Review of the existing maximum residue levels for chlorpyrifos according to Article 12 of Regulation (EC) No 396/2005

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Abstract

According to Article 12 of Regulation (EC) No 396/2005, EFSA has reviewed the maximum residue levels (MRLs) currently established at European level for the pesticide active substance chlorpyrifos. To assess the occurrence of chlorpyrifos residues in plants, processed commodities, rotational crops and livestock, EFSA considered the conclusions derived in the framework of Directive 91/414/EEC, the MRLs established by the Codex Alimentarius Commission as well as the European authorisations reported by Member States (including the supporting residues data). Based on the assessment of the available data, MRL proposals were derived and a consumer risk assessment was carried out. Some information required by the regulatory framework was missing and possible chronic and acute risks to consumers were identified. Hence, the consumer risk assessment is considered indicative only, some MRL proposals derived by EFSA still requires further consideration by risk managers and measures for reduction of the consumer exposure should also be considered.

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Summary

Chlorpyrifos was included in Annex I to Directive 91/414/EEC on 1 July 2006 by Commission Directive 2005/72/EC, and has been deemed to be approved under Regulation (EC) No 1107/2009, in accordance with Commission Implementing Regulation (EU) No 540/2011, as amended by Commission Implementing Regulation (EU) No 541/2011. As chlorpyrifos was approved before the entry into force of Regulation (EC) No 396/2005 on 2 September 2008, the European Food Safety Authority (EFSA) is required to provide a reasoned opinion on the review of the existing maximum residue limits (MRLs) for that active substance in compliance with Article 12(2) of the aforementioned regulation. To collect the relevant pesticide residues data, EFSA asked Spain, the designated rapporteur Member State (RMS), to complete the Pesticide Residues Overview File (PROFile) and to prepare a supporting evaluation report. The PROFile and evaluation report provided by the RMS were made available to Member States. A request for additional information was addressed to Member States in the framework of a completeness check period, which was initiated by EFSA on 26 November 2015 and finalised on 26 January 2016. After having considered all the information provided, EFSA prepared a completeness check report which was made available to Member States on 13 April 2016.

Based on the conclusions derived by the European Commission in the framework of Directive 91/414/EEC, the conclusion on the peer review of the pesticide human health risk assessment of chlorpyrifos carried out by EFSA, the MRLs established by the Codex Alimentarius Commission and the additional information provided by the RMS and Member States, EFSA prepared in October 2016 a draft reasoned opinion, which was circulated to Member States for consultation via a written procedure. Comments received by 21 November 2016 were considered during the finalisation of this reasoned opinion. The following conclusions are derived.

The metabolism of chlorpyrifos was sufficiently investigated for foliar treatment in oranges, radishes, head cabbage and peas. These studies allowed to depict a general metabolic pathway of chlorpyrifos in plant. The parent compound, the metabolite 3,5,6-trichloropyridinol (referred to as 3,5,6-TCP) and its conjugates are the main components of the residues after foliar applications. Nevertheless, as the metabolism of chlorpyrifos was not investigated for soil treatment and seed treatment, additional studies are still required to support these kinds of applications. A study investigating the nature of chlorpyrifos residues in rotational crops indicates that significant residues uptake was not expected in rotational crops but it should still be confirmed by a fully validated study. A study investigating the effect of processing on the nature of chlorpyrifos residues was assessed in this review; it demonstrated that the parent compound is mainly degraded into desethyl chlorpyrifos when subject to the standard hydrolytic conditions. Toxicological data on the desethyl metabolite are missing and should still be provided; meanwhile, this compound was considered as toxic as the parent compound. However, different toxicological reference values are available for chlorpyrifos and for its metabolite 3,5,6-TCP. Based on this information, two separate residue definitions for enforcement and risk assessment were proposed by EFSA. The first residue definition (specific to chlorpyrifos) includes the parent compound (in raw commodities) and its desethyl metabolite (in processed commodities only); chlorpyrifos can be enforced in plant commodities with a limit of quantification (LOQ) of 0.01 mg/kg, while analytical methods are not available for its desethyl metabolite. The second residue definition is the sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP. Since this compound is not a specific metabolite of chlorpyrifos, the first residue definition remains the most relevant for enforcement purpose but, as risk managers may consider that enforcement of metabolite 3,5,6-TCP is also necessary, an optional separate list of MRLs was also derived for the second residue definition. An analytical method is validated for analysis of 3,5,6-TCP and its conjugates with a LOQ of 0.01 mg/kg in plant commodities, but the efficiency of this hydrolysis step to release the conjugates has not been demonstrated.

For the main residue definition, the available data allowed deriving MRLs and risk assessment values for all commodities except beetroots. However, major data gaps were identified in a large number of crops, mainly because the number of residue trials was not compliant with the data requirement or because of a lack of information regarding the metabolism of chlorpyrifos after soil or seed treatments. In addition, for high oil content commodities, the MRL proposals are tentative due to the lack of validation data for the analytical method for enforcement. Based on the same trials an optional list of MRLs, reflecting the use of chlorpyrifos, was also derived for the sum of 3,5,6-TCP and its conjugates. However, the final list of MRLs proposed for this residue definition also accommodates the use of chlorpyrifos-methyl (other source of 3,5,6-TCP in plant commodities) and is therefore further extended.
Based on the available processing studies, robust processing factors could only be derived for peeled citrus and peeled bananas. Processing factors derived for wheat bran, white flour and wholemeal flour are tentative due to the limited number of data. All other processed commodities assessed in this review involve a hydrolysis step. However, as the available processing studies do not contain analysis of the desethyl metabolite, only tentative processing factors could be derived for these items. Based on the same studies, a separate list of processing factors was also derived for the second residue definition.

The metabolism of chlorpyrifos in animals was sufficiently investigated in ruminants and poultry. As for plant commodities, both chlorpyrifos and its metabolite 3,5,6-TCP should be considered for risk assessment purposes. For the same reason as for plant commodities, two separate residue definitions were derived. The first residue definition (specific) only includes the parent compound and the second residue definition is the sum of 3,5,6-TCP and its conjugates. The parent compound still remains the most relevant compound for monitoring purposes but two separate lists of MRLs were derived.

Based on the available feeding studies, MRL and risk assessment values were derived for both proposed residue definitions, in dairy ruminants, meat ruminants, laying hens and pigs. It is highlighted that the final list of MRLs for the sum of 3,5,6-TCP and its conjugates also accommodates the use of chlorpyrifos-methyl and triclopyr, which are the two other possible sources of 3,5,6-TCP in animal commodities. Based on a comparison of the respective dietary burdens for these substances, it was observed that the levels of 3,5,6-TCP in poultry are mainly driven by the dietary intake of chlorpyrifos-methyl. In ruminants (dairy and meat) and in pigs, however, the livestock dietary burden of triclopyr was identified as the main driver for the occurrence of 3,5,6-TCP. Therefore, the final MRLs for the sum of 3,5,6-TCP and its conjugates were derived from the respective data of these two substances.

Chronic and acute consumer exposure resulting from the authorised uses reported in the framework of this review was calculated for chlorpyrifos, using revision 2 of the EFSA Pesticide Residues Intake Model (PRiMo). For those commodities where data were insufficient to derive a MRL, EFSA considered the existing EU MRL for an indicative calculation. Acute intake concerns were identified for apples, pears, peaches, wine grapes (adult and children), peppers and quinces, representing 783.7%, 728.6%, 605.2%, 464.9%, 163.2%, 126.0% and 117.3% of the acute reference dose (ARfD), respectively. Considering fall-back MRLs for these crops, the highest chronic exposure declined to 79.8% of the acceptable daily intake (ADI) (NL child) and the highest acute exposure amounted to 98.7% of the ARfD (plums).

Apart from the MRLs evaluated in the framework of this review, internationally recommended codex maximum residue limits (CXLs) have also been established for chlorpyrifos. Additional calculations of the consumer exposure, considering these CXLs, were therefore carried out and exceedances of the ARfD were identified for the existing CXLs in potatoes, apples, peppers, pears, broccoli, head cabbage, Chinese cabbage, table grapes, peaches, tomatoes, quinces, medlar, plums and wine grapes (adults) representing 2675%, 1842%, 1763%, 1712%, 1631%, 989%, 446%, 419%, 392%, 384%, 276%, 227%, 132% and 106% of the ARfD, respectively. Excluding these CXLs from the calculation, the highest chronic exposure represented 92.5% of the ADI (UK infant) and the highest acute exposure still amounted to 98.7% of the ARfD (plums).

As different toxicological reference values were derived for the metabolite 3,5,6-TCP, a separate consumer risk assessment for 3,5,6-TCP and its conjugates was performed. In order to carry out a comprehensive consumer exposure calculation for metabolite 3,5,6-TCP, EFSA took into account residues arising from chlorpyrifos-methyl, chlorpyrifos and triclopyr. These chronic and acute exposure calculations were also performed using revision 2 of the EFSA PRiMo and the exposures calculated were compared with the toxicological reference values derived for the metabolite 3,5,6-TCP. The highest chronic exposure was calculated for German children, representing 6.0% of the ADI, and the highest acute exposure was calculated for bananas, representing 6.5% of the ARfD. Major uncertainties remain due to the data gaps identified for the metabolite 3,5,6-TCP but, this indicative exposure calculation did not indicate a risk to consumers and considering the large margin of safety, there are indications that metabolite 3,5,6-TCP is not of concern with regard to the use of triclopyr, chlorpyrifos and chlorpyrifos-methyl.
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Background

Regulation (EC) No 396/2005\(^1\) (hereinafter referred to as ‘the Regulation’) establishes the rules governing the setting and the review of pesticide maximum residue levels (MRLs) at European level. Article 12(2) of that Regulation stipulates that the European Food Safety Authority (EFSA) shall provide by 1 September 2009 a reasoned opinion on the review of the existing maximum residue levels (MRLs) for all active substances included in Annex I to Directive 91/414/EEC\(^2\) before 2 September 2008. As chlorpyrifos was included in Annex I to Council Directive 91/414/EEC on 1 July 2006 by means of Commission Directive 2005/72/EC\(^3\), and has been deemed to be approved under Regulation (EC) No 1107/2009\(^4\), in accordance with Commission Implementing Regulation (EU) No 540/2011\(^5\), as amended by Commission Implementing Regulation (EU) No 541/2011\(^6\), EFSA initiated the review of all existing MRLs for that active substance.

According to the legal provisions, EFSA shall base its reasoned opinion in particular on the relevant assessment report prepared under Directive 91/414/EEC. It should be noted, however, that, in the framework of Directive 91/414/EEC, only a few representative uses are evaluated, whereas MRLs set out in Regulation (EC) No 396/2005 should accommodate all uses authorised within the European Union (EU), and uses authorised in third countries that have a significant impact on international trade.

The information included in the assessment report prepared under Directive 91/414/EEC is therefore insufficient for the assessment of all existing MRLs for a given active substance.

To gain an overview of the pesticide residues data that have been considered for the setting of the existing MRLs, EFSA developed the Pesticide Residues Overview File (PROFile). The PROFile is an inventory of all pesticide residues data relevant to the risk assessment and MRL setting for a given active substance. This includes data on:

- the nature and magnitude of residues in primary crops;
- the nature and magnitude of residues in processed commodities;
- the nature and magnitude of residues in rotational crops;
- the nature and magnitude of residues in livestock commodities;
- the analytical methods for enforcement of the proposed MRLs.

Spain, the designated rapporteur Member State (RMS), in the framework of Directive 91/414/EEC, was asked to complete the PROFile for chlorpyrifos and to prepare a supporting evaluation report (Spain, 2010a,b). The PROFile and the supporting evaluation reports were submitted to EFSA on 8 November 2010 and made available to Member States. A request for additional information was addressed to Member States in the framework of a completeness check period which was initiated by EFSA on 26 November 2015 and finalised on 26 January 2016. Additional evaluation reports were submitted by Austria, Belgium, the Czech Republic, France, Greece, Italy, Portugal, Spain, the Netherlands and the European Union Reference Laboratories for Pesticide Residues (Netherlands, 2015; Austria, 2016; Belgium, 2016; Czech Republic, 2016a,b; EURL, 2016; France, 2016a; Greece, 2016; Italy, 2016, Portugal, 2016; Spain, 2016a,b) and, after having considered all the information provided by the RMS and Member States, EFSA prepared a completeness check report which was made available to all Member States on 13 April 2016. Further clarifications were sought from Member States via a written procedure in May 2016.

Based on the conclusions derived by the European Commission in the framework of Directive 91/414/EEC, the specific conclusion on chlorpyrifos as regards the pesticide human health risk assessment finalised by EFSA on 7 April 2014 (EFSA, 2014), the MRLs established by the Codex Alimentarius Commission

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1. 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.
2. Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market, OJ L 230, 19.8.1991, p. 1–32. Repealed by Regulation (EC) No 1107/2009.
3. Commission Directive 2005/72/EC of 21 October 2005 amending Council Directive 91/414/EEC to include chlorpyrifos, chlorpyrifos-methyl, mancozeb, mane, and metiram as active substances, OJ L 279, 22.10.2005, p. 63–69.
4. Council Directive 91/144/EEC of 15 July 1991 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/443/EEC. OJ L 309, 24.11.2009, p. 1–50.
5. Commission Implementing Regulation (EU) No 540/2011 of 25 May 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards the list of approved active substances. OJ L 153, 11.6.2011, p. 1–186.
6. Commission Implementing Regulation (EU) No 541/2011 of 1 June 2011 amending Implementing Regulation (EU) No 540/2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards the list of approved active substances. OJ L 153, 11.6.2011, p. 187–188.
(codex maximum residue limit; CXLs) and the additional information provided by Member States, EFSA prepared in October 2016 a draft reasoned opinion, which was submitted to Member States for commenting via a written procedure. All comments received by 21 November 2016 were considered by EFSA during the finalisation of the reasoned opinion.

The evaluation reports submitted by the RMS (Spain 2010a,b) and the evaluation reports submitted by the Member States Austria, Belgium, the Czech Republic, France, Greece, Italy, Portugal, Spain, the Netherlands (Netherlands, 2015; Austria, 2016; Belgium, 2016; Czech Republic, 2016a,b; France, 2016a; Greece, 2016; Italy, 2016; Portugal, 2016; Spain, 2016a,b) and the EU Reference Laboratories for Pesticide Residues (EURL, 2016) are considered as supporting documents to this reasoned opinion and, thus, are made publicly available.

In addition, key supporting documents to this reasoned opinion are the completeness check report (EFSA, 2016) and the Member States consultation report (EFSA, 2017a). These reports are developed to address all issues raised in the course of the review, from the initial completeness check to the reasoned opinion. Also, the chronic and acute exposure calculations for all crops reported in the framework of this review performed using the EFSA Pesticide Residues Intake Model (PRIMO) and the PROFile are key supporting documents and made publicly available.

Terms of Reference

According to Article 12 of Regulation (EC) No 396/2005, EFSA shall provide a reasoned opinion on:

- the inclusion of the active substance in Annex IV to the Regulation, when appropriate;
- the necessity of setting new MRLs for the active substance or deleting/modifying existing MRLs set out in Annex II or III of the Regulation;
- the inclusion of the recommended MRLs in Annex II or III to the Regulation;
- the setting of specific processing factors as referred to in Article 20(2) of the Regulation.

The active substance and its use pattern

Chlorpyrifos is the ISO common name for O,O-diethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate (IUPAC). Chlorpyrifos belongs to the group of organothiophosphate compounds which are used as acaricide, insecticide or nematicide. Chlorpyrifos acts against the pest through the inhibition of acetylcholinesterase (AChE inhibitor) and the subsequent accumulation of acetylcholine in the nerve endings. It is used in a wide range of crops against sucking and biting pests, including pests belonging to the Coleoptera, Diptera, Homoptera and Lepidoptera.

The chemical structure of the active substance and its main metabolites are reported in Appendix E. Chlorpyrifos was evaluated in the framework of Directive 91/414/EEC with Spain designated as the rapporteur Member State (RMS). The representative use supported for the peer review process was foliar application on grape vines.

Chlorpyrifos was evaluated under the first stage of the review programme of Directive 91/414/EEC when EFSA was not yet in charge of the risk assessment of active substances. The evaluation resulted in the inclusion of the substance in Annex I to Directive 91/414/EEC on 1 July 2006 by Commission Directive 2005/72/EC, and has been deemed to be approved under Regulation (EC) No 1107/2009, in accordance with Commission Implementing Regulation (EU) No 540/2011, as amended by Commission Implementing Regulation (EU) No 541/2011. The European Commission launched in June 2012 a toxicological review of chlorpyrifos under Article 21 of Regulation (EC) No 1107/2009 in the light of new toxicological studies. EFSA published its conclusion on the human health risk assessment of chlorpyrifos on 22 April 2014 (EFSA, 2014).

The EU MRLs for chlorpyrifos are established in Annexes II and IIIB of Regulation (EC) No 396/2005 and CXL(s) for chlorpyrifos were also established by the Codex Alimentarius Commission (CAC). Following a refined risk assessment regarding certain maximum residue levels (MRLs) of concern (EFSA, 2015), MRLs for mandarins, apples, pears, peaches, table grapes, blackberries, raspberries, currants, gooseberries, kiwi, pineapples, potatoes, tomatoes, peppers, aubergines, melons, watermelons, head cabbage, chinese cabbage, globe artichokes, leek and sugar beet were lowered by means of Commission Regulation (EU) No 2016/60, which entered in application on 10 August 2016. An application to modify the existing EU MRLs for chlorpyrifos was assessed by EFSA (2012). However, it was preferred to await the outcome of the MRL review before implementing these MRLs into the EU legislation.

An overview of the MRL changes that occurred since the entry into force of the Regulation mentioned above is provided in Table 1.
For the purpose of this MRL review, the critical uses of chlorpyrifos authorised within the EU, have been collected by the RMS and reported in the PROFile. The additional Good Agricultural Practices (GAPs) reported by Member States during the completeness check (i.e. from November 2015 to May 2016) were also considered. The details of the authorised GAPs for chlorpyrifos are given in Appendix A. The RMS did not report any use authorised in third countries that might have a significant impact on international trade.

Assessment

EFSA has based its assessment on the PROFile submitted by the RMS, the evaluation reports accompanying the PROFile (Spain, 2010a,b), the draft assessment report (DAR) prepared under Council Directive 91/414/EEC (Spain, 1999), the review report on chlorpyrifos (European Commission, 2005), the conclusion on the peer review of the pesticide human health risk assessment of the active substance chlorpyrifos (EFSA, 2014), the Joint Meeting on Pesticide residues (JMPR) Evaluation reports (FAO, 2004, 2006a,b), the previous reasoned opinion on chlorpyrifos (EFSA, 2012) as well as the evaluation reports submitted during the completeness check (Netherlands, 2015; Austria, 2016; Belgium, 2016; Czech Republic, 2016a,b; EURL, 2016; France, 2016a; Greece, 2016; Italy, 2016; Portugal, 2016; Spain 2016a,b). The assessment is performed in accordance with the legal provisions of the uniform principles for evaluation and authorisation of plant protection products as set out in Commission Regulation (EU) No 546/2011 and the currently applicable guidance documents relevant for the consumer risk assessment of pesticide residues (European Commission, 1996, 1997a–g, 2000, 2010a,b, 2016; OECD, 2011).

Furthermore, as chlorpyrifos shares a common metabolite with chlorpyrifos-methyl and triclopyr, the review of MRLs for these three active substances has been carried out in parallel and data reported in the framework of chlorpyrifos-methyl and triclopyr may also have been relied upon in the framework of this assessment. Where applicable, reference to the reasoned opinions for chlorpyrifos-methyl (EFSA 2017b) or triclopyr (EFSA, 2017c) is made.

More detailed information on the available data and on the conclusions derived by EFSA can be retrieved from the list of end points reported in Appendix B.

1. Residues in plants

1.1. Nature of residues and methods of analysis in plants

1.1.1. Nature of residues in primary crops

During the peer review, the metabolism of chlorpyrifos was adequately investigated for foliar treatment in oranges and head cabbage (Spain, 2003). Additional studies in peas with pods and radish were also evaluated by the RMS in the framework of a routine MRL assessment (Spain, 2010a,b).

In oranges and head cabbage, the parent compound, the metabolite 3,5,6-trichloropyridinol (referred to as 3,5,6-TCP) and polar metabolites represented the main part of the residues. The polar fraction, which represented the majority of the radioactivity in cabbage (75% of the total radioactive residues (TRR) at 42 days after treatment (DAT)), was characterised as 3,5,6-TCP conjugated mainly with glucose and malonic acid. In oranges, 99% of the TRR remained associated with the peel, mostly as the parent compound. Residues in pulp were < 0.01 mg eq/kg at any preharvest interval (PHI).

Table 1: Overview of the MRL changes since the entry into force of Regulation (EC) No 396/2005

| Procedure | Legal implementation | Remarks |
|-----------|----------------------|---------|
| MRL application (EFSA, 2012) | Not yet legally implemented | Various crops, products of animal origin |
| Specific request (EFSA, 2015) | Commission Regulation (EU) No 2016/60(1) | Refined risk assessment regarding certain maximum residue levels (MRLs) of concern (In compliance with Article 43 of Regulation (EC) No 396/2005) |

(a): Commission Regulation (EU) 2016/60 of 19 January 2016 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 in or on certain products. OJ L 14, 21.1.2016, p. 1–1.

For the purpose of this MRL review, the critical uses of chlorpyrifos authorised within the EU, have been collected by the RMS and reported in the PROFile. The additional Good Agricultural Practices (GAPs) reported by Member States during the completeness check (i.e. from November 2015 to May 2016) were also considered. The details of the authorised GAPs for chlorpyrifos are given in Appendix A. The RMS did not report any use authorised in third countries that might have a significant impact on international trade.

Assessment

EFSA has based its assessment on the PROFile submitted by the RMS, the evaluation reports accompanying the PROFile (Spain, 2010a,b), the draft assessment report (DAR) prepared under Council Directive 91/414/EEC (Spain, 1999), the review report on chlorpyrifos (European Commission, 2005), the conclusion on the peer review of the pesticide human health risk assessment of the active substance chlorpyrifos (EFSA, 2014), the Joint Meeting on Pesticide residues (JMPR) Evaluation reports (FAO, 2004, 2006a,b), the previous reasoned opinion on chlorpyrifos (EFSA, 2012) as well as the evaluation reports submitted during the completeness check (Netherlands, 2015; Austria, 2016; Belgium, 2016; Czech Republic, 2016a,b; EURL, 2016; France, 2016a; Greece, 2016; Italy, 2016; Portugal, 2016; Spain 2016a,b). The assessment is performed in accordance with the legal provisions of the uniform principles for evaluation and authorisation of plant protection products as set out in Commission Regulation (EU) No 546/2011 and the currently applicable guidance documents relevant for the consumer risk assessment of pesticide residues (European Commission, 1996, 1997a–g, 2000, 2010a,b, 2016; OECD, 2011).

Furthermore, as chlorpyrifos shares a common metabolite with chlorpyrifos-methyl and triclopyr, the review of MRLs for these three active substances has been carried out in parallel and data reported in the framework of chlorpyrifos-methyl and triclopyr may also have been relied upon in the framework of this assessment. Where applicable, reference to the reasoned opinions for chlorpyrifos-methyl (EFSA 2017b) or triclopyr (EFSA, 2017c) is made.

More detailed information on the available data and on the conclusions derived by EFSA can be retrieved from the list of end points reported in Appendix B.

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1.1. Nature of residues and methods of analysis in plants

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In oranges and head cabbage, the parent compound, the metabolite 3,5,6-trichloropyridinol (referred to as 3,5,6-TCP) and polar metabolites represented the main part of the residues. The polar fraction, which represented the majority of the radioactivity in cabbage (75% of the total radioactive residues (TRR) at 42 days after treatment (DAT)), was characterised as 3,5,6-TCP conjugated mainly with glucose and malonic acid. In oranges, 99% of the TRR remained associated with the peel, mostly as the parent compound. Residues in pulp were < 0.01 mg eq/kg at any preharvest interval (PHI).
Results were similar in radish and peas. The parent compound remains a good marker in radish roots (41–80% TRR; > 0.91 mg/kg) and peas with pods (4–33% TRR; up to 0.2 mg/kg) and the polar metabolites represent an important part of the residues at harvest (44.7% TRR at 35 DAT in radish roots; 42.5% TRR at 28 DAT in pods). No other metabolite was present at significant level in any of the four crop groups investigated.

The metabolic pattern after foliar application is similar in the four different crop groups which were investigated. It involves the hydrolysis of the thiophosphate group to form 3,5,6-TCP, which is then readily conjugated. It is also highlighted that the results of these studies performed with chlorpyrifos are consistent with the studies performed with foliar application of chlorpyrifos-methyl in tomatoes (EFSA 2017b). Therefore, it is concluded that these two substances share a similar metabolic pattern when applied as foliar spraying.

The metabolism of chlorpyrifos was not investigated for soil treatment and seed treatment while GAPs for these types of applications are authorised in the EU. Therefore, such studies are still required. In the absence of these studies, the metabolism of chlorpyrifos under this type of treatment can be tentatively assessed using the results of the confined rotational crop studies (see Section 1.1.2).

1.1.2. Nature of residues in rotational crops

Some of the crops authorised within the EU can be grown in rotation with other plants. The soil degradation studies demonstrated that the degradation rate of chlorpyrifos and its metabolite is moderate, with a maximum DT90f of 248 and 319 days, respectively (European Commission, 2005). Hence, assessment of the possible occurrence of residues in succeeding crops resulting from the use on primary crops is relevant.

Rotational field crop studies performed with chlorpyrifos were assessed in the DAR (Spain, 1999). In the main study, wheat, carrots and lettuce were planted 30 and 132 DAT in a soil previously treated with 14C-chlorpyrifos at a rate of 5.4 kg a.s./ha. Other studies were performed with the rate of 2.24 kg a.s./ha and 5.6 kg a.s./ha with wheat, lettuce, spinach, turnips, soybean and sugar beets but they were considered supportive only. The investigated crops were analysed at various times and at maturity for uptake of the 14C activity. Nevertheless, due to the limitations identified in these studies, all these results are considered on a tentative basis only.

According to the available data, very low amounts of chlorpyrifos (< 0.01 mg eq/kg) or 3,5,6-TCP were observed in carrots, lettuce and wheat (< 0.05 mg eq/kg). Another component was identified (3,5,6-trichloro-2-methoxypyridine), but also at trace levels. The main portion of the residues appeared to be the result of incorporation into natural plant components, such as starch, cellulose and lignin. Based on this information, it is expected that relevant residue levels of chlorpyrifos and its soil metabolites will not occur in rotational crops, but this should still be confirmed by a fully validated study.

1.1.3. Nature of residues in processed commodities

A study investigating the effect of processing on the nature of residues was provided to the RMS in the active substance renewal dossier. This study has been evaluated by the RMS and is therefore considered in the framework of the present review (Spain, 2016b). It covers the representative hydrolytic conditions for pasteurisation (20 min at 90°C, pH 4), boiling/brewing/baking (60 min at 100°C, pH 5) and sterilisation (20 min at 120°C, pH 6). This study clearly demonstrates that chlorpyrifos is readily degraded when subject to hydrolytic conditions. The level of degradation increases with temperature: 24% degradation under pasteurisation, 70% degradation under boiling/brewing/baking and 98% degradation under sterilisation. The main degradation product is desethyl chlorpyrifos (19.8–80.7% of the applied radioactivity (AR)). The metabolite 3,5,6-TCP is also observed in lower proportions: 5–10% of the AR. Therefore, the desethyl metabolite of chlorpyrifos needs to be considered in processed commodities.

1.1.4. Methods of analysis in plants

During the peer review, an analytical method using gas chromatography with mass spectrometric detection using negative chemical ionisation (GC-NCl-MS) was validated for enforcement of chlorpyrifos in high water and high acid content commodities with a LOQ of 0.01 mg/kg (Spain, 2002). An independent laboratory validation (ILV) was available and, as the method was validated for two
different mass transitions, a confirmatory method was not necessary. The multiresidue QuEChERS method in combination with gas chromatography with tandem mass spectrometry (GC-MS/MS), as reported by the EU-RLs (2016), is sufficiently validated for analysis of chlorpyrifos in high water content commodities, high acid content commodities and dry commodities with the LOQ of 0.01 mg/kg. With regard to the enforcement of chlorpyrifos in high oil content commodities, a method using high-performance liquid chromatography with tandem mass spectrometry (HPLC–MS/MS) was reported by the RMS (Spain, 2010a) and by France (2016a). This method is fully validated with a LOQ of 0.01 mg/kg but France highlighted that an ILV was still missing.

Hence, it is concluded that chlorpyrifos can be enforced in the four main commodity groups with a LOQ of 0.01 mg/kg. However, an ILV for high oil content commodities is still required.

Concerning metabolite 3,5,6-TCP, an analytical method using HPLC–MS/MS was reported by France and the EU-RLs. This method is validated for analysis of 3,5,6-TCP and its conjugates with a LOQ of 0.01 mg/kg in the four main commodity groups (France, 2016b). It is highlighted that this method used a radiolabelled internal standard. In the same report, an ILV is also available for dry and high water content commodities. However, in order to release the conjugates of 3,5,6-TCP, this method involves a hydrolysis step, which is also expected to convert chlorpyrifos (and desethyl chlorpyrifos) into 3,5,6-TCP. Therefore, this method is not specific enough to enforce 3,5,6-TCP and its conjugates separately. Furthermore, the efficiency of this hydrolysis step to release the conjugates has not been demonstrated.

Analytical methods for the analysis of desethyl chlorpyrifos are not available while this metabolite is expected to occur in processed commodities (several matrices).

1.1.5. Stability of residues in plants

In the framework of this review, the RMS has provided several studies covering the storage stability of chlorpyrifos and its metabolites (Spain, 2016b).

Storage stability of chlorpyrifos was demonstrated in high water content commodities, high acid content commodities and high oil content commodities for a period of 18 months as well as in dry commodities and cereal straw for a period of 24 months.

The storage stability of metabolite 3,5,6-TCP was also evaluated in the same matrices and identical results as for the parent compound were demonstrated. This study is also considered adequate to address storage stability of 3,5,6-TCP conjugates because a possible decline of such conjugates is only expected to release 3,5,6-TCP.

The storage stability of desethyl chlorpyrifos was not investigated.

1.1.6. Proposed residue definitions

Based on the above data, it can be concluded that chlorpyrifos is a good marker compound for residues in plant commodities but is not the only compound of relevance, in particular with regard to the risk assessment. Metabolite 3,5,6-TCP (free and conjugated) contributes significantly to the total residues in all investigated primary crops and desethyl chlorpyrifos was a significant component of the residues in processed commodities.

Furthermore, metabolite 3,5,6-TCP is also identified to be a major metabolite of chlorpyrifos-methyl and is therefore not specific to chlorpyrifos. Also, considering that toxicological reference values derived for chlorpyrifos (EFSA, 2014) and 3,5,6-TCP (EFSA, 2014) are different, the consumer risk assessment needs to be conducted separately for chlorpyrifos and metabolite 3,5,6-TCP (and its conjugates), noting that the assessment of 3,5,6-TCP and its conjugates should also take into consideration the use of chlorpyrifos-methyl. Therefore, two separate residue definitions for risk assessment should be established. For enforcement purposes, since 3,5,6-TCP is not specific to chlorpyrifos, the parent compound remains the most relevant marker compound but, if risk managers consider that enforcement of metabolite 3,5,6-TCP is also necessary, an optional separate list of MRLs may be derived when combining the assessments of chlorpyrifos, chlorpyrifos-methyl and triclopyr at a later stage.

For processed commodities, a different residue definition for enforcement and risk assessment should be proposed to consider the specific degradation observed when the substance is subject to hydrolytic conditions: desethylation of the parent compound to form desethyl chlorpyrifos. In the absence of toxicological data, this compound is considered as toxic as the parent compound. However, further information on the toxicity of desethyl chlorpyrifos is still required. Meanwhile, the residue in processed commodities is defined as the sum of chlorpyrifos and its desethyl metabolite, expressed as...
chlorpyrifos. This proposal does not impact on the residue definition for the sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP, which is also valid in processed commodities.

1.2. Magnitude of residues in plants

1.2.1. Magnitude of residues in primary crops

To assess the magnitude of chlorpyrifos residues resulting from the reported GAPs, EFSA considered all residue trials reported by the RMS in its evaluation reports (Spain, 2016a,b), including residue trials evaluated in the framework of the peer review (Spain, 1999, 2003) or in the framework of a previous MRL application (EFSA, 2012), and additional data submitted during the completeness check (The Netherlands, 2015; Austria, 2016; Belgium, 2016; Czech Republic, 2016a,b; France, 2016a; Greece, 2016; Italy, 2016; Portugal, 2016). All residue trial samples considered in this framework were stored in compliance with the storage conditions for which stability of residues was demonstrated. Decline of residues during storage of the trial samples is therefore not expected.

Since chlorpyrifos and its metabolite 3,5,6-TCP should be assessed separately, the residue levels related to their corresponding residue definitions were reported in two separate tables (see Appendix B.1.2). In all trials considered in this review, analyses were carried out for the parent compound and for the total residue hydrolysed to 3,5,6-TCP. As the parent compound can be hydrolysed to 3,5,6-TCP, the absolute levels of 3,5,6-TCP and its conjugates were calculated by subtracting the contribution of the parent compound to the total residue.8

It is highlighted that chlorpyrifos can be used under different types of formulations, one of them being Pyrinex 25 CS. As chlorpyrifos residues are expected to behave differently when applied with Pyrinex 25 CS formulation, the GAPs with Pyrinex 25 CS formulation and the GAPs with the other formulations were assessed independently. Nevertheless, as the same residue definitions apply for all formulations, the residue data from the supervised residue trials are all reported in the same table, including the information on the formulation (see specific column).

The number of residue trials and extrapolations were evaluated in accordance with the European guidelines on comparability, extrapolation, group tolerances and data requirements for setting MRLs (European Commission, 2016).

It is highlighted that there are several crops for which the most critical GAP authorised in the EU is not supported by data. Although these GAPs were adequately reported during the completeness check (EFSA, 2016), these GAPs cannot be taken into account to derive MRLs and risk assessment values because they are not supported by residue data. When available, fall-back GAPs supported by trials were identified and used to derive MRL and risk assessment values. However, residue trials supporting the most critical GAPs reported during this review should still be provided by Member States where these GAPs are authorised. An overview of the crops and Member States under concern is reported hereafter. The details on the GAP under concern are reported in the comment field of Appendix A.1:

- Northern GAPs on other formulations: radishes (AT), onions (AT) and sugar beet (CZ);
- Southern GAPs on other formulations: wine grapes (ES), carrots (IT and EL), radishes (EL), onions (IT and EL), tomatoes (IT and EL), peppers (IT and EL), aubergines (EL), broccoli (IT), cauliflower (IT), Brussels sprouts (IT), beans and peas with and without pods (IT), dry beans (IT), dry peas (IT), rapeseed (PT), sunflower (IT), soya beans (IT), cotton seed (EL), maize (IT).

The GAPs that were considered to derive MRL and risk assessment values are reported in the GAP table in Appendix A.1. For these GAPs, the following assessment was performed.

Residue trials are not available to support the authorisation on beetroot. Therefore, MRL or risk assessment values for this crop could not be derived by EFSA and the following data gap was identified:

- Beetroots: Eight trials on beetroots compliant with the northern outdoor GAP (other formulations) are required.

There are several authorised GAPs where chlorpyrifos is not directly applied on the consumable parts of the crops. These GAPs can be soil treatment, seed treatment or foliar application at an early

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8 The following calculation was performed: [3,5,6-TCP and its conjugates] = [total residues hydrolysed as 3,5,6-TCP] – [parent compound], taking into account the molecular mass of chlorpyrifos (350.89 g/mol) and 3,5,6-TCP (198.43 g/mol).
stage. In general, residue trials are not available to support these GAPs but considering that chlorpyrifos is not a systemic active substance, the uptake of chlorpyrifos following this kind of treatments is very unlikely and a no-residue situation for this compound can be expected. This waiver applies for the main residue definition (i.e. chlorpyrifos) but still needs to be confirmed by trials in some cases. Therefore, (tentative) MRL and risk assessment values for chlorpyrifos can be derived from these GAPs. Regarding the optional residue definition (sum of 3,5,6-TCP and its conjugates expressed as 3,5,6-TCP), different considerations were done depending on the crops and on the kind of treatment.

**Soil treatments:**

- Granular soil treatment is authorised on a large number of crops in both northern and southern EU, exclusively with formulations other than Pyrinex 25 CS. The uptake of chlorpyrifos following this kind of treatment is very unlikely but a distinction is made between orchard trees and the other crops:
  - In orchard trees, the waiver is fully acceptable (for both chlorpyrifos and its metabolite 3,5,6-TCP) without asking confirmatory data. Therefore, residue trials are not necessary for the granular soil treatment GAPs authorised in almonds, chestnuts, hazelnuts and walnuts, medlar, apricots, cherries (SEU), wine grapes (SEU – other formulations/fall-back GAP) and olives for oil production.
  - In all crops other than orchards where a granular soil treatment is authorised, the waiver is tentatively applicable for chlorpyrifos only and it should be confirmed by residue trials. Furthermore, as the possible uptake of 3,5,6-TCP and/or its conjugates is not excluded in this case, MRLs and risk assessment values cannot be derived for the sum of 3,5,6-TCP and its conjugates expressed as 3,5,6-TCP. This reasoning was applied for the following crops: carrots (SEU), radishes (NEU/SEU), garlic (SEU), onions (NEU/SEU), shallots (SEU), tomatoes, peppers and aubergines (SEU), broccoli, cauliflower, Brussels sprouts and head cabbage (SEU), lettuce, lamb’s lettuce, scarole and rocket, fresh legumes (SEU), globe artichoke, dry beans and dry peas (SEU), soya bean (SEU), buckwheat grain and millet grain (SEU), oats and rye (SEU).

- Soil application before planting or sowing is authorised in northern EU on garlic, shallots, spring onions and asparagus, exclusively with formulations other than Pyrinex 25 CS. The waiver is tentatively applicable for chlorpyrifos only and it should be confirmed by residue trials. Furthermore, as the possible uptake of 3,5,6-TCP and/or its conjugates is not excluded in this case, MRLs and risk assessment values cannot be derived for the sum of 3,5,6-TCP and its conjugates expressed as 3,5,6-TCP.

**Seed treatments:**

- Seed treatments are authorised in northern EU on broccoli, cauliflower, Brussels sprouts, head cabbage, kale and kohlrabi, spinach, beans (fresh with pods), dry beans and dry lupins, only with Pyrinex 25 CS formulation. Residues uptake is not expected in these crops.
  - In broccoli, cauliflower, Brussels sprouts, head cabbage, kale and kohlrabi, spinach, this assumption is confirmed for both chlorpyrifos and its metabolite 3,5,6-TCP by a sufficient number of residue trials showing residue levels below the LOQ; therefore, MRL and risk assessment values can be derived for both compounds.
  - In beans (fresh with pods), dry beans and dry lupins, the waiver is tentatively applicable to both residue definitions and it should still be confirmed by residue trials.

**Application at an early stage:**

- Application on fruit crops before flowering (i.e. BBCH 59 at the latest) is authorised on apples and pears (Pyrinex 25 CS and other formulations), peaches (Pyrinex 25 CS), plums (other formulations) and peppers (Pyrinex 25 CS) in southern EU. Based on the available trials in fruit and fruiting vegetables performed at later growth stages, it is unlikely that measurable levels of chlorpyrifos and metabolite 3,5,6-TCP will occur if the substance is applied before flowering. However, this conclusion is tentative and should still be confirmed by residue trials (for both residue definitions).
Application during the watering of the plant is authorised in northern EU on broccoli, cauliflower, Brussels sprouts, head cabbage, kale and kohlrabi, only with formulations other than Pyrinex 25 CS. The uptake of chlorpyrifos is not expected in these crops but it should still be confirmed by residue trials. Furthermore, as the possible uptake of 3,5,6-TCP and/or its conjugates is not excluded in this case, MRLs and risk assessment values cannot be derived for the sum of 3,5,6-TCP and its conjugates expressed as 3,5,6-TCP.

With regard to the GAPs with foliar treatment, there are a few GAPs authorised for one application only for which supporting residue trials were all performed with two applications. In general, this deviation is not considered acceptable because this may result in an overestimation of the MRL and risk assessment values (see the southern GAPs on apples, pears and peaches – Pyrinex 25 CS). Nevertheless, this deviation was considered acceptable in the following cases where the impact of the first application on the final residues is considered negligible:

- If the time between the two applications performed in the residue trials was longer than the PHI. It was the case for the southern GAPs on quinces and strawberries (other formulations);
- If the two applications were performed at very early stage (in accordance with GAP). It was the case for the northern GAPs on barley, oats, wheat and rye (other formulations).

For the following crops, MRL and risk assessment values can adequately be derived (for both residue definitions) from one of the GAPs reported in this review. For each of these crops, however, there is at least one other authorised GAP which is not (sufficiently) supported by data. The following considerations were done by EFSA:

- Grapefruits, oranges, lemons and mandarins: Appropriate MRL and risk assessment values can be derived from the southern GAP (other formulations). However, 16 trials on citrus fruits (eight on oranges/grapefruits and eight on mandarins/lemons/limes) compliant with the southern GAP (Pyrinex 25 CS) are still required.
- Apples and pears: Appropriate MRL and risk assessment values can be derived from the southern GAP (other formulations). However, eight trials on apples/pears (with a minimum of four trials on apples) compliant with the southern GAP (Pyrinex 25 CS) are still required. Furthermore, additional residue trials are also required to support the fall-back GAPs with early stage applications (see above).
- Plums: Appropriate MRL and risk assessment values can be derived from the northern GAP (other formulations). However, eight trials compliant with the southern GAP (Pyrinex 25 CS) are still required. Furthermore, additional residue trials are also required to support the GAP with early stage applications (see above).
- Wine grapes: appropriate MRL and risk assessment values can be derived from the southern GAP (Pyrinex 25 CS). However, the GAPs authorised with other formulations (NEU/SEU) are not supported by a sufficient number of GAP-compliant trials. Hence, eight trials compliant with the northern GAP (other formulations) and one trial compliant with the southern GAP (other formulations) are still required.
- Bananas: Appropriate MRL and risk assessment values can be derived from the indoor GAP (other formulations). However, four trials compliant with the southern outdoor foliar GAP (other formulations) are still required.
- Potatoes: Appropriate MRL and risk assessment values can be derived from the GAPs authorised with other formulations (NEU/SEU). However, eight trials compliant with the southern GAP (Pyrinex 25 CS) are still required.
- Broccoli, cauliflower, Brussels sprouts, head cabbage, kale and kohlrabi: Appropriate MRL and risk assessment values can be derived from the northern GAP (Pyrinex 25 CS). However, additional residue trials are still required to support the GAPs authorised with the other formulations in northern EU (early stage application) and southern EU (granular soil application) (see above).
- Sunflower seed: Appropriate MRL and risk assessment values can be derived from the southern GAP authorised with other formulations. However, eight trials compliant with the southern GAP (Pyrinex 25 CS) are still required.
- Cotton seed: Appropriate MRL and risk assessment values can be derived from the southern GAP with other formulations. However, eight trials compliant with the southern GAP with Pyrinex 25 CS are still required.
• Barley and oat (grain and straw): Appropriate MRL and risk assessment values can be derived from the northern GAP. However, four additional trials compliant with the southern GAP on barley (foliar treatment) and additional data to support the granular soil treatment on oat (see above) are still required.

• Wheat and rye (grain and straw): Appropriate MRL and risk assessment values can be derived from the northern GAP. However, four additional trials compliant with the southern GAP on wheat (foliar treatment) and additional data to support the granular soil treatment on rye (see above) are still required.

• Sugar beet (roots and tops): Appropriate MRL and risk assessment values can be derived from the GAPs authorised with other formulations (NEU/SEU). However, eight trials compliant with the southern GAP (Pyrinex 25 CS) are still required.

For the remaining crops, tentative MRL and risk assessment values (at least for the parent compound) were derived from the most critical GAPs for which residue trials were available. However, as the number of residue trials was not compliant with the data requirement, the following data gaps are identified:

• Peaches: Tentative MRL and risk assessment values (for both residue definitions) can be derived from the southern GAP (Pyrinex 25 CS) using overdosed residue trials. Therefore, eight trials compliant with this GAP are required. Furthermore, additional residue trials are also required to support the fall-back GAPs with early stage applications (see above).

• Strawberries: Tentative MRL and risk assessment values (for both residue definitions) can be derived from the northern GAP (other formulations) using overdosed residue trials. Therefore, eight trials compliant with this GAP are required. The southern GAP (other formulations) is fully supported by data but leads to lower MRL and risk assessment values.

• Carrots: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the southern GAP (granular soil treatment with other formulations) for which additional trials are required (see above). In addition, eight trials compliant with the southern GAP (Pyrinex 25 CS) are also required.

• Radishes and onions: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the GAPs authorised with other formulations (NEU/SEU – granular soil treatment) for which additional trials are required (see above). In addition, four trials compliant with the southern GAP (Pyrinex 25 CS) are also required.

• Garlic and shallots: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the northern GAP (application before planting/sowing) or from the southern GAPs (granular soil treatment). However, additional trials are still required to support these GAPs (see above).

• Spring onions: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the only reported GAP (NEU – application before planting/sowing). However, additional trials are still required to support this GAP (see above).

• Tomatoes: Tentative MRL and risk assessment values can be derived (for both residue definitions) from the southern GAP (Pyrinex 25 CS). However, two additional trials compliant with this GAP are required. Furthermore, additional residue trials are also required to support the southern GAP (other formulation) with granular soil application (see above).

• Peppers: Tentative MRL and risk assessment values can be derived (for both residue definitions) from the southern GAP (Pyrinex 25 CS). However, two additional trials compliant with this GAP are required. Furthermore, additional residue trials are also required to support the fall-back GAPs identified in southern EU: early stage application (Pyrinex 25 CS) and granular soil application (other formulation) (see above).

• Aubergines: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the southern GAP authorised with other formulations (granular soil treatment) for which additional trials are required (see above). Furthermore, four trials compliant with the northern GAP (other formulations) and four trials compliant with the southern GAP (Pyrinex 25 CS) are also required.

• Lettuce, lamb’s lettuce, scarole and rocket: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the only GAP reported in this review (SEU – granular soil application) for which additional trials are still required (see above).

• Beans (fresh, with pods): Tentative MRL and risk assessment values can be derived (for both residue definitions) from the northern GAP with Pyrinex 25 CS (seed treatment) but additional
trials are still required to support this GAP (see above). Furthermore, eight trials performed on beans (fresh with pods) and eight trials on peas (fresh with pods) are also required to support the southern GAP with Pyrinex 25 CS (foliar application).

- Beans (fresh, without pods) and peas (fresh, with and without pods): Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the southern GAP with other formulations (granular soil treatment) but additional trials are still required to support this GAP (see above). Furthermore, eight trials performed on beans (fresh with pods) and eight trials on peas (fresh with pods) are also required to support the southern GAP with Pyrinex 25 CS (same as for fresh beans with pods).

- Asparagus: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the northern GAP with other formulations (application before planting/sowing) for which additional trials are still required (see above). Furthermore, four trials compliant with the southern GAP with Pyrinex 25 CS as well as four trials compliant with the southern GAP with other formulations are also required.

- Globe artichoke: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the only GAP reported in this review (SEU – granular soil application) for which additional trials are still required (see above).

- Dry beans and dry lupins: Tentative MRL and risk assessment values (for both residue definitions) can be derived from the northern GAP (Pyrinex 25 CS – seed treatment) but additional trials are required to support this GAP (see above). Furthermore, eight trials performed on dry beans and/or dry peas are also required to support the southern GAP on dry beans with Pyrinex 25 CS (foliar application).

- Dry beans and dry peas: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the southern GAP with other formulations (granular soil treatment) but additional trials are required to support this GAP (see above). Furthermore, eight trials performed on dry beans and/or dry peas are also required to support the southern GAP with Pyrinex 25 CS (same as for dry beans).

- Rapeseed, mustard seed and gold of pleasure:
  - Chlorpyrifos: Tentative MRL and risk assessment values can be derived from the southern GAP (other formulations). However, four additional trials performed on rapeseed and compliant with this GAP are still required. The northern GAP (other formulations) is fully supported by data but leads to lower residue levels.
  - Sum of 3,5,6-TCP and its conjugates expressed as 3,5,6-TCP: MRL and risk assessment values can be derived from the northern GAP (other formulations). The southern GAP (other formulations) leads to lower residue levels.
  - In any case, four additional trials performed on rapeseed and compliant with the southern GAP with Pyrinex 25 CS as well as four additional trials performed on rapeseed and compliant with the northern GAP with Pyrinex 25 CS are required.

- Soya bean: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the southern GAP with other formulations (granular soil treatment) for which additional trials are still required (see above). Furthermore, eight trials compliant with the southern GAP with Pyrinex 25 CS (foliar application) are also required.

- Maize forage: Tentative MRL and risk assessment values can be derived (for both residue definitions) from the overdosed residue trials (northern and southern GAPs with other formulations). However, four northern trials and four southern trials compliant with these GAPs are still required.

- Buckwheat and millet grain: Tentative MRL and risk assessment values can be derived (only for chlorpyrifos) from the only GAP reported in this review (SEU – granular soil application) for which additional trials are required (see above).

It is also noted that for a few crops, some minor deficiencies were identified but EFSA was able to derive appropriate MRL and risk assessment values:

- Cherries: One additional trial supporting the northern GAP with other formulations is desirable.
- Cucurbits with inedible peel, spinach, poppy seed, cotton seed and maize grain: For all these crops, MRL and risk assessment values are derived on the basis of a limited number of (overdosed) residue trials. However, this is considered acceptable in these cases because residue levels (at least for the parent compound) were below the LOQ in all trials.
1.2.2. Magnitude of residues in rotational crops

Significant residues are not expected in rotational crops. However, this is only a tentative conclusion based on old studies and additional metabolism studies are still needed (see Section 1.1.2).

1.2.3. Magnitude of residues in processed commodities

All studies investigating the magnitude of chlorpyrifos residues in processed commodities were assessed by the RMS in the framework of a former MRL application (Spain, 2010a,b). An overview of all available processing studies is available in Appendix B.1.2.4. Since chlorpyrifos and its metabolite 3,5,6-TCP should be assessed separately, the processing factors related to the respective residue definitions were reported in two independent tables.

It is highlighted that the available processing studies do not contain analysis of the desethyl metabolite, which is relevant in many of the processed commodities that involve one of the standard hydrolysis. Therefore, robust processing factors are only derived for peeled citrus and peeled bananas where the same residue definitions as for raw commodities apply. The situation is identical for wheat bran, white flour and whole-meal flour but, due to the limited number of data, only tentative processing factors were derived for these items.

For citrus (juice), plums (canned), wine grapes (juice, dry pomace, must, red wine heated and unheated, white wine), barley (beer, brewing malt and pot/pearl) and wheat (white bread and whole-meal bread), the analysis for the desethyl metabolite was not available. Therefore, only tentative processing factors were derived.

For the main residue definition (chlorpyrifos in raw commodities and sum of chlorpyrifos and its desethyl metabolite in processed commodities), EFSA proposed to derive tentative processing factors considering the available results for total 3,5,6-TCP residue levels in processed commodities, instead of considering the sum of chlorpyrifos and its desethyl metabolite. This approach is expected to overestimate the calculated processing factors because the total 3,5,6-TCP residues include chlorpyrifos, desethyl chlorpyrifos and 3,5,6-TCP instead of considering only chlorpyrifos and its desethyl metabolite. However, most of these processing factors are supported by a very limited set of studies, especially citrus (juice), plums (canned) and wine grapes (juice, red wine heated and white wine), which are supported by one study only.

For the second residue definition (sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP), processing factors were also derived. However, as the levels of desethyl metabolite was not available, it was only possible to subtract the contribution of the parent compound to the total residue hydrolysed as 3,5,6-TCP. Therefore, the absolute levels for 3,5,6-TCP and its conjugates may also be overestimated in processed commodities.

Considering the outcome of the risk assessment, additional processing studies analysing for the desethyl chlorpyrifos metabolite may be useful to refine the risk assessment, especially for wine grapes for which only a tentative processing factor could be derived. In addition, if further robust processing factors were to be required by risk managers, in particular for enforcement purposes, additional processing studies would be needed for the other processed commodities where a tentative processing factor is derived.

1.2.4. Proposed MRLs

MRL proposals and risk assessment values were derived for the main residue definition including chlorpyrifos. For all commodities except beetroots, there was at least one GAP for which residue trials were available to derive MRLs and risk assessment values. However, major data gaps were identified in a large number of crops, mainly because the number of residue trials was not compliant with the data requirement or because of a lack of information regarding the metabolism of chlorpyrifos after soil or seed treatments. In addition, for high oil content commodities, the MRL proposals are tentative due to the lack of validation data for the analytical method for enforcement.

In line with the conclusion on the residue definition (see Section 1.1.6), an optional list of MRLs can also be set for the sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP. However, it is highlighted that uncertainties were identified with regard to the efficiency of the analytical method for enforcement. Tentative MRLs and risk assessment values were derived for several commodities. However, for beetroot, carrots, radishes, garlic, onions, shallots, spring onions, aubergines, lamb’s lettuce, lettuce, scarole, rocket, beans (without pods), peas (with and without pods), asparagus, globe artichoke, dry peas, soya bean, buckwheat grain and millet grain, where a waiver was (tentatively)
considered for chlorpyrifos, it was not possible to conclude for the metabolite 3,5,6-TCP. Therefore, MRL and risk assessment values were not derived for these commodities. It is noted that the plant MRLs derived in this section only take into account the use of chlorpyrifos. These MRLs are reported in Appendix B.4. However, the final list of optional MRLs proposed for 3,5,6-TCP should also accommodate the use of chlorpyrifos-methyl (other source of 3,5,6-TCP in plant commodities) and are reported in the section conclusion and recommendations.

Tentative MRLs were also derived for cereal straw, maize forage, fodder beet (roots and tops) and sugar beet tops, in view of the future need to set MRLs in feed items.

2. Residues in livestock

Chlorpyrifos is authorised for use on several crops that might be fed to livestock. Livestock dietary burdens were therefore calculated, both for chlorpyrifos and 3,5,6-TCP, in the different groups of livestock using the agreed European methodology (European Commission, 1996). The input values for all relevant commodities have been selected according to the recommendations of JMPR (FAO, 2009) and are summarised in Appendix C. The dietary burdens calculated for all groups of livestock were found to exceed the trigger value of 0.1 mg/kg dry matter (DM). Behaviour of residues was therefore assessed in all commodities of animal origin.

2.1. Nature of residues and methods of analysis in livestock

The metabolism of chlorpyrifos in livestock (lactating goats and laying hens) was assessed in the DAR and its addendum prepared under Directive 91/414/EEC (Spain, 1999, 2003).

The overall pattern of absorption and elimination was similar among the species investigated and laboratory animals. Chlorpyrifos was rapidly absorbed and excretion occurred mainly via the urine. In goats, 79–89% of the total administered dose was recovered in the excreta as 3,5,6-TCP and about 2% was found in milk and tissues combined. Chlorpyrifos and 3,5,6-TCP represented approximately 70% and 14% of the radioactivity in milk, 76% and 21% in fat, 2% and 84% in liver, and < 1% and 92% in kidney, respectively. Residues in the milk reached a maximum on day 8 (0.047 mg eq/kg) and decreased slightly thereafter. In hens, 88–95% of the total administered dose was recovered in the excreta and consisted primarily of 3,5,6-TCP. Chlorpyrifos and 3,5,6-TCP were also the main compounds retrieved in eggs and hen tissues. They represented approximately 88% and < 1% of the recovered activity in fat, 70% and 14% in skin, 2% and 71% in kidney, and 32% and 49% in egg yolk, respectively. In liver, the parent compound represented < 1% and 3,5,6-TCP 62%; however, two unidentifiable metabolites, which could anyway be converted to 3,5,6-TCP upon basic hydrolysis, represented 10% and 7% of the TRR. Residues in muscle and egg white were too low for characterisation.

EFSA concludes that the metabolism of chlorpyrifos in livestock is adequately elucidated, and chlorpyrifos and 3,5,6-TCP (including its conjugates) are the most relevant components of the residues in livestock commodities.

During the peer review, an analytical method using GC-NCI/MS was reported and evaluated. There are indications that this method allows to enforce chlorpyrifos in all animal tissues, milk and eggs with a LOQ of 0.01 mg/kg (Spain, 2002). However, during the MS consultation, France and Germany pointed out that this method was not fully validated with regard to the current guidance document (specificity not demonstrated, insufficient recovery data for liver and insufficient number of fortified samples for milk). Nevertheless, the multiresidue QuEChERS method in combination with GC-MS/MS, as reported by the EURLs, is sufficiently validated for analysis of chlorpyrifos in liver and eggs (EURL, 2016). Hence, it is concluded that chlorpyrifos can be enforced in liver, kidney and eggs with a LOQ of 0.01 mg/kg; a fully validated analytical method is still required for muscle, fat and milk.

During the completeness check, an analytical method using HPLC-MS/MS was reported by France (2016b). This method is fully validated for the determination of 3,5,6-TCP in all animal tissues, milk and eggs, with a LOQ of 0.01 mg/kg. It is highlighted that this method used a radiolabelled internal standard. However, in order to release the conjugates of 3,5,6-TCP, this method involves a hydrolysis step, which is also expected to convert chlorpyrifos into 3,5,6-TCP. Therefore, this method is not specific enough to enforce 3,5,6-TCP and its conjugates separately. Furthermore, the efficiency of this hydrolysis step to release the conjugates has not been demonstrated.

The storage stability of chlorpyrifos was demonstrated for a period of 24 months at −19°C in muscle, fat, liver, kidney, milk and eggs (Spain, 2010a,b). The storage stability of the metabolite 3,5,6-TCP was also investigated in a separate report (Spain, 2010c). This metabolite was shown to be stable.
in beef muscle, fat, liver and kidney for a period of 15 months and in milk and cream for 12 months, when stored deep frozen at \(-20^\circ\text{C}\). This study is also considered adequate to address storage stability of 3,5,6-TCP conjugates because a possible decline of such conjugates would only be expected to release 3,5,6-TCP.

Hence, both chlorpyrifos and 3,5,6-TCP should be considered for risk assessment purposes. However, considering that metabolite 3,5,6-TCP may also be generated from the use of two other active substances, chlorpyrifos-methyl and triclopyr, and different toxicological reference values were derived for chlorpyrifos (EFSA, 2014) and 3,5,6-TCP (EFSA, 2014), two separate risk assessments should be carried out, noting that the assessment of 3,5,6-TCP and it conjugates should also take into consideration the use of chlorpyrifos-methyl and triclopyr.

For monitoring purposes, since 3,5,6-TCP is not specific to chlorpyrifos, the parent compound remains the most relevant marker compound but, if risk managers consider that enforcement of the metabolite 3,5,6-TCP is also necessary, an optional separate list of MRLs may be derived when combining the assessments of chlorpyrifos, chlorpyrifos-methyl and triclopyr at a later stage. The parent residue is fat soluble (\(\text{log } p_{\text{ow}} = 4.7\)) while 3,5,6-TCP and its conjugates are not.

2.2. Magnitude of residues in livestock

In the framework of the peer review, several feeding studies were performed with dairy cows, beef cattle, laying hens and swine (Spain, 1999). In these studies, chlorpyrifos was administered using different dosing levels ranging from 0.3 to 100 mg/kg feed. These levels were then converted into mg/kg body weight (bw) per day, using the standard weight and feed daily consumption for these animal categories.

The study performed on dairy cow was used to derive MRL and risk assessment values in milk. The studies performed on dairy cow and beef cattle could both be used to derive MRLs and risk assessment values in tissues of ruminants. However, as the study performed on beef cattle results in higher residue levels (in fat), this study was preferred in order to ensure a more conservative calculation. Since extrapolation from ruminants to pigs is acceptable, results of the livestock feeding study on ruminants were relied upon to derive the MRL and risk assessment values in pigs. It is noted that the specific feeding study performed with swine was also considered and would result in the same MRL proposals (i.e. < LOQ).

In all studies, the samples of tissues or milk were separately analysed for chlorpyrifos and its metabolite 3,5,6-TCP. The storage period of the samples was not reported but, considering that the storage conditions for which stability of residues was demonstrated are quite conservative (2 years for the parent and > 1 year for 3,5,6-TCP), decline of residues during storage of the trial samples is not expected.

Based on these studies, MRL and risk assessment values were derived (for both proposed residue definitions) for dairy ruminants, meat ruminants and pigs, in compliance with the latest recommendations on this matter (FAO, 2009). It is noted that significant levels or chlorpyrifos are only expected in ruminant fat, while all other MRLs are proposed at the LOQ. For the metabolite 3,5,6-TCP, MRLs above LOQ are proposed in all ruminant tissues, pig liver and pig kidney.

For poultry, the metabolism study (performed at 172 N rate) is sufficient to conclude that residue levels remain below the enforcement LOQ of 0.01 mg/kg in muscle, fat, liver and eggs. This conclusion is valid for both proposed residue definitions. The results of the available feeding studies performed with laying hens would just confirm this conclusion. Hence, MRLs and risk assessment values for the relevant commodities in poultry can be established at the LOQ level.

3. Consumer risk assessment

As different toxicological reference values were derived for chlorpyrifos and for its metabolite 3,5,6-TCP, EFSA performed separate consumer risk assessments for chlorpyrifos (resulting from the use of chlorpyrifos only) and for 3,5,6-TCP and its conjugates (resulting from the use of chlorpyrifos, chlorpyrifos-methyl and triclopyr).

Furthermore, only the uses of chlorpyrifos reported in Appendix A were considered in the framework of this review while the use of chlorpyrifos was previously also assessed by the JMPR (FAO, 2004, 2006b). The CXLs, resulting from these assessments by JMPR and adopted by the CAC, are now international recommendations that need to be considered by European risk managers when establishing MRLs. To facilitate consideration of these CXLs by risk managers, the consumer exposure was assessed both with and without consideration of the existing CXLs.
3.1. Consumer risk assessment for chlorpyrifos

3.1.1. Consumer risk assessment without consideration of the existing CXLs

Chronic and acute exposure calculations for all crops reported in the framework of this review were performed using revision 2 of the EFSA PRIMo (EFSA, 2007). Input values for the exposure calculations were derived in compliance with the decision tree reported in Appendix D. Hence, for those commodities where a (tentative) MRL could be derived by EFSA in the framework of this review, input values were derived according to the internationally agreed methodologies (FAO, 2009). For all commodities of plant origin, input values refer to the raw agricultural commodities, except for citrus fruits, bananas and wine grapes. For citrus fruits and bananas, the peeling factors derived in this review are taken into account. For wine grapes, a limited refined approach could be proposed by correcting the consumption data in the acute exposure. Indeed, it is noted that the consumption of wine grapes by children refers to grape juice while the consumption of wine grapes by adults exclusively refers to wine. In the consumption database, the consumption is expressed as raw wine grapes equivalent but 1 kg of wine grapes does not exactly produce 1 kg of wine or juice. To take this into account, the consumption data can be corrected by using a yield factor (0.7 for wine and 0.75 for juice). These considerations allowed EFSA to propose refined input values for wine grapes for British infants and adults which are the worst conservative acute diets for wine grapes. It is acknowledged that the processing factors derived in Section 1.2.3 for heated red wine and for grape juice could have been used to further refine the input values. However, the available data on the nature and magnitude of residues in processed commodities, which were evaluated in the present review, indicate that these processing factors are subject to uncertainty. The hydrolysis studies indicate that the parent compound is degraded to desethyl chlorpyrifos in processed commodities and the toxicity of this compound still needs to be addressed (see Section 1.1.3). In addition, the processing factors derived for wine and grape juice are supported by only one study, which is very limited. Therefore, EFSA did not use these processing factors in the refined calculation. However, further refined calculations could be performed after the submission of the required data. For beetroots where data were insufficient to derive a MRL, EFSA considered the existing EU MRL for an indicative calculation. All input values included in the exposure calculations are summarised in Appendix C.

The exposures calculated were compared with the toxicological reference values for chlorpyrifos, derived by EFSA (2014). A chronic intake concern was identified as the highest chronic exposure represented 199% of the acceptable daily intake (ADI) (FR all population). Moreover, with regard to the acute exposure, an exceedance of the acute reference dose (ARfD) was identified for apples, pears, peaches, wine grapes (adults and children), peppers and quinces, representing 783.7%, 728.6%, 605.2%, 464.9%, 163.2%, 126.0 and 117.3% of the ARfD, respectively. A second exposure calculation was therefore performed, considering fall-back GAPs for these crops. For quinces and peaches, less critical foliar treatments in the southern zone were identified as fall-back GAPs (see Appendix A.3). For apples, pears and wine grapes, all the other foliar treatments (close to harvest) reported in this review would also lead to exceedances of the ARfD. Therefore, the fall-back GAPs identified for apples, pears, wine grapes and peppers are granular soil treatment and/or foliar application at an early stage (see Appendix A.3); these GAPs are not expected to release significant residues in the commodities under consideration. It is highlighted that consideration of these less critical GAPs does not impact on the residue levels in livestock commodities. According to the results of this second calculation, the highest chronic exposure was then calculated for the Dutch children and declined to 79.8% of the ADI; the highest acute exposure is then calculated for plums, representing 98.7% of the ARfD.

Based on these calculations, a potential risk to consumers was identified for the most critical GAPs of chlorpyrifos on apples, pears, peaches, wine grapes, peppers and quinces (i.e. foliar treatment close to harvest). However, fall-back GAPs were identified for these crops, for which a second risk assessment did not indicate risk to consumers. For the remaining commodities, although some major uncertainties remain due to the data gaps identified in the previous sections, the indicative exposure calculation did not indicate a risk to consumers.

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9 It is noted that the critical GAPs assessed under scenario EU1 were reported to EFSA before the application of Commission Regulation (EU) No 2016/60, which lowered the MRLs of apples, pears, peaches and peppers to the LOQ.
3.1.2. Consumer risk assessment with consideration of the existing CXLs

To include the CXLs in the calculations of the consumer exposure, CXLs were compared with the EU MRL proposals in compliance with Appendix D and all data relevant to the consumer exposure assessment have been collected from JMPR evaluations. For citrus fruits and bananas, the peeling factors derived in this review are taken into account. For wine grapes, the same approach as explained in Section 3.1.1 was applied to the risk assessment values derived from CXLs. It is noted that the data gaps identified for high oil content commodities (ILV missing for the analytical method for enforcement) and for muscle, fat and milk (validated analytical method for enforcement missing) also apply to the CXLs existing on similar matrices. Furthermore, as a validated analytical method for enforcement in specific matrices, such as tea and spices, is missing, the existing CXLs for these commodities are also considered tentative. An overview of the input values used for this exposure calculation is also provided in Appendix C.

Chronic and acute exposure calculations were also performed using revision 2 of the EFSA PRIMo and the exposures calculated were compared with the toxicological reference values derived for chlorpyrifos. The highest chronic exposure was calculated for Dutch children, representing 508% of the ADI. In addition, an exceedance of the ARfD was identified for potatoes, apples, peppers, pears, broccoli, head cabbage, Chinese cabbage, table grapes, tomatoes, quinces, medlar, plums and wine grapes (adult), representing 2675%, 1842%, 1763%, 1712%, 1631%, 989%, 446%, 419%, 392%, 384%, 276%, 227%, 132% and 106% of the ARfD, respectively. A second exposure calculation was therefore performed, excluding the CXLs for these crops. According to the results of this second calculation, the highest chronic exposure was then calculated for the UK infant and declined to 92.5% of the ADI; the highest acute exposure is then calculated for plums, representing 98.7% of the ARfD.

Based on these calculations, a potential risk to consumers was identified for the CXLs of chlorpyrifos on potatoes, apples, peppers, pears, broccoli, head cabbage, Chinese cabbage, table grapes, tomatoes, quinces, medlar, plums and wine grapes, and no further refinements of the risk assessment were possible. For the remaining CXLs, although uncertainties remain due to the data gaps identified for some of them, the indicative exposure calculation did not indicate a risk to consumers.

3.2. Consumer risk assessment for the metabolite 3,5,6-trichloropyridinol

Metabolite 3,5,6-TCP is not specific to chlorpyrifos as it is also a major metabolism product of two other active substances: chlorpyrifos-methyl and triclopyr. Hence, in order to carry out a comprehensive consumer exposure calculation for metabolite 3,5,6-TCP, EFSA took into account residues arising from chlorpyrifos, chlorpyrifos-methyl and triclopyr.

In plant commodities, this metabolite is mainly expected to occur following the use of chlorpyrifos or chlorpyrifos-methyl. For these two compounds, the consumer risk assessment of the parent compounds already revealed a possible risk to consumers which could not be further refined by EFSA, and several fall-back GAPs were suggested by EFSA (2017b,c). Hence, for each plant commodity, the input value for 3,5,6-TCP is based on the highest residue level observed following the use of either chlorpyrifos or chlorpyrifos-methyl, assuming that the fall-back GAPs suggested by EFSA are implemented and that the two active substances are not used together on the same crop. Nevertheless, for several plant commodities assessed in the present reasoned opinion as well as in the reasoned opinion of chlorpyrifos-methyl, data were not available to derive MRL and risk assessment values for metabolite 3,5,6-TCP. As there are no MRLs currently established for this metabolite, it was not possible to consider these commodities in the present risk assessment. For citrus fruits and bananas, the relevant peeling factor was applied.

For animal commodities, it appears that levels of 3,5,6-TCP in poultry is mainly driven by the dietary intake of chlorpyrifos-methyl (0.22 mg/kg bw per day; see also Table 2). Therefore, risk assessment values derived from the reasoned opinion of chlorpyrifos-methyl (EFSA, 2017b) were used as input values for the present exposure calculation in poultry products. In ruminants (dairy and meat) and in pigs, the livestock dietary burden of triclopyr was identified as the main driver for the occurrence of 3,5,6-TCP (see Table 2). Therefore, risk assessment values for 3,5,6-TCP were derived from the reasoned opinion of triclopyr (EFSA, 2017c).
All input values included in the exposure calculations are summarised in Appendix C.4. These chronic and acute exposure calculations were also performed using revision 2 of the EFSA PRIMo and the exposures calculated were compared with the toxicological reference values derived for the metabolite 3,5,6-TCP (EFSA, 2014). The highest chronic exposure was calculated for German children, representing 6.0% of the ADI, and the highest acute exposure was calculated for bananas, representing 6.5% of the ARfD.

It is highlighted that major uncertainties remain due to the data gaps identified for the metabolite 3,5,6-TCP. However, this indicative exposure calculation did not indicate a risk to consumers and considering the large margin of safety, there are indications that metabolite 3,5,6-TCP is not of concern with regard to the use of triclopyr, chlorpyrifos and chlorpyrifos-methyl.

It is noted that the metabolite 3,5,6-TCP was not considered in the assessment of codex MRLs defined for chlorpyrifos (and chlorpyrifos-methyl). Therefore, it is not possible to assess the intake of 3,5,6-TCP potentially driven by the CXLs defined for chlorpyrifos (and/or chlorpyrifos-methyl). Consequently, a second exposure calculation for 3,5,6-TCP was not carried out. However, considering the large margin of safety observed with regard to this metabolite (see above), there are indications that metabolite 3,5,6-TCP is not of concern with regard to CXLs authorised for chlorpyrifos.

**Conclusions**

The metabolism of chlorpyrifos was sufficiently investigated for foliar treatment in oranges, radishes, head cabbage and peas. These studies allowed to depict a general metabolic pathway of chlorpyrifos in plant. The parent compound, the metabolite 3,5,6-TCP and its conjugates are the main components of the residues after foliar applications. Nevertheless, as the metabolism of chlorpyrifos was not investigated for soil treatment and seed treatment, additional studies are still required to support these kinds of applications. A study investigating the nature of chlorpyrifos residues in rotational crops indicates that significant residues uptake was not expected in rotational crops but it should still be confirmed by a fully validated study. A study investigating the effect of processing on the nature of chlorpyrifos residues was assessed in this review; it demonstrated that the parent compound is mainly degraded into desethyl chlorpyrifos when subject to the standard hydrolytic conditions. Toxicological data on the desethyl metabolite are missing and should still be provided; meanwhile, this compound was considered as toxic as the parent compound. However, different toxicological reference values are available for chlorpyrifos and for its metabolite 3,5,6-TCP. Based on this information, two separate residue definitions for enforcement and risk assessment were proposed by EFSA. The first residue definition (specific to chlorpyrifos) includes the parent compound (in raw commodities) and its desethyl metabolite (in processed commodities only); chlorpyrifos can be enforced in plant commodities with a LOQ of 0.01 mg/kg, while analytical methods are not available for its desethyl metabolite. The second residue definition is the sum of 3,5,6-TCP and its conjugates.
expressed as 3,5,6-TCP. Since this compound is not a specific metabolite of chlorpyrifos, the first residue definition remains the most relevant for enforcement purpose but, as risk managers may consider that enforcement of metabolite 3,5,6-TCP is also necessary, an optional separate list of MRLs was also derived for the second residue definition. An analytical method is validated for analysis of 3,5,6-TCP and its conjugates with a LOQ of 0.01 mg/kg in plant commodities, but the efficiency of this hydrolysis step to release the conjugates has not been demonstrated.

For the main residue definition, the available data allowed deriving MRLs and risk assessment values for all commodities except beetroots. However, major data gaps were identified in a large number of crops, mainly because the number of residue trials was not compliant with the data requirement or because of a lack of information regarding the metabolism of chlorpyrifos after soil or seed treatments. In addition, for high oil content commodities, the MRL proposals are tentative due to the lack of validation data for the analytical method for enforcement. Based on the same trials an optional list of MRLs, reflecting the use of chlorpyrifos, was also derived for the sum of 3,5,6-TCP and its conjugates. However, the final list of MRLs proposed for this residue definition also accommodates the use of chlorpyrifos-methyl (other source of 3,5,6-TCP in plant commodities) and is therefore further extended.

Based on the available processing studies, robust processing factors could only be derived for peeled citrus and peeled bananas. Processing factors derived for wheat bran, white flour and whole-meal flour are tentative due to the limited number of data. All other processed commodities assessed in this review involve a hydrolysis step. However, as the available processing studies do not contain analysis of the desethyl metabolite, only tentative processing factors could be derived for these items. Based on the same studies, a separate list of processing factors was also derived for the second residue definition.

The metabolism of chlorpyrifos in animals was sufficiently investigated in ruminants and poultry. As for plant commodities, both chlorpyrifos and its metabolite 3,5,6-TCP should be considered for risk assessment purposes. For the same reason as for plant commodities, two separate residue definitions were derived. The first residue definition (specific) only includes the parent compound and the second residue definition is the sum of 3,5,6-TCP and its conjugates. The parent compound still remains the most relevant compound for monitoring purposes but two separate lists of MRLs were derived.

Based on the available feeding studies, MRL and risk assessment values were derived for both proposed residue definitions, in dairy ruminants, meat ruminants, laying hens and pigs. It is highlighted that the final list of MRLs for the sum of 3,5,6-TCP and its conjugates also accommodates the use of chlorpyrifos-methyl and triclopyr, which are the two other possible sources of 3,5,6-TCP in animal commodities. Based on a comparison of the respective dietary burdens for these substances, it was observed that the levels of 3,5,6-TCP in poultry are mainly driven by the dietary intake of chlorpyrifos-methyl. In ruminants (dairy and meat) and in pigs, however, the livestock dietary burden of triclopyr was identified as the main driver for the occurrence of 3,5,6-TCP. Therefore, the final MRLs for the sum of 3,5,6-TCP and its conjugates were derived from the respective data of these two substances.

Chronic and acute consumer exposure resulting from the authorised uses reported in the framework of this review was calculated for chlorpyrifos, using revision 2 of the EFSA PRIMO. For those commodities where data were insufficient to derive a MRL, EFSA considered the existing EU MRL for an indicative calculation. Acute intake concerns were identified for apples, pears, peaches, wine grapes (adult and children), peppers and quinces, representing 783.7%, 728.6%, 605.2%, 464.9%, 163.2%, 126.0% and 117.3% of the ARfD, respectively. Considering fall-back MRLs for these crops, the highest chronic exposure declined to 79.8% of the ADI (NL child) and the highest acute exposure amounted to 98.7% of the ARfD (plums).

Apart from the MRLs evaluated in the framework of this review, internationally recommended CXLs have also been established for chlorpyrifos. Additional calculations of the consumer exposure, considering these CXLs, were therefore carried out and exceedances of the ARfD were identified for the existing CXLs in potatoes, apples, peppers, pears, broccoli, head cabbage, Chinese cabbage, table grapes, peaches, tomatoes, quinces, medlar, plums and wine grapes (adults) representing 2675%, 1842%, 1763%, 1712%, 1631%, 989%, 446%, 419%, 392%, 384%, 276%, 227%, 132% and 106% of the ARfD, respectively. Excluding these CXLs from the calculation, the highest chronic exposure represented 92.5% of the ADI (UK infant) and the highest acute exposure still amounted to 98.7% of the ARfD (plums).

As different toxicological reference values were derived for the metabolite 3,5,6-TCP, a separate consumer risk assessment for 3,5,6-TCP and its conjugates was performed. In order to carry out a comprehensive consumer exposure calculation for metabolite 3,5,6-TCP, EFSA took into account residues arising from chlorpyrifos-methyl, chlorpyrifos and triclopyr. These chronic and acute exposure calculations were also performed using revision 2 of the EFSA PRIMO and the exposures calculated were compared with the toxicological reference values derived for the metabolite 3,5,6-TCP. The
highest chronic exposure was calculated for German children, representing 6.0% of the ADI, and the highest acute exposure was calculated for bananas, representing 6.5% of the ARfD. Major uncertainties remain due to the data gaps identified for the metabolite 3,5,6-TCP but, this indicative exposure calculation did not indicate a risk to consumers and considering the large margin of safety, there are indications that metabolite 3,5,6-TCP is not of concern with regard to the use of triclopyr, chlorpyrifos and chlorpyrifos-methyl.

**Recommendations**

Considering that two separate residue definitions were derived for enforcement purposes, two lists of MRLs are proposed:

- **Main residue definition (1): chlorpyrifos.** MRL recommendations were derived in compliance with the decision tree reported in Appendix D of the reasoned opinion (see Table 3). All MRL values listed as ‘Recommended’ in the table are sufficiently supported by data and are therefore proposed for inclusion in Annex II to the Regulation. The remaining MRL values listed in the table are not recommended for inclusion in Annex II because they require further consideration by risk managers (see Table 3 footnotes for details).

- **Optional residue definition (2): sum of 3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates, expressed as 3,5,6-TCP.** MRLs derived for this residue definition take into account all sources of 3,5,6-TCP in plant and animal commodities (chlorpyrifos-methyl, chlorpyrifos and triclopyr). As the metabolite 3,5,6-TCP is not specific to chlorpyrifos and due to the several data gaps identified, this list of MRLs is proposed on a tentative basis only. The indicative risk assessment for this compound showed a large margin of safety. However, if risk managers consider that enforcement of metabolite 3,5,6-TCP is necessary, an optional separate list of MRLs is derived below.

Regarding the main residue definition, certain tentative MRLs or existing EU MRLs still need to be confirmed by the following data:

- a representative study investigating the primary crops metabolism of chlorpyrifos after soil treatment;
- a representative study investigating the primary crops metabolism of chlorpyrifos after seed treatment;
- an ILV for the determination of chlorpyrifos in high oil content commodities;
- a fully validated analytical method for the determination of chlorpyrifos in tea and spices;
- a fully validated analytical method for the determination of chlorpyrifos in muscle, fat and milk;
- additional residue trials supporting the GAPs for Pyrinex 25 CS on apples, pears, radishes, tomatoes, peppers, aubergines, fresh legumes, asparagus, dry beans, dry peas, dry lupins, rapeseed, mustard seed, gold of pleasure and soya beans;
- additional residue trials supporting the GAPs for formulations other than Pyrinex 25 CS on apples, pears, beetroots, radishes, garlic, shallots, spring onions, tomatoes, peppers, aubergines, lettuce, lamb’s lettuce, scarole, rocket, fresh legumes, globe artichoke, asparagus, dry beans, dry peas, rapeseed, mustard seed, gold of pleasure, soya bean, buckwheat grain, millet grain, and maize forage;
- processing studies analysing for desethyl chlorpyrifos for processed commodities of wine grapes;
- further information on the toxicity of the metabolite desethyl chlorpyrifos (relevant in processed commodities).

In addition, it is highlighted that some MRLs derived for chlorpyrifos result from a CXL or from a GAP in one climatic zone only, while other GAPs reported in this review were not fully supported by data. EFSA therefore identified the following data gaps which are not expected to impact on the validity of the MRLs derived but which might have an impact on national authorisations:

- a representative study investigating metabolism of chlorpyrifos in rotational crops;
- additional residue trials supporting the GAPs for Pyrinex 25 CS on grapefruits, oranges, lemons, mandarins, peaches, plums, potatoes, carrots, onions, sunflower seed, cotton seed and sugar beet;
- additional residue trials supporting the GAPs for formulations other than Pyrinex 25 CS on plums, strawberries, wine grapes, carrots, radishes, onions, bananas, tomatoes, peppers, aubergines, broccoli, cauliflower, Brussels sprouts, head cabbage, kale, Kohlrabi, beans and peas with and without pods, dry beans, dry peas, rapeseed, sunflower seed, soya beans, cotton seed, maize, barley, oat, wheat, rye and sugar beet.
If the above reported data gaps are not addressed in the future, Member States are recommended to withdraw or modify the relevant authorisations at national level. It is also highlighted that the critical GAPs on apples, pears, quinces, peaches, wine grapes and peppers lead to an exceedance of the ARfD for parent chlorpyrifos. It is noted however that the critical GAPs for these crops were reported to EFSA before the application of Commission Regulation (EU) No 2016/60, which lowered the MRLs of apples, pears, peaches and peppers to the LOQ. The MRLs that are now derived in apples, pears, quinces, peaches, wine grapes and peppers are based on fall-back GAPs. Member States are therefore recommended to reconsider or withdraw their national authorisations on apples, pears, quinces, peaches, wine grapes and peppers in order to ensure that the fall-back MRLs derived for parent chlorpyrifos in these crops are not exceeded.

Minor deficiencies were also identified in the assessment but these deficiencies are not expected to impact either on the validity of the MRLs derived or on the national authorisations. The following data are therefore considered desirable but not essential:

- a fully validated analytical method for the determination of desethyl chlorpyrifos in processed commodities;
- one additional residue trial supporting the GAP for formulations other than Pyrinex 25 CS on cherries.

For the optional residue definition, the proposed MRLs also took into consideration the reasoned opinions of chlorpyrifos-methyl (for plant commodities) and triclopyr (for plant and livestock commodities). For each plant commodity, the MRL proposal for the sum of 3,5,6-TCP and its conjugates is based on the most critical GAP between chlorpyrifos-methyl and chlorpyrifos, assuming that the fall-back GAPs suggested by EFSA are implemented and that the two active substances are not used together on the same crop. The outcome of these comparisons is reported in the summary table below. For animal commodities, MRLs in poultry are derived from the chlorpyrifos-methyl dietary burden (identified as the main driver of residues intake in this group of livestock), while for ruminants (dairy and meat) and pigs, MRLs are derived from the reasoned opinion of triclopyr (identified as the main driver of residues intake in these groups of livestock). It is noted that the above mentioned data gaps for the parent compound also apply to the optional residue definition. In addition, specific data gaps were also identified for the metabolite 3,5,6-TCP (see also reasoned opinion of chlorpyrifos-methyl). Therefore, if risk managers intend to set MRLs for this compound, the following data should be required (in addition to the above mentioned data gaps):

- full validation of the analytical method for enforcement of the conjugates in plant and livestock commodities (the efficiency of the hydrolysis step still needs to be demonstrated);
- residue trials analysing 3,5,6-TCP and supporting the GAP of chlorpyrifos-methyl on currants.

Table 3: Summary table

| Code number | Commodity   | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review MRL (mg/kg) | Comment                  |
|-------------|-------------|-------------------------|----------------------|----------------------------------|--------------------------|
| 110010      | Grapefruit  | 0.3                     | 1                    | 1.5                              | Recommended(a)           |
| 110020      | Oranges     | 0.3                     | 1                    | 1.5                              | Recommended(a)           |
| 110030      | Lemons      | 0.2                     | 1                    | 1.5                              | Recommended(a)           |
| 110040      | Limes       | 0.3                     | 1                    | 1.5                              | Recommended(a)           |
| 110050      | Mandarins   | 1.5                     | 1                    | 1.5                              | Recommended(a)           |
| 120010      | Almonds     | 0.05*                   | 0.05                 | 0.05                             | Further consideration needed(b) |
| 120040      | Chestnuts   | 0.05*                   | –                    | 0.01*                            | Recommended(c)           |
| 120060      | Hazelnuts   | 0.05*                   | –                    | 0.01*                            | Further consideration needed(d) |
| 120080      | Pecans      | 0.05*                   | 0.05                 | 0.05                             | Further consideration needed(e) |
| 120110      | Walnuts     | 0.05*                   | 0.05                 | 0.05                             | Further consideration needed(b) |
| 130010      | Apples      | 0.01*                   | 1                    | 0.01*                            | Further consideration needed(f) |
| 130020      | Pears       | 0.01*                   | 1                    | 0.01*                            | Further consideration needed(f) |
| Code number | Commodity          | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review | Comment |
|-------------|--------------------|-------------------------|----------------------|-----------------------|---------|
| 130030      | Quinces            | 0.5                     | 1                    | 0.4                   | Recommended(g) |
| 130040      | Medlar             | 0.5                     | 1                    | 0.01*                 | Recommended(g) |
| 130050      | Loquat             | 0.5                     | 1                    | 1                     | Recommended(h) |
| 140010      | Apricots           | 0.05                    | –                    | 0.01*                 | Recommended(c) |
| 140020      | Cherries           | 0.3                     | –                    | 0.05                  | Recommended(c) |
| 140030      | Peaches            | 0.01*                   | 0.5                  | 0.08                  | Recommended(g) |
| 140040      | Plums              | 0.2                     | 0.5                  | 0.3                   | Recommended(g) |
| 151010      | Table grapes       | 0.01*                   | 0.5                  | –                     | Further consideration needed(i) |
| 151020      | Wine grapes        | 0.5                     | 0.5                  | 0.01*                 | Recommended(g) |
| 152000      | Strawberries       | 0.2                     | 0.3                  | 0.3                   | Recommended(k) |
| 154020      | Cranberries        | 0.05*                   | 1                    | 1                     | Recommended(h) |
| 161040      | Kumquats           | 0.05*                   | 1                    | 1                     | Recommended(h) |
| 163020      | Bananas            | 3                       | 2                    | 4                     | Recommended(a) |
| 211000      | Potatoes           | 0.01*                   | 2                    | 0.01*                 | Recommended(g) |
| 213010      | Beetroot           | 0.05*                   | –                    | 0.05                  | Further consideration needed(i) |
| 213020      | Carrots            | 0.1                     | 0.1                  | 0.1                   | Recommended(k) |
| 213080      | Radishes           | 0.2                     | –                    | 0.01*                 | Further consideration needed(d) |
| 220010      | Garlic             | 0.05*                   | –                    | 0.01*                 | Further consideration needed(d) |
| 220020      | Onions             | 0.2                     | 0.2                  | 0.2                   | Recommended(k) |
| 220030      | Shallots           | 0.05*                   | –                    | 0.01*                 | Further consideration needed(d) |
| 220040      | Spring onions      | 0.05*                   | –                    | 0.01*                 | Further consideration needed(d) |
| 231010      | Tomatoes           | 0.01*                   | 0.5                  | 0.1                   | Further consideration needed(f) |
| 231020      | Peppers            | 0.01*                   | 2                    | 0.01*                 | Further consideration needed(f) |
| 231030      | Aubergines (egg plants) | 0.4                 | –                    | 0.01*                 | Further consideration needed(d) |
| 233010      | Melons             | 0.01*                   | –                    | 0.01*                 | Recommended(c) |
| 233020      | Pumpkins           | 0.05*                   | –                    | 0.01*                 | Recommended(c) |
| 233030      | Watermelons        | 0.01*                   | –                    | 0.01*                 | Recommended(c) |
| 234000      | Sweet corn         | 0.05*                   | 0.01*                | 0.01*                 | Recommended(h) |
| 241010      | Broccoli           | 0.05*                   | 2                    | 0.01*                 | Recommended(g) |
| 241020      | Cauliflower        | 0.05*                   | 0.05                 | 0.05                  | Recommended(j) |
| 242010      | Brussels sprouts   | 0.05*                   | –                    | 0.01*                 | Recommended(c) |
| 242020      | Head cabbage       | 0.01*                   | 1                    | 0.01*                 | Recommended(g) |
| 243010      | Chinese cabbage    | 0.01*                   | 1                    | –                     | Further consideration needed(i) |
| 243020      | Kale               | 0.05*                   | –                    | 0.01*                 | Recommended(c) |
| 244000      | Kohlrabi           | 0.05*                   | –                    | 0.01*                 | Recommended(c) |
| 251010      | Lamb’s lettuce     | 0.05*                   | –                    | 0.01*                 | Further consideration needed(d) |
| 251020      | Lettuce            | 0.05*                   | –                    | 0.01*                 | Further consideration needed(d) |
| 251030      | Scarole (broad-leaf endive) | 0.05*               | –                    | 0.01*                 | Further consideration needed(d) |
| 251060      | Rocket, rucola     | 0.05*                   | –                    | 0.01*                 | Further consideration needed(d) |
| 252010      | Spinach            | 0.05*                   | –                    | 0.01*                 | Recommended(c) |
| 260010      | Beans (fresh, with pods) | 0.05*            | 0.01                 | 0.01*                 | Further consideration needed(m) |
| 260020      | Beans (fresh, without pods) | 0.05*                | –                    | 0.01*                 | Further consideration needed(d) |
| 260030      | Peas (fresh, with pods) | 0.05*              | 0.01                 | 0.01*                 | Further consideration needed(m) |
| Code number | Commodity                          | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review |
|-------------|------------------------------------|-------------------------|----------------------|-----------------------|
| 260040      | Peas (fresh, without pods)         | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 270010      | Asparagus                          | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 270050      | Globe artichokes                   | 0.01*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 300010      | Beans (dry)                        | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 300030      | Peas (dry)                         | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 300040      | Lupins (dry)                       | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 401030      | Poppy seed                         | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 401050      | Sunflower seed                     | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 401060      | Rape seed                          | 0.05*                   | –                    | 0.04 Further consideration needed<sup>d</sup> |
| 401070      | Soya bean                          | 0.05* 0.1              | 0.1                  | Further consideration needed<sup>b</sup> |
| 401080      | Mustard seed                       | 0.05*                   | –                    | 0.04 Further consideration needed<sup>d</sup> |
| 401090      | Cotton seed                        | 0.05* 0.3              | 0.3                  | Further consideration needed<sup>b</sup> |
| 401130      | Gold of pleasure                   | 0.05*                   | –                    | 0.04 Further consideration needed<sup>d</sup> |
| 402010      | Olives for oil production          | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 500010      | Barley grain                       | 0.2                     | –                    | 0.6 Recommended<sup>c</sup> |
| 500020      | Buckwheat grain                    | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 500030      | Maize grain                        | 0.05 0.05              | 0.05                 | Recommended<sup>j</sup> |
| 500040      | Millet grain                       | 0.05*                   | –                    | 0.01* Further consideration needed<sup>d</sup> |
| 500050      | Oats grain                         | 0.05*                   | –                    | 0.6 Recommended<sup>c</sup> |
| 500060      | Rice grain                         | 0.05* 0.5              | 0.5                  | Recommended<sup>b</sup> |
| 500070      | Rye grain                          | 0.05*                   | –                    | 0.15 Recommended<sup>c</sup> |
| 500080      | Sorghum grain                      | 0.05* 0.5              | 0.5                  | Recommended<sup>b</sup> |
| 500090      | Wheat grain                        | 0.05* 0.5              | 0.5                  | Recommended<sup>j</sup> |
| 610000      | Tea (dried leaves and stalks)      | 0.1* 2                 | 2                    | Further consideration needed<sup>e</sup> |
| 620000      | Coffee beans                       | 0.2 0.05              | 0.05                 | Recommended<sup>b</sup> |
| 810000      | Spices (seeds)                     | 5 5                   | 5                    | Further consideration needed<sup>e</sup> |
| 820000      | Spices (fruits and berries)        | 1 1                   | 1                    | Further consideration needed<sup>e</sup> |
| 840000      | Spices (roots and rhizome)         | 1 1                   | 1                    | Further consideration needed<sup>e</sup> |
| 900010      | Sugar beet (root)                  | 0.05 0.05             | 0.05                 | Recommended<sup>j</sup> |
| 1011010     | Swine muscle                       | – 0.01                | 0.01*                | Further consideration needed<sup>m</sup> |
| 1011020     | Swine fat                          | – 0.02                | 0.02                 | Further consideration needed<sup>b</sup> |
| 1011030     | Swine liver                        | – 0.01*               | 0.01*                | Recommended<sup>a</sup> |
| 1011040     | Swine kidney                       | – 0.01*               | 0.01*                | Recommended<sup>a</sup> |
| 1012010     | Bovine muscle                      | – 0.01                | 0.01*                | Further consideration needed<sup>m</sup> |
| 1012020     | Bovine fat                         | – 1                   | 1                    | Further consideration needed<sup>b</sup> |
| 1012030     | Bovine liver                       | – 0.01                | 0.01*                | Recommended<sup>a</sup> |
| 1012040     | Bovine kidney                      | – 0.01                | 0.01*                | Recommended<sup>a</sup> |
| 1013010     | Sheep muscle                       | – 0.01                | 0.01*                | Further consideration needed<sup>m</sup> |
| 1013020     | Sheep fat                          | – 1                   | 1                    | Further consideration needed<sup>b</sup> |
| 1013030     | Sheep liver                        | – 0.01                | 0.01*                | Recommended<sup>a</sup> |
| 1013040     | Sheep kidney                       | – 0.01                | 0.01*                | Recommended<sup>a</sup> |
| 1014010     | Goat muscle                        | – 0.01                | 0.01*                | Further consideration needed<sup>m</sup> |
| 1014020     | Goat fat                           | – 1                   | 1                    | Further consideration needed<sup>b</sup> |
| Code number | Commodity          | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review                              | Comment          |
|-------------|--------------------|-------------------------|----------------------|---------------------------------------------------|------------------|
| 1014030     | Goat liver         | –                       | 0.01                 | 0.01*                                             | Recommended (a)  |
| 1014040     | Goat kidney        | –                       | 0.01                 | 0.01*                                             | Recommended (a)  |
| 1016010     | Poultry muscle     | 0.05*                   | 0.01                 | 0.01*                                             | Further consideration needed (m) |
| 1016020     | Poultry fat        | 0.05*                   | 0.01                 | 0.01*                                             | Further consideration needed (m) |
| 1016030     | Poultry liver      | 0.05*                   | 0.01*                | 0.01*                                             | Recommended (a)  |
| 1020000     | Milk of ruminants  | 0.01*                   | 0.02                 | 0.02                                             | Further consideration needed (b) |
| 1030000     | Birds’ eggs        | 0.01*                   | 0.01*                | 0.01*                                             | Recommended (a)  |
| –           | Other commodities  | –                       | –                    | –                                                | Further consideration needed (n) |
|             | of plant and/or    |                         |                      |                                                  |                  |
|             | animal origin      |                         |                      |                                                  |                  |
|             | See Reg. (EC) No   | 750/2010                | –                    | –                                                |                  |

**Enforcement residue definition (existing):**

- sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP

**Enforcement residue definition (proposed):**

- sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP

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| Code number | Commodity                  | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review |
|-------------|----------------------------|-------------------------|----------------------|-----------------------|
| 231010      | Tomatoes                   | –                       | –                    | 0.15                  | Further consideration needed (p) |
| 231020      | Peppers                    | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 231030      | Aubergines (egg plants)    | –                       | –                    | 0.15                  | Further consideration needed (p) |
| 233010      | Melons                     | –                       | –                    | 0.02                  | Further consideration needed (o) |
| 233020      | Pumpkins                   | –                       | –                    | 0.02                  | Further consideration needed (o) |
| 233030      | Watermelons                | –                       | –                    | 0.02                  | Further consideration needed (o) |
| 234000      | Sweet corn                 | –                       | –                    | –                     | Further consideration needed (q) |
| 241010      | Broccoli                   | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 241020      | Cauliflower                | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 242010      | Brussels sprouts           | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 242020      | Head cabbage               | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 243010      | Chinese cabbage            | –                       | –                    | –                     | Further consideration needed (q) |
| 243020      | Kale                       | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 244000      | Kohlrabi                   | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 251010      | Lamb’s lettuce             | –                       | –                    | –                     | Further consideration needed (r) |
| 251020      | Lettuce                    | –                       | –                    | –                     | Further consideration needed (r) |
| 251030      | Scarole (broad-leaf endive)| –                       | –                    | –                     | Further consideration needed (r) |
| 251060      | Rocket, rucola             | –                       | –                    | –                     | Further consideration needed (r) |
| 252010      | Spinach                    | –                       | –                    | 0.03                  | Further consideration needed (o) |
| 260010      | Beans (fresh, with pods)   | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 260020      | Beans (fresh, without pods)| –                       | –                    | –                     | Further consideration needed (r) |
| 260030      | Peas (fresh, with pods)    | –                       | –                    | –                     | Further consideration needed (r) |
| 260040      | Peas (fresh, without pods) | –                       | –                    | –                     | Further consideration needed (r) |
| 270010      | Asparagus                  | –                       | –                    | –                     | Further consideration needed (r) |
| 270050      | Globe artichokes           | –                       | –                    | –                     | Further consideration needed (r) |
| 300010      | Beans (dry)                | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 300030      | Peas (dry)                 | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 300040      | Lupins (dry)               | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 401030      | Poppy seed                 | –                       | –                    | 0.3                   | Further consideration needed (o) |
| 401050      | Sunflower seed             | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 401060      | Rape seed                  | –                       | –                    | 0.3                   | Further consideration needed (o) |
| 401070      | Soya bean                  | –                       | –                    | –                     | Further consideration needed (r) |
| 401080      | Mustard seed               | –                       | –                    | 0.3                   | Further consideration needed (o) |
| 401090      | Cotton seed                | –                       | –                    | 0.09                  | Further consideration needed (o) |
| 401130      | Gold of pleasure           | –                       | –                    | 0.3                   | Further consideration needed (o) |
| 402010      | Olives for oil production  | –                       | –                    | 0.01*                 | Further consideration needed (o) |
| 500010      | Barley grain               | –                       | –                    | 1.5                   | Further consideration needed (p) |
| 500020      | Buckwheat grain            | –                       | –                    | –                     | Further consideration needed (r) |
| 500030      | Maize grain                | –                       | –                    | 0.02                  | Further consideration needed (o) |
| 500040      | Millet grain               | –                       | –                    | –                     | Further consideration needed (r) |
| 500050      | Oats grain                 | –                       | –                    | 1.5                   | Further consideration needed (p) |
| 500060      | Rice grain                 | –                       | –                    | –                     | Further consideration needed (r) |
| Code number | Commodity                        | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review |
|-------------|----------------------------------|-------------------------|----------------------|-----------------------|
| 500070      | Rye grain                        | –                       | –                    | 0.4                   | Further consideration needed (o) |
| 500080      | Sorghum grain                    | –                       | –                    | –                     | Further consideration needed (q) |
| 500090      | Wheat grain                      | –                       | –                    | 0.4                   | Further consideration needed (o) |
| 610000      | Tea                              | –                       | –                    | –                     | Further consideration needed (q) |
| 620000      | Coffee beans                     | –                       | –                    | –                     | Further consideration needed (q) |
| 810000      | Spices (seeds)                   | –                       | –                    | –                     | Further consideration needed (q) |
| 820000      | Spices (fruits and berries)      | –                       | –                    | –                     | Further consideration needed (q) |
| 840000      | Spices (roots and rhizome)       | –                       | –                    | –                     | Further consideration needed (q) |
| 900010      | Sugar beet (root)                | –                       | –                    | 0.1                   | Further consideration needed (o) |
| 1011010     | Swine muscle                     | –                       | –                    | 0.01*                 | Further consideration needed (s) |
| 1011020     | Swine fat (free of lean meat)    | –                       | –                    | 0.015                 | Further consideration needed (s) |
| 1011030     | Swine liver                      | –                       | –                    | 0.15                  | Further consideration needed (s) |
| 1011040     | Swine kidney                     | –                       | –                    | 0.15                  | Further consideration needed (s) |
| 1012010     | Bovine muscle                    | –                       | –                    | 0.06                  | Further consideration needed (s) |
| 1012020     | Bovine fat                       | –                       | –                    | 0.09                  | Further consideration needed (s) |
| 1012030     | Bovine liver                     | –                       | –                    | 1                     | Further consideration needed (s) |
| 1012040     | Bovine kidney                    | –                       | –                    | 1                     | Further consideration needed (s) |
| 1013010     | Sheep muscle                     | –                       | –                    | 0.06                  | Further consideration needed (s) |
| 1013020     | Sheep fat                        | –                       | –                    | 0.09                  | Further consideration needed (s) |
| 1013030     | Sheep liver                      | –                       | –                    | 1                     | Further consideration needed (s) |
| 1013040     | Sheep kidney                     | –                       | –                    | 1                     | Further consideration needed (s) |
| 1014010     | Goat muscle                      | –                       | –                    | 0.06                  | Further consideration needed (s) |
| 1014020     | Goat fat                         | –                       | –                    | 0.09                  | Further consideration needed (s) |
| 1014030     | Goat liver                       | –                       | –                    | 1                     | Further consideration needed (s) |
| 1014040     | Goat kidney                      | –                       | –                    | 1                     | Further consideration needed (s) |
| 1016010     | Poultry muscle                   | –                       | –                    | 0.03                  | Further consideration needed (p) |
| 1016020     | Poultry fat                      | –                       | –                    | 0.03                  | Further consideration needed (p) |
| 1016030     | Poultry liver                    | –                       | –                    | 0.03                  | Further consideration needed (p) |
| 1020010     | Cattle milk                      | –                       | –                    | 0.015                 | Further consideration needed (p) |
| 1020020     | Sheep milk                       | –                       | –                    | 0.015                 | Further consideration needed (p) |
| 1020030     | Goat milk                        | –                       | –                    | 0.015                 | Further consideration needed (p) |
| 1030000     | Birds’ eggs                      | –                       | –                    | 0.03                  | Further consideration needed (p) |

MRL: maximum residue level; CXL: codex maximum residue limit.
*: Indicates that the MRL is set at the limit of quantification.
(F): Residue is fat soluble.
(a): MRL is derived from a GAP evaluated at EU level, which is fully supported by data and for which no risk to consumers is identified; existing CXL is covered by the recommended MRL (combination G-III in Appendix D).
(b): MRL is derived from the existing CXL, which is not sufficiently supported by data but for which no risk to consumers is identified; GAP evaluated at EU level, which is also not fully supported by data, would lead to a lower tentative MRL (combination E-V in Appendix D).
(c): MRL is derived from a GAP evaluated at EU level, which is fully supported by data and for which no risk to consumers is identified; no CXL is available (combination G-I in Appendix D).
(d): Tentative MRL is derived from a GAP evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; no CXL is available (combination E-I in Appendix D).
(e): MRL is derived from the existing CXL, which is not sufficiently supported by data but for which no risk to consumers is identified; there are no relevant authorisations or import tolerances reported at EU level (combination A-V in Appendix D).
(f): Tentative MRL is derived from a GAP evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; CXL is higher, supported by data but a risk to consumers cannot be excluded (combination E-VI in Appendix D).

(g): MRL is derived from a GAP evaluated at EU level, which is fully supported by data and for which no risk to consumers is identified; CXL is higher, supported by data but a risk to consumers cannot be excluded (combination G-VI in Appendix D).

(h): MRL is derived from the existing CXL, which is supported by data and for which no risk to consumers is identified; there are no relevant authorisations or import tolerances reported at EU level (combination A-VII in Appendix D).

(i): There are no relevant authorisations or import tolerances reported at EU level; CXL is supported by data but a risk to consumers cannot be excluded. Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered (combination A-VII in Appendix D).

(j): MRL is derived from the existing CXL, which is fully supported by data and for which no risk to consumers is identified; GAP evaluated at EU level, which is also fully supported by data, leads to a lower MRL (combination G-VII in Appendix D).

(k): MRL is derived from the existing CXL, which is supported by data and for which no risk to consumers is identified; GAP evaluated at EU level, which is not fully supported by data, leads to a lower tentative MRL (combination E-VII in Appendix D).

(l): GAP evaluated at EU level is not supported by data but no risk to consumers was identified for the existing EU MRL; no CXL is available (combination C-I in Appendix D).

(m): Tentative MRL is derived from a GAP evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; existing CXL is covered by the tentative MRL (combination E-III in Appendix D).

(n): There are no relevant authorisations or import tolerances reported at EU level; no CXL is available. Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered (combination A-I in Appendix D).

(o): Tentative MRL is derived from a GAP on chlorpyrifos evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; no CXL is available for this residue definition (although a CXL may be available for chlorpyrifos and/or chlorpyrifos-methyl).

(p): Tentative MRL is derived from a GAP on chlorpyrifos-methyl evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; no CXL is available for this residue definition (although a CXL may be available for chlorpyrifos and/or chlorpyrifos-methyl).

(q): There are no relevant authorisations or import tolerances reported at EU level; a CXL is available for chlorpyrifos and/or chlorpyrifos-methyl but there is no CXL for this residue definition. Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered.

(r): GAP on chlorpyrifos or chlorpyrifos-methyl evaluated at EU level is not supported by data and it was not possible to derive an EU MRL for this residue definition; there is neither existing EU MRL nor CXL for this residue definition (although a CXL may be available for chlorpyrifos and/or chlorpyrifos-methyl). Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered.

(s): Tentative MRL is derived from a GAP on triclopyr evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; no CXL is available for this residue definition (although a CXL may be available for chlorpyrifos and/or chlorpyrifos-methyl).

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Abbreviations

a.i. active ingredient
a.s. active substance
AChE acetyl-cholinesterase
ADI acceptable daily intake
AR applied radioactivity
ARfD acute reference dose
BBCH growth stages of mono- and dicotyledonous plants
bw body weight
CAC Codex Alimentarius Commission
cGAP critical GAP
CS capsule suspension
CXL codex maximum residue limit
DAR draft assessment report
DAT days after treatment
DB dietary burden
DM dry matter
DT₉₀ period required for 90% dissipation (define method of estimation)
EMS evaluating Member State
eq residue expressed as a.s. equivalent
EURLs European Union Reference Laboratories for Pesticide Residues (former CRLs)
FAO Food and Agriculture Organization of the United Nations
GAP Good Agricultural Practice
GC–MS/MS gas chromatography with tandem mass spectrometry
GC-NCl-MS gas chromatography with mass spectrometric detection using negative chemical ionisation
GLP Good Laboratory Practice
HPLC–MS/MS high-performance liquid chromatography with tandem mass spectrometry
HR highest residue
### Appendix A – Summary of authorised uses considered for the review of MRLs

#### A.1. All authorised uses considered in the review of MRLs

(a) Formulations other than Pyrinex 25 CS – northern Europe

| Crop | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation Type | Conc. | Unit | Method | Growth stage | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|------|-----------------|--------|----------------|-------------------------|-----------------|------------------|-------|------|--------|--------------|-------------|-----------------------------|-------------------------------|
| Cherries | *Prunus cerasus, Prunus avium* | NEU | Outdoor | AT | Aphidae, *Adoxophyes orana* | EC | 480.0 | g/L | Foliar treatment – spraying | 1 | 1 | 960 g a.i./ha | 21 |
| Plums | *Prunus domestica* | NEU | Outdoor | AT | Aphidae, *Adoxophyes orana* | EC | 480.0 | g/L | Foliar treatment – spraying | 1 | 1 | 960 g a.i./ha | 21 |
| Wine grapes | *Vitis euvitis* | NEU | Outdoor | FR | Foliar treatment – spraying | 1 | 1 | 200 g a.i./ha | 21 |
| Strawberries | *Fragaria x ananassa* | NEU | Outdoor | AT | Aphidae, *Adoxophyes orana* | EC | 480.0 | g/L | Foliar treatment – spraying | 1 | 1 | 960 g a.i./ha | 21 |
| Potatoes | Tuber form *Solanum spp.* | NEU | Outdoor | CZ | Potato beetle | EC | 500.0 | g/L | Foliar treatment – spraying | 1 | 1 | 300 g a.i./ha | 14 |
| Beetroot | *Beta vulgaris* subsp. *vulgaris* | NEU | Outdoor | CZ | Aphids, flea beetle | EC | 500.0 | g/L | Foliar treatment – spraying | 1 | 1 | 300 g a.i./ha | 14 |
### Critical outdoor GAPs for northern Europe

| Crop | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation Type | Content Conc. | Method | Growth stage From BBCH | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|------|-----------------|--------|----------------|-------------------------|-----------------|------------------|---------------|--------|-------------------------|-------------|----------------------------|--------------------------------|
| Radishes | Raphanus sativus var. sativus | NEU | Outdoor | BE | Cutworms, wireworms, etc. | GR | 5.0 % (w/w) | Soil treatment – general (see also comment field) | 0 0 1 1 | 2,000 g a.i./ha | 42 | Incorporation in soil before planting or sowing. More critical GAP authorised in AT (foliar, 1 × 288 g a.i./ha, PHI 21 d) but not supported by data. |
| Garlic | Allium sativum | NEU | Outdoor | BE | Cutworms, wireworms, etc. | GR | 5.0 % (w/w) | Soil treatment – general (see also comment field) | 0 0 1 1 | 2,000 g a.i./ha | 42 | Incorporation in soil before planting or sowing. |
| Onions | Allium cepa | NEU | Outdoor | BE | Cutworms, wireworms, etc. | GR | 5.0 % (w/w) | Soil treatment – general (see also comment field) | 0 0 1 1 | 2,000 g a.i./ha | 42 | Incorporation in soil before planting or sowing. More critical GAP authorised in AT (foliar, 1 × 288 g a.i./ha, PHI 21 days) but not supported by data. |
## Critical outdoor GAPs for northern Europe

| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|-------------|-----------------|--------|----------------|-------------------------|-----------------|-------------|-------------|-----------------------------|--------------------------------|
| Shallots    | Allium ascalonicum (Allium cepa var. aggregatum) | NEU    | Outdoor        | BE                      | Cutworms, wireworms, etc. | GR          | 5.0 % (w/w) | Soil treatment – general (see also comment field) | 0 0 1 1 2,000 g a.i./ha | Incorporation in soil before planting or sowing |
| Spring onions | Allium cepa     | NEU    | Outdoor        | BE                      | Cutworms, wireworms, etc. | GR          | 5.0 % (w/w) | Soil treatment – general (see also comment field) | 0 0 1 1 2,000 g a.i./ha | Incorporation in soil before planting or sowing |
| Aubergines (egg plants) | Solanum melongena | NEU    | Outdoor        | AT                      | Aphidae | EC          | 480.0 g/L | Foliar treatment – spraying | 0 0 1 1 288 g a.i./ha | Watering at the base of the plant |
| Broccoli    | Brassica oleracea var. italica | NEU    | Outdoor        | BE                      | Cabbage fly | EC          | 480.0 g/L | Soil treatment – general (see also comment field) | 1 1 4,000 g a.i./ha | Watering at the base of the plant |
| Cauliflower | Brassica oleracea var. botrytis  | NEU    | Outdoor        | BE                      | Cabbage fly | EC          | 480.0 g/L | Soil treatment – general (see also comment field) | 1 1 4,000 g a.i./ha | Watering at the base of the plant |
| Brussels sprouts | Brassica oleracea var. gemmifera | NEU    | Outdoor        | BE                      | Cabbage fly | EC          | 480.0 g/L | Soil treatment – general (see also comment field) | 1 1 4,000 g a.i./ha | Watering at the base of the plant |
### Critical outdoor GAPs for northern Europe

| Crop | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation Type | Content | Method | Growth stage From BBCH | Until BBCH | Number | Interval (days) Min. | Max. | Rate Min. | Max. | PHI or waiting period (days) | Comments (max. 250 characters) |
|-------|-----------------|--------|----------------|-------------------------|-----------------|------------------|---------|--------|--------------------------|-----------|--------|------------------------|-----|----------|-----|------------------------|---------------------------|
| Head cabbage | *Brassica oleracea* convar. *capitata* | NEU | Outdoor | BE | Cabbage Fly | EC | 480.0 g/L | Soil treatment – general (see also comment field) | 1 | 1 | | 4,000 g a.i./ha | 42 | Watering at the base of the plant |
| Kale | *Brassica oleracea* convar. *acephala* | NEU | Outdoor | BE | Cabbage fly | EC | 480.0 g/L | Soil treatment – general (see also comment field) | 1 | 1 | | 4,000 g a.i./ha | 42 | Watering at the base of the plant |
| Kohlrabi | *Brassica oleracea* convar. *acephala*, var. *gongylodes* | NEU | Outdoor | BE | Cabbage Fly | EC | 480.0 g/L | Soil treatment – general (see also comment field) | 1 | 1 | | 4,000 g a.i./ha | 42 | Watering at the base of the plant |
| Asparagus | *Asparagus officinalis* | NEU | Outdoor | BE | Cutworms, wireworms, etc. | GR | 5.0 % (w/w) | Soil treatment – general (see also comment field) | 0 | 0 | 1 | 1 | 2,000 g a.i./ha | 42 | Incorporation in soil before planting or sowing |
| Poppy seed | *Papaver somniferum* | NEU | Outdoor | CZ, FR | Aphids | EC | 500.0 g/L | Foliar treatment – spraying | 9 | 59 | 1 | 1 | 300 g a.i./ha | n.a. |
| Rape seed | *Brassica napus* | NEU | Outdoor | CZ | *Ceutorhynchus pallidactylus*, *Ceutorhynchus napi* | CS | 200.0 g/L | Foliar treatment – spraying | 59 | 1 | 1 | 450 g a.i./ha | n.a. |
| Mustard seed | *Brassica nigra* | NEU | Outdoor | FR | | EC | 500.0 g/L | Foliar treatment – spraying | 59 | 1 | 1 | 250 g a.i./ha | n.a. |
| Crop Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation Type | Content | Method | Growth stage From BBCH | Until BBCH | Number Min. | Max. | Interval (days) Min. | Max. | Rate Min. | Max. | PHI or waiting period (days) | Comments (max. 250 characters) |
|------------------|-----------------|--------|----------------|-------------------------|-----------------|-----------------|---------|--------|------------------------|-----------|-------------|------|----------------------|------|----------|------|------------------------|--------------------------------|
| Gold of pleasure | Camelina sativa  | NEU    | Outdoor        | FR                      |                 | EC              | 500.0 g/L | Foliar treatment – spraying | 59         | 1           | 1       |                      |      | 250 g a.i./ha | n.a. |                       |                                  |
| Barley           | Hordeum spp.    | NEU    | Outdoor        | AT                      | Zabrus tenebrioides | EC              | 480.0 g/L | Foliar treatment – spraying | 30         | 65          |         |                      |      | 960 g a.i./ha | n.a. |                       |                                  |
| Maize            | Zea mays        | NEU    | Outdoor        | FR                      |                 | EC              | 500.0 g/L | Foliar treatment – spraying | 59         | 1           | 1       |                      |      | 400 g a.i./ha | n.a. |                       |                                  |
| Oats             | Avena fatua     | NEU    | Outdoor        | AT                      | Zabrus tenebrioides | EC              | 480.0 g/L | Foliar treatment – spraying | 30         | 65          |         |                      |      | 960 g a.i./ha | n.a. |                       |                                  |
| Rye              | Secale cereale  | NEU    | Outdoor        | AT                      | Zabrus tenebrioides | EC              | 480.0 g/L | Foliar treatment – spraying | 30         | 65          |         |                      |      | 960 g a.i./ha | n.a. |                       |                                  |
| Wheat            | Triticum aestivum | NEU    | Outdoor        | AT                      | Zabrus tenebrioides | EC              | 480.0 g/L | Foliar treatment – spraying | 30         | 65          |         |                      |      | 960 g a.i./ha | n.a. |                       |                                  |
| Sugar beet       | Beta vulgaris   | NEU    | Outdoor        | AT                      | Tanymecus palliatus | EC              | 480.0 g/L | Foliar treatment – spraying | 1          | 1           |         |                      |      | 960 g a.i./ha | 60   | More critical GAP authorised in CZ (foliar, 1 × 300 g a.i./ha, PHI 14 days) but not supported by residue trials |
| Fodder beet      | Beta vulgaris   | NEU    | Outdoor        | AT                      | Tanymecus palliatus | EC              | 480.0 g/L | Foliar treatment – spraying | 1          | 1           |         |                      |      | 960 g a.i./ha | 60   |                       |                                  |
## Critical outdoor GAPs for northern Europe

| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|-------------|-----------------|--------|----------------|-------------------------|----------------|-------------|-------------|-----------------------------|-------------------------------|
| Maize (for forage) | *Zea mays* | NEU | Outdoor | FR | | EC | Foliar treatment – spraying | 59 | 1 | 1 | 400 g a.i./ha | n.a. |

(b) Pyrinex 25 CS – northern Europe

| Crop | Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|------|-------------|-----------------|--------|----------------|-------------------------|----------------|-------------|-------------|-----------------------------|-------------------------------|
| Broccoli | *Brassica oleracea* var. *italica* | NEU | Outdoor | FR | | CS | Seed treatment – general (see also comment field) | 0 | 0 | 1 | 1 | 1,000 g a.i./100 kg | n.a. |
| Cauliflower | *Brassica oleracea* var. *botrytis* | NEU | Outdoor | FR | | CS | Seed treatment – general (see also comment field) | 0 | 0 | 1 | 1 | 1,000 g a.i./100 kg | n.a. |
| Brussels sprouts | *Brassica oleracea* var. *geminifera* | NEU | Outdoor | FR | | CS | Seed treatment – general (see also comment field) | 0 | 0 | 1 | 1 | 1,000 g a.i./100 kg | n.a. |
| Crop                        | Scientific name                          | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation Content Type | Method | Growth stage From BBCH | Until BBCH | Number | Interval (days) Min. | Max. | Rate | PHI or waiting period (days) | Comments (max. 250 characters) |
|-----------------------------|------------------------------------------|--------|----------------|-------------------------|-----------------|---------------------------|--------|-----------------------|-----------|--------|---------------------|------|-------|------------------------|---------------------------------|
| Head cabbage                | Brassica oleracea convar. capitata       | NEU    | Outdoor        | FR                      | Seed treatment – general (see also comment field) | CS 250.0 g/L  | Seed treatment – general (see also comment field) | 0     | 0     | 1                   | 1   | 1,000 | 100 kg                | n.a.                            |
| Kale                        | Brassica oleracea convar. acephala       | NEU    | Outdoor        | FR                      | Seed treatment – general (see also comment field) | CS 250.0 g/L  | Seed treatment – general (see also comment field) | 0     | 0     | 1                   | 1   | 1,000 | 100 kg                | n.a.                            |
| Kohlrabi                    | Brassica oleracea convar. acephala, var. gongylodes | NEU    | Outdoor        | FR                      | Seed treatment – general (see also comment field) | CS 250.0 g/L  | Seed treatment – general (see also comment field) | 0     | 0     | 1                   | 1   | 1,000 | 100 kg                | n.a.                            |
| Spinach                     | Spinacia oleracea                        | NEU    | Outdoor        | FR                      | Seed treatment – general (see also comment field) | CS 250.0 g/L  | Seed treatment – general (see also comment field) | 0     | 0     | 1                   | 1   | 150   | 100 kg                | n.a.                            |
| Beans (with pods)           | Phaseolus vulgaris                       | NEU    | Outdoor        | FR                      | Seed treatment – general (see also comment field) | CS 250.0 g/L  | Seed treatment – general (see also comment field) | 0     | 0     | 1                   | 1   | 75    | 100 kg                | n.a.                            |
| Beans (dry)                 | Phaseolus vulgaris                       | NEU    | Outdoor        | FR                      | Seed treatment – general (see also comment field) | CS 250.0 g/L  | Seed treatment – general (see also comment field) | 0     | 0     | 1                   | 1   | 75    | 100 kg                | n.a.                            |
### Critical outdoor GAPs for northern Europe

| Crop | Scientific name      | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Content | Method                              | Growth stage | Application | PHI or waiting period (days) | Comments |
|------|----------------------|--------|----------------|-------------------------|-----------------|-------------|---------|------------------------------------|--------------|-------------|-----------------------------|----------|
| Lupins | *Lupinus* spp. | NEU | Outdoor | FR | CS | 250.0 | g/L | Seed treatment – general (see also comment field) | 0 | 0 | 1 | 1 | 75 | g a.i./100 kg | n.a. |
| Rape seed | *Brassica napus* | NEU | Outdoor | FR | CS | 250.0 | g/L | Foliar treatment – spraying | 59 | 1 | 1 | 1 | 187.50 | g a.i./ha | n.a. |
| Mustard seed | *Brassica nigra* | NEU | Outdoor | FR | CS | 250.0 | g/L | Foliar treatment – spraying | 59 | 1 | 1 | 1 | 187.50 | g a.i./ha | n.a. |
| Gold of pleasure | *Camelina sativa* | NEU | Outdoor | FR | CS | 250.0 | g/L | Foliar treatment – spraying | 59 | 1 | 1 | 1 | 187.50 | g a.i./ha | n.a. |
### Critical outdoor GAPs for southern Europe

| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | PHI or waiting period (days) | PHI or waiting period (days) | PHI or waiting period (days) |
|-------------|-----------------|--------|----------------|-------------------------|-----------------|--------------|-------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Grapefruit  | *Citrus paradisi* | SEU    | Outdoor        | ES                      | Scale insects, whitefly | EC 480.0 g/L   | Foliar treatment – spraying | 11 89 1 2 60 1,440 2,400 g a.i./ha | 21 | GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) No applications authorised during flowering (BBCH 60-69) |
| Oranges     | *Citrus sinensis* | SEU    | Outdoor        | ES                      | Scale insects, whitefly | EC 480.0 g/L   | Foliar treatment – spraying | 11 89 1 2 60 1,440 2,400 g a.i./ha | 21 | GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) No applications authorised during flowering (BBCH 60-69) |
## Critical outdoor GAPs for southern Europe

| Common name     | Scientific name       | Region | Outdoor/in | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments |
|-----------------|-----------------------|--------|------------|--------------------------|-----------------|-------------|-------------|-----------------------------|----------|
| **Lemons**      | *Citrus limon*        | SEU    | Outdoor    | ES                       | Scale insects, whitefly | EC          | Foliar treatment – spraying | 21             | GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) No applications authorised during flowering (BBCH 60-69) |
| **Limes**       | *Citrus aurantifolia* | SEU    | Outdoor    | ES                       | Scale insects, whitefly | EC          | Foliar treatment – spraying | 21             | GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) No applications authorised during flowering (BBCH 60-69) |
| Crop | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) |
|------|-----------------|--------|----------------|-------------------------|-----------------|--------------|-------------|----------------------------|
| Mandarins | *Citrus reticulata* | SEU | Outdoor | ES | Scale insects, whitefly | EC 480.0 g/L | Foliar treatment – spraying | 11 89 1 2 60 1,440 2,400 g a.i./ha | 21 |
| Almonds | *Prunus dulcis* | SEU | Outdoor | IT | Soil dwelling insects | GB 1.0 g/kg | Soil treatment – granules overall | 0 75 1 1 100 200 g a.i./ha | n.a. |
| Chestnuts | *Castanea sativa* | SEU | Outdoor | IT | Soil dwelling insects | GB 1.0 g/kg | Soil treatment – granules overall | 0 75 1 1 100 200 g a.i./ha | n.a. |
| Hazelnuts | *Corylus avellana* | SEU | Outdoor | IT | Soil dwelling insects | GB 1.0 g/kg | Soil treatment – granules overall | 0 75 1 1 100 200 g a.i./ha | n.a. |
| Walnuts | *Juglans regia* | SEU | Outdoor | IT | Soil dwelling insects | GB 1.0 g/kg | Soil treatment – granules overall | 0 75 1 1 100 200 g a.i./ha | n.a. |
| Apples | *Malus domestica* | SEU | Outdoor | IT | Lepidoptera, scales, psyllids | EC 480.0 g/L | Foliar treatment – spraying | 1 2 14 792 g a.i./ha | 30 |
| Pears | *Pyrus communis* | SEU | Outdoor | IT | Lepidoptera, scales, psyllids | EC 480.0 g/L | Foliar treatment – spraying | 1 2 14 792 g a.i./ha | 30 |
| Crop                        | Scientific name | Region | Outdoor/ indoor | Member state or country | Pest controlled | Formulation | Application | Growth stage | Number | Interval (days) | Rate | PHI or waiting period (days) | Comments |
|-----------------------------|-----------------|--------|-----------------|-------------------------|----------------|-------------|-------------|--------------|---------|-----------------|-------|--------------------------|----------|
| Quinces                     | Cydonia oblonga | SEU    | Outdoor         | PT                      | Querapadiotus pernicious | EC 480.0 g/L   | Foliar treatment – spraying | 1 to 1       | 720     | 960 g a.i./ha     |       | 21                      |          |
| Medlar                      | Mespilus germanica | SEU    | Outdoor         | IT                      | Soil dwelling insects | GB 1.0 g/kg   | Soil treatment – granules overall | 0 to 75     | 1 to 1   | 100 g a.i./ha     |       | n.a.                    |          |
| Apricots                    | Prunus armeniaca | SEU    | Outdoor         | IT                      | Soil dwelling insects | GB 1.0 g/kg   | Soil treatment – granules overall | 0 to 75     | 1 to 1   | 100 g a.i./ha     |       | n.a.                    |          |
| Cherries                    | Prunus cerasus, Prunus avium | SEU    | Outdoor         | IT                      | Soil dwelling insects | GB 1.0 g/kg   | Soil treatment – granules overall | 0 to 75     | 1 to 1   | 100 g a.i./ha     |       | n.a.                    |          |
| Peaches                     | Prunus persica  | SEU    | Outdoor         | IT                      | Lepidotera, scales, Ceratitis capitata | EC 480.0 g/L | Foliar treatment – spraying | 1 to 2       | 14       | 792 g a.i./ha     |       | 30                      |          |
| Plums                       | Prunus domestica | SEU    | Outdoor         | EL                      | Sucking and biting insects | EC 480.0 g/L | Foliar treatment – spraying | 10 to 59    | 1 to 15  | 960 g a.i./ha     | 2,400 | n.a.                    | GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) |
| Crop                  | Pest controlled | Common Name | Scientific name | Region | Outdoor/indoor | Member state or country | Formulation | Content | Method            | Growth stage | Number | Interval (days) | Rate | PHI or waiting period (days) | Comments                                                                 |
|----------------------|-----------------|-------------|-----------------|--------|----------------|------------------------|--------------|---------|-------------------|--------------|--------|----------------|------|-------------------|--------------------------------------------------------------------------|
| Wine grapes          | Grape berry moth | Vitis euvitis | SEU              | Outdoor | PT             |                        | EC           | 480.0   | g/L                | Foliar treatment – spraying | 89      | 1               | 2    | 14                | 360 g a.i./ha                                                                   |
| Strawberries         | Aphids, weevils  | Fragaria x ananassa | SEU              | Outdoor | PT             |                        | EC           | 480.0   | g/L                | Foliar treatment – spraying | 35               | 95              | 1   | 1                | 360 720 g a.i./ha                                                              | GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) No applications authorised during flowering (BBCH 60–69) More critical GAP authorised in ES (960 g a.i./ha, PHI 21 days) but not supported by residue trials |
### Critical outdoor GAPs for southern Europe

| Crop | Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) |
|------|-------------|-----------------|--------|----------------|-------------------------|-----------------|-------------|-------------|----------------------------|
| Bananas | Musa x paradisiaca | SEU | Outdoor | PT | Tetanychus urticae, Opogona sacchari, thrips sp. | EC | 480.0 | g/L | Foliar treatment – spraying | 720 | 960 g a.i./ha | 21 |
| Potatoes | Tuber form Solanum spp. | SEU | Outdoor | FR | | EC | 500.0 | g/L | Foliar treatment – spraying | 300 | 21 |
| Carrots | Daucus carota | SEU | Outdoor | IT | Lepidoptera and Diptera larvae | GR | 75.0 | g/kg | Soil treatment – granules in row | 2,250 | 3,000 g a.i./ha | 21 |
| Radishes | Raphanus sativus var. sativus | SEU | Outdoor | PT | Soil insects | GR | 5.0 | % (w/w) | Soil treatment – granules in row | 400 | 500 g a.i./ha | 21 |

**Comments (max. 250 characters)**
- GAP includes other formulations with uncontrolled release (EC 200 g/L).
- More critical GAPs authorised in IT (foliar, 1 × 600 g a.i./ha, PHI 21 days) and EL (foliar, 2 × 1,200 g a.i./ha, PHI 20 days) not supported by residue trials.
- More critical GAP authorised in EL (foliar, 2 × 1,200 g a.i./ha, PHI 20 days) not supported by residue trials.
### Critical outdoor GAPs for southern Europe

| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments |
|-------------|-----------------|--------|----------------|-------------------------|-----------------|-------------|-------------|-----------------------------|----------|
| Garlic      | *Allium sativum* | SEU    | Outdoor        | IT                      | Soil dwelling insects | GB          | 1.0 g/kg    | Soil treatment – granules in row | 0 75 1 1 100 200 g a.i./ha | n.a. |
| Onions      | *Allium cepa*   | SEU    | Outdoor        | IT                      | Lepidoptera and Diptera larvae | GR          | 75.0 g/kg   | Soil treatment – granules in row | 0 0 1 1 2,250 3,000 g a.i./ha | 21 More critical GAPs authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 21 days) and EL (foliar, 2 × 1,200 g a.i./ha, PHI 20 days) not supported by residue trials |
| Shallots    | *Allium ascalonicum* (*Allium cepa var. aggregatum*) | SEU    | Outdoor        | IT                      | Soil dwelling insects | GB          | 1.0 g/kg    | Soil treatment – granules in row | 0 75 1 1 100 200 g a.i./ha | n.a. |
| Tomatoes    | *Lycopersicum esculentum* | SEU    | Outdoor        | IT                      | Lepidoptera and Diptera larvae | GR          | 75.0 g/kg   | Soil treatment – granules in row | 0 0 1 1 2,250 3,000 g a.i./ha | 21 More critical GAPs authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 21 days) and EL (foliar, 2 × 1,200 g a.i./ha, BBCH 59) not supported by residue trials |
## Critical outdoor GAPs for southern Europe

| Crop | Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Content Type | Growth stage | Application | Comments |
|------|-------------|-----------------|--------|---------------|------------------------|-----------------|--------------|---------------|--------------|-------------|----------|
|     |             |                 |        |               |                        |                 |              | Concentration |             |             |          |
|     |             |                 |        |               |                        |                 |              | Unit          |             |             |          |
| Peppers | Capsicum annuum, var. grossum and var. longum | SEU | Outdoor | IT | Lepidoptera and Diptera larvae | GR | 75.0 | g/kg | Soil treatment – granules in row | 0 | 0 | 1 | 1 | 2,250 | 3,000 | 21 | More critical GAPs authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 21 days) and EL (foliar, 2 × 1,200 g a.i./ha, BBCH 59) not supported by residue trials |
| Aubergines (egg plants) | Solanum melongena | SEU | Outdoor | IT | Lepidoptera and Diptera larvae | GR | 75.0 | g/kg | Soil treatment – granules in row | 0 | 0 | 1 | 1 | 2,250 | 3,000 | 15 | More critical GAP authorised in EL (foliar, 2 × 1,200 g a.i./ha, BBCH 59) not supported by residue trials |
| Melons | Cucumis melo | SEU | Outdoor | IT | Soil dwelling insects | GB | 1.0 | g/kg | Soil treatment – granules in row | 0 | 75 | 1 | 1 | 100 | 200 | n.a. | |
| Pumpkins | Cucurbita maxima | SEU | Outdoor | IT | Soil dwelling insects | GB | 1.0 | g/kg | Soil treatment – granules in row | 0 | 75 | 1 | 1 | 100 | 200 | n.a. | |
| Watermelons | Citrullus lanatus | SEU | Outdoor | IT | Soil dwelling insects | GB | 1.0 | g/kg | Soil treatment – granules in row | 0 | 75 | 1 | 1 | 100 | 200 | n.a. | |
## Critical outdoor GAPs for southern Europe

| Crop | Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments |
|------|-------------|-----------------|--------|----------------|-------------------------|----------------|-------------|-------------|-----------------------------|----------|
| Broccoli | Brassica oleracea var. italicca | SEU Outdoor IT | Lepidoptera and Diptera larvae | GR | 75.0 g/kg | Soil treatment – granules in row | 0 0 1 1 | 2,250 3,000 g a.i./ha | 15 | More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI unknown) not supported by residue trials |
| Cauliflower | Brassica oleracea var. botrytis | SEU Outdoor IT | Lepidoptera and Diptera larvae | GR | 75.0 g/kg | Soil treatment – granules in row | 0 0 1 1 | 2,250 3,000 g a.i./ha | 15 | More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI unknown) not supported by residue trials |
| Brussels sprouts | Brassica oleracea var. gemmifera | SEU Outdoor IT | Lepidoptera and Diptera larvae | GR | 75.0 g/kg | Soil treatment – granules in row | 0 0 1 1 | 2,250 3,000 g a.i./ha | 15 | More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI unknown) not supported by residue trials |
| Head cabbage | Brassica oleracea convar. capitata | SEU Outdoor IT | Soil dwelling insects | GB | 1.0 g/kg | Soil treatment – granules in row | 0 75 1 1 | 100 200 g a.i./ha | n.a. | |
| Lamb's lettuce | Valerianella locusta | SEU Outdoor IT | Soil dwelling insects | GB | 1.0 g/kg | Soil treatment – granules in row | 0 75 1 1 | 100 200 g a.i./ha | n.a. | |
| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application |
|-------------|-----------------|--------|----------------|-------------------------|-----------------|-------------|-------------|
| Lettuce     | Lactuca sativa  | SEU    | Outdoor        | IT                      | Soil dwelling insects | GB 1.0 g/kg Soil treatment – granules in row | 0 75 1 1 | 100 200 g a.i./ha | n.a. |
| Scarole     | Cichorium endivia | SEU    | Outdoor        | IT                      | Soil dwelling insects | GB 1.0 g/kg Soil treatment – granules in row | 0 75 1 1 | 100 200 g a.i./ha | n.a. |
| Rocket, Rucola | Eruca sativa (Diplotaxis sp.) | SEU    | Outdoor        | IT                      | Soil dwelling insects | GB 1.0 g/kg Soil treatment – granules in row | 0 75 1 1 | 100 200 g a.i./ha | n.a. |
| Beans (with pods) | Phaseolus vulgaris | SEU    | Outdoor        | IT                      | Lepidoptera and Diptera larvae | GR 75.0 g/kg Soil treatment – granules in row | 0 0 1 1 | 2,250 3,000 g a.i./ha | 15 More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 15 days) not supported by residue trials |
| Beans (without pods) | Phaseolus vulgaris | SEU    | Outdoor        | IT                      | Lepidoptera and Diptera larvae | GR 75.0 g/kg Soil treatment – granules in row | 0 0 1 1 | 2,250 3,000 g a.i./ha | 15 More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 15 days) not supported by residue trials |
### Critical outdoor GAPs for southern Europe

| Crop | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments |
|------|-----------------|--------|----------------|-------------------------|----------------|-------------|-------------|-----------------------------|----------|
| Peas (with pods) | *Pisum sativum* | SEU | Outdoor | IT | Lepidoptera and Diptera larvae | GR 75.0 g/kg Soil treatment - granules in row | 0 0 1 1 | 2,250 3,000 g | a.i./ha | 15 | More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 15 days) not supported by residue trials |
| Peas (without pods) | *Pisum sativum* | SEU | Outdoor | IT | Lepidoptera and Diptera larvae | GR 75.0 g/kg Soil treatment - granules in row | 0 0 1 1 | 2,250 3,000 g | a.i./ha | 15 | More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 15 days) not supported by residue trials |
| Asparagus | *Asparagus officinalis* | SEU | Outdoor | IT | Lepidoptera | EC 480.0 g/L Foliar treatment - spraying | 1 1 | 408 495 g | a.i./ha | 15 | |
| Globe artichokes | *Cynara scolymus* | SEU | Outdoor | IT | Soil dwelling insects | GB 1.0 g/kg Soil treatment - granules in row | 0 75 1 1 | 100 200 g | a.i./ha | n.a. | |
| Beans (dry) | *Phaseolus vulgaris* | SEU | Outdoor | IT | Lepidoptera and Diptera larvae | GR 75.0 g/kg Soil treatment - granules in row | 0 0 1 1 | 2,250 3,000 g | a.i./ha | 15 | More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 15 days) not supported by residue trials |
| Common name | Scientific name | Region | Outdoor/ indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments
|-------------|-----------------|--------|-----------------|-------------------------|----------------|-------------|-------------|-----------------------------|----------------------------------------
| Peas (dry)  | *Pisum sativum* | SEU    | Outdoor         | IT                      | Lepidoptera and Diptera larvae | GR 75.0 g/kg Soil treatment – granules in row | 0 0 1 1 | 2,250 3,000 g a.i./ha | More critical GAP authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 15 days) not supported by residue trials
| Sunflower seed | *Helianthus annuus* | SEU    | Outdoor         | ES, PT                  | Agriotes sp., Agrotus sp., dipterous larvae | GR 5.0 % Soil treatment – general (see also comment field) | 0 0 1 1 | 400 500 g a.i./ha | Granules incorporated in soil at sowing Foliar GAP is authorised in IT (foliar, 1 × 495 g a.i./ha, PHI 120 days) not supported by residue trials
| Rape seed   | *Brassica napus* | SEU    | Outdoor         | FR                      |                 | EC 500.0 g/L Foliar treatment – spraying | 59 1 1 | 250 g a.i./ha | More critical GAP authorised in PT (1 × 0.48 kg a.i./ha, BBCH 59) but not supported by residue trials
### Critical outdoor GAPs for southern Europe

| Crop                          | Scientific name                     | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments |
|-------------------------------|-------------------------------------|--------|----------------|-------------------------|-----------------|-------------|-------------|-----------------------------|----------|
| Soya bean                     | Glycine max                         | SEU    | Outdoor IT     | Lepidoptera and Diptera larvae | GR 75.0 g/kg Soil treatment – granules in row | 0 0 1 1 2,250 3,000 g a.i./ha | 120 | More critical GAP authorised in IT (foliar, 1 × 576 g a.i./ha, PHI 120 days) not supported by residue trials |
| Mustard seed                  | Brassica nigra                      | SEU    | Outdoor PT     | Ceutorhynchus napi, Meligethes aeneus | EC 500.0 g/L Foliar treatment – spraying | 59 1 1 | 250 g a.i./ha | n.a. | |
| Cotton seed                   | Gossypium spp.                      | SEU    | Outdoor EL     | Heliothis, Spodoptera, Pectinophora, aphids, thrips | EC 480.0 g/L Foliar treatment – spraying | 51 59 1 1 | 960 g a.i./ha | 90 | More critical GAP also authorised (2 × 1.2 kg a.i./ha, PHI 20 days) but not supported by residue trials |
| Gold of pleasure              | Camelina sativa                     | SEU    | Outdoor FR     |                                     | EC 500.0 g/L Foliar treatment – spraying | 59 1 1 | 250 g a.i./ha | n.a. | |
| Olives for oil production     | Olea europaea                       | SEU    | Outdoor IT     | Soil dwelling insects             | GB 1.0 g/kg Soil treatment – granules overall | 0 75 1 1 | 100 200 g a.i./ha | n.a. | |
| Common name  | Scientific name                     | Region | Outdoor/indoor | Member state or country | Pest controlled                  | Formulation | Application | PHI or waiting period (days) | Comments                                                                 |
|-------------|-------------------------------------|--------|----------------|-------------------------|----------------------------------|-------------|-------------|-----------------------------|---------------------------------------------------------------------------|
| Barley      | Hordeum spp.                        | SEU    | Outdoor        | PT                      | Ground beetles, Lema spp.        | EC          | Foliar treatment – spraying | 720 g a.i./ha                | GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) |
| Buckwheat   | Fagopyrum esculentum                | SEU    | Outdoor        | IT                      | Soil dwelling insects            | GB          | Soil treatment – granules in row | n.a.                        |                                                                                          |
| Maize       | Zea mays                            | SEU    | Outdoor        | FR                      | Soil dwelling insects            | EC          | Foliar treatment – spraying | 400 g a.i./ha                | Different GAP authorised in IT (2 x 480–816 g a.i./ha, PHI 30 days) but not supported by residue trials |
| Millet      | Panicum spp.                        | SEU    | Outdoor        | IT                      | Soil dwelling insects            | GB          | Soil treatment – granules in row | n.a.                        |                                                                                          |
| Oats        | Avena fatua                         | SEU    | Outdoor        | IT                      | Soil dwelling insects            | GB          | Soil treatment – granules in row | n.a.                        |                                                                                          |
| Rye         | Secale cereale                      | SEU    | Outdoor        | IT                      | Soil dwelling insects            | GB          | Soil treatment – granules in row | n.a.                        |                                                                                          |
### Critical outdoor GAPs for southern Europe

| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Content | Method | Growth stage | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|-------------|----------------|--------|----------------|-------------------------|-----------------|-------------|---------|--------|--------------|-------------|----------------------------|-------------------------------|
| Wheat | *Triticum aestivum* | SEU | Outdoor | PT | Ground beetles, *Lema* spp. | EC | 480.0 g/L | Foliar treatment – spraying | 12 | 59 | 1 | 2 | 60 | 720 g a.i./ha | n.a. GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) |
| Sugar beet | *Beta vulgaris* | SEU | Outdoor | IT | *Chaetocnema tibialis*, *Atomaria* sp., Lepidoptera | EC | 480.0 g/L | Foliar treatment – spraying | 1 | 1 | 408 | 528 | g a.i./ha | 60 |
| Maize (for forage) | *Zea mays* | SEU | Outdoor | FR | | EC | 500.0 g/L | Foliar treatment – spraying | 59 | 1 | 1 | 400 | g a.i./ha | n.a. |

(d) Pyrinex 25 CS – southern Europe

| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Content | Method | Growth stage | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|-------------|----------------|--------|----------------|-------------------------|-----------------|-------------|---------|--------|--------------|-------------|----------------------------|-------------------------------|
| Grapefruit | *Citrus paradisi* | SEU | Outdoor | IT | Sucking and biting insects | CS | 250.0 g/L | Foliar treatment – spraying | 1 | 1 | 1,050 | g a.i./ha | 60 | GAP will not be supported for re-registration in IT |

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| Crop   | Scientific name   | Region | Outdoor/indoor | Member state or country | Pest controlled                  | Formulation Type | Content Conc. | Unit | Method                      | Growth stage From BBCH | Until BBCH | Number | Interval (days) | Rate | PHI or waiting period (days) | Comments (max. 250 characters) |
|--------|-------------------|--------|----------------|------------------------|----------------------------------|------------------|---------------|------|-----------------------------|------------------------|------------|--------|----------------|------|---------------------------|--------------------------------|
| Oranges | Citrus sinensis   | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying | 1 1 | 1,050 g a.i./ha | 60 | Gap will not be supported for re-registration in IT |
| Lemons  | Citrus limon      | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying | 1 1 | 1,050 g a.i./ha | 60 | Gap will not be supported for re-registration in IT |
| Mandarins | Citrus reticulata | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying | 1 1 | 1,050 g a.i./ha | 60 | Gap will not be supported for re-registration in IT |
| Apples  | Malus domestica   | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying | 1 1 | 525 g a.i./ha | 30 | |
| Pears   | Pyrus communis    | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying | 1 1 | 525 g a.i./ha | 30 | |
| Quinces | Cydonia oblonga   | SEU    | Outdoor EL     | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying | 1 2 | 15 | 500 g a.i./ha | 30 | No applications authorised during flowering (BBCH 60–69) |
| Peaches | Prunus persica    | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying | 1 1 | 525 g a.i./ha | 30 | |
| Plums   | Prunus domestica  | SEU    | Outdoor EL     | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying | 1 2 | 15 | 750 g a.i./ha | 20 | No applications authorised during flowering (BBCH 60–69) |
## Critical outdoor GAPs for southern Europe

| Crop                  | Common name                  | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled                                   | Formulation Type | Content Conc. | Unit | Method                             | Growth stage From BBCH | Until BBCH | Number | Interval (days) | Rate     | PHI or waiting period (days) | Comments (max. 250 characters) |
|-----------------------|------------------------------|----------------|--------|----------------|-------------------------|--------------------------------------------------|------------------|---------------|------|-----------------------------------|-------------------------|------------|---------|----------------|---------|----------------------------|--------------------------------|
| Wine grapes           | Vitis euvitis                | SEU            | Outdoor | EL             | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying          | 1 2 14           | 360 g          | a.i./ha |                                  |                         |            | 1 2 14 | 360 g          | a.i./ha | 21                         | Different GAP authorised in IT (1 × 525 g a.i./ha; PHI 30 days), but it will probably be aligned with EL GAP during re-registration |
| Potatoes              | Tuber form Solanum spp.      | SEU            | Outdoor | EL             | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying          | 10 39            | 1,000 1,200 g | a.i./ha |                                  |                         |            | 10 39 | 1,000 1,200 g | a.i./ha | n.a.                        | Different GAP authorised in IT (1 × 500 g a.i./ha; PHI 30 days), but it will probably not be supported for re-registration |
| Carrots               | Daucus carota                | SEU            | Outdoor | EL             | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying          | 1 2 15           | 1,000 g          | a.i./ha |                                  |                         |            | 1 2 15 | 1,000 g          | a.i./ha | 20                         | Less critical GAP authorised in IT (1 × 500 g a.i./ha; PHI 21 days) will probably not be supported for re-registration |
| Radishes              | Raphanus sativus var. sativus | SEU            | Outdoor | EL             | Sucking and biting insects | CS 250.0 g/L Foliar treatment – spraying          | 1 2 15           | 1,000 g          | a.i./ha |                                  |                         |            | 1 2 15 | 1,000 g          | a.i./ha | 20                         |                                  |
### Critical outdoor GAPs for southern Europe

| Common name      | Scientific name | Region | Outdoor/indoor | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments |
|------------------|-----------------|--------|----------------|-----------------|-------------|-------------|----------------------------|----------|
| Onions           | Allium cepa     | SEU    | Outdoor EL     | Sucking and biting insects | CS 250.0 g/L | Foliar treatment – spraying | 1,000 g a.i./ha | 20 Less critical GAP authorised in IT (1 × 500 g a.i./ha; PHI 21 days) will probably not be supported for re-registration |
| Tomatoes         | Lycopersicum esculentum | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L | Foliar treatment – spraying | 500 g a.i./ha | 21 |
| Peppers          | Capsicum annuum, var. grossum and var. longum | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L | Foliar treatment – spraying | 500 g a.i./ha | 21 |
| Aubergines (egg plants) | Solanum melongena | SEU    | Outdoor EL     | Sucking and biting insects | CS 250.0 g/L | Foliar treatment – spraying | 1,000 g a.i./ha | 20 |
| Beans (with pods) | Phaseolus vulgaris | SEU    | Outdoor IT     | Sucking and biting insects | CS 250.0 g/L | Foliar treatment – spraying | 500 g a.i./ha | 15 GAP will not be supported for re-registration in IT; GAP supported for re-registration was not reported to EFSA |
### Critical outdoor GAPs for southern Europe

| Common name (Crop) | Scientific name (Common name) | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation Type | Content Conc. | Unit | Method | Growth stage From BBCH | Until BBCH | Number | Interval (days) Min. | Max. | Rate Min. | Max. | Unit | PHI or waiting period (days) | Comments (max. 250 characters) |
|--------------------|--------------------------------|--------|----------------|--------------------------|----------------|------------------|---------------|------|--------|----------------------|-----------|--------|---------------------|------|----------|------|------|------------------------|--------------------------------|
| Beans (without pods) | Phaseolus vulgaris | SEU | Outdoor | IT | Sucking and biting insects | CS | 250.0 | g/L | Foliar treatment – spraying | 1 | 1 | | | 500 | g a.i./ha | 15 | GAP will not be supported for re-registration in IT; GAP supported for re-registration was not reported to EFSA |
| Peas (with pods) | Pisum sativum | SEU | Outdoor | IT | Sucking and biting insects | CS | 250.0 | g/L | Foliar treatment – spraying | 1 | 1 | | | 500 | g a.i./ha | 15 | GAP will not be supported for re-registration in IT; GAP supported for re-registration was not reported to EFSA |
| Peas (without pods) | Pisum sativum | SEU | Outdoor | IT | Sucking and biting insects | CS | 250.0 | g/L | Foliar treatment – spraying | 1 | 1 | | | 500 | g a.i./ha | 15 | GAP will not be supported for re-registration in IT; GAP supported for re-registration was not reported to EFSA |
### Critical outdoor GAPs for southern Europe

| Crop | Common name | Scientific name | Region | Outdoor/ indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments |
|------|-------------|-----------------|--------|-----------------|------------------------|----------------|-------------|-------------|---------------------------|----------|
|      |             |                 |        |                 |                        |                | Type        | Content     | Method                     |          |
|      |             |                 |        |                 |                        |                | Conc.       | Unit        |                          |          |
| Asparagus | Asparagus officinalis | SEU | Outdoor | IT | Sucking and biting insects | CS | 250.0 | g/L | Foliar treatment – spraying | 1 | 1 | 325 g a.i./ha | Unclear if this GAP refers to slow release formulations. GAP will anyhow not be supported for re-registration in IT. |
| Beans (dry) | Phaseolus vulgaris | SEU | Outdoor | IT | Sucking and biting insects | CS | 250.0 | g/L | Foliar treatment – spraying | 1 | 1 | 500 g a.i./ha | GAP will not be supported for re-registration in IT; GAP supported for re-registration was not reported to EFSA. |
| Peas (dry) | Pisum sativum | SEU | Outdoor | IT | Sucking and biting insects | CS | 250.0 | g/L | Foliar treatment – spraying | 1 | 1 | 500 g a.i./ha | GAP will not be supported for re-registration in IT; GAP supported for re-registration was not reported to EFSA. |
| Sunflower seed | Helianthus annuus | SEU | Outdoor | IT | Sucking and biting insects | CS | 250.0 | g/L | Foliar treatment – spraying | 1 | 1 | 500 g a.i./ha | GAP will not be supported for re-registration in IT. |

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### Critical outdoor GAPs for southern Europe

| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Pest formulation | Application | PHI or waiting period (days) | Comments |
|-------------|-----------------|--------|----------------|-------------------------|----------------|-----------------|-------------|-----------------------------|----------|
| Rape seed | Brassica napus | SEU | Outdoor | FR | CS 250.0 g/L | Foliar treatment – spraying | 59 1 1 | 187.5 g a.i./ha | n.a. |
| Soya bean | Glycine max | SEU | Outdoor | IT | CS 250.0 g/L | Foliar treatment – spraying | 1 1 | 625 g a.i./ha | 120 GAP will not be supported for re-registration in IT |
| Cotton seed | Gossypium spp. | SEU | Outdoor | EL | CS 250.0 g/L | Foliar treatment – spraying | 1 2 15 | 960 g a.i./ha | 20 |
| Gold of pleasure | Camelina sativa | SEU | Outdoor | FR | CS 250.0 g/L | Foliar treatment – spraying | 59 1 1 | 187.5 g a.i./ha | n.a. |
| Sugar beet | Beta vulgaris | SEU | Outdoor | IT | CS 250.0 g/L | Foliar treatment – spraying | 1 1 | 500 g a.i./ha | 60 GAP will not be supported for re-registration in IT |
**Formulations other than Pyrinex 25 CS – indoor uses**

### Critical indoor GAPs for northern and southern Europe (including post-harvest treatments)

| Crop | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|------|--------|----------------|-------------------------|-----------------|-------------|-------------|-----------------------------|--------------------------------|
| Bananas | NEU/SEU | Indoor | ES | Thrips, scale insects | EC 480.0 g/L | Foliar treatment – spraying | 21 | GAP includes other formulations with uncontrolled release (WG 750 g/L and CS 200 g/L) No applications authorised during flowering (BBCH 60–69) |

### A.2. GAPs for which an acute concern was identified

| Crop | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Application | PHI or waiting period (days) | Comments (max. 250 characters) |
|------|--------|----------------|-------------------------|-----------------|-------------|-------------|-----------------------------|--------------------------------|
| Apples | SEU | Outdoor | IT | Lepidoptera, scales, psyllids | EC 480.0 g/L | Foliar treatment – spraying | 30 | With other formulations than Pyrinex 25 CS |
| Pears | SEU | Outdoor | IT | Lepidoptera, scales, psyllids | EC 480.0 g/L | Foliar treatment – spraying | 30 | With other formulations than Pyrinex 25 CS |
| Apples | SEU | Outdoor | IT | Sucking and biting insects | CS 250.0 g/L | Foliar treatment – spraying | 30 | Pyrinex 25 CS formulation |
| Common name | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation Type | Content Conc. Unit | Method | Growth stage From BBCH | Until BBCH | Number | Interval (days) | Rate | PHI or waiting period (days) | Comments (max. 250 characters) |
|-------------|-----------------|--------|----------------|-------------------------|-----------------|-----------------|------------------|--------|---------------------|-----------|--------|----------------|------|--------------------------|--------------------------------|
| Pears       | Pyrus communis  | SEU    | Outdoor        | IT                      | Sucking and biting insects | CS 250.0 g/L    | Foliar treatment – spraying | 1 1    | 525 g a.i./ha        | 30        | Pyrinex 25 CS formulation |
| Quinces     | Cydonia oblonga | SEU    | Outdoor        | PT                      | Quadraspidiotus pemicios | EC 480.0 g/L    | Foliar treatment – spraying | 1 1    | 720 g a.i./ha        | 21        | With other formulations than Pyrinex 25 CS |
| Peaches     | Prunus persica | SEU    | Outdoor        | IT                      | Sucking and biting insects | CS 250.0 g/L    | Foliar treatment – spraying | 1 1    | 525 g a.i./ha        | 30        | Pyrinex 25 CS formulation |
| Wine grapes | Vitis euvitis   | SEU    | Outdoor        | EL                      | Sucking and biting insects | CS 250.0 g/L    | Foliar treatment – spraying | 1 2    | 14 360 g a.i./ha     | 21        | Pyrinex 25 CS formulation |
| Wine grapes | Vitis euvitis   | NEU    | Outdoor        | FR                      | Sucking and biting insects | CS 250.0 g/L    | Foliar treatment – spraying | 1 1    | 200 g a.i./ha        | 21        | With other formulations than Pyrinex 25 CS |
| Wine grapes | Vitis euvitis   | SEU    | Outdoor        | PT                      | Grape berry moth | EC 480.0 g/L    | Foliar treatment – spraying | 89 1 2 | 14 360 g a.i./ha     | 21        | With other formulations than Pyrinex 25 CS |
| Peppers     | Capsicum annum, var. grossum and var. longum | SEU    | Outdoor        | IT                      | Sucking and biting insects | CS 250.0 g/L    | Foliar treatment – spraying | 1 1    | 500 g a.i./ha        | 21        | Pyrinex 25 CS formulation |
### A.3. Fall-back GAPs identified

| Crop | Scientific name | Region | Outdoor/indoor | Member state or country | Pest controlled | Formulation | Method | Growth stage | Application | Comments max. 250 characters |
|------|-----------------|--------|----------------|-------------------------|-----------------|-------------|--------|--------------|-------------|-----------------------------|
| Apples | Malus domesticus | SEU | Outdoor | EL | Sucking and biting insects | EC | 480 g/L | Foliar treatment - spraying | 10 59 1 2 | 10 15 960 2,400 g a.i./ha | n.a. With other formulations than Pyrinex 25 CS |
| Pears | Pyrus communis | SEU | Outdoor | EL | Sucking and biting insects | EC | 480 g/L | Foliar treatment - spraying | 10 59 1 2 | 10 15 960 2,400 g a.i./ha | n.a. With other formulations than Pyrinex 25 CS |
| Quinces | Cydonia oblonga | SEU | Outdoor | EL | Sucking and biting insects | CS | 250.0 g/L | Foliar treatment - spraying | 1 2 15 | 500 g a.i./ha | 30 Pyrinex 25 CS formulation |
| Peaches | Prunus persica | SEU | Outdoor | IT | Lepidoptera, scales, Ceratitis capitata | EC | 480.0 g/L | Foliar treatment - spraying | 1 2 14 | 792 g a.i./ha | 30 With other formulations than Pyrinex 25 CS |
| Wine grapes | Vitis euvitis | SEU | Outdoor | IT | Soil dwelling insects | GB | 1 g/kg | Soil treatment - granules overall | 0 75 1 1 | 100 200 g a.i./ha | n.a. With other formulations than Pyrinex 25 CS |
| Peppers | Capsicum annuum, var. grossum and var. longum | SEU | Outdoor | IT | Lepidoptera and Diptera larvae | GR | 75.0 g/kg | Soil treatment - granules in row | 0 0 1 1 | 2,250 3,000 g a.i./ha | 21 With other formulations than Pyrinex 25 CS |
| Peppers | Capsicum annuum, var. grossum and var. longum | SEU | Outdoor | EL | Sucking and biting insects | CS | 250 g/L | Foliar treatment - spraying | 10 59 1 2 | 15 480 1,200 g a.i./ha | n.a. Pyrinex 25 CS formulation |
## Appendix B – List of end points

### B.1. Residues in plants

#### B.1.1. Nature of residues and methods of analysis in plants

#### B.1.1.1. Metabolism studies, methods of analysis and residue definitions in plants

| Primary crops (available studies) | Crop groups | Crop(s) | Application(s) | Sampling (DAT) |
|-----------------------------------|-------------|---------|----------------|----------------|
| Fruit crops                       | Oranges     |          | Foliar: 1 × 3.97 kg a.s./ha | 0, 6, 21       |
| Root crops                        | Radish      |          | Foliar: 1 × 1.92 kg a.s./ha  | 0, 7, 14, 21, 35|
| Leafy crops                       | Head cabbage|          | Foliar: 1 × 1.43 kg a.s./ha  | 0, 7, 14, 21, 42|
| Cereals/grass crops               | Maize\(^{a}\) |          | --              | --             |
| Pulses/oilseeds                   | Peas with pods |          | Foliar: 1 × 1.9 kg a.s./ha  | 0, 7, 14, 21, 28|

Sources: Oranges (Spain, 2003); Radish (Spain 2010a,b); Head cabbage (Spain, 2003); Peas with pods (Spain 2010a,b)

\(^{a}\): Studies performed on maize were considered supportive (Spain, 1999)

For soil treatment and seed treatment, additional information is provided by the confined rotational crops study (tentative assessment only)

| Rotational crops (available studies) | Crop groups | Crop(s) | Application(s) | PBI (DAT) |
|--------------------------------------|-------------|---------|----------------|-----------|
| Root/tuber crops                     | Carrots     | Bare soil, 5.4 kg a.s./ha | 30, 132   |
| Leafy crops                          | Lettuce     | Bare soil, 5.4 kg a.s./ha | 30, 132   |
| Cereal (small grain)                 | Wheat       | Bare soil, 5.4 kg a.s./ha | 30, 132   |

Source: Spain (1999)

These studies are considered on a tentative basis because some limitations were identified. Other studies, performed on sugar beets, turnips, spinach and soya beans were considered supportive

| Processed commodities (hydrolysis study) | Conditions | Investigated? |
|------------------------------------------|------------|---------------|
|                                         | Pasteurisation (20 min, 90°C, pH 4) | Yes           |
|                                         | Baking, brewing and boiling (60 min, 100°C, pH 5) | Yes           |
|                                         | Sterilisation (20 min, 120°C, pH 6) | Yes           |

Source: Spain (2016b)
| Question | Answer |
|-----------------|--------|
| Can a general residue definition be proposed for primary crops? | Yes |
| Rotational crop and primary crop metabolism similar? | Yes (tentative conclusion) |
| Residue pattern in processed commodities similar to residue pattern in raw commodities? | No |
| Plant residue definition for monitoring (RD-Mo) | **RD-monitoring 1:**  
- **Raw commodities:** chlorpyrifos  
- **Processed commodities:** sum of chlorpyrifos and its desethyl metabolite, expressed as chlorpyrifos (tentative)  

**RD-monitoring 2 (optional):**  
- **All crops:** sum of 3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates, expressed as 3,5,6-TCP |
| Plant residue definition for risk assessment (RD-RA) | **RD-risk assessment 1:**  
- **Raw commodities:** chlorpyrifos  
- **Processed commodities:** sum of chlorpyrifos and its desethyl metabolite, expressed as chlorpyrifos (tentative)  

**RD-risk assessment 2:**  
- **All crops:** sum of 3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates, expressed as 3,5,6-TCP |
| Conversion factor (monitoring to risk assessment) | Not relevant |
| Methods of analysis for monitoring of residues (analytical technique, crop groups, LOQs) | Chlorpyrifos:  
**GC-MS/MS (EURL, 2016):**  
- QuEChERS method is fully validated in high water, high acid and dry commodities  
- LOQ of 0.01 mg/kg  

**HPLC-MS/MS (Spain, 2010a; France, 2016a):**  
- Validated in high oil content commodities  
- ILV is missing  
- Method validated for two different mass transitions  
- LOQ: 0.01 mg/kg  

Desethyl chlorpyrifos:  
- Analytical method not available for this compound  

3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates:  
**HPLC-MS/MS (France, 2016b):**  
- Validated in high water (grass forage), high acid (orange, lemons), high oil (sunflower, soybean grain) and dry (rice grain) commodities and in grass straw  
- ILV available for dry and high water content commodities  
- Method validated for two different mass transitions  
- Efficiency of the hydrolysis step needs to be validated  
- LOQ: 0.01 mg/kg |
### B.1.1.2. Stability of residues in plants

| Plant products (available studies) | Category            | Commodity                   | $T$ (°C) | Stability (months) |
|-----------------------------------|---------------------|-----------------------------|----------|-------------------|
| **Chlorpyrifos**                   |                     |                             |          |                   |
| High water content                | Apple, tomato, peach and potato | −20                          | 18       |
| High oil content                  | Oilseed rape        | −20                          | 18       |
| Dry commodities                   | Wheat grain         | −20                          | 24       |
| Specific matrix                   | Wheat straw         | −20                          | 24       |
| High acid content                 | Grapes, orange      | −20                          | 18       |
| **3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates$^{(a)}$** |                     |                             |          |                   |
| High water content                | Apple, tomato, peach and potato | −20                          | 18       |
| High oil content                  | Oilseed rape        | −20                          | 18       |
| Dry commodities                   | Wheat grain         | −20                          | 24       |
| Specific matrix                   | Wheat straw         | −20                          | 24       |
| High acid content                 | Grapes, orange      | −20                          | 18       |

*Source:* Spain (2016b); supported by previous studies (Spain, 2003)

(a): As the possible decline of conjugates is expected to proceed through 3,5,6-TCP, conjugates are also covered.
### B.1.2. Magnitude of residues in plants

#### B.1.2.1. Summary of residues data from the supervised residue trials (chlorpyrifos)

| Crop                | Region/indoor | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations) | MRL proposals (mg/kg) | HR (mg/kg)<sup>(b)</sup> | STMR (mg/kg)<sup>(c)</sup> |
|---------------------|---------------|-------------|------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------|--------------------------|---------------------------|
| Citrus fruits       | SEU           | Others      | Oranges: 0.20; 0.24; 0.26; 0.39; 0.44; 0.45; 0.54; 0.55; 0.65; 0.66; 0.72 Mandarins: 0.10; 0.22; 0.32; 0.35; 0.40; 0.60; 0.65; 0.81; 0.83 | Trials on oranges and mandarins compliant with GAP (Spain, 2010a) \( \text{MRL}_{OECD} = 1.43 \) | 1.5                   | 0.83                     | 0.45                     |
| Grapefruit          | SEU           | Pyrinex 25 CS | –                                                                                              | No trials available                         | –                     | –                        | –                         |
| Oranges             | SEU           | Others      | –                                                                                              | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | –                     | –                        | –                         |
| Mandarins           | SEU           | Others      | –                                                                                              | \( 0.01^* \) (tentative)<sup>(g)</sup>        | 0.01                  | 0.01                     | 0.01                     |
| Almonds             | SEU           | Others      | –                                                                                              | –                                                                                              | 0.01*                 | 0.01                     | 0.01                     |
| Hazelnuts           | SEU           | Others      | –                                                                                              | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | \( 0.01^* \) (tentative)<sup>(f)</sup>        | 0.01                     | 0.01                     |
| Chestnuts           | SEU           | Others      | –                                                                                              | Combined data set on apples and pears compliant with GAP (Spain, 2010a) \( \text{MRL}_{OECD} = 0.59 \) | 0.6                   | 0.40                     | 0.04                     |
| Apples              | SEU           | Others      | Apples: < 0.01; 0.02; 0.05; 0.13; 0.35; 0.40 Pears: < 0.01; 0.01; 0.02; 0.02; 0.04; 0.04; 0.05 | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), measurable residues are not expected if applied before flowering (to be confirmed by trials) | \( 0.01^* \) (tentative)<sup>(f)</sup>        | 0.01                     | 0.01                     |
| Pears               | SEU           | Others      | –                                                                                              | Combined data set on apples and pears performed with 2 applications instead of 1 (Spain, 2010b) used on a tentative basis \( \text{MRL}_{OECD} = 0.38 \) | \( 0.4 \) (tentative)<sup>(f)</sup>          | 0.16                     | 0.13                     |
| Apples              | SEU           | Pyrinex 25 CS | Apples: 0.10; 0.10; 0.11<sup>(e)</sup>; 0.13; 0.13; 0.14; 0.16 Pears: 0.13 | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), measurable residues are not expected if applied before flowering (to be confirmed by trials) | \( 0.01^* \) (tentative)<sup>(f)</sup>        | 0.01                     | 0.01                     |
| Pears               | SEU           | Pyrinex 25 CS | –                                                                                              | Combined data set on apples and pears performed with 2 applications instead of 1 (Spain, 2010b) used on a tentative basis \( \text{MRL}_{OECD} = 0.38 \) | \( 0.01^* \) (tentative)<sup>(f)</sup>        | 0.01                     | 0.01                     |

<sup>(a)</sup> SEU = Southern Europe Union

<sup>(b)</sup> HR = Highest recorded

<sup>(c)</sup> STMR = Short-term maximum residue levels

<sup>(d)</sup> Pyrinex 25 CS

<sup>(e)</sup> Tentative

<sup>(f)</sup> (fall-back GAP)

<sup>(g)</sup> (tentative)
| Crop              | Region/indoor\(^{(a)}\) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations) | MRL proposals (mg/kg) | HR (mg/kg)\(^{(b)}\) | STMR (mg/kg)\(^{(c)}\) |
|-------------------|--------------------------|-------------|---------------------------------------------------------------------------------|-----------------------------------------------|-----------------------|---------------------|-------------------|
| Quinces           | SEU                      | Others      | Apples: 0.05; 0.08; 0.12; 0.16\(^{(e)}\); 0.35\(^{(e)}\); 0.40\(^{(e)}\); Pears: 0.02; 0.02; 0.13; 0.13; 0.15 | Combined data set on apples and pears with two applications instead of 1 supporting the GAP on quinces (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue MRL\(_{OECD}\) = 0.64 | 0.7                   | 0.40                | 0.13               |
|                   |                          | SEU         | Others (fall-back GAP)                                                            |                                               |                       |                     |                   |
|                   |                          | SEU         | Pyrinex 25 CS                                                                     | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely |                       |                     |                   |
|                   |                          | SEU         | Medlar                                                                             | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely |                       |                     |                   |
|                   |                          | SEU         | Apricots                                                                           | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely |                       |                     |                   |
|                   |                          | NEU         | Cherries                                                                           | Trials compliant with GAP (Spain, 2010a) MRL\(_{OECD}\) = 0.04 |                       |                     |                   |
|                   |                          | SEU         | Cherries                                                                           | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely |                       |                     |                   |
|                   |                          | SEU         | Peaches                                                                            | Trials compliant with GAP (Spain, 2010a) MRL\(_{OECD}\) = 0.08 |                       |                     |                   |

\(^{(a)}\) Crop: Quinces, SEU, Others; Medlar, SEU, Others; Apricots, SEU, Others; Cherries, NEU, Others; Peaches, SEU, Others

\(^{(b)}\) HR (mg/kg): Hazard Ratio

\(^{(c)}\) STMR (mg/kg): Stochastic Toxicity Margin Ratio
| Crop             | Region/indoor | Formulation         | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|------------------|---------------|---------------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|---------------|----------------|
| Peaches          | SEU           | Pyrinex 25 CS       | 0.02; 0.03; 0.07; 0.11; 0.24(0); 0.29(0); 0.32; 0.35; 0.49; 0.51                              | Trials performed with 2 applications instead of 1 (Spain, 2010b) used on a tentative basis                  | 1 (tentative)       | 0.51          | 0.27           |
|                  | SEU           | Pyrinex 25 CS       | –                                                                                               | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), measurable residues are not expected if applied before flowering (to be confirmed by trials) | 0.01* (tentative)   | 0.01          | 0.01           |
| Plums            | NEU           | Others              | 0.02; 0.07; 0.08; 0.09; 0.12; 0.15                                                            | Trials compliant with GAP (Spain, 2010a) MRL\textsubscript{OECD} = 0.29                                       | 0.3                  | 0.15          | 0.09           |
| Plums            | SEU           | Others              | –                                                                                               | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), it is unlikely that measurable residues of chlorpyrifos will occur if applied before flowering (to be confirmed by trials) | 0.01* (tentative)   | 0.01          | 0.01           |
| Plums            | SEU           | Pyrinex 25 CS       | –                                                                                               | No GAP-compliant trials available                                                                          | –                   | –             | –              |
| Wine grapes      | SEU           | Pyrinex 25 CS       | 0.10; 0.26; 0.34; 0.36; 0.39; 0.43; 0.49; 0.62; 0.63; 0.93; 1.40                               | Trials compliant with GAP (Spain, 2010b) MRL\textsubscript{OECD} = 1.98                                       | 2                   | 1.40          | 0.43           |
| Wine grapes      | NEU           | Others              | 0.07; 0.10; 0.11; 0.14; 0.15; 0.16; 0.38                                                       | Overdosed trials performed with 2 × 360 g a.i./ha and PHI 21 days, instead of 1 × 200 g a.i./ha and PHI 21 days (Spain, 2010a); used on tentative basis MRL\textsubscript{OECD} = 0.57 | 0.6 (tentative)     | 0.38          | 0.14           |
| Wine grapes      | SEU           | Others              | 0.02; 0.03; 0.03; 0.09; 0.12; 0.12; 0.62                                                       | Trials compliant with GAP (Spain, 2010a). An additional trial result of 0.86 mg/kg (derived from a GAP-compliant trial) was regarded as an outlier due to the inconsistencies observed in the residue decline MRL\textsubscript{OECD} = 1.0 | 1                   | 0.62          | 0.09           |
### Crop Residue Levels and Recommendations

| Crop       | Region/indoor | Formulation     | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                                                                                                                                                 | MRL proposals (mg/kg) | HR (mg/kg) | STMR (mg/kg) |
|------------|---------------|-----------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------|--------------|
| SEU        | Others        | –               | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely.                                                                 |                                                                                                                                                                                                                                           | 0.01*                | 0.01       | 0.01         |
| Strawberries | NEU          | Others          | < 0.01; < 0.01; 0.01; 0.02; 0.02; 0.06; 0.11 Trials performed with 1 × 720 g a.i./ha (nominal dose within 25% deviation) and PHI 14 days, instead of 1 × 960 g a.i./ha and PHI 21 days (Spain, 2010a); used on tentative basis MRL\textsubscript{OECD} = 0.17 |Trials with one or two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue MRL\textsubscript{OECD} = 0.13 | 0.2 (tentative)      | 0.11       | 0.02         |
| Strawberries | SEU          | Others          | < 0.01; < 0.01; 0.01; 0.01; 0.02; 0.03; 0.04; 0.04; 0.04; 0.09 Trials with one or two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue MRL\textsubscript{OECD} = 0.13 | –                                                                                                                                                                                                                                          | 0.15                 | 0.09       | 0.03         |
| Bananas    | SEU           | Others          | – While a justification was provided for the granular formulations applied after partial plant cut (Portugal, 2016), GAP-compliant trials supporting the foliar GAP on bananas are not available | –                                                                                                                                                                                                                                          | –                    | –          | –            |
| Bananas    | EU            | Others          | 0.36; 0.48; 1.12; 1.55; 1.58 Trials compliant with GAP (Spain, 2010a) MRL\textsubscript{OECD} = 3.33 | –                                                                                                                                                                                                                                          | 4                    | 1.58       | 1.12         |
| Potatoes   | NEU           | Others          | 4 × < 0.01 2 trials on potatoes compliant with GAP (Czech Republic, 2016a; France 2016a). 2 additional trials performed with a PHI of 21 days (as authorised in FR) | –                                                                                                                                                                                                                                          | 0.01*                | 0.01       | 0.01         |
| SEU        | Others        | 4 × < 0.01      | Trials on potatoes compliant with GAP (France 2016a) | –                                                                                                                                                                                                                                          | 0.01*                | 0.01       | 0.01         |
| Potatoes   | SEU           | Pyrinex 25 CS   | – No trials available | –                                                                                                                                                                                                                                          | –                    | –          | –            |
| Beetroots  | NEU           | Others          | – No GAP-compliant trials available | –                                                                                                                                                                                                                                          | –                    | –          | –            |
| Crop      | Region/ indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)                                                                 | Recommendations/comments (OECD calculations)                                                                                                                                                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|-----------|------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------|----------------|
| Carrots   | SEU              | Others      | –                                                                                                                                                                                                 | Although available trials on onions and potatoes were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01           | 0.01           |
| Carrots   | SEU              | Pyrinex 25 CS | –                                                                                                                                                                                                 | No trials available                                                                                                                                                                                                                       | –                    | –              | –              |
| Radishes  | NEU              | Others      | –                                                                                                                                                                                                 | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment is very unlikely (tentative consideration, to be confirmed by trials)                                                                 | 0.01* (tentative)(d),(f) | 0.01           | 0.01           |
| SEU       | Others           | –                                                                 | –                                                                                                                                                                                                 | Although available trials on onions and potatoes were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01           | 0.01           |
| Radishes  | SEU              | Pyrinex 25 CS | –                                                                                                                                                                                                 | No trials available                                                                                                                                                                                                                       | –                    | –              | –              |
| Garlic    | NEU              | Others      | –                                                                                                                                                                                                 | Considering the non-systemic properties of chlorpyrifos and the product being applied before planting or sowing, measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials)                                                                 | 0.01* (tentative)(d),(f) | 0.01           | 0.01           |
| SEU       | Others           | –                                                                 | –                                                                                                                                                                                                 | Although available trials on onions were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01           | 0.01           |
## Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)

| Crop       | Region/indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)                                                                 | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|------------|------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|---------------|-----------------|
| Onions     | NEU              | Others      | –                                                                                                                                                                                | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment is very unlikely (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01          | 0.01            |
| SEU        | Others           | –           | Although available trials on onions and potatoes were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f)                                                                                       | 0.01                 | 0.01          |
| Onions     | SEU              | Pyrinex 25 CS | –                                                                                                                                                                                | No trials available                                                                                          |                      |               |                 |
| Shallots   | NEU              | Others      | –                                                                                                                                                                                | Considering the non-systemic properties of chlorpyrifos and the product being applied before planting or sowing, measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01          | 0.01            |
| SEU        | Others           | –           | Although available trials on onions were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f)                                                                                       | 0.01                 | 0.01          |
| Spring onions | NEU          | Others      | –                                                                                                                                                                                | Considering the non-systemic properties of chlorpyrifos and the product being applied before planting or sowing, measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01          | 0.01            |
### Crop: Tomatoes
- **Region/indoor** (a): SEU
- **Formulation**: Others
- **Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)**: 0.02; 0.02; 0.03; 0.04; 0.04
- **Recommendations/comments (OECD calculations)**: Although available trials on tomatoes were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials)
- **MRL proposals (mg/kg)**: 0.01* (tentative)(d),(f)
- **HR (mg/kg)**: 0.01
- **STMR (mg/kg)**: 0.01

### Crop: Tomatoes
- **Region**: SEU
- **Formulation**: Pyrinex 25 CS
- **Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)**: 0.02; 0.02; 0.03; 0.04; 0.04
- **Recommendations/comments (OECD calculations)**: Trials compliant with GAP (Spain, 2010b) \(\text{MRL}_{\text{OECD}} = 0.10\)
- **MRL proposals (mg/kg)**: 0.1 (tentative)(f)
- **HR (mg/kg)**: 0.04
- **STMR (mg/kg)**: 0.04

### Crop: Peppers
- **Region**: SEU
- **Formulation**: Others
- **Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)**: 0.02; 0.03; 0.03; 0.10; 0.10
- **Recommendations/comments (OECD calculations)**: Although available trials on tomatoes were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials)
- **MRL proposals (mg/kg)**: 0.2 (tentative)(f)
- **HR (mg/kg)**: 0.10
- **STMR (mg/kg)**: 0.03

### Crop: Peppers
- **Region**: SEU
- **Formulation**: Pyrinex 25 CS (fall-back GAP)
- **Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)**: –
- **Recommendations/comments (OECD calculations)**: Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), it is unlikely that measurable residues of chlorpyrifos will occur if applied before flowering (to be confirmed by trials)
- **MRL proposals (mg/kg)**: 0.01* (tentative)(f)
- **HR (mg/kg)**: 0.01
- **STMR (mg/kg)**: 0.01

### Crop: Aubergines (egg plants)
- **Region**: NEU
- **Formulation**: Others
- **Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)**: –
- **Recommendations/comments (OECD calculations)**: No GAP-compliant trials available
- **MRL proposals (mg/kg)**: –
- **HR (mg/kg)**: –
- **STMR (mg/kg)**: –

### Crop: Aubergines (egg plants)
- **Region**: SEU
- **Formulation**: Pyrinex 25 CS
- **Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)**: –
- **Recommendations/comments (OECD calculations)**: No GAP-compliant trials available
- **MRL proposals (mg/kg)**: –
- **HR (mg/kg)**: –
- **STMR (mg/kg)**: –
## Review of the existing MRLs for chlorpyrifos

| Crop                  | Region/ indoor | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|-----------------------|----------------|-------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|------------------------|--------------|-----------------|
| Melons, Pumpkins, Watermelons | SEU, Others    | –           | 4 × < 0.02                                                                                      | Overdosed trials on melons performed at 400 instead of 200 g a.i./ha (Italy, 2016), acceptable as residues are below LOQ. Extrapolation to pumpkins and watermelons is applicable | 0.01*                  | 0.01         | 0.01            |
| Broccoli, Cauliflower, Brussels sprouts, Head cabbage, Kale, Kohlrabi | NEU, Others    | –           |                                                                                               | Considering the non-systemic properties of chlorpyrifos and the product being applied at an early stage (when watering the plant), measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01         | 0.01            |
| Broccoli, Cauliflower, Brussels sprouts, Head cabbage, Kale, Kohlrabi | NEU, Others    | –           |                                                                                               | Although available trials on lettuce were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01         | 0.01            |
| Lettuce, Lamb's lettuce, Scarole, Rocket | SEU, Others    | –           |                                                                                               | Although available trials on lettuce were not compliant with GAP (Italy, 2016), considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)(d),(f) | 0.01         | 0.01            |
| Spinach               | NEU, Pyrinex 25 CS | 2 × < 0.01   | Trials compliant with GAP (France, 2016a)                                                       |                                                                                                               | 0.01*                  | 0.01         | 0.01            |
### Review of the existing MRLs for chlorpyrifos

| Crop                        | Region/indoor(a) | Formulation       | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)                                                                 | Recommendations/comments (OECD calculations)                                                                                                                                                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|-----------------------------|------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----------------|----------------|
| Beans (fresh, with pods)    | SEU              | Others            | –                                                                                                                                | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials)                                                                                             | 0.01* (tentative)(d),(f) | 0.01           | 0.01            |
| Beans (fresh, without pods) | SEU              | Pyrinex 25 CS     | –                                                                                                                                | Considering the non-systemic properties of chlorpyrifos and the trial results observed for other seed treatments, measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials). Not authorised for use on beans (without pods) and peas (with and without pods) in NEU                                                                 | 0.01* (tentative)(d),(f) | 0.01           | 0.01            |
| Peas (fresh, with pods)     | SEU              | Pyrinex 25 CS     | –                                                                                                                                | No GAP-compliant trials available                                                                                                                                                                                                                                                                                     | –                     | –              | –              |
| Peas (fresh, without pods)  | SEU              | Others            | –                                                                                                                                | No residue trials available                                                                                                                                                                                                                                                                                              | –                     | –              | –              |
| Asparagus                   | SEU              | Others            | –                                                                                                                                | Considering the non-systemic properties of chlorpyrifos and the product being applied before planting or sowing, measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials)                                                                                                         | 0.01* (tentative)(d),(f) | 0.01           | 0.01            |
| Asparagus                   | SEU              | Pyrinex 25 CS     | –                                                                                                                                | No GAP-compliant trials available                                                                                                                                                                                                                                                                                     | –                     | –              | –              |
| Globe artichoke             | SEU              | Others            | –                                                                                                                                | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials)                                                                                             | 0.01* (tentative)(d),(f) | 0.01           | 0.01            |
| Beans (dry)                 | SEU              | Others            | –                                                                                                                                | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials)                                                                                             | 0.01* (tentative)(d),(f) | 0.01           | 0.01            |
| Peas (dry)                  | SEU              | Others            | –                                                                                                                                | Consideration the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials)                                                                                             | 0.01* (tentative)(d),(f) | 0.01           | 0.01            |
| Crop                  | Region/indoor<sup>(a)</sup> | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)<sup>(b)</sup> | STMR (mg/kg)<sup>(c)</sup> |
|----------------------|-----------------------------|-------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|--------------------------|---------------------------|
| Beans (dry)          | NEU                         | Pyrinex 25 CS | –                                                                                             | Considering the non-systemic properties of chlorpyrifos and the trial results observed for other seed treatments, measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials). Not authorised for use on dry peas in NEU | 0.01* (tentative)<sup>(d),(f)</sup> | 0.01                     | 0.01                       |
| Peas (dry)           |                             |             |                                                                                               |                                                                   |                      |                          |                           |
| Lupins (dry)         | SEU                         | Pyrinex 25 CS | –                                                                                             | No GAP-compliant trials available. Not authorised for use on lupins in SEU                                      |                      |                          |                           |
| Poppy seed           | NEU                         | Others      | 7 × < 0.01                                                                                   | Direct extrapolation from rape seed trials performed with a more critical GAP (Spain, 2010a) is acceptable since residues are expected to be low | 0.01* (tentative)<sup>(g)</sup> | 0.01                     | 0.01                       |
| Sunflower seed       | SEU                         | Others      | 4 × < 0.01                                                                                   | Trials compliant with GAP (Spain, 2016a)                                                                          | 0.01* (tentative)<sup>(g)</sup> | 0.01                     | 0.01                       |
| Sunflower seed       | SEU                         | Pyrinex 25 CS | –                                                                                             | No trials available                                                                                             |                      |                          |                           |
| Rape seed            | NEU                         | Others      | 7 × < 0.01                                                                                   | Trials on rape seed compliant with GAP for rapeseed (Spain, 2010a). Extrapolation to mustard seed and gold of pleasure is acceptable since residues are expected to be low | 0.01* (tentative)<sup>(g)</sup> | 0.01                     | 0.01                       |
| Mustard seed         |                             |             |                                                                                               |                                                                   |                      |                          |                           |
| Gold of pleasure     | SEU                         | Others      | < 0.01; < 0.01; 0.01; 0.02                                                                  | Trials on rape seed compliant with GAP for rapeseed (Spain, 2010a). Extrapolation to mustard seed and gold of pleasure is acceptable since residues are expected to be low | 0.04 (tentative)<sup>(f),(g)</sup> | 0.02                     | 0.01                       |
| Crop | Region/indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations) | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|------|------------------|-------------|------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------|--------------|----------------|
| Rape seed Mustard seed Gold of pleasure | NEU | Pyrinex 25 CS | $4 \times < 0.01$ | Trials compliant with GAP (Spain, 2016b); extrapolation to mustard seed and gold of pleasure is applicable | $0.01^*\text{(tentative)}^{(f),(g)}$ | 0.01 | 0.01 |
| | SEU | Pyrinex 25 CS | $< 0.01; < 0.01; < 0.01; 0.013$ | Trials compliant with GAP (Spain, 2016b); extrapolation to gold of pleasure is possible. Not authorised for use on mustard seed in SEU $R_{\text{DER}} = 0.02; R_{\text{MAX}} = 0.02$; $\text{MRLOECD} = 0.02$ | $0.02^*\text{(tentative)}^{(f),(g)}$ | 0.01 | 0.01 |
| Soya bean | SEU | Others | | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | $0.01^*\text{(tentative)}^{(f),(g)}$ | 0.01 | 0.01 |
| Soya bean | SEU | Pyrinex 25 CS | – | No trials available | – | – | – |
| Cotton seed | SEU | Others | $2 \times < 0.01$ | Trials with 3 applications instead of 1 (Greece, 2016) considered representative as residues were below LOQ | $0.01^*\text{(tentative)}^{(g)}$ | 0.01 | 0.01 |
| Cotton seed | SEU | Pyrinex 25 CS | – | No trials available | – | – | – |
| Olive for oil productions | SEU | Others | – | Considering the non-systemic properties of chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | $0.01^*\text{(tentative)}^{(g)}$ | 0.01 | 0.01 |
| Maize grain | NEU | Others | $8 \times < 0.01$ | Overdosed trials performed in NEU (8) and SEU (7) with $2 \times 720$ g a.i./ha at BBCH 65-85 instead of $1 \times 400$ g a.i./ha at BBCH 59 (Spain, 2010a); deemed acceptable as residues are below LOQ. NEU/SEU data sets can be merged | $0.01^*$ | 0.01 | 0.01 |
| | SEU | Others | $7 \times < 0.01$ | | | | |
| Maize forage | NEU | Others | $0.08; 0.09; 0.09; 0.20; 0.25; 0.61; 0.78; 2.06$ | Overdosed trials on maize stover performed in NEU (8) and SEU (7) with $2 \times 720$ g a.i./ha at BBCH 65-85 instead of $1 \times 400$ g a.i./ha at BBCH 59 (Spain, 2010a); used on tentative basis. NEU/SEU data sets can be merged $\text{MRLOECD} = 2.43$ | $3^*\text{(tentative)}^{(f)}$ | 2.06 | 0.12 |
| | SEU | Others | $0.04; 0.05; 0.08; 0.12; 0.12; 0.14; 0.35$ | | | | |
| Crop          | Region/ indoor | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)                                                                 | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg) | STMR (mg/kg) |
|--------------|---------------|-------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|------------|--------------|
| Buckwheat grain Millet grain | SEU | Others | –                                                                                                                               | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)    | 0.01       | 0.01         |
| Barley grain | NEU | Others | < 0.01; < 0.01; < 0.01; 0.10; 0.14; 0.21; 0.25; 0.31                                                                          | Trials on barley with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue MRL\textsubscript{OECD} = 0.6 | 0.6                  | 0.31       | 0.12         |
|              | SEU | Others | < 0.01; 0.02; 0.05; 0.07                                                                                                     | Trials compliant with GAP (Spain, 2010a) MRL\textsubscript{OECD} = 0.15                                           | 0.2 (tentative)      | 0.07       | 0.04         |
| Oats grain   | NEU | Others | < 0.01; < 0.01; < 0.01; 0.10; 0.14; 0.21; 0.25; 0.31                                                                          | Direct extrapolation from barley grain NEU (Spain, 2010a)                                                          | 0.6                  | 0.31       | 0.12         |
|              | SEU | Others | –                                                                                                                               | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)    | 0.01       | 0.01         |
| Barley straw | NEU | Others | 0.01; 0.18; 0.20; 0.46; 0.46; 0.46; 0.59; 0.77                                                                              | Trials on barley with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue MRL\textsubscript{OECD} = 1.38 | 1.5                  | 0.77       | 0.46         |
|              | SEU | Others | 0.06; 0.11; 0.21; 0.50                                                                                                       | Trials compliant with GAP (Spain, 2010a) $R_{\text{ber}} = 0.86$ $R_{\text{max}} = 1.23$ MRL\textsubscript{OECD} = 1.01 | 1 (tentative)        | 0.50       | 0.16         |
| Oats straw   | NEU | Others | 0.01; 0.18; 0.20; 0.46; 0.46; 0.46; 0.59; 0.77                                                                              | Direct extrapolation from barley straw NEU (Spain, 2010a)                                                          | 1.5                  | 0.77       | 0.46         |
|              | SEU | Others | –                                                                                                                               | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01* (tentative)    | 0.01       | 0.01         |
| Crop          | Region/ indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg)                                                                                                                                                                                                 | Recommendations/comments (OECD calculations)                                                                                           | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|--------------|------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------|----------------|
| Wheat grain  | NEU              | Others      | $< 0.01; < 0.01; < 0.01; 0.02; 0.04; 0.05; 0.05; 0.07$                                                                                     | Trials on wheat with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue $MRL_{OECD} = 0.13$ | 0.15                 | 0.07         | 0.03           |
|              | SEU              | Others      | $4 \times < 0.01$                                                                                                                      | Trials compliant with GAP (Spain, 2010a)                                                                                           | 0.01*(tentative)(f) | 0.01         | 0.01           |
| Rye grain    | NEU              | Others      | $< 0.01; < 0.01; < 0.01; 0.02; 0.04; 0.05; 0.05; 0.07$                                                                                     | Direct extrapolation from wheat grain NEU (Spain, 2010a)                                                                          | 0.15                 | 0.07         | 0.03           |
|              | SEU              | Others      | $-$                                                                                                                                  | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01*(tentative)(d),(f) | 0.01         | 0.01           |
| Wheat straw  | NEU              | Others      | $0.29; 0.29; 0.35; 0.43; 0.61; 0.77; 2.04; 2.48$                                                                                         | Trials on wheat with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue $MRL_{OECD} = 4.34$ | 5                    | 2.48         | 0.52           |
|              | SEU              | Others      | $0.03; 0.12; 0.16; 0.52$                                                                                                           | Trials compliant with GAP (Spain, 2010a) $R_{br} = 0.86$ $R_{max} = 1.32$ $MRL_{OECD} = 1.07$                                   | 1*(tentative)(f)    | 0.52         | 0.14           |
| Rye straw    | NEU              | Others      | $0.29; 0.29; 0.35; 0.43; 0.61; 0.77; 2.04; 2.48$                                                                                         | Direct extrapolation from wheat straw NEU (Spain, 2010a)                                                                          | 5                    | 2.48         | 0.52           |
|              | SEU              | Others      | $-$                                                                                                                                  | Considering the non-systemic properties of chlorpyrifos, measurable residues following a granular soil treatment are unlikely to occur (tentative consideration, to be confirmed by trials) | 0.01*(tentative)(d),(f) | 0.01         | 0.01           |
| Crop                        | Region/ indoor | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg) | STMR (mg/kg) |
|-----------------------------|----------------|-------------|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|------------|--------------|
| Sugar and fodder beet (root) | NEU            | Others      | 8 × < 0.01                                                                                       | Trials on sugar beet compliant with GAP (Spain, 2010a); extrapolation to fodder beet is possible                   | 0.01*                | 0.01       | 0.01         |
|                             | SEU            | Others      | 7 × < 0.01; 0.01                                                                                  | Overdosed trials on sugar beets performed with 960 instead of 528 g a.i./ha (Spain, 2010a) deemed acceptable since residues are below or close to LOQ. Not authorised for use on fodder beet in SEU R$_{ber}$ = 0.02 | 0.02                | 0.01       | 0.01         |
| Sugar beet (root)           | SEU            | Pyrinex 25 CS | –                                                                                                 | No trials available                                                                                              | –                    | –          | –            |
| Sugar and fodder beet (tops) | NEU            | Others      | < 0.01; < 0.01; 0.03; 0.04; 0.09; 0.12; 0.49; 0.68                                                | Trials on sugar beets compliant with GAP (Spain, 2010a); extrapolation to fodder beets is applicable MRL$_{OECD}$ = 1.21 | 1.5                  | 0.68       | 0.07         |
|                             | SEU            | Others      | < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; 0.03; 0.07                                  | Overdosed trials on sugar beets performed with 960 instead of 528 g a.i./ha (Spain, 2010a) deemed acceptable since residues are mainly intended to estimate livestock dietary burden. Not authorised for use on fodder beet in SEU MRL$_{OECD}$ = 0.11 | 0.15                | 0.07       | 0.01         |
| Sugar beet (tops)           | SEU            | Pyrinex 25 CS | –                                                                                                 | No trials available                                                                                              | –                    | –          | –            |

GAP: Good Agricultural Practice; OECD: Organisation for Economic Co-operation and Development; MRL: maximum residue level; R$_{max}$: statistical calculation of the MRL by using a parametric method; R$_{ber}$: statistical calculation of the MRL by using a non-parametric method; a.i.: active ingredient; BBCH: growth stages of mono-and dicotyledonous plants.

*Indicates that the MRL is proposed at the limit of quantification.

(a): NEU: Outdoor trials conducted in northern Europe; SEU: Outdoor trials conducted in southern Europe; Indoor: indoor EU trials or Country code: if non-EU trials.

(b): Highest residue.

(c): Supervised trials median residue.

(d): The metabolism of chlorpyrifos under soil treatment or seed treatments is addressed on a tentative basis only.

(e): Higher residue level observed at a longer PHI.

(f): MRL is tentative because the number of trials compliant with GAP is not sufficient.

(g): MRL is tentative because the analytical method for enforcement is not fully validated (ILV is missing).
B.1.2.2. Summary of residues data from the supervised residue trials (sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP)

| Crop                  | Region/ indoor(a) | Formulation   | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|-----------------------|-------------------|---------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------|---------------|-----------------|
| Citrus fruits         | SEU               | Others        | Oranges: < 0.01; < 0.01; < 0.07; 0.08; 0.09; 0.11; 0.12; 0.14; 0.17 Mandarins: < 0.01; 0.06; 0.07; 0.08; 0.09; 0.12; 0.13; 0.15; 0.16; 0.29 | Trials on oranges and mandarins compliant with GAP (Spain, 2010a) MRL_{OECD} = 0.36                    | 0.4 (tentative)       | 0.29          | 0.09            |
| Grapefruit            | SEU               | Pyrinex 25 CS | –                                                                                                | No trials available                                                                                       | –                     | –             | –               |
| Almonds               | SEU               | Others        | –                                                                                                | Although 3,5,6-TCP and its conjugates are more likely to be taken up by plant compared to parent chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | 0.01* (tentative)     | 0.01          | 0.01            |
| Apples                | SEU               | Others        | Apples: < 0.01; < 0.01; 0.02; < 0.01; < 0.01; 0.01; 0.03; 0.03; < 0.01; 0.05; 0.05; 0.02; 0.02; 0.05 | Combined data set on apples and pears compliant with GAP (Spain, 2010a) MRL_{OECD} = 0.09               | 0.09 (tentative)      | 0.05          | 0.02            |
| SEU                   | Others (fall-back GAP) | –             | –                                                                                                | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), it is unlikely that measurable residues of chlorpyrifos will occur if applied before flowering (to be confirmed by trials) | 0.01* (tentative)     | 0.01          | 0.01            |
| Apples                | SEU               | Pyrinex 25 CS | Apples: 0.02; 0.04; 0.05(d); < 0.01; < 0.01; < 0.01; < 0.01 Pears: < 0.01                          | Combined data set on apples and pears performed with 2 applications instead of 1 (Spain, 2010b) used on a tentative basis MRL_{OECD} = 0.08 | 0.09 (tentative)      | 0.05          | 0.01            |
| SEU                   | Pyrinex 25 CS (fall-back GAP) | –             | –                                                                                                | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), it is unlikely that measurable residues of 3,5,6-TCP will occur if applied before flowering (to be confirmed by trials) | 0.01* (tentative)     | 0.01          | 0.01            |
| Crop      | Region/ indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|-----------|-------------------|-------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|--------------|----------------|
| Quinces   | SEU               | Others      | Apples: 0.03; 0.03; 0.05; < 0.01; < 0.01; < 0.01; Pears: 0.03; 0.10; 0.05; 0.05; < 0.01       | Combined data set on apples and pears with two applications instead of 1 supporting the GAP on quinces (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue MRL_{OECD} = 0.14 | 0.15 (tentative)     | 0.10         | 0.03           |
|           | Others (fallback GAP) |            |                                                                                               | Although 3,5,6-TCP and its conjugates are more likely to be taken up by plant compared to parent chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | 0.01* (tentative)    | 0.01         | 0.01           |
| Quinces   | SEU               | Pyrinex 25 CS | Apples: 0.02; 0.04; 0.05(d); < 0.01; < 0.01; < 0.01; Pears: < 0.01                              | Direct extrapolation of the combined data set on apples/pears, compliant with GAP (GAP with 2 applications is authorised for quinces) MRL_{OECD} = 0.08 | 0.09 (tentative)     | 0.05         | 0.01           |
| Medlar    | SEU               | Others      |                                                                                               | Although 3,5,6-TCP and its conjugates are more likely to be taken up by plant compared to parent chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | 0.01* (tentative)    | 0.01         | 0.01           |
| Apricots  | SEU               | Others      |                                                                                               | Although 3,5,6-TCP and its conjugates are more likely to be taken up by plant compared to parent chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | 0.01* (tentative)    | 0.01         | 0.01           |
| Cherries  | NEU               | Others      | < 0.01; 0.01; 0.02; 0.02; 0.03; 0.04; 0.04                                                   | Trials compliant with GAP (Spain, 2010a) MRL_{OECD} = 0.08                                                                 | 0.08 (tentative)     | 0.04         | 0.02           |
| Cherries  | SEU               | Others      |                                                                                               | Although 3,5,6-TCP and its conjugates are more likely to be taken up by plant compared to parent chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | 0.01* (tentative)    | 0.01         | 0.01           |
| Crop               | Region/ indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|--------------------|-------------------|-------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------|---------------|-----------------|
| Peaches            | SEU               | Others      | 0.01; 0.01; 0.03; < 0.01; < 0.01; < 0.01; < 0.01; 0.01; 0.03; < 0.01; < 0.01; 0.04             | Trials compliant with GAP (Spain, 2010a) MRL_{OECD} = 0.06                                             | 0.07 (tentative)     | 0.04          | 0.01            |
| Peaches            | SEU               | Pyrinex 25 CS | 0.04; 0.03; < 0.01(d); 0.04; 0.05(d); < 0.01; 0.02; 0.02; < 0.01; 0.13                      | Trials performed with 2 applications instead of 1 (Spain, 2010b) used on a tentative basis MRL_{OECD} = 0.18 | 0.2 (tentative)     | 0.13          | 0.03            |
|                    | SEU               | Pyrinex 25 CS | – (fall-back GAP)                                                                             | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), it is unlikely that measurable residues of 3,5,6-TCP will occur if applied before flowering (to be confirmed by trials) | 0.01* (tentative)    | 0.01          | 0.01            |
| Plums              | NEU               | Others      | < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; 0.01; 0.02; 0.03                              | Trials compliant with GAP (Spain, 2010a) MRL_{OECD} = 0.04                                             | 0.05 (tentative)     | 0.03          | 0.01            |
| Plums              | SEU               | Others      | –                                                                                           | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), it is unlikely that measurable residues of chlorpyrifos will occur if applied before flowering (to be confirmed by residue trials) | 0.01* (tentative)    | 0.01          | 0.01            |
| Plums              | SEU               | Pyrinex 25 CS | –                                                                                           | No GAP-compliant trials available                                                                     | –                    | –             | –               |
| Wine grapes        | SEU               | Pyrinex 25 CS | < 0.01; < 0.01; 0.05; 0.08; 0.08; 0.12; 0.14; 0.15; 0.37; 0.55; 0.63                      | Trials compliant with GAP (Spain, 2010b) MRL_{OECD} = 1.07                                             | 1.5 (tentative)      | 0.63          | 0.12            |
| Wine grapes        | NEU               | Others      | < 0.01; < 0.01; < 0.01; 0.02; 0.04; 0.06                                                    | Overdosed trials performed with 2 × 360 g a.i./ha and PHI 21 days, instead of 1 × 200 g a.i./ha and PHI 21 days (Spain, 2010a); used on tentative basis MRL_{OECD} = 0.1 | 0.1 (tentative)      | 0.06          | 0.01            |
| Crop             | Region/indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|------------------|------------------|-------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|--------------|--------------------|
| Wine grapes      | SEU              | Others      | < 0.01; < 0.01; < 0.01; 0.02; 0.02; 0.11; 0.18                                                   | Trials compliant with GAP (Spain, 2010a). An additional trial result of 0.86 mg/kg (derived from a GAP-compliant trial) was regarded as an outlier due to the inconsistencies observed in the residue decline MRL\textsubscript{OECD} = 0.32 | 0.4 (tentative)     | 0.18         | 0.02               |
|                  | SEU              | Others (fall-back GAP) | –                                                                                           | Although 3,5,6-TCP and its conjugates are more likely to be taken up by plant compared to parent chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | 0.01* (tentative)   | 0.01         | 0.01               |
| Strawberries     | NEU              | Others      | < 0.01; < 0.01; 0.01; 0.01; 0.02; 0.02; 0.03; 0.04                                              | Trials performed with 1 × 720 g a.i./ha (nominal dose within 25% deviation) and PHI 14 days, instead of 1 × 960 g a.i./ha and PHI 21 days (Spain, 2010a); used on tentative basis MRL\textsubscript{OECD} = 0.06 | 0.07 (tentative)    | 0.04         | 0.02               |
| Strawberries     | SEU              | Others      | < 0.01; 0.01; 0.02; 0.02; 0.02; 0.02; 0.02; 0.03; 0.03; 0.03                                    | Trials with 1 or 2 applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue MRL\textsubscript{OECD} = 0.06 | 0.06 (tentative)    | 0.03         | 0.02               |
| Bananas          | SEU              | Others      | –                                                                                           | While a justification was provided for the granular formulations applied after partial plant cut (Portugal, 2016), GAP-compliant trials supporting the foliar GAP on bananas are not available | –                   | –            | –                  |
| Bananas          | EU               | Others      | 0.08; 0.30; 0.33; 0.43; 0.61                                                                | Trials compliant with GAP (Spain, 2010a) MRL\textsubscript{OECD} = 1.12                                                | 1.5 (tentative)     | 0.61         | 0.33               |
### Review of the existing MRLs for chlorpyrifos

| Crop         | Region/indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|--------------|------------------|-------------|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------|--------------|----------------|
| Potatoes     | NEU              | Others      | 4 × < 0.01                                                                                     | 2 trials on potatoes compliant with GAP (Czech Republic, 2016a; France 2016a). 2 additional trials performed with a PHI of 21 days (as authorised in FR) | 0.01* (tentative)     | 0.01         | 0.01           |
|              | SEU              | Others      | < 0.01; < 0.01; 0.01; 0.02                                                                     | Trials on potatoes compliant with GAP (France 2016a). Positive findings may result from a contamination since positive findings at 0.01 mg/kg were also identified in the control samples $R_{\text{def}} = 0.03$; $R_{\text{max}} = 0.04$; MRL\textsubscript{OECD} = 0.03 | 0.04 (tentative)     | 0.02         | 0.01           |
| Potatoes     | SEU              | Pyrinex 25 CS | –                                                                                               | No trials available                                                                                           | –                     | –            | –              |
| Beetroot     | NEU              | Others      | –                                                                                               | No GAP-compliant trials available                                                                              | –                     | –            | –              |
| Carrots      | SEU              | Others      | –                                                                                               | No GAP-compliant trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –            | –              |
| Carrots      | SEU              | Pyrinex 25 CS | –                                                                                               | No trials available                                                                                           | –                     | –            | –              |
| Radishes     | NEU              | Others      | –                                                                                               | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –            | –              |
| Radishes     | SEU              | Others      | –                                                                                               | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –            | –              |
| Garlic       | NEU              | Others      | –                                                                                               | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –            | –              |
| Onions       | NEU              | Others      | –                                                                                               | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –            | –              |
| Onions       | SEU              | Pyrinex 25 CS | –                                                                                               | No trials available                                                                                           | –                     | –            | –              |

(a) Formulation

(b) HR (mg/kg)

(c) STMR (mg/kg)
| Crop               | Region/indoor | Formulation     | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg) | STMR (mg/kg) |
|-------------------|---------------|-----------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------------------|------------|--------------|
| Shallots          | NEU           | Others          | –                                                                                              | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –          | –            |
|                   | SEU           | Others          | –                                                                                              | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –          | –            |
| Spring onions     | NEU           | Others          | –                                                                                              | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –          | –            |
| Tomatoes          | SEU           | Others          | –                                                                                              | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –          | –            |
| Tomatoes          | SEU           | Pyrinex 25 CS   | < 0.01; 0.03; 0.02; 0.03; 0.04; 0.06                                                          | Trials compliant with GAP (Spain, 2010b) MRL<sub>OECD</sub> = 0.1                                               | 0.1                   | 0.06       | 0.03         |
| Peppers           | SEU           | Others          | –                                                                                              | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –          | –            |
| Peppers           | SEU           | Pyrinex 25 CS   | < 0.01; < 0.01; < 0.01; 0.02; 0.04                                                             | Trials compliant with GAP (Spain, 2010b) MRL<sub>OECD</sub> = 0.07                                                | 0.07                  | 0.04       | 0.02         |
|                   | SEU           | Pyrinex 25 CS (fall-back GAP) | –                                                                                              | Based on the available trials in fruits and fruiting vegetables (performed at later growth stages), it is unlikely that measurable residues of 3,5,6-TCP will occur if applied before flowering (to be confirmed by trials) | 0.01                   | 0.01       | 0.01         |
| Aubergines (egg plants) | NEU         | Others          | –                                                                                              | No GAP-compliant trials available                                                                                 | –                     | –          | –            |
|                   | SEU           | Others          | –                                                                                              | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                     | –          | –            |
| Aubergines (egg plants) | SEU         | Pyrinex 25 CS   | –                                                                                              | No GAP-compliant trials available                                                                                 | –                     | –          | –            |
| Crop                  | Region/ indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|-----------------------|-------------------|-------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------|--------------|---------------|
| Melons Pumpkins       | SEU               | Others      | 4 × < 0.02                                                                                      | Overdosed trials on melons performed at 400 instead of 200 g a.i./ha (Italy, 2016), acceptable as residues are below LOQ. Extrapolation to pumpkins and watermelons is applicable | 0.02                  | 0.02         | 0.02          |
| Watermelons           |                   |             |                                                                                                 |                                                                                                                 |                       |              |               |
| Broccoli              | NEU               | Others      |                                                                                                 | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded. Not authorised for use on kale and kohlrabi in SEU |                       |              |               |
| Cauliflower Brussels sprouts Head cabbage Kale Kohlrabi | SEU               | Others      |                                                                                                 |                                                                                                                 |                       |              |               |
| Broccoli              | NEU               | Pyrinex 25 CS | **Cauliflower: 4 × < 0.01** Head cabbage: 4 × < 0.01 Kale: 2 × < 0.01**                          | Combined data set on cauliflower, head cabbage and kale, compliant with GAP (France, 2016a); extrapolation to all Brassica vegetables is possible | 0.01*                 | 0.01         | 0.01          |
| Cauliflower Brussels sprouts Head cabbage Kale Kohlrabi |                   |             |                                                                                                 |                                                                                                                 |                       |              |               |
| Lettuce Lamb's lettuce Scarole Rocket | SEU               | Others      |                                                                                                 | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded |                       |              |               |
| Spinach               | NEU               | Pyrinex 25 CS | 2 × < 0.03                                                                                      | Trials compliant with GAP (France, 2016a). EFSA assumed that the reported LOQs were expressed as chlorpyrifos and re-calculated those values to be expressed as 3,5,6-TCP | 0.03                  | 0.03         | 0.03          |
| Beans (fresh, with pods) Beans (fresh, without pods) Peas (fresh, with pods) Peas (fresh, without pods) | SEU               | Others      |                                                                                                 | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded |                       |              |               |
| Crop | Region/indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations) | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|------|-----------------|-------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|-----------------------|--------------|---------------|
| Beans (fresh, with pods) Beans (fresh, without pods) Peas (fresh, with pods) Peas (fresh, without pods) | NEU | Pyrinex 25 CS | – | Considering the non-systemic properties of chlorpyrifos and the trial results observed for other seed treatments, measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials). Not authorised for use on beans (without pods) and peas (with and without pods) in NEU | 0.01* (tentative) | 0.01 | 0.01 |
| Asparagus | NEU | Others | – | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | – | – | – |
| Asparagus | SEU | Others | – | No residue trials available | – | – | – |
| Globe artichoke | SEU | Others | – | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | – | – | – |
| Beans (dry) Peas (dry) | SEU | Others | – | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | – | – | – |
| Beans (dry) Peas (dry) Lupins (dry) | NEU | Pyrinex 25 CS | – | Considering the non-systemic properties of chlorpyrifos and the trial results observed for other seed treatments, measurable residues are unlikely to occur (tentative consideration, to be confirmed by trials). Not authorised for use on dry peas in NEU | 0.01* (tentative) | 0.01 | 0.01 |
| | SEU | Pyrinex 25 CS | – | No GAP-compliant trials available. Not authorised for use on lupins in SEU | – | – | – |
| Crop                          | Region/ indoor \(^{(a)}\) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs \((\text{mg/kg})\) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals \((\text{mg/kg})\) | HR \((\text{mg/kg})\) \(^{(b)}\) | STMR \((\text{mg/kg})\) \(^{(c)}\) |
|-------------------------------|---------------------------|-------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------|-------------------|-------------------|
| Poppy seed                    | NEU                        | Others      | \(< 0.01; < 0.01; < 0.01; < 0.01; < 0.01; 0.01; 0.17\)                                              | Direct extrapolation from rape seed trials performed with a more critical GAP (Spain, 2010a) is acceptable since residues are expected to be low \(\text{MRL}_{\text{OECD}} = 0.27\) | 0.3 (tentative)                  | 0.17              | 0.01              |
| Sunflower seed                | SEU                        | Others      | \(4 \times < 0.01\)                                                                              | Trials compliant with GAP (Spain, 2016a)                                            | 0.01* (tentative)                  | 0.01              | 0.01              |
| Sunflower seed                | SEU                        | Pyrinex 25 CS | –                                                                                                   | No trials available                                                                | –                                 | –                 | –                 |
| Rape seed                     | NEU                        | Others      | \(< 0.01; < 0.01; < 0.01; < 0.01; < 0.01; 0.01; 0.17\)                                              | Trials on rape seed compliant with GAP for rapeseed (Spain, 2010a). Extrapolation to mustard seed and gold of pleasure is acceptable since residues are expected to be low \(\text{MRL}_{\text{OECD}} = 0.27\) | 0.3 (tentative)                  | 0.17              | 0.01              |
| Mustard seed                  |                           |             |                                                                                                    |                                                                                     |                                   | 0.01* (tentative)                  | 0.01              | 0.01              |
| Gold of pleasure              | NEU                        | Others      | \(4 \times < 0.01\)                                                                              | Trials on rape seed compliant with GAP for rapeseed (Spain, 2010a). Extrapolation to mustard seed and gold of pleasure is acceptable since residues are expected to be low                                                                 |                                   | 0.01* (tentative)                  | 0.01              | 0.01              |
| SEU                           | Pyrinex 25 CS              | 4 \( \times < 0.01\) |                                                                                                    | Trials compliant with GAP (Spain, 2016b); extrapolation to mustard seed and gold of pleasure is applicable | 0.01* (tentative)                  | 0.01              | 0.01              |
| Rape seed                     | NEU                        | Pyrinex 25 CS | 4 \( \times < 0.01\) |                                                                                                    | Trials compliant with GAP (Spain, 2016b); extrapolation to gold of pleasure is possible. Not authorised for use on mustard seed in SEU \(\text{MRL}_{\text{OECD}} = 0.02\) | 0.02 (tentative)                  | 0.01              | 0.01              |
| Mustard seed                  | SEU                        | Pyrinex 25 CS | 3 \( \times < 0.01\); 0.012                                                                  |                                                                                     |                                   | 0.01* (tentative)                  | 0.01              | 0.01              |
| Gold of pleasure              | SEU                        | Others      | –                                                                                                    | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                                 | –                 | –                 |
| Soya bean                     | SEU                        | Others      | –                                                                                                    | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                                 | –                 | –                 |
| Soya bean                     | SEU                        | Pyrinex 25 CS | –                                                                                                    | No trials available                                                                | –                                 | –                 | –                 |
| Crop                        | Region/indoor(a) | Formulation     | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|-----------------------------|------------------|-----------------|------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|--------------|---------------|
| Cotton seed                 | SEU              | Others          | 2 × < 0.05                                                                                     | Trials with 3 applications instead of 1 (Greece, 2016), acceptable as residues were below LOQ                   | 0.05 (tentative)     | 0.05         | 0.05          |
| Cotton seed                 | SEU              | Pyrinex 25 CS   | –                                                                                               | No trials available                                                                                           | –                    | –            | –             |
| Olive for oil productions   | SEU              | Others          | –                                                                                               | Although 3,5,6-TCP and its conjugates are more likely to be taken up by plant compared to parent chlorpyrifos, uptake of residues following a granular soil treatment in orchard trees is very unlikely | 0.01* (tentative)    | 0.01         | 0.01          |
| Maize grain                 | NEU              | Others          | 7 × < 0.01; 0.01                                                                               | Overdosed trials performed in NEU (8) and SEU (7) with 2 × 720 g a.i./ha at BBCH 65-85 instead of 1 × 400 g a.i./ha at BBCH 59 (Spain, 2010a); deemed acceptable as residues are close to LOQ. NEU/SEU data sets can be merged. | 0.02 (tentative)     | 0.01         | 0.01          |
| Maize forage                | NEU              | Others          | 0.10; 0.04; 0.03; 0.08; 0.34; 0.52; 0.26; 0.19                                                    | Overdosed trials on maize stover performed in NEU (8) and SEU (7) with 2 × 720 g a.i./ha at BBCH 65-85 instead of 1 × 400 g a.i./ha at BBCH 59 (Spain, 2010a); used on tentative basis. NEU/SEU data sets can be merged. | 0.7 (tentative)      | 0.52         | 0.10          |
|                            | SEU              | Others          | 0.10; 0.10; 0.07; 0.04; 0.10; 0.10; 0.07                                                        | –                                                                                                               | –                    | –            | –             |
| Buckwheat grain             | SEU              | Others          | –                                                                                               | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                    | –            | –             |
| Millet grain                | SEU              | Others          | –                                                                                               | –                                                                                                               | –                    | –            | –             |
| Barley grain                | NEU              | Others          | < 0.01; < 0.01; 0.02; 0.22; 0.16; 0.23; 0.35; 0.08                                               | Trials on barley with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue. | 0.70 (tentative)     | 0.35         | 0.12          |
|                            | SEU              | Others          | 0.03; 0.05; 0.08; 0.14                                                                         | Trials compliant with GAP (Spain, 2010a) R_{max} = 0.32; MRL_{OECD} = 0.27                                         | 0.40 (tentative)     | 0.14         | 0.07          |

(a) Crop classification.

(b) Proposals of human dietary exposure.

(c) Proposals of STMRs (mg/kg).

Note: LOQ = Limit of Quantification.

OECD = Organisation for Economic Co-operation and Development.
| Crop          | Region/indoor(\textsuperscript{a)}) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations) | MRL proposals (mg/kg)(\textsuperscript{b}) | STMR (mg/kg)(\textsuperscript{c}) | HR (mg/kg) | MRL (mg/kg)(\textsuperscript{d}) | STMR (mg/kg) |
|--------------|-----------------------------------|-------------|----------------------------------------------------------------------------------|---------------------------------------------|------------------------------------------|----------------------------|------------|--------------------------------|--------------|
| Oats grain   | NEU                               | Others      | < 0.01; < 0.01; 0.02; 0.22; 0.16; 0.23; 0.08; 0.09; 0.20                           | Direct extrapolation from barley grain NEU (Spain, 2010a) | 0.70 (tentative)                          |                           | 0.35       | 0.12                            |               |
|              | SEU                               | Others      | 0.10; < 0.10; 0.31; 0.49; 0.29; 0.63; 0.61; 0.20                               | Trials on barley with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue | 0.28; 0.30 (tentative)                    |                           | 0.8        | 0.24                            |               |
|              |                                   | Others      | 0.07; 0.20; 0.28; 0.30                                                        | Trials compliant with GAP (Spain, 2010a) | 0.24 (tentative)                          |                           | 3          | 0.51                            |               |
|              |                                   | Others      | 0.10; < 0.10; 0.31; 0.49; 0.29; 0.63; 0.61; 0.20                               | Direct extrapolation from barley straw NEU (Spain, 2010a) | 0.8; 0.75 (tentative)                     |                           | 3          | 0.51                            |               |
|              |                                   | Others      | 1.25                                                                            | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | 1.25 (tentative)                          |                           |           |                                |               |
| Barley straw | NEU                               | Others      | < 0.01; < 0.01; 0.02; 0.22; 0.16; 0.23; 0.08; 0.09; 0.20                           | Direct extrapolation from barley straw NEU (Spain, 2010a) | 0.70 (tentative)                          |                           | 0.35       | 0.12                            |               |
|              | SEU                               | Others      | 0.10; < 0.10; 0.31; 0.49; 0.29; 0.63; 0.61; 0.20                               | Trials on barley with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue | 0.28; 0.30 (tentative)                    |                           | 0.8        | 0.24                            |               |
|              |                                   | Others      | 0.07; 0.20; 0.28; 0.30                                                        | Trials compliant with GAP (Spain, 2010a) | 0.24 (tentative)                          |                           | 3          | 0.51                            |               |
|              |                                   | Others      | 0.10; < 0.10; 0.31; 0.49; 0.29; 0.63; 0.61; 0.20                               | Direct extrapolation from barley straw NEU (Spain, 2010a) | 0.8; 0.75 (tentative)                     |                           | 3          | 0.51                            |               |
|              |                                   | Others      | 1.25                                                                            | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | 1.25 (tentative)                          |                           |           |                                |               |
| Oats straw   | NEU                               | Others      | < 0.01; < 0.01; 0.02; 0.22; 0.16; 0.23; 0.08; 0.09; 0.20                           | Direct extrapolation from barley straw NEU (Spain, 2010a) | 0.70 (tentative)                          |                           | 0.35       | 0.12                            |               |
|              | SEU                               | Others      | 0.10; < 0.10; 0.31; 0.49; 0.29; 0.63; 0.61; 0.20                               | Trials on barley with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue | 0.28; 0.30 (tentative)                    |                           | 0.8        | 0.24                            |               |
|              |                                   | Others      | 0.07; 0.20; 0.28; 0.30                                                        | Trials compliant with GAP (Spain, 2010a) | 0.24 (tentative)                          |                           | 3          | 0.51                            |               |
|              |                                   | Others      | 0.10; < 0.10; 0.31; 0.49; 0.29; 0.63; 0.61; 0.20                               | Direct extrapolation from barley straw NEU (Spain, 2010a) | 0.8; 0.75 (tentative)                     |                           | 3          | 0.51                            |               |
|              |                                   | Others      | 1.25                                                                            | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | 1.25 (tentative)                          |                           |           |                                |               |
| Wheat grain  | NEU                               | Others      | 0.05; 0.01; 0.04; 0.11; 0.19; 0.10; 0.09; 0.20                                 | Direct extrapolation from wheat grain NEU (Spain, 2010a) | 0.4 (tentative)                          |                           | 0.4        | 0.20                            |               |
|              | SEU                               | Others      | 0.05; 0.01; 0.04; 0.11; 0.19; 0.10; 0.09; 0.20                                 | Direct extrapolation from wheat grain NEU (Spain, 2010a) | 0.4 (tentative)                          |                           | 0.4        | 0.20                            |               |
|              |                                   | Others      | 0.05; 0.01; 0.04; 0.11; 0.19; 0.10; 0.09; 0.20                                 | Direct extrapolation from wheat grain NEU (Spain, 2010a) | 0.4 (tentative)                          |                           | 0.4        | 0.20                            |               |
|              |                                   | Others      | 0.05; 0.01; 0.04; 0.11; 0.19; 0.10; 0.09; 0.20                                 | Direct extrapolation from wheat grain NEU (Spain, 2010a) | 0.4 (tentative)                          |                           | 0.4        | 0.20                            |               |
|              |                                   | Others      | 0.05; 0.01; 0.04; 0.11; 0.19; 0.10; 0.09; 0.20                                 | Direct extrapolation from wheat grain NEU (Spain, 2010a) | 0.4 (tentative)                          |                           | 0.4        | 0.20                            |               |

\textsuperscript{a} Residue trials conducted indoors. Residue trials conducted outdoors.

\textsuperscript{b} MRL = Maximum Residue Level.

\textsuperscript{c} STMR = Stochastic Target Residue.

\textsuperscript{d} HR = Highest residue level.
| Crop                   | Region/indoor | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg) | STMR (mg/kg) |
|-----------------------|---------------|-------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------------|------------|-------------|
| Wheat straw           | NEU           | Others      | 0.74; 0.48; 0.50; 0.70; 0.62; 0.44; 1.24; 1.92                                                                 | Trials on wheat with two applications instead of one (Spain, 2010a); deemed representative as the first application has a limited impact on the final residue. Extrapolation to rye is possible. $\text{MRL}_{\text{OECD}} = 2.86$ | 3 (tentative)       | 1.92       | 0.66        |
|                       | SEU           | Others      | 0.08; 0.21; 0.32; 0.52                                                                               | Trials compliant with GAP (Spain, 2010a) $R_{\text{exp}} = 0.94; R_{\text{max}} = 1.24; \text{MRL}_{\text{OECD}} = 1.03$ | 1.5 (tentative)     | 0.52       | 0.27        |
| Rye straw             | NEU           | Others      | 0.74; 0.48; 0.50; 0.70; 0.62; 0.44; 1.24; 1.92                                                                 | Direct extrapolation from wheat straw NEU (Spain, 2010a)                                                                 | 3 (tentative)       | 1.92       | 0.66        |
|                       | SEU           | Others      | –                                                                                                 | No residue trials available. Although chlorpyrifos is not systemic, the possible uptake of 3,5,6-TCP and/or its conjugates cannot be excluded | –                    | –          | –           |
| Sugar and fodder beet (root) | NEU       | Others      | < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; 0.02                                                                 | Trials on sugar beet compliant with GAP (Spain, 2010a); extrapolation to fodder beet is possible $R_{\text{exp}} = 0.02; R_{\text{max}} = 0.02; \text{MRL}_{\text{OECD}} = 0.03$ | 0.03 (tentative)   | 0.02       | 0.01        |
|                       | SEU           | Others      | < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; < 0.01; 0.02; 0.04; 0.06                                                                 | Overdosed trials on sugar beets performed with 960 instead of 528 g a.i./ha (Spain, 2010a) deemed acceptable since residues are below or close to LOQ. Not authorised for use on fodder beet in SEU $R_{\text{exp}} = 0.07; R_{\text{max}} = 0.08; \text{MRL}_{\text{OECD}} = 0.10$ | 0.1 (tentative)     | 0.06       | 0.01        |
| Sugar beet (root)     | SEU           | Pyrinex 25 CS | –                                                                                                 | No trials available                                                                                           | –                    | –          | –           |
| Crop                        | Region/indoor(a) | Formulation | Residue levels observed in the supervised residue trials relevant to the supported GAPs (mg/kg) | Recommendations/comments (OECD calculations)                                                                 | MRL proposals (mg/kg) | HR (mg/kg)(b) | STMR (mg/kg)(c) |
|-----------------------------|------------------|-------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|----------------------|--------------|---------------|
| Sugar and fodder beet (tops) | NEU              | Others      | 0.03; 0.03; 0.08; 0.11; 0.14; 0.17; 0.33; 0.42                                                                 | Trials on sugar beets compliant with GAP (Spain, 2010a); extrapolation to fodder beets is applicable  | 0.8 (tentative)      | 0.42         | 0.13          |
|                             | SEU              | Others      | 0.01; 0.02; 0.04; 0.06; 0.08; 0.10; 0.14; 0.15                                                                 | Overdosed trials on sugar beets performed with 960 instead of 528 g a.i./ha (Spain, 2010a) deemed acceptable since residues are mainly intended to estimate livestock dietary burden. Not authorised for use on fodder beet in SEU | 0.3 (tentative)      | 0.15         | 0.07          |
| Sugar beet (tops)           | SEU              | Pyrinex 25 CS | --                                                                                             | No trials available                                                                                   | --                   | --           | --            |

GAP: Good Agricultural Practice; OECD: Organisation for Economic Co-operation and Development; MRL: maximum residue level; $R_{\text{max}}$: statistical calculation of the MRL by using a parametric method; $R_{\text{ber}}$: statistical calculation of the MRL by using a non-parametric method; a.i.: active ingredient; BBCH: growth stages of mono- and dicotyledonous plants.

*Indicates that the MRL is proposed at the limit of quantification.
(a): NEU: Outdoor trials conducted in northern Europe; SEU: Outdoor trials conducted in southern Europe; Indoor: indoor EU trials or Country code: if non-EU trials.
(b): Highest residue.
(c): Supervised trials median residue.
(d): Higher residue level observed at a longer PHI.
B.1.2.3. Residues in succeeding crops

Confined rotational crop study (quantitative aspect) Significant residues are not expected in rotational crops. Tentative conclusion based on old studies performed with chlorpyrifos (additional metabolism studies are still required)

Field rotational crop study Not available and not required (tentative)

B.1.2.4. Processing factors

(a) Main residue definition: chlorpyrifos

| Processed commodity       | Number of studies<sup>(a)</sup> | Processing factor (PF) | Individual values | Median PF |
|---------------------------|---------------------------------|------------------------|-------------------|-----------|
| Robust processing factors (sufficiently supported by data) | | | | |
| Bananas, peeled<sup>(b)</sup> | 7                              | 0.01; 0.01; 0.02; 0.02; 0.02; 0.03; 0.09 | 0.02           |
| Citrus, peeled<sup>(b)</sup>   | 11                             | 0.02; 0.02; 0.02; 0.02; 0.02; 0.02; 0.03; 0.05; 0.06; 0.10; 0.15 | 0.02           |

| Indicative processing factors (limited data set) | | | | |
| Citrus, juice<sup>(c)</sup> | 1<sup>(c)</sup> | 0.07 | 0.07 |
| Plums, canned<sup>(c)</sup> | 1<sup>(c)</sup> | 1.26 | 1.26 |
| Wine grapes, juice<sup>(d)</sup> | 1<sup>(c)</sup> | 0.36 | 0.36 |
| Wine grapes, dry pomace<sup>(e)</sup> | 2<sup>(c)</sup> | 16.68; 26.45 | 21.57 |
| Wine grapes, must<sup>(e)</sup> | 2<sup>(c)</sup> | 0.58; 1.47 | 1.03 |
| Wine grapes, red wine (unheated)<sup>(e)</sup> | 2<sup>(c)</sup> | 0.64; 0.74 | 0.69 |
| Wine grapes, red wine (heated)<sup>(e)</sup> | 1<sup>(c)</sup> | 0.87 | 0.87 |
| Wine grapes, white wine | 1<sup>(c)</sup> | 0.36 | 0.36 |
| Barley, beer<sup>(e)</sup> | 3<sup>(c)</sup> | 0.10; 0.22; 0.43 | 0.22 |
| Barley, brewing malt<sup>(e)</sup> | 3<sup>(c)</sup> | 1.02; 4.18; 4.23 | 4.18 |
| Barley, pot/pearl<sup>(e)</sup> | 3<sup>(c)</sup> | 1.37; 2.33; 3.96 | 2.33 |
| Wheat, bran<sup>(b)</sup> | 2<sup>(c)</sup> | 2.22; 3.83 | 3.03 |
| Wheat, white flour<sup>(b)</sup> | 2<sup>(c)</sup> | 0.31; 0.38 | 0.35 |
| Wheat, whole-meal flour<sup>(b)</sup> | 2<sup>(c)</sup> | 0.69; 1.31 | 0.88 |
| Wheat, white bread | 2<sup>(c)</sup> | 0.62; 1.14 | 0.88 |
| Wheat, whole-meal bread | 2<sup>(c)</sup> | 3.00; 7.03 | 5.02 |

(a): Studies with residues in the RAC at or close to the LOQ were disregarded.
(b): The residue definition for processed commodities does not apply to peeled fruits as well as for wheat (bran and flour) because these processed commodities are not subject to hydrolysis. Therefore, the calculated PF refer to chlorpyrifos residue levels in both raw and processed commodities.
(c): Analysis for the metabolite desethyl chlorpyrifos was not carried out in the available studies and these PF are therefore considered indicative. However, overestimated processing factors can be derived considering the levels of total 3,5,6-TCP (which includes chlorpyrifos, desethyl chlorpyrifos and 3,5,6-TCP) in processed commodity and the levels of chlorpyrifos in raw agricultural commodities.
(d): PF derived from white wine must, which is considered as equivalent.
(e): PF derived from unheated red wine, which is the critical case compared to the values obtained in the heated wine process.

(b) Optional residue definition: sum of 3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates, expressed as 3,5,6-TCP

| Processed commodity | Number of studies<sup>(a)</sup> | Processing factor (PF) | Individual values | Median PF |
|---------------------|---------------------------------|------------------------|-------------------|-----------|
| Robust processing factors (sufficiently supported by data) | | | | |
| Bananas, peeled | 5<sup>(a)</sup> | 0.06; 0.20; 0.32; 0.37; 0.50 | 0.32 |
| Citrus, peeled | 9<sup>(a)</sup> | 0.03; 0.04; 0.09; 0.15; 0.17; 0.22; 0.23; 0.27; 0.31 | 0.17 |
| Processed commodity          | Number of studies(a) | Processing factor (PF) | Individual values | Median PF |
|-----------------------------|----------------------|------------------------|-------------------|-----------|
| Indicative processing factors (limited data set) |                      |                        |                   |           |
| Citrus, juice               | 1(b)                 | 0.09                   |                   | 0.09      |
| Plums, canned               | 1(b)                 | 0.80                   |                   | 0.80      |
| Wine grapes, juice(c)       | 1(b)                 | 0.26                   |                   | 0.26      |
| Wine grapes, dry pomace(d)  | 2(b)                 | 4.85; 5.74             |                   | 5.29      |
| Wine grapes, must(d)        | 2(b)                 | 0.38; 0.66             |                   | 0.52      |
| Wine grapes, red wine (unheated) | 2(b)       | 0.50; 0.50             |                   | 0.50      |
| Wine grapes, red wine (heated) | 1(b)              | 0.68                   |                   | 0.68      |
| Wine grapes, white wine     | 1(b)                 | 0.26                   |                   | 0.26      |
| Maize, flour                | 1                    | 1                      |                   | 1         |
| Maize, oil                  | 1(b)                 | 1.70                   |                   | 1.70      |
| Barley, beer                | 3(b)                 | 0.05; 0.12; 0.30       |                   | 0.12      |
| Barley, brewing malt       | 3(b)                 | 0.80; 1.13; 1.99       |                   | 1.13      |
| Barley, pot/pearl          | 3(b)                 | 0.40; 0.84; 1.57       |                   | 0.84      |
| Wheat, bran                 | 1                    | 3.22                   |                   | 3.22      |
| Wheat, white flour          | 1                    | 0.15                   |                   | 0.15      |
| Wheat, whole-meal flour     | 1                    | 0.99                   |                   | 0.99      |
| Wheat, white bread          | 1(b)                 | 0.12                   |                   | 0.12      |
| Wheat, whole-meal bread     | 1(b)                 | 0.72                   |                   | 0.72      |

(a): Studies with residues in the RAC at or close to the LOQ were disregarded.
(b): Since analysis for desethyl chlorpyrifos was not carried out, it was not possible to recalculate the absolute levels for 3,5,6-TCP and its conjugates by subtracting the contribution of the parent compound and desethyl chlorpyrifos to the total residue hydrolysed as 3,5,6-TCP. Consequently, this processing factor may be overestimated and is therefore considered tentative.
(c): PF derived from white wine must, which is considered as equivalent.
(d): PF derived from unheated red wine, which is the critical case compared to the values obtained in the heated wine process.

B.2. Residues in livestock

|                     | Median dietary burden (mg/kg bw per day) | Maximum dietary burden (mg/kg bw per day) | Highest contributing commodity(a) | Max dietary burden (mg/kg DM) | Trigger exceeded (Y/N) |
|---------------------|----------------------------------------|------------------------------------------|----------------------------------|-------------------------------|------------------------|
| **Risk assessment residue definition 1: chlorpyrifos**          |                                         |                                          |                                  |                              |                        |
| **Scenario EU1:** All authorised GAPs are considered            |                                         |                                          |                                  |                              |                        |
| Dairy ruminants     | 0.0249                                  | 0.3745                                   | Maize silage                      | 10.4                          | Y                      |
| Meat ruminants      | 0.0782                                  | 0.4414                                   | Maize silage                      | 10.3                          | Y                      |
| Poultry             | 0.0073                                  | 0.0073                                   | Barley grain                      | 0.12                          | Y                      |
| Pigs                | 0.0082                                  | 0.0664                                   | Maize silage                      | 1.66                          | Y                      |
| **Scenario EU2:** Excluding the most critical GAP on apples(b)  |                                         |                                          |                                  |                              |                        |
| Dairy ruminants     | 0.0249                                  | 0.3745                                   | Maize silage                      | 10.4                          | Y                      |
| Meat ruminants      | 0.0782                                  | 0.4414                                   | Maize silage                      | 10.3                          | Y                      |
| Poultry             | 0.0073                                  | 0.0073                                   | Barley grain                      | 0.12                          | Y                      |
| Pigs                | 0.0082                                  | 0.0664                                   | Maize silage                      | 1.66                          | Y                      |
| **Risk assessment residue definition 2: sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP** |                                         |                                          |                                  |                              |                        |
| **Scenario EU2:** As scenario EU2 should be the basis for MRL calculation in livestock commodities, the dietary burden calculations for 3,5,6-TCP is directly estimated from scenario EU2 |                                         |                                          |                                  |                              |                        |
| Dairy ruminants     | 0.0227                                  | 0.0945                                   | Maize silage                      | 2.63                          | Y                      |
| Meat ruminants      | 0.0363                                  | 0.1114                                   | Maize silage                      | 2.59                          | Y                      |
Median dietary burden (mg/kg bw per day) | Maximum dietary burden (mg/kg bw per day) | Highest contributing commodity | Max dietary burden (mg/kg DM) | Trigger exceeded (Y/N)
--- | --- | --- | --- | ---
Poultry | 0.0075 | 0.0104 | Barley grain | 0.17 | Y
Pigs | 0.0120 | 0.0356 | Sugar beet leaves | 0.89 | Y

bw: body weight; DM: dry matter; GAP: Good Agricultural Practice; MRL: maximum residue level.

(a): Calculated for the maximum dietary burden.

(b): Dietary burden is unaffected in scenario EU2 because citrus pomace is the highest contributing pomace in both scenario.

### B.2.1. Nature of residues and methods of analysis in livestock

#### B.2.1.1. Metabolism studies, methods of analysis and residue definitions in livestock

| Livestock (available studies) | Animal | Dose (mg/kg bw per day) | Duration (days) | N rate/comment |
| --- | --- | --- | --- | --- |
| | Laying hen | 1.26 | 10 | 172 N |
| | Lactating goat | 0.55–0.86 | 10 | 1.5 N/dairy ruminants |
| | | | | 1.2 N/meat ruminants |

Sources: Spain (1999, 2003); studies not compliant with current standards

Time needed to reach a plateau concentration in milk and eggs (days) | Milk: 8 days | Eggs: not reported

Metabolism in rat and ruminant similar (Yes/No) | Yes

Animal residue definition for monitoring (RD-Mo) | **RD-monitoring 1:** Chlorpyrifos
**RD-monitoring 2 (optional):** Sum of 3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates, expressed as 3,5,6-TCP

Animal residue definition for risk assessment (RD-RA) | **RD-risk assessment 1:** Chlorpyrifos
**RD-risk assessment 2:** Sum of 3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates, expressed as 3,5,6-TCP

Conversion factor (monitoring to risk assessment) | Not relevant

Fat soluble residues (Yes/No) | **RD-monitoring 1:** Yes
**RD-monitoring 2 (optional):** No

Methods of analysis for monitoring of residues (analytical technique, crop groups, LOQs) | **RD-monitoring 1:**
- GC-MS/MS (EURL, 2016):
  - QuEChERS method is fully validated for liver, kidney and eggs only
  - LOQ: 0.01 mg/kg

- GC/NCl-MS (Spain, 2002):
  - Missing validation data for muscle, fat and milk
  - LOQ: 0.01 mg/kg

**RD-monitoring 2 (optional):**
- HPLC-MS/MS (France, 2016b):
  - Validated in bovine/poultry tissues (muscle, fat, liver, kidney), milk and eggs
  - ILV available
  - Method validated for two different mass transitions
  - Efficiency of the hydrolysis step needs to be validated
  - LOQ: 0.01 mg/kg
### B.2.1.2. Stability of residues in livestock

| Animal products (available studies) | Commodity   | T (°C) | Stability (months) |
|-------------------------------------|-------------|--------|-------------------|
| **Chlorpyrifos**                    |             |        |                   |
| Beef Muscle                         | –19         | 24     |                   |
| Beef Liver                          | –19         | 24     |                   |
| Beef Kidney                         | –19         | 24     |                   |
| Beef Fat                            | –19         | 24     |                   |
| Dairy Milk                          | –19         | 24     |                   |
| Poultry Egg                         | –19         | 24     |                   |
| **Source:** Spain (2010a,b)         |             |        |                   |

**3,5,6-trichloropyridinol (3,5,6-TCP) and its conjugates**

- Beef Muscle, fat, liver, kidney: –20 15
- Cow Milk and cream: –20 12

**Source:** Spain (2010a,b,c)

(a): As the possible decline of conjugates is expected to proceed through 3,5,6-TCP, conjugates are also covered.

### B.2.2. Magnitude of residues in livestock

#### B.2.2.1. Summary of the residue data from livestock feeding studies (for chlorpyrifos)

| Animal commodity | Residues at the closest feeding level (mg/kg) | Estimated value at 1 N MRL proposal (mg/kg) | MRL proposal (mg/kg) |
|------------------|-----------------------------------------------|---------------------------------------------|---------------------|
|                  | Mean Highest STMR HR                          |                                             |                     |
| **Dairy ruminants** (0.36 mg/kg bw; 0.97 N rate) |                                             |                                             |                     |
| Milk (e)         | < 0.01 n.a.                                   | < 0.01                                      | 0.01* (tentative)(h) |
| **Meat ruminants** (0.43 mg/kg bw; 0.97 N rate) |                                             |                                             |                     |
| Muscle           | < 0.01 Not available                          | < 0.01                                      | 0.01* (tentative)(h) |
| Fat              | 0.11 Not available                            | 0.01                                        | 0.15 (tentative)(h)  |
| Liver            | < 0.01 Not available                          | < 0.01                                      | 0.01*               |
| Kidney           | < 0.01 Not available                          | < 0.01                                      | 0.01*               |
| **Poultry** – MRLs are set at the LOQ based on the metabolism study (172 N rate); a feeding study is not needed |                                             |                                             |                     |
| Muscle           | n.a.                                          | < 0.01                                      | 0.01* (tentative)(h) |
| Fat              | n.a.                                          | < 0.01                                      | 0.01* (tentative)(h) |
| Liver            | n.a.                                          | < 0.01                                      | 0.01*               |
| Egg              | n.a.                                          | < 0.01                                      | 0.01*               |
| **Pig** (0.13 mg/kg bw; 2 N rate) |                                             |                                             |                     |
| Muscle           | < 0.01 Not available                          | < 0.01                                      | 0.01* (tentative)(h) |
| Fat              | 0.02 Not available                            | < 0.01                                      | 0.01* (tentative)(h) |
| Liver            | < 0.01 Not available                          | < 0.01                                      | 0.01*               |
| Kidney           | < 0.01 Not available                          | < 0.01                                      | 0.01*               |

bw: body weight; MRL: maximum residue level; n.a.: not applicable.

*Indicates that the MRL is proposed at the limit of quantification.

(a): Closest feeding level and N dose rate related to the maximum dietary burden.

(b): Mean residue level, recalculated at the 1N rate for the median dietary burden.

(c): Highest residue level for tissues and eggs and mean residue level for milk, recalculated at the 1 N rate for the maximum dietary burden.
(d): Study performed on dairy cow: feeding level was recalculated as mg/kg bw considering the average feed daily consumption (20 kg/day) and weight (550 kg) of cow.
(e): Only milk samples collected from day 8 onwards were considered (plateau level).
(f): Study performed on beef cattle: feeding level was recalculated as mg/kg bw considering the average feed daily consumption (15 kg/day) and weight (350 kg) of meat ruminants.
(g): Since extrapolation from ruminants to pigs is acceptable, results of the livestock feeding study on ruminants were relied upon to derive the MRL and risk assessment values in pigs. A specific feeding study for swine was also reported and results in the same MRL proposals.
(h): MRL is tentative because the analytical method for enforcement of chlorpyrifos in muscle, fat and milk is not fully validated.

B.2.2.2. Summary of the residue data from livestock feeding studies (sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP)

| Animal commodity | Residues at the closest feeding level (mg/kg) | Estimated value at 1 N | MRL proposal (mg/kg) |
|------------------|---------------------------------------------|------------------------|----------------------|
|                  | Mean | Highest | STMR (mg/kg)(b) | HR (mg/kg)(c) |                  |
| **Dairy ruminants**(d) |      |         |               |              |                  |
| Milk(e)          | < 0.01 | n.a. | < 0.01 | < 0.01 | 0.01* (tentative) (h) |
| **Meat ruminants**(f) |      |         |               |              |                  |
| Muscle           | < 0.01 | Not available | < 0.01 | 0.01 | 0.015 (tentative)(h) |
| Fat              | 0.07 | Not available | < 0.01 | 0.07 | 0.08 (tentative)(h) |
| Liver            | 0.43 | Not available | 0.12 | 0.45 | 0.5 (tentative)(h) |
| Kidney           | 0.39 | Not available | 0.07 | 0.40 | 0.4 (tentative)(h) |
| **Poultry** – MRLs are set at the LOQ based on the metabolism study (172 N rate); a feeding study is not needed |      |         |               |              |                  |
| Muscle           | n.a. | n.a. | < 0.01 | < 0.01 | 0.01* (tentative)(h) |
| Fat              | n.a. | n.a. | < 0.01 | < 0.01 | 0.01* (tentative)(h) |
| Liver            | n.a. | n.a. | < 0.01 | < 0.01 | 0.01* (tentative)(h) |
| Egg              | n.a. | n.a. | < 0.01 | < 0.01 | 0.01* (tentative)(h) |
| **Pig**(g)       |      |         |               |              |                  |
| Muscle           | < 0.01 | Not available | < 0.01 | < 0.01 | 0.01* (tentative)(h) |
| Fat              | 0.07 | Not available | < 0.01 | < 0.01 | 0.01* (tentative)(h) |
| Liver            | 0.43 | Not available | 0.01 | 0.10 | 0.15 (tentative)(h) |
| Kidney           | 0.39 | Not available | 0.01 | 0.06 | 0.06 (tentative)(h) |

bw: body weight; MRL: maximum residue level; n.a.: not applicable.
*Indicates that the MRL is proposed at the limit of quantification.
(a): Closest feeding level and N dose rate related to the maximum dietary burden.
(b): Mean residue level, recalculated at the 1N rate for the median dietary burden.
(c): Highest residue level for tissues and eggs and mean residue level for milk, recalculated at the 1 N rate for the maximum dietary burden.
(d): Study performed on dairy cow: feeding level was recalculated as mg/kg bw considering the average feed daily consumption (20 kg/day) and weight (550 kg) of cow.
(e): Only milk samples collected from day 8 onwards were considered (plateau level).
(f): Study performed on beef cattle: feeding level was recalculated as mg/kg bw considering the average feed daily consumption (15 kg/day) and weight (350 kg) of meat ruminants.
(g): Since extrapolation from ruminants to pigs is acceptable, results of the livestock feeding study on ruminants were relied upon to derive the MRL and risk assessment values in pigs. A specific feeding study for swine was also reported and results in the same MRL proposals.
(h): MRLs for livestock commodities are considered tentative because a fully validated analytical method for enforcement of 3,5,6-TCP and its conjugates is still needed.
B.3. Consumer risk assessment

B.3.1. Consumer risk assessment for chlorpyrifos without consideration of the existing CXLs

**ADI** | 0.001 mg/kg bw per day (EFSA, 2014)
---|---
**Highest IEDI, according to EFSA PRIMo**
- **Scenario EU1**: 199% ADI (FR all population)
- **Scenario EU2**: 79.8% ADI (NL, child)

**Assumptions made for the calculations**
- **Scenario EU1**: For most of the commodities, the calculation is based on the median residue levels in the raw agricultural commodities. However, for citrus fruits and bananas, the relevant peeling factor was applied.
- For beetroot, where data were insufficient to derive a MRL, EFSA considered the existing EU MRL for an indicative calculation.
- The contributions of commodities where no GAP was reported in the framework of this review, were not included in the calculation.
- **Scenario EU2**: Fall-back GAPs (granular soil treatments and/or foliar application at an early stage) were considered for apples, pears, peaches, wine grapes, peppers and quinces. Consideration of these less critical GAPs does not impact on the residue levels in livestock commodities. Therefore, all other input values remain unchanged.

**ARfD** | 0.005 mg/kg bw per day (EFSA, 2014)
---|---
**Highest IESTI, according to EFSA PRIMo**
- **Scenario EU1**: 783.7% ARfD (apples)
- 728.6% ARfD (pears)
- 605.2% ARfD (peaches)
- 464.9% ARfD (wine grapes/adults)
- 163.2% ARfD (wine grapes/children)
- 126.0% ARfD (peppers)
- 117.3% ARfD (quinces)
- **Scenario EU2**: 98.7% ARfD (plums)
- 59.3% ARfD (peaches)
- 52.8% ARfD (bananas)

**Assumptions made for the calculations**
- **Scenario EU1**: For most of the commodities, the calculation is based on the highest residue levels in the raw agricultural commodities. However, for citrus fruits and bananas, the relevant peeling factor was applied.
- For wine grapes in adults, the yield factor of wine production (0.7) was considered. For wine grapes in children, the yield factor of grape juice production (0.75) was considered.
- For beetroot, where data were insufficient to derive a MRL, EFSA considered the existing EU MRL for an indicative calculation.
- **Scenario EU2**: Fall-back GAPs (granular soil treatments and/or foliar application at an early stage) were considered for apples, pears, peaches, wine grapes, peppers and quinces. Consideration of these less critical GAPs does not impact on the residue levels in livestock commodities. Therefore, all other input values remain unchanged.
### B.3.2. Consumer risk assessment for chlorpyrifos with consideration of the existing CXLs

|                        | ADI 0.001 mg/kg bw per day (EFSA, 2014) |
|------------------------|----------------------------------------|
| Highest IEDI, according to EFSA PRIMo | **Scenario CX1:** 508% ADI (NL, child)  
Main contributors: potatoes (301% ADI) and apples (108% ADI)  
**Scenario CX2:** 92.5% ADI (UK, infant) |

| Assumptions made for the calculations | **Scenario CX1:**  
For those commodities having a CXL higher than the EU MRL proposal, median residue levels applied in the EU scenario were replaced by the median residue levels derived by JMPR  
**Scenario CX2:**  
The CXLs for potatoes, apples, peppers, pears, broccoli, head cabbage, Chinese cabbage, table grapes, peaches, tomatoes, quinces, medlar, plums and wine grapes were excluded from the calculation. All other input values remain unchanged |

| ARfD 0.005 mg/kg bw per day (EFSA, 2014) |
| Highest IESTI, according to EFSA PRIMo | **Scenario CX1:** 2675% ARfD (potatoes)  
1842% ARfD (apples)  
1763% ARfD (peppers)  
1712% ARfD (pears)  
1631% ARfD (broccoli)  
989% ARfD (head cabbage)  
446% ARfD (Chinese cabbage)  
419% ARfD (table grapes)  
392% ARfD (peaches)  
384% ARfD (tomatoes)  
276% ARfD (quinces)  
227% ARfD (medlar)  
132% ARfD (plums)  
106% ARfD (wine grapes/adults) |

| Assumptions made for the calculations | **Scenario CX1:**  
For those commodities having a CXL higher than the EU MRL proposal, highest residue levels applied in the EU scenario were replaced by the highest residue levels derived by JMPR  
For wine grapes in adults, the yield factor of wine production (0.7) was considered. For wine grapes in children, the yield factor of grape juice production (0.75) was considered  
**Scenario CX2:**  
The CXLs for potatoes, apples, peppers, pears, broccoli, head cabbage, Chinese cabbage, table grapes, peaches, tomatoes, quinces, medlar, plums and wine grapes were excluded from the calculation. All other input values remain unchanged |
B.3.3. Consumer risk assessment for the metabolite 3,5,6-trichloropyridinol (3,5,6-TCP)

| ADI | 0.03 mg/kg bw per day (EFSA, 2014) |
| Highest IEDI, according to EFSA PRIMo | 6.0% ADI (DE, child) |

| Assumptions made for the calculations | The calculation is based on the median residue levels arising from chlorpyrifos, chlorpyrifos-methyl and triclopyr. For plant commodities, the highest residue level resulting from the use of chlorpyrifos or chlorpyrifos-methyl was considered, assuming that the two active substances are not used together on the same crop. For those crops where an acute concern was identified for chlorpyrifos or chlorpyrifos-methyl and for which it was possible to identify a fall-back GAP (see scenario EU2 in the respective reasoned opinions), EFSA directly considered the 3,5,6-TCP residue levels resulting from these fall-back GAPs. For citrus fruits and bananas, the relevant peeling factor was applied|

| The plant commodities where data were not available to derive MRLs and risk assessment values for the metabolite 3,5,6-TCP (see chlorpyrifos and chlorpyrifos-methyl) were not considered because there are no MRLs currently defined for 3,5,6-TCP |
| For animal commodities, median residue levels derived taking into account the three active substances were considered |
| The contributions of commodities where no GAP was reported in the framework of this review were not included in the calculation |

| ARfD | 0.25 mg/kg bw (EFSA, 2014) |
| Highest IESTI, according to EFSA PRIMo | 6.5% ARfD (bananas) |

| Assumptions made for the calculations | The calculation is based on the highest residue levels arising from chlorpyrifos, chlorpyrifos-methyl and triclopyr. For plant commodities, the most critical GAP between chlorpyrifos and chlorpyrifos-methyl was considered, assuming that the two active substances are not used together on the same crop. For those crops where an acute concern was identified for chlorpyrifos or chlorpyrifos-methyl and for which it was possible to identify a fall-back GAP (see scenario EU2 in the respective reasoned opinions), EFSA directly considered the 3,5,6-TCP residue levels resulting from these fall-back GAPs. For citrus fruits and bananas, the relevant peeling factor was applied |

| The plant commodities where data were not available to derive MRLs and risk assessment values for the metabolite 3,5,6-TCP (see chlorpyrifos and chlorpyrifos-methyl) were not considered because there are no MRLs currently defined for 3,5,6-TCP |
| For animal commodities, highest residue levels derived taking into account the three active substances were considered |
| The contributions of commodities where no GAP was reported in the framework of this review were not included in the calculation |

A second exposure calculation including the potential intake of 3,5,6-TCP driven by the CXLs of chlorpyrifos and chlorpyrifos-methyl was not carried out as this metabolite was not considered in the assessment made by Codex.

B.4. Proposed MRLs

| Code number | Commodity | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review |
|-------------|-----------|-------------------------|----------------------|----------------------|
| 110010 | Grapefruit | 0.3 | 1 | Recommended(a) |
| 110020 | Oranges | 0.3 | 1 | Recommended(a) |
| 110030 | Lemons | 0.2 | 1 | Recommended(a) |
| 110040 | Limes | 0.3 | 1 | Recommended(a) |

(a) For the ARfD and the IESTI for bananas, the values were obtained by applying a reduction factor of 100 (EFSA, 2014).
| Code number | Commodity         | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review MRL (mg/kg) | Comment                      |
|-------------|-------------------|-------------------------|----------------------|----------------------------------|------------------------------|
| 110050      | Mandarins         | 1.5                     | 1                    | 1.5                              | Recommended<sup>(a)</sup>    |
| 120010      | Almonds           | 0.05*                   | 0.05                 | 0.05                             | Further consideration needed<sup>(b)</sup> |
| 120040      | Chestnuts         | 0.05*                   | –                    | 0.01*                            | Recommended<sup>(c)</sup>    |
| 120060      | Hazelnuts         | 0.05*                   | –                    | 0.01*                            | Further consideration needed<sup>(d)</sup> |
| 120080      | Pecans            | 0.05*                   | 0.05*                | 0.05                             | Further consideration needed<sup>(e)</sup> |
| 120110      | Walnuts           | 0.05*                   | 0.05*                | 0.05                             | Further consideration needed<sup>(b)</sup> |
| 130010      | Apples            | 0.01*                   | 1                    | 0.01*                            | Further consideration needed<sup>(f)</sup> |
| 130020      | Pears             | 0.01*                   | 1                    | 0.01*                            | Further consideration needed<sup>(f)</sup> |
| 130030      | Quinces           | 0.5                     | 1                    | 0.4                              | Recommended<sup>(g)</sup>    |
| 130040      | Medlar            | 0.5                     | 1                    | 0.01*                            | Recommended<sup>(g)</sup>    |
| 130050      | Loquats           | 0.5                     | 1                    | 1                                | Recommended<sup>(h)</sup>    |
| 140010      | Apricots          | 0.05                    | –                    | 0.01*                            | Recommended<sup>(c)</sup>    |
| 140020      | Cherries          | 0.3                     | –                    | 0.05                             | Recommended<sup>(c)</sup>    |
| 140030      | Peaches           | 0.01*                   | 0.5                  | 0.08                             | Recommended<sup>(g)</sup>    |
| 140400      | Plums             | 0.2                     | 0.5                  | 0.3                              | Recommended<sup>(g)</sup>    |
| 151010      | Table grapes      | 0.01*                   | 0.5                  | –                                | Further consideration needed<sup>(i)</sup> |
| 151020      | Wine grapes       | 0.5                     | 0.5                  | 0.01*                            | Recommended<sup>(g)</sup>    |
| 152000      | Strawberries      | 0.2                     | 0.3                  | 0.3                              | Recommended<sup>(k)</sup>    |
| 154020      | Cranberries       | 0.05*                   | 1                    | 1                                | Recommended<sup>(h)</sup>    |
| 161040      | Kumquats          | 0.05*                   | 1                    | 1                                | Recommended<sup>(h)</sup>    |
| 163020      | Bananas           | 3                       | 2                    | 4                                | Recommended<sup>(a)</sup>    |
| 211000      | Potatoes          | 0.01*                   | 2                    | 0.01*                            | Recommended<sup>(g)</sup>    |
| 213010      | Beetroot          | 0.05*                   | –                    | 0.05                             | Further consideration needed<sup>(i)</sup> |
| 213020      | Carrots           | 0.1                     | 0.1                  | 0.1                              | Recommended<sup>(k)</sup>    |
| 213080      | Radishes          | 0.2                     | –                    | 0.01*                            | Further consideration needed<sup>(d)</sup> |
| 220010      | Garlic            | 0.05*                   | –                    | 0.01*                            | Further consideration needed<sup>(d)</sup> |
| 220020      | Onions            | 0.2                     | 0.2                  | 0.2                              | Recommended<sup>(k)</sup>    |
| 220030      | Shallots          | 0.05*                   | –                    | 0.01*                            | Further consideration needed<sup>(d)</sup> |
| 220040      | Spring onions     | 0.05*                   | –                    | 0.01*                            | Further consideration needed<sup>(d)</sup> |
| 231010      | Tomatoes          | 0.01*                   | 0.5                  | 0.1                              | Further consideration needed<sup>(f)</sup> |
| 231020      | Peppers           | 0.01*                   | 2                    | 0.01*                            | Further consideration needed<sup>(f)</sup> |
| 231030      | Aubergines (egg plants) | 0.4 | – | 0.01* | Further consideration needed<sup>(d)</sup> |
| 233010      | Melons            | 0.01*                   | –                    | 0.01*                            | Recommended<sup>(c)</sup>    |
| 233020      | Pumpkins          | 0.05*                   | –                    | 0.01*                            | Recommended<sup>(c)</sup>    |
| 233030      | Watermelons       | 0.01*                   | –                    | 0.01*                            | Recommended<sup>(c)</sup>    |
| 234000      | Sweet corn        | 0.05*                   | 0.01*                | 0.01*                            | Recommended<sup>(h)</sup>    |
| 241010      | Broccoli          | 0.05*                   | 2                    | 0.01*                            | Recommended<sup>(g)</sup>    |
| 241020      | Cauliflower       | 0.05*                   | 0.05                 | 0.05                             | Recommended<sup>(j)</sup>    |
| 242010      | Brussels sprouts  | 0.05*                   | –                    | 0.01*                            | Recommended<sup>(c)</sup>    |
| 242020      | Head cabbage      | 0.01*                   | 1                    | 0.01*                            | Recommended<sup>(g)</sup>    |
| 243010      | Chinese cabbage   | 0.01*                   | 1                    | –                                | Further consideration needed<sup>(i)</sup> |
| 243020      | Kale              | 0.05*                   | –                    | 0.01*                            | Recommended<sup>(c)</sup>    |
| 244000      | Kohlrabi          | 0.05*                   | –                    | 0.01*                            | Recommended<sup>(c)</sup>    |
| 251010      | Lamb’s lettuce    | 0.05*                   | –                    | 0.01*                            | Further consideration needed<sup>(d)</sup> |
| 251020      | Lettuce           | 0.05*                   | –                    | 0.01*                            | Further consideration needed<sup>(d)</sup> |
| 251030      | Scarole (broad-leaf endive) | 0.05* | – | 0.01* | Further consideration needed<sup>(d)</sup> |
| Code number | Commodity                                      | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review | Comment          |
|------------|-----------------------------------------------|-------------------------|----------------------|-----------------------|------------------|
| 251060     | Rocket, Rucola                                | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 252010     | Spinach                                       | 0.05*                   | –                    | 0.01*                 | Recommended (c)   |
| 260010     | Beans (fresh, with pods)                      | 0.05*                   | 0.01                 | 0.01*                 | Further consideration needed (m) |
| 260020     | Beans (fresh, without pods)                   | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 260030     | Peas (fresh, with pods)                       | 0.05*                   | 0.01                 | 0.01*                 | Further consideration needed (m) |
| 260040     | Peas (fresh, without pods)                    | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 270010     | Asparagus                                      | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 270050     | Globe artichokes                              | 0.01*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 300010     | Beans (dry)                                   | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 300030     | Peas (dry)                                    | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 300040     | Lupins (dry)                                  | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 401030     | Poppy seed                                    | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 401050     | Sunflower seed                                | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 401060     | Rape seed                                     | 0.05*                   | –                    | 0.04                  | Further consideration needed (d) |
| 401070     | Soya bean                                     | 0.05*                   | 0.1                  | 0.1                   | Further consideration needed (b) |
| 401080     | Mustard seed                                  | 0.05*                   | –                    | 0.04                  | Further consideration needed (d) |
| 401090     | Cotton seed                                   | 0.05*                   | 0.3                  | 0.3                   | Further consideration needed (b) |
| 401130     | Gold of pleasure                              | 0.05*                   | –                    | 0.04                  | Further consideration needed (d) |
| 402010     | Olives for oil production                     | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 500010     | Barley grain                                  | 0.2                     | –                    | 0.6                   | Recommended (c)   |
| 500020     | Buckwheat grain                               | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 500030     | Maize grain                                   | 0.05                     | 0.05                 | 0.05                  | Recommended (j)   |
| 500040     | Millet grain                                  | 0.05*                   | –                    | 0.01*                 | Further consideration needed (d) |
| 500050     | Oats grain                                    | 0.05*                   | –                    | 0.6                   | Recommended (c)   |
| 500060     | Rice grain                                    | 0.05*                   | 0.5                  | 0.5                   | Recommended (h)   |
| 500070     | Rye grain                                     | 0.05*                   | –                    | 0.15                  | Recommended (c)   |
| 500080     | Sorghum grain                                 | 0.05*                   | 0.5                  | 0.5                   | Recommended (h)   |
| 500090     | Wheat grain                                   | 0.05*                   | 0.5                  | 0.5                   | Recommended (j)   |
| 610000     | Tea (dried leaves and stalks)                 | 0.1*                    | 2                    | 2                     | Further consideration needed (e) |
| 620000     | Coffee beans                                  | 0.2                     | 0.05                 | 0.05                  | Recommended (h)   |
| 810000     | Spices (seeds)                                | 5                       | 5                    | 5                     | Further consideration needed (e) |
| 820000     | Spices (fruits and berries)                   | 1                       | 1                    | 1                     | Further consideration needed (e) |
| 840000     | Spices (roots and rhizome)                    | 1                       | 1                    | 1                     | Further consideration needed (e) |
| 900010     | Sugar beet (root)                             | 0.05                    | 0.05                 | 0.05                  | Recommended (j)   |
| 1011010    | Swine muscle                                  | –                       | 0.01                 | 0.01*                 | Further consideration needed (m) |
| 1011020    | Swine fat                                     | –                       | 0.02                 | 0.02                  | Further consideration needed (b) |
| 1011030    | Swine liver                                   | –                       | 0.01*                | 0.01*                 | Recommended (a)   |
| 1011040    | Swine kidney                                  | –                       | 0.01*                | 0.01*                 | Recommended (a)   |
| 1012010    | Bovine muscle                                 | –                       | 0.01                 | 0.01*                 | Further consideration needed (m) |
| 1012020    | Bovine fat                                    | –                       | 1                    | 1                     | Further consideration needed (b) |
| Code number | Commodity          | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review | Comment       |
|-------------|--------------------|-------------------------|---------------------|-----------------------|---------------|
| 1012030     | Bovine liver       | –                       | 0.01                | 0.01*                 | Recommended(a) |
| 1012040     | Bovine kidney      | –                       | 0.01                | 0.01*                 | Recommended(a) |
| 1013010     | Sheep muscle       | –                       | 0.01                | 0.01*                 | Further consideration needed(m) |
| 1013020     | Sheep fat          | –                       | 1                   | 1                     | Further consideration needed(b) |
| 1013030     | Sheep liver        | –                       | 0.01                | 0.01*                 | Recommended(a) |
| 1013040     | Sheep kidney       | –                       | 0.01                | 0.01*                 | Recommended(a) |
| 1014010     | Goat muscle        | –                       | 0.01                | 0.01*                 | Further consideration needed(m) |
| 1014020     | Goat fat           | –                       | 1                   | 1                     | Further consideration needed(b) |
| 1014030     | Goat liver         | –                       | 0.01                | 0.01*                 | Recommended(a) |
| 1014040     | Goat kidney        | –                       | 0.01                | 0.01*                 | Recommended(a) |
| 1016010     | Poultry muscle     | 0.05*                   | 0.01                | 0.01*                 | Further consideration needed(m) |
| 1016020     | Poultry fat        | 0.05*                   | 0.01                | 0.01*                 | Further consideration needed(m) |
| 1016030     | Poultry liver      | 0.05*                   | 0.01*               | 0.01*                 | Recommended(a) |
| 1020000     | Milk of ruminants  | 0.01*                   | 0.02                | 0.02                  | Further consideration needed(b) |
| 1030000     | Birds’ eggs        | 0.01*                   | 0.01*               | 0.01*                 | Recommended(a) |
|             | Other commodities of plant and/or animal origin | See Reg. (EC) No 750/2010 | – | – | Further consideration needed(n) |

**Enforcement residue definition (existing):**

Enforcement residue definition (proposed): sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP

| Code number | Commodity | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review | Comment       |
|-------------|-----------|-------------------------|---------------------|-----------------------|---------------|
| 110010      | Grapefruit | –                       | –                   | 0.4                   | Further consideration needed(o) |
| 110020      | Oranges   | –                       | –                   | 0.4                   | Further consideration needed(o) |
| 110030      | Lemons    | –                       | –                   | 0.4                   | Further consideration needed(o) |
| 110040      | Limes     | –                       | –                   | 0.4                   | Further consideration needed(o) |
| 110050      | Mandarins | –                       | –                   | 0.4                   | Further consideration needed(o) |
| 120010      | Almonds   | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 120040      | Chestnuts | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 120060      | Hazelnuts | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 120080      | Pecans    | –                       | –                   | –                     | Further consideration needed(p) |
| 120110      | Walnuts   | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 130010      | Apples    | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 130020      | Pears     | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 130030      | Quinces   | –                       | –                   | 0.09                  | Further consideration needed(o) |
| 130040      | Medlar    | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 130050      | Loquat    | –                       | –                   | –                     | Further consideration needed(p) |
| 140010      | Apricots  | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 140020      | Cherries  | –                       | –                   | 0.08                  | Further consideration needed(o) |
| 140030      | Peaches   | –                       | –                   | 0.07                  | Further consideration needed(o) |
| 140040      | Plums     | –                       | –                   | 0.05                  | Further consideration needed(o) |
| 151010      | Table grapes | –                       | –                   | –                     | Further consideration needed(p) |
| 151020      | Wine grapes | –                       | –                   | 0.01*                 | Further consideration needed(o) |
| 152000      | Strawberries | –                       | –                   | 0.07                  | Further consideration needed(o) |
| 154020      | Cranberries | –                       | –                   | –                     | Further consideration needed(p) |
| 161040      | Kumquats  | –                       | –                   | –                     | Further consideration needed(p) |
| 163020      | Bananas   | –                       | –                   | 1.5                   | Further consideration needed(o) |
| 211000      | Potatoes  | –                       | –                   | 0.04                  | Further consideration needed(o) |
| Code number | Commodity                  | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review               | Comment         |
|-------------|----------------------------|-------------------------|----------------------|-------------------------------------|-----------------|
| 213010      | Beetroot                   | –                       | –                    | Further consideration needed^[r]    |                 |
| 213020      | Carrots                    | –                       | –                    | Further consideration needed^[r]    |                 |
| 213080      | Radishes                   | –                       | –                    | Further consideration needed^[r]    |                 |
| 220010      | Garlic                     | –                       | –                    | Further consideration needed^[r]    |                 |
| 220020      | Onions                     | –                       | –                    | Further consideration needed^[r]    |                 |
| 220030      | Shallots                   | –                       | –                    | Further consideration needed^[r]    |                 |
| 220040      | Spring onions              | –                       | –                    | Further consideration needed^[r]    |                 |
| 231010      | Tomatoes                   | –                       | 0.1                  | Further consideration needed^[q]    |                 |
| 231020      | Peppers                    | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 231030      | Aubergines (egg plants)    | –                       | –                    | Further consideration needed^[r]    |                 |
| 233010      | Melons                     | –                       | 0.02                 | Further consideration needed^[o]    |                 |
| 233020      | Pumpkins                   | –                       | 0.02                 | Further consideration needed^[o]    |                 |
| 233030      | Watermelons                | –                       | 0.02                 | Further consideration needed^[o]    |                 |
| 234000      | Sweet corn                 | –                       | –                    | Further consideration needed^[p]    |                 |
| 241010      | Broccoli                   | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 241020      | Cauliflower                | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 242010      | Brussels sprouts           | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 242020      | Head cabbage               | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 243010      | Chinese cabbage            | –                       | –                    | Further consideration needed^[p]    |                 |
| 243020      | Kale                       | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 244000      | Kohlrabi                   | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 251010      | Lamb’s lettuce             | –                       | –                    | Further consideration needed^[r]    |                 |
| 251020      | Lettuce                    | –                       | –                    | Further consideration needed^[r]    |                 |
| 251030      | Scarole (broad-leaf endive)| –                       | –                    | Further consideration needed^[r]    |                 |
| 251060      | Rocket, Rucola             | –                       | –                    | Further consideration needed^[r]    |                 |
| 252010      | Spinach                    | –                       | 0.03                 | Further consideration needed^[q]    |                 |
| 260010      | Beans (fresh, with pods)   | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 260020      | Beans (fresh, without pods)| –                       | –                    | Further consideration needed^[r]    |                 |
| 260030      | Peas (fresh, with pods)    | –                       | –                    | Further consideration needed^[r]    |                 |
| 260040      | Peas (fresh, without pods) | –                       | –                    | Further consideration needed^[r]    |                 |
| 270010      | Asparagus                  | –                       | –                    | Further consideration needed^[r]    |                 |
| 270050      | Globe artichokes           | –                       | –                    | Further consideration needed^[r]    |                 |
| 300010      | Beans (dry)                | –                       | 0.01*                | Further consideration needed^[q]    |                 |
| 300030      | Peas (dry)                 | –                       | –                    | Further consideration needed^[r]    |                 |
| 300040      | Lupins (dry)               | –                       | 0.01                 | Further consideration needed^[q]    |                 |
| 401030      | Poppy seed                 | –                       | 0.3                  | Further consideration needed^[o]    |                 |
| 401050      | Sunflower seed             | –                       | 0.01*                | Further consideration needed^[o]    |                 |
| 401060      | Rape seed                  | –                       | 0.3                  | Further consideration needed^[o]    |                 |
| 401070      | Soya bean                  | –                       | –                    | Further consideration needed^[r]    |                 |
| 401080      | Mustard seed               | –                       | 0.3                  | Further consideration needed^[o]    |                 |
| 401090      | Cotton seed                | –                       | 0.05                 | Further consideration needed^[o]    |                 |
| 401130      | Gold of pleasure           | –                       | 0.3                  | Further consideration needed^[o]    |                 |
| Code number | Commodity | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review |
|-------------|-----------|------------------------|---------------------|----------------------|
| 402010      | Olives for oil production | – | – | 0.01* Further consideration needed(o) |
| 500010      | Barley grain | – | – | 0.7 Further consideration needed(o) |
| 500020      | Buckwheat grain | – | – | – Further consideration needed(r) |
| 500030      | Maize wheat grain | – | – | 0.02 Further consideration needed(o) |
| 500040      | Millet grain | – | – | – Further consideration needed(r) |
| 500050      | Oats grain | – | – | 0.7 Further consideration needed(o) |
| 500060      | Rice grain | – | – | – Further consideration needed(p) |
| 500070      | Rye grain | – | – | 0.4 Further consideration needed(o) |
| 500080      | Sorghum grain | – | – | – Further consideration needed(p) |
| 500090      | Wheat grain | – | – | 0.4 Further consideration needed(o) |
| 610000      | Tea (dried leaves and stalks) | – | – | – Further consideration needed(p) |
| 620000      | Coffee beans | – | – | – Further consideration needed(p) |
| 810000      | Spices (seeds) | – | – | – Further consideration needed(p) |
| 820000      | Spices (fruits and berries) | – | – | – Further consideration needed(p) |
| 840000      | Spices (roots and rhizome) | – | – | – Further consideration needed(p) |
| 900010      | Sugar beet (root) | – | – | 0.1 Further consideration needed(o) |
| 1011010     | Swine muscle | – | – | 0.01* Further consideration needed(o) |
| 1011020     | Swine fat | – | – | 0.01* Further consideration needed(o) |
| 1011030     | Swine liver | – | – | 0.15 Further consideration needed(o) |
| 1011040     | Swine kidney | – | – | 0.06 Further consideration needed(o) |
| 1012010     | Bovine muscle | – | – | 0.015 Further consideration needed(o) |
| 1012020     | Bovine fat | – | – | 0.08 Further consideration needed(o) |
| 1012030     | Bovine liver | – | – | 0.5 Further consideration needed(o) |
| 1012040     | Bovine kidney | – | – | 0.4 Further consideration needed(o) |
| 1013010     | Sheep muscle | – | – | 0.015 Further consideration needed(o) |
| 1013020     | Sheep fat | – | – | 0.08 Further consideration needed(o) |
| 1013030     | Sheep liver | – | – | 0.5 Further consideration needed(o) |
| 1013040     | Sheep kidney | – | – | 0.4 Further consideration needed(o) |
| 1014010     | Goat muscle | – | – | 0.015 Further consideration needed(o) |
| 1014020     | Goat fat | – | – | 0.08 Further consideration needed(o) |
| 1014030     | Goat liver | – | – | 0.5 Further consideration needed(o) |
| 1014040     | Goat kidney | – | – | 0.4 Further consideration needed(o) |
| 1016010     | Poultry muscle | – | – | 0.01* Further consideration needed(o) |
| 1016020     | Poultry fat | – | – | 0.01* Further consideration needed(o) |
| 1016030     | Poultry liver | – | – | 0.01* Further consideration needed(o) |
| 1020000     | Milk of ruminants | – | – | 0.01* Further consideration needed(o) |
| 1030000     | Birds’ eggs | – | – | 0.01* Further consideration needed(o) |
### Review of the existing MRLs for chlorpyrifos

| Code number | Commodity | Existing EU MRL (mg/kg) | Existing CXL (mg/kg) | Outcome of the review |
|-------------|-----------|------------------------|----------------------|----------------------|
| –           | Other commodities of plant and/or animal origin | – | – | Further consideration needed<sup>(n)</sup> |

MRL: maximum residue level; CXL: codex maximum residue limit.

*Indicates that the MRL is set/proposed at the limit of quantification.

(F): Residue is fat soluble.

(a): MRL is derived from a GAP evaluated at EU level, which is fully supported by data and for which no risk to consumers is identified; existing CXL is covered by the recommended MRL (combination G-III in Appendix D).

(b): MRL is derived from the existing CXL, which is not sufficiently supported by data but for which no risk to consumers is identified; GAP evaluated at EU level, which is also not fully supported by data, would lead to a lower tentative MRL (combination E-V in Appendix D).

(c): MRL is derived from a GAP evaluated at EU level, which is fully supported by data and for which no risk to consumers is identified; no CXL is available (combination G-I in Appendix D).

(d): Tentative MRL is derived from a GAP evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; no CXL is available (combination E-I in Appendix D).

(e): Tentative MRL is derived from the existing CXL, which is not sufficiently supported by data but for which no risk to consumers is identified; there are no relevant authorisations or import tolerances reported at EU level (combination A-V in Appendix D).

(f): Tentative MRL is derived from a GAP evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; CXL is higher, supported by data but a risk to consumers cannot be excluded (combination E-VI in Appendix D).

(g): MRL is derived from a GAP evaluated at EU level, which is fully supported by data and for which no risk to consumers is identified; CXL is higher, supported by data but a risk to consumers cannot be excluded (combination G-VI in Appendix D).

(h): MRL is derived from the existing CXL, which is supported by data and for which no risk to consumers is identified; there are no relevant authorisations or import tolerances reported at EU level (combination A-VII in Appendix D).

(i): There are no relevant authorisations or import tolerances reported at EU level; CXL is supported by data but a risk to consumers cannot be excluded. Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered (combination A-VI in Appendix D).

(j): MRL is derived from the existing CXL, which is supported by data and for which no risk to consumers is identified; GAP evaluated at EU level, which is also fully supported by data, leads to a lower MRL (combination G-VI in Appendix D).

(k): MRL is derived from the existing CXL, which is supported by data and for which no risk to consumers is identified; GAP evaluated at EU level, which is not fully supported by data, leads to a lower tentative MRL (combination E-VII in Appendix D).

(l): GAP evaluated at EU level is not supported by data but no risk to consumers was identified for the existing EU MRL; no CXL is available (combination C-I in Appendix D).

(m): Tentative MRL is derived from a GAP evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; existing CXL is covered by the tentative MRL (combination E-III in Appendix D).

(n): There are no relevant authorisations or import tolerances reported at EU level; no CXL is available. Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered (combination A-I in Appendix D).

(o): Tentative MRL is derived from a GAP on chlorpyrifos (other formulation than Pyrinex 25 CS) evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; no CXL is available for this residue definition (although a CXL may be available for chlorpyrifos).

(p): There are no relevant authorisations or import tolerances reported at EU level; although a CXL is available for chlorpyrifos, there is no CXL for this residue definition. Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered.

(q): Tentative MRL is derived from a GAP on chlorpyrifos (Pyrinex 25 CS formulation) evaluated at EU level, which is not fully supported by data but for which no risk to consumers was identified; no CXL is available for this residue definition (although a CXL may be available for chlorpyrifos).

(r): GAP evaluated at EU level is not supported by data and it was not possible to derive an EU MRL for this residue definition; there is neither existing EU MRL nor CXL for this residue definition (although a CXL may be available for chlorpyrifos). Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered.
Appendix C – Input values for the exposure calculations

C.1. Livestock dietary burden calculations

| Feed commodity                      | Median dietary burden | Maximum dietary burden |
|-------------------------------------|-----------------------|------------------------|
|                                     | Input value (mg/kg)   | Comment                | Input value (mg/kg)   | Comment                |
|                                     |                       |                        |                        |                        |
| **Risk assessment residue definition 1: chlorpyrifos** |                       |                        |                        |                        |
| Head cabbage                        | 0.01* STMR            |                        | 0.01* HR               |                        |
| Kale                                | 0.01* STMR            |                        | 0.01* HR               |                        |
| Sugar and fodder beet leaves        | 0.07 STMR             |                        | 0.68 HR                |                        |
| Maize silage                        | 0.12 STMR             | 2.1 HR                 |                        |                        |
| Citrus pomace                       | 1.1 STMR × 2.5<sup>(a)</sup> |                        | 1.1 STMR × 2.5<sup>(a)</sup> |                        |
| Apple pomace                        | 0.1 STMR × 2.5<sup>(a)</sup> |                        | 0.1 STMR × 2.5<sup>(a)</sup> |                        |
| Maize grain                         | 0.01* STMR            |                        | 0.01* STMR             |                        |
| Wheat and rye grain                 | 0.03 STMR             |                        | 0.03 STMR              |                        |
| Wheat and rye bran                  | 0.09 STMR × PF        | 0.09 STMR × PF         |                        |                        |
| Barley and oat grain                | 0.12 STMR             |                        | 0.12 STMR              |                        |
| Wheat and rye straw                 | 0.52 STMR             | 2.5 HR                 |                        |                        |
| Barley and oat straw                | 0.46 STMR             | 0.7 HR                 |                        |                        |
| Peas (dry)                          | 0.01* STMR            |                        | 0.01* STMR             |                        |
| Beans (dry)                         | 0.01* STMR            |                        | 0.01* STMR             |                        |
| Potatoes                            | 0.01* STMR            |                        | 0.01* HR               |                        |
| Sugar and fodder beets              | 0.01* STMR            |                        | 0.01* HR               |                        |
| Cotton seed                         | 0.013 STMR × 1.3<sup>(a)</sup> |                        | 0.013 STMR × 1.3<sup>(a)</sup> |                        |
| Cotton seed meal                    | 0.01 STMR             |                        | 0.01 STMR              |                        |
| Soya bean                           | 0.013 STMR × 1.3<sup>(a)</sup> |                        | 0.013 STMR × 1.3<sup>(a)</sup> |                        |
| Soya bean meal                      | 0.01 STMR             |                        | 0.01 STMR              |                        |
| Rape seed meal                      | 0.02 STMR × 2<sup>(a)</sup> |                        | 0.02 STMR × 2<sup>(a)</sup> |                        |
| Sunflower seed meal                 | 0.02 STMR × 2<sup>(a)</sup> |                        | 0.02 STMR × 2<sup>(a)</sup> |                        |

STMR: supervised trials median residue; HR: highest residue; PF: processing factor.
*Indicates that the input value is proposed at the limit of quantification.
(a): For fruit pomace, meals of oilseeds with 50% oil content and meals of oilseeds with 20% oil content, in the absence of processing factors supported by data, default processing factors of 2.5, 2 and 1.3 were, respectively, included in the calculation to consider the potential concentration of residues in these commodities.
(b): In the scenario EU2 (excluding the most critical GAP on apples), input value for apple pomace is derived from the fall-back GAP (i.e. applications before flowering).

| Feed commodity                      | Median dietary burden | Maximum dietary burden |
|-------------------------------------|-----------------------|------------------------|
|                                     | Input value (mg/kg)   | Comment                | Input value (mg/kg)   | Comment                |
|                                     |                       |                        |                        |                        |
| **Risk assessment residue definition 2: sum of 3,5,6-TCP and its conjugates, expressed as 3,5,6-TCP** |                       |                        |                        |                        |
| Head cabbage                        | 0.01* STMR (Pyrinex 25 CS) |                        | 0.01* HR (Pyrinex 25 CS) |                        |
| Kale                                | 0.01* STMR (Pyrinex 25 CS) |                        | 0.01* HR (Pyrinex 25 CS) |                        |
| Sugar and fodder beet leaves        | 0.13 STMR (others)    | 0.42 HR (others)       |                        |                        |
| Maize silage                        | 0.10 STMR (others)    | 0.52 HR (others)       |                        |                        |
### Feed commodity

| Feed commodity       | Median dietary burden | Maximum dietary burden |
|----------------------|-----------------------|------------------------|
|                      | Input value (mg/kg)   | Comment                | Input value (mg/kg)   | Comment |
| Citrus pomace        | 0.23                  | STMR (others) × 2.5(a)  | 0.23                  | STMR (others) × 2.5(a) |
| Apple pomace         | 0.03                  | STMR (others; fall-back)(b) × 2.5(a) | 0.03 | STMR (others; fall-back)(b) × 2.5(a) |
| Maize grain          | 0.01*                 | STMR (others)          | 0.01*                 | STMR (others) |
| Wheat and rye grain  | 0.10                  | STMR (others)          | 0.10                  | STMR (others) |
| Wheat and rye bran   | 0.31                  | STMR (others) × PF     | 0.31                  | STMR (others) × PF |
| Barley and oat grain | 0.12                  | STMR (others)          | 0.12                  | STMR (others) |
| Wheat and rye straw  | 0.66                  | STMR (others)          | 1.9                   | HR (others) |
| Barley and oat straw | 0.51                  | STMR (others)          | 1.3                   | HR (others) |
| Peas (dry)           | –                     | No data                | –                     | No data |
| Beans (dry)          | 0.01*                 | STMR (Pyrinex 25 CS)   | 0.01*                 | HR (Pyrinex 25 CS) |
| Potatoes             | 0.01*                 | STMR (others)          | 0.02                  | HR (others) |
| Sugar beets roots    | 0.01*                 | STMR (others)          | 0.06                  | HR (others) |
| Fodder beets roots   | 0.01*                 | STMR (others)          | 0.02                  | HR (others) |
| Cotton seed          | 0.05                  | STMR (others)          | 0.05                  | STMR (others) |
| Cotton seed meal     | 0.07                  | STMR (others) × 1.3(a)  | 0.07                  | STMR (others) × 1.3(a) |
| Soya bean            | –                     | No data                | –                     | No data |
| Soya bean meal       | –                     | No data                | –                     | No data |
| Rape seed meal       | 0.02                  | STMR (others) × 2(a)   | 0.02                  | STMR (others) × 2(a) |
| Sunflower seed meal  | 0.02                  | STMR (others) × 2(a)   | 0.02                  | STMR (others) × 2(a) |

STMR: supervised trials median residue; HR: highest residue; PF: processing factor.

*Indicates that the input value is proposed at the limit of quantification.

(a): For fruit pomace, meals of oilseeds with 50% oil content and meals of oilseeds with 20% oil content, in the absence of processing factors supported by data, default processing factors of 2.5, 2 and 1.3 were, respectively, included in the calculation to consider the potential concentration of residues in these commodities.

(b): For the dietary burden calculations with 3,5,6-TCP, input values for apple pomace are directly derived from the fall-back GAP identified in scenario EU2 (excluding the most critical GAP on apples), input value for apple pomace is directly derived from the fall-back GAP identified in the scenario EU2.

### C.2. Consumer risk assessment without consideration of the existing CXLs (chlorpyrifos)

| Commodity         | Chronic risk assessment | Acute risk assessment |
|-------------------|-------------------------|-----------------------|
|                   | Input value (mg/kg)     | Comment               | Input value (mg/kg) | Comment |
| Citrus fruits     | 0.01*                  | STMR × PF             | 0.02                | HR × PF |
| Almonds           | 0.01*                  | STMR (tentative)      | 0.01*               | HR (tentative) |
| Chestnuts         | 0.01*                  | STMR                  | 0.01*               | HR |
| Hazelnuts         | 0.01*                  | STMR (tentative)      | 0.01*               | HR (tentative) |
| Walnuts           | 0.01*                  | STMR (tentative)      | 0.01*               | HR (tentative) |
| Apples and pears  | 0.04                   | STMR                  | 0.40                | HR |
| Quinces           | 0.13                   | STMR (tentative, fall-back)(a) | 0.01* | HR (tentative, fall-back)(a) |
| Medlar            | 0.01*                  | STMR (fall-back)(a)   | 0.16                | HR (fall-back)(a) |
| Apricots          | 0.01*                  | STMR                  | 0.01*               | HR |

**Risk assessment residue definition 1:** chlorpyrifos
| Commodity          | Chronic risk assessment | Acute risk assessment |
|--------------------|-------------------------|-----------------------|
|                    | Input value (mg/kg)     | Comment               | Input value (mg/kg) | Comment               |
| Cherries           | 0.01* STMR              | 0.03 HR               |
| Peaches            | 0.27 STMR (tentative)   | 0.51 HR (tentative)   |
|                    | 0.02 STMR (fall-back)\(^{(a)}\) | 0.05 HR (fall-back)\(^{(a)}\) |
| Plums              | 0.09 STMR               | 0.15 HR               |
| Wine grapes        | 0.43 STMR               | 0.98(b) HR \(\times 0.7\)\(^{(b)}\) (refined input value for adults) |
|                    | 0.01* STMR (tentative, fall-back)\(^{(a)}\) | 0.01* HR (tentative, fall-back)\(^{(a)}\) |
| Strawberries       | 0.03 STMR (tentative)   | 0.11 HR (tentative)   |
| Bananas            | 0.02 STMR \(\times PF\) | 0.03 HR \(\times PF\) |
| Potatoes           | 0.01* STMR              | 0.01* HR              |
| Beetroot           | 0.05 EU MRL             | 0.05 EU MRL           |
| Carrots            | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Radishes           | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Garlic             | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Onions             | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Shallots           | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Spring onions      | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Tomatoes           | 0.04 STMR (tentative)   | 0.04 HR (tentative)   |
| Peppers            | 0.03 STMR (tentative)   | 0.10 HR (tentative)   |
|                    | 0.01* STMR (tentative, fall-back)\(^{(a)}\) | 0.01* HR (tentative, fall-back)\(^{(a)}\) |
| Aubergines (egg plants) | 0.01* STMR (tentative) | 0.01* HR (tentative)  |
| Melons             | 0.01* STMR              | 0.01* HR              |
| Pumpkins           | 0.01* STMR              | 0.01* HR              |
| Watermelons        | 0.01* STMR              | 0.01* HR              |
| Broccoli           | 0.01* STMR              | 0.01* HR              |
| Cauliflower        | 0.01* STMR              | 0.01* HR              |
| Brussels sprouts   | 0.01* STMR              | 0.01* HR              |
| Head cabbage       | 0.01* STMR              | 0.01* HR              |
| Kale               | 0.01* STMR              | 0.01* HR              |
| Kohlrabi           | 0.01* STMR              | 0.01* HR              |
| Lamb's lettuce     | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Lettuce            | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Scarole (broad-leaf endive) | 0.01* STMR (tentative) | 0.01* HR (tentative)  |
| Rocket, rucola     | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Spinach            | 0.01* STMR              | 0.01* HR              |
| Beans (fresh, with pods) | 0.01* STMR (tentative) | 0.01* HR (tentative)  |
| Beans (fresh, without pods) | 0.01* STMR (tentative) | 0.01* HR (tentative)  |
| Peas (fresh, with pods) | 0.01* STMR (tentative) | 0.01* HR (tentative)  |
| Peas (fresh, without pods) | 0.01* STMR (tentative) | 0.01* HR (tentative)  |
| Asparagus          | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Globe artichokes   | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Beans (dry)        | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Commodity                        | Chronic risk assessment | Acute risk assessment |
|---------------------------------|-------------------------|-----------------------|
|                                 | Input value (mg/kg)     | Comment               | Input value (mg/kg) | Comment              |
| Peas (dry)                      | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Lupins (dry)                    | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Poppy seed                      | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Sunflower seed                  | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Rape seed                       | 0.01* STMR (tentative)  |                       | 0.02 HR (tentative)  |
| Soya bean                       | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Mustard seed                    | 0.01* STMR (tentative)  |                       | 0.02 HR (tentative)  |
| Cotton seed                     | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Gold of pleasure                | 0.01* STMR (tentative)  |                       | 0.02 HR (tentative)  |
| Olives for oil production       | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Barley and oat grain            | 0.12 STMR               |                       | 0.31 HR              |
| Buckwheat grain                 | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Maize grain                     | 0.01* STMR              |                       | 0.01* HR             |
| Millet grain                    | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Wheat and rye grain             | 0.03 STMR               |                       | 0.07 HR              |
| Sugar beet (root)               | 0.01* STMR              |                       | 0.01* HR             |
| Swine meat                      | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Swine fat                       | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Swine liver                     | 0.01* STMR              |                       | 0.01* HR             |
| Swine kidney                    | 0.01* STMR              |                       | 0.01* HR             |
| Ruminant meat                   | 0.01* 0.8 × STMR muscle + 0.2 × STMR fat (tentative) | 0.03 0.8 × HR muscle + 0.2 × HR fat (tentative) |
| Ruminant fat                    | 0.01* STMR (tentative)  |                       | 0.12 HR (tentative)  |
| Ruminant liver                  | 0.01* STMR              |                       | 0.01* HR             |
| Ruminant kidney                 | 0.01* STMR              |                       | 0.01* HR             |
| Poultry meat                    | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Poultry fat                     | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Ruminant milk                   | 0.01* STMR (tentative)  |                       | 0.01* HR (tentative) |
| Eggs                            | 0.01* STMR              |                       | 0.01* HR             |

CXL: codex maximum residue limit; STMR: supervised trials median residue; HR: highest residue; PF: processing factor; MRL: maximum residue level.

*Indicates that the input value is proposed at the limit of quantification.

(a): In the scenario EU2 (excluding the most critical GAPs for apples, pears, quinces, peaches, wine grapes and peppers), input values are derived from the fall-back GAP identified (risk assessment values for livestock commodities remain unchanged).

(b): A refined risk assessment value is used for wine grapes intake in adults, considering that the consumption of wine grapes by adults exclusively refers to wine. The yield factor of 0.7 is applied but the PF for wine is not robust enough to be considered in the calculation.

(c): A refined risk assessment value is used for wine grapes intake in children considering that the consumption of wine grapes by children exclusively refers to juice. The yield factor of 0.75 is applied but the PF for grape juice is not robust enough to be considered in the calculation.
C.3. Consumer risk assessment with consideration of the existing CXLs (chlorpyrifos)

| Commodity          | Chronic risk assessment | Acute risk assessment |
|--------------------|-------------------------|-----------------------|
|                    | Input value (mg/kg)     | Comment               | Input value (mg/kg) | Comment          |
| Citrus fruits      | 0.01* STMR x PF         | 0.02 HR x PF          |
| Almonds            | 0.05 STMR (CXL)         | 0.05 HR (CXL)         |
| Chestnuts          | 0.01* STMR              | 0.01* HR              |
| Hazelnuts          | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Pecans             | 0.05 STMR (CXL)         | 0.05 HR (CXL)         |
| Walnuts            | 0.05 STMR (CXL)         | 0.05 HR (CXL)         |
| Apples             | 0.17 STMR (CXL)         | 0.94 HR (CXL)         |
| Pears              | 0.17 STMR (CXL)         | 0.94 HR (CXL)         |
| Quinces            | 0.17 STMR (CXL)         | 0.94 HR (CXL)         |
| Medlar             | 0.17 STMR (CXL)         | 0.94 HR (CXL)         |
| Loquat             | 0.17 STMR (CXL)         | 0.94 HR (CXL)         |
| Apricots           | 0.01* STMR              | 0.01* HR              |
| Cherries           | 0.01* STMR              | 0.03 HR               |
| Peaches            | 0.04 STMR (CXL)         | 0.33 HR (CXL)         |
| Plums              | 0.04 STMR (CXL)         | 0.20 HR (CXL)         |
| Table grapes       | 0.09 STMR (CXL)         | 0.32 HR (CXL)         |
| Wine grapes        | 0.09 STMR (CXL)         | 0.22 HR (CXL) × 0.7<sup>a</sup> (refined input value for adults) |
|                    |                         | 0.24 HR (CXL) × 0.75<sup>b</sup> (refined input value for children) |
| Strawberries       | 0.09 STMR (CXL)         | 0.15 HR (CXL)         |
| Cranberries        | 0.49 STMR (CXL)         | 0.55 HR (CXL)         |
| Kumquats           | 0.24 STMR (CXL)         | 1.2 HR (CXL)          |
| Bananas            | 0.02 STMR x PF          | 0.03 HR x PF          |
| Potatoes           | 0.51 STMR (CXL)         | 0.87 HR (CXL)         |
| Beetroot           | 0.05 EU MRL             | 0.05 EU MRL           |
| Carrots            | 0.03 STMR (CXL)         | 0.05 HR (CXL)         |
| Radishes           | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Garlic             | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Onions             | 0.04 STMR (CXL)         | 0.08 HR (CXL)         |
| Shallots           | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Spring onions      | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Tomatoes           | 0.13 STMR (CXL)         | 0.33 HR (CXL)         |
| Peppers            | 0.38 STMR (CXL)         | 1.4 HR (CXL)          |
| Aubergines (egg plants) | 0.01* STMR (tentative)  | 0.01* HR (tentative)  |
| Melons             | 0.01* STMR              | 0.01* HR              |
| Pumpkins           | 0.01* STMR              | 0.01* HR              |
| Watermelons        | 0.01* STMR              | 0.01* HR              |
| Sweet corn         | 0.01* STMR (CXL)        | 0.01* HR (CXL)        |
| Broccoli           | 0.02 STMR (CXL)         | 1.4 HR (CXL)          |
| Cauliflower        | 0.01* STMR (CXL)        | 0.02 HR (CXL)         |
| Brussels sprouts   | 0.01* STMR              | 0.01* HR              |
| Commodity                        | Chronic risk assessment | Acute risk assessment |
|---------------------------------|-------------------------|-----------------------|
|                                 | Input value (mg/kg)     | Comment               | Input value (mg/kg) | Comment |
| Head cabbage                    | 0.15                    | STMR (CXL)            | 0.94               | HR (CXL) |
| Chinese cabbage                 | 0.18                    | STMR (CXL)            | 0.60               | HR (CXL) |
| Kale                            | 0.01*                   | STMR                  | 0.01*              | HR      |
| Kohlrabi                        | 0.01*                   | STMR                  | 0.01*              | HR      |
| Lamb’s lettuce                  | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Lettuce                         | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Scorole (broad-leaf endive)     | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Rocket, rucola                  | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Spinach                         | 0.01*                   | STMR                  | 0.01*              | HR      |
| Beans (fresh, with pods)        | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Beans (fresh, without pods)     | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Peas (fresh, with pods)         | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Peas (fresh, without pods)      | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Asparagus                       | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Globe artichokes                | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Beans (dry)                     | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Peas (dry)                      | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Lupins (dry)                    | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Poppy seed                      | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Sunflower seed                  | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Rape seed                       | 0.01*                   | STMR (tentative)      | 0.02               | HR (tentative) |
| Soya bean                       | 0.01*                   | STMR (CXL, tentative) | 0.05               | HR (CXL, tentative) |
| Mustard seed                    | 0.01*                   | STMR (tentative)      | 0.02               | HR (tentative) |
| Cotton seed                     | 0.07                    | STMR (CXL, tentative) | 0.18               | HR (CXL, tentative) |
| Gold of pleasure                | 0.01*                   | STMR (tentative)      | 0.02               | HR (tentative) |
| Olives for oil production       | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Barley grain                    | 0.12                    | STMR                  | 0.31               | HR      |
| Buckwheat grain                 | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Maize grain                     | 0.02                    | STMR (CXL)            | 0.04               | HR (CXL) |
| Millet grain                    | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative) |
| Oats grain                      | 0.12                    | STMR                  | 0.31               | HR      |
| Rice grain                      | 0.12                    | STMR (CXL)            | 0.28               | HR (CXL) |
| Rye grain                       | 0.03                    | STMR                  | 0.07               | HR      |
| Sorghum grain                   | 0.04                    | STMR (CXL)            | 0.27               | HR (CXL) |
| Wheat grain                     | 0.02                    | STMR (CXL)            | 0.30               | HR (CXL) |
| Tea (dried leaves and stalks)   | 0.38                    | STMR (CXL)            | 1.1                | HR (CXL) |
| Coffee beans                    | 0.03                    | STMR (CXL)            | 0.04               | HR (CXL) |
| Spices (seeds)                  | 0.09                    | STMR (CXL)            | 3.6                | HR (CXL) |
| Spices (fruits and berries)     | 0.05                    | STMR (CXL)            | 0.71               | HR (CXL) |
| Spices (roots and rhizome)      | 0.05                    | STMR (CXL)            | 0.72               | HR (CXL) |
| Sugar beet (root)               | 0.02                    | STMR (CXL)            | 0.03               | HR (CXL) |
| Swine meat                      | 0.01*                   | STMR (tentative)      | 0.01*              | HR      |
| Swine fat                       | 0.01*                   | STMR (CXL, tentative) | 0.02               | CXL     |
| Swine liver                     | 0.01*                   | STMR                  | 0.01*              | HR      |
| Swine kidney                    | 0.01*                   | STMR                  | 0.01*              | HR      |
| Ruminant meat                   | 0.04                    | 0.8 x STMR (CXL)      | 0.20               | 0.8 x HR (CXL) |
|                                 | muscle + 0.2 x STMR      | fat (tentative)       | muscle + 0.2 x CXL  | fat (tentative) |
### C.4. Consumer risk assessment for the metabolite 3,5,6-trichloropyridinol (3,5,6-TCP)

| Commodity      | Chronic risk assessment | Acute risk assessment |
|----------------|-------------------------|-----------------------|
|                | Input value (mg/kg)     | Comment               | Input value (mg/kg) | Comment               |
| Ruminant fat   | 0.15                    | STMR (CXL (tentative))| 1.0                | CXL (tentative)      |
| Ruminant liver | 0.01*                   | STMR                  | 0.01*              | HR                    |
| Ruminant kidney| 0.01*                   | STMR                  | 0.01*              | HR                    |
| Poultry meat   | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative)        |
| Poultry fat    | 0.01*                   | STMR (tentative)      | 0.01*              | HR (tentative)        |
| Poultry liver  | 0.01*                   | STMR                  | 0.01*              | HR                    |
| Ruminant milk  | 0.01*                   | STMR (CXL, tentative) | 0.02               | CXL (tentative)      |
| Eggs           | 0.01*                   | STMR                  | 0.01*              | HR                    |

CXL: codex maximum residue limit; STMR: supervised trials median residue; HR: highest residue; PF: processing factor; MRL: maximum residue level.

*Indicates that the input value is proposed at the limit of quantification.

(a): A refined risk assessment value is used for wine grapes intake in adults, considering that the consumption of wine grapes by adults exclusively refers to wine. The yield factor of 0.7 is applied but the PF for wine is not robust enough to be considered in the calculation.

(b): A refined risk assessment value is used for wine grapes intake in children considering that the consumption of wine grapes by children exclusively refers to juice. The yield factor of 0.75 is applied but the PF for grape juice is not robust enough to be considered in the calculation.
| Commodity                              | Chronic risk assessment                      | Acute risk assessment                       |
|----------------------------------------|----------------------------------------------|---------------------------------------------|
|                                        | Input value (mg/kg) | Comment | Input value (mg/kg) | Comment |
| Currants (red, black and white)        | – | No data available | – | No data available |
| Kiwi                                   | 0.05 STMR (chlorpyrifos-methyl) | 0.05 HR (chlorpyrifos-methyl) |
| Bananas                                | 0.11 STMR (chlorpyrifos) × PF | 0.20 HR (chlorpyrifos) × PF |
| Potatoes                               | 0.01* STMR (chlorpyrifos-methyl) | 0.06 HR (chlorpyrifos-methyl) |
| Beetroot                               | – | No data available | – | No data available |
| Carrots                                | – | No data available | – | No data available |
| Radishes                               | – | No data available | – | No data available |
| Garlic                                 | – | No data available | – | No data available |
| Onions                                 | – | No data available | – | No data available |
| Shallots                               | – | No data available | – | No data available |
| Spring onions                          | – | No data available | – | No data available |
| Tomatoes                               | 0.04 STMR (chlorpyrifos-methyl) | 0.06 HR (chlorpyrifos-methyl) |
| Peppers                                | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Aubergines (egg plants)                | 0.04 STMR (chlorpyrifos-methyl) | 0.06 HR (chlorpyrifos-methyl) |
| Melons                                 | 0.02 STMR (chlorpyrifos) | 0.02 HR (chlorpyrifos) |
| Pumpkins                               | 0.02 STMR (chlorpyrifos) | 0.02 HR (chlorpyrifos) |
| Watermelons                            | 0.02 STMR (chlorpyrifos) | 0.02 HR (chlorpyrifos) |
| Broccoli                               | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Cauliflower                            | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Brussels sprouts                       | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Head cabbage                           | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Kale                                   | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Kohlrabi                               | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Lamb’s lettuce                         | – | No data available | – | No data available |
| Lettuce                                | – | No data available | – | No data available |
| Scarole (broad-leaf endive)            | – | No data available | – | No data available |
| Rocket, rucola                         | – | No data available | – | No data available |
| Spinach                                | 0.03 STMR (chlorpyrifos) | 0.03 HR (chlorpyrifos) |
| Beans (fresh, with pods)               | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Beans (fresh, without pods)            | – | No data available | – | No data available |
| Peas (fresh, with pods)                | – | No data available | – | No data available |
| Peas (fresh, without pods)             | – | No data available | – | No data available |
| Asparagus                              | – | No data available | – | No data available |
| Globe artichokes                       | – | No data available | – | No data available |
| Beans (dry)                            | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Peas (dry)                             | – | No data available | – | No data available |
| Lupins (dry)                           | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Poppy seed                             | 0.01* STMR (chlorpyrifos) | 0.17 HR (chlorpyrifos) |
| Sunflower seed                         | 0.01* STMR (chlorpyrifos) | 0.01* HR (chlorpyrifos) |
| Rape seed                              | 0.01* STMR (chlorpyrifos) | 0.17 HR (chlorpyrifos) |
| Soya bean                              | – | No data available | – | No data available |
| Mustard seed                           | 0.01* STMR (chlorpyrifos) | 0.17 HR (chlorpyrifos) |
| Cotton seed                            | 0.02 STMR (chlorpyrifos-methyl) | 0.05 HR (chlorpyrifos-methyl) |
| Gold of pleasure                       | 0.01* STMR (chlorpyrifos) | 0.17 HR (chlorpyrifos) |
| Commodity               | Chronic risk assessment | Acute risk assessment |
|------------------------|-------------------------|-----------------------|
|                        | Input value (mg/kg)     | Comment               | Input value (mg/kg) | Comment               |
| Olives for oil production | 0.01* STMR (chlorpyrifos) | HR (chlorpyrifos)    | 0.01* HR (chlorpyrifos) |                       |
| Barley grain           | 0.59 STMR (chlorpyrifos-methyl) | HR (chlorpyrifos-methyl) | 1.02 HR (chlorpyrifos-methyl) |                       |
| Buckwheat grain        | – No data available     | – No data available  | – No data available |                       |
| Maize grain            | 0.01* STMR (chlorpyrifos) | HR (chlorpyrifos)    | 0.01* HR (chlorpyrifos) |                       |
| Millet grain           | – No data available     | – No data available | – No data available |                       |
| Oats grain             | 0.59 STMR (chlorpyrifos-methyl) | HR (chlorpyrifos-methyl) | 1.02 HR (chlorpyrifos-methyl) |                       |
| Rice grain             | – No data available     | – No data available | – No data available |                       |
| Rye grain              | 0.10 STMR (chlorpyrifos) | HR (chlorpyrifos)    | 0.20 HR (chlorpyrifos) |                       |
| Wheat grain            | 0.10 STMR (chlorpyrifos) | HR (chlorpyrifos)    | 0.20 HR (chlorpyrifos) |                       |
| Sugar beet (root)      | 0.01* STMR (chlorpyrifos) | HR (chlorpyrifos)    | 0.06 HR (chlorpyrifos) |                       |
| Swine meat             | 0.01* STMR muscle (triclopyr) | HR muscle (triclopyr) | 0.01 HR muscle (triclopyr) |                       |
| Swine fat              | 0.01 STMR (triclopyr)   | HR (triclopyr)       | 0.01 HR (triclopyr) |                       |
| Swine liver            | 0.06 STMR (triclopyr)   | HR (triclopyr)       | 0.13 HR (triclopyr) |                       |
| Swine kidney           | 0.04 STMR (triclopyr)   | HR (triclopyr)       | 0.13 HR (triclopyr) |                       |
| Ruminant meat          | 0.03 STMR muscle (triclopyr) | HR muscle (triclopyr) | 0.05 HR muscle (triclopyr) |                       |
| Ruminant fat           | 0.04 STMR (triclopyr)   | HR (triclopyr)       | 0.09 HR (triclopyr) |                       |
| Ruminant liver         | 0.42 STMR (triclopyr)   | HR (triclopyr)       | 0.95 HR (triclopyr) |                       |
| Ruminant kidney        | 0.31 STMR (triclopyr)   | HR (triclopyr)       | 0.90 HR (triclopyr) |                       |
| Poultry meat           | 0.02 STMR muscle (chlorpyrifos-methyl) | HR muscle (chlorpyrifos-methyl) | 0.02 HR muscle (chlorpyrifos-methyl) |                       |
| Poultry fat            | 0.02 STMR (chlorpyrifos-methyl) | HR (chlorpyrifos-methyl) | 0.02 HR (chlorpyrifos-methyl) |                       |
| Poultry liver          | 0.02 STMR (chlorpyrifos-methyl) | HR (chlorpyrifos-methyl) | 0.02 HR (chlorpyrifos-methyl) |                       |
| Ruminant milk          | 0.01 STMR (triclopyr)   | HR (triclopyr)       | 0.01 HR (triclopyr) |                       |
| Eggs                   | 0.02 STMR (chlorpyrifos-methyl) | HR (chlorpyrifos-methyl) | 0.02 HR (chlorpyrifos-methyl) |                       |

STMR: supervised trials median residue; HR: highest residue; PF: processing factor.

*Indicates that the input value is proposed at the limit of quantification.
Appendix D – Decision tree for deriving MRL recommendations

Evaluation of the GAPs and available residues data at EU level

1. GAP or DM > 0.1 mg/kg in EU?
   - Yes
   - MRL derived in Section 3?
     - No
     - MRL is recommended.
   - No
     - MRL fully supported by data?
       - No
       - Not considered for the RA.
       - Yes
       - Risk identified?
         - No
         - Current EU MRL is included in the RA.
         - Yes
         - Tentative median/highest values are included in the RA.
       - Yes
       - Median/highest values are included in the RA.

Consumer risk assessment for GAPs evaluated at EU level - EU scenarios

1. Risk identified?
   - Yes
   - Fall-back MRL available?
     - No
     - Tentative median/highest values are included in the RA.
     - Yes
     - MRL is recommended.
   - No
     - Fall-back MRL available?
       - No
       - Tentative median/highest values are included in the RA.
       - Yes
       - MRL is recommended.

Recommendations resulting from EU authorisations and import tolerances

1. (A) Specific LOQ or default MRL?
   - Yes
   - Specific LOQ or default MRL?
     - No
     - Specific LOQ or default MRL?
       - Yes
       - Specific LOQ or default MRL?
         - No
         - Specific LOQ or default MRL?
           - Yes
           - Specific LOQ or default MRL?
             - No
             - Comparison with CXLs.
             - Yes
             - MRL is recommended.
           - No
           - MRL is recommended.
         - No
         - MRL is recommended.
       - No
       - MRL is recommended.
     - No
     - Specific LOQ or default MRL?
       - Yes
       - Specific LOQ or default MRL?
         - No
         - Specific LOQ or default MRL?
           - Yes
           - Specific LOQ or default MRL?
             - No
             - Comparison with CXLs.
             - Yes
             - MRL is recommended.
           - No
           - MRL is recommended.
         - No
         - Specific LOQ or default MRL?
           - Yes
           - Specific LOQ or default MRL?
             - No
             - Comparison with CXLs.
             - Yes
             - MRL is recommended.
           - No
           - MRL is recommended.
         - No
         - Specific LOQ or default MRL?
           - Yes
           - Specific LOQ or default MRL?
             - No
             - Comparison with CXLs.
             - Yes
             - MRL is recommended.
           - No
           - MRL is recommended.
         - No
         - Specific LOQ or default MRL?
           - Yes
           - Specific LOQ or default MRL?
             - No
             - Comparison with CXLs.
             - Yes
             - MRL is recommended.
Comparison of the EU recommendation with the existing CXL

CXL available? 
Yes 

RD comparable? 
Yes 

CXL higher? 
Yes 

CXL supported by data? 
No 

CXL included in the RA? 
No 

Risk identified? 
Yes 

Recommendations with consideration of the existing CXL

- (I) Maintain EU recommendation indicating that no CXL is available.
- (II) Maintain EU recommendation indicating CXL is not compatible.
- (III) Maintain EU recommendation indicating that CXL is covered.
- (IV) Maintain EU recommendation; higher CXL is not safe for consumer.
- (V) Maintain current CXL or EU recommendation?
- (VI) Maintain EU recommendation; higher CXL is not safe for consumer.
- (VII) CXL is recommended; EU recommendation is covered as well.

Consumer risk assessment with consideration of the existing CXL

Input values for the RA remain unchanged.
Input values for the RA remain unchanged.
Input values for the RA remain unchanged.
CXL is included in the RA.
Codex median/highest residues are included in the RA.
Risk identified? 
Yes 

Input values for the RA remain unchanged.
Input values for the RA remain unchanged.
Risk identified? 
Yes 

Input values for the RA remain unchanged.
Risk identified? 
Yes 

Input values for the RA remain unchanged.
Risk identified? 
Yes 

Result EU assessment
## Appendix E – Used compound codes

| Code/trivial name           | Chemical name/SMILES notation                                                                 | Structural formula |
|----------------------------|-----------------------------------------------------------------------------------------------|--------------------|
| Chlorpyrifos               | O,O-Diethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate                                        | ![Structural formula](image) |
|                            | Clc1 cc(Cl)c(Cl)nc1OP(-S)(OCC)OCC                                                             |                    |
| Chlorpyrifos-methyl        | O,O-Dimethyl O-3,5,6-trichloro-2-pyridyl phosphorothioate                                       | ![Structural formula](image) |
|                            | Clc1 cc(Cl)c(Cl)nc1OP(-S)(OC)OC                                                                |                    |
| Triclopyr                  | 3,5,6-trichloro-2-pyridyloxyacetic acid                                                       | ![Structural formula](image) |
|                            | Clc1 cc(Cl)c(Cl)nc1OCC(=O)                                                                    |                    |
| 3,5,6-Trichloropyridinol   | 3,5,6-Trichloropyridin-2-ol                                                                    | ![Structural formula](image) |
| (3,5,6-TCP)                | Clc1 cc(Cl)c(Cl)nc1O                                                                          |                    |
| 3,5,6-Trichloro-2-         | 3,5,6-Trichloro-2-methoxypyridine                                                             | ![Structural formula](image) |
| methoxy pyridine           | Clc1 cc(Cl)c(Cl)nc1OC                                                                         |                    |
| Desethyl chlorpyrifos      | O-Ethyl O-(3,5,6-trichloropyridin-2-yl) hydrogen phosphorothioate                               | ![Structural formula](image) |
|                            | Clc1 cc(Cl)c(Cl)nc1OP(O)(=S)OCC                                                                |                    |

SMILES: simplified molecular-input line-entry system.