Azoxystrobin	5	Germany (5)	0.011–0.086	0.01*	Approved fungicide which may lead to residues if it is used on crops that are foraged by bees.	Carry-over of residues from treated crops which were foraged by bees.
Celery/Chlorpyrifos	5	France (2), Italy (1), Spain (1), Greece (1)	0.31–0.62	0.05*	Approved insecticide	Use of approved pesticides on a crop where use was not permitted

Product/pesticide [(a)]	Number of detections exceeding the MRL	Origin of the products	Range of measured residue levels (mg/kg)	MRL (mg/kg)	Comment on the pesticide exceeding the MRL	Possible reason for MRL exceedance
Kale/Pyraclostrobin	5	France (3), Germany (2)	0.034–0.24	0.02*/1.5[(b)]	Approved fungicide	Use of approved pesticides on a crop where the MRL was raised in 2013. Probably no MRL exceedance.
Lettuce/Chlorothalonil (RD)	5	Romania (3), Netherlands (1)	0.016–7.83	0.01*	Approved fungicide	Use of approved pesticides on a crop where use was not permitted
Lettuce/Thiophanate-methyl	5	Bulgaria (4), Italy (1)	0.211–3.58	0.1*	Approved fungicide	Use of approved pesticides on a crop where use was not permitted
Apples/BAC (RD)	5	Germany (5)	0.016–0.17	0.01	BAC was previously used as a pesticide. Currently BAC is widely used as a biocide for disinfection of machineries, surfaces, which may be in contact with food during processing or packaging. BAC may be added to water used for washing the crops.	Use of BAC for other purposes than pesticides (e.g. addition of biocides to water used for washing products prior to marketing)
Lettuce/Iprodione (RD)	5	France (4), Poland (1)	10.8–15.5	10	Approved fungicide	Use of approved pesticides, not respecting the GAP.
Lettuce/Procymidone (RD)	5	Italy (2), France (1), Spain (1), Romania (1)	0.06–3.7	0.02*/ 0.01*[(b)]	Fungicide no longer approved in the EU	Use of a non-approved pesticide

(a): Product/pesticide combinations with at least five cases of MRL exceedances
(b): The MRL changed during the reference period 2013.

Appendix D: Background information on dietary risk assessment

Table D1: Toxicological reference values used in the dietary risk assessments

Pesticide	ADI (mg/kg bw per d)	Year	Source	ARfD (mg/kg bw)	Year	Source
2,4-D (RD)	0.05	2014	EFSA	0.75	2014	EFSA
2-phenylphenol	0.4	2008	EFSA	ARfD not necessary	2008	EFSA
Abamectin (RD)	0.0025	2008	EFSA	0.005	2008	COM
Acephate	0.03	2005	JMPR	0.1	2005	JMPR
Acetamiprid (RD)	0.025	2013	EFSA	0.025	2013	EFSA
Acrinathrin	0.01	2013	EFSA	0.01	2013	EFSA
Aldicarb (RD)	0.003	2001	JMPR	0.003	2001	JMPR
Amitraz (RD)	0.003	2003	COM	0.01	2003	COM
Amitrole	0.001	2014	EFSA	0.015	2014	EFSA
Azinphos-ethyl	No ADI allocated			No ARfD allocated		
Azinphos-methyl	0.005	2006	COM	0.01	2006	COM
Azoxystrobin	0.2	2011	COM	ARfD not necessary	2011	COM
Benfuracarb	0.01	2009	EFSA	0.02	2009	EFSA
Bifenthrin	0.015	2011	EFSA	0.03	2011	EFSA
Biphenyl	0.125	1967	JMPR	No ARfD allocated		
Bitertanol	0.003	2011	COM	0.01	2011	COM
Bixafen (RD)	0.02	2012	EFSA	0.2	2012	EFSA
Boscalid (RD)	0.04	2008	COM	ARfD not necessary	2008	COM
Bromide ion[(a)]	1	1988	JMPR	ARfD not necessary		
Bromopropylate	0.03	1993	JMPR	No ARfD allocated		
Bromuconazole	0.01	2010	COM	0.1	2010	COM
Bupirimate	0.05	2011	COM	ARfD not necessary	2011	COM
Buprofezin	0.01	2010	COM	0.5	2010	COM
Captan (RD)	0.1	2007	COM	0.3	2008	COM
Carbaryl	0.0075	2006	EFSA	0.01	2006	EFSA
Carbendazim (RD)	0.02	2010	COM	0.02	2010	COM
Carbofuran (RD)	0.00015	2009	EFSA	0.00015	2009	EFSA
Carbosulfan	0.005	2009	EFSA	0.005	2009	EFSA
Chlorantraniliprole	1.56	2013	EFSA	ARfD not necessary	2013	EFSA
Chlordane (RD)	0.0005	1994	JMPR	No ARfD allocated		
Chlorfenapyr	0.015	1999	ECCO	0.015	2006	EFSA
Chlorfenvinphos	0.0005	1994	JMPR	No ARfD allocated		
Chlormequat[(b)]	0.031	2009	COM	0.07	2009	COM
Chlorobenzilate	0.02	1980	JMPR	No ARfD allocated		
Chlorothalonil (RD)	0.015	2006	COM	0.6	2006	COM
Chlorpropham (RD)	0.05	2004	COM	0.5	2004	COM
Chlorpyrifos	0.001	2014	EFSA	0.005	2014	EFSA
Chlorpyrifos-methyl	0.01	2005	COM	0.1	2005	COM
Clofentezine (RD)	0.02	2010	COM	ARfD not necessary	2010	COM
Clothianidin	0.097	2006	COM	0.1	2006	COM
Cyfluthrin (RD)[(c)]	0.003	2003	COM	0.02	2003	COM
Cymoxanil	0.013	2008	EFSA	0.08	2008	EFSA
Cypermethrin (RD)[(d)]	0.05	2005	COM	0.2	2005	COM
Cyproconazole	0.02	2011	COM	0.02	2011	COM
Cyprodinil (RD)	0.03	2006	COM	ARfD not necessary	2006	COM
Cyromazine	0.06	2009	COM	0.1	2009	COM
DDT (RD)	0.01	2000	JMPR	ARfD not necessary	2000	JMPR
Deltamethrin	0.01	2003	COM	0.01	2003	COM
Diazinon	0.0002	2006	EFSA	0.025	2006	EFSA
Dichlofluanid	0.3	1983	JMPR	No ARfD allocated		
Dichlorvos	0.00008	2006	EFSA	0.002	2006	EFSA
Dicloran	0.005	2010	EFSA	0.025	2010	EFSA

Pesticide	ADI (mg/kg bw per d)	Year	Source	ARfD (mg/kg bw)	Year	Source
Dicofol (RD)	0.002	1992	JMPR	0.2	2011	JMPR
Dicrotophos	No ADI allocated			No ARfD allocated		
Dieldrin (RD)	0.0001	1994	JMPR	0.003	2007	EFSA
Diethofencarb	0.43	2010	EFSA	ARfD not necessary	2010	EFSA
Difenoconazole	0.01	2008	COM	0.16	2008	COM
Diflubenzuron (RD)	0.1	2009	EFSA	ARfD not necessary	2009	EFSA
Dimethoate (RD) - dimethoate[(e)]	0.001	2007	COM	0.01	2013	EFSA
Dimethoate (RD) - omethoate[(e)]	0.0003	2013	EFSA	0.002	2013	EFSA
Dimethomorph	0.05	2007	COM	0.6	2007	COM
Diniconazole	No ADI allocated			No ARfD allocated		
Diphenylamine	0.075	2008	EFSA	ARfD not necessary	2008	EFSA
Dithianon	0.01	2011	COM	0.12	2011	COM
Dithiocarbamates (RD) - mancozeb scenario[(f)]	0.028	2005	COM	0.337	2005	COM
Dithiocarbamates (RD) - maneb scenario[(f)]	0.029	2005	COM	0.11	2005	COM
Dithiocarbamates (RD) - propineb scenario[(f)]	0.004	2003	COM	0.053	2003	COM
Dithiocarbamates (RD) - thiram scenario[(f)]	0.006	2003	COM	0.38	2003	COM
Dithiocarbamates (RD) - ziram scenario[(f)]	0.003	2004	COM	0.04	2004	COM
Dodine	0.1	2010	EFSA	0.1	2010	EFSA
Endosulfan (RD)	0.006	2006	JMPR	0.015	2001	ECCO
Endrin	0.0002	1994	JMPR	No ARfD allocated		
EPN	No ADI allocated			No ARfD allocated		
Epoxiconazole	0.008	2008	COM	0.023	2008	COM
Ethephon	0.03	2006	COM	0.05	2008	COM
Ethion	0.002	1990	JMPR	No ARfD allocated		
Ethirimol	No ADI allocated			No ARfD allocated		
Ethoprophos	0.0004	2006	EFSA	0.01	2006	EFSA
Etofenprox	0.03	2009	COM	1	2009	COM
Famoxadone	0.012	2002	COM	0.2	2002	COM
Fenamidone	0.03	2003	COM	ARfD not necessary[(n)]	2003	COM
Fenamiphos (RD)	0.0008	2006	COM	0.0025	2006	COM
Fenarimol	0.01	2006	COM	0.02	2006	COM
Fenazaquin	0.005	2013	EFSA	0.1	2013	EFSA
Fenbuconazole	0.006	2010	COM	0.3	2010	COM
Fenbutatin oxide	0.05	2011	COM	0.1	2011	COM
Fenhexamid	0.2	2014	EFSA	ARfD not necessary	2014	EFSA
Fenitrothion	0.005	2006	EFSA	0.013	2006	EFSA
Fenoxycarb	0.053	2011	COM	2	2011	COM
Fenpropathrin	0.03	1993	JMPR	0.03	2012	JMPR
Fenpropimorph (RD)	0.003	2008	COM	0.03	2008	COM
Fenpyroximate	0.01	2013	EFSA	0.02	2013	EFSA
Fenthion (RD)	0.007	2000	JMPR	0.01	2000	JMPR
Fenvalerate (RD)[(g)]	0.0175	2014	EFSA	0.0175	2014	EFSA
Fipronil (RD)	0.0002	2007	COM	0.009	2007	COM
Flonicamid (RD)	0.025	2010	COM	0.025	2010	COM
Fluazifop-P-butyl (RD)[(h)]	0.01	2012	EFSA	0.017	2012	EFSA
Flubendiamide	0.017	2013	EFSA	0.1	2013	EFSA
Fludioxonil	0.37	2007	COM	ARfD not necessary	2007	COM
Flufenoxuron	0.01	2011	EFSA	ARfD not necessary	2011	EFSA

Pesticide	ADI (mg/kg bw per d)	Year	Source	ARfD (mg/kg bw)	Year	Source
Fluopyram (RD)	0.012	2013	EFSA	0.5	2013	EFSA
Fluquinconazole	0.002	2011	COM	0.02	2011	COM
Flusilazole (RD)	0.002	2007	COM	0.005	2007	COM
Flutriafol	0.01	2011	COM	0.05	2011	COM
Folpet (RD)	0.1	2013	EFSA	0.2	2013	EFSA
Formetanate (RD)	0.004	2007	COM	0.005	2007	COM
Formothion	No ADI allocated	1996	JMPR	No ARfD allocated	1996	JMPR
Fosthiazate	0.004	2003	COM	0.005	2003	COM
Glyphosate	0.3	2001	COM	ARfD not necessary	2001	COM
Haloxyfop-R (RD)	0.00065	2006	EFSA	0.075	2006	EFSA
Heptachlor (RD)	0.0001	1994	JMPR	No ARfD allocated		
Hexachlorobenzene	No ADI allocated			No ARfD allocated		
Hexachlorocyclohexane (α)	No ADI allocated			No ARfD allocated		
Hexachlorocyclohexane (β)	No ADI allocated			No ARfD allocated		
Hexaconazole	0.005	1990	JMPR	No ARfD allocated		
Hexythiazox	0.03	2011	COM	ARfD not necessary	2011	COM
Imazalil	0.025	2011	COM	0.05	2011	COM
Imidacloprid	0.06	2013	EFSA	0.06	2013	EFSA
Indoxacarb	0.006	2005	COM	0.125	2005	COM
Ioxynil (RD)	0.005	2004	COM	0.04	0.04	COM
Iprodione (RD)	0.06	2002	COM	ARfD not necessary	2002	COM
Iprovalicarb	0.015	2014	EFSA	ARfD not necessary	2014	EFSA
Isocarbophos	No ADI allocated			No ARfD allocated		
Isofenphos-methyl	No ADI allocated			No ARfD allocated		
Isoprocarb	No ADI allocated			No ARfD allocated		
Kresoxim-methyl (RD)	0.4	2011	COM	ARfD not necessary	2011	COM
Lambda-cyhalothrin (RD)	0.0025	2014	EFSA	0.005	2014	EFSA
Lindane	0.005	2000	COM	0.06	2000	COM
Linuron	0.003	2002	COM	0.03	2002	COM
Lufenuron	0.015	2009	COM	ARfD not necessary	2009	COM
Malathion (RD)	0.03	2010	COM	0.3	2010	COM
Maleic hydrazide (RD)	0.25	2003	COM	ARfD not necessary	2003	COM
Mandipropamid	0.15	2012	EFSA	ARfD not necessary	2012	EFSA
Mepanipyrim (RD)	0.02	2004	COM	0.3	2004	COM
Mepiquat[(i)]	0.154	2008	COM	0.23	2008	COM
Meptyldinocap (RD)	0.016	2013	EFSA	0.12	2013	EFSA
Metaflumizone	0.01	2013	EFSA	0.13	2013	EFSA
Metalaxyl (RD)	0.08	2010	COM	0.5	2010	COM
Metconazole	0.01	2006	COM	0.01	2006	COM
Methamidophos	0.001	2007	COM	0.003	2007	COM
Methidathion	0.001	1997	JMPR	0.01	1997	JMPR
Methiocarb (RD)	0.013	2007	COM	0.013	2007	COM
Methomyl (RD)[(j)]	0.0025	2009	COM	0.0025	2009	COM
Methoxychlor	0.1	1977	JMPR	No ARfD allocated		
Methoxyfenozide	0.1	2005	COM	0.2	2005	COM
Metobromuron	0.008	2014	EFSA	0.3	2014	EFSA
Monocrotophos	0.0006	1995	JMPR	0.002	1995	JMPR
Myclobutanil (RD)	0.025	2010	COM	0.31	2010	COM
Nitenpyram	No ADI allocated			No ARfD allocated		
Oxadixyl	0.01	1984	FR	No ARfD allocated		
Oxamyl	0.001	2006	COM	0.001	2006	COM
Oxydemeton-methyl (RD)	0.0003	2006	COM	0.0015	2006	COM
Paclobutrazol	0.022	2011	COM	0.1	2011	COM
Parathion	0.0006	2001	ECCO 100	0.005	2001	ECCO 100

Pesticide	ADI (mg/kg bw per d)	Year	Source	ARfD (mg/kg bw)	Year	Source
Parathion-methyl (RD)	0.003	2002	COM	0.03	2001	COM
Penconazole	0.03	2009	COM	0.5	2009	COM
Pencycuron	0.2	2011	COM	ARfD not necessary	2011	COM
Pendimethalin	0.125	2003	COM	ARfD not necessary	2003	COM
Permethrin	0.05	2000	COM	1.5	2000	COM
Phenthoate	0.003	1984	JMPR	No ARfD allocated		
Phosalone	0.01	2006	EFSA	0.1	2006	EFSA
Phosmet (RD)	0.01	2007	COM	0.045	2007	COM
Phoxim	0.00375	2000	EMEA	No ARfD allocated		
Pirimicarb (RD)	0.035	2006	COM	0.1	2006	COM
Pirimiphos-methyl	0.004	2007	COM	0.15	2007	COM
Prochloraz (RD)	0.01	2011	COM	0.025	2011	COM
Procymidone (RD)	0.0028	2007	DAR FR	0.012	2007	DAR FR
Profenofos	0.03	2007	JMPR	1	2007	JMPR
Propamocarb (RD)[(k)]	0.244	2007	COM	0.84	2007	COM
Propargite	No ADI allocated	2011	EFSA	No ARfD allocated		
Propiconazole	0.04	2003	COM	0.3	2003	COM
Propoxur	0.02	1989	JMPR	No ARfD allocated		
Propyzamide (RD)	0.02	2003	COM	ARfD not necessary	2003	COM
Prothioconazole (RD)	0.01	2008	COM	0.01	2008	COM
Prothiofos	No ADI allocated			No ARfD allocated		
Pymetrozine	0.03	2014	EFSA	0.1	2014	EFSA
Pyraclostrobin	0.03	2004	COM	0.03	2004	COM
Pyrazophos	0.004	1992	JMPR	No ARfD allocated		
Pyrethrins[(l)]	0.04	2013	EFSA	0.2	2013	EFSA
Pyridaben	0.01	2010	COM	0.05	2010	COM
Pyrimethanil	0.17	2006	COM	ARfD not necessary	2006	EFSA
Pyriproxyfen	0.1	2008	COM	10	2008	COM
Quinoxyfen	0.2	2004	COM	ARfD not necessary	2003	COM
Resmethrin (RD)	0.03	1991	JMPR	No ARfD allocated		
Rotenone	No ADI allocated			No ARfD allocated		
Spinosad (RD)	0.024	2007	COM	ARfD not necessary	2006	COM
Spirodiclofen	0.015	2009	EFSA	ARfD not necessary	2009	EFSA
Spiromesifen	0.03	2007	EFSA	2	2007	EFSA
Spiroxamine (RD)	0.025	1999	COM	0.1	2011	COM
tau-Fluvalinate	0.005	2010	COM	0.05	2010	COM
Tebuconazole	0.03	2013	EFSA	0.03	2013	EFSA
Tebufenozide	0.02	2011	COM	ARfD not necessary	2011	COM
Tebufenpyrad	0.01	2009	COM	0.02	2009	COM
Teflubenzuron	0.01	2008	COM	ARfD not necessary	2008	COM
Tefluthrin	0.005	2010	COM	0.005	2010	COM
Terbuthylazine	0.004	2011	EFSA	0.008	2011	EFSA
Tetraconazole	0.004	2008	COM	0.05	2008	COM
Tetradifon	0.015	2001	DE	ARfD not necessary	2002	DE
Tetramethrin	No ADI allocated			No ARfD allocated		
Thiabendazole (RD)	0.1	2014	EFSA	0.1	2014	EFSA
Thiacloprid	0.01	2004	COM	0.03	2004	COM
Thiamethoxam (RD)	0.026	2007	COM	0.5	2007	COM
Thiophanate-methyl	0.08	2005	COM	0.2	2005	COM
Tolclofos-methyl	0.064	2006	COM	ARfD not necessary	2006	COM
Tolylfluanid (RD)	0.1	2006	COM	0.25	2006	COM
Triadimenol (RD)[(m)]	0.05	2008	COM	0.05	2008	COM
Triazophos	0.001	2002	JMPR	0.001	2002	JMPR
Trichlorfon	0.002	2003	JMPR	0.1	2006	EFSA

Pesticide	ADI (mg/kg bw per d)	Year	Source	ARfD (mg/kg bw)	Year	Source
Trifloxystrobin (RD)	0.1	2003	COM	ARfD not necessary	2003	COM
Triflumuron	0.014	2011	COM	ARfD not necessary	2011	COM
Trifluralin	0.015	2005	EFSA	ARfD not necessary	2005	EFSA
Triticonazole	0.025	2006	COM	0.05	2006	COM
Vinclozolin (RD)	0.005	2006	COM	0.06	2006	COM
Zoxamide	0.5	2003	COM	ARfD not necessary	2003	COM

(a): Bromide ion: The toxicological reference values for methyl bromide are not suitable as the residues are expressed as inorganic bromide ion. The ADI derived by JMPR was therefore used for the long-term risk assessment. No ARfD had been established by JMPR at the time when methyl bromide was assessed.

(b): Chlormequat: the toxicological values for chlormequat chloride (ADI: 0.04 mg/kg bw/d and ARfD: 0.09 mg/kg bw) were recalculated to chlormequat ion to match the residue definition by applying a molecular weight conversion factor calculated as: (ADI or ARfD)*(122.6/158.1).

(c): Cyfluthrin: the risk assessment was performed with the toxicological reference values for cyfluthrin which were the same as for beta-cyfluthrin.

(d): Cypermethrin: the risk assessment was performed with the toxicological reference values for cypermethrin (mixture of isomers). Other toxicological reference values for cypermethrin isomers are: alpha-cypermethrin (ADI: 0.015 mg/kg bw/d; ARfD: 0.04 mg/kg bw), beta-cypermethrin (ADI: 0.0016 mg/kg bw/d; ARfD 0.0016 mg/kg bw) and zeta-cypermethrin (ADI: 0.04 mg/kg bw/d; ARfD: 0.125 mg/kg bw).

(e): Dimethoate (RD): the risk assessment was calculated for two scenarios. Dimethoate scenario, based on the toxicological reference values derived for dimethoate. Omethoate scenario, based on the toxicological reference values derived for omethoate.

(f): Dithiocarbamates (RD): the risk assessment was calculated based on the results reported as CS_2. For the long-term risk assessment, EFSA calculated five scenarios (mancozeb, maneb, propineb, thiram and ziram scenario). For the acute risk assessment, it was assumed that the residues measured as CS_2 were resulting from the pesticide that was the basis for setting the MRL and had lower toxicological values in case more than one dithiocarbamate was approved (see footnote in MRL legislation). The ADI and ARfD values derived for these five active substances were recalculated to CS_2, taking into account the respective molecular weights.

- Mancozeb for head cabbage: the toxicological reference values for mancozeb (ADI: 0.05 mg/kg bw/d and ARfD: 0.6 mg/kg bw) were recalculated to CS_2 to match the residue definition by applying a conversion factor calculated as: (ADI or ARfD)*2* mol. weight CS_2/mol. weight mancozeb (271.3). (Molecular weight for CS_2 = 76)).

- Maneb for leek, oats and rye: the toxicological reference values for maneb (ADI: 0.05 mg/kg bw/d and ARfD: 0.2 mg/kg bw) were recalculated to CS_2 to match the residue definition by applying a conversion factor calculated as: (ADI or ARfD)*2* mol. weight CS_2/mol. weight maneb (265.3). (Molecular weight for CS_2 = 76).

- Propineb for tomatoes and wine grapes: the toxicological reference values for propineb (ADI: 0.007 mg/kg bw/d and ARfD: 0.1 mg/kg bw) were recalculated to CS_2 to match the residue definition by applying a conversion factor calculated as: (ADI or ARfD)*2* mol. weight CS_2/ mol. weight propineb (289.9).

- Thiram for lettuce, peaches and strawberries: the toxicological reference values for thiram (ADI: 0.01 mg/kg bw/d and ARfD: 0.6 mg/kg bw) were recalculated to CS_2 to match the residue definition by applying a conversion factor calculated as: (ADI or ARfD)*2*mol. weight CS_2/ mol. weight thiram (240.4).

- Ziram for apples: the toxicological reference values for ziram (ADI: 0.006 mg/kg bw/d and ARfD: 0.08 mg/kg bw) were recalculated to CS_2 to match the residue definition by applying a conversion factor calculated as: (ADI or ARfD)*2*mol. weight CS_2/ mol. weight ziram (306).

(g): Fenvalerate (RD): the risk assessment was performed with the toxicological values of esfenvalerate.

(h): Fluazifop-P-butyl (RD): the toxicological values are expressed as fluazifop acid to match the residue definition.

(i): Mepiquat: the toxicological values for mepiquat chloride (ADI: 0.2 mg/kg bw/d and ARfD: 0.3 mg/kg bw) were recalculated to mepiquat to match the residue definition by applying a molecular weight conversion factor calculated as: (tox value)*(114.2/149.9).

(j): Methomyl (RD): the risk assessment was performed with the toxicological reference values of methomyl and not with the lower values derived for thiodicarb (ADI: 0.01 mg/kg bw/d and ARfD: 0.01 mg/kg bw) since it is more likely that the residues result from use of the approved substance methomyl.

(k): Propamocarb (RD): the toxicological values for propamocarb hydrochloride (ADI: 0.29 mg/kg bw/d and ARfD: 1 mg/kg bw) were recalculated to probamocarb to match the residue definition by applying a molecular weight conversion factor calculated as: (tox value)*(189/224.5).

(l): Pyrethrins: the toxicological values referred to the mixture of the six pyrethrins.

(m): Triadimenol (RD): the risk assessment was performed with the toxicological reference values of triadimenol and not the values derived for triadimefon since it is more likely that the residues result from the use of the approved substance triadimenol.

(n): In 20013, JMPR derived an ARfD of 1 mg/kg bw for fenamidone.

Table D2: Input values (highest residues measured (HRM) in mg/kg) for short-term dietary exposure assessment calculation (Section 4.1).

Pesticide	Ap	Hc	Le	Lt	Pe	St	To	Ot	Ry	Wi	Mi	Sw
2,4-D (RD)		0.023		0.075								
2-phenylphenol	0.016			0.013	0.036				0.02			
Abamectin (RD)			0.04	0.098		0.048	0.02					
Acephate							0.027					
Acetamiprid (RD)	0.18			1.4	0.095	0.15	0.22					
Acrinathrin				0.12	0.068	0.3	0.03					
Aldicarb (RD)												
Amitraz (RD)	0.01				0.049							
Amitrole												
Azinphos-ethyl												0.005
Azinphos-methyl	0.027											
Azoxystrobin	0.03	0.28	0.16	6	0.027	10	1.2	0.02		0.216		
Benfuracarb												
Bifenthrin	0.05	0.022	0.01	0.23	0.05	0.037	0.059					
Biphenyl												
Bitertanol	0.08				0.088							
Bixafen (RD)												
Boscalid (RD)	0.58	0.3	0.78	16	0.67	5.8	0.9	0.11	0.02	0.37		
Bromide ion				40			154	9.98	4.8			
Bromopropylate												
Bromuconazole												
Bupirimate	0.043			0.005	0.114	4	0.234					
Buprofezin	0.03				0.159		0.1					
Captan (RD)	2.06				0.51	3.77	0.04			0.02		
Carbaryl	0.008									0.02		
Carbendazim (RD)	0.21	0.026	0.083	6.68	0.545	0.9	0.402			1.7		
Carbofuran (RD)												
Carbosulfan												
Chlorantraniliprole	0.14	0.001		1.53	0.05	0.07	0.16			0.032		
Chlordane (RD)												
Chlorfenapyr							0.018					
Chlorfenvinphos												
Chlormequat							0.044	9.1	1.65	0.019		
Chlorobenzilate												
Chlorothalonil (RD)	0.09	1.1	0.4	7.83	0.74	3	1.22					
Chlorpropham (RD)		0.075		0.022	0.001	0.019		0.002				
Chlorpyrifos	0.73	0.2	0.1	0.5	1.44	0.12	0.14	1.47	0.044	0.06		
Chlorpyrifos-methyl	0.39				0.33	0.44	0.576	0.75	1.5			
Clofentezine (RD)	0.02				0.063	0.8	0.15					
Clothianidin		0.01		0.31	0.021		0.044					
Cyfluthrin (RD)	0.056	0.03		0.048	0.071							
Cymoxanil				0.065			0.18					
Cypermethrin (RD)	0.94	0.52	0.09	0.78	0.33	0.024	0.38	0.14				0.002
Cyproconazole	0.003			0.03	0.033	0.068	0.01					
Cyprodinil (RD)	0.94	0.03	0.18	8.2	1.7	2.8	0.42			0.054		
Cyromazine							0.4					
DDT (RD)											1.1	0.212
Deltamethrin	0.073	0.038	0.013	0.43	0.06	0.13	0.19	0.097	0.6			0.002
Diazinon	0.01											
Dichlofluanid						0.037						
Dichlorvos						0.017		0.05				
Dicloran							0.02					
Dicofol (RD)						0.04						
Dicrotophos												
Dieldrin (RD)												
Diethofencarb						0.08	0.034			0.012		
Difenoconazole	0.088	0.31	0.12	0.25	0.14	0.13	0.24					
Diflubenzuron (RD)	0.14				0.059		0.24					
Dimethoate (RD)	0.59	0.314		0.364	0.29	0.047	0.1		0.005	0.006		
Dimethomorph		0.9	0.054	5.8	0.01	0.07	0.17			0.32		
Diniconazole												
Diphenylamine	3.4	0.025	0.07	0.015	0.028				0.01	0.037		
Dithianon	1.1				0.017							
Dithiocarbamates (RD)	1.2	1.8	2.1	9.5	1.1	4.76	0.73	0.34	0.374	0.6		
Dodine	1.5				0.25	0.05	0.054					
Endosulfan (RD)						0.05	0.13				0.023	
Endrin												
EPN												
Epoxiconazole		0.043		0.003			0.01		0.01			
Ethephon	0.3				0.065		2.1		0.05	0.59		
Ethion						0.086						
Ethirimol	0.03				0.012	0.06	0.04					
Ethoprophos												
Etofenprox	0.34			0.87	0.8	0.01	0.064					
Famoxadone	0.02		0.29	0.032		0.016	0.081					
Fenamidone				1.2		0.023						
Fenamiphos (RD)							0.067					
Fenarimol						0.01				0.016		
Fenazaquin	0.18				0.019	0.23	0.11					
Fenbuconazole					0.34							
Fenbutatin oxide	2.4		0.082		0.037	1.4	0.027					
Fenhexamid	0.009	0.015		9.65	0.67	4.8	0.91			2.03		
Fenitrothion												
Fenoxycarb	0.65				0.04	0.001						

Pesticide	Ap	Hc	Le	Lt	Pe	St	To	Ot	Ry	Wi	Mi	Sw
Fenpropathrin												
Fenpropimorph (RD)			0.161			0.3						
Fenpyroximate	0.07				0.054	0.22	0.051					
Fenthion (RD)	0.088					0.02						
Fenvalerate (RD)	0.04				0.021			0.098				
Fipronil (RD)												
Flonicamid (RD)	0.06	0.07		1.18	0.067	0.085	0.235			0.03		
Fluazifop-P-butyl (RD)		1.4	0.02			0.15						
Flubendiamide	0.06						0.11					
Fludioxonil	1.9		0.11	4	6.1	1.7	0.18			0.08		
Flufenoxuron	0.054				0.016							
Fluopyram (RD)	0.098	0.001		3.1	0.024	0.06	0.23			0.014		
Fluquinconazole	0.05					0.014						
Flusilazole (RD)	0.027					0.04						
Flutriafol						0.9	0.08					
Folpet (RD)	2.06			12.9	0.036	3.77	0.04			0.194		
Formetanate (RD)						0.55						
Formothion												
Fosthiazate												
Glyphosate	0.036							1.5	2.06	0.37		
Haloxyfop-R (RD)			0.05			0.043						
Heptachlor (RD)											0.001	
Hexachlorobenzene											0.026	0.0001
Hexachlorocyclohexane (α)												
Hexachlorocyclohexane (β)											0.024	
Hexaconazole	0.018											
Hexythiazox	0.015				0.02	0.5	0.025					
Imazalil	1	0.019		0.026	0.019	0.018	0.068					
Imidacloprid	0.075	0.12	0.031	3.37	0.15	0.03	0.65			0.070		
Indoxacarb	0.09	0.064	0.18	1	0.032	0.29	0.05			0.23		
Ioxynil (RD)												
Iprodione (RD)	4.7	4	0.034	15.5	5.3	1.8	0.983			0.37		
Iprovalicarb				0.049			0.08			0.34		
Isocarbophos												
Isofenphos-methyl												
Isoprocarb												
Kresoxim-methyl (RD)	0.01		0.244		0.03	0.455	0.068			0.68		
λ-cyhalothrin (RD)	0.029	0.04	0.0639	0.37	0.22	0.18	0.073					
Lindane											0.0007	0.015
Linuron		0.025		0.001				0.005				
Lufenuron		0.19		0.33		0.087	0.063					
Malathion (RD)		0.01			0.011	0.17		0.029	0.014			
Maleic hydrazide (RD)												
Mandipropamid				3.3			0.106			0.04		
Mepanipyrim (RD)				0.02	0.16	2.5	0.281			0.006		

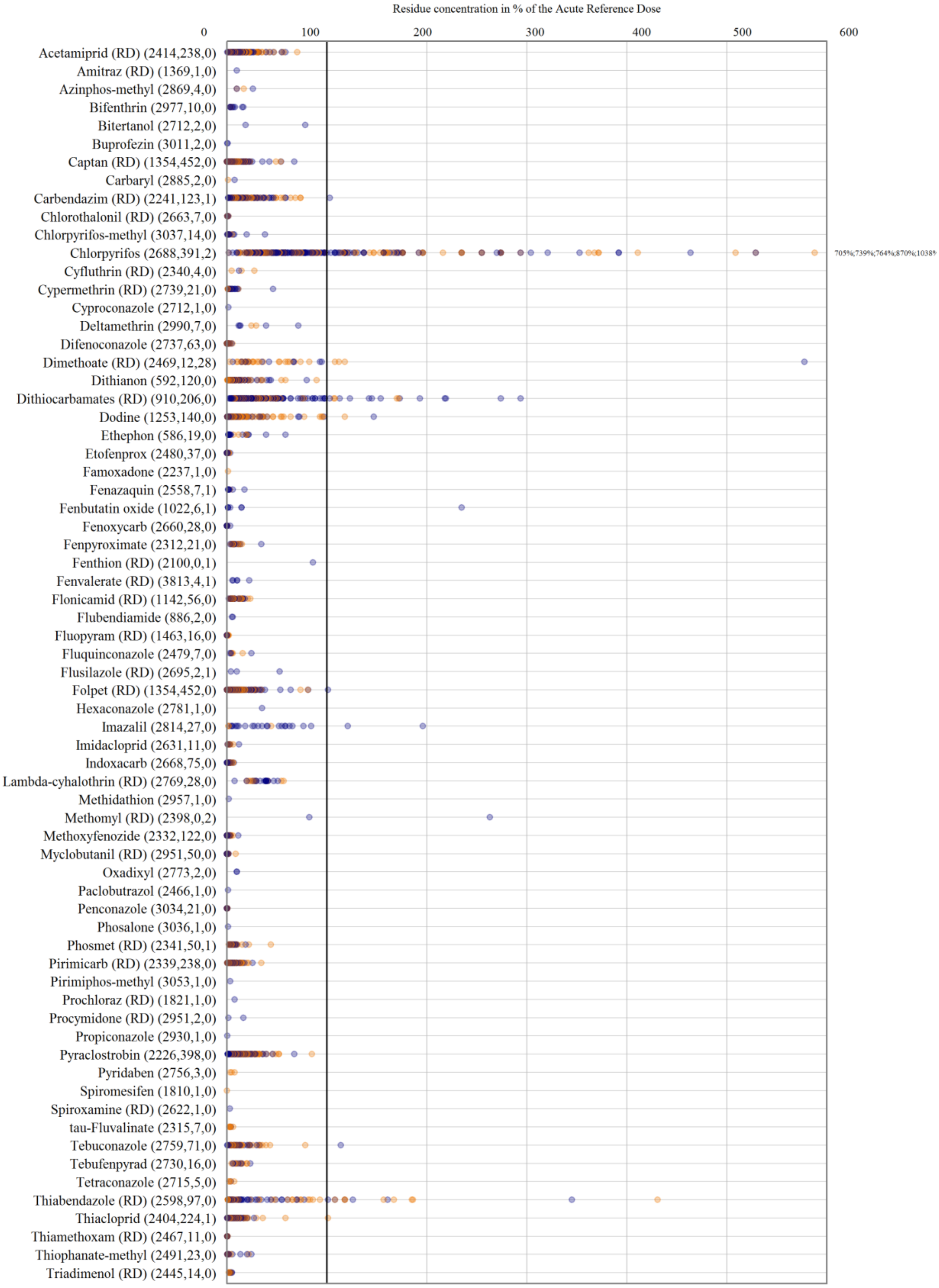
Pesticide	Ap	Hc	Le	Lt	Pe	St	To	Ot	Ry	Wi	Mi	Sw
Mepiquat								0.19	0.777			
Meptyldinocap (RD)												
Metaflumizone												
Metalaxyl (RD)		0.189	0.01	0.27	0.03	0.36	0.1			0.15		
Metconazole												
Methamidophos												
Methidathion	0.002											
Methiocarb (RD)		0.36	0.16	0.44	0.068	0.07				0.01		
Methomyl (RD)	0.067					0.02						
Methoxychlor											0.035	
Methoxyfenozide	0.23			0.047	0.1	0.2	0.07			0.15		
Metobromuron				0.01								
Monocrotophos												
Myclobutanil (RD)	0.28				0.059	0.6	0.3			0.101		
Nitenpyram												
Oxadixyl	0.01			0.044								
Oxamyl				0.17		0.051	0.056					
Oxydemeton-methyl (RD)												
Paclobutrazol	0.01					0.012						
Parathion		0.002										
Parathion-methyl (RD)												
Penconazole	0.02				0.035	0.4	0.025					
Pencycuron				6.2								
Pendimethalin	0.016	0.01	0.4	0.14	0.01	0.02						
Permethrin												
Phenthoate												
Phosalone	0.01											
Phosmet (RD)	0.201				0.171							
Phoxim												
Pirimicarb (RD)	0.35	0.011		2.2	0.075	1.01						
Pirimiphos-methyl	0.05			0.038			0.12	0.85	2.67			0.03
Prochloraz (RD)	0.02	0.064										
Procymidone (RD)	0.02			3.7		0.1	0.034			0.01		
Profenofos						0.03						
Propamocarb (RD)		3.18	0.1	23	0.022	0.033	1.4					
Propargite	0.76				0.28	0.012	0.488					
Propiconazole	0.014		0.017	0.002	0.022	0.086				0.082		
Propoxur												
Propyzamide (RD)				0.42		0.01						
Prothioconazole (RD)				0.001								
Prothiofos												
Pymetrozine		0.01		0.79	0.021	0.3	0.32					
Pyraclostrobin	0.26	0.088	0.092	2	0.38	0.79	0.14	0.031				
Pyrazophos												
Pyrethrins					0.072		0.02					

Pesticide	Ap	Hc	Le	Lt	Pe	St	To	Ot	Ry	Wi	Mi	Sw
Pyridaben	0.04					0.12	0.269		0.022			
Pyrimethanil	3.4	0.064	0.047	0.57	1.2	7.4	0.276			0.273		
Pyriproxyfen				0.26	0.01		0.14			0.013		
Quinoxyfen					0.015	0.36				0.01		
Resmethrin (RD)												
Rotenone												
Spinosad (RD)	0.021		0.049	0.79	0.56	0.67	0.1					
Spirodiclofen	0.18				0.13	0.12	0.012					
Spiromesifen	0.016					0.57	1.2					
Spiroxamine (RD)	0.03			0.01	0.003		0.041			0.01		
tau-Fluvalinate	0.032			0.011	0.028	0.015	0.064					
Tebuconazole	0.35	0.3	0.44	0.86	1.9	0.156	0.23	0.091	0.08	0.064		
Tebufenozide	0.299			0.063			0.03			0.6		
Tebufenpyrad	0.048				0.001	0.14	0.087			0.057		
Teflubenzuron	0.01				0.02		0.057					
Tefluthrin												
Terbuthylazine				0.013	0.003	0.002						
Tetraconazole	0.038				0.049	0.26	0.04			0.005		
Tetradifon												
Tetramethrin				0.018								
Thiabendazole (RD)	4.4	0.026	0.019	0.012	0.03	0.044	0.1			0.02		
Thiacloprid	0.31	0.085	0.008	0.81	0.08	1	0.16					
Thiamethoxam (RD)	0.02834	0.026		1.17	0.046	0.09	0.092					
Thiophanate-methyl	0.5	0.11	0.064	3.58	0.62	0.099	0.5			0.371		
Tolclofos-methyl				6			0.01					
Tolylfluanid (RD)						1.16						
Triadimenol (RD)	0.027		0.082	1.5	0.041	0.83	0.16		0.015			
Triazophos						0.006						
Trichlorfon												
Trifloxystrobin (RD)	0.14	0.02	0.05	0.026	0.033	0.82	0.18					
Triflumuron	0.095				0.15	0.019						
Trifluralin												
Triticonazole												
Vinclozolin (RD)				0.121	0.055				0.01			
Zoxamide			0.04				0.051			0.097		

Ap: apples; Hc: head cabbage; Le: leek; Lt: lettuce; Pe: peaches; St: strawberries; To: tomatoes; Ot: oats; Ry: rye; Wi: wine (red or white) made from grapes; Mi: cow’s milk; Sw: swine meat.

Table D3: Residue concentrations measured in the food products in focus of the EUCP, expressed as percentage of the ARfD

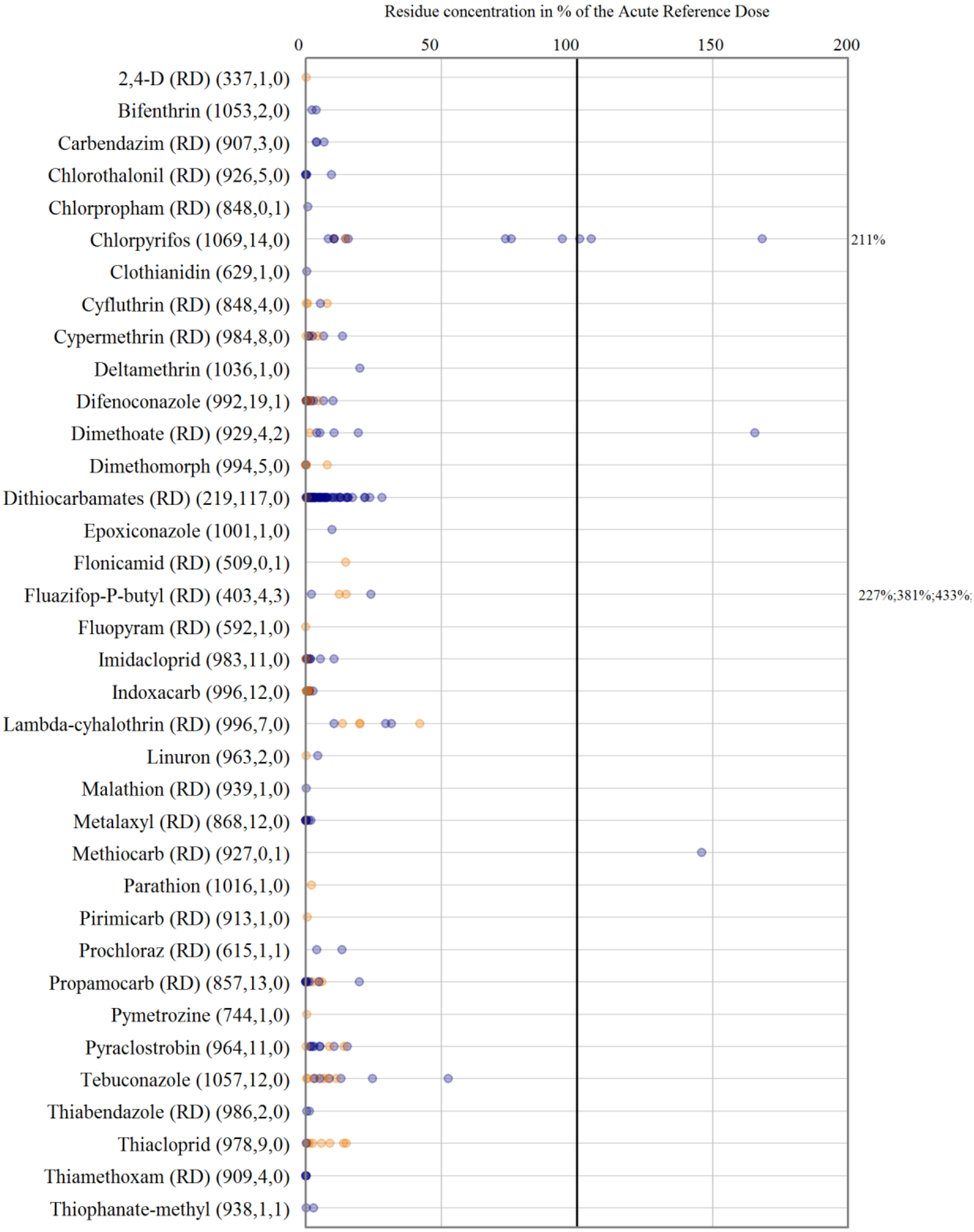
Apples



Results beyond 600 %:

Chlorpyrifos 705 % (NP), 739 % (EUCP), 764 % (NP), 870 % (NP), 1038 % (NP), 1430 % (EUCP)

Head cabbage

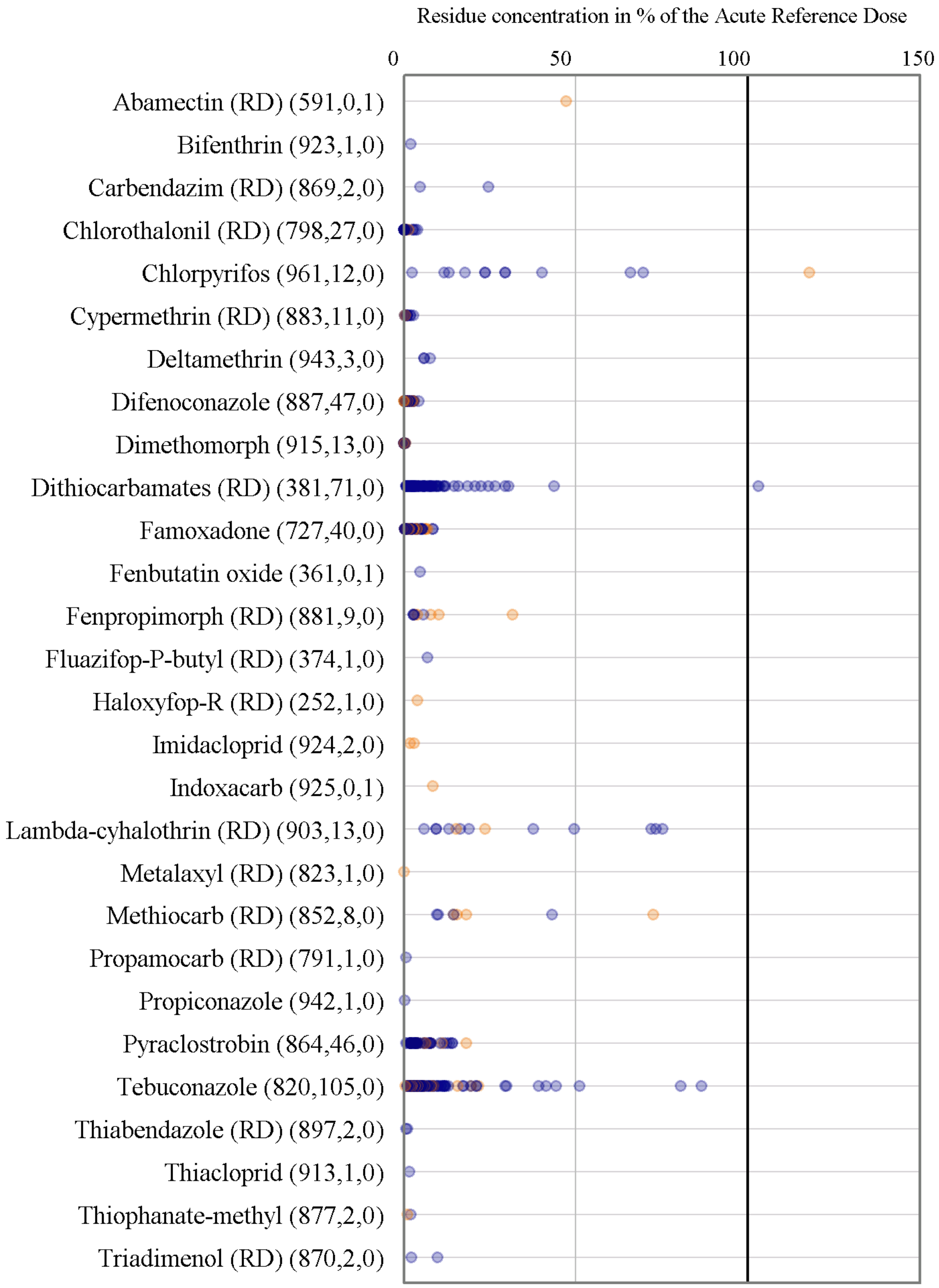


Results beyond 200 %:

Chlorpyrifos 211 % (EUCP)

Fluazifop-P-butyl (RD): 227 % (NP), 381 % (NP), 433 % (EUCP)

Leek


Residue concentration in % of the Acute Reference Dose
0
50
100
150
Abamectin (RD) (591,0,1)
Bifenthrin (923,1,0)
Carbendazim (RD) (869,2,0)
Chlorothalonil (RD) (798,27,0)
Chlorpyrifos (961,12,0)
Cypermethrin (RD) (883,11,0)
Deltamethrin (943,3,0)
Difenoconazole (887,47,0)
Dimethomorph (915,13,0)
Dithiocarbamates (RD) (381,71,0)
Famoxadone (727,40,0)
Fenbutatin oxide (361,0,1)
Fenpropimorph (RD) (881,9,0)
Fluazifop-P-butyl (RD) (374,1,0)
Haloxyfop-R (RD) (252,1,0)
Imidacloprid (924,2,0)
Indoxacarb (925,0,1)
Lambda-cyhalothrin (RD) (903,13,0)
Metalaxyl (RD) (823,1,0)
Methiocarb (RD) (852,8,0)
Propamocarb (RD) (791,1,0)
Propiconazole (942,1,0)
Pyraclostrobin (864,46,0)
Tebuconazole (820,105,0)
Thiabendazole (RD) (897,2,0)
Thiacloprid (913,1,0)
Thiophanate-methyl (877,2,0)
Triadimenol (RD) (870,2,0)

Lettuce

Results beyond 500 %:

Carbendazim (RD): 628 % (EUCP), 899 % (EUCP)

Procymidone (RD): 830 % (EUCP)

Peaches

Results beyond 500 %: Chlorpyrifos: 534 % (NP), 1709 % (EUCP)

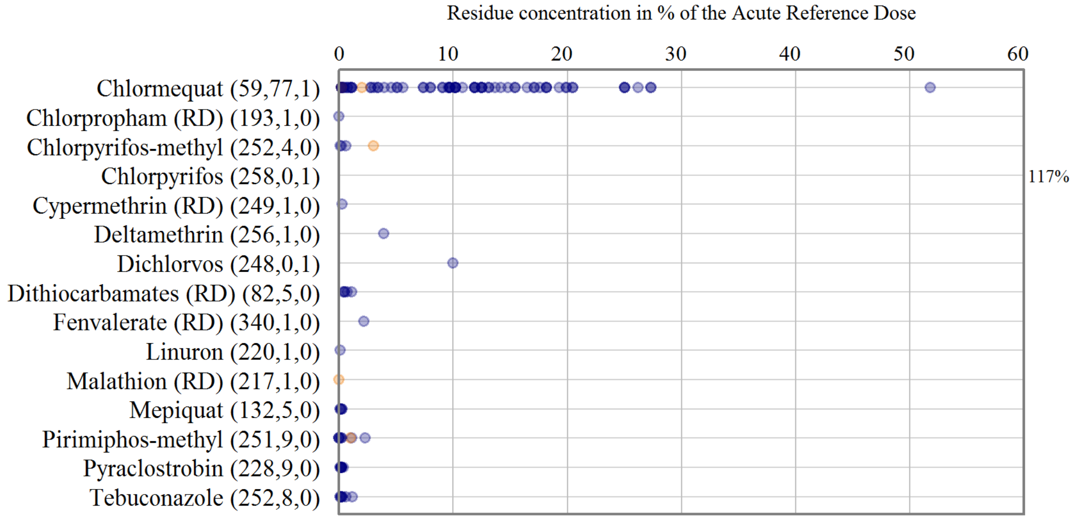
Strawberries

Results beyond 80 %: Formetanate (RD: 172 % (NCP)

Tomatoes

Results beyond 300 %: Oxamyl: 326 % (NP)

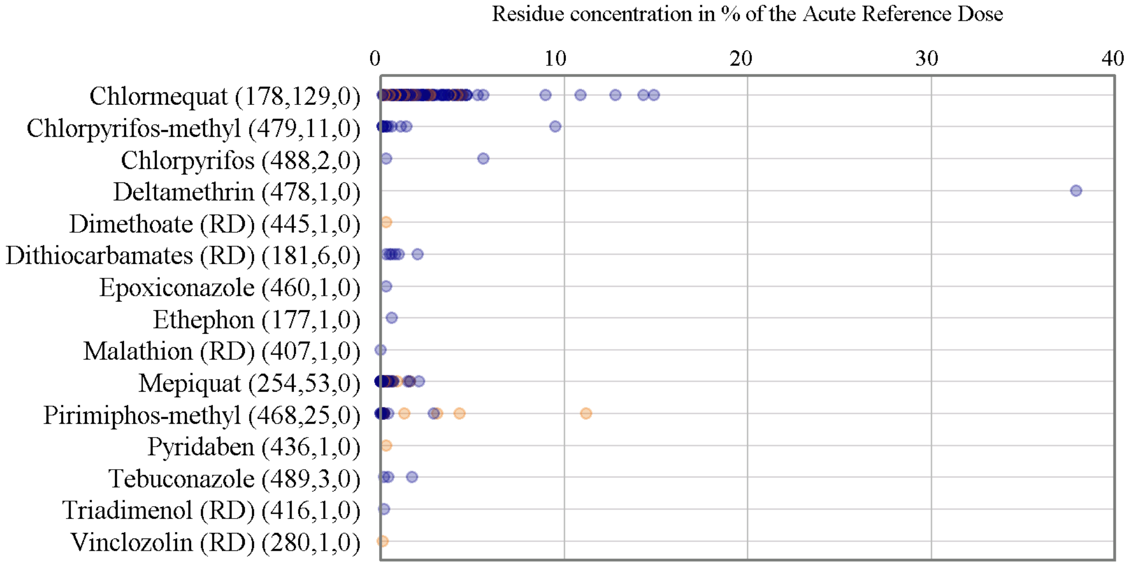
Oats



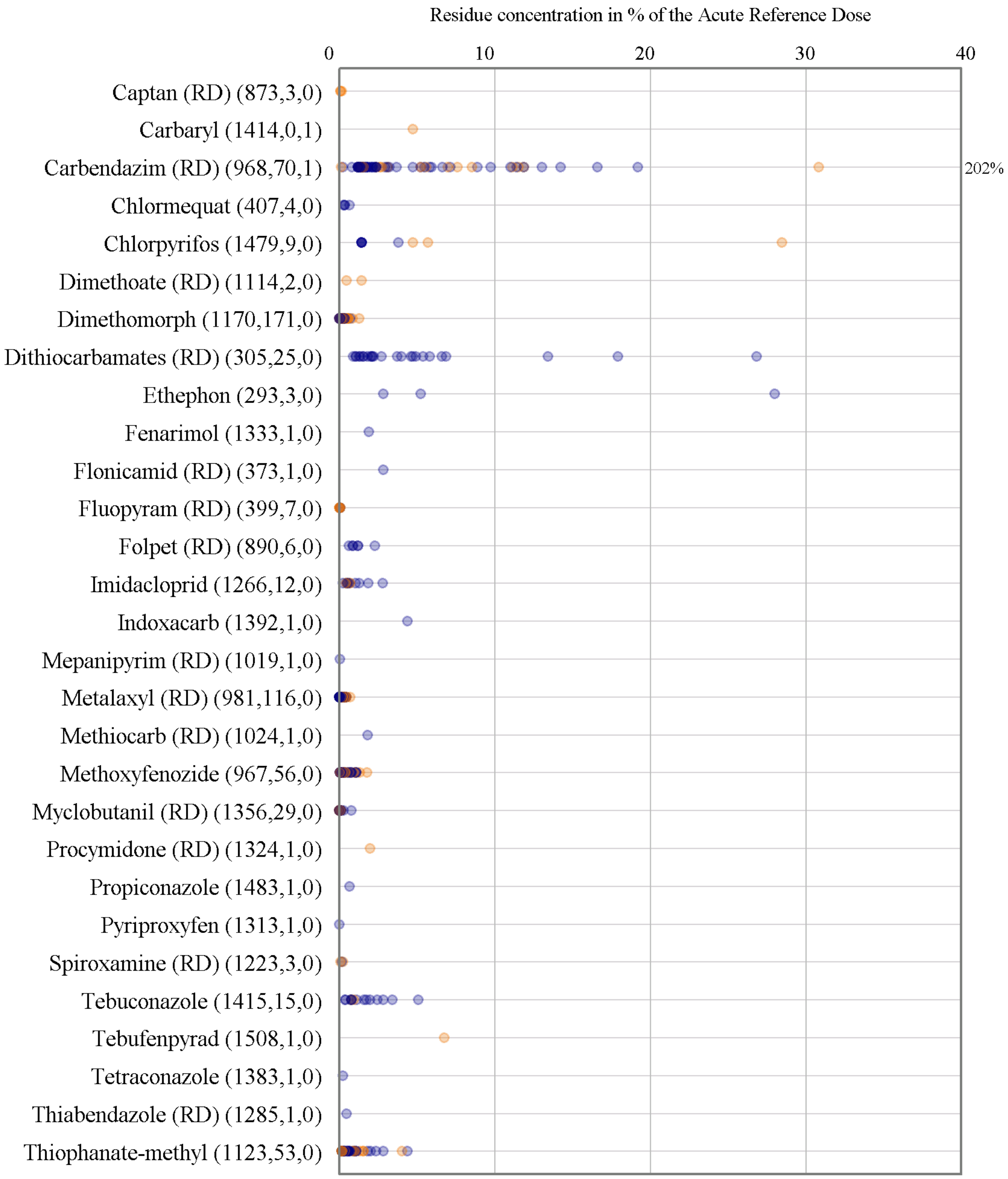
Results beyond 60 %:

Chlorpyrifos: 117 % (EUCP)

Rye



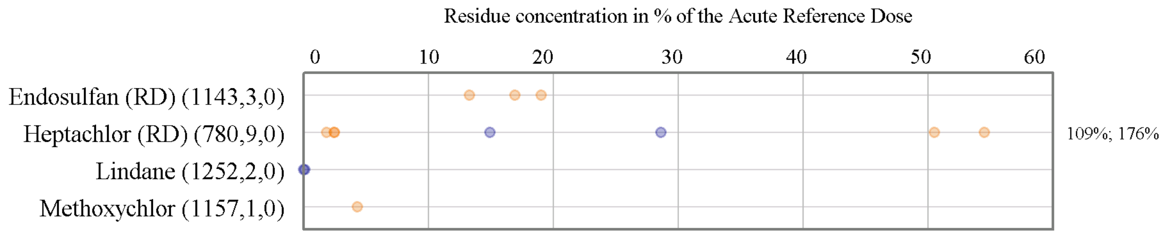
Wine



Results beyond 40 %:

Carbendazim (RD): 202 % (EUCP)

Cow's milk



Results beyond 60 %:

Heptachlor (RD): 109 % (NP), 176 % (EUCP)

Swine meat

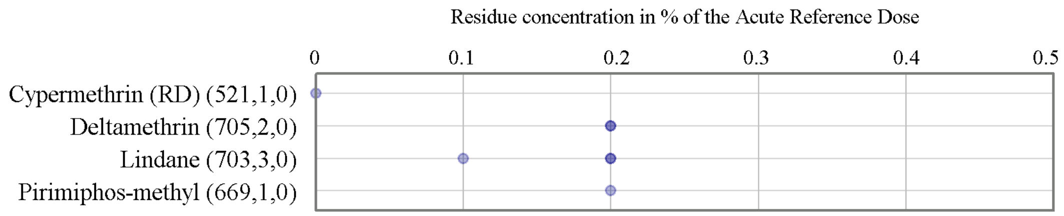


Table D4: Input values (mean residue concentrations in mg/kg) for long-term dietary exposure calculations (Section 4.2)

Pesticide	Oranges	Mandarins	Apples	Pears	Peaches	Table grapes	Wine	Strawberries	Bananas	Potatoes	Carrots	Tomatoes	Peppers	Aubergines	Cucumbers	Broccoli	Cauliflower	Head cabbage	Lettuce	Spinach	Beans (with pods)	Peas (without pods)	Leek	Olives (oil production)	Oats	Rice	Rye	Wheat	Swine meat	Liver	Poultry meat	Cow's milk	Chicken eggs
2,4-D (RD)	0.030	0.044											0.014			0.012	0.013	0.014	0.017														
2-phenylphenol	0.163	0.083	0.015	0.017	0.012				0.011	0.019			0.012						0.016					0.017			0.014	0.014					
Abamectin (RD)		0.009				0.009		0.014				0.010	0.014						0.015		0.009		0.009							0.008			
Acephate						0.011						0.011	0.012	0.012	0.010						0.012												
Acetamiprid (RD)	0.010	0.010	0.012	0.010	0.010	0.009		0.011				0.011	0.013	0.011	0.010	0.018			0.015	0.011	0.010					0.009							
Acrinathrin				0.019	0.017	0.013		0.019	0.024			0.019			0.018				0.016		0.017												
Aldicarb (RD)						0.010																											
Amitraz (RD)			0.019	0.021	0.019							0.020									0.010												
Amitrole																																	
Azinphos-ethyl																	0.011												0.005				
Azinphos-methyl			0.018	0.016																													
Azoxystrobin	0.015	0.012	0.012	0.011	0.012	0.023	0.017	0.026	0.044	0.012	0.014	0.016	0.017	0.017	0.017	0.014		0.011	0.034	0.013	0.015	0.024	0.012		0.013	0.015		0.013					
Benfuracarb																																	
Bifenthrin	0.013	0.011	0.013	0.011	0.012	0.010		0.012	0.014			0.013	0.012		0.011			0.011	0.012	0.012	0.012		0.011	0.023				0.014					
Biphenyl	0.010								0.010											0.010													
Bitertanol			0.015	0.014	0.012	0.013			0.020				0.012																				
Bixafen (RD)																																	
Boscalid (RD)	0.017	0.011	0.021	0.048	0.019	0.058	0.019	0.090	0.026	0.015	0.027	0.018	0.024	0.036	0.013	0.016	0.017	0.011	0.080	0.056	0.020	0.075	0.017	0.024	0.012		0.015	0.013					
Bromide ion						3.00					1.05	6.04	10.3						5.67	8.45					18.7	6.74	3.34	3.89					
Bromopropylate						0.009							0.009																				
Bromuconazole						0.011																											
Bupirimate			0.012		0.012	0.010		0.028	0.014			0.012	0.013	0.015	0.013				0.011					0.018									
Buprofezin	0.013	0.012	0.014	0.012	0.012	0.011			0.014			0.013	0.013								0.013			0.033		0.017							
Captan (RD)			0.054	0.050	0.030	0.012	0.013	0.028				0.021	0.019								0.024												
Carbaryl	0.011	0.010	0.010				0.012		0.010																								
Carbendazim (RD)	0.013	0.011	0.012	0.013	0.012	0.011	0.014	0.012	0.015	0.011		0.010	0.015	0.017	0.014	0.015		0.010	0.027		0.018	0.023	0.010			0.009		0.016					
Carbofuran (RD)												0.011	0.011			0.011					0.012												
Carbosulfan												0.017	0.020																				
Chlorantraniliprole	0.009		0.011	0.013	0.009	0.010	0.009	0.010				0.011	0.011	0.009	0.009			0.010	0.013	0.019	0.010												
Chlordane (RD)																								0.010								0.001	
Chlorfenapyr	0.017					0.013						0.014	0.014			0.011					0.013												
Chlorfenvinphos																																	
Chlormequat				0.016		0.012	0.019			0.008	0.010	0.014													1.21		0.126	0.049					
Chlorobenzilate																					0.010												0.013
Chlorothalonil (RD)			0.017	0.014	0.016			0.021	0.018			0.020	0.018	0.016	0.028	0.018		0.019	0.021	0.010	0.018	0.015	0.016										

Pesticide	Oranges	Mandarins	Apples	Pears	Peaches	Table grapes	Wine	Strawberries	Bananas	Potatoes	Carrots	Tomatoes	Peppers	Aubergines	Cucumbers	Broccoli	Cauliflower	Head cabbage	Lettuce	Spinach	Beans (with pods)	Peas (without pods)	Leek	Olives (oil production)	Oats	Rice	Rye	Wheat	Swine meat	Liver	Poultry meat	Cow's milk	Chicken eggs
Chlorpropham (RD)					0.010	0.013		0.015	0.013	0.249	0.014		0.012	0.018				0.013	0.015						0.011		0.012	0.011					
Chlorpyrifos	0.028	0.051	0.017	0.016	0.016	0.015	0.017	0.011	0.018	0.011	0.013	0.012	0.015	0.014	0.012	0.013	0.017	0.011	0.011	0.011	0.014		0.011	0.029	0.019	0.015	0.015	0.013					
Chlorpyrifos-methyl	0.013	0.014	0.012	0.011	0.011	0.010	0.017	0.011			0.012	0.013	0.012		0.012										0.014	0.013	0.020	0.017					
Clofentezine (RD)	0.011	0.011	0.013		0.009	0.009		0.018				0.013	0.010	0.011																			
Clothianidin			0.011	0.011	0.010	0.010				0.010	0.011	0.011	0.012					0.010	0.011	0.011	0.010												
Cyfluthrin (RD)			0.019	0.016	0.015	0.016	0.013						0.019			0.014		0.019	0.018					0.014				0.012					
Cymoxanil						0.012						0.011		0.011	0.014				0.011														
Cypermethrin (RD)	0.020	0.015	0.025	0.021	0.024	0.021	0.013	0.021	0.017			0.026	0.022	0.032	0.019	0.021		0.022	0.023	0.021	0.031		0.023	0.032	0.021			0.022	0.015				
Cyproconazole			0.013	0.012	0.013	0.011		0.012			0.013	0.013	0.012		0.011	0.010			0.012		0.011					0.016							
Cyprodinil (RD)			0.020	0.024	0.022	0.036	0.017	0.064	0.014	0.016	0.013	0.017	0.013	0.018	0.016	0.010		0.011	0.047	0.012	0.014	0.021	0.011					0.014					
Cyromazine										0.032	0.032	0.041	0.054	0.032	0.043						0.044												
DDT (RD)										0.014	0.015									0.012									0.017	0.007	0.011	0.007	0.005
Deltamethrin		0.013	0.019	0.016	0.015	0.015		0.014				0.019	0.015	0.018	0.016	0.018		0.015	0.018	0.018	0.015		0.016	0.027	0.018	0.035	0.021	0.019	0.024				
Diazinon															0.010									0.016									
Dichlofluanid								0.010																									
Dichlorvos								0.010					0.010												0.010			0.010					
Dicloran												0.011																					
Dicofol (RD)		0.020						0.012				0.018	0.012								0.013	0.013											
Dicrotophos																																	
Dieldrin (RD)										0.009	0.009				0.009																		0.004
Diethofencarb				0.011			0.011	0.011			0.011	0.012																					
Difenoconazole	0.015	0.012	0.014	0.014	0.015	0.014	0.017	0.014		0.012	0.016	0.014	0.015	0.015	0.014	0.015		0.014	0.014	0.017	0.013		0.017	0.023		0.016							
Diflubenzuron (RD)	0.012		0.014	0.013	0.012						0.011	0.012	0.012																				
Dimethoate (RD)	0.011	0.010	0.011	0.010	0.009	0.010	0.009	0.010	0.010		0.010	0.010	0.011	0.013	0.010	0.010		0.010	0.010	0.013	0.014			0.017			0.014	0.013					
Dimethomorph	0.012	0.011		0.011	0.011	0.029	0.012	0.011		0.012		0.012	0.013	0.014	0.012	0.012		0.011	0.019	0.014	0.010		0.011										
Diniconazole						0.011							0.011								0.010												
Diphenylamine	0.015	0.014	0.038	0.034			0.014						0.014					0.019					0.021				0.014	0.013					
Dithianon			0.073	0.032	0.050	0.024	0.055																										
Dithiocarbamates (RD)	0.076	0.081	0.086	0.146	0.079	0.065	0.095	0.073	0.160	0.092	0.036	0.068	0.120	0.184	0.084	1.00	0.776	0.220	0.176	0.049	0.084		0.076		0.202	0.052	0.146	0.058					
Dodine		0.019	0.032	0.017	0.020	0.015		0.016				0.022	0.012			0.010				0.017													
Endosulfan (RD)								0.012			0.013	0.012	0.012		0.011						0.013			0.022								0.004	0.004
Endrin																										0.009							
EPN													0.010								0.009					0.009							
Epoxiconazole				0.011					0.012			0.011					0.009	0.010	0.011								0.016	0.013					
Ethephon			0.029		0.019	0.062	0.029					0.039	0.046														0.121						
Ethion								0.009					0.013	0.009							0.009												
Ethirimol			0.009		0.009	0.010		0.010				0.009	0.009	0.009	0.009																		
Ethoprophos									0.011		0.010		0.011																				
Etofenprox	0.012	0.014	0.011	0.010	0.015	0.011		0.010				0.011	0.011						0.011	0.019	0.009												0.008
Famoxadone	0.011		0.011			0.013	0.014	0.010				0.012			0.013	0.014			0.011	0.011			0.019										

Pesticide	Oranges	Mandarins	Apples	Pears	Peaches	Table grapes	Wine	Strawberries	Bananas	Potatoes	Carrots	Tomatoes	Peppers	Aubergines	Cucumbers	Broccoli	Cauliflower	Head cabbage	Lettuce	Spinach	Beans (with pods)	Peas (without pods)	Leek	Olives (oil production)	Oats	Rice	Rye	Wheat	Swine meat	Liver	Poultry meat	Cow's milk	Chicken eggs
Fenamidone						0.013		0.011						0.010					0.014														
Fenamiphos (RD)				0.009								0.010																					
Fenarimol						0.010	0.011	0.011					0.010																				
Fenazaquin	0.010	0.010	0.010	0.010	0.009	0.010		0.010				0.010	0.010	0.009	0.010																		
Fenbuconazole	0.013			0.011	0.013	0.011																											
Fenbutatin oxide	0.022	0.028	0.026		0.013	0.028		0.017				0.022				0.010							0.012										
Fenhexamid	0.013		0.017	0.014	0.016	0.089	0.024	0.102	0.013		0.014	0.021	0.016	0.018	0.017		0.016	0.012	0.036	0.015	0.014												
Fenitrothion				0.009																													
Fenoxycarb			0.014	0.015	0.016	0.013	0.016	0.011																									
Fenpropathrin	0.015	0.013										0.009									0.010												
Fenpropimorph (RD)								0.010	0.012											0.010			0.010					0.011					
Fenpyroximate	0.012	0.011	0.011		0.011	0.010		0.011				0.011	0.011		0.011																		
Fenthion (RD)			0.010					0.010																0.010									
Fenvalerate (RD)		0.011	0.012		0.011	0.013						0.013	0.012	0.012							0.011				0.015			0.013					
Fipronil (RD)	0.005					0.004		0.005		0.008			0.005								0.004												
Flonicamid (RD)		0.023	0.021		0.021		0.034	0.019		0.014		0.023	0.013	0.015	0.017			0.020	0.024		0.010							0.018					
Fluazifop-P-butyl (RD)								0.011		0.010						0.016		0.015		0.015	0.010		0.009										
Flubendiamide			0.010	0.011								0.011	0.011		0.010						0.011												
Fludioxonil	0.013	0.012	0.019	0.021	0.044	0.027	0.018	0.047		0.013	0.014	0.014	0.015	0.018	0.014				0.041	0.013	0.011	0.021	0.011					0.014					
Flufenoxuron			0.015	0.012	0.012	0.012	0.016														0.012												
Fluopyram (RD)			0.009		0.008	0.041	0.008	0.009	0.009		0.008	0.011	0.010	0.009				0.009	0.015		0.009												
Fluquinconazole			0.014	0.011				0.012																				0.013					
Flusilazole (RD)	0.011		0.011			0.010		0.011				0.011	0.010								0.009												
Flutriafol		0.011						0.013			0.013	0.012	0.018		0.013						0.013					0.015							
Folpet (RD)			0.054	0.050	0.012	0.011	0.018	0.028			0.013	0.021	0.013		0.012				0.022		0.024												
Formetanate (RD)						0.010		0.013					0.011																				
Formothion																																	
Fosthiazate									0.013	0.009			0.009																				
Glyphosate		0.022	0.023			0.021	0.155																		0.382		0.195	0.081					
Haloxyfop-R (RD)								0.016															0.011										
Heptachlor (RD)															0.009																	0.001	
Hexachlorobenzene																													0.009	0.003		0.003	0.004
Hexachlorocyclohexane (α)																																0.002	
Hexachlorocyclohexane (β)																												0.009		0.002		0.002	0.004
Hexaconazole			0.011			0.010						0.011	0.011		0.010						0.010					0.011							
Hexythiazox	0.012	0.012	0.014	0.012	0.012	0.011		0.013				0.014	0.013	0.015	0.012																		
Imazalil	0.848	0.934	0.020	0.045	0.012	0.011		0.012	0.102	0.015	0.013	0.013	0.012	0.015	0.013				0.013	0.013	0.012	0.022											
Imidacloprid	0.015	0.012	0.012	0.013	0.012	0.018	0.016	0.011	0.013	0.012	0.011	0.012	0.015	0.021	0.012	0.010		0.011	0.019	0.015	0.013	0.017	0.011			0.015		0.012					
Indoxacarb			0.013	0.012	0.012	0.013	0.013	0.014				0.013	0.012	0.012	0.012	0.010	0.012	0.012	0.017	0.017	0.012												
Ioxynil (RD)																																	

Pesticide	Oranges	Mandarins	Apples	Pears	Peaches	Table grapes	Wine	Strawberries	Bananas	Potatoes	Carrots	Tomatoes	Peppers	Aubergines	Cucumbers	Broccoli	Cauliflower	Head cabbage	Lettuce	Spinach	Beans (with pods)	Peas (without pods)	Leek	Olives (oil production)	Oats	Rice	Rye	Wheat	Swine meat	Liver	Poultry meat	Cow's milk	Chicken eggs
Iprodione (RD)	0.012	0.013	0.024	0.023	0.096	0.046	0.016	0.041			0.021	0.023	0.015	0.017	0.019	0.015		0.025	0.117	0.013	0.031	0.021	0.012			0.016		0.016					
Iprovalicarb		0.011				0.010	0.018			0.013		0.011	0.013						0.012		0.011												
Isocarbophos																																	
Isofenphos-methyl																																	
Isoprocarb																																	
Kresoxim-methyl (RD)			0.014	0.012	0.013	0.014	0.020	0.015				0.014	0.013		0.014								0.012										
λ-cyhalothrin (RD)	0.012	0.011	0.013	0.012	0.013	0.012	0.012	0.012	0.012		0.010	0.012	0.012	0.015		0.011		0.011	0.014	0.016	0.012		0.012	0.031		0.011	0.014						
Lindane																				0.009								0.009	0.007			0.001	0.005
Linuron	0.013										0.017		0.014					0.014	0.015	0.017	0.015	0.020			0.010								
Lufenuron		0.011						0.011				0.011	0.011		0.010			0.011	0.012		0.010					0.012							
Malathion (RD)	0.011	0.010			0.010			0.011										0.010							0.010	0.011	0.012	0.011					
Maleic hydrazide (RD)										1.83																							
Mandipropamid						0.012	0.010					0.010	0.011		0.011				0.031	0.028													
Mepanipyrim (RD)					0.009	0.009	0.010	0.030				0.010		0.011					0.010														
Mepiquat																									0.027		0.030	0.023					
Meptyldinocap (RD)																																	
Metaflumizone													0.013			0.009																	
Metalaxyl (RD)	0.012	0.010			0.011	0.015	0.010	0.011		0.011	0.011	0.011	0.012		0.013	0.010	0.009	0.011	0.012	0.012	0.010		0.011	0.013									
Metconazole																																	
Methamidophos						0.009					0.009		0.010	0.010	0.009						0.009												
Methidathion	0.011	0.011	0.011			0.009							0.010								0.010												
Methiocarb (RD)	0.012				0.010	0.009	0.010	0.010					0.012					0.010	0.010		0.010		0.010										
Methomyl (RD)			0.010			0.009		0.010					0.010		0.010						0.011												
Methoxychlor																																0.004	
Methoxyfenozide	0.015		0.012	0.012	0.010	0.017	0.010	0.010			0.011	0.012	0.012	0.014	0.009				0.011		0.011							0.012					
Metobromuron																			0.009														
Monocrotophos						0.009															0.009												
Myclobutanil (RD)	0.013	0.011	0.013	0.011	0.011	0.016	0.012	0.017	0.014	0.010		0.013	0.012		0.013						0.010												
Nitenpyram																																	
Oxadixyl			0.010							0.011									0.012														
Oxamyl								0.009	0.009		0.009	0.009	0.009	0.009	0.009				0.009		0.009												
Oxydemeton-methyl (RD)																																	
Paclobutrazol			0.010	0.011				0.010				0.010																					
Parathion											0.015							0.014															
Parathion-methyl (RD)																																	
Penconazole			0.012		0.011	0.014	0.017	0.014				0.012	0.011		0.012						0.011												
Pencycuron										0.011			0.010						0.021	0.011													
Pendimethalin			0.014	0.011	0.012	0.011		0.012		0.013	0.013		0.012			0.011		0.012	0.012	0.012			0.011										
Permethrin	0.015					0.017							0.018							0.018						0.016		0.015					
Phenthoate													0.010																				

Pesticide	Oranges	Mandarins	Apples	Pears	Peaches	Table grapes	Wine	Strawberries	Bananas	Potatoes	Carrots	Tomatoes	Peppers	Aubergines	Cucumbers	Broccoli	Cauliflower	Head cabbage	Lettuce	Spinach	Beans (with pods)	Peas (without pods)	Leek	Olives (oil production)	Oats	Rice	Rye	Wheat	Swine meat	Liver	Poultry meat	Cow's milk	Chicken eggs
Phosalone			0.014										0.013															0.012					
Phosmet (RD)	0.012	0.011	0.011	0.013	0.011																			0.018									
Phoxim																												0.009					
Pirimicarb (RD)			0.014	0.011	0.011	0.010		0.015					0.011		0.010	0.009		0.009	0.012	0.011	0.010												
Pirimiphos-methyl	0.012		0.013			0.010						0.013	0.012		0.013	0.013			0.011						0.019	0.022	0.019	0.035	0.010				
Prochloraz (RD)	0.033	0.036	0.014			0.011									0.011			0.014			0.012							0.014					
Procymidone (RD)			0.016			0.016	0.011	0.015				0.016	0.017	0.017					0.020														
Profenofos		0.011						0.011				0.012	0.015	0.017							0.012												
Propamocarb (RD)			0.018	0.015	0.019	0.017		0.018		0.015	0.018	0.023	0.018	0.020	0.115	0.010	0.012	0.022	0.186	0.094	0.019		0.012										
Propargite	0.015	0.020	0.022	0.013	0.014	0.013		0.010				0.019	0.017	0.013							0.011												
Propiconazole	0.015	0.014	0.014	0.014	0.013	0.011	0.018	0.013		0.013		0.015	0.013			0.014			0.013		0.012		0.015			0.015							
Propoxur															0.010									0.028									
Propyzamide (RD)		0.010				0.010		0.010			0.010								0.012														
Prothioconazole (RD)											0.009								0.009														
Prothiofos	0.010																																
Pymetrozine					0.009			0.011			0.010	0.011	0.012	0.009	0.012			0.010	0.011	0.009	0.010												
Pyraclostrobin	0.011	0.010	0.013	0.015	0.010	0.012	0.010	0.022	0.009		0.010	0.010	0.011		0.010	0.009		0.009	0.018	0.011	0.009	0.010	0.010		0.010			0.012					
Pyrazophos																																	
Pyrethrins	0.069				0.056							0.058	0.093							0.068						0.041	0.044						
Pyridaben	0.013	0.011	0.012	0.011		0.010		0.011				0.013	0.012	0.014		0.010					0.011	0.021					0.015						
Pyrimethanil	0.068	0.142	0.038	0.041	0.018	0.051	0.021	0.030	0.016		0.014	0.017	0.015	0.016	0.017		0.011	0.012	0.017	0.012	0.013	0.023	0.011					0.012					
Pyriproxyfen	0.014	0.013		0.011	0.011	0.011	0.016					0.012	0.013	0.015					0.011					0.020									
Quinoxyfen					0.010	0.010	0.011	0.011																									
Resmethrin (RD)																																	
Rotenone																																	
Spinosad (RD)		0.011	0.013	0.011	0.014	0.012	0.011	0.017				0.013	0.013	0.013	0.012	0.009			0.014	0.055	0.024		0.010										
Spirodiclofen		0.010	0.012	0.011	0.011	0.011		0.011				0.011	0.011																				
Spiromesifen			0.011					0.011				0.014	0.012	0.011	0.010					0.011	0.010												
Spiroxamine (RD)			0.012		0.011	0.022	0.016		0.013			0.011	0.012		0.010				0.011		0.010							0.013					
tau-Fluvalinate	0.011	0.011	0.012	0.011	0.012	0.011		0.012				0.013	0.010						0.013		0.012	0.012					0.013						
Tebuconazole	0.014	0.012	0.015	0.013	0.028	0.017	0.016	0.011		0.014	0.016	0.015	0.015	0.016	0.014	0.011	0.014	0.013	0.012		0.013	0.021	0.016	0.024	0.015	0.016	0.016	0.014					
Tebufenozide			0.011	0.011		0.009	0.017					0.011	0.011						0.010							0.016		0.011					
Tebufenpyrad	0.013	0.012	0.011	0.012	0.011	0.011	0.016	0.011			0.013	0.011	0.013	0.016						0.011	0.013												
Teflubenzuron			0.015		0.013							0.016	0.015		0.018		0.013																
Tefluthrin											0.011													0.023									
Terbuthylazine	0.014	0.013			0.012			0.011											0.014	0.011				0.017									
Tetraconazole			0.012	0.011	0.012	0.011	0.011	0.013		0.010		0.012	0.011							0.010								0.013					
Tetradifon	0.009												0.009								0.009					0.009							
Tetramethrin																			0.009		0.009							0.009					
Thiabendazole (RD)	0.331	0.283	0.028	0.027	0.013	0.013	0.016	0.012	0.113	0.024	0.012	0.016	0.012					0.012			0.014		0.012			0.016							

Pesticide	Oranges	Mandarins	Apples	Pears	Peaches	Table grapes	Wine	Strawberries	Bananas	Potatoes	Carrots	Tomatoes	Peppers	Aubergines	Cucumbers	Broccoli	Cauliflower	Head cabbage	Lettuce	Spinach	Beans (with pods)	Peas (without pods)	Leek	Olives (oil production)	Oats	Rice	Rye	Wheat	Swine meat	Liver	Poultry meat	Cow's milk	Chicken eggs
Thiacloprid			0.012	0.014	0.011			0.019				0.011	0.011	0.014	0.012	0.009	0.010	0.010	0.011	0.010	0.011	0.014	0.010										
Thiamethoxam (RD)			0.012	0.010	0.011	0.010	0.017	0.011		0.012	0.011	0.012	0.013	0.011	0.012	0.010	0.011	0.011	0.017	0.012	0.012					0.015		0.013					
Thiophanate-methyl	0.011		0.013	0.014	0.015	0.011	0.013	0.011				0.012	0.014	0.017				0.013	0.023		0.012	0.022	0.012					0.012					
Tolclofos-methyl											0.013		0.012						0.017									0.013					
Tolylfluanid (RD)						0.010		0.013																									
Triadimenol (RD)			0.012		0.011	0.011		0.015	0.015		0.015	0.013	0.015		0.014				0.015		0.013		0.013				0.014	0.011					
Triazophos								0.009				0.009	0.011		0.009						0.009			0.010		0.010							
Trichlorfon													0.013																				
Trifloxystrobin (RD)	0.011	0.010	0.012	0.011	0.011	0.015	0.012	0.018			0.011	0.010	0.011	0.011	0.010			0.010	0.010		0.010		0.010										
Triflumuron			0.014	0.011	0.013			0.013																									
Trifluralin											0.013			0.015						0.011													
Triticonazole											0.009																	0.010					
Vinclozolin (RD)					0.013	0.012							0.014						0.014	0.013							0.017						
Zoxamide						0.009	0.011					0.010											0.010	0.011									