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# The 2018 European Union report on pesticide residues in food

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## Abstract

Under EU legislation (Article 32, Regulation (EC) No 396/2005), EFSA provides an annual report which analyses pesticide residue levels in foods on the European market. The analysis is based on data from the official national control activities carried out by EU Member States, Iceland and Norway and includes a subset of data from the EU-coordinated control programme which uses a randomised sampling strategy. For 2018, 95.5% of the overall 91,015 samples analysed fell below the maximum residue level (MRL), 4.5% exceeded this level, of which 2.7% were non-compliant, i.e. samples exceeding the MRL after taking into account the measurement uncertainty. For the subset of 11,679 samples analysed as part of the EU-coordinated control programme, 1.4% exceeded the MRL and 0.9% were non-compliant. Table grapes and sweet peppers/bell peppers were among the food products that most frequently exceeded the MRLs. To assess acute and chronic risk to consumer health, dietary exposure to pesticide residues was estimated and compared with health-based guidance values. The findings suggest that the assessed levels for the food commodities analysed are unlikely to pose concern for consumer health. However, a number of recommendations are proposed to increase the efficiency of European control systems (e.g. optimising traceability), thereby continuing to ensure a high level of consumer protection.



**Keywords:** pesticide residues, food safety, European Union, national monitoring programme, maximum residue levels, dietary exposure, risk assessment, acute, chronic

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## Summary

The 2018 EU report on pesticide residues in food provides an overview of the official control activities on pesticide residues carried out in the European Union (EU) Member States,[1] Iceland and Norway. It summarises the results of both the EU-coordinated control programme (EUCP) and the national control programmes (NP). The report also includes the outcome of the risk assessment to both programmes.

The comprehensive analysis of the results of all reporting countries provides risk managers with a sound- evidence base for designing future monitoring programmes and taking decisions on which pesticides and food products should be targeted.

EU-coordinated control programme (EUCP)

The EUCP randomly samples the food products most commonly consumed by EU citizens, giving a statistically representative snapshot of the situation of pesticide residues in those products. This year, these results are for the first time presented in a dedicated website.[2] Conclusions and recommendations derived from the results remain within this report.

In the EUCP, the same group of commodities is monitored every 3 years. In 2018, 12 food products were considered: aubergines (eggplant), bananas, broccoli, cultivated fungi, grapefruit, melons, sweet peppers/bell peppers, table grapes, wheat grain, virgin olive oil, bovine fat and chicken eggs. The results were compared with those of 2015. Cultivated fungi, grapefruit, melons and bovine fat were included in the programme for the first time in 2018, so no comparison was possible. The samples were analysed for 177 pesticide residues: 169 in food of plant origin and 21 in food of animal origin (13 pesticide residues were analysed for food both of plant and animal origin).

Of the 11,679 samples analysed[3]:

- 6,770 or 58% were found to be without quantifiable levels of residues (residues < LOQ).
- 4,743 or 40.6% contained one or more pesticide residues in concentrations above the LOQ and below or equal to the maximum residue levels (MRLs).[4]
- 166 or 1.4% contained residue concentrations exceeding the MRLs. Of these, 101 or 0.9% of the total samples were considered non-compliant, when the measurement uncertainty is taken into account.

Due to different commodities being sampled, there is not a direct MRL exceedance rate comparison between 2018 and 2015. By food commodities, the individual MRL exceedance rate increased from 2015 to 2018 in table grapes (from 1.8% to 2.6%), sweet peppers/bell peppers (from 1.2% to 2.4%), bananas (from 0.5% to 1.7%) and aubergines (from 0.6% to 1.6%). The rate of exceedances fell in 2018 compared to 2015 for broccoli (from 3.7% to 2.0%), virgin olive oil (from 0.9% to 0.6%) and chicken eggs (from 0.2% to 0.1%).

Among the EUCP commodities of plant origin grown in the EU territory, the following non-EU-approved pesticides (i.e. plant protection products containing active substances that are not allowed to be applied on products grown in the EU), were reported to exceed the legal limit: omethoate[5] in aubergines; bitertanol, carbendazim (RD)[6] and flusilazole in broccoli; dieldrin (RD) and chlorfenapyr in melons; chlorfenapyr and triadimefon in sweet peppers; carbendazim (RD), omethoate[5] and acephate in table grapes; carbendazim (RD) and fenitrothion in wheat and iprodione (RD) in virgin olive oil.

Among the commodities of animal origin (i.e. bovine fat and chicken eggs), fat-soluble persistent organic pollutant pesticides (i.e. DDT (RD), hexachlorobenzene and lindane) were the substances most

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[1] When the data were provided to EFSA, the United Kingdom was an EU Member State. As of 31 January 2020, it has become a third country. However, in the context of this report their data has been included.

[2] https://www.efsa.europa.eu/en/annual-pesticides-report-2018

[3] These samples comprised those provided by EU-MS, Norway and Iceland. It excludes those of baby food samples requested under the EUCP and those samples BG, DK, ES, FI and NL were not able to flag as EUCP during the data collection.

[4] The ‘maximum residue level’ (MRL) is define as the upper legal level of a concentration for a pesticide residue in or on food or feed set in accordance with Regulation (EC) No 396/2005, based on good agricultural practice and the lowest consumer exposure necessary to protect vulnerable consumers.

[5] In 2018, omethoate and dimethoate were two separate residue definitions. The presence of omethoate in some samples (not approved for use) could be due to the degradation of dimethoate which at that time was still approved for its use at EU level (some grace periods are still granted for some crops until 30/6/2020).

[6] The term (RD) after a pesticide name refers to ‘residue definition’ and stands for an abbreviation that covers the measurable amounts of an active substance and/or related metabolites and/or degradation products that can be found on harvested crops or in foods of animal origin within a residue definition.

frequently quantified. These substances are no longer used as pesticides but are very persistent in the environment and can be therefore still found in the food chain. One noteworthy finding relates to the presence of the persistent pesticide DDT (RD) in bovine fat, which was sampled for the first time in 2018 EUCP. The rate of detection was higher (7.5% of samples) compared to samples of fat from other species (e.g. swine, poultry) taken in previous years (less than 2%). Regarding MRL exceedances, they were identified for beta hexachlorocyclohexane in two bovine fat samples and DDT (RD) in one chicken egg sample.

EU-coordinated and national programmes (EUCP + NP)

The overall EU pesticide monitoring programmes for 2018 incorporate both the results of the EUCP and the national programmes, as implemented by the 28 Member States, Iceland and Norway. The data analysis of this section is not presented in the European Food Safety Authority (EFSA) website but remains in the body text of this report.

The reporting countries analysed 91,015 samples, an increase of 3% compared to 2017. In total, 821 pesticides were analysed and on average, 239 per sample (229 pesticides in 2017).

Overall, the number of samples that fell within the legal limit (i.e. the measured levels did not exceed the MRLs permitted in EU legislation) remains steady in comparison with the previous year (95.5% in 2018 vs. 95.9% in 2017). MRLs were exceeded in 4.5% of the samples (4.1% in 2017). Considering the measurement uncertainty, 2.7% of all samples analysed (2,478 samples) exceeded legal limits, triggering legal sanctions or administrative actions. This is higher than last year's respective value of 2.5%.

The number of samples from EU reporting countries compared to third countries also remains steady. However, there was an increase in the number of samples of unknown origin (10.1% in 2018 vs. 7% in 2017).

Exceedances remain higher for unprocessed food than for processed food (4.7% vs. 3.6%, respectively). However, the exceedance rate for processed food increased in 2018 (3.6%) compared to 2017 (2.7%). Furthermore, a slight increase was reported in multiple residues (29.1%) compared to 2017 (27.5%). The rate of multiple residues (31.2%) continuous to be higher in unprocessed food commodities than in processed products (12.4%).

Glyphosate detection rate remains steady compared to last year with 98% of samples not having been quantified. The percentage of MRL exceedances decrease from 0.2% in 2017 to 0.1% in 2018. The highest exceedance rate was reported for dry lentils, as it was the case in 2017.

Regarding import controls under Regulation (EC) No 669/2009, 82,971 consignments were imported to the EU. These were 6,182 consignments more than in 2017. In 2018, 4.8% of the consignments were considered to be non-compliant; 3.0% in 2017.

Reporting countries analysed 1,658 samples of foods for infants and young children. In general, the default MRL[7] of 0.01 mg/kg is applicable for baby food products[8] with the exceptions of specific residue definitions for which lower MRLs apply. In 90.3% of the samples, no quantifiable residues were reported. The MRL was exceeded in 22 samples (1.3%), of which 7 samples (0.4%) were non-compliant. In nine samples (0.5%), there were two residues reported in the same sample. Like in the previous reporting years, the most frequently quantified compounds in baby food were chlorates (quantified in 80 samples; 4.8%), followed by copper (39 samples; 2.4%). Pesticides found to occur in at least 5 samples were: bromide ion, cypermethrin, fosetyl-Al (RD) and benzalkonium chloride (BAC) (RD).

The number of organic food samples reported in 2018 (5,735) was slightly lower than in 2017 (5,806). The rate of MRL exceedance fell marginally to 1.4% from 1.5% in comparison to the previous year. 0.5% of the samples analysed were non-compliant compared to 0.7% in 2017.

The number of samples of animal origin reported in 2018 (11,549) was higher than in 2017 (9,682). MRL exceedance rates were also higher in 2018 than in 2017 (1.7% compared to 1.1%, respectively).

Dietary exposure and risk assessment

Dietary exposure to pesticide residues is estimated by combining EU food consumption information from dietary surveys provided by reporting countries with occurrence data of pesticide residues per

[7] In general, a default MRL of 0.01 mg/kg is applicable for food covered by Directive 2006/125/EC and 2006/141/EC unless lower legal limits for the residue levels are defined in the Directives. Thus, the provisions are more restrictive than for other food falling under the provisions of Regulation (EC) No 396/2005.

[8] Baby food samples are referring to: 'baby foods other than processed cereal-based foods', 'processed cereal-based foods for infants and young children' and 'follow-on formulae'.

food commodity. Based on current scientific knowledge, when dietary exposure to a substance is found to be lower than or equal to its health-based guidance value, this substance is unlikely to pose a risk to consumer health. On the contrary, when it exceeds its health-based guidance value, negative health outcomes cannot be excluded.

*Acute risk assessment*

The acute risk assessment was carried out for the pesticide/food product combinations covered by the EUCP programme using the conservative deterministic model PRIMo revision 3.1. The deterministic approach used for this calculation is likely to overestimate the real exposure as it is based on a conservative model assumption. Samples taken under the EUCP were pooled with those from national programmes matching the EUCP pesticide/crop combinations in order to have a more representative number of samples. Overall, 22,752 samples were assessed for acute exposure for the 177 pesticide residues covered in the EUCP (for the marker $CS_2$ included in the EUCP, six different dithiocarbamate scenarios were built; so, overall 182 pesticides underwent the acute exposure assessment). For six of those pesticides, no acute health-based guidance value was available and therefore consumer risk could not be assessed. For 143 pesticides, there was no acute exposure concern because no acute toxicity was observed in the toxicological studies, or no exceedances of the acute health-based-guidance value was found. The remaining 33 pesticides exceeded the acute health-based guidance value in 327 samples (1.4%). For 136 of these cases, legal actions were taken to restrict the movements of those food in the EU market. The food products that registered exceedances, in descending order were grapefruit (196 samples), sweet peppers (78 samples), table grapes (26 samples), broccoli (9 samples), aubergines (7 samples), melons (7 samples), wheat (4 samples). No results exceeded the health-based guidance values in cultivated fungi, virgin olive oil and animal commodities (bovine fat and chicken eggs). The pesticides which most frequently exceeded the acute reference dose (ARfD) were: chlorpyrifos (126 samples), thiabendazole (RD) (91), formetanate (17), methomyl (16), ethephon (15), acetamiprid (RD) (14), tebuconazole (RD) (10) and propiconazole (10).

Based on the deterministic screening method which uses a number of conservative assumptions to assess acute exposure, EFSA considers unlikely that the limited number of exceedances of the ARfD would pose concerns for consumer health.

*Chronic risk assessment*

EFSA estimated chronic exposure to pesticides for all the food products for which a consumption value was provided in PRIMo revision 3.1 and for which residue concentrations were reported. The assessment was based on results submitted for the 177 pesticide residues covered by the EUCP (for the marker $CS_2$ included in the EUCP, six different dithiocarbamate scenarios were built; so, overall 182 pesticides underwent the acute exposure assessment) and analysed in 80,733 samples (those from the EUCP and the national programmes) covering all unprocessed products from Annex I (part A) of Regulation (EC) No 396/2005.

Two scenarios were calculated. The lower-bound scenario – which assumes that if not quantified (i.e. samples with residue level $<$ LOQ), the residues are not present in the food product analysed – where no acceptable daily intake (ADI) was exceeded. The adjusted upper-bound scenario – which assumes that even if not quantified residues are present at the level of LOQ – where 121% ADI was identified for dithiocarbamates (RD) – scenario ziram – out of the six dithiocarbamate scenarios.

Based on the above, EFSA concluded that according to current scientific knowledge, chronic dietary exposure to the 177 pesticide residues of the 2018 EUCP at the assessed levels for the food commodities analysed, is unlikely to pose concerns for consumer health.

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# 1. Background

## 1.1. Legal Basis

Pesticide residues[9] resulting from the use of plant protection products[10] on crops or food products that are used for food may pose a risk 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,[11] their use and their residues in food. In order to ensure a high level of consumer protection, legal limits, so called 'maximum residue levels',[4] are established in Regulation (EC) No 396/2005[12]. EU-harmonised MRLs are set for more than 1,240 pesticides covering 378 food products/food groups. A default MRL of 0.01 mg/kg is applicable to nearly 690 of these 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:

- EU-coordinated control programme: this programme defines the food products and pesticides that should be monitored by all Member States. The EU-coordinated programme (EUCP) relevant for the calendar year 2018 was set up in Commission Implementing Regulation (EU) No 2017/660[13] hereafter referred to as '2018 monitoring regulation',
- National control programmes: 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, the European Food Safety Authority (EFSA) and other Member States. Under Article 32 of the above-mentioned Regulation, EFSA is responsible for 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, based on the findings, EFSA should derive recommendations for future monitoring programmes.

Specific MRLs are set in Directives 2006/125/EC[14] and 2006/141/EC[15] for food intended for infants and young children. Following the precautionary principle, the legal limit for this type of food products was set at a low level (limit of quantification); in general, a default MRL of 0.01 mg/kg is applicable unless lower legal limits for the residue levels are defined in these Directives. Regulation (EU) No 609/2013[16] repeals the aforementioned Directives; however, the pesticide MRLs of Directive 2006/125/EC and 2006/141/EC were still applicable in 2018.

9 The term pesticide residue is used throughout this report and supplementary documents (the MRL exceedance supplement and the PRIMo exposure assessment) refer to measurable amounts of an active substance and/or related metabolites and/or degradation products that can be found on harvested crops or in foods of animal origin.

10 The term plant protection products (PPP) is used throughout this report and supplementary documents pertains to a product containing an active substance and other substances added and/or their products to ensure, among others, plant protection against harmful organisms, influence their life processes (e.g. growth regulators), destroy or prevent growth of undesired plants or parts of them in the fields, etc.

11 Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC. OJ L 309, 24.11.2009, p. 1–50.

12 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 70, 16.3.2005, p. 1–16.

13 Commission Implementing Regulation (EU) 2017/660 of 6 April 2017 concerning a coordinated multiannual control programme of the Union for 2018, 2019 and 2020 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 94, 7.4.2017, p. 12–24.

14 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.

15 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.

16 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.

It is noted that some of the active substances for which legal limits are set under Regulation (EC) No 396/2005 are also covered by Commission Regulation (EU) No 37/2010 on pharmacologically active substances.[17] For these so-called dual use substances, Member States perform controls in accordance with Council Directive 96/23/EC[18] for veterinary medicinal products; results of the controls for dual use substances[19] are also reported in this report.

It should be highlighted 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. However, Article 5 of Regulation (EC) No 889/2008[20] on organic production of agricultural products defines the restriction of using plant protection products.

Regulation (EC) No 669/2009[21] lays down rules concerning the increased level of official controls to be carried out on a list of food and feed of non-animal origin which, based on known or emerging risks, requires an increased level of controls prior to their introduction into the EU. 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. pesticides residues, not approved food additives, mycotoxins) are specified in Annex I to this regulation which is regularly updated; for the calendar year 2018, three updated versions are relevant.[22,23,24]

## 1.2. 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 carried out in 2018.

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,
- 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[25].

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

[17] Commission Regulation (EU) No 37/2010 of 22 December 2009 on pharmacologically active substances and their classification regarding maximum residue limits in foodstuffs of animal origin. OJ L 015 20.1.2010, p. 1.

[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.

[19] The comprehensive results from the monitoring of veterinary medicinal product residues and other substances in live animals and animal products are published in a separate report (EFSA, 2020a).

[20] 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.

[21] 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.

[22] Commission Implementing Regulation (EU) 2017/2298 of 12 December 2017 amending 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 329, 13.12.2017, p. 26–32.

[23] Commission Implementing Regulation (EU) 2018/941 of 2 July 2018 amending 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 and Commission Implementing Regulation (EU) No 885/2014. OJ L 166, 3.7.2018, p. 7–16.

[24] Commission Implementing Regulation (EU) 2018/1660 of 7 November 2018 imposing special conditions governing the import of certain food of non-animal origin from certain third countries due to the risks of contamination with pesticides residues, amending Regulation (EC) No 669/2009 and repealing Implementing Regulation (EU) No 885/2014. OJ L 278, 8.11.2018, p. 7–15.

[25] 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.

## 2. Introduction

This report provides a detailed insight in the control activities at European level and the most relevant results on the official control activities performed by the EU Member States, including Iceland and Norway that are members of the European Free Trade Association (EFTA) and of the European Economic Area (EEA). The main purpose of the data analysis presented in this report is to give risk managers the necessary information to decide on risk management issues. At the same time, the report aims as addressing questions such as:

- How frequently were pesticide residues found in food?
- Which food products frequently contained pesticide residues?
- Compared with previous years, are there any notable changes?
- In which products were violations of the legal limits identified by the Member States?
- What actions were taken by the national competent authorities responsible for food control to ensure that pesticide residues in food not complying with the European food standards is placed in the EU market?
- Do the residues in food pose a risk to consumer health?

This report aims to answer these questions in a way that can be understood without deep knowledge on the subject. Furthermore, EFSA has developed a new data visualisation tool to help end-users gain insights from the vast amount of data underpinning this report. The 2018 EU-coordinated programme results, as defined in Commission Implementing Regulation (EU) No 2017/660[13], are therefore presented on EFSA's website[2,26] An overall evaluation can still be found in Section 3 of this report, but the figures and tables will be on the website. The design and analysis of the national control programmes results are reported in Section 4 of this report. The results of the dietary exposure assessments for individual pesticides are described in Section 5. The raw data provided by reporting countries and anonymised by EFSA, can also be downloadable in the Open Science platform Zenodo by typing: 'Member-State-Name results from the monitoring of pesticide residues in food'.

Furthermore, separated Excel files will be published supplementary to this report in Wiley Journal such as: a full list of samples exceeding the MRLs previously anonymised and including information on the measured residue concentrations and the origin of the samples, and a PRIMo file containing the results of the exposure assessment.

The websites of the national competent authorities can be seen in Appendix A of this report. In addition, EFSA compiled a technical report (EFSA, 2020c) containing the national summary reports submitted by the reporting countries, where further details on the pesticide monitoring activities at national level are provided.

## 3. EU-coordinated control programme

According to the 2018 EU monitoring Regulation (EU) No 2017/660[13], reporting countries sampled and analysed specific pesticide/food product combinations, set out in Annex I of this Regulation: aubergines (egg plants), bananas, broccoli, cultivated fungi, grapefruit, melons, sweet peppers/bell peppers, table grapes, wheat grain, virgin olive oil, chicken eggs and bovine fat. Cultivated fungi, grapefruit, melons and bovine fat were included in the programme for the first time, so no comparison with results of 2015 was possible for these four food products. In this same Annex I, the pesticides to be analysed were also provided, i.e. 177 pesticide residues. Further details on the list of pesticides covered by the 2018 EUCP are presented in Appendix B – Table B.1. Compared with the 2015 EUCP list (n = 163), the 2018 EUCP pesticide list was enlarged by 14 pesticide residues (n = 177); some as a consequence of the splitting of the residue definition into two different ones (e.g. dimethoate/omethoate, triadimenol/triadimefon, methomyl/thiodicarb); some as repeated finding reported by Member States taking into account official laboratories capacity of analysing them before being included.

In accordance with Annex II of the EUCP Regulation, one sample from organic production for each of the 12 food products mentioned in Annex I, providing that such samples were available, should be sampled: in total 781 organic samples. In addition, Annex II also requested Member States to sample 10 samples of processed cereal-based baby food. For this reason, 600 samples were flagged as baby food. A comprehensive analysis of these results under the EUCP Regulation together with the results on other type of baby food products is reported in Section 4.2.6 (and not in the data visualisation).

[26] In the data visualisation shown in EFSA website, the EUCP findings are presented. However, baby food samples requested under the EUCP, are excluded from the analyses and are presented in Section 4.2.6 of this report.

Furthermore, Annex II of the above-mentioned Regulation, sets a minimum number of samples per food product and per Member State (depending on their population) to be analysed. These numbers ranged from 12 to 97 samples per food product. Overall, 11,679 samples were analysed. These do not include samples of infant formulae and follow-on formulae which are presented in Section 4.2.6 of the report. Bulgaria did not provide samples flagged as EUCP. Finland was not able to send all their data set by the legal deadline. Denmark complied with the EUCP Regulation; however, Denmark coded as national, EUCP samples during EFSA's data collection.

Overall, in 58% of samples (6,770 out of the 11,679 samples analysed), no quantifiable levels of residues[27] were reported (residues were below the LOQ). The number of samples with pesticide residues within the legally permitted levels[28] (at or above the LOQ but below or at the MRL) was 4,743 (40.6%). MRLs were exceeded in 1.4% of the samples (166 samples), 0.9% of which (101 samples) were found to be non-compliant based on the measurement uncertainty.[29] In 2015, EFSA assessed the design of the EUCP and concluded that an MRL exceedance rate above 1% could be estimated with a margin of error of 0.75% by selecting at least 683 samples per food item to be monitored (EFSA, 2015f). For most of the commodities required to be sampled in the EUCP Regulation,[13] the number of samples taken was above 683 (except for melon and virgin olive oil). Therefore, the margin of error for most of the individual commodities was below or very close to 0.75%. This means, that conclusions derived by crop are within the acceptable uncertainty.

Due to different commodities being sampled, there is not a direct MRL exceedance rate comparison between 2018 and 2015. By food commodities, the individual MRL exceedance rate increase from 2015 to 2018 in bananas (from 0.5% to 1.7%), sweet peppers/bell peppers (from 1.2% to 2.4%), aubergines (from 0.6% to 1.6%) and table grapes (from 1.8% to 2.6%). The rate of exceedances for broccoli, virgin olive oil and chicken eggs fell in 2018 compared to 2015.

Regarding the individual MRL exceedance rate by food commodities, there was an increase from 2015 to 2018 for bananas (from 0.5% to 1.7%), for sweet peppers (from 1.2% to 2.4%), for aubergines (from 0.6% to 1.6%) and for table grapes (from 1.8% to 2.6%). On the contrary, the rate of exceedances fell in 2018 compared to 2015 for broccoli (from 3.7% to 2.0%), virgin olive oil (from 0.9% to 0.6%) and chicken eggs (from 0.2% to 0.1%).

Among the commodities of plant origin analysed in the framework of the 2018 EU-coordinated programme, the following non-EU-approved pesticides were reported to exceed the legal limit in samples produced in the EU territory: omethoate[5] in aubergines; bitertanol, carbendazim (RD) and flusilazole in broccoli; dieldrin (RD) and chlorfenapyr in melons; chlorfenapyr and triadimefon in sweet peppers; carbendazim (RD), omethoate and acephate in table grapes; carbendazim (RD) and fenitrothion in wheat; iprodione (RD) in virgin olive oil.[30] Member States should investigate these misuses of not approved pesticides found in those crops.

Among the EUCP samples grown outside the internal market, the following non-EU-approved pesticides were found to exceed the legal limits: carbofuran and chlorfenapyr in aubergines; carbendazim (RD) in bananas; isocarbophos, bromopropylate, diazinon and fenthion (RD) in grapefruit; carbaryl, fenitrothion, carbofuran (RD) and propiconazole in sweet peppers; acephate and carbendazim (RD) in table grapes.

Regarding the commodities of animal origin tested in the framework of the 2018 EU-coordinated programme (i.e. bovine fat and chicken eggs), fat-soluble persistent organic pollutant (POP) pesticides (i.e. DDT (RD), hexachlorobenzene (HCB) and lindane) were most frequently quantified. These substances are no longer used as pesticides but are very persistent in the environment and can be

[27] Samples without quantifiable residues in the context of this report refer to results where the analytes were not present in concentrations at or exceeding the limit of quantification (LOQ). The LOQ is the smallest concentration of an analyte that can be quantified. It is commonly defined as the minimum concentration of the analyte in the test sample that can be determined with acceptable precision and accuracy.

[28] Samples with quantified residues within the legal limits (below or at the MRL) in the context of this report refer to samples containing quantified residues of one or several pesticides in concentrations below or at the MRL but above the limit of quantification.

[29] Non-compliant samples in the context of this report refer to samples containing residue concentrations clearly exceeding the legal limits, considering the measurement uncertainty. The concept of measurement uncertainties and the impact on the decision of non-compliance is described in Figure 1 of the 2018 guidance document on reporting data on pesticide residues (EFSA, 2018g). It is required in official controls that the uncertainty of the analytical measurement is considered before legal or administrative sanctions are imposed on food business operators for infringement of the MRL legislation (Codex, 2006; Ellison and Williams, 2012; European Commission, 2018).

[30] Iprodione authorisations in olives for oil production could be granted until 5/6/2018. The MRL exceedances might not be such due to oil has a long-standing shell life.

therefore still found in the food chain. The detection rate of DDT (RD) in bovine fat (7%) sampled for the first year was high compared to previous years where fat from other species (e.g. swine, poultry) was analysed (less than 2%). All samples being detected with DDT (RD) had EU origin. Regarding MRL exceedances, beta HCH in two bovine fat samples and DDT (RD) in one chicken egg sample, were identified.

Detail analysis can be seen in the dedicated EFSA's website.[2]

# 4. Overall monitoring programmes (EUCP and national programmes)

This chapter incorporates both the results of the EUCP and the national programmes, as implemented by the 28 Member States, Iceland and Norway. The data analysis of this section is not presented in EFSA website but remains in the body text of this report.

Compared with the EUCP, the national control programmes are rather risk based, focussing on products likely to contain pesticide residues or for which MRL infringements were identified in previous 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 considering 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 in accordance with Article 29 of Regulation (EC) No 396/2005. The number of samples and/or the number of pesticides analysed by the reporting 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, some reporting countries provide results of import controls performed under Regulation (EC) No 669/2009. These specific import controls are *inter alia* based on previously observed high incidences of non-compliant products imported from certain countries from outside the Union. Some of these controls may derive into a Rapid Alert System for Food and Feed of the European Commission, whereas others not necessarily. This Regulation provides a percentage of frequency of analysis. This means that if not sampled at the EU border the consignment can enter the EU market and be consumed. That is the main reason for analysing these samples in the remit of this chapter.

The first part of this chapter (Section 4.1) gives an overview of the national programmes, highlighting the sample origin (e.g. domestic samples), type (e.g. processed, unprocessed), number of samples and pesticides tested per reporting country. In the second part of the chapter (Section 4.2), the results of the national control activities are analysed and discussed. The findings, in particular the MRL exceedances, are used by risk managers for their considerations and/or to take decisions on designing the risk based national monitoring programmes, e.g. which pesticides should be covered by the analytical methods used to analyse food products, or which types of products should be included in the national control programmes in order to make the programmes more efficient. The findings are also valuable source of information for food business operators and can be used to enhance the efficiency of self-control systems.

## 4.1. Overview of the EUCP and national monitoring programmes

In 2018, in total, 91,015 samples[31] of food products covered by Regulation (EC) No 396/2005 were analysed for pesticide residues by 30 reporting countries (Figure 1). The total number of samples analysed in 2018[32] increased by 3% compared to 2017 (88,247 samples) and by 7% compared to 2016 (84,652 samples).

The frequency of sampling random by 100,000 inhabitants per reporting country is presented in Figure 2.

Information on the origin of samples included in the 2018 programme, is presented in Figure 3.

[31] In addition to these 91,015 samples, 13 Member States reported to EFSA 800 samples of feed and 1,145 samples of fish. However, as no MRLs are applicable for feed neither fish under Regulation (EC) No 396/2005, these samples were not considered in 2018s overall monitoring analysis of the results.

[32] In this section, the national and EUCP samples are pooled and analysed together.

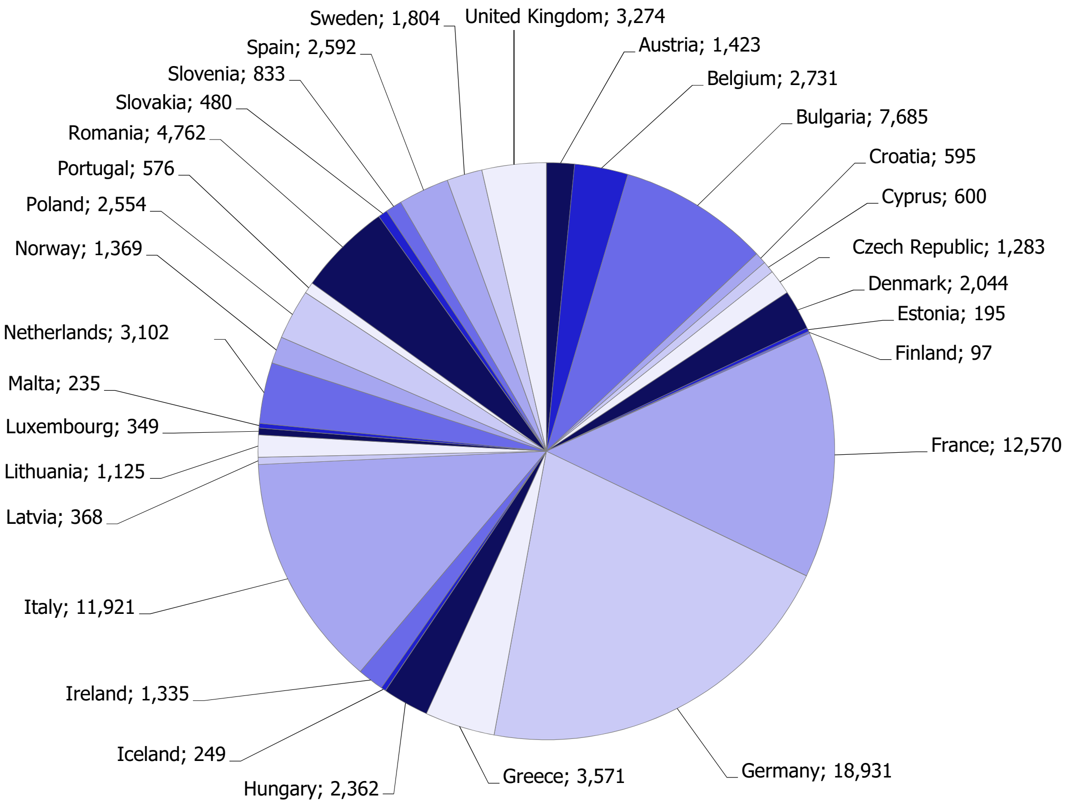
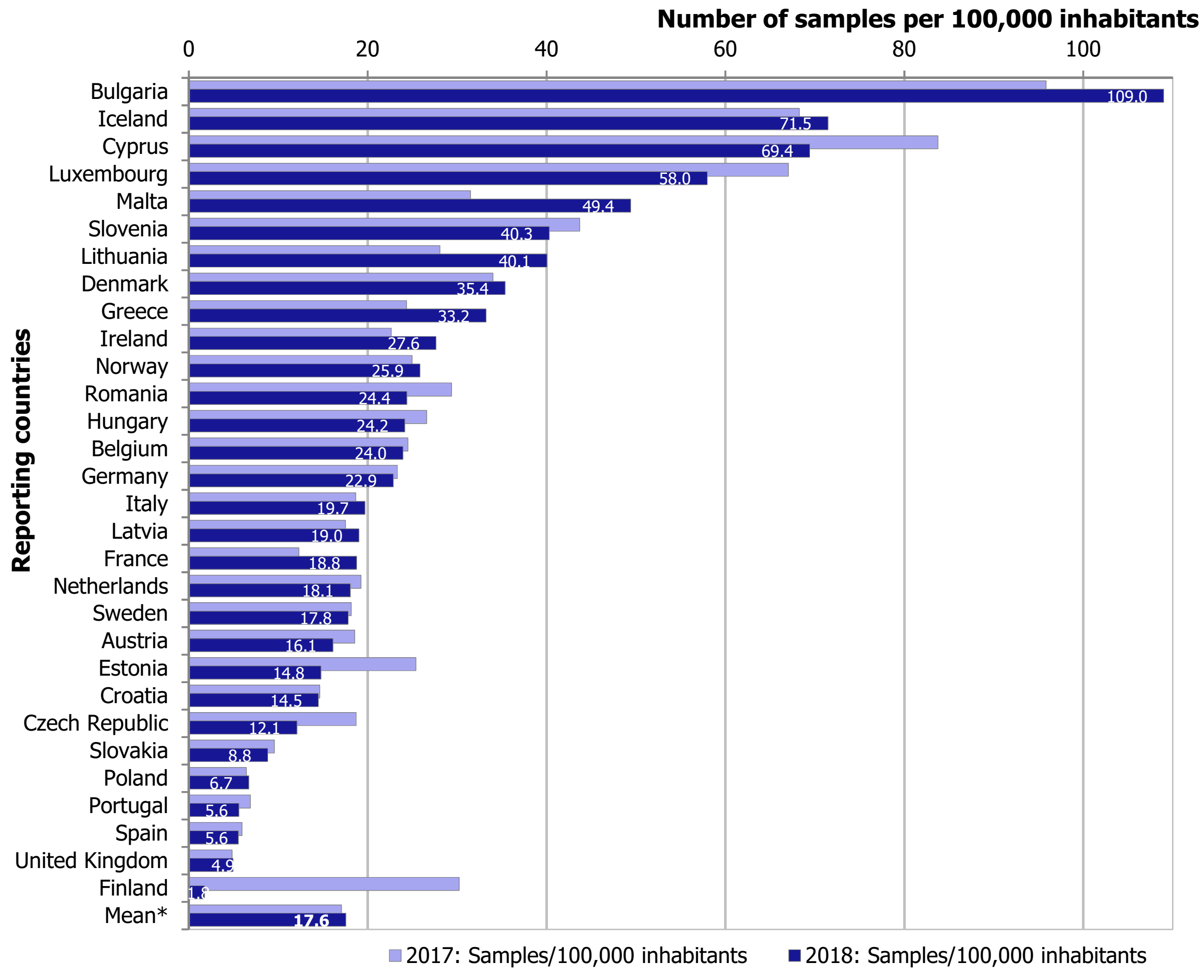



**Figure 1:** Number of samples analysed per reporting country[33]

[33] Austria, Belgium, Finland, Germany, Spain and the Netherlands reported more samples during 2018 than those included in the present report. To have a complete picture, is recommended to look into EFSA's Technical Report published along with this report (EFSA, 2020c).




* Overall mean of all reporting countries

**Figure 2:** Number of samples normalised per number of inhabitants[33]

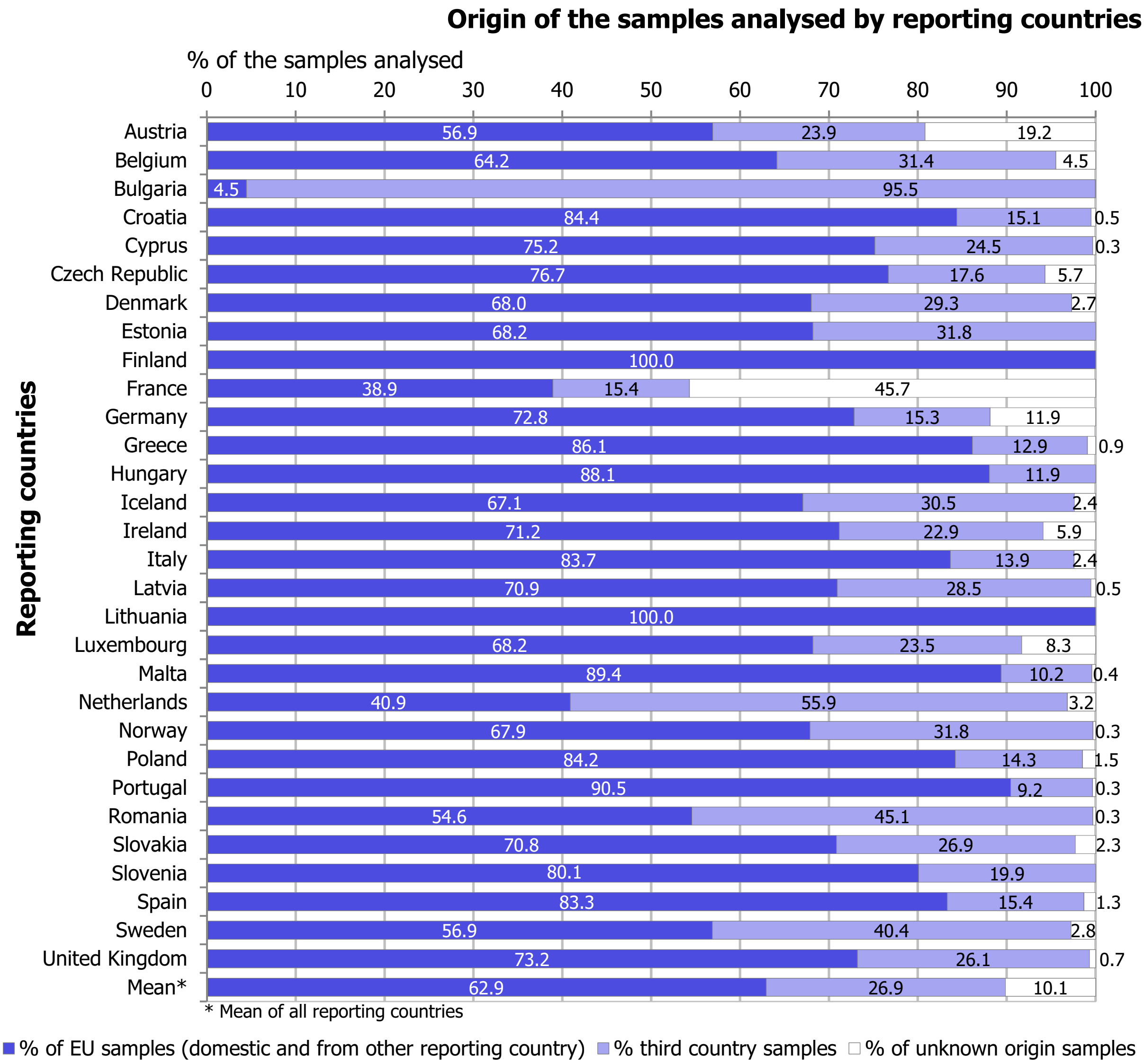



**Figure 3:** Origin of samples per reporting country[33]

Overall, 57,286 samples (62.9%) were originated from EU reporting countries (EU MS, Norway and Iceland), 24,495 samples (26.9%) concerned products imported from third countries and for 9,234 samples (10.1%) no food product origin was reported. A more detailed analysis of the origin of the samples is presented in Figure 4.

Regarding the country of origin for EU/EEA countries, the sampling rate decreased from 2017 to 2018 (from 64.9% to 62.9%, respectively) as well as for third countries (from 28.8% to 26.9%, respectively). The countries with the highest sampling rates of imported products from third countries were Bulgaria (95.5%),[34] the Netherlands (55.9%), Romania (45.1%) and Sweden (40.4%); Portugal, Malta, Hungary and Greece mainly focussed on domestic sampling[35] (more than 85% of the samples analysed). A notable increase was seen in samples of unknown origin from 6.9% in 2017 to 10.1% in 2018. EFSA recommends to Member States' competent authority tracing the origin of the samples to allow drawing conclusions on the findings on these samples.

[34] Bulgaria import control at border is much greater than their internal market control, also notably greater than in other EU Member States.

[35] Finland is not considered as this year only domestic samples were reported to EFSA despite more samples were taken.

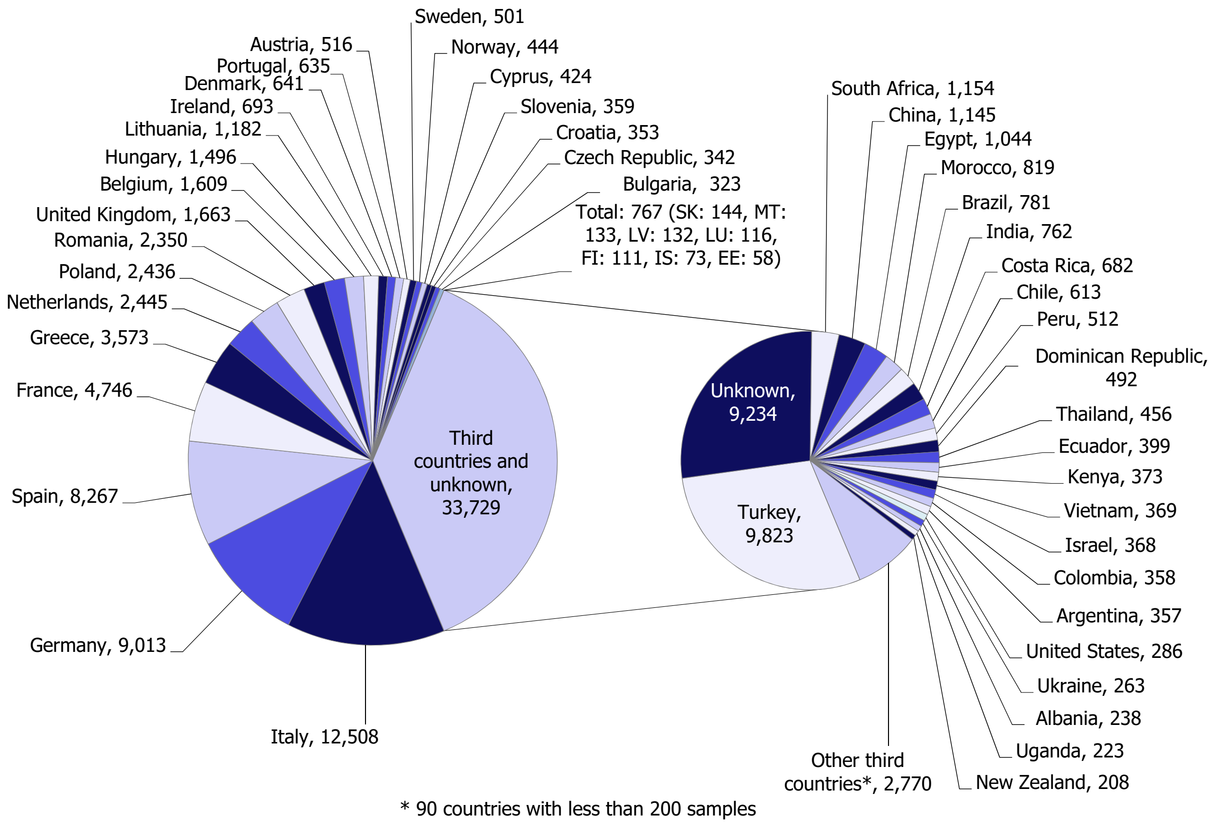



**Figure 4:** Origin of tested samples (reporting countries and third countries)

As in previous years, a wide range of pesticides and different food products was analysed. Considering all samples, the reporting countries analysed in total 821 different pesticides. The wider analytical scope at country level were noted by Spain (700 pesticides), Germany (682 pesticides), Malta (642 pesticides), Luxembourg (635 pesticides) and France (628 pesticides). On average, 239 different pesticides were analysed per sample (229 pesticides in 2017) (see Figure 5).

The heterogeneity of national control programmes needs to be kept in mind when comparing results of different reporting countries. In the next sections, a detailed analysis of the national control programmes shows the different scopes of the national MRL enforcement strategies.

More information on the national control programmes can be found in the separate EFSA technical report that summarises the national results (EFSA, 2020c).

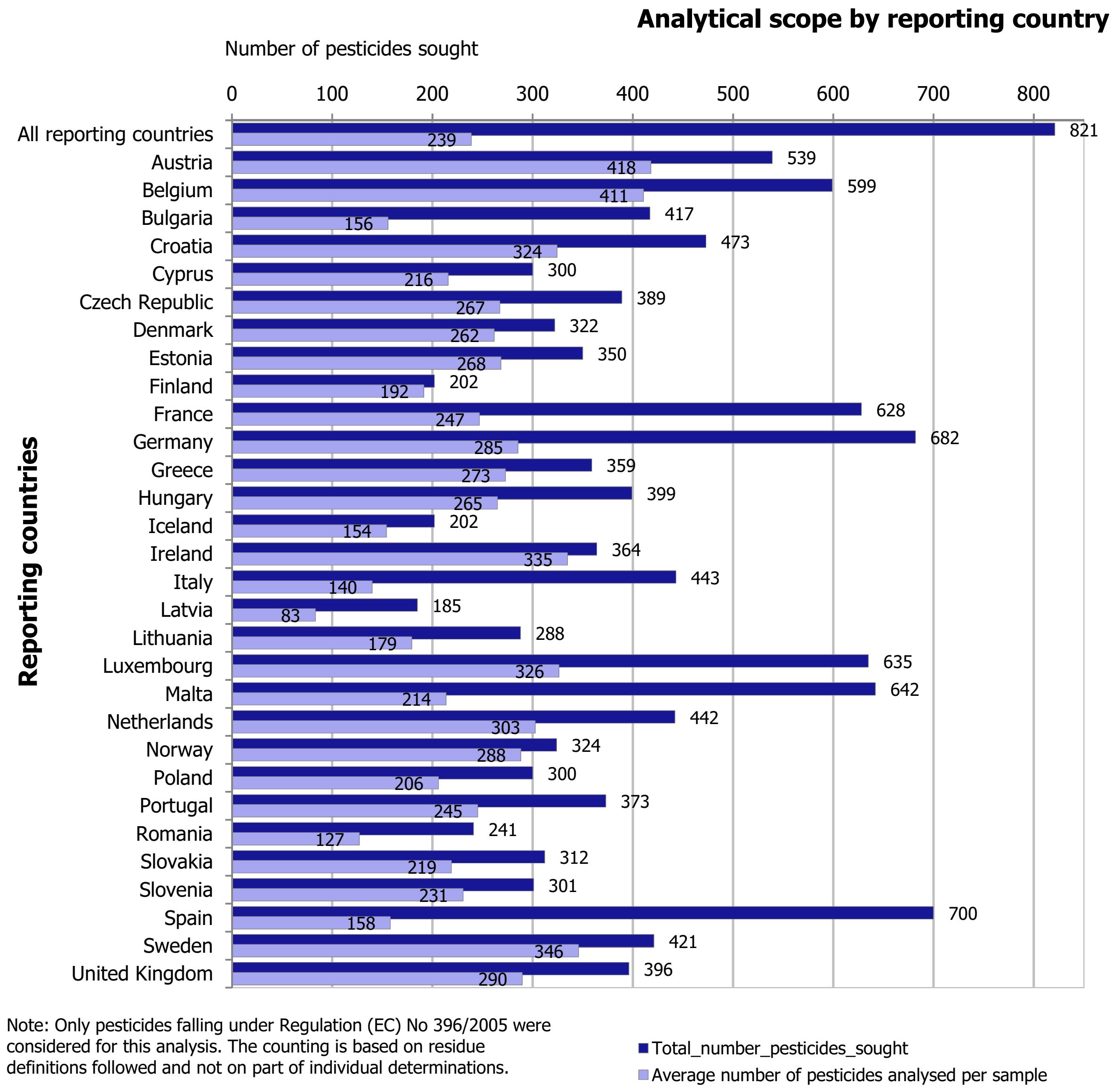



**Figure 5:** Number of pesticides analysed by reporting country

## 4.2. Results of the EUCP and national monitoring programmes

The results presented in these sections refer to complete data sets, comprising results of surveillance (meaning that the samples were taken without targeting specific growers/producers/ importers or consignments likely to be non-compliant) and enforcement samples (where a suspect sampling strategy was applied) as well as unprocessed and processed food products. If the analysis is restricted to a subset of results, this is clearly indicated in the relevant section.

Overall, 95.5% of the 91,015 samples analysed in 2018 fell within the legal limits (86,873 samples); of these, 47,473 samples (52.2%) did not contain quantifiable residues (results below the LOQ for all pesticides analysed) while 43.3% of the samples analysed contained quantified residues not exceeding the legal limits (39,400 samples). MRLs were exceeded in 4.5% of the samples analysed in 2018 (4,142 samples). Considering the measurement uncertainty, 2.7% of all samples analysed in 2018 (2,478 samples) clearly exceeded the legal limits, triggering legal sanctions or administrative actions; these samples are considered as non-compliant with the legal limits. (Figure 6).

Most samples (80,340 samples, 88.3%) were classified as surveillance samples. On the contrary, 11.7% of the cases were enforcement samples, a lower rate than in 2017 (12.1%). This means that samples were taken after concrete indications that certain food may be of higher risk as regards non-compliance or consumer safety (e.g. Regulation (EC) No 669/2009 or follow-up enforcement samples following MRL violations identified in a first analysis of the product under scrutiny).

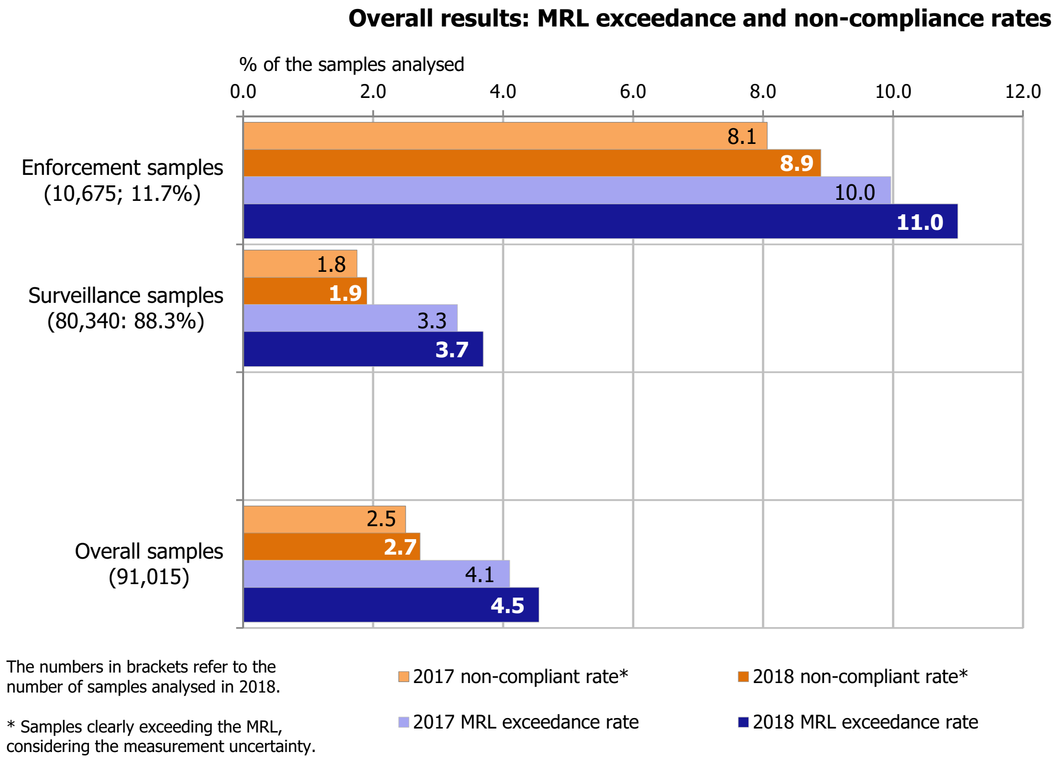



**Figure 6:** Percentage of samples non-compliant and exceeding the MRL by sampling strategy

Overall, MRL exceedance and non-compliance rates increased slightly in 2018 in comparison with 2017. The MRL exceedance rate increased from 4.1% in 2017 to 4.5% in 2018; the non-compliance rate increased from 2.5% in 2017 to 2.7% in 2018.

The rates for surveillance samples regarding MRL exceedances (3.3% in 2017 and 3.7% in 2018) and non-compliances (1.8% in 2017 vs. 1.9% in 2018) increased slightly too as it was the case for the rates for enforcement samples regarding MRL exceedances (10% in 2017 and 11% in 2018) and non-compliance (8.1% in 2017 to 8.9% in 2018).

Being the surveillance samples collected in 2018 (80,340 samples, 88.3%) greater than in 2017 (77,570 samples; 87.9%) as well as the MRL exceedance rate (4.5% in 2018 and 4.1 in 2017), this situation allows concluding that the control system in place is working.

### 4.2.1. Results by country of food origin

In Figure 7, a comparison among the MRL exceedances and non-compliance rate based on the sample origin is presented.

The samples originating from one of the reporting countries (i.e. from EU Member States, Iceland and Norway) were found to be in 54.7% below the LOQ while 42.3% contained residues at or above the LOQ but below or equal to the MRL; 3.1% of the samples exceeded the MRL and 1.6% were considered non-compliant with the MRL, taking into account the measurement uncertainty.

The samples from third countries were found to have a higher MRL exceedance rate (8.3%) and a higher non-compliance rate (5.8%) compared to food produced in the EU. The percentage of samples from third countries without quantifiable residues was 38.2% while the percentage of samples containing quantifiable residues within the legal limits was 53.5%.

From the 91,015 samples taken in 2018, 63% (57,286 samples) were originated from one of the reporting countries, 27% (24,495 samples) were coming from third countries. The rate of samples with unknown origin increased from 7% (6,120 samples) in 2017 to 10% (9,234 samples) in 2018. The country of origin of a sample is a very valuable piece of information for traceability purposes of non-compliance samples. Food business operators should make sure this information is available to inspectors and so is accessible throughout the entire food chain.

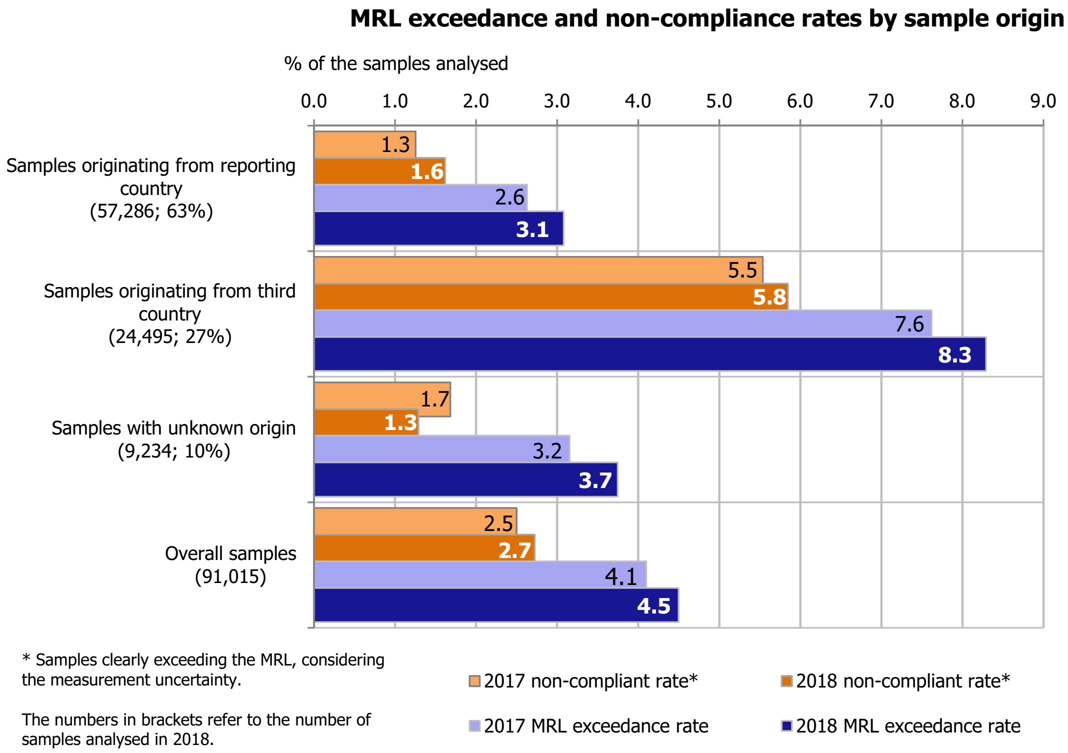



**Figure 7:** Percentage of samples exceeding the MRL and non-compliant by origin

In Figures 8 and 9, detailed quantification and MRL exceedance rates are plotted for samples originating from the reporting countries and samples from third countries, respectively. Results from 2017 are plotted in both charts, allowing comparison with 2018 results. The numbers in these figures need to be interpreted with caution when comparing monitoring results between countries setting different priorities in the design of their national monitoring activities (e.g. more/less risk-based sampling, different national food trade interests, dietary habits, pattern of pesticides used in crops, etc.). Therefore, the use of national data to derive comparative conclusions should be interpreted with caution.

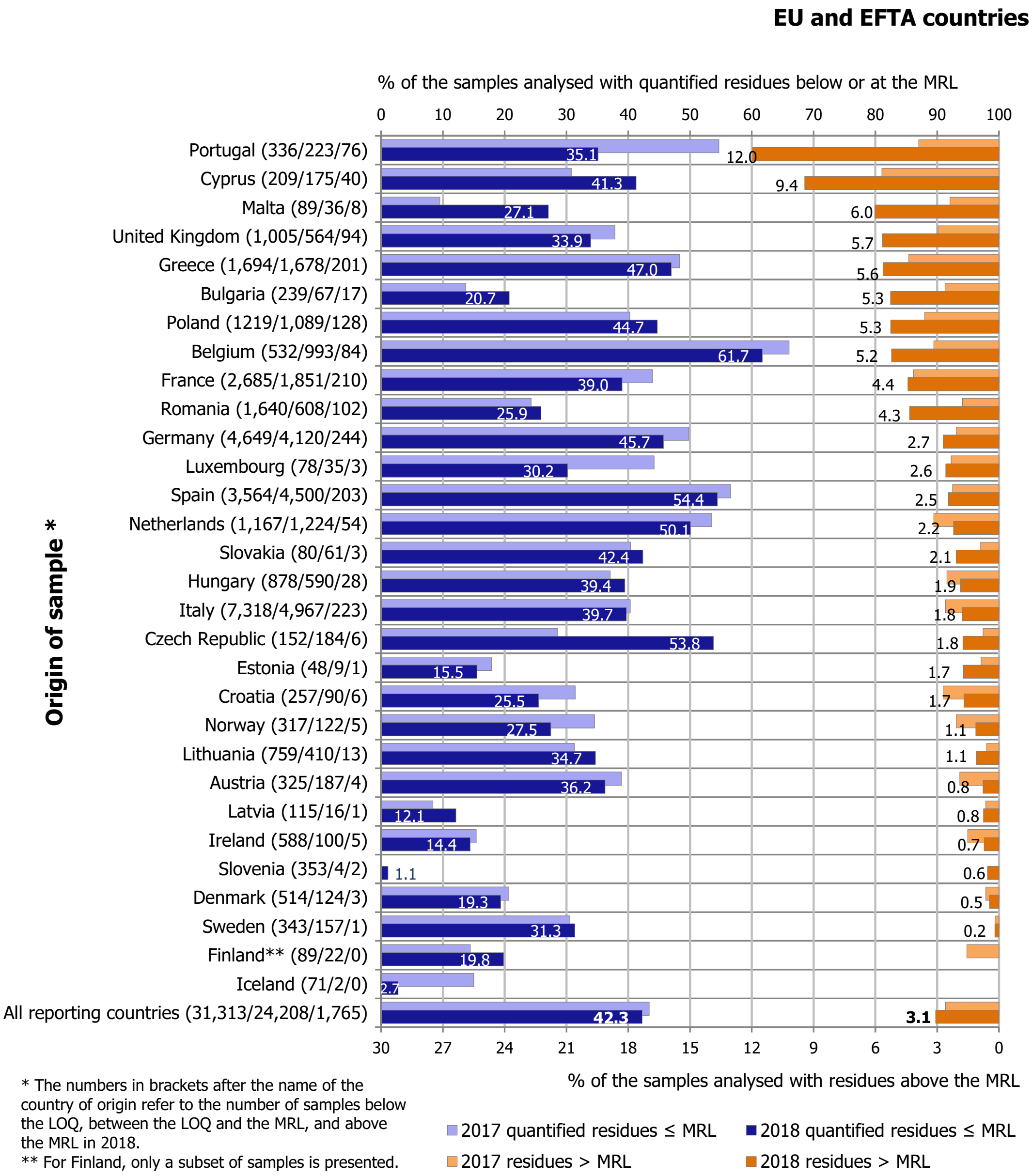



**Figure 8:** MRL exceedance and quantification rates by country of origin (reporting countries)

In Figure 8 among the reporting countries, the highest MRL exceedance rates were reported for products from Portugal, Cyprus and Malta with more or equal to 6% of the samples exceeding the MRL.

In Figure 9, regarding samples originating from third countries (countries with more than 40 samples analysed are presented), the highest MRL exceedance rates (more than 15% of the samples) were reported for Suriname, Jordan, Uganda, Pakistan, Vietnam, Dominican Republic, Thailand, China and India.

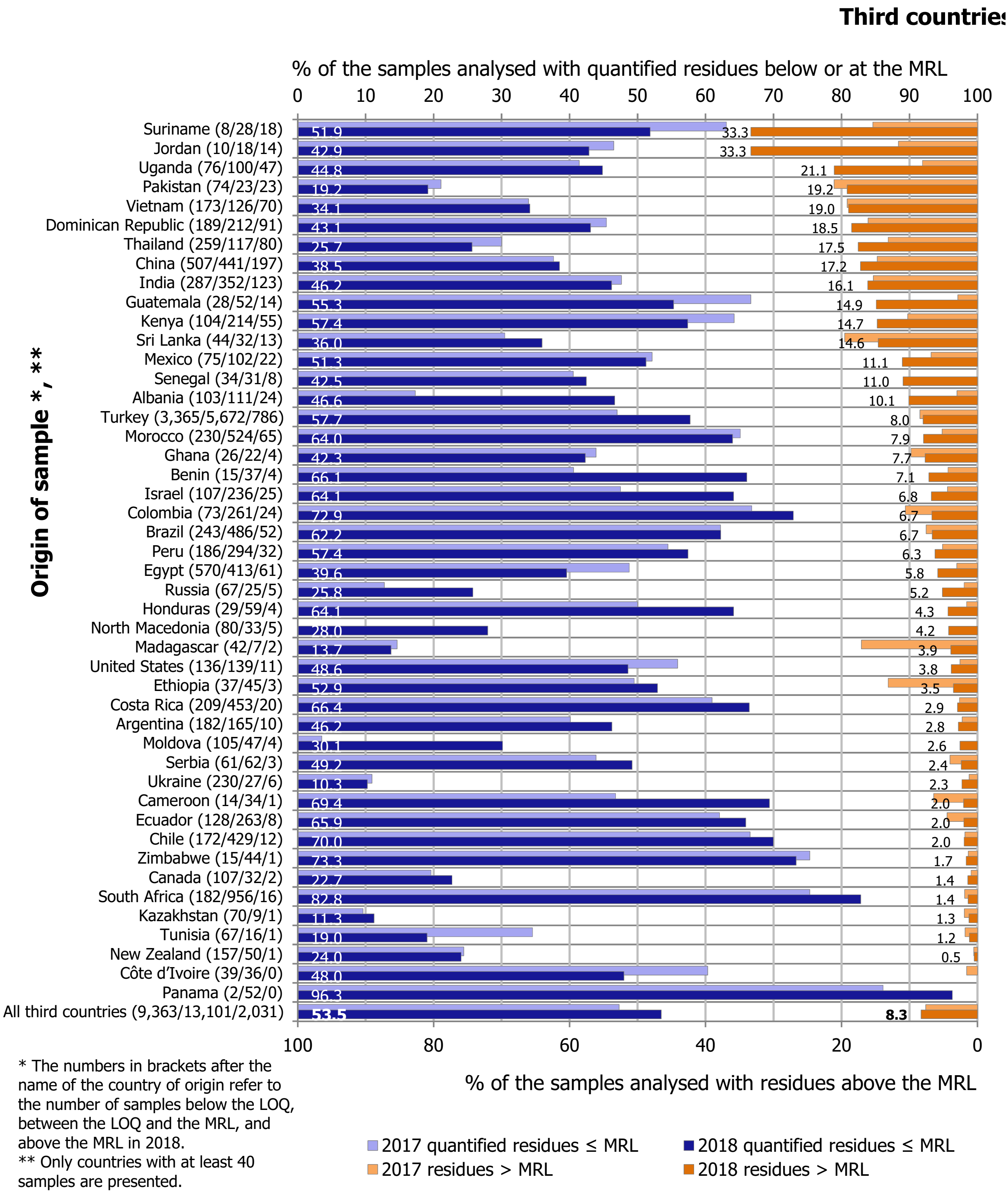



**Figure 9:** MRL exceedance and quantification rates by country of origin (third countries)

### 4.2.2. Results by food product

Among unprocessed food products,[36] 4.7% of the samples analysed in 2018 contained residues exceeding their corresponding MRLs (2.8% were non-compliant samples). This percentage of exceedances is similar to the one reported in the 2017 results (4.3%). The percentage of samples

[36] In the framework of this report, unprocessed food products are considered mainly raw agricultural products in compliance with Annex I to Regulation (EC) No 396/2005, but also some processed products such as fermented tea, dried spices, dried herbal infusions, etc.

containing quantified residues within the legal limits was 45.3% in 2018 vs. 44% in 2017, whereas samples without quantifiable residues[37] were 50.1% in 2018 vs. 51.7% in 2017 (Figure 10).

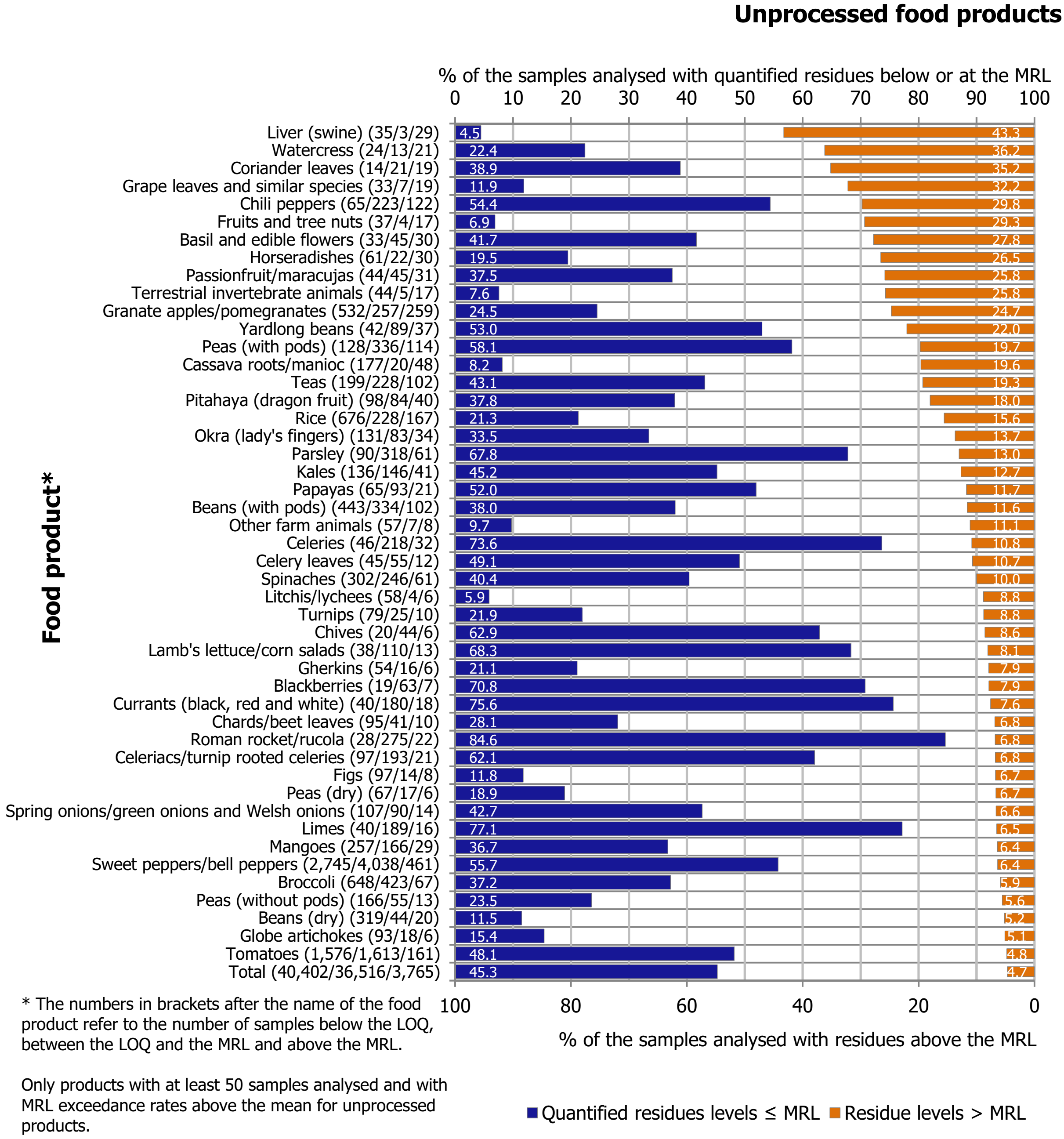



**Figure 10:** MRL exceedance rate and quantification rate for unprocessed food products

When considering the unprocessed products with at least 60 samples analysed, no MRL exceedances were reported for wine grapes, chestnuts, coffee beans, rhubarbs, soybeans, walnuts, kidney (from sheep), milk (from cattle and goat) and muscle (from poultry and swine).

Among the unprocessed products with at least 50 samples analysed, the highest MRL exceedance rates (greater than 15%) were identified for liver (swine), watercress, coriander leaves, grape leaves and similar species, chilli peppers, fruits and tree nuts, basil and edible flowers, horseradishes, passion

[37] SANCO/12574/2015 (rev. 5) (European Commission, 2018) entered into force on 1 January 2018. The provision relates the reporting of the LOQ to multicomponent residue definitions (RD). Individual LOQ for each component of a multicomponent RD, needed to be reported to EFSA. Additionally, the calculated sum LOQ of the RD or a default '99999' must have been reported. If '99999' was reported, EFSA calculated the sum LOQ based on the individual LOQ and the molecular weight factor. This recalculation was used when calculating the mean upper-bound scenario. In case no individual LOQs were reported, EFSA did not recalculate a summed LOQ and disregard the record.

fruit/maracujas, terrestrial invertebrate animals, pomegranates, yardlong beans, peas (with pods), cassava roots/manioc, teas, pitahaya (dragon fruit) and rice. Some of the products particularly exceeding the MRL were risk-based samples subject to increased import controls (i.e. coriander leaves, pomegranates, chilli peppers, pitahaya, basil, teas and yardlong beans) falling within the 2018 amendments of Regulation (EC) No 669/2009. Although the number of exceedances identified for these risk-based samples does not represent the average pesticide levels expected to be found in these commodities, the monitoring and reporting of these results is a call for action at Member State level in line with Article 50 of Regulation (EC) No 178/2002. Generally, Member States reply with appropriate measures to those MRL exceedances resulting in non-compliant samples (e.g. administrative fines, Rapid Alert System for Food and Feed (RASFF) notifications,[38] and follow up actions, etc.). Based on the Commission's 2018 RASFF annual report,[39] 154 out of the 237 pesticide residues notifications concerned rejections at the EEA border. More details on results for this specific sampling programme can be found in Section 4.2.4.

Regarding processed food products, the overall MRL exceedance rate was lower (3.6%) (Figure 11) than the one of unprocessed products (4.7%) (Figure 10) but higher than in 2017 (2.7%). Furthermore, the frequency of MRL exceedances in processed food products reported in 2018 were similar in 2017 (i.e. grape leaves and similar species, tomatoes, wild fungi, sweet peppers, rice, table olive and cattle milk).

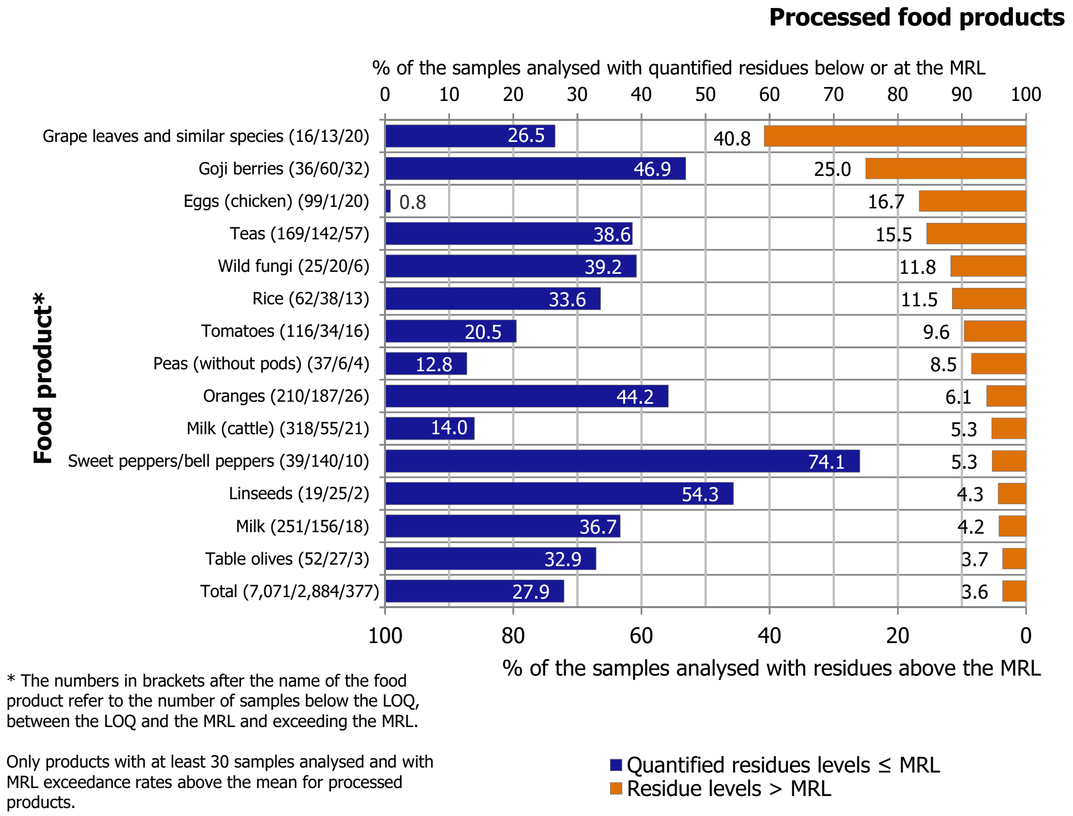



**Figure 11:** MRL exceedance rate and quantification rate for processed food products (excluding baby foods)

### 4.2.3. Results by pesticide

In 2018, more than 21 million analytical determinations (individual results) were submitted to EFSA and used for the analysis presented in this report. The number of single determinations for which the residue levels were quantified at or above the LOQ amounted to 114,286 (0.07% of the total determinations) in relation to 43,542 samples (40,326 in 2017) and 358 different pesticides (353 in 2017).

[38] https://ec.europa.eu/food/safety/rasff_en
[39] https://ec.europa.eu/food/sites/food/files/safety/docs/rasff_annual_report_2018.pdf

As in 2017, the pesticides mostly quantified (i.e. above the LOQ) were boscalid (RD) (6,720 determinations), imazalil (5,348 determinations), fludioxonil (RD) (4,550 determinations), acetamiprid (RD) (4,473 determinations) followed by fluopyram (RD) (4,131 determinations), azoxystrobin (3,794 determinations) and pyrimethanil (RD) (3,558 determinations); the full list can be consulted in Appendix C, Table C.1.

Pesticides were detected in 903 samples of cultivated fungi. The most frequently reported (in more than 10 samples) were: mepiquat, metrafenone, prochloraz (RD), copper, chlormequat, mercury,[40] cyromazine, carbendazim (RD), fosetyl-Al (RD), trimethyl-sulfonium cation, chlorate,[41,42] and diflubenzuron (RD). The presence of some of these is likely to be a consequence of a carry-over due to later uses of cereal straw as substrate for cultivating fungi (EFSA, 2016).

MRL exceedances, were found in 5,337 analytical determinations. The pesticides most frequently exceeding their corresponding MRLs are presented in Figure 12 (only pesticides with more than 0.05% of MRL exceedances and with at least 2,000 samples analysed). The pesticide with the highest MRL exceedance rate was chlorate[41] (10.3%). This is a notable exceedance rate in comparison with 2017 (6.4%). The MRL in place (0.01 mg/kg) is currently under revision by risk managers. As the result for chlorate is out of scale, it does not appear in Figure 12.

Other exceedances were reported for EU non-approved active substances:

- 71 samples containing chlordecone (banned at EU level and a POP,[43,44]). These were mainly 24 cassava root samples from French overseas territories (i.e. Guadeloupe and Martinique) and 39 animal commodities of unknown origin (swine: fat, kidney and liver; bovine fat and sheep fat).
- 44 samples containing nicotine, mainly appearing in goji berries coming from China, cultivated fungi and kales.
- 88 samples containing antraquinone, mainly in teas coming from China (66 samples). Quantifications not exceeding the MRL on antraquinone in goji berries coming from China were also reported.
- Tricyclazole in 109 rice samples (50 samples from India, 10 samples from Germany[45] and 26 samples with unknown origin) and 6 chilli pepper samples from Vietnam.
- 131 samples containing chlorfenapyr, mainly in 64 tomato samples of which 29 samples came from Greece[46] and 18 samples from Italy and 25 chilli pepper samples from different third countries.
- 124 samples containing carbendazim (RD) of which 24 were chilli pepper and 13 pitahaya samples coming all from different third countries and 20 rice samples coming mainly from India.
- 113 samples containing fipronil (RD) of which 63 were reported in chicken eggs mainly from Romania, 19 in chilli peppers mainly from Dominican Republic.

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[40] Regulation (EU) 2017/852 of the European Parliament and of the Council of 17 May 2017 on mercury and repealing Regulation (EC) No 1102/2008. OJ L 137, 24.5.2017, p. 1–21.

[41] The frequency of occurrence of chlorates can be explained by the fact that they are by-products of chlorine solutions (chlorine dioxide, chlorite and hypochlorite salts) used as sanitizing and disinfection agents in the food industry and as biocides. These uses, being necessary to ensure a good hygiene of food products, lead to detectable residues of chlorate in food most probably not linked to their use as pesticides. Since these substances have been used as pesticides in the past, they fall under the remit of the pesticide MRL regulation. Discussions on the revision/setting of more realistic MRLs for chlorates by the risk managers are currently on-going, with an expected vote in 2020. Some detections might not have been reported to EFSA in 2018 data collection due to the absence of a revised and agreed MRL.

[42] The presence of chlorate in cultivate fungi cannot be linked to a use as a pesticide, but rather as a by-product of disinfecting agent.

[43] Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants. OJ L 169, 25.6.2019, p. 45–77.

[44] EFSA has issued a Scientific Opinion reviewing the temporary MRLs for chlordecone in certain products of animal origin review temporary MRLs for chlordecone in certain products of animal origin with new health-based guidance values derived by the French authorities (EFSA, 2020b). In accordance with the policy for persistent organic pollutants, existing MRLs should be regularly reviewed, taking onto account results from pesticide monitoring programmes, since contamination of food is expected to gradually decrease over time.

[45] Rice is not grown in Germany. However, being a food product that can be blend the packaging process may have been carried out in this Member State.

[46] Chlorfenapyr is a non-EU approved active substance and therefore its use is not authorised in the EU territory. However, some Member States in their National Summary Report (EFSA, 2020c) reported that this insecticide was misused in tomato to control the leaf miner *Tuta absoluta* pest.

- 32 samples containing carbofuran mainly in goji berries from China (16 samples). Findings on this pesticide/crop/country of origin combination was also reported in 2017.
- 60 samples containing acephate and 35 containing methamidophos, of which 22 were in beans (with pods) from Kenya

Information on the number of analyses/determinations, the number of quantifications per pesticide, the quantification rate and the number of countries analysing for the single pesticides is available in Appendix C, Table C.1.

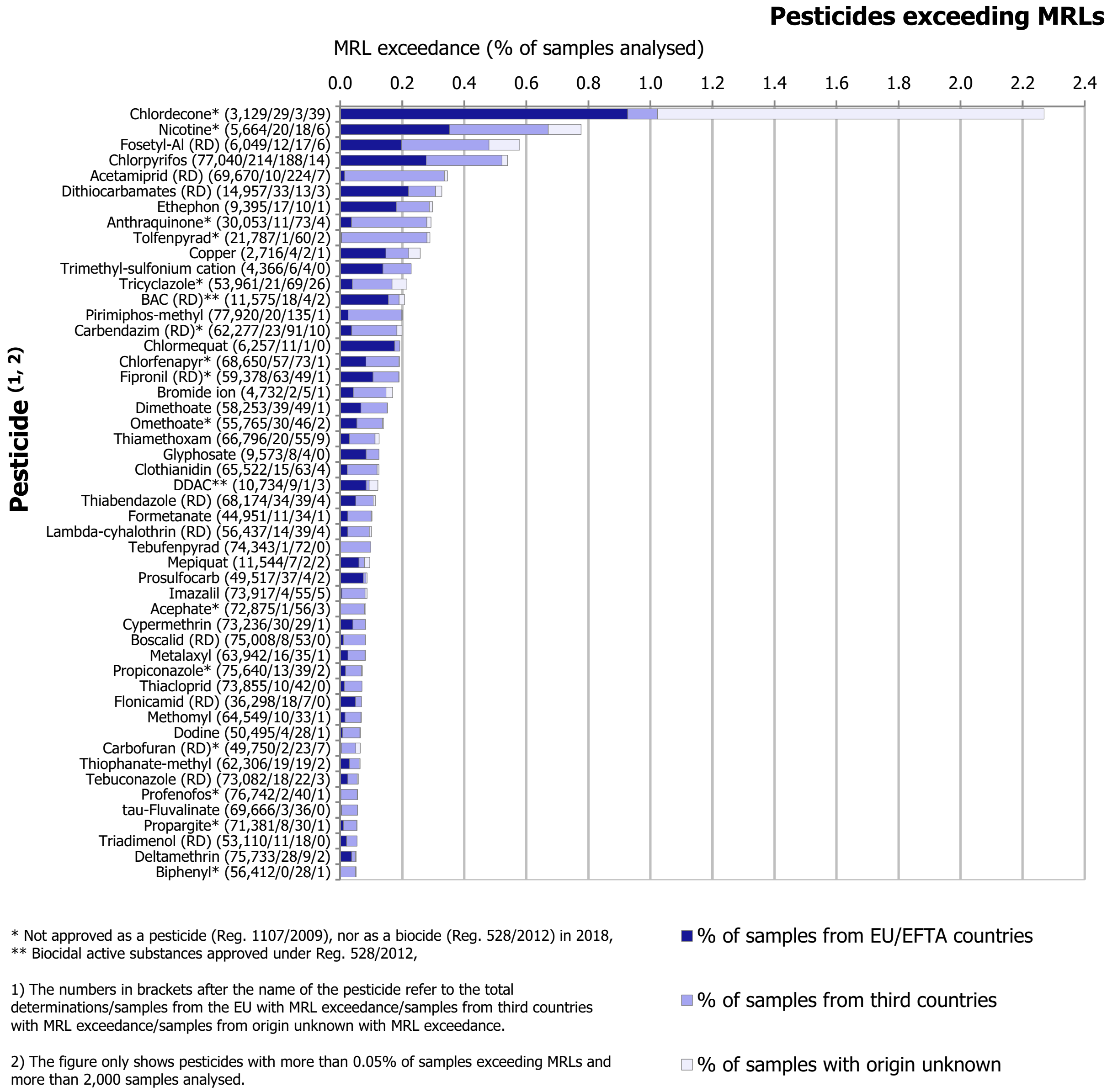



**Figure 12:** Frequency of MRL exceedances per pesticide and sample origin

### 4.2.4. Results of glyphosate residues in food

In 2018, glyphosate was analysed by 26 reporting countries. Overall, 9,573 samples of different food products (including processed products) were analysed for glyphosate residues; of these, 227 were baby food samples[8] and 192 were food samples of animal origin (including honey). The results showed that in 98% of the samples glyphosate was not quantified as it was the case in 2017. In 1.9% of the samples (179 samples), glyphosate was quantified at levels above the LOQ but below the MRL and in 12 samples (0.1%), the residue levels exceeded the MRL. The exceedance rate decreased in comparison to 2017 (0.2%). Glyphosate residues were not quantified in baby food samples.[8]

MRL exceedances were identified in samples grown in Argentina (1 dry bean sample), Germany (1 apple sample), India (1 dry lentil sample), Lithuania (4 honey and other apicultural product samples), Poland (2 buckwheat and other pseudo-cereal samples and 1 honey and other apicultural product sample) and Ukraine (2 millet samples).

In Figure 13, detailed quantification and MRL exceedance rates for glyphosate are plotted by food product where at least 10 samples were reported. The highest occurrence rate as it was the case in 2017, was reported for dry lentils.

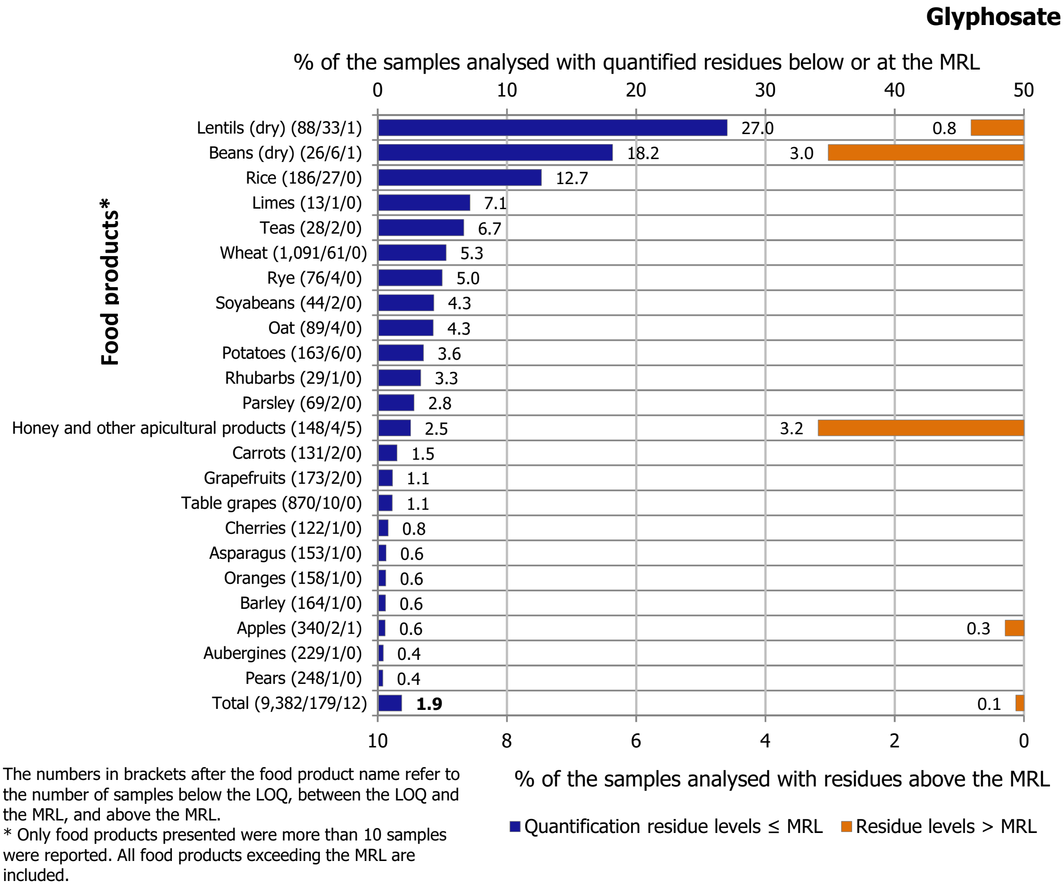



**Figure 13:** Glyphosate quantification and MRL exceedances rates

The use of plant protection products containing glyphosate-trimesium, a variant of glyphosate, may lead not only to residues of glyphosate, but also to residues of trimethyl-sulfonium cation, a compound for which specific MRLs have been established. However, in the recent EFSA MRL review (EFSA, 2019c), no EU Good Agricultural Practices (GAPs) or import tolerance were reported by Member States for glyphosate-trimesium. Therefore, with this uncertainty and the fact that trimethyl-sulfonium can also be formed when the samples undergo heat treatments with methylating agent, is difficult to estimate the origin of this substance.

Trimethyl-sulfonium cation was analysed in 4,366 samples by five reporting countries (Cyprus, Germany, Italy, the Netherlands and Portugal) of which 98.4% were free of quantifiable residues. In 1.3% of the samples (58 samples), residues were above the LOQ but below the MRL and in 0.2% of the samples (10 samples) the MRL of trimethyl-sulfonium cation was exceeded.

In Figure 14, detailed quantification and MRL exceedance rates for trimethyl-sulfonium cation are plotted by food product where at least 10 samples were reported. The highest quantification rate was in cultivated fungi, followed by grapefruit.

MRL exceedances were reported for samples from Germany (5 cultivated fungi samples), Mexico (2 asparagus samples), Poland (1 cultivated fungi sample) and Turkey (1 cucumber sample and 1 lime/linden flower sample).

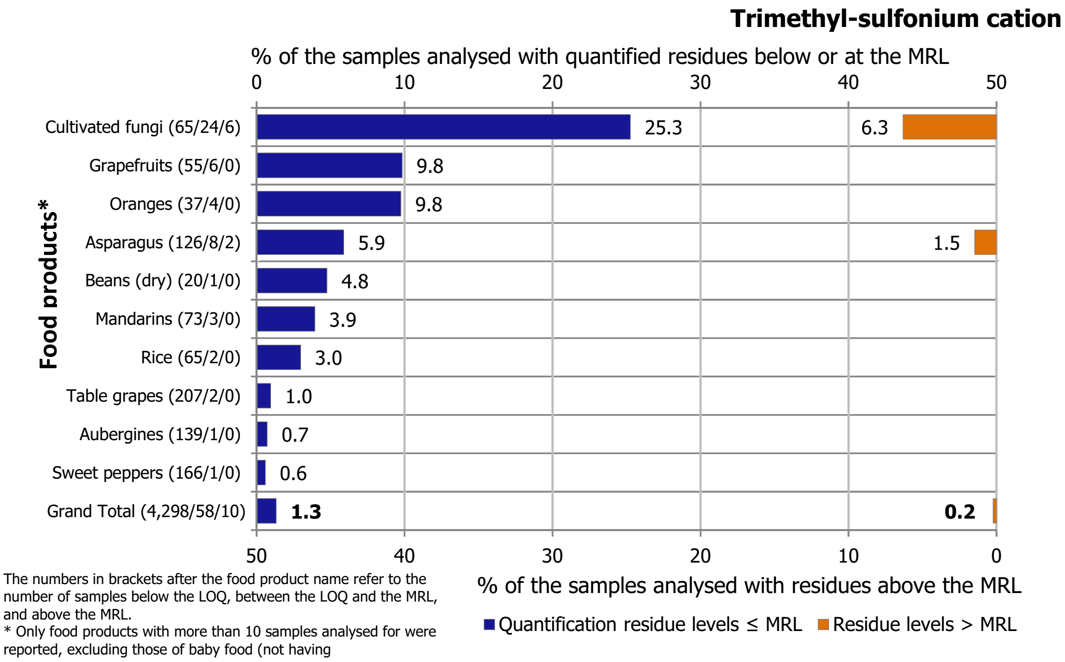



**Figure 14:** Trimethyl-sulfonium cation quantification and MRL exceedances rates

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

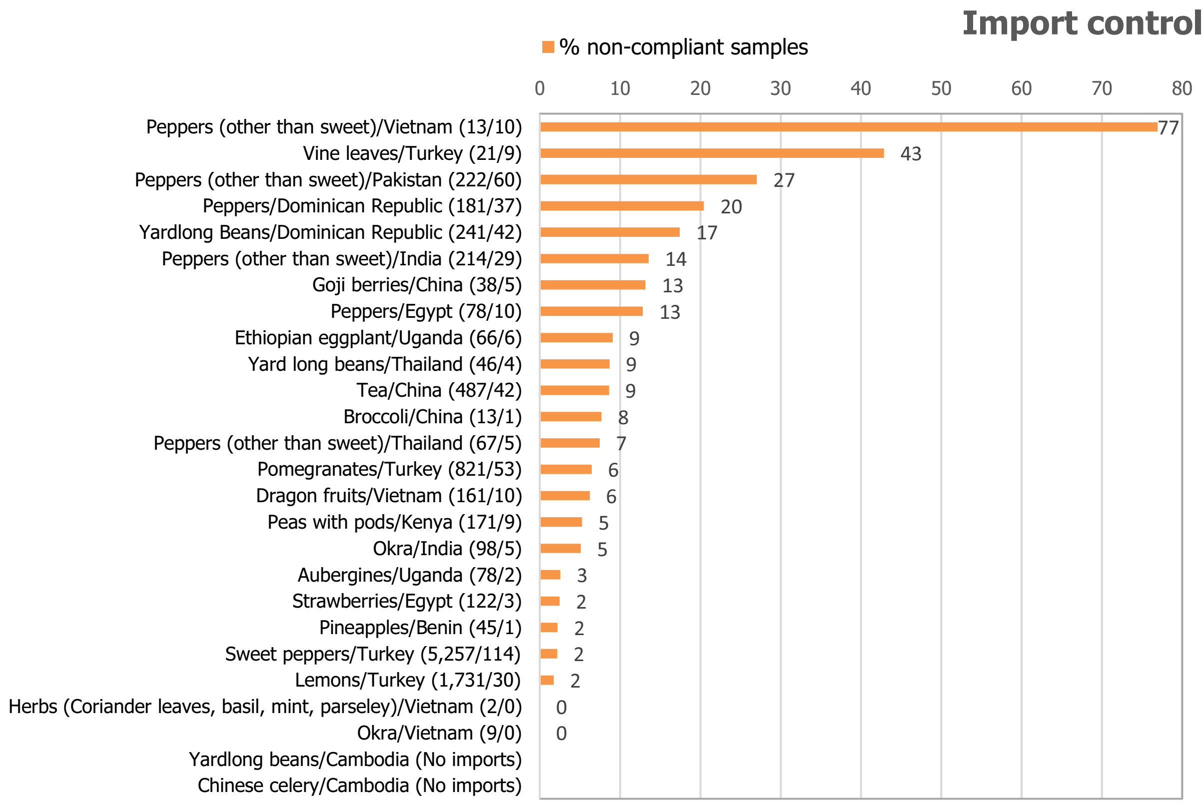
According to the provisions of Regulation (EC) No 669/2009[47] on import controls, in 2018, certain food products from Benin (pineapples), Cambodia (yardlong beans and chinese celery), China (tea, goji berries, broccoli), Dominican Republic (yardlong beans, peppers), Egypt (strawberries, peppers), India (okra, peppers (other than sweet)), Kenya (peas with pods), Pakistan (peppers (other than sweet)), Thailand (peppers (other than sweet)), yardlong beans), Turkey (sweet peppers, vine leaves, pomegranates, lemons), Uganda (aubergines, Ethiopian eggplant) and Vietnam (peppers (other than sweet), dragon fruits, herbs (coriander leaves, basil, mint, parsley, okra)) were subject to an increased level of official controls for certain pesticides at the point of entry into the EU territory. A description of the required controls of pesticide hazard (type of products and countries of origin) relevant for the calendar year 2018 can be found in Appendix C, Table C.2.

As for the last EU report on pesticide residues (2017 control year), the results presented in this paragraph are based on the 2018 results provided by the European Commission, i.e. summary statistics on commodities tested and the exceedance rates with no detailed information on the pesticides analysed and quantified.

Overall, 82,971 consignments of products covered by the Regulation (EC) No 669/2009[21] were imported to the EU (76,789 in 2017). Of those, 10,182 consignments were selected for laboratory analyses. A total of 487 consignments (4.8% of the total number of consignments submitted for analysis) were considered as non-compliant with EU legislation on pesticide residues, considering measurement uncertainty (3.0% in 2017).

Among food commodities analysed in 2018, the ones reported above 10% non-compliance rate were: peppers (other than sweet) from Vietnam (77%), Pakistan (27%), India (13.5%), vine leaves from Turkey (43%), sweet peppers from Dominican Republic (20%) and Egypt (13%), yardlong beans from Dominican Republic (17%) and goji berries from China (13%). These results are reported in Figure 15.

[47] 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.




The numbers in brackets after the food product/country of origin, refer to the number of samples analysed under import control and the number of non-compliant samples.

**Figure 15:** Frequency of non-compliant analysed in the framework of the reinforced import controls under Regulation (EC) No 669/2009

### 4.2.6. Results on food for infants and young children

Reporting countries analysed 1,658 samples of foods for infants and young children as defined in Regulation (EU) No 609/2013[16] and covered by Directives 2006/125/EC and 2006/141/EC (herein referred as baby food). The types of baby food samples were: 688 baby foods other than processed cereal-based foods samples, 147 follow-on formulae samples, 1 food for infants and young children sample, 172 infant formulae samples and 650 processed cereal-based foods for infants and young children. From the overall number of baby food samples analysed, 538 samples were flagged as organic samples.

Regulation (EU) No 2017/660 requested Member States to sample 10 samples of processed cereal-based baby food. For this reason, 600 samples among the 1,658 samples were flagged as EUCP sample.

The rate of samples with no quantifiable residues was 90.3% lower than in 2017 (94.6%). Quantified residues (at or above the LOQ but below the MRL) were found in 9.7% (161 samples), higher than in 2017 (5.4%). MRL exceedances[7] were reported in 1.3% of the samples (22 samples) (1.5% in 2017) and non-compliance in 0.4% of the samples (7 samples), (0.6% in 2017). In 1% of the samples (9 samples) there were two residues reported in the same sample (Figure 16).

Regarding the analytical determinations, 757 different pesticides were analysed, of which 23 were quantified in concentrations at or above the LOQ. Like in the previous reporting years, the most frequently quantified compounds in baby food were chlorates (quantified in 80 samples; 4.8%), followed by copper (39 samples; 2.4%). Pesticides found to occur in at least five samples were: bromide ion, cypermethrin, fosetyl-Al (RD) and benzalkonium chloride (BAC) (RD).

The frequency of occurrence of chlorates can be explained by the fact that they are by-products of chlorine solutions (chlorine dioxide, chlorite and hypochlorite salts) used as sanitising and disinfection agents in the food industry and as biocides. These uses, being necessary to ensure a good hygiene of food products, lead to detectable residues of chlorate in food most probably not linked to their use as pesticides. BAC belong to a group of quaternary ammonium compounds that are widely used in biocides (disinfectants); since these substances have been used as pesticides in the past, they fall under the remit of the pesticide MRL regulation.

The occurrence of copper can be explained by the fact that is approved as a baby food nutrient. Copper compounds may also result from other sources (natural occurrence of copper in plant or animal products or from feed additive use).

The results for fosetyl-Al may include the presence of phosphonic acid residues coming from potassium phosphonates (which can be used as a fertiliser but is also approved as a fungicide) and disodium phosphonate which is also approved for use as a fungicide.

Cypermethrin was reported in 6 samples (0.36%), of which the MRL was not exceeded. Cypermethrin is a synthetic pyrethroid insecticide that aims at resembling naturally occurring pyrethroids (chemicals with insecticidal properties).

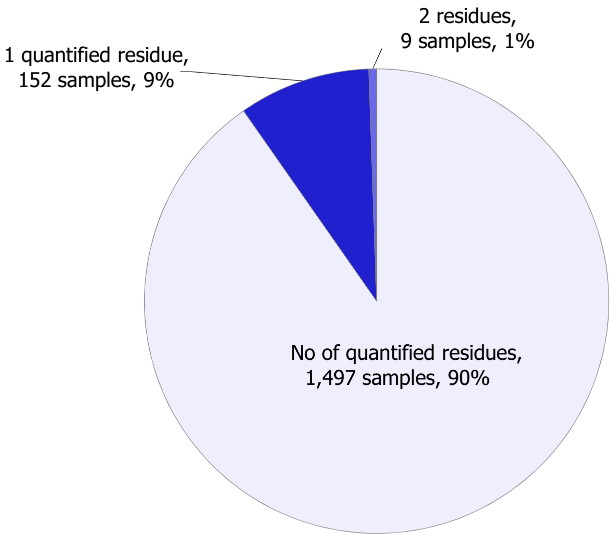



**Figure 16:** Number of quantified residues per individual baby food samples

### 4.2.7. Results on organic food

In 2018, 5,735 samples of organic food (excluding baby food)[48] were analysed. This is 6.3% of the total number of samples. In 2017, the organic rate was practically the same (6.6%). In the framework of the EUCP, samples from commodities originating from organic farming (where available in a Member State and in proportion to the available market share of the commodities to be sampled) were to be taken with a minimum of one organic sample per commodity. In total, 781 organic samples were taken under the EUCP and are included in the total number of organic samples in this section.

Overall, 4,863 samples did not contain quantifiable residues (84.8% of the analysed samples vs. 86.3% in 2017); 794 samples contained quantified residues below or at the MRL level (13.8% vs. 12.2% in 2017) and 78 samples were reported with residue levels above their corresponding MRLs (1.4% vs. 1.5% in 2017), of which 0.5% (29 samples) were non-compliant in 2018.

Compared to conventionally produced food (non-organic), the MRL exceedance and quantification rates were lower in organic food. In 2018, the MRL exceedance rate was 1.4% in organic food, while 4.8% for conventional food[49]; the same pattern was observed for the quantification rates, which were 13.8%[50] in organic food and 46% in conventional food.[51] A comparison between organic and conventional foods is presented in Figure 17. Major differences were identified, in particular for fruits and nuts, vegetables and cereals.

[48] Of the total 1,546 baby food samples, 538 were also flagged as organic samples. These were not included in this section since the results for this food group are presented in detail in Section 4.2.6.

[49] The overall MRL exceedance rate for the 91,015 samples is 4.5%. In this section, baby food samples are excluded.

[50] For this comparison, all pesticides were considered; the naturally occurring substances covered by the MRL legislation were not excluded since they are also present in conventional food and are therefore also covered in the calculation of the quantification rate for conventional food.

[51] The overall quantification rate for the 91,015 samples is 43.3%. In this section, baby food samples are excluded.

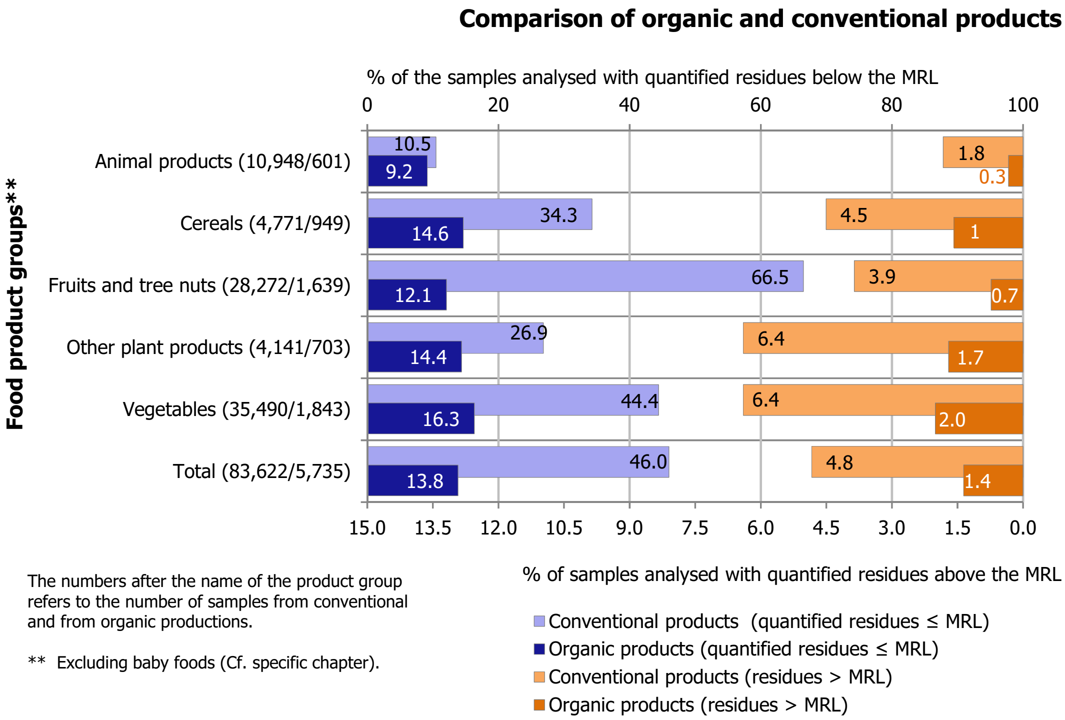



**Figure 17:** Comparison of organic and conventional foods (excluding baby food): quantification and MRL exceedance rates for main food product groups (including all pesticides)

In 2018, 150 different pesticides (134 pesticides in 2017) were quantified in concentrations at or above the LOQ. The pesticides most frequently quantified in at least five samples are presented in Figure 18. The pesticides permitted in organic farming, naturally occurring compounds and substances resulting from environmental contamination (persistent pesticides no longer used in the EU) are specifically labelled with an asterisk.

Similar to the previous reporting years, the most frequently quantified residue in organic food was copper, found in 225 samples (in 28 different food items, mostly wheat, linseeds, bananas, oranges, peas with pods and maize), followed by dithiocarbamates (RD) in 90 samples (22 commodities, mostly in cauliflower and broccoli), bromide ion in 82 samples (23 commodities, mostly wheat and sweet peppers), chlorates in 62 samples (28 food items, mostly in wheat), spinosad in 60 samples (17 commodities, mainly in tomatoes), fosetyl-Al (RD) in 51 samples (23 commodities, mostly wheat) and chlorpyrifos in 35 samples (29 commodities, mainly in bananas). Other pesticides found in less than 30 samples are reported in Figure 18 together with the above-mentioned pesticides.

MRL exceedances[52] in organic products were reported mainly for chlorate (34 samples), followed by 32 other pesticides. The details on samples of organic products exceeding a legal limit can also be found from the Excel file published as a supplement to this report (MRL exceedance supplement).

It was noted that copper, spinosad, azadirachtin and pyrethrins can be used in organic farming as far as their use is covered by the general agricultural policy in the Member State concerned. Since the presence of residues of these compounds is linked to agricultural practices permitted in organic farming in the Union, the positive measurements of these substances in organic food is not unexpected.

Residues of HCB and DDT result from environmental contaminations (mainly from the soil) due to the use of these persistent in the environment compounds as pesticides in the past. Quantifications of copper, bromide ion, chlorate and dithiocarbamates in certain commodities may also result from other sources, e.g. $CS_2$ measured as a residue from dithiocarbamates also occurs naturally in some plants, particularly in Brassicaceae (e.g. broccoli, cauliflower) and Alliaceae.

Fosetyl-Al residues were among the top three most frequently quantified residues in organic food. Considering that the current residue definition for fosetyl-Al is 'sum of fosetyl-Al and phosphonic acid and their salts expressed as fosetyl', the results for fosetyl-Al may include the presence of phosphonic acid residues coming from potassium phosphonates (which can be used as a foliar feed fertiliser but is

[52] For conventional and organic products, the MRLs established in Regulation (EC) No 396/2005 are applicable.

also approved as a fungicide) and disodium phosphonate which is also approved for use as a fungicide. These findings, therefore, do not necessarily indicate that there was just a use of fosetyl-Al in the field. This has been explicitly communicated to food business operators in 2015 through a note on the DG SANTE webpage and through the relevant trade associations.[53]

The occurrence of other pesticides not authorised in organic farming can – as for conventional products – be the result of spray drift, environmental contaminations or contaminations during handling, packaging, storage or processing of organic products. This occurrence could also be linked to wrong labelling of conventionally produced food labelled as organic food. Therefore, Member States should try to elucidate the reasons for the presence of pesticides found occasionally in organic food and are not permitted in this type of products (e.g. chlorpyrifos, imazalil, nicotine, thiacloprid).

[53] https://ec.europa.eu/food/sites/food/files/plant/docs/pesticides_appr-act-subs_eu-rules_letter-stakeholders.pdf

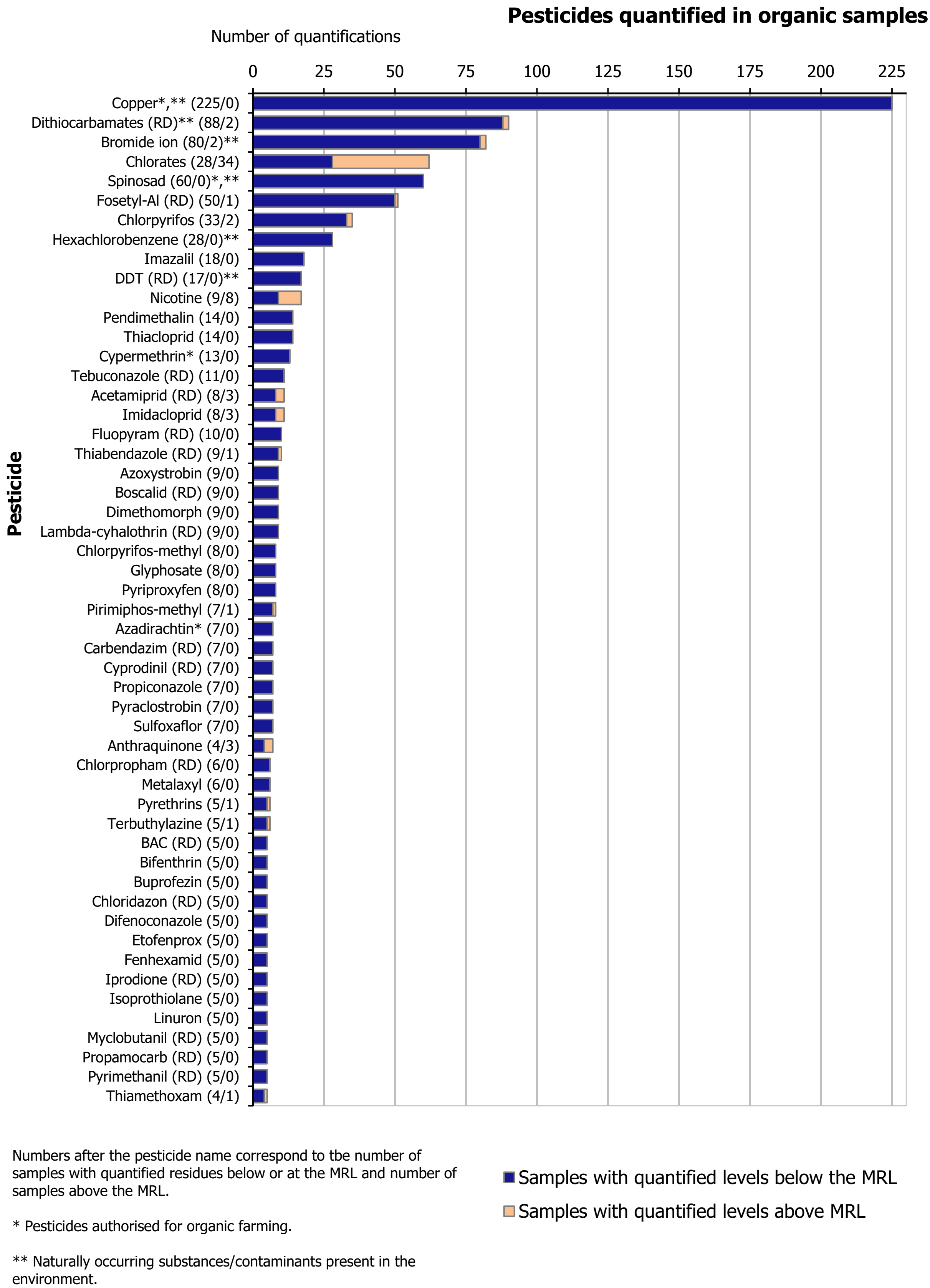



**Figure 18:** Pesticides most frequently quantified in organic samples (pesticides with at least five positive quantifications reported)

### 4.2.8. Results on animal products

In total, 11,549 samples[54] of products of animal origin were analysed. In Figure 19, the total number of samples taken is broken-down by food group.

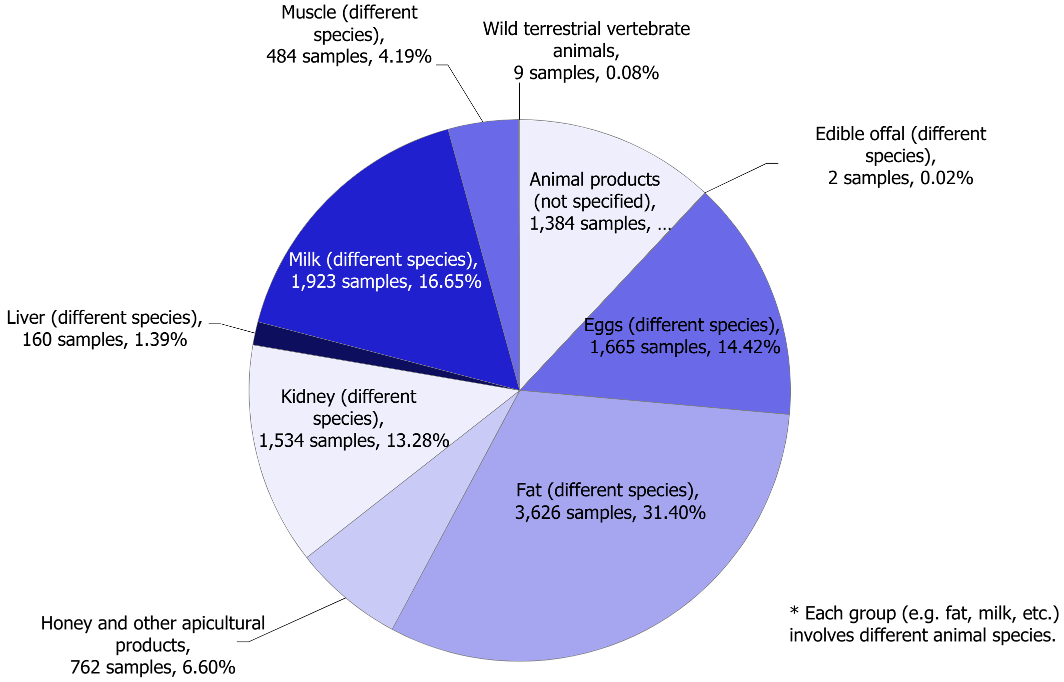



**Figure 19:** Number of samples of animal products tested, broken-down by food group

The results showed that 10,145 samples were free of quantifiable residues (87.8% vs. 87.5% in 2017) while 1,404 samples (12.2% vs. 12.5% in 2017) contained one or several pesticides in quantifiable concentrations. MRL exceedances were identified in 202 samples (1.7% vs. 1.1% in 2017) of which, 113 samples (1.0%) were non-compliant considering measurement uncertainty.

The MRL exceedances are related to the following products: chicken eggs (69 samples), swine liver (29 samples) and milk (39 samples of which 21 were of cattle). Multiple residues were reported in 141 samples (1.2%); up to four different pesticides were reported in the same sample (Figure 20).

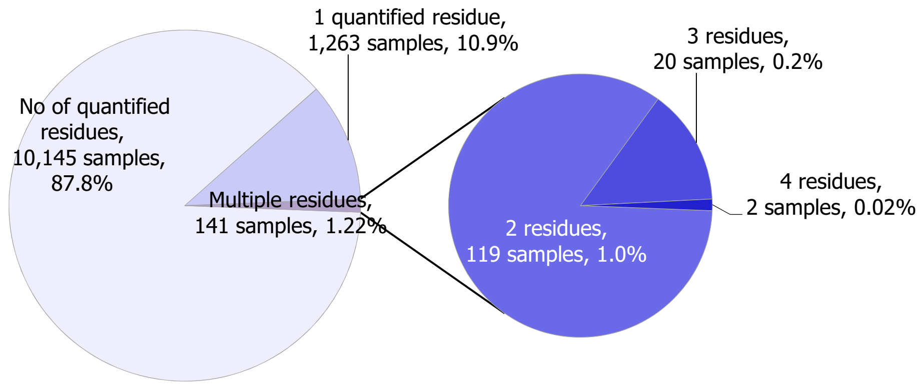



**Figure 20:** Number of quantified residues per individual sample of animal origin

In Figure 21, the 48 pesticides found in animal products at levels at or above the LOQ are presented.

The most frequently quantified substances (at or above 10 samples) were chlordecone, DDT (RD), HCB, copper, thiacloprid, fipronil (RD), BAC (RD), chlorates, amitraz (RD), didecyldimethylammonium chloride (DDAC), acetamiprid (RD), chlorpyrifos, dimoxystrobin (RD), mercury and HCH (beta).

[54] This is a subset of samples reported to EFSA as some Member States report residues and other substances in live animals and animal products under veterinary medicinal product data collection.

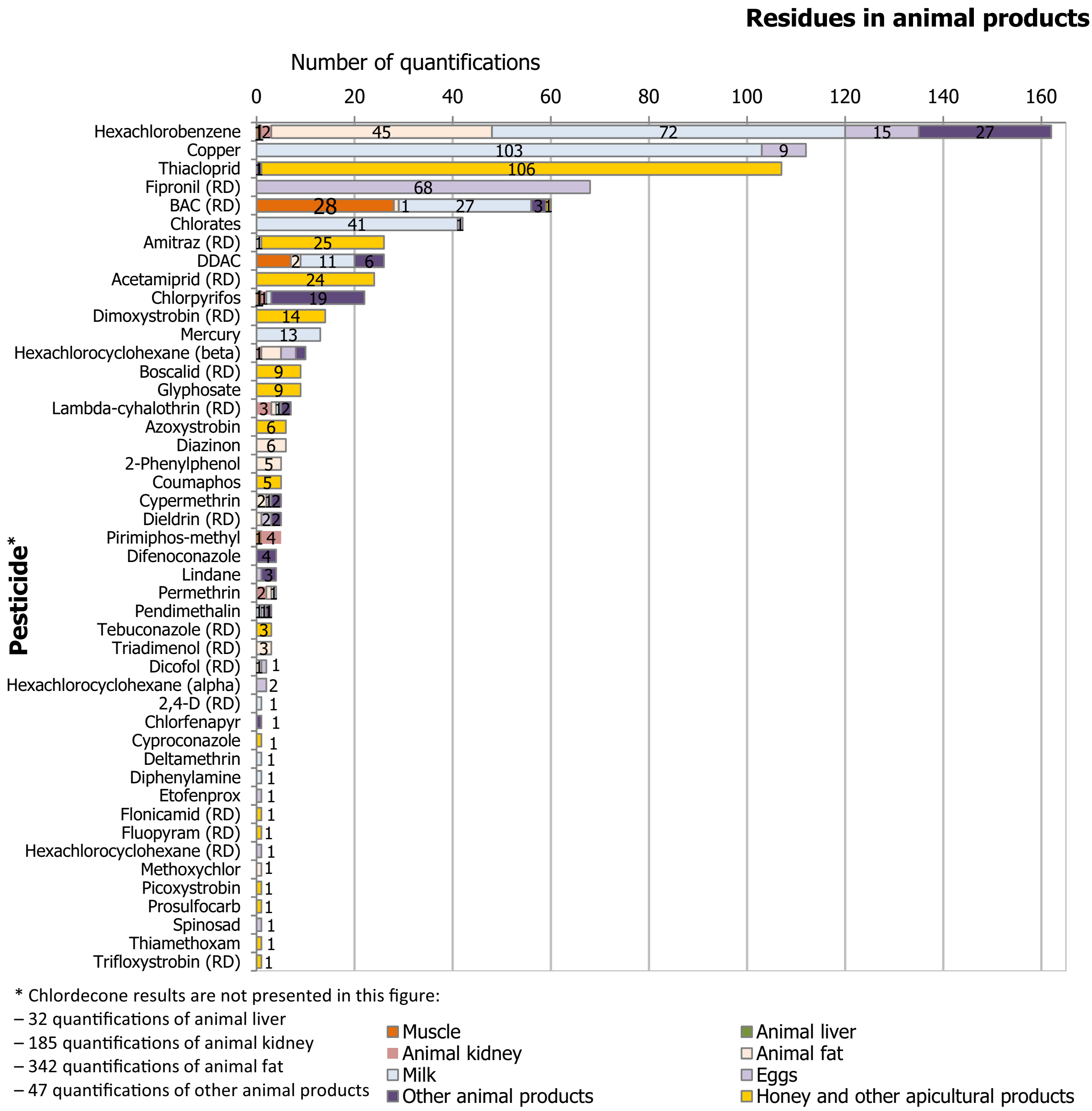



**Figure 21:** Pesticides most frequently quantified in animal products (in absolute numbers of detections at or above the LOQ)[55]

Chlordecone, DDT, HCB and HCH (beta) are still found in the food chain due to their persistence in the environment. These persistent compounds were found mainly in animal fat, kidney and liver. DDT and HCB were also reported in eggs. To be noticed, the high frequency of chlordecone samples reported only by France on their overseas territories (5.3%) with unknown origin.

It is noted that copper residues found mainly in milk are not necessarily linked to the use of copper as a pesticide, but may result from the use of feed supplements, which contain copper compounds.

Fipronil was reported to be found only in eggs (68 samples). Fipronil, is a veterinary medicinal product or biocide and its presence in eggs is the result of illegal use. Due to the fipronil incident in chicken eggs in 2017, and EFSA's report after being mandated (EFSA, 2018c), EFSA keeps recommending Member States to continue analysing for acaricides in animal products.

Chlorate, BAC and DDAC were reported mainly in milk either due to being a by-product of chlorine solutions (chlorine dioxide, chlorite and hypochlorite salts) used as sanitising and disinfection agents in

[55] Chlordecone results are excluded from this representation. Its results are: 32 quantification of animal liver, 185 of animal kidney, 342 of animal fat and 47 of other animal products.

the food industry or either as biocides (disinfectants). However, since these substances have been used as pesticides in the past, they still fall under the remit of the pesticide MRL regulation.

Chlorpyrifos was reported mainly in terrestrial invertebrate animals. Its presence is likely to be due to a carryover of the use in feed. Mercury was reported in 13 milk samples from the EU. Mercury is a banned active substance. However, it persists due to environmental contamination.

As in previous reports and due to the importance of beekeeping, EFSA gave specific attention to pesticide occurrence in honey and other apicultural products. In 2018, 762 samples of honey and other apicultural products were analysed. In 601 samples (78.9%), no quantifiable residues were found. In 152 samples (19.9%), residues at or above the LOQ but below or at the MRL were identified. MRL exceedances were reported in 9 samples (1.2%), at least for one of the residues analysed. The number of pesticides analysed in honey varies from one reporting country to another. Overall, 667 different pesticides were analysed. The pesticides uniquely reported in honey and other apicultural products above the LOQ were thiacloprid (106 samples), amitraz (25 samples), acetamiprid (24 samples) and dimoxystrobin (14 samples). MRLs were exceeded[56] for the following substances: glyphosate (5 samples), acetamiprid (RD) (2 samples), boscalid (2 samples) and dimoxystrobin (RD) (2 samples).

In the MRL exceedance Excel file published as a supplement to this report, further detailed data on the pesticide/food combinations found to exceed the legal limits in animal products is presented.

### 4.2.9. Multiple residues in the same sample

Multiple residues in one single sample may result from the application of different types of pesticides (e.g. application of herbicides, fungicides or insecticides against different pests or diseases) or use of different active substances avoiding the development of resistant pests or diseases and or uptake of persistent residues from soil from previous seasons treatments or spray/dust drift to fields adjacent to treated fields. Besides multiple residues resulting from agricultural practice, multiple residues may also occur due to mixing or blending of products with different treatment histories at different stages in the supply chain, including contamination during food processing. According to the present EU legislation, the presence of multiple residues is compliant, as long as each individual residue level does not exceed the individual MRL set for each active substance.

In 2018, of the 91,015 samples analysed, 43,542 samples (47.8%) contained one or several pesticides in quantifiable concentrations. Multiple residues were reported in 26,461 samples (29.1% vs. 27.5% in 2017); in an individual goji berry sample coming from China, up to 29 different pesticides[57] were reported (Figure 22).

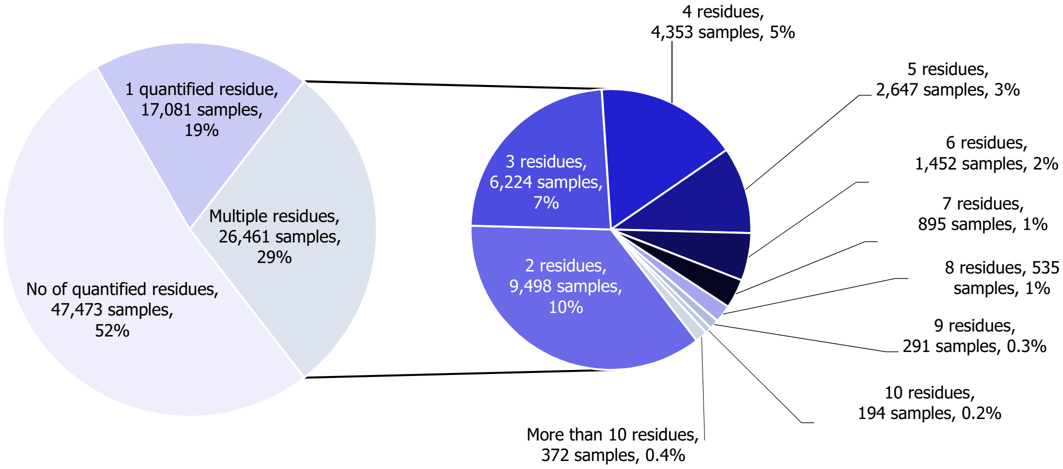



**Figure 22:** Percentage of samples with single and multiple quantified residues

The frequency of multiple residues was slightly higher in unprocessed products (31.2%) compared to processed products (12.4%) for samples containing more than one pesticide in concentrations

[56] The number of MRL exceedances in honey and other apicultural products were 9 samples, but 11 determinations i.e. two samples had multiple residues.

[57] This number of pesticides in a goji berry sample is likely to be due to mixing of different lots.

higher or equal to the LOQ. In 372 samples, 10 pesticides were found in the same sample. Of those, 89 samples were corresponding to processed products and 283 to unprocessed products.

In Figure 23, the results of unprocessed food products with multiple residues are presented, broken down by the number of residues found in quantified concentrations; only food products with at least 100 samples analysed and more than 35% of multiple residues are included.

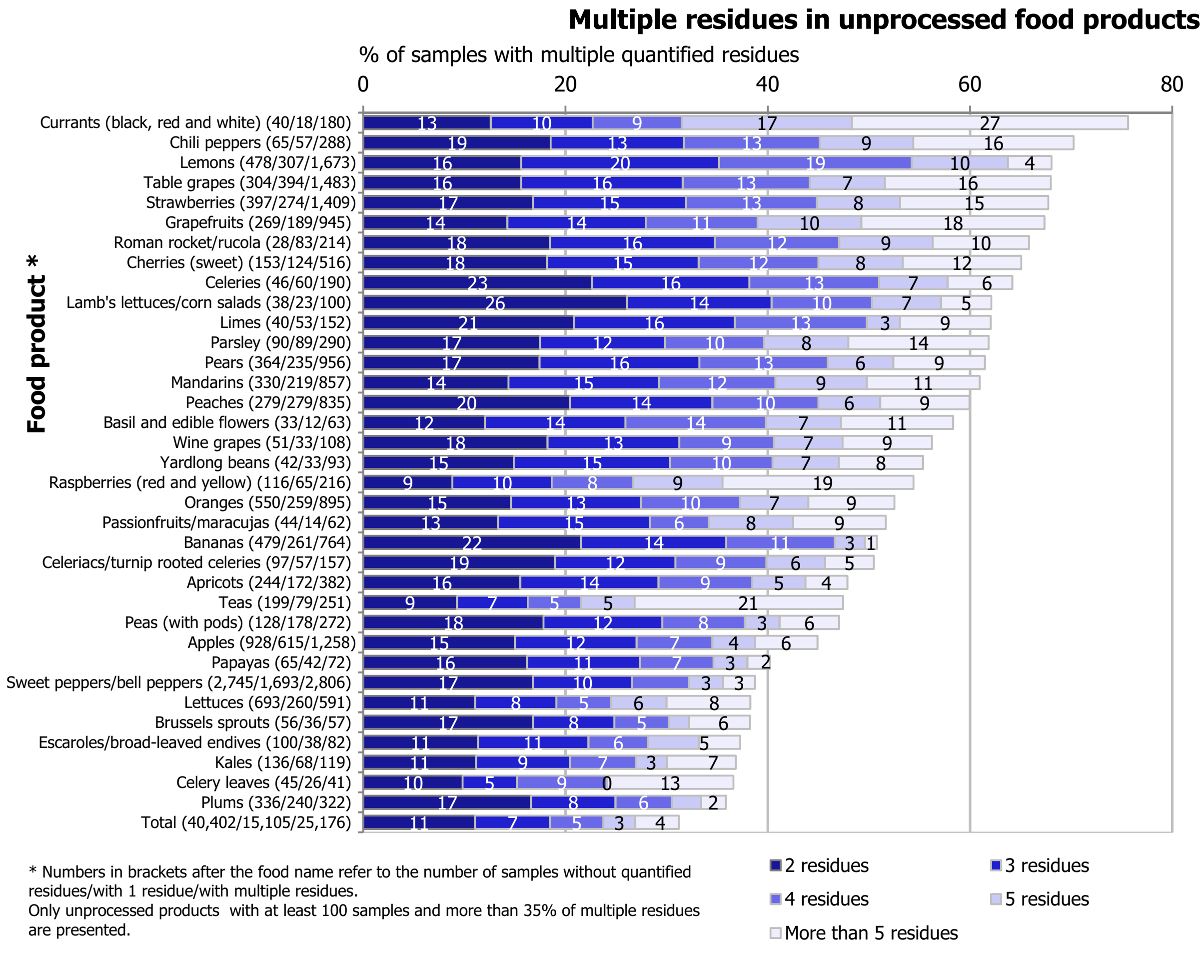



**Figure 23:** Unprocessed food products most frequently containing multiple quantified residues

The highest frequency of multiple residues in unprocessed products (above 65%) was found in currants (black, red and white) (75.6% of the total unprocessed samples analysed), chilli peppers (70.2%), lemons (68.1%), table grapes (68.1%), strawberries (67.7%), grapefruit (67.4%), Roman rocket/rucola (65.8) and sweet cherries (65.1). These findings for these commodities are comparable to those from previous years. Celeries, lamb's lettuce/corn salads, limes, parsley, pears, mandarins, peaches, basil and edible flowers, wine grapes, yardlong beans, raspberries (red and yellow), oranges, passion fruit/maracujas and bananas were found to contain multiple residues in more than 50% of the samples analysed.

A similar analysis was performed for processed food products with multiple residues. In Figure 24, the results for the top ranked processed food products with multiple residues are broken down by the number of residues found in quantified concentrations; only food products with at least 10 samples analysed are included.

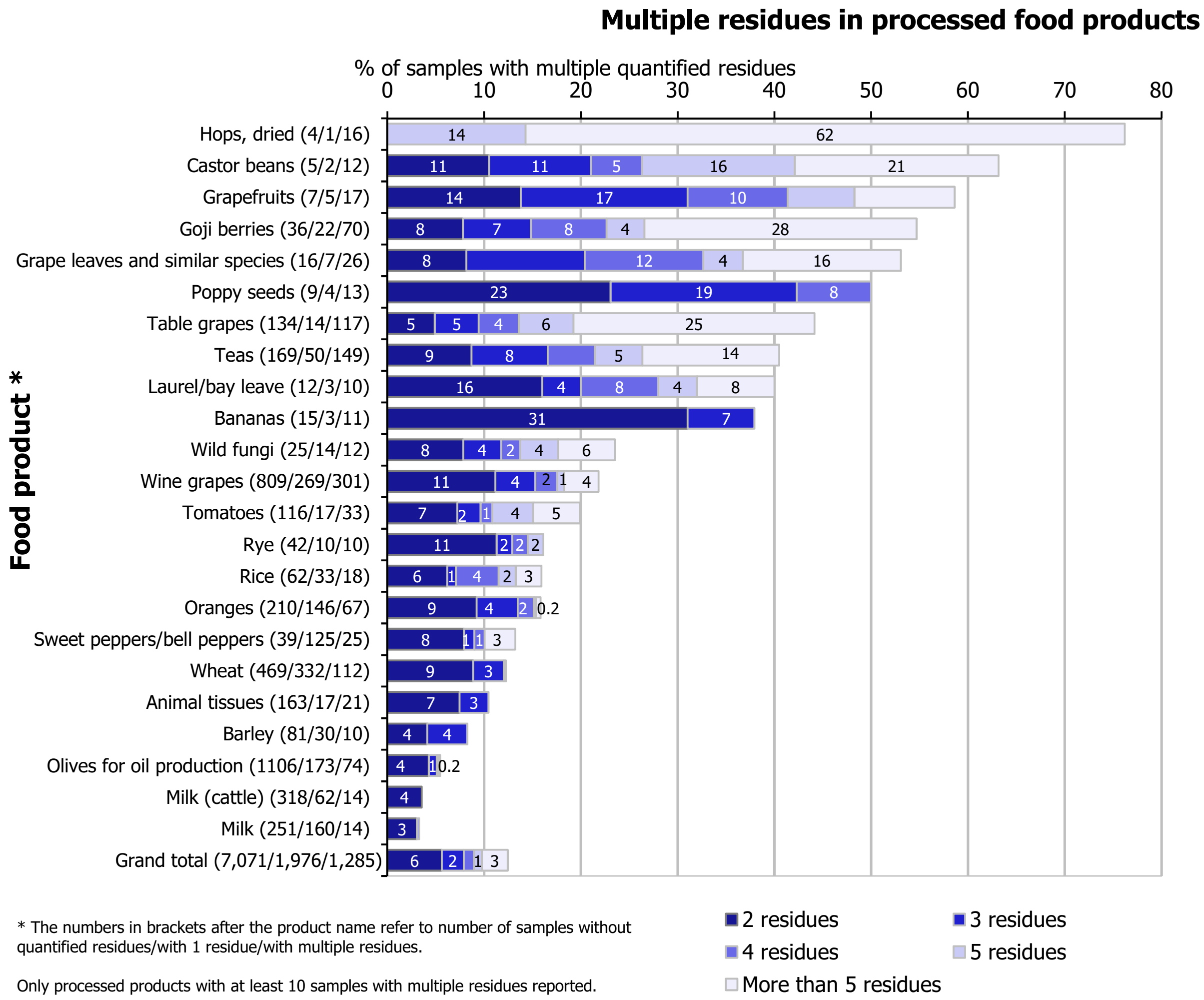



**Figure 24:** Processed food products most frequently containing multiple quantified residues

The highest frequency of multiple residues (above 40%) was found for processed dried hops (76%), castor beans (63%), grapefruit (59%), goji berries (55%), grape leaves and similar species (53%), poppy seeds (50%), table grapes (44%) and teas (41%).

## 4.3. Reasons for MRL exceedances

The legal limits (MRLs) are established based on supervised residue trials that reflect the residue levels expected under field conditions or, for animal products, animal feeding studies based on appropriate dietary requirements of different food producing animals. The MRL value is estimated using statistical methods and is usually established to cover at least the upper confidence interval of the 95th percentile of the expected residue distribution. Therefore, a percentage of approximately 1% MRL exceedances are expected even if the GAPs are fully respected.

In 2018, 4.5% of samples analysed contained pesticide residues exceeding their respective MRLs (4,142 samples). The MRL exceedance rate for 2017 was 4.1% (3,620 samples in total). Multiple MRL exceedances per sample were reported for 2,946 samples (909 from EU/EEA origin, 1,814 from third countries, and 223 for samples of unknown origin).

The possible reasons for MRL exceedances are summarised below:

- For samples coming from third countries:
  - use of non-EU-approved pesticides on crops for which no import tolerances are requested by the importers, as foreseen in Article 6 of Regulation (EC) No 396/2005 or are still on-hold pending scientific information to be provided (tricyclazole in rice),
  - presence of contaminants with unclear origin in concentrations exceeding the legal limit (e.g. anthraquinone in tea, nicotine in mushrooms).

- For samples originating from the internal market (reporting countries):
  - GAP not respected: i.e. different to the ones set as the GAP application rates, preharvest intervals, number or method of applications of the pesticide product (e.g. ethephon in sweet peppers). This may also concern drift-contamination resulting from inappropriate application during adverse weather conditions or unauthorised use of EU-approved pesticides in crops where MRLs have not been set.
  - Use of non-EU-approved pesticides (e.g. carbendazim (RD) in chilli peppers, methamidophos in beans (with pods)).
  - Contamination from previous uses uptake of residues from the soil or from substrate (e.g. mepiquat or nicotine in mushrooms).
  - Natural presence in the crop (e.g. residues included in the definition for dithiocarbamates in brassica and allium vegetables, bromide ion).
  - Existing MRLs not reflecting the uses currently authorised for some pesticides (e.g. phosphonates covering fosetyl, potassium and disodium phosphate).
  - Presence of biocide residues used as pesticides in the past and continuing to be monitored under the pesticide legislation (Regulation (EU) No 528/2013[58]) (e.g. BAC and DDAC in baby food).
  - Use of chlorine solutions (chlorine dioxide, chlorite and hypochlorite salts) used as sanitising and disinfection agents in the food industry generate chlorate salts that exceed the default MRL of 0.01 mg/kg.
  - Environmental contamination: such as mercury included in the Minamata Convention[59] or POPs included in the Stockholm Convention of prohibited substances (UNEP, 2001). These substances are no longer used as pesticides but are very persistent in the environment and found in the food chain (e.g. chlordecone in animal commodities but also in root commodities, DDT (RD) in chicken eggs and beta HCH in bovine fat).

Among the 9,234 samples of unknown origin analysed in 2018, MRLs were exceeded for 346 samples of which, 223 had multiple MRL exceedances).

More details on the pesticide/crop combinations exceeding the legal limits are compiled in the Excel file published as a supplement to this report (see 'Supporting Information').

# 5. Dietary exposure and analysis of health risks

To estimate the dietary exposure to pesticide residues, EU food consumption information originating from dietary surveys conducted by Member States and others taken from WHO matching EU clusters, is combined with occurrence data provided by reporting countries per food commodity.

The exposure assessment methodology used so far by EFSA relies on a conservative deterministic model and is expected to result in an overestimation of the exposure to a given single substance. The Pesticide Residues Intake Model (PRIMo) integrates the principles of the WHO methodologies for acute (acute) and chronic (chronic) risk assessment (FAO, 2017) adjusted to the food consumed by the EU population. In this report the dietary exposure assessment was performed with revision 3.1 of the PRIMo model (EFSA, 2018a). The file including the exposure assessment is published separately as a supplement to this report.

Two types of dietary exposure assessments were performed:

- The acute exposure assessment is based on the consumption of a 'large portion' of a commodity that is consumed on a single day or meal. There have not been any changes in this approach (except for updates in commodity consumption data included in PRIMo rev. 3.1) compared to previous EFSA risk assessments (EFSA, 2013, 2015c,e,g, 2017f, 2018a,h).
- The chronic exposure assessment estimates the dietary exposure of average concentration of a pesticide present on occurrence data and average daily consumption of food commodities over a period of time. The chronic dietary exposure to pesticides was estimated for all food items for which average consumption data were available in PRIMo revision 3.1 and for which residue concentrations were reported (EFSA, 2018d, 2019d).

[58] Regulation (EU) No 528/2012 of the European Parliament and of the council of 22 May 2012 concerning the making available on the market and use of biocidal products, OJ L 167, 27.6.2012, p. 1–123.
[59] http://www.mercuryconvention.org/

In order to analyse acute and chronic risks to consumer health, EFSA compares dietary exposure to a residue (i.e. amount of residue consumed) with its corresponding health-based guidance value (i.e. residue intake above which possible negative health effects cannot be excluded).

- For the acute risk assessment, the dietary exposure per pesticide residue is compared to the substance's acute reference dose (ARfD, in mg of residue/kg body weight (bw)).
- For the chronic risk assessment, the dietary exposure per pesticide residue is compared to the substance's acceptable daily intake (ADI, in mg of residue/kg bw per day).

Based on the current scientific knowledge, when the dietary exposure to a substance is found to be lower than or equal to its health-based guidance value the health risk for the consumer is low. When it exceeds its health-based guidance value, possible negative health outcomes cannot be excluded.

Results on exposure to multiple residues (cumulative risk assessment[60]) are not presented in this report. The two pilot assessments on the risks to humans to multiple pesticide residues in food (on the nervous system and on the thyroid) are to be published on early 2020. In future, the deterministic methodology used in the current reports will be replaced by a more realistic one, based on probabilistic models that allows calculation of an exposure distribution rather than only point estimate using the highest value.

## 5.1. Acute risk assessment

The acute risk assessment was estimated for samples matching the pesticide/crop combinations covered by the 2018 EU-coordinated programme. Samples from national programmes matching these EUCP pesticide/crop combinations were pooled with those previously mentioned. The ARfD values for the active substances covered by the 2018 EU-coordinated programme are reported in Appendix D – Table D.1.[61]

Overall, this assessment considers results submitted for 182[62] pesticides/scenarios covering the 12 food products in the 2018 EUCP: aubergines (egg plants), bananas, broccoli, cultivated fungi, grapefruit, melons, sweet peppers, table grapes, wheat, virgin olive oil, bovine fat and chicken eggs for 22,752 samples. Nearly 50% of samples (11,073 samples) were taken in the framework of the national programmes for the above-mentioned crop/pesticides combinations, i.e. based on targeted (risk-based) sampling strategy. Within these targeted samples, those under import control were also pooled on the assumption that may have entered the EU market if not stopped at border.[63]

### 5.1.1. Methodology for the estimation of acute exposure

The acute dietary exposure by pesticide was calculated using the International Estimation of Acute Intake (IESTI) equation, following a methodology described by the experts of the Joint Meeting on Pesticide Residues (JMPR) (FAO, 2017). However, the methodology was modified by EFSA into the PRIMo model as follows:

- Each food item contains the highest measured residue concentration reported to EFSA and it is assumed that a large portion[64] per item is consumed. For this, the highest residue level measured at or above the LOQ was identified for each single pesticide/crop combination and used in the acute exposure estimate. This is also applicable for bulk or processed samples (e.g. wheat or virgin olive oil). To retrieve the highest residue concentration for wheat, results from raw wheat grains and wheat whole grain flour[65] were pooled.
- The analysis of samples refers to the unprocessed raw commodity. Considering that some food items may undergo treatment before consumption (e.g. washing, peeling, cooking, etc.), processing factors could be applied. Only peeling factors in bananas, melons and grapefruit

[60] For further information on developed methodology, please visit EFSA's site: http://www.efsa.europa.eu/en/events/event/technical-stakeholder-event-cumulative-risk-assessment-pesticides-food

[61] Not only health-based guidance values noted in SCoPAFF meetings have been used to carry out the risk assessment but also those derived under EFSA expert groups.

[62] The total number of EUCP pesticides is 177. However, counting the different dithiocarbamates scenarios considered, the total number raises to 182 pesticides.

[63] This assumption is based on the fact that not all the imported goods are stopped at EU border for control.

[64] Normally, 97.5th percentile of the daily food consumption reported in food surveys, considering only persons who have consumed the pertinent food item during the reference period.

[65] According to the 2018 EUCP control programme, samples of wheat whole grain flour could have been taken in case samples of wheat grains were not available for monitoring purposes.

were used to refine exposure. Appendix D – Table D.2 contains a list of the processing factors for pesticide/crop combinations used in the context of this report. It should be stressed that only a limited number of reliable peeling factors are currently available. When plant protection products are authorised on food consumed peeled, factors should be derived for those products.

- For virgin olive oil, the EFSA PRIMo was modified, recalculating the consumption of unprocessed olives to olive oil, assuming an olive oil content approximately of 20%.
- Both surveillance and enforcement samples (EFSA, 2018d) (i.e. sample strategies ST10A, ST20A and ST30A) were used in the estimation of the exposure considering that enforcement samples may also be placed on the market and consumed by the EU citizens, if not removed from the EU food supply at an early stage.
- The residue concentration in the consumed products is five to seven times higher than the one measured in the samples analysed. The approach followed uses the so-called unit variability factor which has the aim of covering the inhomogeneous residue distribution among the individual units. For food commodities with a unit weight of more than 250 g (i.e. aubergines, broccoli, grapefruit, melons and table grapes), a variability factor of 5 is applied. For mid-sized products (i.e. bananas, peppers and cultivated fungi) with a unit size from 25 to 250 g, a variability factor of 7 is applied; no variability factor is used for commodities with unit weights less than 25 g, composite or animal products (i.e. virgin olive oil, wheat, bovine fay and chicken eggs).[66]
- The exposure calculations were carried out separately for each pesticide/crop combination as it is considered unlikely that a consumer would eat two or more different food products in large portions within a short period of time and that all these food products would contain residues of the same pesticide at the highest level observed during the reporting year.
- Results for commodities with residue concentrations below the LOQ were not considered in the acute exposure assessment, assuming a no residue/no exposure situation.
- The estimation of the exposure to pesticides was based on the residue definition for enforcement (in accordance with the EU MRL legislation) and not the residue definition for risk assessment. This was because the monitoring residue/commodity results refer to the residue definition for enforcement and currently a comprehensive list of conversion factors between the enforcement definition and the definitions set for risk assessment is not available.

The above assumptions would be expected to overestimate the acute exposure to pesticides by food item.

### 5.1.2. Results

The results of the acute risk assessment are summarised in Figure 25. The numbers in the cells are read/interpreted based on the following information:

- Numbers in the cells express the exposure to a specific pesticide per commodity as a percentage of the ARfD (or ADI, if ARfD not available). Each result corresponds to the sample containing the highest residue concentration for a given pesticide/food combination (most conservative estimate).
- When no numbers are reported in the cells, one of the following occurs: (i) no residues were quantified for a specific pesticide/food combination (i.e. residue concentration < LOQ, see white cells), (ii) the acute risk assessment is not relevant and therefore not calculated and (iii) the acute risk assessment is relevant but not calculated due to the absence of health-based guidance values (i.e. not available ARfD/ADI).

The colour of the cells is read/interpreted as follows:

- White cells in the grid refer to pesticide/crop combinations for which none of the samples analysed for the given food item contained quantified residues (i.e. residue concentration < LOQ) or no ARfD was not necessary or not available.
- Yellow cells refer to pesticide/crop combinations where the exposure was lower than the residue's ARfD.

[66] In 2017, JMPR recommended using a variability factor of 3 (which is the rounded mean of 2.8) for all commodities (FAO, 2017). At EU level, the choice of the most appropriate variability factor to be used for the acute risk assessment is still under discussion. So far, Member States did not agree to reduce the variability factor.

- Red cells refer to pesticide/crop combinations where the calculated dietary exposure was higher than the residue's ARfD; light red cells correspond to acute exposure estimates ranging between 100% and 1,000% of the ARfD, and dark red cells correspond to acute exposure estimates above 1,000% of the ARfD.
- Grey cells refer to pesticide/crop combinations not covered by the 2018 EUCP.
- Residues marked with an asterisk refer to pesticide/crop combinations with quantified residues for which the health-based guidance values (ADI/ARfD are not available).

For the acute risk assessment of the 2018 results, EFSA considered the following:

- For bromopropylate, chlordane (RD), heptachlor (RD), hexaconazole and methoxychlor, the acute risk assessment was performed with the available ADIs, as ARfDs are not currently available (Figure 25). The use of the ADI instead of the ARfD is an additional conservative element to consider in the risk assessment for these substances.
- For the legal residue definition of fenvalerate containing esfenvalerate (a compound with a different toxicological profile), the acute risk assessment was based on the ARfD of the authorised active substance esfenvalerate.
- In most cases, dithiocarbamates were analysed using a common moiety method measuring the generation of $CS_2$. However, this method has a lack of specificity towards the individual active substances applied in the field. Therefore, a conservative approach involving five[67] different scenarios was used. This approach assumed that the $CS_2$ concentrations measured, referred exclusively to each dithiocarbamates, i.e. either mancozeb, maneb, propineb, thiram or ziram, as each one of them has a different toxicological profile.

Among the 182 pesticides/scenarios analysed in 22,752 food samples, the acute risk assessment results were as follows (Figure 25):

- For 6 pesticides: EPN, fenamidone,[68] HCB, HCH (alpha), HCH (beta) and isocarbophos, no health-based guidance values (ARfD/ADI) are available. These pesticides are marked with footnote d) in Figure 25.
- For 34 pesticides, the setting of an ARfD was not relevant. Therefore, an acute adverse effects to the consumer would not be expected: 2-phenylphenol, azoxystrobin, biphenyl, boscalid (RD), bromide ion, bupirimate, chlorantraniliprole, clofentezin (RD), cyprodinil (RD), DDT (RD), diethofencarb, diflubenzuron (RD), diphenylamine, ethirimol, fenhexamid, fludioxonil (RD), flufenoxuron, hexythiazox, iprovalicarb, kresoxim-methyl (RD), lufenuron, mandipropamid, dithiocarbamates (RD) – metiram, pencycuron, pyrimethanil (RD), pyriproxyfen, quinoxyfen, spinosad, spirodiclofen, tebufenozide, teflubenzuron, tetradifon, tolclofos-methyl and triflumuron. These pesticides are marked with footnote b) in Figure 25.
- For 21 pesticides, there were no quantified results in the samples under consideration: aldicarb (RD), azinphos-methyl, chlordane (RD), dicofol (RD), dithianon, ethion, fenarimol, fluquinconazole, heptachlor (RD), hexaconazole, methoxychlor (listed in Annex A of the Stockholm Convention on Persistent Organic Pollutants[69]), monocrotophos, oxydemeton-methyl (RD), parathion, procymidone (RD), prothioconazole (RD), tefluthrin, terbuthylazine, tolylfluanid (RD), triazophos and vinclozolin. Therefore, the acute dietary exposure to these pesticides, would not be expected to pose a concern to consumer health.
- Some 88 the quantified levels resulted in an exposure below their corresponding acute health-based guidance values: 2,4-D (RD), abamectin (RD), acephate, acrinathrin, bifenthrin, bitertanol, bromopropylate, buprofezin, captan (RD), carbaryl, chlorfenapyr, chlormequat, chlorothalonil (RD), chlorpropham (RD), chlorpyrifos-methyl, clothianidin, cyfluthrin, cymoxanil, cypermethrin, cyproconazole, cyromazine, diazinon, dichlorvos, dicloran, difenoconazole, dimethoate, dimethomorph, diniconazole, dithiocarbamates (RD) – mancozeb scenario, endosulfan (RD), epoxiconazole, etofenprox, famoxadone, fenamiphos (RD), fenazaquin,

[67] For metiram, no ARfD was considered necessary. Thus, no metiram scenario was calculated.

[68] In the framework of the Pesticides Peer Review Experts' Meeting 134 on fenamidone (EFSA, 2017b), no health-based guidance values were set because of the lack of conclusive data on the potential genotoxicity. During the renewal procedure most of the experts considered that the setting of reference values of fenamidone cannot be supported because no conclusion on the genotoxic potential of fenamidone could be drawn leading to a critical area of concern. That is why the reference values set in 2003 were not used in the exposure assessment.

[69] Council Decision (EU) 2019/448 of 18 March 2019 on the submission, on behalf of the European Union, of a proposal for the listing of methoxychlor in Annex A to the Stockholm Convention on Persistent Organic Pollutants. OJ L 77, 20.3.2019, p. 74–75.

fenbuconazole, fenitrothion, fenoxycarb, fenpropathrin, fenpropidin (RD), fenpropimorph (RD), fenpyroximate (RD), fenvalerate (RD), flubendiamide, fluopicolide, fluopyram (RD), flusilazole (RD), flutriafol, folpet (RD), glyphosate, haloxyfop (RD), imidacloprid, indoxacarb, lindane, linuron, malathion (RD), mepanipyrim, mepiquat, metalaxyl, methamidophos, methidathion, methoxyfenozide, myclobutanil (RD), oxadixyl, paclobutrazol, parathion-methyl (RD), penconazole, pendimethalin, permethrin, phosmet (RD), pirimicarb (RD), profenofos, propamocarb (RD), propargite, propyzamide (RD), prosulfocarb, pymetrozine (RD), pyridaben, spiromesifen, spiroxamine (RD), tau-fluvalinate, tetraconazole, thiamethoxam, thiodicarb, thiophanate-methyl, triadimefon, triadimenol (RD) and trifloxystrobin (RD). Therefore, the acute dietary exposure to these pesticides, would not be expected to be of concern to consumer health.

- Some 33 pesticides were quantified in one or more food commodities in levels exceeding their corresponding acute health-based guidance values: acetamiprid (RD), carbendazim (RD), carbofuran (RD), chlorpyrifos, deltamethrin, dieldrin (RD), dithiocarbamates (RD) – maneb, dithiocarbamates (RD) – propineb, dithiocarbamates (RD) – thiram, dithiocarbamates (RD) – ziram, dodine, ethephon, fenbutatin oxide, fenthion (RD), fipronil (RD), flonicamid (RD), fluazifop-P (RD), formetanate, fosthiazate, imazalil, iprodione (RD), lambda-cyhalothrin (RD), methiocarb (RD), methomyl, omethoate, oxamyl, pirimiphos-methyl, propiconazole, pyraclostrobin, tebuconazole (RD), tebufenpyrad, thiabendazole (RD) and thiacloprid.

The above-mentioned 33 pesticides, exceeded the ARfD in 327 samples out of 22,752 samples (1.4%). For 136 of these cases, legal actions were taken to restrict the movements of those food in the EU market. It should be stressed that the results of the acute exposure assessment reflect the outcome of a deterministic screening method which uses a number of conservative assumptions. In all cases, the exposure calculations were performed for extreme consumers, where large portions were considered, the variability factor taken for bananas and sweet peppers/bell peppers was of 7 (i.e. it was considered that the highest residue due to the heterogeneity of the sample could be seven times higher) and 5 for grapefruits, table grapes and aubergines. Furthermore, it was not considered that usual consumer practices like peeling, cooking, frying and baking further reduce the residue concentrations in the consumed food. Currently, evidence-based processing factors were used for some pesticide/crop combinations (e.g. imazalil in grapefruit, bananas or melon), allowing a more realistic acute risk assessment for these substances Appendix D – Table D.2. Among the EUCP food items, the ARfD exceedances were distributed in the following way: grapefruit (196 samples), sweet peppers (78 samples), table grapes (26 samples), broccoli (9 samples), aubergines (7 samples), melons (7 samples), wheat (4 samples). No results exceeding the available health-based guidance values for acute exposure were observed in cultivated fungi, virgin olive oil and animal commodities (bovine fat and chicken eggs).

The samples with ARfD exceedances among pesticides for a total of 347 determinations[70] were: 126 samples (chlorpyrifos), 91 samples (thiabendazole (RD)), 17 samples (formetanate), 16 samples (methomyl), 15 samples (ethephon), 14 samples (acetamiprid (RD)), 10 samples (tebuconazole (RD) and propiconazole), 6 samples (deltamethrin and lambda-cyhalothrin (RD)), 5 samples (iprodione (RD)), 3 samples (carbendazim (RD), omethoate, flonicamid (RD)), 2 samples (tebufenpyrad, carbofuran (RD), pyraclostrobin, methiocarb (RD), fenbutatin oxide, fosthiazate, pirimiphos-methyl) and 1 sample (oxamyl, fluazifop-P (RD), dodine, dieldrin (RD), fenthion (RD), fipronil (RD), thiacloprid,[71] imazalil).

More detailed analysis for pesticides exceeding the ARfD is explained below – only in cases where the number of samples was above 10:

*Dithiocarbamates (RD)*

From the above list of pesticides exceeding the ARfD, dithiocarbamates (RD) scenarios are not included. Findings on those are: the scenario of *maneb* in melons and table grapes, *propineb* in bananas, melons and table grapes, *thiram* in bananas, grapefruit, melons and table grapes and *ziram* in bananas, grapefruit, melons and table grapes, exceeded the ARfD. In 2018, only mancozeb, metiram and ziram were approved for used. For mancozeb scenario, all food commodities in which dithiocarbamates were to be monitored in accordance with the EUCP Regulation, remained below the ARfD. Of those crops with concern i.e. bananas, grapefruit and melons, the exposure could have been

[70] There were samples exceeding the ARfD more than once due to multiple residues in the same sample.

[71] Thiacloprid has been voted for non-renewal decision on 21–22 October 2019 during the SCoPAFF on phytopharmaceuticals legislation.

refined if peeling factors would have been retrieved. Not being the case, EFSA recommends the development of specific studies for deriving peeling factors. In table grapes all the scenarios (except for mancozeb and metiram) exceeded the ARfD. In the case of ziram, the exceedance was of 656% of ARfD, corresponding to a concentration of 3.6 mg/kg determined as $CS_2$ not exceeding the MRL set at 5 mg/kg for table grapes. EFSA recommends considering appropriate taking these monitoring findings into account when ziram renewal is assessed.

*Chlorpyrifos*

For chlorpyrifos, 126 samples exceeded the ARfD. Of those, 100 samples were of grapefruit. The highest residue was of 0.53 mg/kg leading to an acute exposure of 832% of ARfD. A generic citrus peeling factor of 0.17 (EFSA, 2015a,h, 2017g, 2019b) would refine the exposure to 141% of ARfD. Towards the end of 2018, the MRL was raised for the entire citrus group[72] from 0.3 to 1.5 (residue trials in oranges and mandarins resulted in highest residue (HR): 0.83 and supervised trials median residue (STMR): 0.45 extrapolated to all citrus group using revision 2 of PRIMo). EFSA recommends using exclusively PRIMo rev. 3.1 where updated consumption data is provided. Other exceedances occurred in peppers (14 samples), broccoli (7 samples), table grapes (3 samples) and aubergines (2 samples).

Furthermore, based on EFSA's recent statement (EFSA, 2019a,b,c) the approval criteria which are applicable to human health as laid down in Article 4 of Regulation (EC) No 1107/2009 are not met. Therefore, by implementing Regulation (EU) No 2020/18[73], chlorpyrifos was not renewed[74] and Member States should revoke their plant protection products authorisation by 16 February 2020.

*Thiabendazole*

For thiabendazole (RD), 91 samples (all in grapefruit) exceeded the ARfD. The highest residue reported was 6 mg/kg (MRL = 7 mg/kg taken from CODEX) exceeding by 471% of the ARfD. No specific peeling factor for grapefruit was derived. However, extrapolating one from oranges of 0.17 (Scholz, 2018), the highest exposure would be refined to 80% of ARfD.

*Formetanate*

For formetanate, an EU-approved substance in 2018,[75] exceeded the ARfD in 17 samples, all sweet peppers also exceeding the MRL. Of those, 16 samples were coming from Turkey and were sampled under Regulation (EC) No 669/2009[21] leading to a RASFF notification; the other sample had origin unknown and had administrative consequences.

*Methomyl*

For methomyl in 16 samples (12 pepper samples, 2 aubergine samples and 2 melon samples), the 100% of the acute health-based guidance value was exceeded. Out of the 12 pepper samples, 11 were targeted samples taken under Regulation (EC) No 669/2009[21], all coming from Turkey and leading except one to RASFF notifications. The other one had origin unknown and no actions were taken. Of the two aubergine samples, one was grown in Italy and the other was part of a targeted control programme coming from the Dominican Republic. No information on the action taken was provided. Of the two melon samples, both were coming from third countries (Morocco and Albania, respectively). Warning notifications under the RASFF system were launched.

For methomyl, the EU status changed from approved in 2018 to non-approved substance in 2019 and the MRLs lowered to LOQ levels for most of the crops.[76]

EFSA would need information on the country of origin and possible actions taken to better draw conclusions on the findings presented and whether the product was consumed or withdrawn from the market.

[72] Commission Regulation (EU) 2018/686 of 4 May 2018 amending Annexes II and III to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards maximum residue levels for chlorpyrifos, chlorpyrifos-methyl and triclopyr in or on certain products. OJ L 121, 16.5.2018, p. 30–62.

[73] Commission Implementing Regulation (EU) 2020/18 of 10 January 2020 concerning the non-renewal of the approval of the active substance chlorpyrifos, in accordance with Regulation (EC) No 1107/2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market, and amending the Annex to Commission Implementing Regulation (EU) No 540/2011. OJ L 7, 13.1.2020, p. 14–16.

[74] Chlorpyrifos and chlorpyrifos-methyl has been agreed for non-renewal decision in the SCoPAFF of 26-27 September 2019 and MRLs will be lowering accordingly.

[75] Formetanate approval will expire by 31 July 2020.

[76] Commission Regulation (EU) 2016/1822 of 13 October 2016 amending Annexes II, III and V to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards maximum residue levels for aclonifen, deltamethrin, fluazinam, methomyl, sulcotrione and thiodicarb in or on certain products. OJ L 281, 18.10.2016, p. 1–44.

*Ethephon*

For ethepon, an EU-approved substance in 2018, in 15 samples (8 table grape samples and 7 pepper samples) the ARfD was exceeded. In table grapes, one sample exceeded the MRL coming from South Africa whereas in another seven samples the MRL of 1 mg/kg[77] was not exceeded. The methodology in place for calculating the MRL using the IESTI equation (FAO, 2017) may result in this divergency (EFSA, 2015f) due to the gap between the highest residue (0.56 mg/kg) derived from residue trial results and the statistical estimation of the MRL (1.5 mg/kg) in accordance with the OECD calculator (EFSA, 2014). Overall, the table grape samples were originated from Egypt (4 samples), South Africa (3 samples) and Brazil (1 sample). As they were compliant samples, no actions were taken to withdraw the product from the market. On the contrary, all sweet pepper samples exceeded the MRL. The country of origin was reported (one sample was grown in Spain and the other six samples in Poland) and for all, actions were taken.

*Acetamiprid*

For acetamiprid, an EU-approved active substance which was renewed in 2018, the ARfD was exceeded in 14 samples (7 samples in sweet peppers, 6 samples in grapefruit and 1 sample in table grapes). Sweet pepper samples were all non-compliant samples under the import control activities.[21] The origin of the samples was Turkey (except for one Egyptian sample). For grapefruit samples, a peeling factor of 0.81 (Scholz, 2018) was used to refine the exposure. The highest refined concentration of 0.729 ($0.9 \times 0.81$) still leads to an exceedance of 229% of the ARfD. No action was taken as the MRL was not exceeded. The table grape sample was grown in Italy and no action was taken as the MRL was neither exceeded.

*Tebuconazole (RD)*

For tebuconazole (RD), an EU-approved substance in 2018, the ARfD was exceeded in 10 samples of which 8 samples were sweet peppers coming from Turkey and the other two table grape samples, one from Spain and another one from Chile. All sweet pepper samples were part of import control activity[21], four of which were non-compliant samples, leading only one to a RASFF notification whereas for the others no action was taken. The other four sweet pepper samples did not exceed the MRL. The methodology in place for calculating the MRL may result in these divergencies (EFSA and RIVM, 2015). The table grapes were randomly sampled not leading to MRL exceedances; thus, no actions were taken.

*Propiconazole*

For propiconazole, an active substance for which at the end of 2018 the non-renewal was approved,[78] the ARfD was exceeded in 10 grapefruit samples, mostly from Turkey except one from Lithuania. No action was taken as no sample exceeded the MRL. No peeling factor has been derived thus the exposure could not be refined. Being 166% the highest ARfD exceedance, presumably with a peeling factor the exposure would be refined.

HCB, HCH (alpha) and HCH (beta) are POPs banned for agricultural use in the EU but still present in the environment due to their persistence.

The acute risk assessment of these substances marked with an asterisk in Figure 25 could not be based on ARfDs nor ADIs from European evaluations, as none have been set for any of them. However an estimated acute exposure to HCB, HCH-alpha and HCH-beta using the food consumption data of EFSA PRIMo rev. 3.1, is presented in Table 1:

[77] Commission Regulation (EU) 2015/846 of 28 May 2015 amending Annexes II and III to Regulation (EC) No 396/2005 of the European Parliament and of the Council as regards maximum residue levels for acetamiprid, ametoctradin, amisulbrom, bupirimate, clofentezine, ethephon, ethirimol, fluopicolide, imazapic, propamocarb, pyraclostrobin and tau-fluvalinate in or on certain products. OJ L 140, 5.6.2015, p. 1–49.

[78] Commission Implementing Regulation (EU) 2018/1865 of 28 November 2018 concerning the non-renewal of approval of the active substance propiconazole, in accordance with Regulation (EC) No 1107/2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market, and amending Commission Implementing Regulation (EU) No 540/2011. OJ L 304, 29.11.2018, p. 6–9.

**Table 1:** Estimated acute exposure to active substances without ARfD/ADI values

| Pesticide | Food product | Acute exposure (in mg/kg bw per day) |
|---|---|---|
| Hexachlorobenzene (HCB) | Chicken eggs<br>Bovine fat | $1.2 \times 10^{-3}$<br>$1.1 \times 10^{-3}$ |
| Hexachlorocyclohexane (alpha) | Chicken eggs | $1.9 \times 10^{-6}$ |
| Hexachlorocyclohexane (beta) | Chicken eggs<br>Bovine fat | $1.9 \times 10^{-6}$<br>$1.9 \times 10^{-7}$ |

ARfD: acute reference dose; ADI: acceptable daily intake; bw: body weight.

A detailed acute dietary exposure assessment results for the pesticide residues found in the 12 food products covered by the 2018 EU-coordinated control programme are presented in Appendix D – Figures D.1–D.12. In these charts, the results for the samples containing residues at or above the LOQ are presented individually, expressing the exposure as percentage of the ARfD. The different dithiocarbamate scenarios have not been represented.

| Pesticides | Aubergines | Bananas | Broccoli | Cultivated fungi | Grapefruit | Melons | Sweet peppers[a] | Table grapes | Wheat grain | Olives for oil production | Bovine fat | Chicken eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2,4-D (RD) | 0.1 | | 1 | | 10 | | | 0.3 | | | | |
| 2-Phenylphenol[b] | | | | | | | | | | | | |
| Abamectin (RD) | 3 | | | | | | 17 | 57 | | | | |
| Acephate | 2 | | | | | | | 5 | | | | |
| Acetamiprid (RD) | 30 | 97 | 8 | | 229 | 67 | 177 | 113 | | | | |
| Acrinathrin | 8 | 39 | 50 | | | | 55 | 14 | | | | |
| Aldicarb (RD) | | | | | | | | | | | | |
| Azinphos-methyl | | | | | | | | | | | | |
| Azoxystrobin[b] | | | | | | | | | | | | |
| Bifenthrin | | 24 | 4 | | 10 | 5 | 44 | | | 0.01 | | |
| Biphenyl[b] | | | | | | | | | | | | |
| Bitertanol | | | 5 | | | | | | | | | |
| Boscalid (RD)[b] | | | | | | | | | | | | |
| Bromide ion[b] | | | | | | | | | | | | |
| Bromopropylate[c] | 3 | | | | 30 | | | 1 | | | | |
| Bupirimate[b] | | | | | | | | | | | | |
| Buprofezin | 0.2 | 4 | | | 5 | 1 | 4 | 9 | | | | |
| Captan (RD) | | | | | | 1 | 1 | 2 | | | | |
| Carbaryl | | | | | | | 77 | | | | | |
| Carbendazim (RD) | 7 | 53 | 229 | 41 | 43 | 97 | 24 | 208 | 9 | 0.1 | | |
| Carbofuran (RD) | 250 | | | | | | 2,063 | | | | | |
| Chlorantraniliprole[b] | | | | | | | | | | | | |
| Chlordane (RD)[c] | | | | | | | | | | | | |
| Chlorfenapyr | 9 | | 0.3 | | | 24 | 19 | | | | | |
| Chlormequat | | | | 87 | | | | 5 | 37 | | | |
| Chlorothalonil (RD) | 5 | 2 | | 0.3 | | 30 | 1 | 0.3 | | | | |
| Chlorpropham (RD) | 0.1 | | | | | | 0.1 | | 0.1 | | | |
| Chlorpyrifos | 120 | 20 | 466 | | 832 | 88 | 940 | 613 | 68 | 1 | | |
| Chlorpyrifos-methyl | 2 | 10 | 1 | | 9 | | 52 | 16 | 15 | | | |
| Clofentezine (RD)[b] | | | | | | | | | | | | |
| Clothianidin | 0.4 | | | | 1 | 0.2 | 9 | 7 | 0.2 | | | |
| Cyfluthrin | 2 | | 2 | | | | 33 | 20 | | 0.02 | | |
| Cymoxanil | | | | | | | 1 | 3 | | | | |
| Cypermethrin | 2 | 2 | 5 | 1 | 20 | 1 | 23 | 36 | 5 | 0.03 | 0.01 | |
| Cyproconazole | | 37 | 71 | | | | 6 | 12 | 1 | | | |
| Cyprodinil (RD)[b] | | | | | | | | | | | | |
| Cyromazine | 1 | | | 29 | | 11 | | | | | | |
| DDT (RD)[b] | | | | | | | | | | | | |
| Deltamethrin | 10 | | 9 | 3 | 9 | 12 | 95 | 124 | 621 | 0.1 | | |
| Diazinon | 2 | | | | 4 | | 19 | | | | 0.1 | |
| Dichlorvos | 13 | | | | | | | | | | | |
| Dicloran | 2 | | | | 3 | | | | | | | |
| Dicofol (RD) | | | | | | | | | | | | |

| Pesticides | Aubergines | Bananas | Broccoli | Cultivated fungi | Grapefruit | Melons | Sweet peppers[a] | Table grapes | Wheat grain | Olives for oil production | Bovine fat | Chicken eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dieldrin (RD) | | | | | | 167 | | | | | 1 | 0.03 |
| Diethofencarb[b] | | | | | | | | | | | | |
| Difenoconazole | 1 | | 11 | | 3 | 3 | 12 | 13 | 0.1 | 0.01 | | |
| Diflubenzuron (RD)[b] | | | | | | | | | | | | |
| Dimethoate | 63 | | | | | | 6 | 66 | | 0.1 | | |
| Dimethomorph | 1 | 0.2 | 0.3 | | 0.4 | 4 | 2 | 30 | 0.02 | 0.002 | | |
| Diniconazole | | | | | 7 | | | | | | | |
| Diphenylamine[b] | | | | | | | | | | | | |
| Dithianon | | | | | | | | | | | | |
| Dithiocarbamates (RD) – mancozeb sc. | 2 | 17 | | 2 | 13 | 35 | 5 | 78 | 2 | | | |
| Dithiocarbamates (RD) – maneb sc. | 8 | 52 | | 7 | 39 | 106 | 16 | 239 | 7 | | | |
| Dithiocarbamates (RD) – metiram sc.[b] | | | | | | | | | | | | |
| Dithiocarbamates (RD) – propineb sc. | 16 | 108 | | 15 | 81 | 220 | 33 | 495 | 15 | | | |
| Dithiocarbamates (RD) – thiram sc. | 34 | 229 | | 31 | 173 | 467 | 69 | 1,050 | 31 | | | |
| Dithiocarbamates (RD) – ziram sc. | 21 | 143 | | 19 | 108 | 292 | 43 | 656 | 20 | | | |
| Dodine | | | | | 243 | | 8 | | | | | |
| Endosulfan (RD) | | | | | | | | 4 | | | | |
| EPN[d] | | | | | | | | | | | | |
| Epoxiconazole | | 1 | | | | | 5 | | 1 | | | |
| Ethephon | | | | | | | 857 | 161 | | | | |
| Ethion | | | | | | | | | | | | |
| Ethirimol[b] | | | | | | | | | | | | |
| Etofenprox | 1 | 0.02 | 0.2 | | 0.4 | 2 | 0.1 | 7 | | | | |
| Famoxadone | | | 1 | | | | 2 | 36 | | | | |
| Fenamidone[d] | | | | | | * | * | * | | | | |
| Fenamiphos (RD) | | 39 | | | | | 83 | | | | | |
| Fenarimol | | | | | | | | | | | | |
| Fenazaquin | | | 1 | | | | 29 | 10 | | | | |
| Fenbuconazole | | 0.1 | | | 1 | 5 | | 0.3 | | | | |
| Fenbutatin oxide | 0.3 | | | | 118 | | 1 | 2 | | | | |
| Fenhexamid[b] | | | | | | | | | | | | |
| Fenitrothion | | | | | | | 22 | | 31 | | | |
| Fenoxycarb | | | | | | | 0.1 | 0.04 | 0.02 | | | |
| Fenpropathrin | | | | | 34 | | | | | 0.02 | | |
| Fenpropidin (RD) | | 34 | | | | | | | 0.4 | | | |
| Fenpropimorph (RD) | | 9 | | | | | 4 | | 1 | | | |
| Fenpyroximate (RD) | 10 | | | | | | 10 | 16 | | | | |
| Fenthion (RD) | | | | | 160 | | 26 | 1 | | | | |
| Fenvalerate (RD) | 3 | | 2 | | 39 | | 5 | 61 | | | | |
| Fipronil (RD) | 2 | | | | 2 | | 145 | | | | | |
| Flonicamid (RD) | 68 | | | | 4 | 201 | 71 | | 1 | | | |
| Fluazifop-P (RD) | | | 416 | | | | | | | | | |
| Flubendiamide | 0.4 | | | | | | | 4 | | | | |

| Pesticides | Aubergines | Bananas | Broccoli | Cultivated fungi | Grapefruit | Melons | Sweet peppers[a] | Table grapes | Wheat grain | Olives for oil production | Bovine fat | Chicken eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fludioxonil (RD)[b] | | | | | | | | | | | | |
| Flufenoxuron[b] | | | | | | | | | | | | |
| Fluopicolide | | | 1 | | | 6 | 3 | 28 | | | | |
| Fluopyram (RD) | 1 | 0.3 | 0.2 | | | 5 | 12 | 13 | 0.05 | 0.003 | | |
| Fluquinconazole | | | | | | | | | | | | |
| Flusilazole (RD) | | | 9 | | | | 38 | | | | | |
| Flutriafol | 1 | 45 | | | | 5 | 33 | 0.3 | | | | |
| Folpet (RD) | | | | | | | | 23 | | | | |
| Formetanate | 44 | | | | | 24 | 396 | 88 | | | | |
| Fosthiazate | | | | | | | 164 | | | | | |
| Glyphosate | | | | | | | | 2 | 3 | | | |
| Haloxyfop (RD) | | | | | 2 | | | | | | | |
| Heptachlor (RD)[c] | | | | | | | | | | | | |
| Hexachlorobenzene[d] | | | | | | | | | | | * | * |
| Hexachlorocyclohexane (alpha)[d] | | | | | | | | | | | | * |
| Hexachlorocyclohexane (beta)[d] | | | | | | | | | | | * | * |
| Hexaconazole[c] | | | | | | | | | | | | |
| Hexythiazox[b] | | | | | | | | | | | | |
| Imazalil | 2 | 40 | 1 | 1 | 68 | 60 | 229 | 2 | | | | |
| Imidacloprid | 10 | 2 | 16 | 1 | 20 | 23 | 74 | 88 | 2 | | | |
| Indoxacarb | 0.4 | 2 | 3 | | | 1 | 15 | 18 | | 0.002 | | |
| Iprodione (RD) | 15 | | 39 | | | 10 | 87 | 316 | | 0.04 | | |
| Iprovalicarb[b] | | | | | | | | | | | | |
| Isocarbophos[d] | | | | | * | | | | | | | |
| Kresoxim-methyl (RD)[b] | | | | | | | | | | | | |
| Lambda-cyhalothrin (RD) | 29 | 37 | 27 | | 61 | 15 | 282 | 146 | 3 | 0.2 | | |
| Lindane | | | | | | | | | | | | 0.2 |
| Linuron | | | | | | | 18 | | | | | |
| Lufenuron[b] | | | | | | | | | | | | |
| Malathion (RD) | 0.1 | | | | 2 | | 8 | | 0.2 | | | |
| Mandipropamid[b] | | | | | | | | | | | | |
| Mepanipyrim | 5 | | | 0.2 | | | 1 | | | | | |
| Mepiquat | | | | 1 | | | | | 2 | | | |
| Metalaxyl | 0.1 | | 1 | | 0.2 | 1 | 3 | 9 | | | | |
| Methamidophos | | | | | | | | 12 | | | | |
| Methidathion | | | | | 10 | | | | | | | |
| Methiocarb (RD) | 31 | 19 | | | | | 224 | 9 | | | | |
| Methomyl | 260 | | | | | 109 | 1,566 | 233 | | | | |
| Methoxychlor[c] | | | | | | | | | | | | |
| Methoxyfenozide | 1 | | | | 27 | | 19 | 43 | | | | |
| Monocrotophos | | | | | | | | | | | | |
| Myclobutanil (RD) | 0.02 | 27 | 0.01 | | 2 | 3 | 7 | 14 | | | | |
| Omethoate | 163 | | | | | | | 149 | | | | |
| Oxadixyl | | | | | 4 | | | | | | | |
| Oxamyl | | | | | | 273 | 71 | | | | | |
| Oxydemeton-methyl (RD) | | | | | | | | | | | | |
| Paclobutrazol | | | | | | | 1 | | | | | |
| Parathion | | | | | | | | | | | | |
| Parathion-methyl (RD) | | 3 | | | | | | | | | | |
| Penconazole | | | | 0.04 | | 1 | 2 | 5 | | | | |
| Pencycuron[b] | | | | | | | | | | | | |
| Pendimethalin | 0.2 | | 0.3 | 0.2 | | 0.3 | 0.2 | | | | | |
| Permethrin | 0.2 | 0.1 | 0.1 | | 0.3 | 0 | 0.2 | 0.2 | 0.04 | | | |
| Phosmet (RD) | | | | | | | | 3 | | 0.4 | | |
| Pirimicarb (RD) | 2 | | | | | 17 | 12 | 1 | | | | |
| Pirimiphos-methyl | | | | | | | 105 | | 58 | | | |
| Procymidone (RD) | | | | | | | 0 | | | | | |
| Profenofos | 1 | | | | | | 1 | | | | | |
| Propamocarb (RD) | 1 | | 1 | | | 10 | 3 | 0.1 | | | | |
| Propargite | 2 | | | | | 9 | | | 0.3 | | | |
| Propiconazole | | 2 | | | 166 | 26 | 8 | 12 | | | | |
| Propyzamide (RD) | | | | | 1 | 2 | 1 | | | 0.004 | | |
| Prosulfocarb | | | | 0.3 | | | | | | | | |
| Prothioconazole (RD) | | | | | | | | | | | | |
| Pymetrozine (RD) | 0.4 | | | | | 5 | 31 | | | | | |
| Pyraclostrobin | 5 | | 14 | | 8 | 8 | 71 | 118 | 1 | 0.01 | | |
| Pyridaben | 6 | | | | 42 | | 66 | 5 | | | | |
| Pyrimethanil (RD)[b] | | | | | | | | | | | | |
| Pyriproxyfen[b] | | | | | | | | | | | | |
| Quinoxyfen[b] | | | | | | | | | | | | |
| Spinosad[b] | | | | | | | | | | | | |
| Spirodiclofen[b] | | | | | | | | | | | | |
| Spiromesifen | 0.4 | | 0.02 | | | 0.1 | 2 | 0.1 | | | | |
| Spiroxamine (RD) | | 1 | | | | | 2 | 40 | 0.2 | | | |
| tau-Fluvalinate | 6 | | | | 7 | | 8 | 67 | | | | |
| Tebuconazole (RD) | 7 | 25 | 6 | 1 | 15 | 11 | 269 | 139 | 3 | 0.1 | | |
| Tebufenozide[b] | | | | | | | | | | | | |
| Tebufenpyrad | 3 | | | | 9 | 38 | 146 | 9 | | | | |
| Teflubenzuron[b] | | | | | | | | | | | | |
| Tefluthrin | | | | | | | | | | | | |
| Terbuthylazine | | | | | | | | | | | | |
| Tetraconazole | | | | | | 7 | 14 | 55 | 1 | | | |
| Tetradifon[b] | | | | | | | | | | | | |
| Thiabendazole (RD) | 0.4 | 92 | 0.2 | | 471 | 10 | 24 | 1 | 0.1 | | | |
| Thiacloprid | 5 | | 19 | | 5 | 36 | 113 | 4 | 0.1 | | | |
| Thiamethoxam | 1 | | 0.1 | | 0.3 | 4 | 5 | 1 | | | | |
| Thiodicarb | | | | | | 27 | | | | | | |
| Thiophanate-methyl | 1 | | 11 | 1 | 1 | 16 | 9 | 79 | 0.1 | | | |
| Tolclofos-methyl[b] | | | | | | | | | | | | |
| Tolylfluanid (RD) | | | | | | | | | | | | |

| Pesticides | Aubergines | Bananas | Broccoli | Cultivated fungi | Grapefruit | Melons | Sweet peppers[(a)] | Table grapes | Wheat grain | Olives for oil production | Bovine fat | Chicken eggs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Triadimefon | | | | | 2 | 1 | 1 | | | | | |
| Triadimenol (RD) | 1 | | | | | 30 | 46 | 20 | | 0.02 | | |
| Triazophos | | | | | | | | | | | | |
| Trifloxystrobin (RD) | 0.1 | | 0.04 | | 1 | 6 | 2 | 8 | | 0.005 | | |
| Triflumuron[(b)] | | | | | | | | | | | | |
| Vinclozolin | | | | | | | | | | | | |

Sc.: scenario.
(a): Sweet peppers/bell peppers.
(b): No ARfD necessary due to low acute toxicity.
(c): Acute risk assessment was performed with the ADI, since no ARfD is available for the active substance.
(d): No ADI/ARfD allocated; in case quantified residues are reported in one or several commodities, an asterisk (*) is used to highlight it. See exposure assessment in Table 1

**Figure 25:** Results of acute dietary risk assessment without risk refinement for the highest residues reported by pesticide/crop combination (expressed as a percentage of the acute health-based guidance reference value)

## 5.2. Chronic risk assessment

The chronic risk assessment compares the dietary exposure per pesticide residue (mg of residue/kg bw per day) to the substance's Acceptable Daily Intake (ADI in mg of residue/kg bw per day). The ADI values for the active substances are reported in Appendix D – Table D.1.[63]

### 5.2.1. Methodology for the estimation of chronic exposure

The chronic exposure assessment estimates the dietary exposure to pesticides from food over a period of time. Its calculation is based on a deterministic approach developed by JMPR (FAO, 2017). It consists of multiplying the average measured pesticide concentration by the average commodity's daily intake consumption per capita, summing up the results for all commodities.

The assessment deals with results submitted for 182 scenarios/pesticides[64] covered by the EUCP and all unprocessed products covered by Annex I (part A) of Reg. (EC) No 396/2005 and analysed by the reporting countries. In total, 80,733 samples were use from EUCP and national programmes pooled together.

EFSA calculated two scenarios for chronic exposure assessment and risk assessment: the lower-bound scenario and the adjusted upper-bound scenario.

- The lower-bound scenario assumes that if not-quantified residues (i.e. samples with residue level < LOQ), the residues are not present in the food product analysed. This scenario is therefore less conservative, and it may result in an underestimation of chronic exposure.
- The adjusted upper-bound scenario assumes that non-quantified residues (i.e. samples with residue level < LOQ) are present in the sample at the level of LOQ.[37] This results in a conservative screening which is likely to overestimate the chronic exposure to a pesticide residue.

The lower- and upper-bound assessments are used by EFSA to frame the boundaries of a more realistic exposure estimate to pesticide residues and better address the impact of the analytical uncertainties linked to the presence of residues at levels below the LOQ.

For both the lower-bound and upper-bound scenarios, the following assumptions were considered:

- The mean residue concentration issued from all analytical results per pesticide and crop combination was used.
- Only results for unprocessed *products* from Annex I (part A) of Regulation (EC) No 396/2005 were considered having consumption data available. This included wheat whole flour, recoded as unprocessed. Results on commodities from Annex I (Table B) of Regulation (EC) No 396/2005 such as bitter melons, chilli peppers, Chinese broccoli, coriander leaves, curry leaves, ginger roots, goji berries, holy basil, peppermint, pitahayas/dragon fruits and yardlong beans were not included in the risk assessment since no specific information on their consumption is currently available in PRIMo revision 3.1 (EFSA, 2018d).
- Only data on the 182 *pesticides* of the 2018 EUCP and for which the analysis covered their full RD were used. Results of part of residue definition (i.e. reported as P002A) were not taken into consideration.
- Results concerning samples analysed with analytical methods for which the LOQ was greater than the corresponding MRL were disregarded.
- If all results reported for a given pesticide/crop combination are below the LOQ for all samples analysed the exposure is not calculated.
- Both surveillance and enforcement samples (EFSA, 2018d) (i.e. sample strategies ST10A, ST20A and ST30A) were used in the estimation of the exposure considering that enforcement samples are also placed on the market and consumed by the EU citizens, if not destroyed at an early stage.
- For fat-soluble pesticides in milk and eggs samples for which results were expressed on a fat basis, the residue levels have been recalculated for the whole product assuming a default fat content of 4% in milk and a default fat content of 10% in eggs (FAO, 2017). This approach was implemented only in case of positive quantifications (results ≥ LOQ).
- For olive oil, the residue concentration measured in the oil was recalculated to unprocessed olives, assuming an oil content of 20% in olives.
- The estimation of the exposure is based on the residue definition for enforcement (in accordance with the EU MRL legislation) and not the residue definition for risk assessment. This was because the monitoring residue/commodity results refer to the residue definition for enforcement and currently a comprehensive list of conversion factors between the enforcement definition and the definitions set for risk assessment is not available.

### 5.2.2. Results

The chronic dietary exposure assessment expressed as percentage of the ADI for each pesticide (lower-bound and adjusted upper-bound scenarios) are reported in Table 2.

For the legal residue of fenvalerate containing esfenvalerate, a compound with different toxicological profile, the chronic risk assessment was based on the authorised active substance esfenvalerate.

For dithiocarbamates, six scenarios were calculated considering that the measured $CS_2$ concentrations originated exclusively from maneb, mancozeb, metiram, propineb, thiram or ziram, each with different ADI.

**Table 2:** Results of chronic dietary exposure assessment

| Pesticide | Chronic exposure (in % of ADI) | |
|---|---|---|
| | Lower-bound | Ad. upper-bound |
| 2,4-D (RD) | 3.2 | 4.1 |
| 2-Phenylphenol | 0.17 | 0.21 |
| Abamectin (RD) | 0.02 | 4.9 |
| Acephate | 0.01 | 0.14 |
| Acetamiprid (RD) | 0.37 | 1.5 |
| Acrinathrin | 0.02 | 1.8 |
| Aldicarb (RD) | n.r. | |
| Azinphos-methyl | 0.004 | 4.6 |
| Azoxystrobin | 0.16 | 0.36 |
| Bifenthrin | 0.16 | 1.9 |
| Biphenyl | 0.01 | 0.04 |
| Bitertanol | 0.005 | 5.3 |
| Boscalid (RD) | 1.6 | 2.5 |
| Bromide ion** | 1.6 | 9.4 |
| Bromopropylate | 0.0003 | 0.18 |
| Bupirimate | 0.013 | 0.41 |
| Buprofezin | 0.31 | 3.3 |
| Captan (RD) | 2.3 | 2.8 |
| Carbaryl | 0.003 | 0.31 |
| Carbendazim (RD) | 0.31 | 2.6 |
| Carbofuran (RD) | 0.067 | 8.1 |
| Chlorantraniliprole | 0.006 | 0.022 |
| Chlordane (RD) | 0.002 | 0.917 |
| Chlorfenapyr | 0.073 | 0.684 |
| Chlormequat | 1.7 | 6.6 |
| Chlorothalonil (RD) | 0.25 | 2.5 |
| Chlorpropham (RD) | 2.2 | 2.6 |
| Chlorpyrifos | 9.5 | 55.8 |
| Chlorpyrifos-methyl | 0.51 | 4.7 |
| Clofentezine (RD) | 0.01 | 1.1 |
| Clothianidin | 0.006 | 0.314 |
| Cyfluthrin | 0.055 | 10.2 |
| Cymoxanil | 0.005 | 0.423 |
| Cypermethrin | 0.376 | 1.7 |
| Cyproconazole | 0.007 | 1.4 |
| Cyprodinil (RD) | 0.74 | 1.7 |
| Cyromazine | 0.022 | 0.233 |

| Pesticide | Chronic exposure (in % of ADI) | |
|---|---|---|
| | Lower-bound | Ad. upper-bound |
| DDT (RD) | 0.111 | 8.2 |
| Deltamethrin | 1.2 | 11.4 |
| Diazinon | 0.43 | 84.7 |
| Dichlorvos | 0.02 | 4.6 |
| Dicloran | 0.0002 | 0.2 |
| Dicofol (RD) | 0.09 | 4.1 |
| Dieldrin (RD) | 1.2 | 80.2 |
| Diethofencarb | 0.0001 | 0.01 |
| Difenoconazole | 0.44 | 3.9 |
| Diflubenzuron (RD) | 0.005 | 0.17 |
| Dimethoate | 1.1 | 25.1 |
| Dimethomorph | 0.25 | 1.0 |
| Diniconazole | 0.0001 | 0.035 |
| Diphenylamine | 0.008 | 0.315 |
| Dithianon | 2.4 | 4.5 |
| Dithiocarbamates (RD) – mancozeb sc. | 3.8 | 13.0 |
| Dithiocarbamates (RD) – maneb sc. | 3.7 | 12.6 |
| Dithiocarbamates (RD) – metiram sc. | 25.5 | 87.0 |
| Dithiocarbamates (RD) – propineb sc. | 26.7 | 91.1 |
| Dithiocarbamates (RD) – thiram sc. | 10.7 | 36.4 |
| Dithiocarbamates (RD) – ziram sc. | 35.6 | 121 NL toddler |
| Dodine | 0.08 | 0.25 |
| Endosulfan (RD) | 0.015 | 4.8 |
| EPN | n.r. | |
| Epoxiconazole | 0.03 | 2.2 |
| Ethephon | 0.73 | 2.3 |
| Ethion | 0.002 | 0.08 |
| Ethirimol | 0.007 | 0.55 |
| Etofenprox | 0.27 | 1.2 |
| Famoxadone | 0.16 | 1.3 |
| Fenamidone* | Quantifies residues in one or several commodities | |

| Pesticide | Chronic exposure (in % of ADI) | |
|---|---|---|
| | Lower-bound | Ad. upper-bound |
| Fenamiphos (RD) | 0.03 | 14.5 |
| Fenarimol | 0.002 | 0.51 |
| Fenazaquin | 0.03 | 4.3 |
| Fenbuconazole | 0.08 | 3.7 |
| Fenbutatin oxide | 0.03 | 0.34 |
| Fenhexamid | 0.11 | 0.20 |
| Fenitrothion | 0.03 | 4.6 |
| Fenoxycarb | 0.008 | 0.46 |
| Fenpropathrin | 0.006 | 0.185 |
| Fenpropidin (RD) | 0.005 | 0.56 |
| Fenpropimorph (RD) | 0.16 | 3.3 |
| Fenpyroximate (RD) | 0.03 | 2.2 |
| Fenthion (RD) | 0.004 | 0.76 |
| Fenvalerate (RD) | 0.012 | 1.5 |
| Fipronil (RD) | 0.72 | 39.3 |
| Flonicamid (RD) | 0.2 | 2.2 |
| Fluazifop-P (RD) | 0.04 | 0.43 |
| Flubendiamide | 0.03 | 1.1 |
| Fludioxonil (RD) | 0.29 | 0.39 |
| Flufenoxuron | 0.003 | 0.09 |
| Fluopicolide | 0.025 | 0.29 |
| Fluopyram (RD) | 0.91 | 4.0 |
| Fluquinconazole | 0.003 | 6.9 |
| Flusilazole (RD) | 0.0025 | 2.7 |
| Flutriafol | 0.07 | 2.0 |
| Folpet (RD) | 0.10 | 0.52 |
| Formetanate | 0.18 | 2.0 |
| Fosthiazate | 0.018 | 3.8 |
| Glyphosate | 0.06 | 0.26 |
| Haloxyfop (RD) | 0.37 | 4.5 |
| Heptachlor (RD) | 0.03 | 5.7 |
| Hexachlorobenzene* | Quantifies residues in one or several commodities | |
| Hexachlorocyclohexane (alpha)* | Quantifies residues in one or several commodities | |
| Hexachlorocyclohexane (beta)* | Quantifies residues in one or several commodities | |
| Hexaconazole | 0.0045 | 0.50 |
| Hexythiazox | 0.02 | 0.88 |
| Imazalil | 15.4 | 16.6 |
| Imidacloprid | 0.11 | 0.93 |
| Indoxacarb | 0.5 | 5.9 |
| Iprodione (RD) | 0.66 | 2.3 |
| Iprovalicarb | 0.011 | 0.32 |
| Isocarbophos* | Quantifies residues in one or several commodities | |
| Kresoxim-methyl (RD) | 0.001 | 0.05 |
| Lambda-cyhalothrin (RD) | 0.91 | 17.9 |

| Pesticide | Chronic exposure (in % of ADI) | |
|---|---|---|
| | Lower-bound | Ad. upper-bound |
| Lindane | 0.003 | 1.7 |
| Linuron | 0.26 | 7.4 |
| Lufenuron | 0.008 | 0.56 |
| Malathion (RD) | 0.03 | 0.79 |
| Mandipropamid | 0.02 | 0.07 |
| Mepanipyrim | 0.028 | 0.44 |
| Mepiquat | 0.1 | 0.79 |
| Metalaxyl | 0.03 | 0.21 |
| Methamidophos | 0.09 | 3.1 |
| Methidathion | 0.005 | 5.1 |
| Methiocarb (RD) | 0.007 | 1.3 |
| Methomyl (RD) | 0.14 | 4.2 |
| Methoxychlor | 0.095 | 1.9 |
| Methoxyfenozide | 0.034 | 0.24 |
| Monocrotophos | 0.038 | 1.3 |
| Myclobutanil (RD) | 0.327 | 1.5 |
| Omethoate | 0.747 | 75.9 |
| Oxadixyl | 0.004 | 0.89 |
| Oxamyl | 0.05 | 3.4 |
| Oxydemeton-methyl (RD) | n.r. | |
| Paclobutrazol | 0.002 | 0.676 |
| Parathion | 0.013 | 8.5 |
| Parathion-methyl (RD) | 0.002 | 2.9 |
| Penconazole | 0.028 | 0.63 |
| Pencycuron | 0.001 | 0.05 |
| Pendimethalin | 0.002 | 0.21 |
| Permethrin | 0.012 | 0.74 |
| Phosmet (RD) | 0.45 | 3.7 |
| Pirimicarb (RD) | 0.077 | 0.69 |
| Pirimiphos-methyl | 7.5 | 10.4 |
| Procymidone (RD) | 0.06 | 5.7 |
| Profenofos | 0.02 | 0.14 |
| Propamocarb (RD) | 0.1 | 0.13 |
| Propargite | 0.01 | 0.89 |
| Propiconazole | 0.77 | 1.4 |
| Propyzamide (RD) | 0.001 | 0.041 |
| Prosulfocarb | 0.11 | 3.8 |
| Prothioconazole (RD) | 0.004 | 0.21 |
| Pymetrozine (RD) | 0.017 | 0.27 |
| Pyraclostrobin | 0.383 | 1.4 |
| Pyridaben | 0.04 | 2.1 |
| Pyrimethanil (RD) | 0.862 | 1.0 |
| Pyriproxyfen | 0.018 | 0.330 |
| Quinoxyfen | 0.005 | 0.03 |
| Spinosad | 0.2 | 1.5 |
| Spirodiclofen | 0.123 | 1.9 |
| Spiromesifen | 0.05 | 0.7 |

| Pesticide | Chronic exposure (in % of ADI) | |
|---|---|---|
| | Lower-bound | Ad. upper-bound |
| Spiroxamine (RD) | 0.02 | 0.712 |
| tau-Fluvalinate | 0.09 | 4.8 |
| Tebuconazole (RD) | 0.26 | 1.5 |
| Tebufenozide | 0.05 | 1.1 |
| Tebufenpyrad | 0.05 | 2.3 |
| Teflubenzuron | 0.02 | 2.2 |
| Tefluthrin | 0.01 | 1.1 |
| Terbuthylazine | 0.001 | 1.0 |
| Tetraconazole | 0.135 | 7.7 |
| Tetradifon | 0.0001 | 0.04 |
| Thiabendazole (RD) | 1.1 | 1.5 |
| Thiacloprid | 0.59 | 4.3 |
| Thiamethoxam | 0.04 | 1.1 |
| Thiodicarb | 0.0006 | 0.11 |
| Thiophanate-methyl | 0.113 | 0.473 |
| Tolclofos-methyl | 0.0008 | 0.09 |
| Tolylfluanid (RD) | 0.0001 | 0.009 |
| Triadimefon | 0.004 | 0.158 |
| Triadimenol (RD) | 0.01 | 0.233 |
| Triazophos | 0.063 | 1.6 |
| Trifloxystrobin (RD) | 0.065 | 0.3 |
| Triflumuron | 0.18 | 1.6 |
| Vinclozolin | n.r. | |

ADI: acceptable daily intake; RD: residue definition.
*: Active substance for which no ADI was established.
**: Tentative risk assessment based on ADI of 1 mg/kg bw per day set by JMPR (FAO, 1988).
n.r.: No quantified residues in any of the samples analysed.
sc.: scenario.

When the chronic risk assessment is based on the lower-bound scenario, ADI exceedances from pesticide consumption were not identified. The top 3 highest chronic exposure estimates correspond to the dithiocarbamates (RD) scenarios (35.6% of the ADI of ziram, 26.7% of the ADI of propineb and 25.5 of the ADI of metiram).

When the chronic risk assessment is based on the more conservative adjusted upper-bound scenario, the ADI exceedance identified corresponded to consumption of dithiocarbamates (RD) – scenario ziram (121% of the ziram ADI). The highest expose population was the Dutch toddlers. The major contributors to the total upper bound chronic exposure from dithiocarbamates came from apples (35%), pears (15.7%) and potatoes (12.4%).

Dithiocarbamates were found in 1,212 out of the 14,121 samples analysed for this substance (8.6%).

EFSA noted that the contribution to the upper-bound exposure estimated for dithiocarbamates ziram scenario may be biased by different uncertainties (e.g. background $CS_2$ sources, high LOQ values for a classical ultraviolet-visible spectroscopy quantification methods). Therefore, it is recommended that analytical methods are selective enough to differentiate among the dithiocarbamates applied in the field and not to be quantified together as a common degradation product that even is common to plants not having been treated with any dithiocarbamates.

ADI exceedances were not identified for any other pesticides based on the upper-bound risk assessment. For 155 pesticides/scenarios, the estimated chronic exposure was less than 10% of the ADI whereas for 74 thereof the result was lower or equal to 1% of the ADI.

For aldicarb, EPN, oxydemeton-methyl (RD) and vinclozolin covered by the 2018 EUCP, quantifiable residues were not reported for any of the food items tested.

The active substances fenamidone, HCB, HCH (alpha), HCH (beta) and isocarbophos were quantified in one or more food commodities. As no internationally agreed health-based guidance values are currently set for these pesticides no exposure could be calculated.[79] An estimation using the food consumption in EFSA PRIMo rev. 3.1, is reported in Table 3.

For bromide ion, a tentative risk assessment was carried out based on an ADI of 1 mg/kg bw per day set by JMPR (FAO, 1988). In both lower- and upper-bound scenarios the exposure to the naturally occurring bromide ion was below this ADI.

[79] In the framework of the Pesticides Peer Review Experts' Meeting 134 on fenamidone (EFSA, 2017b), no health-based guidance values were set because of the lack of conclusive data on the potential genotoxicity. During the renewal procedure most of the experts considered that the setting of reference values of fenamidone cannot be supported because of no conclusion on the genotoxic potential of fenamidone could be drawn leading to a critical area of concern. That is why the reference values set in 2003 were not used in the exposure assessment.

**Table 3:** Results of chronic exposure assessment for active substances without ADI values

| Pesticide | Chronic exposure (in mg/kg bw per day) | |
|---|---|---|
| | Lower-bound approach | Adjusted upper-bound approach |
| Bromide ion | 0.016 | 0.094 |
| Fenamidone | 0.01 | 0.0001 |
| Hexachlorobenzene (HCB) | 0.000001 | 0.0004 |
| Hexachlorocyclohexane (alpha) | 0.000000002 | 0.00002 |
| Hexachlorocyclohexane (beta) | 0.0000001 | 0.00002 |
| Isocarbophos | 0.0000004 | 0.000009 |

bw: body weight.

In general, the estimated exposure was notably lower in the lower-bound scenario compared to the adjusted upper-bound approach. EFSA noted that the high proportion of samples with pesticide residues below the LOQ may result in particularly high upper-bound exposure values due to the assumption that even if not quantified, residues are present in all samples at the level of LOQ. This indicates the high conservatism of the exposure assessment methodology basing it on the sensitivity of the analytical equipment used and the LOQ value derived. Furthermore, high LOQs explain the differences in the exposure estimates between the lower-bound and upper-bound scenarios.

Taking into consideration all food items for which consumption data are provided in PRIMo rev. 3.1, the higher contributors to the overall EU pesticide dietary exposure remain to be those covered by the 3-years cycle of the EU-coordinated programme. Overall, EFSA concludes that based on the results of the 2018 pesticide monitoring programmes (EUCP and NP), the chronic dietary exposure to pesticides and for which health-based guidance values are available, would be unlikely to pose a health risk to consumers.

## 6. Conclusions and recommendations

The 2018 EU report on pesticide residues in food provides an overview of the official control activities on pesticide residues carried out in the EU Member State[1], Iceland and Norway.

In the context of the national programmes (including the results of the EUCP), the number of samples analysed by reporting countries for pesticide residues increased by 3% compared to 2017. The MRL exceedance rate increased from 4.1% in 2017 to 4.5% in 2018. The percentage of samples coming from the EU internal market (63%) and those coming from third countries (27%) remained steady in comparison with 2017 (64% and 29%, respectively) except for an increase in the number of samples of unknown origin (7% in 2017 vs. 10.1% in 2018).

The random sampling of the EUCP commodities mostly consumed by EU citizens (i.e. aubergines (eggplants), bananas, broccoli, cultivated fungi, grapefruit, melons, sweet peppers/bell peppers, table grapes, wheat grain, virgin olive oil, bovine fat and chicken eggs) provides a statistically representative snapshot of the situation of pesticide residues in those food products. For the first time this year, these results are presented on a dedicated website[2] that allows stakeholders to scroll through the results. As the commodities in both 2018 and 2015 EUCPs are not completely aligned, not direct MRL exceedance comparison can be drawn. By food commodities, the individual MRL exceedance rate increased from 2015 to 2018 in table grapes (from 1.8% to 2.6%), sweet peppers/bell peppers (from 1.2% to 2.4%), bananas (from 0.5% to 1.7%) and aubergines (from 0.6% to 1.6%). The rate of exceedances fell in 2018 compared to 2015 for broccoli (from 3.7% to 2.0%), virgin olive oil (from 0.9% to 0.6%) and chicken eggs (from 0.2% to 0.1%). The EUCP Regulation requirement to sample a minimum of 683 samples by commodity to estimate the MRL exceedance rate of 1% with a margin of error of 0.75%, was achieved for all the individual commodities, except for melon and virgin olive oil for which it was very close. This means, that conclusions derived by food item with the EUCP results, are within the agreed uncertainty.

The results of the monitoring programmes are a valuable source of information for estimating the dietary exposure of EU consumers to pesticide residues. As in previous years, the deterministic model PRIMo rev. 3.1 was used to performed risk assessments to the 177 pesticide residues covered in the EUCP (for the marker $CS_2$ included in the EUCP, 6 different dithiocarbamate scenarios were built; so, overall 182 pesticides underwent these assessment). The EUCP commodities were the ones that underwent the acute risk assessment, whereas all the raw commodities listed in PRIMo rev. 3.1 where used to conduct the chronic risk assessment.

The acute exposure assessment was carried out on 22,752 samples. In 1.4% of the samples the ARfD was found to be exceeded. The pesticides most frequently exceeded were chlorpyrifos (126 samples), thiabendazole (RD) (91), formetanate (17), methomyl (16), ethephon (15), acetamiprid (RD) (14), tebuconazole (RD) (10) and propiconazole (10). These results are based on a deterministic screening method which uses a number of conservative assumptions. Therefore, EFSA considers unlikely that the limited number of exceedances of the ARfD would pose concerns for consumer health.

The chronic exposure assessment conducted on 80,733 samples, estimated that the exposure was below the ADI for all pesticide residues (except for the conservative assumption -the adjusted upper bound- where the marker $CS_2$ was assumed to come from ziram dithiocarbamate). Therefore, according to current scientific knowledge, chronic dietary exposure, is unlikely to pose concerns for consumer health.

Based on the 2018 pesticide monitoring findings, EFSA recommends the following:

- Several non-approved pesticides in the EU, were found repeatedly in food randomly sampled produced in the EU at levels exceeding the legal limits, e.g.:
  - aubergines: omethoate,[5]
  - broccoli: bitertanol, carbendazim (RD) and flusilazole,
  - melons: dieldrin (RD) and chlorfenapyr,
  - sweet peppers/bell peppers: chlorfenapyr and triadimefon,
  - table grapes: carbendazim (RD), omethoate[5] and acephate,
  - wheat grain: carbendazim (RD) and fenitrothion
  - virgin olive oil: iprodione (RD).[30]

Since these results give an indication of possible misuses of EU non-approved active substances, it is recommended that Member States follow-up on these findings, investigating the reasons and taking corrective measures where appropriate.

- Several non-approved pesticides in the EU, were found in food randomly sampled grown outside the internal market, in concentrations exceeding the legal limit:
  - aubergines: carbofuran and chlorfenapyr,
  - bananas: carbendazim (RD),
  - grapefruit: bromopropylate, diazinon, isocarbophos, and fenthion (RD),
  - sweet peppers/bell peppers: carbaryl, fenitrothion, carbofuran (RD) and propiconazole,
  - table grapes: acephate and carbendazim (RD).

Follow-up on imports of these pesticides/crop combinations by Member States is recommended.

- Due to the increase in DDT (RD) detection rate in bovine fat compared to other species, EFSA recommends prioritising the analysis of bovine fat over other fat commodities included in the EUCP (e.g. swine, poultry).
- A notable increase of samples of unknown origin (10.1%) was seen in comparison with 2017 (7%). The country of origin of a sample is a valuable piece of information for traceability of non-compliant samples and gives relevant information on potential problems in third countries. Member States' competent authorities should make sure that this information is provided when reporting the sample results to EFSA.
- The MRL exceedances rate remains high in specific crops (e.g. grape leaves, wild fungi) not covered in the EUCP. Therefore, it is recommended to continue monitoring those food items in the national control programmes.
- Anthraquinone is a non-approved EU substance that has been found in teas, mate and goji berries coming from third countries. Several possible reasons for its occurrence have been suggested, including environmental contamination and its formation through drying and smoking processes alongside other polycyclic aromatic hydrocarbons. EFSA recommends third countries to make use of the mitigation methods for smoking and drying processes already laid

down at international level in a Code of Practice adopted by the Codex Alimentarius Commission in 2009.[80]

- Nicotine has been reported in goji berries, cultivated fungi and kale. It is recommended that these products should continue to be analysed under the national control programmes.
- The presence of tricyclazole in rice from third countries indicates the need to keep monitoring this combination under the national programmes.
- Other pesticides not approved at EU level have been identified in at least one sample exceeding the legal limit. National authorities should consider the following combinations when planning their sampling programmes:
  - carbendazim (RD) in chilli pepper, pitahaya and rice,
  - carbofuran in goji berries,
  - acephate and methamidophos in beans (with pods)
  - chlorfenapyr in chilli peppers
- Chlorfenapyr which is a non-approved EU pesticide was found in many samples grown in different EU countries. EFSA recommends Member States to monitor this pesticide and investigate the reasons for its presence, including possible misuses by EU farmers.
- The following pesticides are some of the non-permitted pesticides sporadically found in organic crops: chlorpyrifos, imazalil and thiacloprid. Member States should investigate the reason for their presence.
- Fipronil (RD) is still found in chicken eggs in the EU. EFSA repeats its recommendation of previous years that Member States should continue analysing acaricides in animal products. However, as this pesticide was also reported in chilli peppers (mainly from the Dominican Republic), EFSA suggests that Member States include this pesticide in their analysis of fruit and vegetable samples.
- In animal products the main detections were of environmental contaminants, used as pesticides in the past (e.g. chlordecone, DDT (RD), HCB, mercury and HCH (beta)), substances with uses other than as a pesticide (e.g. copper, BAC (RD), chlorates, DDAC) and others likely to be carried over resulting from animal intake in feed (e.g. thiacloprid, fipronil (RD), amitraz (RD), acetamiprid (RD), chlorpyrifos). EFSA recommends continued monitoring of these substances in this group of commodities.
- Honey is a minor contributor to dietary exposure to pesticide residues. Therefore, EFSA recommends honey samples to be analysed by Member States under their national programmes, keeping the analytical scope as wide as possible. As a minimum, the following pesticides should be included: acetamiprid, amitraz, boscalid, dimoxystrobin, glyphosate and thiacloprid.
- The number of samples with multiple pesticide residues increased in 2018 compared to the previous year (from 27.5% to 29.1%), especially in non-EU origin samples (e.g. up to 29 different pesticides were reported in goji berry from China). EFSA recommends Member States to monitor under the national programmes food that is likely to contain multiple residues, and to analyse as wide scope of pesticides as possible.
- When the chronic risk assessment is based on the upper-bound scenario, the % of ADI is exceeded for ziram (different scenarios are built for the different dithiocarbamates used in the field that can lead to $CS_2$ marker). EFSA reiterates its previous recommendation to develop specific analytical methods which identify the individual active substance belonging to the class of dithiocarbamates used in the field.
- For aldicarb, EPN, oxydemeton-methyl (RD) and vinclozolin, quantified residues were not reported for any of the food items tested. Residues of aldicarb, EPN and oxydemeton-methyl are currently included in the EUCP and have not been quantified in any of the samples analysed over the past three years. Risk managers may consider taking them out of the mandatory testing in the framework of the EUCP and instead include them in national programmes. Furthermore, it should be verified if these pesticides are still required under the scope of Regulation (EC) No 669/2009 on official controls and emergency measures governing the entry into the Union of certain goods from certain third countries.
- EFSA recommends building a European database on processing factors that will allow Member States to refine exposure assessments if needed.

[80] Code of Practice for the reduction of contamination of food with polycyclic aromatic hydrocarbons (PAH) from smoking and direct drying processes (CAC-RCP 68/2009).

- EFSA again recommends that Member States include limit of detection (LOD) in their analytical methods validation. This requires additional effort and resources, but information on the percentage of samples free of residues (i.e. residues below the LOD) would contribute to a more realistic exposure assessment. As an alternative to this costly recommendation, EFSA suggests Member States to provide to EFSA the 'LOQ of the instrument' (if lower than the reporting level being provided) and to define this parameter in the Guidance on Method Validation and Quality Control Procedures for Pesticide Residues Analysis in Food and Feed (EC, 2020).

This report is intended to provide information to the interested public and stakeholders with an interest and responsibilities in the food chain, in particular food supply chain operators. Its aim is to present a comprehensive overview of findings of residues in food placed on the market, including possible non-compliances with legal limits, and to assess the exposure of consumers to pesticides residues. Furthermore, it gives recommendations on possible risk management options where appropriate. The report's findings are systematically used by the Commission and the Member States to establish priorities for controls on food on the market, including the most relevant substance/commodity combinations to be included in the EUCP regulation or in the national control programmes.

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## Abbreviations

EU/EEA country codes

AT Austria
BE Belgium
BG Bulgaria
CY Cyprus
CZ The 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 The Netherlands
NO Norway
PL Poland
PT Portugal
RO Romania
SE Sweden
SI Slovenia
SK Slovak Republic
UK The 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
EEA European Economic Area

| | |
|---|---|
| EFTA | European Free Trade Association |
| EUCP | EU-coordinated control programme |
| FAO | Food and Agriculture Organization of the United Nations |
| GAP | Good Agricultural Practice |
| HCB | hexachlorobenzene |
| HCH | hexachlorocyclohexane |
| HR | highest residue |
| IESTI | International Estimation of Acute Intake |
| JMPR | Joint Meeting on Pesticide Residues |
| LOD | limit of detection |
| LOQ | limit of quantification |
| MRL | maximum residue level |
| NP | National control programme |
| POP | persistent organic pollutants |
| PRIMo | Pesticide Residue Intake Model |
| RASFF | Rapid Alert System for Food and Feed |
| RD | residue definition |
| STMR | supervised trials median residue |
| WHO | World Health Organization |

# Appendix A – Authorities responsible in the reporting countries for pesticide residue monitoring

| Country | National competent authority | Web address for published national monitoring reports |
|---|---|---|
| Austria | Federal Ministry Labour, Social Affairs, Health and Consumer Protection | https://www.verbrauchergesundheit.gv.at/lebensmittel/lebensmittelkontrolle/monitoring/pestizid.html |
| | Austrian Agency for Health and Food Safety | http://www.ages.at/themen/rueckstaende-kontaminanten/pflanzenschutzmittel-rueckstaende/pestizidmonitoringberichte/ |
| Belgium | Federal Agency for the Safety of the food Chain (FASFC) | http://www.favv-afsca.fgov.be/publicationsthematiques/pesticide-residue-monitoring-food-plant-origin.asp |
| Bulgaria | Risk Assessment Centre on Food Chain | http://www.babh.government.bg/en/ |
| Croatia | Ministry of Agriculture | http://www.mps.hr/ |
| 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 |
| | State Veterinary Administration | http://www.svscr.cz |
| Denmark | Danish Veterinary and Food Administration | https://www.foedevarestyrelsen.dk/Kontrol/Kontrolresultater/Sider/Pesticidrester.aspx |
| | National Food Institute, Technical University of Denmark | http://www.food.dtu.dk/publikationer/kemikaliepaavirkninger/pesticider-i-kosten |
| Estonia | Veterinary and Food Board | http://www.vet.agri.ee |
| Finland | Finnish Food Authority Evira and Finnish Customs | https://www.ruokavirasto.fi/en/companies/food-sector/production/common-requirements-for-composition/residues-of-plant-protection-products/control-of-plant-protection-product-residues-in-food/ |
| France | Ministère de l'économie et des finances/Direction générale de la concurrence, de la consommation et de la répression des fraudes (DGCCRF) | http://www.economie.gouv.fr/dgccrf/securite/produits-alimentaires |
| | Ministère de l'Agriculture et de l'Alimentation, Direction générale de l'alimentation (DGAL) | http://agriculture.gouv.fr/plans-de-surveillance-et-de-controle |
| Germany | Federal Office of Consumer Protection and Food Safety (BVL) | www.bvl.bund.de/berichtpsm |
| Greece | Ministry of Rural Development and Food | http://www.minagric.gr/index.php/en/citizen-menu/foodsafety-menu |
| | | http://www.minagric.gr/index.php/el/for-farmer-2/crop-production/fytoprostasiamenu/ypoleimatafyto |
| Hungary | National Food Chain Safety Office | https://www.nebih.gov.hu |
| Iceland | MAST – The Icelandic Food and Veterinary Authority | http://www.mast.is |
| Ireland | Department of Agriculture Food and the Marine | www.pcs.agriculture.gov.i.e |
| Italy | Ministero della Salute – Direzione Generale per l'Igiene e la Sicurezza degli Alimenti e la Nutrizione – Ufficio 7 | http://www.salute.gov.it/portale/temi/p2_6.jsp?lingua=italiano&id=1105&area=fitosanitari&menu=vegetali |
| Latvia | Ministry of Agriculture<br>Food and Veterinary Service of Latvia | www.zm.gov.lv |

| Country | National competent authority | Web address for published national monitoring reports |
|---|---|---|
| Lithuania | National Food and Veterinary Risk Assessment Institute | http://www.nmvrvi.lt |
| Luxembourg | Ministry of Health, Directorate for public health, Division of Food Safety (Secualim) | http://www.securite-alimentaire.public.lu |
| | Ministry of Health, Administration of Veterinary Services (ASV) | |
| Malta | Malta Competition and Consumer Affairs Authority | www.mccaa.org.mt |
| Netherlands | Netherlands Food and Consumer Product Safety Authority (NVWA) | www.nvwa.nl |
| Norway | Norwegian Food Safety Authority | www.mattilsynet.no https://www.mattilsynet.no/mat_og_vann/uonskede_stofferimaten/rester_av_plantevernmidler_i_mat/#overvakings_og_kartleggingsprogrammer |
| Poland | The State Sanitary Inspection | http://www.gis.gov.pl |
| Portugal | Direção-Geral de Alimentação e Veterinária (DGAV) | http://www.dgv.min-agricultura.pt/portal/page/portal/DGV/genericos?generico=4217393&cboui=4217393t |
| 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 | http://www.svps.sk/ |
| | Public Health Authority of the Slovakian Republic | |
| 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 |
| Spain | Spanish Agency for Food Safety and Nutrition (AESAN) | http://www.aecosan.msssi.gob.es/AECOSAN/web/seguridad_alimentaria/subseccion/programa_control_residuos.htm |
| Sweden | National Food Agency | www.livsmedelsverket.se |
| United Kingdom | Health and Safety Executive, Chemicals Regulation Division | https://www.gov.uk/government/publications/expert-committee-on-pesticide-residues-in-food-prif-annual-report |

# Appendix B – Background information on the EU-coordinated programme

**Table B.1:** Description of the 2018 EU-coordinated control programme

| Pesticide | Type of food analysed[(a)] | Residue definition[(d)] according to Regulation (EC) No 396/2005 on EU MRLs[(b)] | Analysis mandatory for the following food products[(c)] |
|---|---|---|---|
| 2,4-D (RD) | P | 2,4-D (sum of 2,4-D, its salts, its esters and its conjugates, expressed as 2,4-D) | Au, Br, Gr, Tg |
| 2-Phenylphenol | P | 2-Phenylphenol<br>2-Phenylphenol (sum of 2-phenylphenol and its conjugates, expressed as 2-phenylphenol) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Abamectin (RD) | P | Abamectin (sum of avermectin B1a, avermectin B1b and delta-8,9-isomer of avermectin B1a, expressed as avermectin B1a) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Acephate | P | Acephate | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Acetamiprid (RD) | P | Acetamiprid | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Acrinathrin | P | Acrinathrin<br>Acrinathrin and its enantiomer | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Aldicarb (RD) | P | Aldicarb (sum of aldicarb, its sulfoxide and its sulfone, expressed as aldicarb) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Azinphos-methyl | P | Azinphos-methyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Azoxystrobin | P | Azoxystrobin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Bifenthrin | PA | Bifenthrin (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Biphenyl | P | Biphenyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Bitertanol | P | Bitertanol (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Boscalid (RD) | P | Boscalid | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Bromide ion | P | Bromide ion | Pe |
| Bromopropylate | P | Bromopropylate | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Bupirimate | P | Bupirimate | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Buprofezin | P | Buprofezin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Captan (RD) | P | Sum of captan and THPI, expressed as captan | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Carbaryl | P | Carbaryl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Carbendazim (RD) | P | Carbendazim and benomyl (sum of benomyl and carbendazim expressed as carbendazim) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Carbofuran (RD) | P | Carbofuran (sum of carbofuran (including any carbofuran generated from carbosulfan, benfuracarb or furathiocarb) and 3-OH carbofuran expressed as carbofuran) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Chlorantraniliprole | P | Chlorantraniliprole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |

| Pesticide | Type of food analysed[a] | Residue definition[d] according to Regulation (EC) No 396/2005 on EU MRLs[b] | Analysis mandatory for the following food products[c] |
|---|---|---|---|
| Chlordane (RD) | A | Chlordane (sum of cis- and trans-isomers and oxychlordane expressed as chlordane) | Eg, Fb |
| Chlorfenapyr | P | Chlorfenapyr | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Chlormequat | P | Chlormequat (sum of chlormequat and its salts, expressed as chlormequat-chloride) | Au, Cf, Tg, Wh |
| Chlorothalonil (RD) | P | Chlorothalonil | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Chlorpropham (RD) | P | Chlorpropham | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Chlorpyrifos | PA | Chlorpyrifos | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Chlorpyrifos-methyl | PA | Chlorpyrifos-methyl<br>Sum of chlorpyrifos-methyl and desmethyl chlorpyrifos-methyl, expressed as chlorpyrifos-methyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Clofentezine (RD) | P | Clofentezine | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Clothianidin | P | Clothianidin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Cyfluthrin | P | Cyfluthrin (cyfluthrin including other mixtures of constituent isomers (sum of isomers)) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Cymoxanil | P | Cymoxanil | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Cypermethrin | PA | Cypermethrin (cypermethrin including other mixtures of constituent isomers (sum of isomers)) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Cyproconazole | P | Cyproconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Cyprodinil (RD) | P | Cyprodinil | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Cyromazine | P | Cyromazine | Au, Cf, Me, Pe |
| DDT (RD) | A | DDT (sum of *p,p′*-DDT, *o,p′*-DDT, *p,p′*-DDE and *p,p′*-TDE (DDD) expressed as DDT) | Eg, Fb |
| Deltamethrin | PA | Deltamethrin (*cis*-deltamethrin) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Diazinon | PA | Diazinon | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Dichlorvos | P | Dichlorvos | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Dicloran | P | Dicloran | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Dicofol (RD) | P | Dicofol (sum of *p,p′*- and *o,p′*-isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Dieldrin (RD) | PA | Aldrin and Dieldrin (Aldrin and dieldrin combined expressed as dieldrin) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Diethofencarb | P | Diethofencarb | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Difenoconazole | P | Difenoconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Diflubenzuron (RD) | P | Diflubenzuron | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |

| Pesticide | Type of food analysed[(a)] | Residue definition[(d)] according to Regulation (EC) No 396/2005 on EU MRLs[(b)] | Analysis mandatory for the following food products[(c)] |
|---|---|---|---|
| Dimethoate | P | Dimethoate (sum of dimethoate and omethoate expressed as dimethoate) Dimethoate | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Dimethomorph | P | Dimethomorph (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Diniconazole | P | Diniconazole (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Diphenylamine | P | Diphenylamine | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Dithianon | P | Dithianon | Tg |
| Dithiocarbamates (RD) | P | Dithiocarbamates (dithiocarbamates expressed as $CS_2$, including maneb, mancozeb, metiram, propineb, thiram and ziram) | Au, Ba, Cf, Gr, Me, Pe, Tg, Wh |
| Dodine | P | Dodine | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Endosulfan (RD) | PA | Endosulfan (sum of alpha- and beta-isomers and endosulfan-sulfate expresses as endosulfan) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| EPN | P | EPN | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Epoxiconazole | P | Epoxiconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Ethephon | P | Ethephon | Pe, Tg, Wh |
| Ethion | P | Ethion | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Ethirimol | P | Ethirimol | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Etofenprox | P | Etofenprox | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Famoxadone | PA | Famoxadone | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Fenamidone | P | Fenamidone | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenamiphos (RD) | P | Fenamiphos (sum of fenamiphos and its sulfoxide and sulfone expressed as fenamiphos) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenarimol | P | Fenarimol | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Fenazaquin | P | Fenazaquin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Fenbuconazole | P | Fenbuconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenbutatin oxide | P | Fenbutatin oxide | Au, Gr, Pe, Tg |
| Fenhexamid | P | Fenhexamid | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenitrothion | P | Fenitrothion | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenoxycarb | P | Fenoxycarb | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenpropathrin | P | Fenpropathrin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |

| Pesticide | Type of food analysed[(a)] | Residue definition[(d)] according to Regulation (EC) No 396/2005 on EU MRLs[(b)] | Analysis mandatory for the following food products[(c)] |
|---|---|---|---|
| Fenpropidin (RD) | P | Fenpropidin (sum of fenpropidin and its salts, expressed as fenpropidin) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenpropimorph (RD) | P | Fenpropimorph (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenpyroximate (RD) | P | Fenpyroximate | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenthion (RD) | P | Fenthion (fenthion and its oxygen analogue, their sulfoxides and sulfone expressed as parent) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fenvalerate (RD) | PA | Fenvalerate (any ratio of constituent isomers (RR, SS, RS and SR) including esfenvalerate) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Fipronil (RD) | P | Fipronil (sum Fipronil and sulfone metabolite (MB46136) expressed as Fipronil) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Flonicamid (RD) | P | Flonicamid (sum of flonicamid, TNFG and TNFA expressed as flonicamid) | Au, Gr, Me, Pe, Tg, Wh |
| Fluazifop-P (RD) | P | Fluazifop-P (sum of all the constituent isomers of fluazifop, its esters and its conjugates, expressed as fluazifop) | Au, Br, Pe, Wh |
| Flubendiamide | P | Flubendiamide | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fludioxonil (RD) | P | Fludioxonil | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Flufenoxuron | P | Flufenoxuron | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fluopicolide | P | Fluopicolide | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fluopyram (RD) | P | Fluopyram | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fluquinconazole | P | Fluquinconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Flusilazole (RD) | P | Flusilazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Flutriafol | P | Flutriafol | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Folpet (RD) | P | Fluvalinate, tau- | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Formetanate | P | Formetanate: Sum of formetanate and its salts expressed as formetanate (hydrochloride) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Fosthiazate | P | Fosthiazate | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Glyphosate | P | Glyphosate | Tg, Wh |
| Haloxyfop (RD) | P | Haloxyfop (Sum of haloxyfop, its esters, salts and conjugates expressed as haloxyfop (sum of the *R*- and *S*-isomers at any ratio)) | Br, Gr, Pe, Wh |
| Heptachlor (RD) | A | Heptachlor (sum of heptachlor and heptachlor epoxide expressed as heptachlor) | Eg, Fb |
| Hexachlorobenzene | A | Hexachlorobenzene | Eg, Fb |

| Pesticide | Type of food analysed[(a)] | Residue definition[(d)] according to Regulation (EC) No 396/2005 on EU MRLs[(b)] | Analysis mandatory for the following food products[(c)] |
|---|---|---|---|
| Hexachlorocyclohexane (alpha) | A | Hexachlorocyclohexane (HCH), alpha-isomer | Eg, Fb |
| Hexachlorocyclohexane (beta) | A | Hexachlorocyclohexane (HCH), beta-isomer | Eg, Fb |
| Hexaconazole | P | Hexaconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Hexythiazox | P | Hexythiazox | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Imazalil | P | Imazalil | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Imidacloprid | P | Imidacloprid | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Indoxacarb | P | Indoxacarb (sum of indoxacarb and its R enantiomer) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Iprodione (RD) | P | Iprodione | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Iprovalicarb | P | Iprovalicarb | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Isocarbophos | P | Isocarbophos | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Kresoxim-methyl (RD) | P | Kresoxim-methyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Lambda-cyhalothrin (RD) | P | Lambda-Cyhalothrin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Lindane | A | Lindane (gamma-isomer of hexachlorocyclohexane (HCH)) | Eg, Fb |
| Linuron | P | Linuron | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Lufenuron | P | Lufenuron<br>Lufenuron (any ratio of constituent isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Malathion (RD) | P | Malathion (sum of malathion and malaoxon expressed as malathion) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Mandipropamid | P | Mandipropamid | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Mepanipyrim | P | Mepanipyrim | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Mepiquat | P | Mepiquat (sum of mepiquat and its salts, expressed as mepiquat chloride) | Cf, Wh |
| Metalaxyl | P | Metalaxyl and metalaxyl-M (metalaxyl including other mixtures of constituent isomers including metalaxyl-M (sum of isomers))<br>Metalaxyl including other mixtures of constituent isomers including metalaxyl-M (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Methamidophos | P | Methamidophos | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Methidathion | P | Methidathion | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Methiocarb (RD) | P | Methiocarb (sum of methiocarb and methiocarb sulfoxide and sulfone, expressed as methiocarb) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |

| Pesticide | Type of food analysed[(a)] | Residue definition[(d)] according to Regulation (EC) No 396/2005 on EU MRLs[(b)] | Analysis mandatory for the following food products[(c)] |
|---|---|---|---|
| Methomyl | P | Methomyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Methoxychlor | A | Methoxychlor | Eg, Fb |
| Methoxyfenozide | P | Methoxyfenozide | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Monocrotophos | P | Monocrotophos | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Myclobutanil (RD) | P | Myclobutanil | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Omethoate | P | Omethoate | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Oxadixyl | P | Oxadixyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Oxamyl | P | Oxamyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Oxydemeton-methyl (RD) | P | Oxydemeton-methyl (sum of oxydemeton-methyl and demeton-S-methylsulfone expressed as oxydemeton-methyl) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Paclobutrazol | P | Paclobutrazol | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Parathion | PA | Parathion | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Parathion-methyl (RD) | P | Parathion-methyl (sum of parathion-methyl and paraoxon-methyl expressed as parathion-methyl) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Penconazole | P | Penconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Pencycuron | P | Pencycuron | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Pendimethalin | P | Pendimethalin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Permethrin | PA | Permethrin (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Phosmet (RD) | P | Phosmet (phosmet and phosmet oxon expressed as phosmet) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Pirimicarb (RD) | P | Pirimicarb | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Pirimiphos-methyl | PA | Pirimiphos-methyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo, Eg, Fb |
| Procymidone (RD) | P | Procymidone | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Profenofos | P | Profenofos | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Propamocarb (RD) | P | Propamocarb (sum of propamocarb and its salt expressed as propamocarb) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Propargite | P | Propargite | Au, Br, Me, Pe, Tg, Wh |
| Propiconazole | P | Propiconazole (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Propyzamide (RD) | P | Propyzamide | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Prosulfocarb | P | Prosulfocarb | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |

| Pesticide | Type of food analysed[(a)] | Residue definition[(d)] according to Regulation (EC) No 396/2005 on EU MRLs[(b)] | Analysis mandatory for the following food products[(c)] |
|---|---|---|---|
| Prothioconazole (RD) | P | Prothioconazole: prothioconazole-desthio (sum of isomers) | Pe, Wh |
| Pymetrozine (RD) | P | Pymetrozine | Au, Me, Pe |
| Pyraclostrobin | P | Pyraclostrobin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Pyridaben | P | Pyridaben | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Pyrimethanil (RD) | P | Pyrimethanil | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Pyriproxyfen | P | Pyriproxyfen | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Quinoxyfen | P | Quinoxyfen | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Spinosad | P | Spinosad (spinosad, sum of spinosyn A and spinosyn D) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Spirodiclofen | P | Spirodiclofen | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Spiromesifen | P | Spiromesifen | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Spiroxamine (RD) | P | Spiroxamine (sum of isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| tau-Fluvalinate | P | Tau-Fluvalinate | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Tebuconazole (RD) | P | Tebuconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Tebufenozide | P | Tebufenozide | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Tebufenpyrad | P | Tebufenpyrad | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Teflubenzuron | P | Teflubenzuron | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Tefluthrin | P | Tefluthrin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Terbuthylazine | P | Terbuthylazine | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Tetraconazole | P | Tetraconazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Tetradifon | P | Tetradifon | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Thiabendazole (RD) | P | Thiabendazole | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Thiacloprid | P | Thiacloprid | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Thiamethoxam | P | Thiamethoxam | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Thiodicarb | P | Thiodicarb | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Thiophanate-methyl | P | Thiophanate-methyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Tolclofos-methyl | P | Tolclofos-methyl | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |

| Pesticide | Type of food analysed[(a)] | Residue definition[(d)] according to Regulation (EC) No 396/2005 on EU MRLs[(b)] | Analysis mandatory for the following food products[(c)] |
|---|---|---|---|
| Tolylfluanid (RD) | P | Tolylfluanid (sum of tolylfluanid and dimethylaminosulfotoluidide expressed as tolylfluanid) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Oo |
| Triadimefon | P | Triadimefon | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Triadimenol (RD) | P | Triadimenol (any ratio of constituent isomers) | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Triazophos | P | Triazophos | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Trifloxystrobin (RD) | P | Trifloxystrobin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Triflumuron | P | Triflumuron | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |
| Vinclozolin | P | Vinclozolin | Au, Ba, Br, Cf, Gr, Me, Pe, Tg, Wh, Oo |

MRL: maximum residue level.
(a): P: to be analysed in plant products; A: to be analysed in animal products.
(b): Legal residue definition applicable in 2018 for the relevant food products covered by the EUCP; if not specifically mentioned, the residue definition comprises the parent compound only.
(c): Au: Aubergines; Ba: Bananas; Br: Broccoli; Cf: Cultivated fungi; Gr: Grapefruit; Me: Melons; Pe: Sweet peppers/bell peppers; Tg: Table grapes; Wh: Wheat; Oo: Virgin olive oil; Eg: Eggs (chicken); Fb: Fat (bovine).
(d): The term 'residue definition (RD)' in this report refers to all substances generated from the presence of a pesticide in the crop, food or/and feed. A residue definition may be a simple (i.e. one substance only) or a complex one (i.e. more than one substance). Considering that the substances used for the estimation of the dietary exposure to a pesticide residue may not coincide with the ones used for setting and enforcing maximum residue limits (MRLs), different residue definitions may be implemented at EU level for risk assessment and enforcement purposes. In this report, dealing with pesticide monitoring, the 'RD' refers to the enforcement one.

# Appendix C – Background information and detailed results on the overall control programmes

**Table C.1:** Scope of the 2018 pesticide analyses in alphabetical order by pesticide name

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| 1,1-Dichloro-2,2-bis(4-ethylphenyl)ethane | 4,785 | 0 | 0 | 4 | |
| 1,2-Dibromo-3-chloropropane | 2,942 | 0 | 0 | 5 | |
| 1,2-Dichloroethane | 40 | 0 | 0 | 1 | |
| 1,4-Dimethylnaphthalene | 1,247 | 15 | 1.20 | 4 | |
| 1-Naphthylacetic acid (RD) | 11,267 | 18 | 0.16 | 7 | |
| 2,3,4,5-TCNB (2,3,4,5-Tetrachloronitrobenzene) | 1,505 | 0 | 0 | 1 | |
| 2,3,5-Trimethacarb | 11,456 | 0 | 0 | 5 | |
| 2,4,5-T (RD) | 11,448 | 0 | 0 | 13 | |
| 2,4-D (RD) | 22,354 | 309 | 1.38 | 23 | 1 |
| 2,4-DB (RD) | 20,605 | 2 | 0.01 | 16 | |
| 2,4-Dichlorobenzamide | 96 | 0 | 0 | 2 | |
| 2-Naphthyloxyacetic acid | 11,407 | 1 | 0.01 | 7 | |
| 2-phenylphenol | 49,787 | 975 | 1.96 | 29 | 1 |
| 3,4,5-Trimethacarb | 2,761 | 0 | 0 | 4 | |
| 4-CPA | 11,590 | 8 | 0.07 | 8 | |
| 6-Benzyladenine | 11,855 | 7 | 0.06 | 10 | |
| 8-Hydroxyquinoline | 178 | 0 | 0 | 2 | |
| AMTT | 534 | 0 | 0 | 1 | |
| Abamectin (RD) | 42,426 | 74 | 0.17 | 25 | 1 |
| Acephate | 72,875 | 77 | 0.11 | 30 | 1 |
| Acequinocyl | 3,073 | 2 | 0.07 | 5 | |
| Acetamiprid (RD) | 69,670 | 4,473 | 6.42 | 30 | 1 |
| Acetochlor | 26,314 | 0 | 0 | 20 | |
| Acibenzolar-S-methyl (RD) | 18,408 | 1 | 0.01 | 13 | |
| Acifluorfen | 2,762 | 0 | 0 | 4 | |
| Aclonifen | 42,205 | 46 | 0.11 | 26 | |
| Acrinathrin | 64,307 | 51 | 0.08 | 30 | 1 |
| Alachlor | 32,009 | 2 | 0.01 | 22 | |
| Alanycarb | 10,538 | 0 | 0 | 6 | |
| Aldicarb (RD) | 60,253 | 1 | 0.00 | 29 | 1 |
| Aldimorph | 18 | 0 | 0 | 1 | |
| Allethrin | 12,737 | 0 | 0 | 13 | |
| Allidochlor | 4,636 | 0 | 0 | 4 | |
| Alloxydim | 186 | 0 | 0 | 2 | |
| Ametoctradin (RD) | 42,417 | 248 | 0.58 | 21 | |
| Ametryn | 30,675 | 7 | 0.02 | 16 | |
| Amidithion | 2,242 | 0 | 0 | 2 | |
| Amidosulfuron (RD) | 19,838 | 0 | 0 | 15 | |
| Aminocarb | 22,309 | 0 | 0 | 13 | |
| Aminopyralid | 3,888 | 0 | 0 | 4 | |
| Amisulbrom | 15,428 | 4 | 0.03 | 12 | |
| Amitraz (RD) | 38,013 | 60 | 0.16 | 26 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Amitrole | 3,858 | 1 | 0.03 | 5 | |
| Ancymidol | 8,614 | 0 | 0 | 5 | |
| Anilazine | 2,694 | 0 | 0 | 5 | |
| Anilofos | 11,214 | 0 | 0 | 7 | |
| Anthraquinone | 30,053 | 166 | 0.55 | 15 | |
| Aramite | 299 | 0 | 0 | 4 | |
| Aspon | 12,808 | 0 | 0 | 5 | |
| Asulam | 17,584 | 2 | 0.01 | 13 | |
| Atraton | 4,116 | 0 | 0 | 6 | |
| Atrazine | 51,446 | 13 | 0.03 | 27 | |
| Azaconazole | 25,067 | 0 | 0 | 16 | |
| Azadirachtin | 18,832 | 21 | 0.11 | 11 | |
| Azamethiphos | 13,533 | 0 | 0 | 15 | |
| Azimsulfuron | 10,029 | 0 | 0 | 8 | |
| Azinphos-ethyl | 60,551 | 8 | 0.01 | 29 | |
| Azinphos-methyl | 69,216 | 8 | 0.01 | 30 | 1 |
| Aziprotryne | 12,292 | 0 | 0 | 9 | |
| Azoxybenzene | 1,733 | 0 | 0 | 2 | |
| Azoxystrobin | 75,783 | 3,794 | 5.01 | 30 | 1 |
| BAC (RD) | 11,575 | 135 | 1.17 | 12 | |
| Barban | 2,048 | 0 | 0 | 3 | |
| Beflubutamid | 18,198 | 0 | 0 | 12 | |
| Benalaxyl | 56,316 | 18 | 0.03 | 26 | |
| Benazolin | 2,496 | 0 | 0 | 1 | |
| Benazolin-Ethyl | 1,147 | 0 | 0 | 2 | |
| Bendiocarb | 34,213 | 2 | 0.01 | 19 | |
| Benfluralin | 34,958 | 1 | 0.00 | 15 | |
| Benfuresate | 2,682 | 0 | 0 | 3 | |
| Benodanil | 9,689 | 0 | 0 | 7 | |
| Bensulfuron-methyl | 15,243 | 0 | 0 | 8 | |
| Bensulide | 10,349 | 0 | 0 | 5 | |
| Bensultap | 1,273 | 0 | 0 | 1 | |
| Bentazone (RD) | 13,629 | 2 | 0.01 | 19 | |
| Benthiavalicarb | 19,291 | 0 | 0 | 13 | |
| Benzobicyclon | 1,590 | 0 | 0 | 1 | |
| Benzovindiflupyr | 11,841 | 1 | 0.01 | 10 | |
| Benzoximate | 8,434 | 0 | 0 | 8 | |
| Benzoylprop | 380 | 0 | 0 | 1 | |
| Benzoylprop-Ethyl | 7,002 | 0 | 0 | 7 | |
| Benzthiazuron | 32 | 0 | 0 | 2 | |
| Bifenazate (RD) | 21,722 | 114 | 0.52 | 15 | |
| Bifenox | 32,006 | 0 | 0 | 17 | |
| Bifenthrin | 76,573 | 793 | 1.04 | 30 | 1 |
| Bioallethrin | 3,148 | 0 | 0 | 6 | |
| Bioresmethrin | 4,346 | 0 | 0 | 5 | |
| Biphenyl | 56,412 | 99 | 0.18 | 26 | 1 |
| Bispyribac | 8,352 | 0 | 0 | 8 | |
| Bitertanol | 70,716 | 5 | 0.01 | 30 | 1 |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Bixafen (RD) | 40,458 | 11 | 0.03 | 26 | |
| Boscalid (RD) | 75,008 | 6,720 | 8.96 | 30 | 1 |
| Brodifacoum | 43 | 0 | 0 | 1 | |
| Bromacil | 30,466 | 1 | 0.00 | 16 | |
| Bromadiolone | 843 | 0 | 0 | 3 | |
| Bromfenvinfos | 3,359 | 0 | 0 | 9 | |
| Bromfenvinfos-methyl | 827 | 0 | 0 | 3 | |
| Bromide ion | 4,732 | 602 | 12.72 | 22 | 1 |
| Bromobutide | 1,150 | 0 | 0 | 2 | |
| Bromocyclen | 8,208 | 0 | 0 | 5 | |
| Bromofenoxim | 24 | 0 | 0 | 1 | |
| Bromophos | 37.180 | 0 | 0 | 24 | |
| Bromophos-ethyl | 50,540 | 0 | 0 | 24 | |
| Bromopropylate | 72,874 | 13 | 0.02 | 30 | 1 |
| Bromoxynil | 20,711 | 1 | 0.00 | 17 | |
| Bromuconazole | 66,625 | 19 | 0.03 | 28 | |
| Bronopol | 24 | 0 | 0 | 1 | |
| Bupirimate | 74,381 | 178 | 0.24 | 30 | 1 |
| Buprofezin | 75,109 | 932 | 1.24 | 30 | 1 |
| Butachlor | 7,670 | 0 | 0 | 11 | |
| Butafenacil | 19,099 | 0 | 0 | 11 | |
| Butamifos | 10,943 | 0 | 0 | 5 | |
| Butocarboxim | 14,763 | 0 | 0 | 13 | |
| Butoxycarboxim | 14,559 | 0 | 0 | 12 | |
| Butralin | 20,183 | 0 | 0 | 13 | |
| Buturon | 10,257 | 0 | 0 | 8 | |
| Butylate | 12,047 | 0 | 0 | 10 | |
| Cadusafos | 64,497 | 2 | 0.00 | 28 | |
| Cafenstrole | 9,090 | 0 | 0 | 4 | |
| Camphechlor (RD) | 8 | 0 | 0 | 1 | |
| Captafol | 17,963 | 0 | 0 | 16 | |
| Captan (RD) | 31,907 | 1,128 | 3.54 | 21 | 1 |
| Carbaryl | 74,511 | 11 | 0.01 | 30 | 1 |
| Carbendazim (RD) | 62,277 | 1,303 | 2.09 | 29 | 1 |
| Carbetamide | 31,105 | 0 | 0 | 20 | |
| Carbofuran (RD) | 49,750 | 42 | 0.08 | 27 | 1 |
| Carbophenothion | 27,543 | 0 | 0 | 18 | |
| Carboxin | 52,926 | 1 | 0.00 | 27 | |
| Carfentrazone-ethyl | 17,366 | 0 | 0 | 15 | |
| Carpropamid | 2,922 | 0 | 0 | 6 | |
| Carvone | 198 | 0 | 0 | 1 | |
| Chinomethionat | 31,257 | 0 | 0 | 20 | |
| Chlorantraniliprole | 65,228 | 1,912 | 2.93 | 28 | 1 |
| Chlorates | 6,755 | 1,115 | 16.51 | 8 | |
| Chlorbenside | 8,958 | 0 | 0 | 13 | |
| Chlorbromuron | 29,821 | 0 | 0 | 15 | |
| Chlorbufam | 20,357 | 0 | 0 | 16 | |
| Chlordane (RD) | 38,306 | 1 | 0.00 | 28 | 1 |

| Pesticide residues | No. of analysis[a] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Chlordecone | 3,129 | 670 | 21.41 | 3 | |
| Chlordimeform | 4,265 | 0 | 0 | 8 | |
| Chlorfenapyr | 68,650 | 316 | 0.46 | 29 | 1 |
| Chlorfenethol | 2,766 | 0 | 0 | 2 | |
| Chlorfenprop-Methyl | 8,410 | 0 | 0 | 6 | |
| Chlorfenson | 29,863 | 1 | 0.00 | 21 | |
| Chlorfenvinphos | 65,042 | 0 | 0 | 28 | |
| Chlorfluazuron | 32,212 | 10 | 0.03 | 17 | |
| Chlorflurenol | 140 | 0 | 0 | 2 | |
| Chlorflurenol-Methyl | 1,259 | 0 | 0 | 2 | |
| Chloridazon (RD) | 15,542 | 29 | 0.19 | 11 | |
| Chlorimuron | 27 | 0 | 0 | 1 | |
| Chlormephos | 21,104 | 0 | 0 | 15 | |
| Chlormequat | 6,257 | 716 | 11.44 | 26 | 1 |
| Chlornitrofen | 2,017 | 0 | 0 | 1 | |
| Chlorobenzilate | 48,236 | 0 | 0 | 28 | |
| Chloroneb | 7,548 | 0 | 0 | 10 | |
| Chloropropylate | 12,366 | 0 | 0 | 9 | |
| Chlorothalonil (RD) | 53,301 | 343 | 0.64 | 29 | 1 |
| Chlorotoluron | 34,377 | 3 | 0.01 | 19 | |
| Chloroxuron | 24,823 | 0 | 0 | 16 | |
| Chlorpropham (RD) | 70,021 | 533 | 0.76 | 30 | 1 |
| Chlorpyrifos | 77,040 | 2,974 | 3.86 | 30 | 1 |
| Chlorpyrifos-methyl | 75,989 | 1,199 | 1.58 | 30 | 1 |
| Chlorsulfuron | 15,249 | 0 | 0 | 11 | |
| Chlorthal | 32 | 0 | 0 | 2 | |
| Chlorthal-dimethyl | 37,407 | 2 | 0.01 | 20 | |
| Chlorthiamid | 4,010 | 0 | 0 | 7 | |
| Chlorthion | 2,270 | 0 | 0 | 5 | |
| Chlorthiophos | 16,713 | 0 | 0 | 12 | |
| Chlozolinate | 40,995 | 0 | 0 | 24 | |
| Chromafenozide | 20,399 | 0 | 0 | 8 | |
| Cinidon-ethyl | 9,184 | 0 | 0 | 10 | |
| Cinosulfuron | 11,688 | 0 | 0 | 7 | |
| Clethodim (RD) | 24,240 | 3 | 0.01 | 15 | |
| Climbazole | 1,426 | 0 | 0 | 4 | |
| Clodinafop | 8,286 | 0 | 0 | 8 | |
| Clofentezine (RD) | 59,760 | 78 | 0.13 | 27 | 1 |
| Clomazone | 49,282 | 29 | 0.06 | 24 | |
| Clopyralid | 13,105 | 37 | 0.28 | 16 | |
| Cloransulam-Methyl | 27 | 0 | 0 | 1 | |
| Clothianidin | 65,522 | 458 | 0.70 | 30 | 1 |
| Copper | 2,716 | 2,131 | 78.46 | 3 | |
| Coumachlor | 4,171 | 0 | 0 | 2 | |
| Coumaphos | 40,309 | 5 | 0.01 | 27 | |
| Coumatetralyl | 5,712 | 0 | 0 | 3 | |
| Crimidine | 9,643 | 0 | 0 | 7 | |
| Crotoxyphos | 2,687 | 0 | 0 | 3 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Crufomate | 7,559 | 0 | 0 | 6 | |
| Cyanamide | 93 | 0 | 0 | 1 | |
| Cyanazine | 35,319 | 0 | 0 | 19 | |
| Cyanofenphos | 19,524 | 0 | 0 | 15 | |
| Cyanophos | 13,782 | 0 | 0 | 11 | |
| Cyantraniliprole | 17,487 | 79 | 0.45 | 11 | |
| Cyazofamid | 52,777 | 190 | 0.36 | 26 | |
| Cyclanilide | 6,900 | 0 | 0 | 7 | |
| Cycloate | 13,512 | 0 | 0 | 14 | |
| Cyclosulfamuron | 51 | 0 | 0 | 2 | |
| Cycloxydim (RD) | 20,425 | 1 | 0.00 | 16 | |
| Cycluron | 10,525 | 0 | 0 | 9 | |
| Cyenopyrafen | 2,613 | 0 | 0 | 3 | |
| Cyflufenamid | 41,607 | 146 | 0.35 | 22 | |
| Cyflumetofen | 11,285 | 3 | 0.03 | 9 | |
| Cyfluthrin | 60,928 | 137 | 0.22 | 30 | 1 |
| Cyhalofop-butyl (RD) | 12,447 | 0 | 0 | 11 | |
| Cyhalothrin | 2,652 | 2 | 0.08 | 6 | |
| Cyhalothrin, gamma- | 845 | 0 | 0 | 4 | |
| Cyhexatin (RD) | 1,322 | 0 | 0 | 8 | |
| Cymiazole | 13,634 | 0 | 0 | 14 | |
| Cymoxanil | 63,309 | 31 | 0.05 | 29 | 1 |
| Cypermethrin | 73,236 | 1,290 | 1.76 | 30 | 1 |
| Cyphenothrin | 12,036 | 3 | 0.02 | 9 | |
| Cyprazin | 10,191 | 0 | 0 | 4 | |
| Cyproconazole | 73,596 | 109 | 0.15 | 30 | 1 |
| Cyprodinil (RD) | 72,362 | 3,146 | 4.35 | 30 | 1 |
| Cyprofuram | 2,910 | 0 | 0 | 4 | |
| Cyromazine | 35,860 | 129 | 0.36 | 25 | 1 |
| Cythioate | 961 | 0 | 0 | 1 | |
| DDAC | 10,734 | 80 | 0.75 | 11 | |
| DDT (RD) | 54,690 | 211 | 0.39 | 30 | 1 |
| DNOC | 3,868 | 0 | 0 | 7 | |
| Daimuron | 8,179 | 0 | 0 | 3 | |
| Dalapon | 1,273 | 0 | 0 | 1 | |
| Daminozide (RD) | 1,440 | 0 | 0 | 5 | |
| Dazomet | 1,147 | 0 | 0 | 6 | |
| Deltamethrin | 75,733 | 979 | 1.29 | 30 | 1 |
| Demeton | 120 | 0 | 0 | 2 | |
| Demeton-O-methyl | 6 | 0 | 0 | 1 | |
| Demeton-S | 5,007 | 0 | 0 | 6 | |
| Demeton-S-Methyl | 34,053 | 0 | 0 | 25 | |
| Desmedipham | 27,958 | 0 | 0 | 20 | |
| Desmetryn | 17,763 | 0 | 0 | 14 | |
| Di-allate | 4,766 | 0 | 0 | 9 | |
| Diafenthiuron | 32,407 | 11 | 0.03 | 19 | |
| Dialifos | 16,909 | 0 | 0 | 13 | |
| Diazinon | 76,036 | 47 | 0.06 | 30 | 1 |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Dicamba | 20,736 | 2 | 0.01 | 17 | |
| Dichlobenil | 35,422 | 0 | 0 | 21 | |
| Dichlofenthion | 21,700 | 0 | 0 | 14 | |
| Dichlofluanid | 55,773 | 1 | 0.00 | 26 | |
| Dichlone | 5 | 0 | 0 | 1 | |
| Dichlorophen | 1,078 | 0 | 0 | 4 | |
| Dichlorprop (RD) | 19,336 | 9 | 0.05 | 19 | |
| Dichlorvos | 72,099 | 3 | 0.00 | 30 | 1 |
| Diclobutrazol | 28,273 | 0 | 0 | 15 | |
| Diclofop (RD) | 14,844 | 0 | 0 | 12 | |
| Dicloran | 70,474 | 6 | 0.01 | 30 | 1 |
| Diclosulam | 5,580 | 0 | 0 | 2 | |
| Dicofol (RD) | 58,792 | 17 | 0.03 | 28 | 1 |
| Dicrotophos | 54,921 | 1 | 0.00 | 28 | |
| Dicyclanil | 30 | 0 | 0 | 2 | |
| Dieldrin (RD) | 62,055 | 55 | 0.09 | 30 | 1 |
| Diethatyl | 24 | 0 | 0 | 1 | |
| Diethofencarb | 68,635 | 4 | 0.01 | 30 | 1 |
| Difenacoum | 411 | 0 | 0 | 3 | |
| Difenoconazole | 73,400 | 2,269 | 3.09 | 30 | 1 |
| Difenoxuron | 8,397 | 0 | 0 | 7 | |
| Difenzoquat | 3,220 | 0 | 0 | 5 | |
| Diflubenzuron (RD) | 62,638 | 77 | 0.12 | 30 | 1 |
| Diflufenican | 46,253 | 10 | 0.02 | 23 | |
| Diflufenzopyr | 6,996 | 0 | 0 | 3 | |
| Dikegulac | 2,639 | 1 | 0.04 | 3 | |
| Dimefox | 5,469 | 0 | 0 | 9 | |
| Dimefuron | 13,785 | 0 | 0 | 8 | |
| Dimepiperate | 8,840 | 0 | 0 | 6 | |
| Dimethachlor | 25,143 | 0 | 0 | 15 | |
| Dimethametryn | 5,635 | 0 | 0 | 2 | |
| Dimethenamid-p | 22,433 | 7 | 0.03 | 15 | |
| Dimethipin | 1,061 | 0 | 0 | 1 | |
| Dimethirimol | 1,094 | 0 | 0 | 3 | |
| Dimethoate | 58,253 | 159 | 0.27 | 29 | 1 |
| Dimethomorph | 70,445 | 1,705 | 2.42 | 30 | 1 |
| Dimethylvinphos | 9,817 | 0 | 0 | 4 | |
| Dimetilan | 3,281 | 0 | 0 | 6 | |
| Dimoxystrobin (RD) | 45,696 | 14 | 0.03 | 28 | |
| Diniconazole | 68,286 | 4 | 0.01 | 30 | 1 |
| Dinitramine | 11,295 | 0 | 0 | 8 | |
| Dinobuton | 3,564 | 0 | 0 | 3 | |
| Dinocap (RD) | 4,149 | 0 | 0 | 9 | |
| Dinoseb (RD) | 10,963 | 0 | 0 | 8 | |
| Dinotefuran | 38,344 | 20 | 0.05 | 22 | |
| Dinoterb (RD) | 3,288 | 0 | 0 | 7 | |
| Diofenolan | 1,123 | 0 | 0 | 1 | |
| Dioxabenzofos | 1,464 | 0 | 0 | 5 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Dioxacarb | 16,003 | 2 | 0.01 | 11 | |
| Dioxathion | 11,690 | 0 | 0 | 13 | |
| Diphenamid | 16,321 | 0 | 0 | 12 | |
| Diphenylamine | 70,481 | 55 | 0.08 | 30 | 1 |
| Dipropetryn | 3,157 | 0 | 0 | 6 | |
| Diquat | 1,062 | 4 | 0.38 | 8 | |
| Disulfoton (RD) | 42,683 | 1 | 0.00 | 26 | |
| Ditalimfos | 22,620 | 0 | 0 | 17 | |
| Dithianon | 16,054 | 217 | 1.35 | 23 | 1 |
| Dithiocarbamates (RD) | 14,957 | 1,244 | 8.32 | 28 | 1 |
| Dithiopyr | 11,290 | 0 | 0 | 5 | |
| Diuron | 45,657 | 35 | 0.08 | 23 | |
| Dodemorph | 15,068 | 0 | 0 | 14 | |
| Dodine | 50,495 | 247 | 0.49 | 26 | 1 |
| EPN | 69,318 | 0 | 0 | 30 | 1 |
| EPTC | 13,369 | 0 | 0 | 15 | |
| Edifenphos | 9,789 | 0 | 0 | 10 | |
| Emamectin | 28,777 | 62 | 0.22 | 17 | |
| Empenthrin | 1,195 | 0 | 0 | 4 | |
| Endosulfan (RD) | 69,147 | 25 | 0.04 | 30 | 1 |
| Endrin | 51,146 | 0 | 0 | 30 | |
| Epoxiconazole | 75,112 | 54 | 0.07 | 30 | 1 |
| Esprocarb | 11,712 | 0 | 0 | 5 | |
| Etaconazole | 21,166 | 0 | 0 | 10 | |
| Ethalfluralin | 11,696 | 0 | 0 | 9 | |
| Ethametsulfuron-methyl | 4,022 | 0 | 0 | 8 | |
| Ethephon | 9,395 | 321 | 3.42 | 26 | 1 |
| Ethidimuron | 4,133 | 0 | 0 | 6 | |
| Ethiofencarb | 41,121 | 1 | 0.00 | 19 | |
| Ethion | 73,699 | 32 | 0.04 | 30 | 1 |
| Ethiprole | 10,591 | 0 | 0 | 12 | |
| Ethirimol | 64,780 | 92 | 0.14 | 29 | 1 |
| Ethofumesate (RD) | 15,950 | 3 | 0.02 | 17 | |
| Ethoprophos | 65,603 | 3 | 0.00 | 30 | |
| Ethoxyquin | 22,779 | 3 | 0.01 | 18 | |
| Ethoxysulfuron | 6,539 | 0 | 0 | 7 | |
| Ethylene oxide (RD) | 1 | 0 | 0 | 1 | |
| Etobenzanid | 5,580 | 0 | 0 | 2 | |
| Etofenprox | 71,730 | 945 | 1.32 | 30 | 1 |
| Etoxazole | 51,688 | 98 | 0.19 | 24 | |
| Etridiazole | 29,106 | 2 | 0.01 | 17 | |
| Etrimfos | 38,692 | 0 | 0 | 26 | |
| Famoxadone | 66,319 | 141 | 0.21 | 30 | 1 |
| Famphur | 8,289 | 0 | 0 | 9 | |
| Fenamidone | 72,117 | 69 | 0.10 | 30 | 1 |
| Fenamiphos (RD) | 60,357 | 17 | 0.03 | 29 | 1 |
| Fenarimol | 74,096 | 6 | 0.01 | 30 | 1 |
| Fenazaflor | 1,272 | 0 | 0 | 2 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Fenazaquin | 70,703 | 36 | 0.05 | 29 | 1 |
| Fenbuconazole | 70,335 | 299 | 0.43 | 30 | 1 |
| Fenbutatin oxide | 23,078 | 115 | 0.50 | 24 | 1 |
| Fenchlorphos (RD) | 23,746 | 0 | 0 | 20 | |
| Fenfluthrin | 1,017 | 0 | 0 | 3 | |
| Fenfuram | 6,713 | 0 | 0 | 4 | |
| Fenhexamid | 74,178 | 1,333 | 1.80 | 30 | 1 |
| Fenitrothion | 73,133 | 7 | 0.01 | 30 | 1 |
| Fenobucarb | 28,797 | 13 | 0.05 | 16 | |
| Fenothiocarb | 17,132 | 0 | 0 | 11 | |
| Fenoxanil | 27 | 0 | 0 | 1 | |
| Fenoxaprop | 15,284 | 0 | 0 | 5 | |
| Fenoxaprop-P | 4,813 | 1 | 0.02 | 10 | |
| Fenoxaprop-P-Ethyl | 11,794 | 0 | 0 | 10 | |
| Fenoxaprop-ethyl | 2,256 | 0 | 0 | 4 | |
| Fenoxycarb | 72,674 | 65 | 0.09 | 29 | 1 |
| Fenpiclonil | 18,571 | 0 | 0 | 9 | |
| Fenpropathrin | 73,316 | 113 | 0.15 | 29 | 1 |
| Fenpropidin (RD) | 52,937 | 14 | 0.03 | 29 | 1 |
| Fenpropimorph (RD) | 70,863 | 111 | 0.16 | 30 | 1 |
| Fenpyrazamine | 32,615 | 132 | 0.40 | 19 | |
| Fenpyroximate (RD) | 65,069 | 146 | 0.22 | 29 | 1 |
| Fenson | 23,296 | 0 | 0 | 13 | |
| Fensulfothion | 40,731 | 1 | 0.00 | 26 | |
| Fenthion (RD) | 58,654 | 7 | 0.01 | 27 | 1 |
| Fentin | 5,322 | 0 | 0 | 13 | |
| Fentrazamide | 27 | 0 | 0 | 1 | |
| Fenuron | 11,843 | 0 | 0 | 12 | |
| Fenvalerate (RD) | 59,727 | 106 | 0.18 | 29 | 1 |
| Fipronil (RD) | 59,378 | 145 | 0.24 | 30 | 1 |
| Flamprop | 2,906 | 0 | 0 | 5 | |
| Flamprop-M-Isopropyl | 1,298 | 0 | 0 | 3 | |
| Flamprop-M-Methyl | 70 | 0 | 0 | 3 | |
| Flamprop-isopropyl | 3,293 | 0 | 0 | 4 | |
| Flamprop-methyl | 4,768 | 0 | 0 | 7 | |
| Flazasulfuron | 16,287 | 0 | 0 | 13 | |
| Flocoumafen | 5,707 | 0 | 0 | 3 | |
| Flonicamid (RD) | 36,298 | 481 | 1.33 | 25 | 1 |
| Florasulam | 26,646 | 0 | 0 | 18 | |
| Fluacrypyrim | 5,161 | 1 | 0.02 | 6 | |
| Fluazifop-P (RD) | 26,794 | 23 | 0.09 | 21 | 1 |
| Fluazinam | 34,681 | 11 | 0.03 | 24 | |
| Fluazolate | 22 | 0 | 0 | 1 | |
| Fluazuron | 10,745 | 0 | 0 | 4 | |
| Flubendiamide | 44,929 | 38 | 0.08 | 28 | 1 |
| Flubenzimine | 1,962 | 0 | 0 | 4 | |
| Fluchloralin | 7,236 | 0 | 0 | 8 | |
| Flucycloxuron | 15,054 | 0 | 0 | 7 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Flucythrinate | 22,276 | 1 | 0.00 | 22 | |
| Fludioxonil (RD) | 69,788 | 4,550 | 6.52 | 30 | 1 |
| Flufenacet | 33,160 | 0 | 0 | 23 | |
| Flufenoxuron | 67,793 | 32 | 0.05 | 30 | 1 |
| Flufenzin | 808 | 0 | 0 | 5 | |
| Flumethrin | 3,182 | 0 | 0 | 8 | |
| Flumetralin | 14,437 | 0 | 0 | 9 | |
| Flumetsulam | 1,150 | 0 | 0 | 3 | |
| Flumiclorac-Pentyl | 27 | 0 | 0 | 1 | |
| Flumioxazine | 16,135 | 1 | 0.01 | 13 | |
| Fluometuron | 22,502 | 0 | 0 | 15 | |
| Fluopicolide | 64,504 | 422 | 0.65 | 29 | 1 |
| Fluopyram (RD) | 61,161 | 4,131 | 6.75 | 30 | 1 |
| Fluorodifen | 4,667 | 0 | 0 | 3 | |
| Fluoroglycofene | 30 | 0 | 0 | 2 | |
| Fluoroimide | 5 | 0 | 0 | 1 | |
| Fluotrimazole | 10,748 | 0 | 0 | 7 | |
| Fluoxastrobin (RD) | 29,886 | 2 | 0.01 | 13 | |
| Flupyradifurone | 15,189 | 9 | 0.06 | 8 | |
| Flupyrsulfuron | 198 | 0 | 0 | 1 | |
| Flupyrsulfuron-methyl | 7,083 | 1 | 0.01 | 7 | |
| Fluquinconazole | 71,361 | 1 | 0.00 | 30 | 1 |
| Flurenol | 27 | 0 | 0 | 2 | |
| Flurenol-butyl | 22 | 0 | 0 | 1 | |
| Fluridone | 4,829 | 0 | 0 | 6 | |
| Flurochloridone | 24,338 | 5 | 0.02 | 15 | |
| Fluroxypyr (RD) | 19,921 | 0 | 0 | 20 | |
| Flurprimidole | 14,527 | 0 | 0 | 9 | |
| Flurtamone | 26,528 | 0 | 0 | 11 | |
| Flusilazole (RD) | 71,852 | 16 | 0.02 | 30 | 1 |
| Flusulfamide | 6,128 | 0 | 0 | 4 | |
| Fluthiacet-Methyl | 7,950 | 0 | 0 | 7 | |
| Flutolanil (RD) | 61,478 | 18 | 0.03 | 28 | |
| Flutriafol | 71,670 | 245 | 0.34 | 30 | 1 |
| Fluvalinate | 3,676 | 0 | 0 | 9 | |
| tau-Fluvalinate | 69,666 | 101 | 0.14 | 30 | 1 |
| Fluxapyroxad | 45,507 | 208 | 0.46 | 26 | |
| Folpet (RD) | 25,204 | 77 | 0.31 | 19 | 1 |
| Fomesafen | 11,865 | 1 | 0.01 | 8 | |
| Fonofos | 36,878 | 0 | 0 | 22 | |
| Foramsulfuron | 15,873 | 0 | 0 | 11 | |
| Forchlorfenuron | 31,525 | 11 | 0.03 | 19 | |
| Formetanate | 44,951 | 63 | 0.14 | 26 | 1 |
| Formothion | 40,116 | 0 | 0 | 26 | |
| Fosetyl-Al (RD) | 6,049 | 1,338 | 22.12 | 9 | |
| Fosthiazate | 62,926 | 40 | 0.06 | 29 | 1 |
| Fosthietan | 5 | 0 | 0 | 1 | |
| Fuberidazole | 28,551 | 0 | 0 | 19 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Furalaxyl | 27,000 | 0 | 0 | 15 | |
| Furmecyclox | 7,911 | 0 | 0 | 6 | |
| Genite | 1,796 | 0 | 0 | 3 | |
| Gibberellic acid | 3,104 | 55 | 1.77 | 3 | |
| Glufosinate (RD) | 3,946 | 19 | 0.48 | 10 | |
| Glyphosate | 9,573 | 191 | 2.00 | 26 | 1 |
| Griseofulvin | 119 | 1 | 0.84 | 1 | |
| Halauxifen-methyl (RD) | 1,352 | 0 | 0 | 2 | |
| Halfenprox | 6,521 | 0 | 0 | 7 | |
| Halofenozide | 19,304 | 1 | 0.01 | 10 | |
| Halosulfuron-methyl | 15,636 | 0 | 0 | 8 | |
| Haloxyfop (RD) | 29,511 | 26 | 0.09 | 25 | 1 |
| Heptachlor (RD) | 36,833 | 3 | 0.01 | 29 | 1 |
| Heptenophos | 42,143 | 0 | 0 | 27 | |
| Hexachlorobenzene | 53,381 | 197 | 0.37 | 30 | 1 |
| Hexachlorobutadiene | 376 | 0 | 0 | 3 | |
| Hexachlorocyclohexane (RD) | 27,894 | 1 | 0.00 | 23 | |
| Hexachlorocyclohexane (alpha) | 46,507 | 3 | 0.01 | 27 | 1 |
| Hexachlorocyclohexane (beta) | 46,972 | 10 | 0.02 | 27 | 1 |
| Hexaconazole | 74,517 | 56 | 0.08 | 30 | 1 |
| Hexaflumuron | 38,807 | 2 | 0.01 | 23 | |
| Hexazinone | 31,180 | 1 | 0.00 | 16 | |
| Hexythiazox | 68,760 | 524 | 0.76 | 30 | 1 |
| Hydramethylnon | 1,586 | 0 | 0 | 6 | |
| Hymexazol | 4,085 | 1 | 0.02 | 4 | |
| Imazalil | 73,917 | 5,348 | 7.24 | 30 | 1 |
| Imazamethabenz | 6,450 | 0 | 0 | 6 | |
| Imazamox | 15,609 | 12 | 0.08 | 14 | |
| Imazapic | 4,526 | 0 | 0 | 5 | |
| Imazapyr | 13,911 | 0 | 0 | 14 | |
| Imazaquin | 15,042 | 0 | 0 | 10 | |
| Imazethapyr | 12,789 | 3 | 0.02 | 11 | |
| Imazosulfuron | 14,394 | 0 | 0 | 7 | |
| Imibenconazole | 14,992 | 0 | 0 | 8 | |
| Imidacloprid | 72,740 | 2,926 | 4.02 | 30 | 1 |
| Inabenfide | 8,628 | 0 | 0 | 3 | |
| Indolylbutyric acid | 2,496 | 0 | 0 | 1 | |
| Indoxacarb | 73,259 | 951 | 1.30 | 30 | 1 |
| Iodocarb | 40 | 0 | 0 | 1 | |
| Iodofenphos | 16,854 | 0 | 0 | 13 | |
| Iodosulfuron-methyl | 13,838 | 0 | 0 | 15 | |
| Ioxynil (RD) | 19,089 | 0 | 0 | 18 | |
| Ipconazole | 22,923 | 0 | 0 | 15 | |
| Iprobenfos | 20,883 | 0 | 0 | 12 | |
| Iprodione (RD) | 68,593 | 865 | 1.26 | 30 | 1 |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Iprovalicarb | 72,404 | 124 | 0.17 | 30 | 1 |
| Isazofos | 13,228 | 0 | 0 | 13 | |
| Isobenzan | 2,620 | 0 | 0 | 3 | |
| Isocarbamid | 1,737 | 0 | 0 | 4 | |
| Isocarbophos | 61,350 | 12 | 0.02 | 30 | 1 |
| Isodrin | 10,067 | 0 | 0 | 11 | |
| Isofenphos | 40,835 | 0 | 0 | 24 | |
| Isofenphos-methyl | 59,049 | 0 | 0 | 27 | |
| Isofetamid | 1,409 | 0 | 0 | 1 | |
| Isomethiozin | 9,593 | 0 | 0 | 6 | |
| Isonoruron | 1,876 | 0 | 0 | 4 | |
| Isoprocarb | 49,620 | 2 | 0.00 | 26 | |
| Isopropalin | 9,426 | 0 | 0 | 9 | |
| Isoprothiolane | 64,068 | 117 | 0.18 | 29 | |
| Isoproturon | 50,307 | 1 | 0.00 | 27 | |
| Isopyrazam | 32,079 | 3 | 0.01 | 17 | |
| Isouron | 894 | 0 | 0 | 3 | |
| Isoxaben | 25,601 | 0 | 0 | 14 | |
| Isoxaflutole (RD) | 12,472 | 0 | 0 | 15 | |
| Isoxathion | 16,641 | 0 | 0 | 9 | |
| Ivermectin | 2,332 | 0 | 0 | 5 | |
| Karbutilate | 6,806 | 0 | 0 | 3 | |
| Kresoxim-methyl (RD) | 71,613 | 171 | 0.24 | 30 | 1 |
| Lactofen | 11,863 | 0 | 0 | 6 | |
| Lambda-cyhalothrin (RD) | 56,437 | 1,189 | 2.11 | 30 | 1 |
| Lenacil | 35,313 | 12 | 0.03 | 21 | |
| Leptophos | 8,898 | 0 | 0 | 11 | |
| Lindane | 60,449 | 12 | 0.02 | 30 | 1 |
| Linuron | 70,650 | 334 | 0.47 | 30 | 1 |
| Lufenuron | 62,641 | 80 | 0.13 | 29 | 1 |
| MCPA (RD) | 20,721 | 13 | 0.06 | 20 | |
| Malathion (RD) | 63,586 | 170 | 0.27 | 29 | 1 |
| Maleic hydrazide (RD) | 5,332 | 105 | 1.97 | 8 | |
| Mandestrobin | 2,997 | 0 | 0 | 2 | |
| Mandipropamid | 67,761 | 508 | 0.75 | 30 | 1 |
| Mecarbam | 50,866 | 0 | 0 | 27 | |
| Mecoprop | 21,812 | 0 | 0 | 22 | |
| Mefenacet | 15,227 | 0 | 0 | 9 | |
| Mefluidide | 4,951 | 0 | 0 | 3 | |
| Mepanipyrim | 71,912 | 158 | 0.22 | 30 | 1 |
| Mephosfolan | 16,555 | 1 | 0.01 | 12 | |
| Mepiquat | 11,544 | 356 | 3.08 | 27 | 1 |
| Mepronil | 37,440 | 0 | 0 | 21 | |
| Meptyldinocap (RD) | 10,256 | 13 | 0.13 | 8 | |
| Mercury | 1,401 | 134 | 9.56 | 1 | |
| Merphos | 5 | 0 | 0 | 1 | |
| Mesosulfuron | 17,631 | 0 | 0 | 12 | |
| Mesotrione | 8,630 | 0 | 0 | 12 | |

| Pesticide residues | No. of analysis[a] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Metaflumizone | 48,718 | 75 | 0.15 | 27 | |
| Metalaxyl | 63,942 | 1,060 | 1.66 | 30 | 1 |
| Metaldehyde | 5,618 | 6 | 0.11 | 5 | |
| Metamitron | 45,080 | 65 | 0.14 | 24 | |
| Metazachlor (RD) | 17,763 | 1 | 0.01 | 20 | |
| Metconazole | 65,147 | 16 | 0.02 | 28 | |
| Methabenzthiazuron | 28,413 | 3 | 0.01 | 15 | |
| Methacrifos | 49,254 | 0 | 0 | 27 | |
| Methamidophos | 71,196 | 45 | 0.06 | 30 | 1 |
| Methfuroxam | 82 | 0 | 0 | 1 | |
| Methidathion | 76,858 | 12 | 0.02 | 30 | 1 |
| Methiocarb (RD) | 64,904 | 52 | 0.08 | 30 | 1 |
| Methomyl | 64,549 | 61 | 0.09 | 30 | 1 |
| Methoprene | 7,095 | 1 | 0.01 | 9 | |
| Methoprotryne | 10,718 | 0 | 0 | 11 | |
| Methothrin | 5,683 | 0 | 0 | 2 | |
| Methoxychlor | 56,428 | 5 | 0.01 | 30 | 1 |
| Methoxyfenozide | 69,952 | 791 | 1.13 | 29 | 1 |
| Metobromuron | 52,132 | 18 | 0.03 | 26 | |
| Metolachlor | 30,308 | 1 | 0.00 | 22 | |
| Metolcarb | 17,992 | 0 | 0 | 12 | |
| Metominostrobin | 4,767 | 0 | 0 | 3 | |
| Metosulam | 26,364 | 0 | 0 | 14 | |
| Metoxuron | 24,600 | 1 | 0.00 | 17 | |
| Metrafenone | 55,063 | 720 | 1.31 | 27 | |
| Metribuzin | 61,020 | 37 | 0.06 | 29 | |
| Metsulfuron-methyl | 26,674 | 0 | 0 | 17 | |
| Mevinphos (RD) | 54,960 | 1 | 0.00 | 27 | |
| Milbemectin (RD) | 8,985 | 4 | 0.04 | 6 | |
| Mirex | 16,309 | 0 | 0 | 15 | |
| Molinate | 28,188 | 0 | 0 | 18 | |
| Monalide | 7,386 | 0 | 0 | 4 | |
| Monocrotophos | 70,683 | 9 | 0.01 | 29 | 1 |
| Monolinuron | 34,547 | 0 | 0 | 22 | |
| Monuron | 14,380 | 0 | 0 | 11 | |
| Myclobutanil (RD) | 72,157 | 846 | 1.17 | 30 | 1 |
| Naled | 15,332 | 0 | 0 | 11 | |
| Napropamide | 40,511 | 10 | 0.02 | 22 | |
| Naptalam | 5,593 | 0 | 0 | 3 | |
| Neburon | 9,869 | 0 | 0 | 12 | |
| Nicosulfuron | 19,577 | 0 | 0 | 15 | |
| Nicotine | 5,664 | 96 | 1.69 | 10 | |
| Nitenpyram | 51,367 | 4 | 0.01 | 26 | |
| Nitralin | 6,190 | 0 | 0 | 8 | |
| Nitrapyrin | 4,913 | 0 | 0 | 4 | |
| Nitrofen | 46,777 | 0 | 0 | 29 | |
| Nitrothal-Isopropyl | 14,562 | 0 | 0 | 11 | |
| Norflurazon | 7,655 | 0 | 0 | 11 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Novaluron | 37,768 | 16 | 0.04 | 20 | |
| Noviflumuron | 2,518 | 0 | 0 | 2 | |
| Nuarimol | 38,882 | 0 | 0 | 23 | |
| Octhilinone | 3 | 0 | 0 | 1 | |
| Ofurace | 23,931 | 1 | 0.00 | 15 | |
| Omethoate | 55,765 | 152 | 0.27 | 25 | 1 |
| Orbencarb | 9,444 | 0 | 0 | 7 | |
| Orthosulfamuron | 4,628 | 0 | 0 | 5 | |
| Oryzalin | 9,430 | 0 | 0 | 6 | |
| Oxadiargyl | 22,971 | 0 | 0 | 12 | |
| Oxadiazon | 41,317 | 18 | 0.04 | 19 | |
| Oxadixyl | 71,202 | 6 | 0.01 | 30 | 1 |
| Oxamyl | 69,545 | 10 | 0.01 | 28 | 1 |
| Oxasulfuron | 13,127 | 0 | 0 | 9 | |
| Oxathiapiprolin | 2,656 | 0 | 0 | 3 | |
| Oxaziclomefone | 54 | 0 | 0 | 2 | |
| Oxycarboxin | 14,049 | 0 | 0 | 14 | |
| Oxydemeton-methyl (RD) | 58,302 | 0 | 0 | 28 | 1 |
| Oxyfluorfen | 41,991 | 79 | 0.19 | 21 | |
| Paclobutrazol | 70,714 | 10 | 0.01 | 30 | 1 |
| Paraquat | 978 | 0 | 0 | 8 | |
| Parathion | 74,764 | 1 | 0.00 | 29 | 1 |
| Parathion-methyl (RD) | 64,192 | 3 | 0.00 | 29 | 1 |
| Pebulate | 13,185 | 0 | 0 | 10 | |
| Penconazole | 74,407 | 525 | 0.71 | 30 | 1 |
| Pencycuron | 71,366 | 50 | 0.07 | 30 | 1 |
| Pendimethalin | 75,889 | 424 | 0.56 | 30 | 1 |
| Penflufen | 21,455 | 0 | 0 | 19 | |
| Penfluron | 10,188 | 0 | 0 | 3 | |
| Penoxsulam | 11,650 | 0 | 0 | 7 | |
| Pentachlorophenol | 7,471 | 1 | 0.01 | 7 | |
| Pentanochlor | 13,017 | 0 | 0 | 8 | |
| Penthiopyrad | 33,021 | 23 | 0.07 | 20 | |
| Perfluidone | 24 | 0 | 0 | 1 | |
| Permethrin | 74,240 | 113 | 0.15 | 30 | 1 |
| Pethoxamid | 26,258 | 2 | 0.01 | 14 | |
| Phenkapton | 4,159 | 0 | 0 | 6 | |
| Phenmedipham | 39,962 | 29 | 0.07 | 22 | |
| Phenothrin | 13,217 | 2 | 0.02 | 11 | |
| Phenthoate | 62,299 | 3 | 0.00 | 28 | |
| Phorate (RD) | 34,980 | 4 | 0.01 | 23 | |
| Phosalone | 72,920 | 4 | 0.01 | 29 | |
| Phosfolan | 3,291 | 0 | 0 | 6 | |
| Phosmet (RD) | 56,470 | 310 | 0.55 | 28 | 1 |
| Phosphamidon | 47,333 | 1 | 0.00 | 27 | |
| Phosphane salts | 5 | 0 | 0 | 1 | |
| Phoxim | 55,374 | 2 | 0.00 | 27 | |
| Picloram | 5,717 | 0 | 0 | 9 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Picolinafen | 36,286 | 0 | 0 | 21 | |
| Picoxystrobin | 50,649 | 9 | 0.02 | 26 | |
| Pinoxaden | 15,413 | 0 | 0 | 13 | |
| Piperophos | 1,528 | 0 | 0 | 6 | |
| Pirimicarb (RD) | 67,898 | 499 | 0.73 | 30 | 1 |
| Pirimiphos-ethyl | 41,570 | 0 | 0 | 25 | |
| Pirimiphos-methyl | 77,920 | 633 | 0.81 | 30 | 1 |
| Prallethrin | 3,567 | 0 | 0 | 4 | |
| Pretilachlor | 5,935 | 0 | 0 | 9 | |
| Primisulfuron | 1,871 | 0 | 0 | 1 | |
| Primisulfuron-Methyl | 4,806 | 0 | 0 | 7 | |
| Probenazole | 4,147 | 0 | 0 | 1 | |
| Prochloraz (RD) | 48,940 | 402 | 0.82 | 26 | |
| Procymidone (RD) | 67,737 | 19 | 0.03 | 30 | 1 |
| Profenofos | 76,742 | 103 | 0.13 | 30 | 1 |
| Profluralin | 15,694 | 0 | 0 | 12 | |
| Profoxydim | 7,139 | 0 | 0 | 5 | |
| Prohexadione | 1,581 | 0 | 0 | 3 | |
| Promecarb | 37,867 | 3 | 0.01 | 16 | |
| Prometon | 14,860 | 0 | 0 | 11 | |
| Prometryn | 46,677 | 5 | 0.01 | 24 | |
| Propachlor | 24,578 | 1 | 0.00 | 19 | |
| Propamocarb (RD) | 63,987 | 1,537 | 2.40 | 29 | 1 |
| Propanil | 23,710 | 2 | 0.01 | 17 | |
| Propaphos | 2,552 | 0 | 0 | 4 | |
| Propaquizafop | 32,876 | 0 | 0 | 22 | |
| Propargite | 71,381 | 87 | 0.12 | 30 | 1 |
| Propazine | 24,407 | 0 | 0 | 15 | |
| Propetamphos | 22,947 | 0 | 0 | 15 | |
| Propham | 43,822 | 1 | 0.00 | 25 | |
| Propiconazole | 75,640 | 1,344 | 1.78 | 30 | 1 |
| Propineb | 120 | 0 | 0 | 2 | |
| Propisochlor | 2,287 | 0 | 0 | 4 | |
| Propoxur | 58,760 | 8 | 0.01 | 28 | |
| Propoxycarbazone (RD) | 12,443 | 0 | 0 | 10 | |
| Propyzamide (RD) | 68,285 | 125 | 0.18 | 30 | 1 |
| Proquinazid | 47,993 | 102 | 0.21 | 25 | |
| Prosulfocarb | 49,517 | 233 | 0.47 | 27 | 1 |
| Prosulfuron | 22,565 | 0 | 0 | 12 | |
| Prothiocarb | 961 | 0 | 0 | 1 | |
| Prothioconazole (RD) | 62,346 | 49 | 0.08 | 30 | 1 |
| Prothiofos | 57,676 | 9 | 0.02 | 28 | |
| Prothoate | 4,176 | 0 | 0 | 3 | |
| Pymetrozine (RD) | 62,949 | 267 | 0.42 | 28 | 1 |
| Pyracarbolid | 3,856 | 0 | 0 | 4 | |
| Pyraclofos | 12,790 | 0 | 0 | 11 | |
| Pyraclostrobin | 72,931 | 3,103 | 4.25 | 30 | 1 |
| Pyraflufen-ethyl (RD) | 14,410 | 0 | 0 | 12 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Pyrasulfotole | 31 | 0 | 0 | 2 | |
| Pyrazophos | 61,649 | 1 | 0.00 | 29 | |
| Pyrazoxyfen | 416 | 0 | 0 | 3 | |
| Pyrethrins | 32,770 | 41 | 0.13 | 25 | |
| Pyribencarb | 67 | 0 | 0 | 2 | |
| Pyributicarb | 11,338 | 0 | 0 | 4 | |
| Pyridaben | 74,356 | 650 | 0.87 | 30 | 1 |
| Pyridafol | 5,559 | 0 | 0 | 5 | |
| Pyridalyl | 30,933 | 50 | 0.16 | 16 | |
| Pyridaphenthion | 43,981 | 0 | 0 | 23 | |
| Pyridate (RD) | 22,376 | 0 | 0 | 15 | |
| Pyrifenox | 44,038 | 0 | 0 | 21 | |
| Pyriftalid | 27 | 0 | 0 | 1 | |
| Pyrimethanil (RD) | 73,085 | 3,558 | 4.87 | 30 | 1 |
| Pyrimidifen | 17,919 | 0 | 0 | 10 | |
| Pyriminobac-Methyl | 27 | 0 | 0 | 1 | |
| Pyriofenone | 12,095 | 4 | 0.03 | 11 | |
| Pyriproxyfen | 72,922 | 1,262 | 1.73 | 30 | 1 |
| Pyrithiobac | 24 | 0 | 0 | 1 | |
| Pyroquilon | 12,633 | 0 | 0 | 8 | |
| Pyroxsulam | 15,097 | 0 | 0 | 13 | |
| Quassia | 1,814 | 0 | 0 | 2 | |
| Quinalphos | 58,768 | 8 | 0.01 | 27 | |
| Quinclorac | 15,399 | 7 | 0.05 | 14 | |
| Quinmerac | 17,534 | 1 | 0.01 | 12 | |
| Quinoclamine | 21,504 | 0 | 0 | 14 | |
| Quinoxyfen | 74,018 | 247 | 0.33 | 30 | 1 |
| Quintozene (RD) | 46,410 | 6 | 0.01 | 27 | |
| Quizalofop | 14,396 | 7 | 0.05 | 17 | |
| Rabenzazole | 8,264 | 0 | 0 | 5 | |
| Resmethrin | 30,197 | 1 | 0.00 | 24 | |
| Rimsulfuron | 25,042 | 0 | 0 | 17 | |
| Rotenone | 46,026 | 3 | 0.01 | 26 | |
| Saflufenacil (RD) | 139 | 0 | 0 | 3 | |
| Schradan | 8,179 | 0 | 0 | 3 | |
| Sebuthylazine | 7,040 | 0 | 0 | 8 | |
| Secbumeton | 3,246 | 0 | 0 | 8 | |
| Sedaxane | 5,035 | 0 | 0 | 6 | |
| Siduron | 13,722 | 0 | 0 | 7 | |
| Silafluofen | 7,845 | 0 | 0 | 8 | |
| Silthiofam | 23,411 | 0 | 0 | 10 | |
| Simazine | 45,553 | 0 | 0 | 26 | |
| Simeconazole | 5,814 | 0 | 0 | 4 | |
| Simetryn | 6,950 | 0 | 0 | 9 | |
| Spinetoram | 32,599 | 61 | 0.19 | 15 | |
| Spinosad | 68,754 | 1,165 | 1.69 | 30 | 1 |
| Spirodiclofen | 66,825 | 239 | 0.36 | 29 | 1 |
| Spiromesifen | 65,131 | 541 | 0.83 | 29 | 1 |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Spirotetramat (RD) | 30,708 | 737 | 2.40 | 19 | |
| Spiroxamine (RD) | 71,062 | 162 | 0.23 | 30 | 1 |
| Streptomycin | 1 | 0 | 0 | 1 | |
| Sulcotrione | 13,621 | 0 | 0 | 9 | |
| Sulfallate | 82 | 0 | 0 | 1 | |
| Sulfentrazone | 5,228 | 0 | 0 | 10 | |
| Sulfometuron-Methyl | 109 | 0 | 0 | 2 | |
| Sulfosulfuron | 5,193 | 0 | 0 | 9 | |
| Sulfotep | 40,882 | 1 | 0.00 | 22 | |
| Sulfoxaflor | 25,959 | 84 | 0.32 | 16 | |
| Sulfur | 1,510 | 0 | 0 | 2 | |
| Sulprofos | 11,052 | 0 | 0 | 12 | |
| TCMTB | 8,352 | 0 | 0 | 4 | |
| TEPP | 4,424 | 0 | 0 | 7 | |
| Tebuconazole (RD) | 73,082 | 3,044 | 4.17 | 30 | 1 |
| Tebufenozide | 70,925 | 111 | 0.16 | 30 | 1 |
| Tebufenpyrad | 74,343 | 307 | 0.41 | 30 | 1 |
| Tebupirimphos | 8,740 | 0 | 0 | 6 | |
| Tebutam | 3,833 | 0 | 0 | 7 | |
| Tebuthiuron | 4,921 | 0 | 0 | 6 | |
| Tecloftalam | 4,485 | 0 | 0 | 1 | |
| Tecnazene | 50,800 | 0 | 0 | 29 | |
| Teflubenzuron | 61,164 | 35 | 0.06 | 28 | 1 |
| Tefluthrin | 68,926 | 19 | 0.03 | 29 | 1 |
| Tembotrione (RD) | 15,096 | 0 | 0 | 6 | |
| Temephos | 9,100 | 0 | 0 | 9 | |
| Tepraloxydim | 16,549 | 0 | 0 | 10 | |
| Terbacil | 15,105 | 2 | 0.01 | 13 | |
| Terbucarb | 1,231 | 0 | 0 | 4 | |
| Terbufos | 43,087 | 0 | 0 | 28 | |
| Terbumeton | 14,345 | 0 | 0 | 15 | |
| Terbuthylazine | 70,106 | 23 | 0.03 | 30 | 1 |
| Terbutryn | 44,487 | 1 | 0.00 | 23 | |
| Tetrachlorvinphos | 32,031 | 0 | 0 | 20 | |
| Tetraconazole | 74,641 | 195 | 0.26 | 30 | 1 |
| Tetradifon | 70,751 | 2 | 0.00 | 30 | 1 |
| Tetramethrin | 50,984 | 17 | 0.03 | 26 | |
| Tetrasul | 11,018 | 0 | 0 | 7 | |
| Thenylchlor | 9,301 | 0 | 0 | 4 | |
| Thiabendazole (RD) | 68,174 | 2,796 | 4.10 | 29 | 1 |
| Thiacloprid | 73,855 | 1,735 | 2.35 | 30 | 1 |
| Thiamethoxam | 66,796 | 1,026 | 1.54 | 29 | 1 |
| Thiazafluron | 82 | 0 | 0 | 1 | |
| Thiazopyr | 8,207 | 0 | 0 | 4 | |
| Thidiazuron | 13,520 | 1 | 0.01 | 9 | |
| Thiencarbazone | 9,354 | 0 | 0 | 8 | |
| Thifensulfuron | 116 | 0 | 0 | 1 | |
| Thifensulfuron-methyl | 22,556 | 0 | 0 | 13 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Thifluzamide | 28 | 0 | 0 | 1 | |
| Thiobencarb | 21,179 | 0 | 0 | 13 | |
| Thiocyclam | 5,908 | 0 | 0 | 7 | |
| Thiocyclam hydrogen oxalate | 13 | 0 | 0 | 1 | |
| Thiodicarb | 59,313 | 5 | 0.01 | 27 | 1 |
| Thiofanox | 7,119 | 0 | 0 | 10 | |
| Thiometon | 24,395 | 0 | 0 | 17 | |
| Thionazin | 10,310 | 0 | 0 | 12 | |
| Thiophanate-ethyl | 3,054 | 0 | 0 | 5 | |
| Thiophanate-methyl | 62,306 | 548 | 0.88 | 28 | 1 |
| Thiosultap sodium | 1,273 | 0 | 0 | 1 | |
| Thiram | 422 | 0 | 0 | 2 | |
| Tiocarbazil | 12,012 | 0 | 0 | 7 | |
| Tolclofos-methyl | 72,862 | 23 | 0.03 | 30 | 1 |
| Tolfenpyrad | 21,787 | 70 | 0.32 | 15 | |
| Tolylfluanid (RD) | 55,224 | 1 | 0.00 | 29 | 1 |
| Topramezone | 3,770 | 0 | 0 | 6 | |
| Tralkoxydim | 6,670 | 0 | 0 | 10 | |
| Tralomethrin | 3,262 | 0 | 0 | 5 | |
| Transfluthrin | 8,235 | 0 | 0 | 12 | |
| Tri-allate | 32,721 | 20 | 0.06 | 19 | |
| Triadimefon | 67,639 | 13 | 0.02 | 29 | 1 |
| Triadimenol (RD) | 53,110 | 303 | 0.57 | 27 | 1 |
| Triamiphos | 1,677 | 0 | 0 | 4 | |
| Triapenthenol | 1,018 | 0 | 0 | 1 | |
| Triasulfuron | 15,343 | 0 | 0 | 17 | |
| Triazamate | 14,308 | 0 | 0 | 11 | |
| Triazophos | 76,899 | 33 | 0.04 | 30 | 1 |
| Triazoxide | 10,018 | 2 | 0.02 | 6 | |
| Tribenuron-methyl | 14,260 | 0 | 0 | 13 | |
| Tribufos | 3,076 | 0 | 0 | 4 | |
| Trichlamide | 2,495 | 0 | 0 | 1 | |
| Trichlorfon | 60,768 | 1 | 0.00 | 27 | |
| Trichloronat | 16,231 | 0 | 0 | 10 | |
| Triclopyr | 27,817 | 17 | 0.06 | 19 | |
| Tricyclazole | 53,961 | 138 | 0.26 | 27 | |
| Tridemorph | 7,041 | 0 | 0 | 9 | |
| Tridiphane | 1,654 | 0 | 0 | 2 | |
| Trietazine | 2,678 | 0 | 0 | 3 | |
| Trifloxystrobin (RD) | 71,513 | 1,398 | 1.95 | 30 | 1 |
| Trifloxysulfuron | 11,071 | 0 | 0 | 4 | |
| Triflumizole (RD) | 21,879 | 21 | 0.10 | 17 | |
| Triflumuron | 65,747 | 127 | 0.19 | 30 | 1 |
| Trifluralin | 62,932 | 3 | 0.00 | 29 | |
| Triflusulfuron | 1,133 | 0 | 0 | 2 | |
| Triflusulfuron-Methyl | 12,030 | 0 | 0 | 8 | |
| Triforine | 33,920 | 0 | 0 | 22 | |

| Pesticide residues | No. of analysis[(a)] | No. of quantifications (levels > LOQ) | Quantification rate (%) | No of countries analysing | Pesticide covered by 2018 EUCP |
|---|---|---|---|---|---|
| Trimethacarb | 3,690 | 0 | 0 | 7 | |
| Trimethyl-sulfonium cation | 4,366 | 68 | 1.56 | 5 | |
| Trinexapac | 5,113 | 33 | 0.65 | 8 | |
| Trinexapac-Ethyl | 10,179 | 2 | 0.02 | 12 | |
| Triticonazole | 67,420 | 0 | 0 | 28 | |
| Tritosulfuron | 17,207 | 0 | 0 | 13 | |
| Uniconazole | 5,547 | 0 | 0 | 9 | |
| Valifenalate | 19,042 | 0 | 0 | 12 | |
| Vamidothion | 33,817 | 0 | 0 | 25 | |
| Vernolate | 2,602 | 0 | 0 | 2 | |
| Vinclozolin | 56,327 | 1 | 0.00 | 28 | 1 |
| Warfarin | 405 | 0 | 0 | 3 | |
| XMC | 3,618 | 0 | 0 | 3 | |
| Ziram | 380 | 0 | 0 | 1 | |
| Zoxamide | 63,136 | 127 | 0.20 | 29 | |

LOQ: limit of quantification; EUCP: EU-coordinated control programme; RD: residue definition.
(a): The number of analysis has been derived counting the number of residue definitions reported i.e. those as paramType P004A and P005A. Those reported as part of (P002A) were not counted.

**Table C.2:** Food to be analysed in 2018 according to Regulation (EC) No 669/2009 on import controls

| Country of origin | Food | Food name (code) in food classification under Reg. (EC) No 396/2005[(a)] |
|---|---|---|
| Benin | Pineapples | |
| Cambodia | Chinese celery (*Apium graveolens*) | Celery leaves (0256030) |
| | Yardlong beans (*Vigna unguiculata* spp. *sesquipedalis*) | Beans with pods (0260010) |
| China | Brassica oleracea (other edible Brassica, 'Chinese Broccoli') | Broccoli |
| | Goji berries (wolfberries) (*Lycium barbarum L.*) | Tomatoes |
| | Tea leaves, whether or not flavoured | |
| Dominican Republic | Sweet peppers (*Capsicum annuum*) and peppers (other than sweet) | Sweet peppers/bell peppers |
| | Yardlong beans (*Vigna unguiculata* spp. *sesquipedalis*) | Beans with pods (0260010) |
| Egypt | Sweet peppers (*Capsicum annuum*) and peppers (other than sweet) | Sweet peppers/bell peppers |
| | Strawberries | |
| India | Curry leaves (bergera/Murraya koenigii) | Laurel/bay leaves |
| | Okra | Okra, lady's fingers |
| | Peppers (other than sweet) | |
| Kenya | Peas with pods | |
| Pakistan | Peppers (other than sweet) | |
| Thailand | Peppers (other than sweet) | |
| | Yardlong beans (Vigna unguiculata spp. sesquipedalis) | Beans with pods (0260010) |
| Turkey | Lemons | |
| | Pomegranates | |
| | Sweet peppers (*Capsicum annuum*) | Sweet peppers/bell peppers |
| | Vine leaves | Grape leaves and similar species |

| Country of origin | Food | Food name (code) in food classification under Reg. (EC) No 396/2005[(a)] |
|---|---|---|
| Uganda | Aubergines (*Solanum melongena*) and Ethiopian eggplant (*Solanum aethiopicum*) | Aubergines/eggplants |
| Vietnam | Basil (holy, sweet) | |
| | Coriander leaves | Celery leaves (0256030) |
| | Dragon fruit (Pitahaya) | Prickly pears/cactus fruits (0162040) |
| | Mint | Basil (0256080) |
| | Okra | Okra/lady's finger |
| | Parsley | |
| | Peppers (other than sweet) | |

(a): Corresponding name in the food classification under Regulation (EC) No 396/2005 (only if the food product to be analysed under Regulation 669/2009 is not listed in Annex I, Part A of Regulation (EU) No 62/2018).

# Appendix D – Background information and detailed results on risk assessment

**Table D.1:** Health-based guidance values[63] for compounds included in the 2018 EUCP

| Pesticide | ADI (mg/kg bw per day) | Year | Source | ARfD (mg/kg bw) | Year | Source |
|---|---|---|---|---|---|---|
| 2,4-D (RD) | 0.02 | 2018 | EFSA | 0.3 | 2018 | EFSA |
| 2-Phenylphenol | 0.4 | 2008 | EFSA | n.n. | 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 |
| Azinphos-methyl | 0.005 | 2006 | COM | 0.01 | 2006 | COM |
| Azoxystrobin | 0.2 | 2011 | COM | n.n. | 2011 | COM |
| Bifenthrin | 0.015 | 2011 | EFSA | 0.03 | 2011 | EFSA |
| Biphenyl | 0.038 | 1999 | WHO | n.n. | 2010 | EFSA |
| Bitertanol | 0.003 | 2011 | COM | 0.01 | 2011 | COM |
| Boscalid (RD) | 0.04 | 2008 | COM | n.n. | 2008 | COM |
| Bromide ion* | 1 | 1988 | JMPR | n.n | 2013 | EFSA |
| Bromopropylate | 0.03 | 1993 | JMPR | 0.03 | | |
| Bupirimate | 0.05 | 2011 | COM | n.n. | 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 |
| Chlorantraniliprole | 1.56 | 2013 | EFSA | n.n. | 2013 | EFSA |
| Chlordane (RD) | 0.0005 | 1994 | JMPR | 0.0005 | | |
| Chlorfenapyr | 0.015 | 1999 | ECCO | 0.015 | 2006 | EFSA |
| Chlormequat | 0.04 | 2008 | EFSA | 0.09 | 2008 | EFSA |
| Chlorothalonil (RD) | 0.015 | 2006 | COM | 0.6 | 2006 | COM |
| Chlorpropham (RD) | 0.05 | 2004 | COM | 0.5 | 2004 | COM |
| Chlorpyrifos | 0.001 | 2015 | EFSA | 0.005 | 2015 | EFSA |
| Chlorpyrifos-methyl | 0.01 | 2005 | COM | 0.1 | 2005 | COM |
| Clofentezine (RD) | 0.02 | 2010 | COM | n.n. | 2010 | COM |
| Clothianidin | 0.097 | 2006 | COM | 0.1 | 2006 | COM |
| Cyfluthrin | 0.003 | 2003 | COM | 0.02 | 2003 | COM |
| Cymoxanil | 0.013 | 2008 | EFSA | 0.08 | 2008 | EFSA |
| Cypermethrin | 0.05 | 2005 | COM | 0.2 | 2005 | COM |
| Cyproconazole | 0.02 | 2011 | COM | 0.02 | 2011 | COM |
| Cyprodinil (RD) | 0.03 | 2006 | COM | n.n. | 2006 | COM |
| Cyromazine | 0.06 | 2006 | JMPR | 0.1 | 2006 | JMPR |
| DDT (RD) | 0.01 | 2000 | JMPR | n.n. | 2000 | JMPR |
| Deltamethrin | 0.01 | 2003 | COM | 0.01 | 2003 | COM |
| Diazinon | 0.0002 | 2006 | EFSA | 0.025 | 2006 | EFSA |
| Dichlorvos | 0.00008 | 2006 | EFSA | 0.002 | 2006 | EFSA |
| Dicloran | 0.005 | 2010 | EFSA | 0.025 | 2010 | EFSA |
| Dicofol (RD) | 0.002 | 1992 | JMPR | 0.2 | 2011 | JMPR |
| Dieldrin (RD) | 0.0001 | 1994 | JMPR | 0.003 | 2007 | EFSA |
| Diethofencarb | 0.43 | 2010 | EFSA | n.n. | 2010 | EFSA |

| Pesticide | ADI (mg/kg bw per day) | Year | Source | ARfD (mg/kg bw) | Year | Source |
|---|---|---|---|---|---|---|
| Difenoconazole | 0.01 | 2008 | COM | 0.16 | 2008 | COM |
| Diflubenzuron (RD) | 0.1 | 2009 | EFSA | n.n. | 2009 | EFSA |
| Dimethoate | 0.001 | 2013 | EFSA | 0.01 | 2013 | EFSA |
| Dimethomorph | 0.05 | 2007 | COM | 0.6 | 2007 | COM |
| Diniconazole | 0.02 | 2007 | France | 0.02 | 2007 | France |
| Diphenylamine | 0.075 | 2008 | EFSA | n.n. | 2008 | EFSA |
| Dithianon | 0.01 | 2011 | COM | 0.12 | 2011 | COM |
| Dithiocarbamates (RD) – mancozeb sc. | 0.028 | 2005 | COM | 0.337 | 2005 | COM |
| Dithiocarbamates (RD) – maneb sc. | 0.029 | 2005 | COM | 0.11 | 2005 | COM |
| Dithiocarbamates (RD) – metiram sc. | 0.004 | 2005 | COM | n.n. | 2005 | COM |
| Dithiocarbamates (RD) – propineb sc. | 0.004 | 2003 | COM | 0.053 | 2003 | COM |
| Dithiocarbamates (RD) – thiram sc. | 0.01 | 2003 | COM | 0.025 | 2003 | COM |
| Dithiocarbamates (RD) – ziram sc. | 0.003 | 2004 | COM | 0.04 | 2004 | COM |
| Dodine | 0.1 | 2010 | EFSA | 0.1 | 2010 | EFSA |
| Endosulfan (RD) | 0.006 | 2006 | JMPR | 0.02 | 2006 | JMPR |
| EPN | | | | | | |
| Epoxiconazole | 0.008 | 2008 | COM | 0.023 | 2008 | COM |
| Ethephon | 0.03 | 2006 | COM | 0.05 | 2008 | COM |
| Ethion | 0.002 | 1990 | JMPR | 0.015 | 1999 | UK ACP |
| Ethirimol | 0.035 | 2010 | EFSA | n.n. | 2010 | EFSA |
| Etofenprox | 0.03 | 2009 | COM | 1 | 2009 | COM |
| Famoxadone | 0.006 | 2015 | EFSA | 0.1 | 2015 | EFSA |
| Fenamidone | | 2017 | EFSA | | 2017 | EFSA |
| 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 | 2015 | EFSA | n.n. | 2015 | 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 |
| Fenpropidin (RD) | 0.02 | 2012 | COM | 0.02 | 2012 | COM |
| Fenpropimorph (RD) | 0.003 | 2008 | COM | 0.03 | 2008 | COM |
| Fenpyroximate (RD) | 0.01 | 2013 | EFSA | 0.02 | 2013 | EFSA |
| Fenthion (RD) | 0.007 | 2000 | JMPR | 0.01 | 2000 | JMPR |
| Fenvalerate (RD) | 0.0175 | 2015 | EFSA | 0.0175 | 2015 | EFSA |
| Fipronil (RD) | 0.0002 | 2007 | COM | 0.009 | 2007 | COM |
| Flonicamid (RD) | 0.025 | 2010 | COM | 0.025 | 2010 | COM |
| Fluazifop-P (RD) | 0.01 | 2010 | EFSA | 0.017 | 2010 | EFSA |
| Flubendiamide | 0.017 | 2013 | EFSA | 0.1 | 2013 | EFSA |
| Fludioxonil (RD) | 0.37 | 2007 | COM | n.n. | 2007 | COM |
| Flufenoxuron | 0.01 | 2011 | EFSA | n.n. | 2011 | EFSA |
| Fluopicolide | 0.08 | 2010 | COM | 0.18 | 2010 | COM |

| Pesticide | ADI (mg/kg bw per day) | 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 | 0.004 | 2007 | COM | 0.005 | 2007 | COM |
| Fosthiazate | 0.004 | 2003 | COM | 0.005 | 2003 | COM |
| Glyphosate | 0.5 | 2015 | EFSA | 0.5 | 2015 | EFSA |
| Haloxyfop (RD) | 0.00065 | 2015 | COM | 0.075 | 2015 | COM |
| Heptachlor (RD) | 0.0001 | 1994 | JMPR | | | |
| Hexachlorobenzene | | | | | | |
| Hexachlorocyclohexane (alpha) | | | | | | |
| Hexachlorocyclohexane (beta) | | | | | | |
| Hexaconazole | 0.005 | 1990 | JMPR | 0.005 | | |
| Hexythiazox | 0.03 | 2011 | COM | n.n. | 2011 | COM |
| Imazalil | 0.025 | 2011 | COM | 0.05 | 2011 | COM |
| Imidacloprid | 0.06 | 2013 | EFSA | 0.08 | 2013 | EFSA |
| Indoxacarb | 0.006 | 2005 | COM | 0.125 | 2005 | COM |
| Iprodione (RD) | 0.02 | 2018 | EFSA | 0.06 | 2018 | EFSA |
| Iprovalicarb | 0.015 | 2015 | EFSA | n.n. | 2015 | EFSA |
| Isocarbophos | | | | | | |
| Isoprothiolane | 0.1 | 2012 | EFSA | 0.12 | 2012 | EFSA |
| Kresoxim-methyl (RD) | 0.4 | 2011 | COM | n.n. | 2011 | COM |
| Lambda-cyhalothrin (RD) | 0.0025 | 2015 | EFSA | 0.005 | 2015 | EFSA |
| Lindane | 0.005 | 2000 | COM | 0.06 | 2000 | COM |
| Linuron | 0.003 | 2002 | COM | 0.03 | 2002 | COM |
| Lufenuron | 0.015 | 2009 | COM | n.n. | 2009 | COM |
| Malathion (RD) | 0.03 | 2010 | COM | 0.3 | 2010 | COM |
| Mandipropamid | 0.15 | 2012 | EFSA | n.n. | 2012 | EFSA |
| Mepanipyrim | 0.012 | 2018 | EFSA | 0.1 | 2018 | EFSA |
| Mepiquat | 0.2 | 2008 | COM | 0.3 | 2008 | COM |
| Metalaxyl | 0.08 | 2015 | EFSA | 0.5 | 2015 | EFSA |
| 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 | 0.0025 | 2009 | COM | 0.0025 | 2009 | COM |
| Methoxychlor | 0.005 | 2011 | ATSDR | 0.005 | | |
| Methoxyfenozide | 0.1 | 2018 | EFSA | 0.1 | 2018 | EFSA |
| Monocrotophos | 0.0006 | 1995 | JMPR | 0.002 | 1995 | JMPR |
| Myclobutanil (RD) | 0.025 | 2010 | COM | 0.31 | 2010 | COM |
| Omethoate | 0.0003 | 2013 | EFSA | 0.002 | 2013 | EFSA |
| Oxadixyl | 0.01 | 1984 | FR | 0.01 | 1984 | FR |
| 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 |
| Parathion-methyl (RD) | 0.003 | 2002 | COM | 0.03 | 2001 | COM |

| Pesticide | ADI (mg/kg bw per day) | Year | Source | ARfD (mg/kg bw) | Year | Source |
|---|---|---|---|---|---|---|
| Penconazole | 0.03 | 2009 | COM | 0.5 | 2009 | COM |
| Pencycuron | 0.2 | 2011 | COM | n.n. | 2011 | COM |
| Pendimethalin | 0.125 | 2015 | EFSA | 0.3 | 2015 | EFSA |
| Permethrin | 0.05 | 2000 | COM | 1.5 | 2000 | COM |
| Phosmet (RD) | 0.01 | 2007 | COM | 0.045 | 2007 | COM |
| Pirimicarb (RD) | 0.035 | 2006 | COM | 0.1 | 2006 | COM |
| Pirimiphos-methyl | 0.004 | 2007 | COM | 0.15 | 2007 | COM |
| Procymidone (RD) | 0.0028 | 2007 | DAR FR | 0.012 | 2007 | DAR FR |
| Profenofos | 0.03 | 2007 | JMPR | 1 | 2007 | JMPR |
| Propamocarb (RD) | 0.29 | 2007 | COM | 1 | 2007 | COM |
| Propargite | 0.03 | 2018 | EFSA | 0.06 | 2018 | EFSA |
| Propiconazole | 0.04 | 2018 | EFSA | 0.1 | 2018 | EFSA |
| Propyzamide (RD) | 0.05 | 2017 | EFSA | 0.13 | 2017 | EFSA |
| Prosulfocarb | 0.005 | 2007 | COM | 0.1 | 2007 | COM |
| Prothioconazole (RD) | 0.01 | 2008 | COM | 0.01 | 2008 | COM |
| Pymetrozine (RD) | 0.03 | 2018 | COM | 0.1 | 2018 | COM |
| Pyraclostrobin | 0.03 | 2004 | COM | 0.03 | 2004 | COM |
| Pyridaben | 0.01 | 2010 | COM | 0.05 | 2010 | COM |
| Pyrimethanil (RD) | 0.17 | 2006 | COM | n.n. | 2006 | EFSA |
| Pyriproxyfen | 0.1 | 2008 | COM | n.n. | 2008 | COM |
| Quinoxyfen | 0.2 | 2004 | COM | n.n. | 2003 | COM |
| Spinosad | 0.024 | 2007 | COM | n.n. | 2006 | COM |
| Spirodiclofen | 0.015 | 2009 | EFSA | n.n. | 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 (RD) | 0.03 | 2013 | EFSA | 0.03 | 2013 | EFSA |
| Tebufenozide | 0.02 | 2011 | COM | n.n. | 2011 | COM |
| Tebufenpyrad | 0.01 | 2009 | COM | 0.02 | 2009 | COM |
| Teflubenzuron | 0.01 | 2008 | COM | n.n. | 2008 | COM |
| Tefluthrin | 0.005 | 2010 | COM | 0.005 | 2010 | COM |
| Terbuthylazine | 0.004 | 2018 | EFSA | 0.008 | 2018 | EFSA |
| Tetraconazole | 0.004 | 2008 | COM | 0.05 | 2008 | COM |
| Tetradifon | 0.015 | 2001 | DE | n.n. | 2002 | DE |
| Thiabendazole (RD) | 0.1 | 2015 | EFSA | 0.1 | 2015 | EFSA |
| Thiacloprid | 0.01 | 2004 | COM | 0.03 | 2004 | COM |
| Thiamethoxam | 0.026 | 2007 | COM | 0.5 | 2007 | COM |
| Thiodicarb | 0.01 | 2005 | EFSA | 0.01 | 2005 | EFSA |
| Thiophanate-methyl | 0.08 | 2005 | COM | 0.2 | 2005 | COM |
| Tolclofos-methyl | 0.064 | 2006 | COM | n.n. | 2006 | COM |
| Tolylfluanid (RD) | 0.1 | 2006 | COM | 0.25 | 2006 | COM |
| Triadimenol (RD) | 0.05 | 2008 | COM | 0.05 | 2008 | COM |
| Triadimefon | 0.03 | 2004 | JMPR | 0.08 | 2004 | JMPR |
| Triazophos | 0.001 | 2002 | JMPR | 0.001 | 2002 | JMPR |
| Trifloxystrobin (RD) | 0.1 | 2018 | EFSA | 0.5 | 2018 | EFSA |
| Triflumuron | 0.014 | 2011 | COM | n.n. | 2011 | COM |
| Vinclozolin | 0.005 | 2006 | COM | 0.06 | 2006 | COM |

EUCP: EU-coordinated control programme; ADI: acceptable daily intake; ARfD: acute reference dose; bw: body weight.
n.n.: ARfD not necessary.
*: For tentative risk assessment only.

**Table D.2:** Processing factors by pesticide/crop combination used for refining the risk assessment

| Pesticide | Food commodity | Processing factor used in the risk assessment | Reference |
|---|---|---|---|
| Acetamiprid | Grapefruit | 0.81 | Scholz (2018) |
| Chlorpyrifos | Bananas | 0.02 | Scholz (2018) |
| Difenoconazole | Melons | 0.22 | Scholz (2018) |
| Flonicamid (RD) | Melons | 0.33 | Scholz (2018) |
| Fludioxonil (RD) | Melons | 0.36 | Scholz (2018) |
| Imazalil | Melons | 0.33 | Scholz (2018) |
| Imazalil | Grapefruit | 0.07 | EFSA (2018a–i) |
| Imazalil | Bananas | 0.13 | EFSA (2018a–i) |
| Pymetrozine (RD) | Melons | 0.12 | EFSA (2018a–i) |
| Pyraclostrobin | Melons | 0.92 | Scholz (2018) |
| Pyraclostrobin | Grapefruit | 0.17 | Scholz (2018) |
| Spiroxamine (RD) | Melons | 0.42 | Scholz (2018) |
| Difenoconazole | Bananas | 0.33 | Scholz (2018) |

RD: residue definition.

**Results of acute risk assessment for food products in focus of the EUCP, expressed as percentage of the ARfD**

In the following figures,[81] the acute exposure calculated for each sample with residues above the LOQ is presented individually, expressing the result as percentage of the ARfD. The blue dots refer to results reported under the EU-coordinated programme, whereas the orange dots refer to findings in samples that were analysed in the framework of the national control 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 quantified residues below or at the MRL, and the number of samples with residues above the MRL[82] (the asterisk in the graphs' labels indicates that the MRL changed during the 2018 monitoring year).

[81] In the following figures, there are some cases where the ARfD was exceeded due to recent lowering in the ARfD value, while the samples were still within the MRL. In other cases, the exceedance of the ARfD is due to the IESTI equation and the gap between the highest residue derived under residue trials and the calculation of the MRL.

[82] Samples with residues above the MRL in the context of this report refers to samples with one or several pesticides exceeding the legal limit, as reported by the Member States.

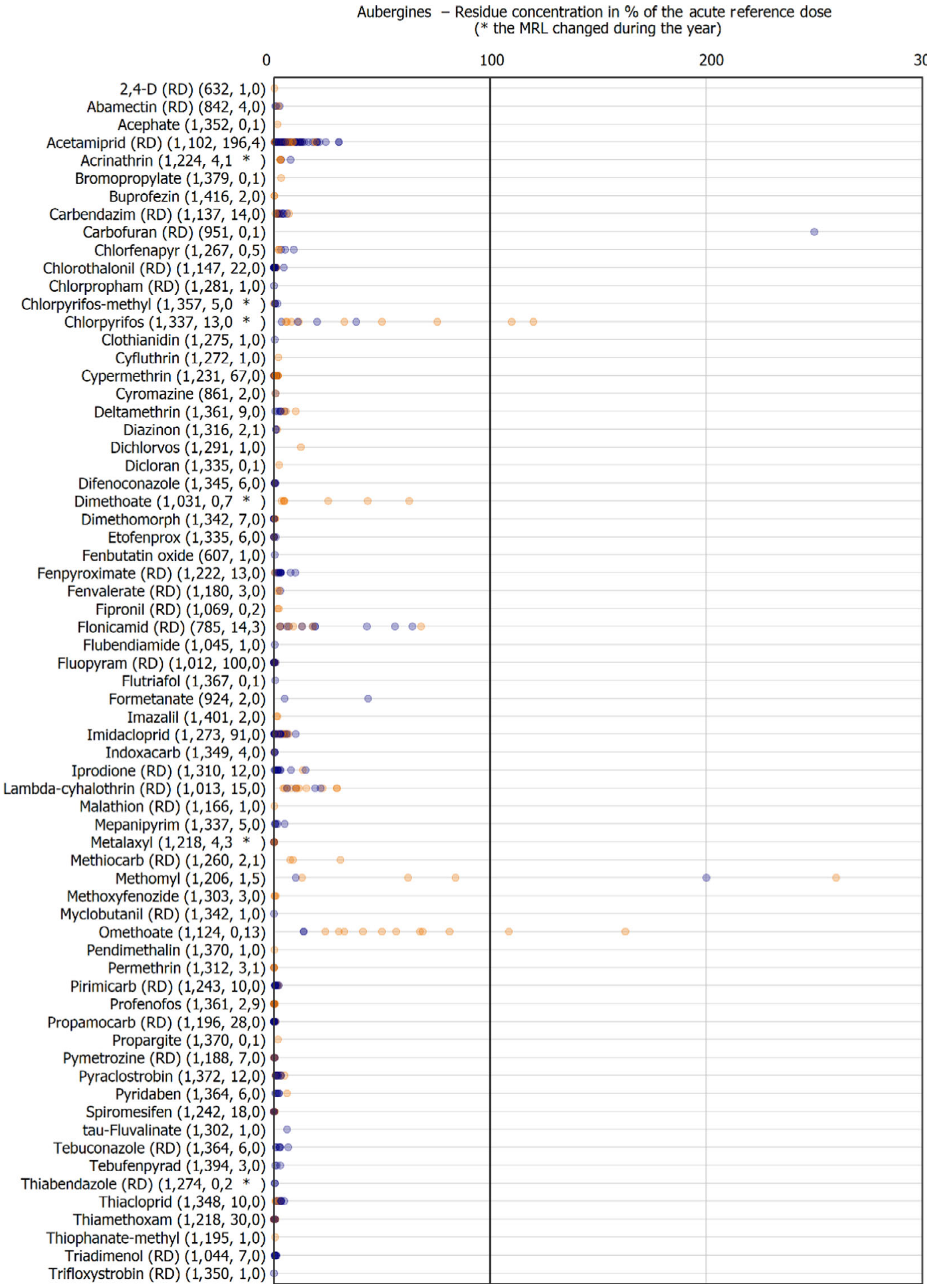


**Figure D.1:** Acute dietary exposure assessment – aubergines

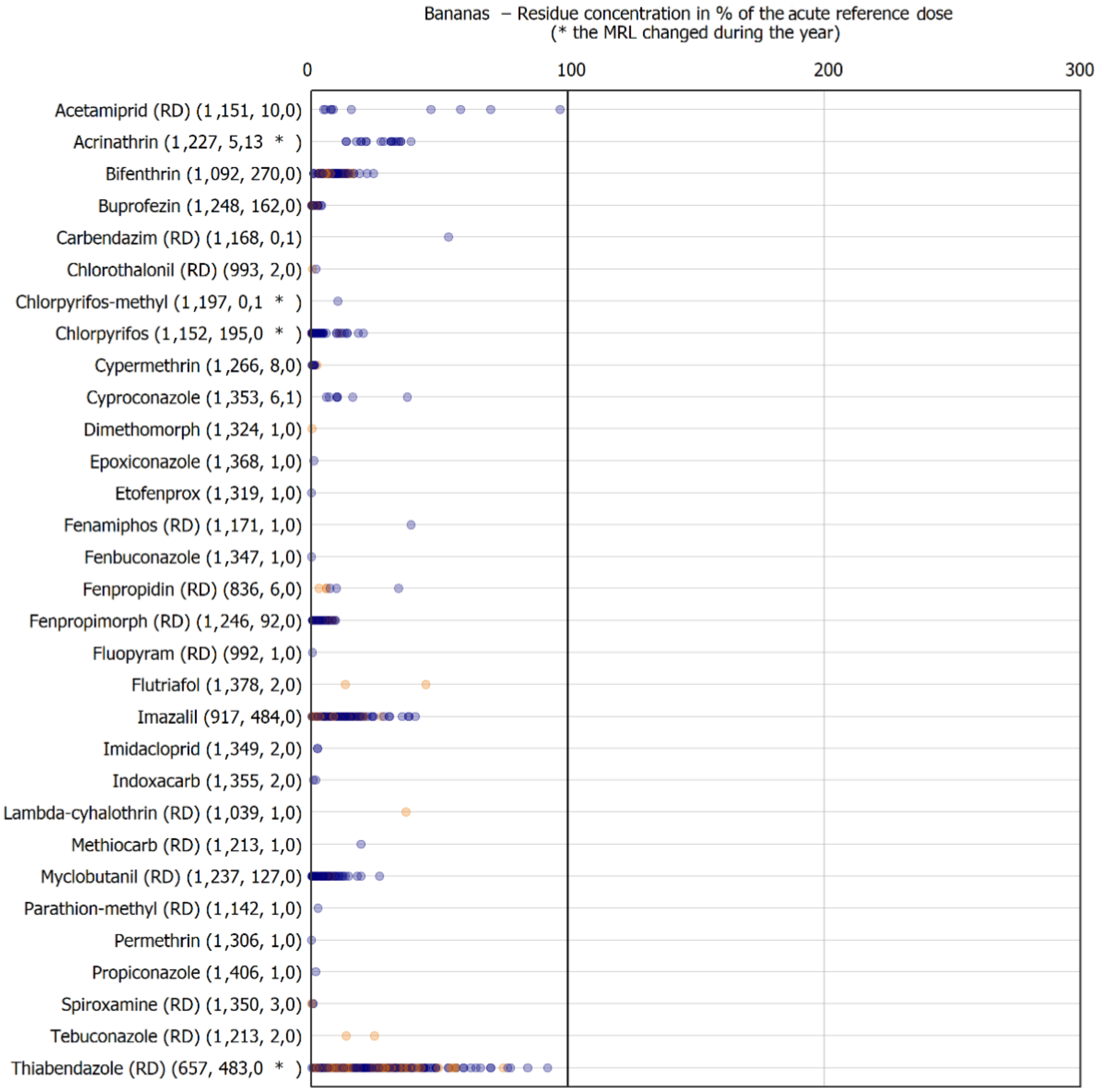


**Figure D.2:** Acute dietary exposure assessment – bananas

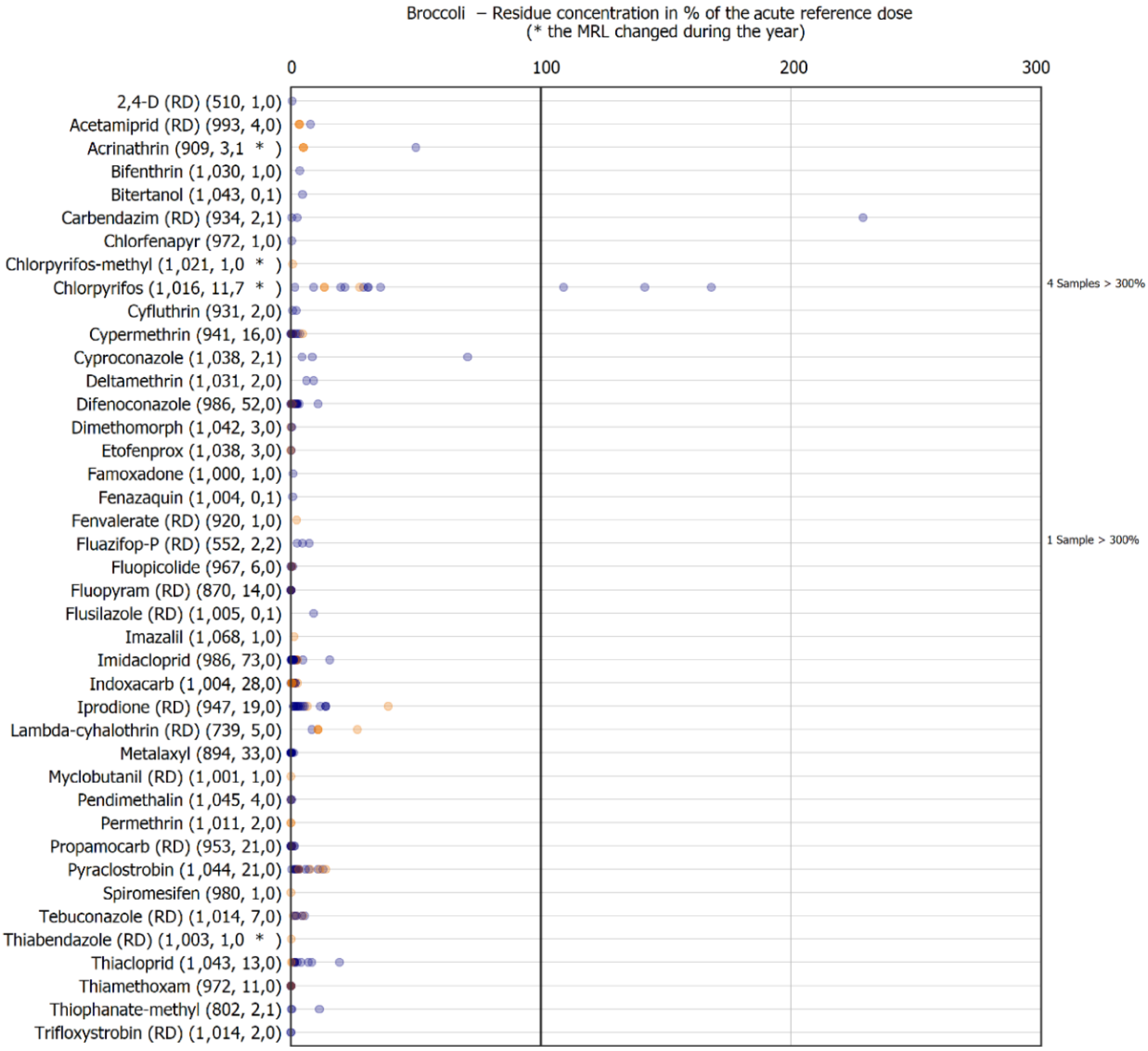


**Figure D.3:** Acute dietary exposure assessment – broccoli

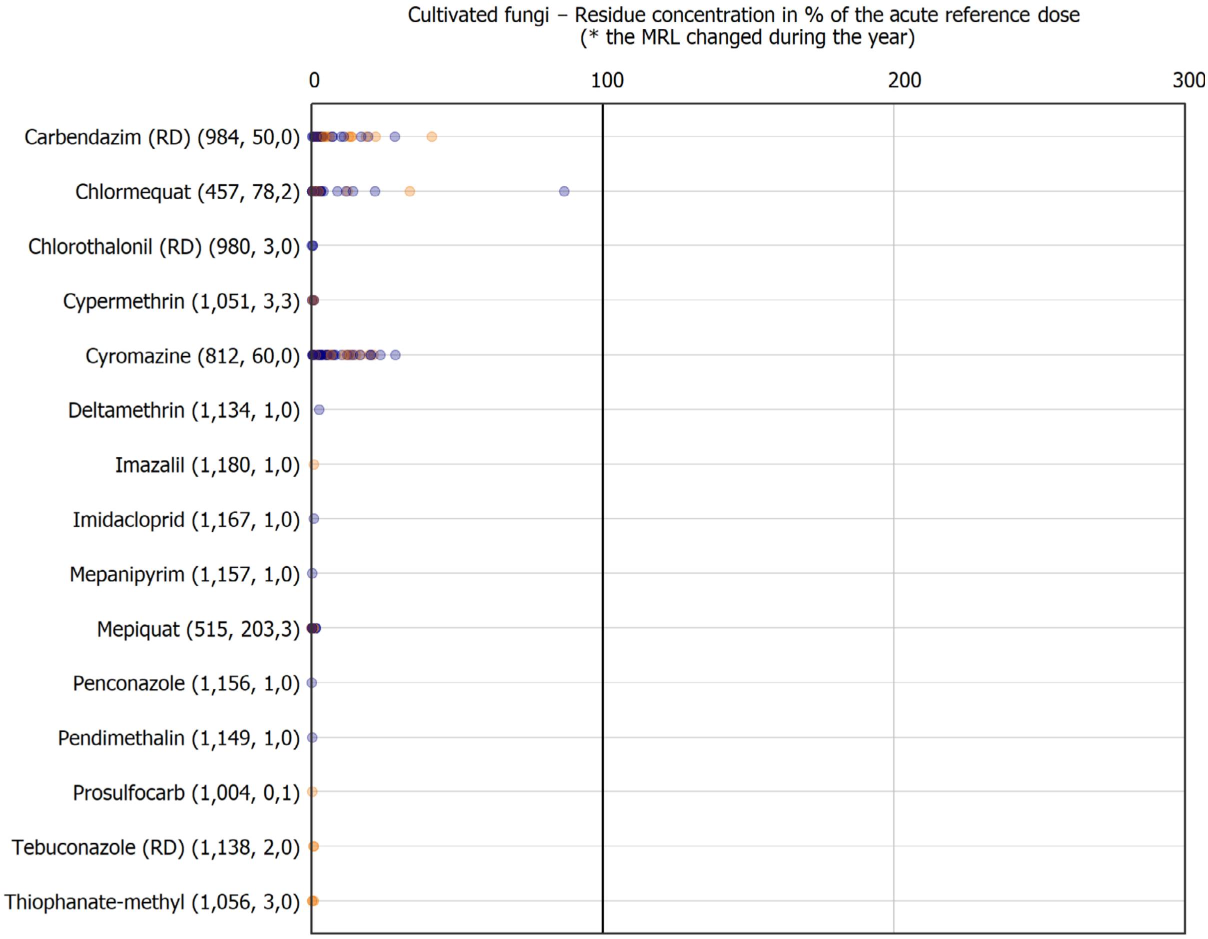


**Figure D.4:** Acute dietary exposure assessment – cultivated fungi


**Figure D.5:** Acute dietary exposure assessment – grapefruit


**Figure D.6:** Acute dietary exposure assessment – melon

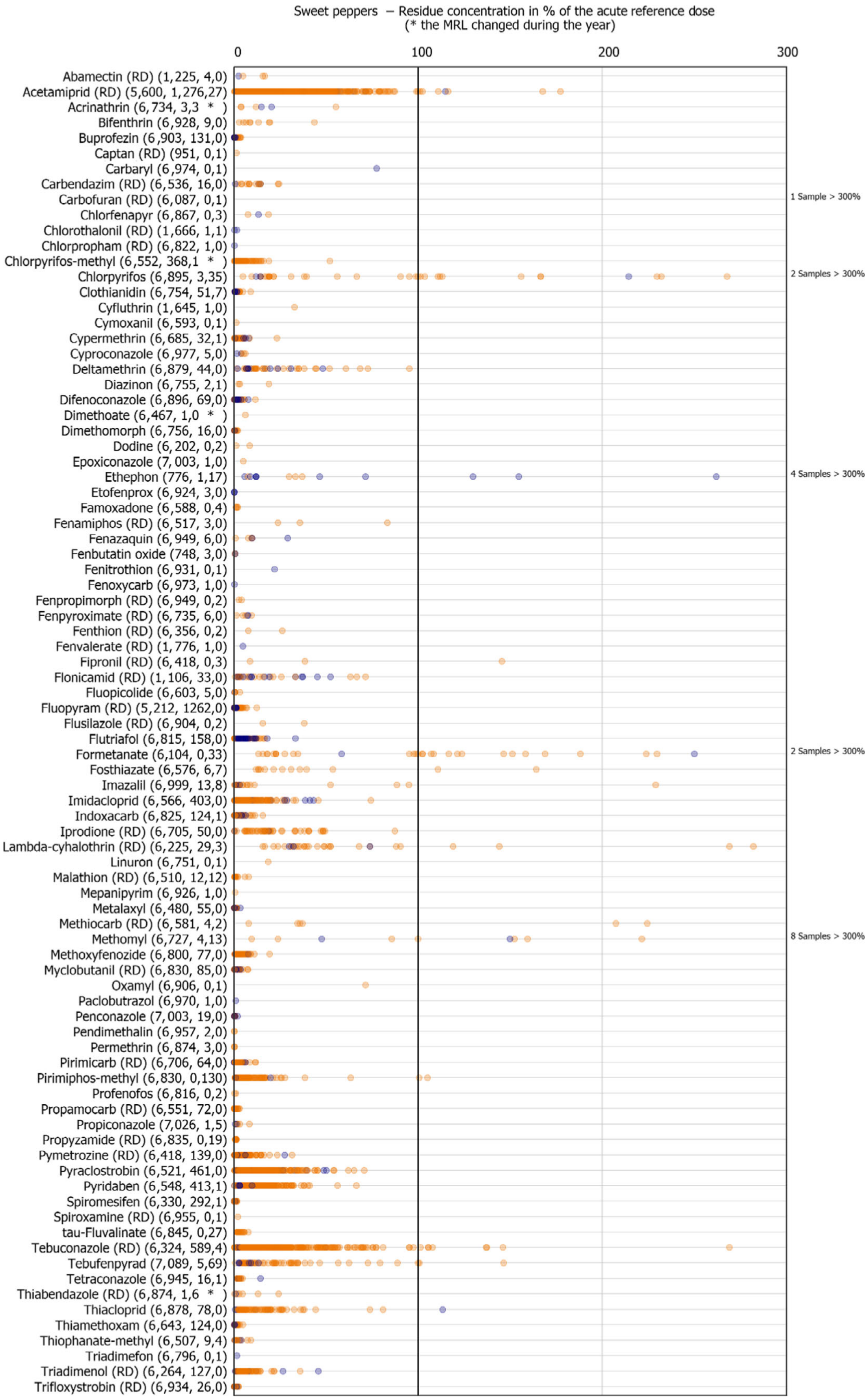


**Figure D.7:** Acute dietary exposure assessment – sweet peppers


**Figure D.8:** Acute dietary exposure assessment – table grapes[83]

[83] Revision of IESTI equation is recommended as MRL was not exceeded but the %ARfD did (e.g. acetamiprid, ethephon and tebuconazole).

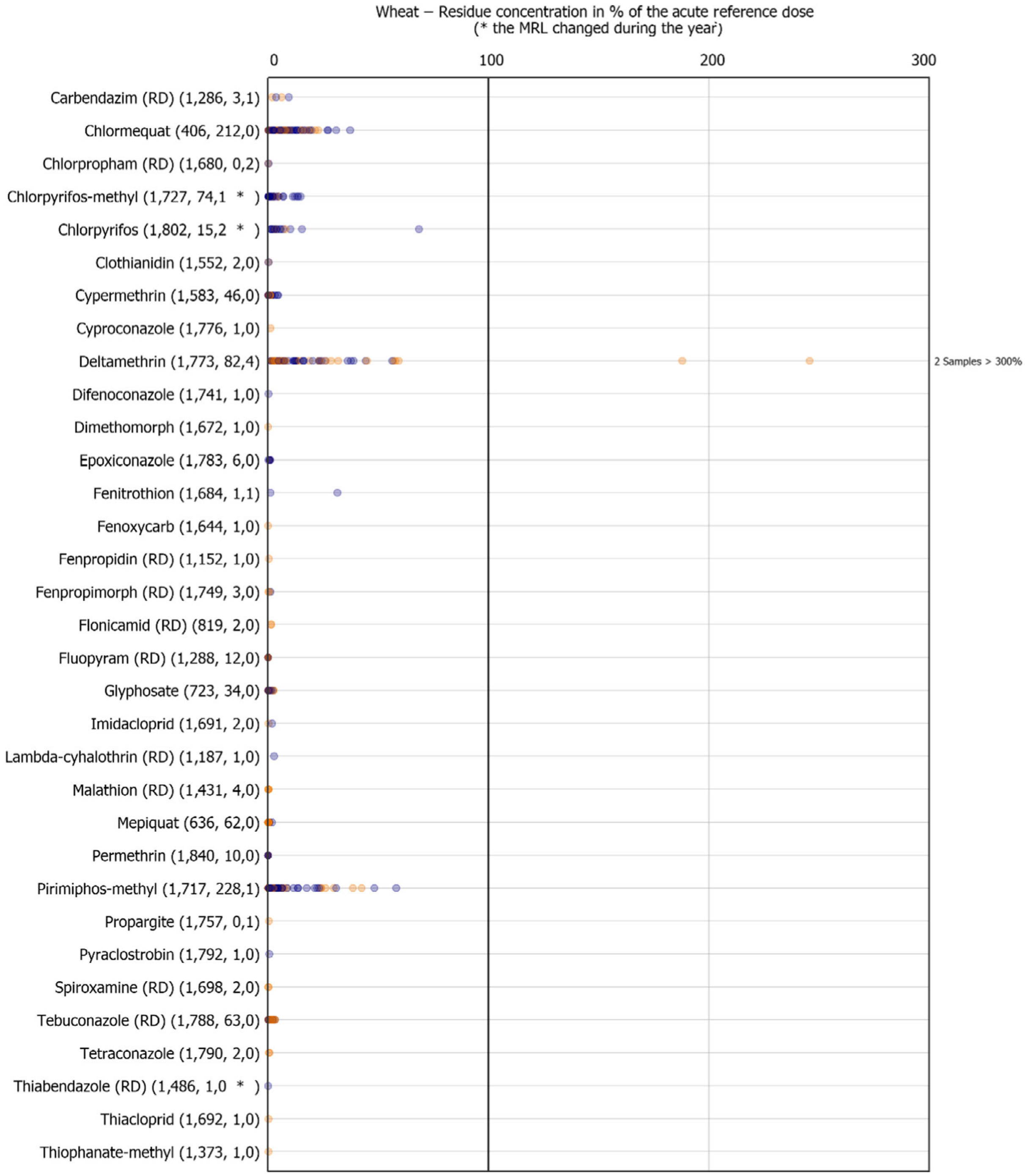


**Figure D.9:** Acute dietary exposure assessment – wheat

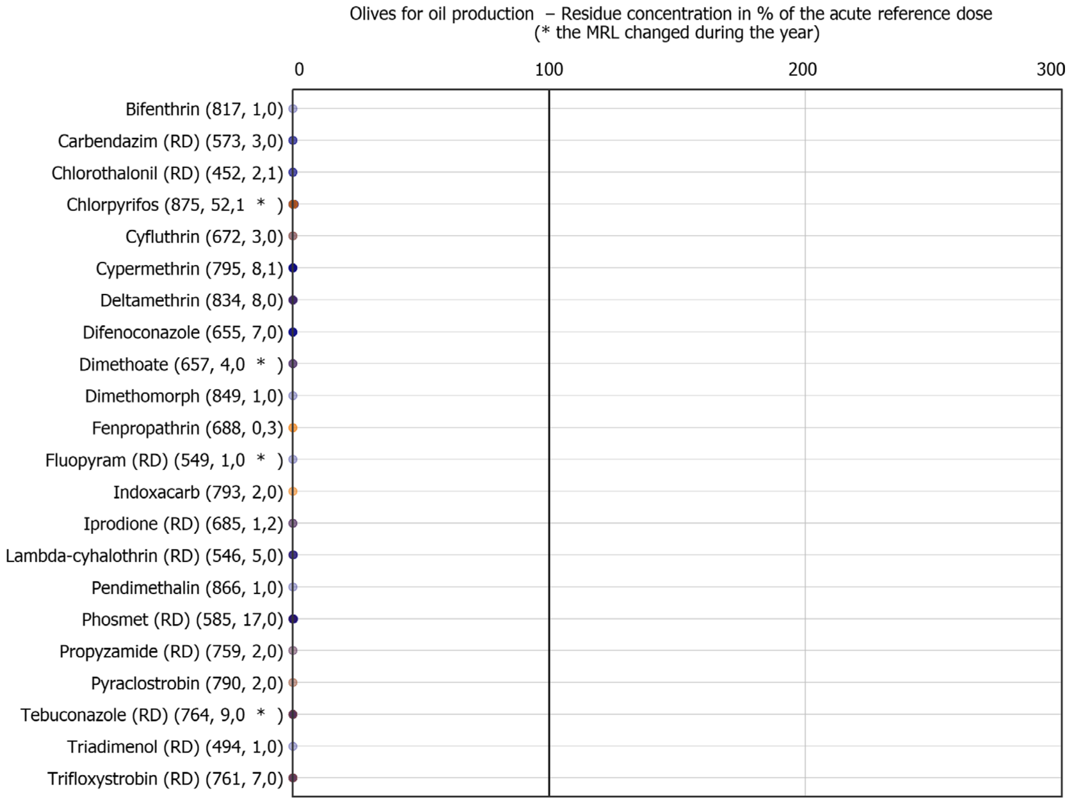


**Figure D.10:** Acute dietary exposure assessment – olives for oil production[84]

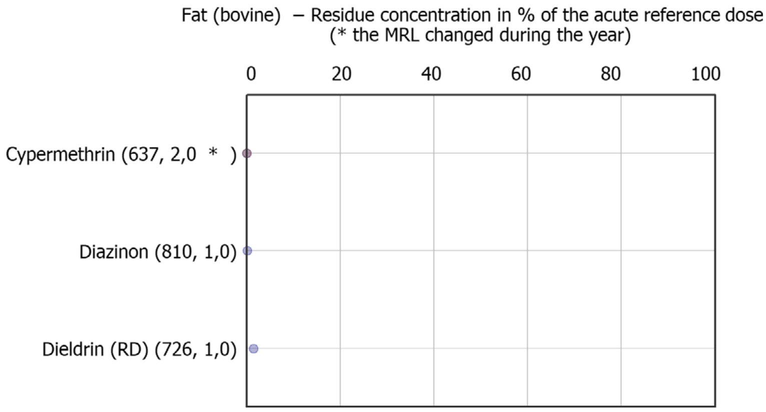


**Figure D.11:** Acute dietary exposure assessment – bovine fat

[84] To compare the residue concentrations reported for virgin olive oil with the consumption on olives for oil production, a default yield factor of 20% was used. This implies that residues in oil were diluted five times when the residues were converted to unprocessed olives (assuming 5 kg of olives are used to produce 1 kg of oil and assuming a complete transfer of the residues to oil occurs).

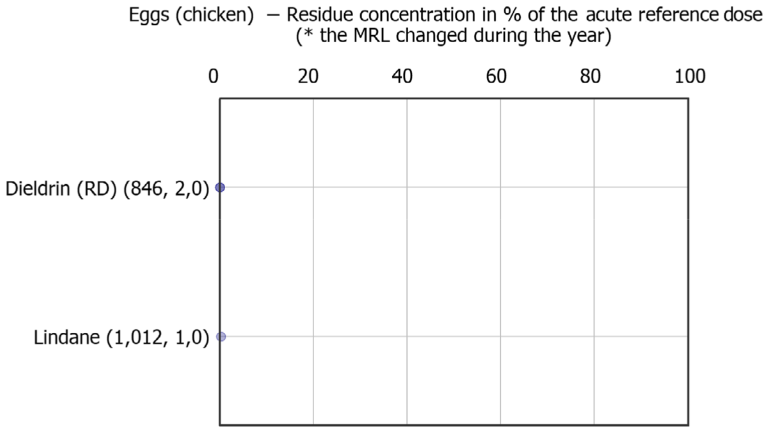


**Figure D.12:** Acute dietary exposure assessment – chicken eggs