

REASONED OPINION

Modification of the existing MRLs for sulfuryl fluoride and fluoride ion in chestnuts¹

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SUMMARY

According to Article 6 of the Regulation (EC) No 396/2005, France, herewith referred to as the Evaluating Member State (EMS), received an application from the company Dow AgroSciences to modify the existing MRL for sulfuryl fluoride and fluoride ion in chestnuts. In order to accommodate for the intended use of sulfuryl fluoride on chestnuts in France and Portugal, the EMS proposed to raise the existing MRL for fluoride ion in chestnuts from 25 to 110 mg/kg. For sulfuryl fluoride no need to modify the existing MRL of 10 mg/kg was identified. The EMS France drafted an evaluation report according to Article 8 of Regulation (EC) No 396/2005 which was submitted to the European Commission and forwarded to EFSA on 11 July 2011.

EFSA derives the following conclusions based on the submitted evaluation report prepared by the EMS France, the Draft Assessment Report (DAR) prepared by the rapporteur Member State (RMS) United Kingdom under Directive 91/414/EEC and the EFSA conclusion on the peer review of sulfuryl fluoride.

The toxicological profile of sulfuryl fluoride was assessed in the framework of the peer review under Directive 91/414/EEC and the data were sufficient to derive an ADI value of 0.014 mg/kg bw/day and an ARfD of 0.7 mg/kg bw. In the peer review the ADI and ARfD for the fluoride were also discussed. An ADI of 0.005 mg/kg bw/day has been calculated on the basis of the parent compound, taking into account the molecular weight. An upper tolerable intake level (UL) of 0.1 mg/kg bw for fluoride for children up to 8 years has been established by the EFSA Scientific Panel on Dietetic Products, Nutrition and Allergies. However, the peer review concluded that at the moment no scientifically based conclusions can be drawn on the ADI and ARfD values for fluoride and further studies are required.

The nature of sulfuryl fluoride in food commodities after fumigation has not been investigated. The available studies for the peer review were considered insufficient to assess the involved reactions and to verify the reported results and therefore the peer review suggested that a study according to modern standards has to be carried out in order to fully elucidate the nature of the residues in food matrices

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upon fumigation with sulfuryl fluoride. A provisional residue definition for the risk assessment and monitoring was proposed as sulfuryl fluoride and inorganic fluoride (separately). It was agreed, if protein-bound fluoride is formed in treated food and can in some way be taken up by the consumer, it should also be included in the residue definition.

The data requirements identified by the peer review have not been addressed and EFSA therefore concludes that the metabolism of sulfuryl fluoride in chestnuts following the fumigation treatment is not sufficiently elucidated.

The submitted residue data indicate that fumigation of chestnuts according to the intended GAP would require raising the existing MRL for fluoride, but the EU MRL for sulfuryl fluoride would not need to be modified. However, pending the investigation of the nature of sulfuryl fluoride following fumigation treatment in chestnuts, no MRLs can currently be proposed. EFSA also notes that the storage stability of sulfuryl fluoride residues in plant matrices has to be investigated.

EFSA calculated the consumer exposure to sulfuryl fluoride residues using the existing EU MRLs as established in Annex IIIA of Regulation (EC) 396/2005 as input values. The estimated exposure was then compared with the toxicological reference values derived for sulfuryl fluoride. No long-term consumer intake concerns were identified for any of the European diets incorporated in the EFSA PRIMo. The total calculated intake values ranged from 1-30% of the ADI (maximum for IE adult diet). The contribution of residues in chestnuts to the total consumer exposure accounted for a maximum of 2% of the ADI (WHO Cluster diet B). No acute consumer risk was identified with regard to the existing EU MRL for sulfuryl fluoride in chestnuts (6% of the ARfD).

A conclusive consumer exposure assessment to fluoride residues currently cannot be performed, pending investigation of the nature of sulfuryl fluoride in chestnuts after the fumigation treatment as well as lacking the information on the toxicological reference values for fluoride and the consumer exposure to fluoride residues from other sources than pesticide residues.

EFSA concludes that the intended use on chestnuts in France and Portugal cannot be supported.

KEY WORDS

Sulfuryl fluoride, chestnuts, MRL application, Regulation (EC) No 396/2005, consumer risk assessment, fluoride ion, insecticide, nematicide

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BACKGROUND

Commission Regulation (EC) No 396/2005³ establishes the rules governing the setting of pesticide MRLs at Community level. Article 6 of that regulation lays down that a party requesting an authorisation for the use of a plant protection product in accordance with Council Directive 91/414/EEC⁴, currently replaced by Regulation (EC) No 1107/2009⁵, shall submit to a Member State, when appropriate, an application to set or modify an MRL in accordance with the provisions of Article 7 of that regulation.

France, hereafter referred to as the evaluating Member State (EMS), received an application from the company Dow AgroSciences⁶ to modify the existing MRL for the active substance sulfuryl fluoride and fluoride ion in chestnuts. This application was notified to the European Commission and EFSA and subsequently evaluated by the EMS in accordance with Article 8 of the Regulation.

After completion, the evaluation report of the EMS was submitted to the European Commission who forwarded the application, the evaluation report and the supporting dossier to EFSA on 11 July 2011. The application was included in the EFSA Register of Questions with the reference number EFSA-Q-2011-00889 and the following subject:

Sulfuryl fluoride - Application to modify the existing MRL in chestnuts.

The EMS proposed to amend the MRL for fluoride ion in chestnuts from 25 mg/kg to 110 mg/kg. For sulfuryl fluoride the existing MRL of 10 mg/kg is confirmed.

EFSA then proceeded with the assessment of the application as required by Article 10 of the Regulation.

TERMS OF REFERENCE

In accordance with Article 10 of Regulation (EC) No 396/2005, EFSA shall, based on the evaluation report provided by the evaluating Member State, provide a reasoned opinion on the risks to the consumer associated with the application.

In accordance with Article 11 of that Regulation, the reasoned opinion shall be provided as soon as possible and at the latest within three months (which may be extended to six months where more detailed evaluations need to be carried out) from the date of receipt of the application. Where EFSA requests supplementary information, the time limit laid down shall be suspended until that information has been provided.

In this particular case the calculated deadline for providing the reasoned opinion is 11 October 2011.

³ Regulation (EC) No 396/2005 of the European Parliament and of the Council of 23 February 2005. OJ L 70, 16.3.2005, p. 1-16.

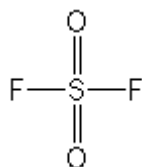
⁴ Council Directive 91/414/EEC of 15 July 1991, OJ L 230, 19.8.1991, p. 1-32.

⁵ Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009. OJ L 309, 24.11.2009, p. 1-50.

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THE ACTIVE SUBSTANCE AND ITS USE PATTERN

There is no ISO common name for sulfuryl fluoride, it has been used in the literature but has no official status except as a systematic name. The IUPAC name is sulfuryl fluoride.



Molecular weight: 102.1g/mol

Sulfuryl fluoride is a non-specific insecticide that acts by disrupting the glycolysis and citric acid cycles, depriving the organism of the necessary energy for survival. Sulfuryl fluoride is used for the control of all life stages of arthropods (e.g. meal moths, flour and grain beetles).

Sulfuryl fluoride is an active substance which was evaluated according to Directive 91/414/EEC with the United Kingdom designated as rapporteur Member State (RMS). It was included in Annex I of this Directive by Directive 2010/38/EU⁷ for use as insecticide/nematicide (fumigant) only, provided that the active substance is used by professional users in sealable structures which are empty, or where conditions of use ensure that consumer exposure is acceptable. The representative uses evaluated by the peer review were fumigation of buildings or storage containers by releasing gas from a cylinder, to control stored product insect pests (eg. *Ephestia kuehniella*, *Plodia interpunctella*, *Tribolium castaneum*, *Tribolium confusum*, *Trogoderma variabile*, *Oryzaephilus surinamensis*) in emptied cereal grain mills. The maximum target dosage was 1500 CTP g h/m³ with a maximum target concentration of 128 g/m³.

The existing MRLs for sulfuryl fluoride and fluoride ion are established on a temporary basis in Annex IIIA of Regulation (EC) No 396/2005 (see Appendix C). In the framework of the assessment of consumer exposure arising from temporary EU MRLs, EFSA could not finalise the evaluation because questions concerning the toxicological reference values for fluoride and the consumer exposure to fluoride resulting from other sources than pesticide residues have to be clarified first (EFSA, 2007). The existing EU MRL for sulfuryl fluoride in chestnuts is set at 10 mg/kg, whereas the fluoride MRL for chestnuts is set at 25 mg/kg. The Codex Alimentarius has set a CXL of 3 mg/kg for sulfuryl fluoride in tree nuts following post harvest treatment. No MRLs for fluoride ion have been established by the Codex Alimentarius.

The intended GAP in France and Portugal for which a modification of the existing MRLs is requested refers to post harvest fumigation of chestnuts. The details of the GAP are given in Appendix A.

⁷ Commission Directive 2010/38/EU of 18 June 2010, OJ L 154, 19.06.2010, p.21-23.

ASSESSMENT

EFSA bases its assessment on the evaluation report submitted by the EMS (France, 2011), the Draft Assessment Report (DAR) prepared under Council Directive 91/414/EEC (UK, 2004) and the conclusion on the peer review of the pesticide risk assessment of the active substance sulfuryl fluoride (EFSA, 2010). The assessment is performed in accordance with the legal provisions of the Uniform Principles for the Evaluation of the Authorization of Plant Protection Products set out in Regulation (EU) No 546/2011⁸ and the currently applicable guidance documents relevant for the consumer risk assessment of pesticide residues (EC, 1997).

1. Methods of analysis

1.1. Methods for enforcement of residues in food of plant origin

Analytical methods for the determination of sulfuryl fluoride and fluoride residues in plant commodities were assessed in the DAR and in the conclusion on the peer review under Directive 91/414/EEC (UK, 2004; EFSA, 2010).

Sulfuryl fluoride residues can be determined in matrices with high oil content and in dry matrices at the LOQs of 0.004 to 0.01 mg/kg using GC-ECD method. Fluoride residues in these matrices can be determined using a fluoride ion specific electrode and the validated LOQs were within a range of 0.5 to 5 mg/kg. In nuts (pecan nuts, almonds, pistachios) the LOQ was 2.5 mg/kg.

EFSA concludes that sufficiently validated analytical methods are available to monitor all compounds given in the provisional enforcement residue definition for chestnuts.

1.2. Methods for enforcement of residues in food of animal origin

Analytical methods for the determination of residues in food of animal origin are not assessed in the current application, since chestnuts are normally not fed to livestock.

2. Mammalian toxicology

The toxicological profile of the active substance sulfuryl fluoride was assessed in the framework of the peer review under Directive 91/414/EEC (EFSA, 2010). The data were sufficient to derive the toxicological reference values which are compiled in Table 2-1.

Table 2-1: Overview of the toxicological reference values

	Source	Year	Value	Study relied upon	Safety factor
Sulfuryl fluoride					
ADI	EFSA	2010	0.014 mg/kg bw/d	2 yr rat	100
ARfD	EFSA	2010	0.7 mg/kg bw	Acute neurotoxicity study	100

⁸ Commission Regulation (EU) No 546/2011 of 10 June 2011, OJ L 155, 11.6.2011, p.127-174

In the experts' meeting the ADI and ARfD for the fluoride were discussed as well. An ADI of 0.005 mg/kg bw/day has been calculated on the basis of the parent compound, taking into account the molecular weight (EFSA, 2010). A tolerable upper intake level (UL) of 0.1 mg/kg bw for fluoride has been established in the EFSA opinion of the Scientific Panel on Dietetic Products, Nutrition and Allergies for children up to 8 years, based on human data (EFSA, 2005). The peer review discussed whether an appropriate value could be derived based on these data, but decided that at the moment no scientifically based conclusion can be drawn on the ADI and ARfD for the metabolite fluoride.

3. Residues

3.1. Nature and magnitude of residues in plant

3.1.1. Primary crops

3.1.1.1. Nature of residues

Several studies investigating the mode of degradation of sulfuranyl fluoride in food commodities have been available for the peer review, but the meeting of the experts concluded that the available information was not sufficient to assess the involved reactions and to verify the reported results (EFSA, 2010). The peer review suggested that a study according to modern standards has to be carried out in order to fully elucidate the nature of the residues expected in food matrices upon fumigation with sulfuranyl fluoride. From research papers it is known that, due to its small steric size, fluorine has been used as a replacement for hydrogen in many biologically active molecules, including amino acids. Once introduced, the strong carbon-fluorine bond is particularly resistant to metabolic transformations, and the electro-negativity of fluorine can have a significant effect on the basicity and acidity of neighbouring groups and on the electron distribution, and can change the overall reactivity and stability of the molecule. The peer review experts were of the opinion that for all uses where sulfuranyl fluoride can come into contact with food (directly or through contamination) data on the nature and levels of the residue are required. Only if these data are available it can be adequately assessed which measures are appropriate to mitigate consumer risk (EFSA, 2010).

Provisionally a residue definition for risk assessment and monitoring was proposed to include sulfuranyl fluoride on the one hand and inorganic fluoride on the other hand. The experts agreed that, if protein-bound fluoride is formed and can in some way be taken up by the consumer, it should also be included in the residue definition.

The data requirements identified by the peer review have not been addressed by the manufacturer and are thus applicable also for the current MRL application. EFSA therefore concludes that the metabolism of sulfuranyl fluoride in chestnuts following the fumigation treatment is not sufficiently elucidated. Not knowing the residues formed and the toxicity of these compounds, a conclusive consumer risk assessment currently cannot be performed.

3.1.1.2. Magnitude of residues

In support of the intended use, the applicant submitted in total 27 residue trials reflecting sulfuranyl fluoride and fluoride residues in chestnuts after the fumigation. Six residue trials were performed in France in 2009 and 21 trials in the United States in 2006/2007. Trials from the United States were analysed for parent sulfuranyl fluoride as well as fluoride ion. Residue trials from France were analysed for fluoride ion only and the day when the sample was taken was not indicated.

Residues of sulfuryl fluoride in all trials were within a range of <0.002 to 0.01 mg/kg.

The residue concentrations of fluoride measured in the chestnuts treated according to the intended application rate (300 – 400 CTP (concentration (g) x Time (t) (hours)/Product (m³), ± 25%) showed high variations, ranging from 13.6 to 74.4 mg/kg. Additional 17 trials, which were over- or under dosed (expressed in terms of CTP) did not give an indication that the residue concentration is proportionate to the application rate. The data suggest that variations in time of exposure have a higher impact on the final residue levels in the crop than the concentration of the product applied. For example, an under dosed residue trial (200 CTP) in France with chestnuts being fumigated for *ca.* 132 hours gave the highest residues of fluoride (85.9 mg/kg), whereas more than 3 times overdosed trial with a fumigation time of 7 hours resulted in 58.8 mg/kg of fluoride. EFSA has therefore doubts that for this specific type of treatment the CTP is a good way of expressing the GAP.

The results of the trials for fluoride are reported in the table below (Table 3-1).

Table 3-1: Overview of the available residues trials data

Trial No.	CTP (mg hr/L)	hr	mg/L	Fluoride (mg/kg)	Application rate within the tolerated deviation +/- 25%
1	194	8.17	23.75	22.8	
2	199	8.17	24.36	24.3	
3	199	8.17	24.36	29	
4	203	8.17	24.85	28.7	
5	207	8.17	25.34	16.8	
6	216	8.17	26.44	20.1	
7	313	22.5	13.91	31	x
8	313	22.5	13.91	23.4	x
9	313	22.5	13.91	30.4	x
10	317	22.5	14.09	13.6	x
11	336	22.5	14.93	22.6	x
12	358	22.5	15.91	21.9	x
13	582	3.13	185.94	32.5	
14	596	3.13	190.42	58	
15	603	3.13	192.65	51.8	
16	603	3.13	192.65	43.1	
17	603	3.13	192.65	24.1	
18	603	3.13	192.65	33	
19	1500	7.38	203.25	58.8	
20	1472	23.92	61.54	64.6	
21	1408	23.92	58.86	72.8	
22	445	12	37.08	17.7	x
23	327	12	27.25	64.1	x
24	424	12.25	34.61	51.7	x
25	395	12	32.92	74.4	x
26	240	2.08	115.38	27.2	
27	200	132	1.52	85.9	

Finally 6 residue trials from the United States and 4 residue trials from France were selected as being the most representative for the intended use (Table 3-2).

The storage stability of sulfuryl fluoride in primary crops was not investigated in the peer review (EFSA, 2010). The stability of fluoride residues has been demonstrated in wheat grain and flour, raisins, walnuts, maize grain and meal for at least 1 month at ambient temperatures and for at least 3 months at -20°C (EFSA, 2010). EFSA has no information on the storage conditions of residue trial samples. However, as the EMS confirmed the validity of residue trials data regarding storage stability, EFSA assumed that the samples were stored for a minimum storage interval which does not require submission of storage stability studies. Nevertheless, the storage stability studies of sulfuryl fluoride are required.

According to the EMS, the analytical methods used to analyse supervised residue trial samples have been sufficiently validated and were proven to be fit for purpose (France, 2011).

The submitted residue data indicate that fumigation of chestnuts according to the intended GAP would require raising the existing MRL for fluoride, but the EU MRL for sulfuryl fluoride would not need to be modified. However, pending the investigation of nature of sulfuryl fluoride following fumigation treatment in chestnuts, no MRLs can currently be proposed.

Table 3-2: Overview of the available residues trials data

Commodity	Region ^(a)	Outdoor /Indoor	Individual trial results (mg/kg)		Median residue (mg/kg) _(b)	Highest residue (mg/kg) _(c)	MRL proposal (mg/kg)	Median CF ^(d)	Comments
			Enforcement	Risk assessment					
Provisional enforcement and risk assessment residue definition: Sulfuryl fluoride									
Chestnuts	EU	Indoor	6 x <0.002	6 x <0.002	<0.002	<0.002	0.002*	1	The existing EU MRL is 10 mg/kg.
Provisional enforcement and risk assessment residue definition: Fluoride ion									
Chestnuts	EU	Indoor	13.6 ^g ; 17.7 ^f ; 21.9 ^g ; 22.6 ^g ; 23.4 ^g ; 30.4 ^g ; 31 ^g ; 51.7 ^f ; 64.1 ^f ; 74.4 ^f	13.6 ^g ; 17.7 ^f ; 21.9 ^g ; 22.6 ^g ; 23.4 ^g ; 30.4 ^g ; 31 ^g ; 51.7 ^f ; 64.1 ^f ; 74.4 ^f	26.9	74.4	150	1	R _{ber} = 110 R _{max} =96 OECD MRL ^e =150

(a): NEU, SEU, EU or Import (country code). In the case of indoor uses there is no necessity to differentiate between NEU and SEU.

(b): Median value of the individual trial results according to the enforcement residue definition.

(c): Highest value of the individual trial results according to the enforcement residue definition.

(d): The median conversion factor for enforcement to risk assessment is obtained by calculating the median of the individual conversion factors for each residues trial.

(e): The MRL calculated using the OECD MRL calculator (OECD, 2011b)

(f): Days after fumigation not indicated. Samples analyzed for fluoride only.

(g): Residue trial sample taken 9 days after the fumigation.

(*): Indicates that the MRL is set at the limit of analytical quantification

3.1.1.3. Rotational crops

Investigation of sulfuryl fluoride residues in rotational/succeeding crops is not of relevance for the post harvest treatment of chestnuts.

3.2. Nature and magnitude of residues in livestock

Chestnuts are not fed to livestock and therefore the nature and magnitude of sulfuryl fluoride residues in livestock was not assessed in the framework of this application.

4. Consumer risk assessment

4.1. Consumer risk assessment sulfuryl fluoride

The consumer risk assessment regarding sulfuryl fluoride residues was performed with revision 2 of the EFSA Pesticide Residues Intake Model (PRIMo). This exposure assessment model contains the relevant European food consumption data for different sub-groups of the EU population⁹ (EFSA, 2007).

For the calculation of the chronic and acute exposure EFSA used the existing EU MRLs for sulfuryl fluoride as currently established in Annex IIIA of the Regulation (EC) No 396/2005. The estimated exposure was then compared with the toxicological reference values derived for sulfuryl fluoride (see Table 2-1). The results of the intake calculation are presented in Appendix B to this reasoned opinion.

No long-term consumer intake concerns were identified for any of the European diets incorporated in the EFSA PRIMo. The total calculated intake values ranged from 1-30% of the ADI (maximum for IE adult diet). The contribution of residues in chestnuts to the total consumer exposure accounted for a maximum of 2% of the ADI (WHO Cluster diet B).

No acute consumer risk was identified in relation to the existing EU MRL for sulfuryl fluoride in chestnuts. The calculated maximum exposure in percentage of the ARfD was 6% for chestnuts.

4.2. Consumer risk assessment fluoride

Without further information on the nature of sulfuryl fluoride in chestnuts following the fumigation treatment as well as lacking the information on the toxicological reference values for fluoride and the consumer exposure to fluoride resulting from other sources than pesticide residues, a conclusive consumer exposure assessment at the current stage cannot be performed.

⁹ The calculation of the long-term exposure (chronic exposure) is based on the mean consumption data representative for 22 national diets collected from MS surveys plus 1 regional and 4 cluster diets from the WHO GEMS Food database; for the acute exposure assessment the most critical large portion consumption data from 19 national diets collected from MS surveys is used. The complete list of diets incorporated in EFSA PRIMo is given in its reference section (EFSA, 2007).

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The toxicological profile of sulfuryl fluoride was assessed in the framework of the peer review under Directive 91/414/EEC and the data were sufficient to derive an ADI value of 0.014 mg/kg bw/day and an ARfD of 0.7 mg/kg bw. In the peer review the ADI and ARfD for the fluoride were also discussed. An ADI of 0.005 mg/kg bw/day has been calculated on the basis of the parent compound, taking into account the molecular weight. An upper tolerable intake level (UL) of 0.1 mg/kg bw for fluoride for children up to 8 years has been established by the EFSA Scientific Panel on Dietetic Products, Nutrition and Allergies. However, the peer review concluded that at the moment no scientifically based conclusions can be drawn on the ADI and ARfD values for fluoride and further studies are required.

The nature of sulfuryl fluoride in food commodities after fumigation has not been investigated. The available studies for the peer review were considered insufficient to assess the involved reactions and to verify the reported results and therefore the peer review suggested that a study according to modern standards has to be carried out in order to fully elucidate the nature of the residues in food matrices upon fumigation with sulfuryl fluoride. A provisional residue definition for the risk assessment and monitoring was proposed as sulfuryl fluoride and inorganic fluoride (separately). It was agreed, if protein-bound fluoride is formed in treated food and can in some way be taken up by the consumer, it should also be included in the residue definition.

The data requirements identified by the peer review have not yet been addressed and EFSA therefore concludes that the metabolism of sulfuryl fluoride in chestnuts following the fumigation treatment is not sufficiently elucidated.

The submitted residue data indicate that fumigation of chestnuts according to the intended GAP would require raising the existing MRL for fluoride, but the EU MRL for sulfuryl fluoride would not need to be modified. However, pending the investigation of the nature of sulfuryl fluoride following fumigation treatment in chestnuts, no MRLs can currently be proposed. EFSA also notes that the storage stability of sulfuryl fluoride residues in plant matrices has to be investigated.

EFSA calculated the consumer exposure to sulfuryl fluoride residues using the existing EU MRLs as established in Annex IIIA of Regulation (EC) 396/2005 as input values. The estimated exposure was then compared with the toxicological reference values derived for sulfuryl fluoride. No long-term consumer intake concerns were identified for any of the European diets incorporated in the EFSA PRIMo. The total calculated intake values ranged from 1-30% of the ADI (maximum for IE adult diet). The contribution of residues in chestnuts to the total consumer exposure accounted for a maximum of 2% of the ADI (WHO Cluster diet B). No acute consumer risk was identified with regard to the existing EU MRL for sulfuryl fluoride in chestnuts (6% of the ARfD).

A conclusive consumer exposure assessment to fluoride residues currently cannot be performed, pending investigation of the nature of sulfuryl fluoride in chestnuts after the fumigation treatment as well as lacking the information on the toxicological reference values for fluoride and the consumer exposure to fluoride residues from other sources than pesticide residues.

EFSA concludes that the intended use on chestnuts in France and Portugal cannot be supported.

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Appendix A. GOOD AGRICULTURAL PRACTICES (GAPS)

Crop and/or situation (a)	Member State or Country	F G or I (b)	Pest or group of pests controlled (c)	Formulation		Application				Application rate per treatment			PHI (days) (l)	Remarks (m)
				type (d - f)	conc. of a.s. (i)	method kind (f - h)	growth stage & season (j)	number min max (k)	interval min max	kg as/hL min max	water L/ha min max	kg a.s./ha min max		
Chestnuts	FRANCE PORTUGAL	I	Stored product insect pests (for example, <i>Curculio elephas</i> and months of <i>Laspeyria splendana</i>)	Fumigant gas ⁿ	99.8%	Fumigation ^o	Post harvest	1	-	CTP ^p of 300-400/ commodity	-	-	3	The dosage CTP (concentration x exposure time) used is dependent on surrounding temperature. Dosage decreases as temperature increases.

- Remarks:
- (a) For crops, EU or other classifications, e.g. Codex, should be used; where relevant, the use situation should be described (e.g. fumigation of a structure)
 - (b) Outdoor or field use (F), glasshouse application (G) or indoor application (I)
 - (c) e.g. biting and suckling insects, soil born insects, foliar fungi, weeds
 - (d) e.g. wettable powder (WP), emulsifiable concentrate (EC), granule (GR)
 - (e) GCPF Technical Monograph No 2, 4th Ed., 1999 or other codes, e.g. OECD/CIPAC, should be used
 - (f) All abbreviations used must be explained
 - (g) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench
 - (h) Kind, e.g. overall, broadcast, aerial spraying, row, individual plant, between the plants - type of equipment used must be indicated
 - (i) g/kg or g/l
 - (j) Growth stage at last treatment (Growth stages of mono- and dicotyledonous plants. BBCH Monograph, 2nd Ed., 2001), including where relevant, information on season at time of application
 - (k) The minimum and maximum number of application possible under practical conditions of use must be provided
 - (l) PHI - minimum pre-harvest interval
 - (m) Remarks may include: Extent of use/economic importance/restrictions (i.e. feeding, grazing)
 - (n) Packaged as a liquid under pressure. As liquid is released it converts to a gas state and disperses in the confined space of the fumigation.
 - (o) Release fumigant from cylinder into confined air space, confine gas for 2-72 + hours, then exhaust. Vacuum fumigation follows same procedure, with vacuum to increase insecticidal activity.
 - (p) CTP = concentration (g) x Time (t) (hours)/Product (m³).

Acute risk assessment /children - refined calculations						Acute risk assessment / adults / general population - refined calculations						
The acute risk assessment is based on the ARfD.												
For each commodity the calculation is based on the highest reported MS consumption per kg bw and the corresponding unit weight from the MS with the critical consumption. If no data on the unit weight was available from that MS an average European unit weight was used for the IESTI calculation.												
In the IESTI 1 calculation, the variability factors were 10, 7 or 5 (according to JMPR manual 2002), for lettuce a variability factor of 5 was used.												
In the IESTI 2 calculations, the variability factors of 10 and 7 were replaced by 5. For lettuce the calculation was performed with a variability factor of 3.												
Threshold MRL is the calculated residue level which would leads to an exposure equivalent to 100 % of the ARfD.												
Unprocessed commodities	No of commodities for which ARfD/ADI is exceeded (IESTI 1):			No of commodities for which ARfD/ADI is exceeded (IESTI 2):			No of commodities for which ARfD/ADI is exceeded (IESTI 1):			No of commodities for which ARfD/ADI is exceeded (IESTI 2):		
	---			---			---			---		
	IESTI 1	*)	**)	IESTI 2	*)	**)	IESTI 1	*)	**)	IESTI 2	*)	**)
	Highest % of ARfD/ADI	Commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Commodities	pTMRL/ threshold MRL (mg/kg)
	6.0	Chestnuts	10 / -	6.0	Chestnuts	10 / -	2.6	Chestnuts	10 / -	2.6	Chestnuts	10 / -
No of critical MRLs (IESTI 1)						No of critical MRLs (IESTI 2)						
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Processed commodities	No of commodities for which ARfD/ADI is exceeded:			No of commodities for which ARfD/ADI is exceeded:			No of commodities for which ARfD/ADI is exceeded:			No of commodities for which ARfD/ADI is exceeded:		
	---			---			---			---		
	Highest % of ARfD/ADI	Processed commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Processed commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Processed commodities	pTMRL/ threshold MRL (mg/kg)	Highest % of ARfD/ADI	Processed commodities	pTMRL/ threshold MRL (mg/kg)
*) The results of the IESTI calculations are reported for at least 5 commodities. If the ARfD is exceeded for more than 5 commodities, all IESTI values > 90% of ARfD are reported.												
**) pTMRL: provisional temporary MRL												
***) pTMRL: provisional temporary MRL for unprocessed commodity												
Conclusion:												
For Sulfuryl fluoride IESTI 1 and IESTI 2 were calculated for food commodities for which pTMRLs were submitted and for which consumption data are available.												
No exceedance of the ARfD/ADI was identified for any unprocessed commodity.												
For processed commodities, no exceedance of the ARfD/ADI was identified.												

Appendix C. EXISTING EU MAXIMUM RESIDUE LIMITS (MRLs)

Sulfuryl Fluoride

(Pesticides - Web Version - EU MRLs
(File created on 27/01/2012 14:22))

Code number	Groups and examples of individual products to which the MRLs apply (a)	Sulfuryl fluoride
100000	1. FRUIT FRESH OR FROZEN; NUTS	
110000	(i) Citrus fruit	0,01*
110010	Grapefruit (Shaddocks, pomelos, sweeties, tangelo (except mineola), ugli and other hybrids)	0,01*
110020	Oranges (Bergamot, bitter orange, chinotto and other hybrids)	0,01*
110030	Lemons (Citron, lemon)	0,01*
110040	Limes	0,01*
110050	Mandarins (Clementine, tangerine, mineola and other hybrids)	0,01*
110990	Others	0,01*
120000	(ii) Tree nuts (shelled or unshelled)	10
120010	Almonds	10
120020	Brazil nuts	10
120030	Cashew nuts	10
120040	Chestnuts	10
120050	Coconuts	10
120060	Hazelnuts (Filbert)	10
120070	Macadamia	10
120080	Pecans	10
120090	Pine nuts	10
120100	Pistachios	10
120110	Walnuts	10
120990	Others	10
130000	(iii) Pome fruit	0,01*
130010	Apples (Crab apple)	0,01*
130020	Pears (Oriental pear)	0,01*
130030	Quinces	0,01*

130040	Medlar	0,01*
130050	Loquat	0,01*
130990	Others	0,01*
140000	(iv) Stone fruit	0,01*
140010	Apricots	0,01*
140020	Cherries (sweet cherries, sour cherries)	0,01*
140030	Peaches (Nectarines and similar hybrids)	0,01*
140040	Plums (Damson, greengage, mirabelle, sloe)	0,01*
140990	Others	0,01*
150000	(v) Berries & small fruit	0,01*
151000	(a) Table and wine grapes	0,01*
151010	Table grapes	0,01*
151020	Wine grapes	0,01*
152000	(b) Strawberries	0,01*
153000	(c) Cane fruit	0,01*
153010	Blackberries	0,01*
153020	Dewberries (Loganberries, boysenberries, and cloudberry)	0,01*
153030	Raspberries (Wineberries, arctic bramble/raspberry, (Rubus arcticus), nectar raspberries (Rubus arcticus x idaeus))	0,01*
153990	Others	0,01*
154000	(d) Other small fruit & berries	0,01*
154010	Blueberries (Bilberries)	0,01*
154020	Cranberries (Cowberries (red bilberries))	0,01*
154030	Currants (red, black and white)	0,01*
154040	Gooseberries (Including hybrids with other ribes species)	0,01*
154050	Rose hips	0,01*
154060	Mulberries (arbutus berry)	0,01*
154070	Azarole (mediterranean medlar) (Kiwiberry (Actinidia arguta))	0,01*
154080	Elderberries (Black chokeberry (appleberry), mountain ash, buckthorn (sea sawallowthorn), hawthorn, service berries, and other treeberries)	0,01*
154990	Others	0,01*
160000	(vi) Miscellaneous fruit	0,01*
161000	(a) Edible peel	0,01*
161010	Dates	0,01*
161020	Figs	0,01*
161030	Table olives	0,01*

161040	Kumquats (Marumi kumquats, nagami kumquats, limequats (Citrus aurantifolia x Fortunella spp.))	0,01*
161050	Carambola (Bilimbi)	0,01*
161060	Persimmon	0,01*
161070	Jambolan (java plum) (Java apple (water apple), pomerac, rose apple, Brazilian cherry Surinam cherry (grumichama Eugenia uniflora.))	0,01*
161990	Others	0,01*
162000	(b) Inedible peel, small	0,01*
162010	Kiwi	0,01*
162020	Lychee (Litchi) (Pulasan, rambutan (hairy litchi), mangosteen)	0,01*
162030	Passion fruit	0,01*
162040	Prickly pear (cactus fruit)	0,01*
162050	Star apple	0,01*
162060	American persimmon (Virginia kaki) (Black sapote, white sapote, green sapote, canistel (yellow sapote), and mammy sapote)	0,01*
162990	Others	0,01*
163000	(c) Inedible peel, large	0,01*
163010	Avocados	0,01*
163020	Bananas (Dwarf banana, plantain, apple banana)	0,01*
163030	Mangoes	0,01*
163040	Papaya	0,01*
163050	Pomegranate	0,01*
163060	Cherimoya (Custard apple, sugar apple (sweetsop), llama and other medium sized Annonaceae)	0,01*
163070	Guava (Red pitaya or dragon fruit (Hylocereus undatus))	0,01*
163080	Pineapples	0,01*
163090	Bread fruit (Jackfruit)	0,01*
163100	Durian	0,01*
163110	Soursop (guanabana)	0,01*
163990	Others	0,01*
200000	2. VEGETABLES FRESH OR FROZEN	0,01*
210000	(i) Root and tuber vegetables	0,01*
211000	(a) Potatoes	0,01*
212000	(b) Tropical root and tuber vegetables	0,01*
212010	Cassava (Dasheen, eddoe (Japanese taro), tannia)	0,01*

212020	Sweet potatoes	0,01*
212030	Yams (Potato bean (yam bean), Mexican yam bean)	0,01*
212040	Arrowroot	0,01*
212990	Others	0,01*
213000	(c) Other root and tuber vegetables except sugar beet	0,01*
213010	Beetroot	0,01*
213020	Carrots	0,01*
213030	Celeriac	0,01*
213040	Horse radish (Angelica roots, lovage roots, gentiana roots,)	0,01*
213050	Jerusalem artichokes	0,01*
213060	Parsnips	0,01*
213070	Parsley root	0,01*
213080	Radishes (Black radish, Japanese radish, small radish and similar varieties, tiger nut (Cyperus esculentus))	0,01*
213090	Salsify (Scorzonera, Spanish salsify (Spanish oysterplant))	0,01*
213100	Swedes	0,01*
213110	Turnips	0,01*
213990	Others	0,01*
220000	(ii) Bulb vegetables	0,01*
220010	Garlic	0,01*
220020	Onions (Silverskin onions)	0,01*
220030	Shallots	0,01*
220040	Spring onions (Welsh onion and similar varieties)	0,01*
220990	Others	0,01*
230000	(iii) Fruiting vegetables	0,01*
231000	(a) Solanacea	0,01*
231010	Tomatoes (Cherry tomatoes, tree tomato, Physalis, goji berry, wolfberry (Lycium barbarum and L. chinense))	0,01*
231020	Peppers (Chilli peppers)	0,01*
231030	Aubergines (egg plants) (Pepino)	0,01*
231040	Okra, lady's fingers	0,01*
231990	Others	0,01*
232000	(b) Cucurbits - edible peel	0,01*
232010	Cucumbers	0,01*
232020	Gherkins	0,01*
232030	Courgettes (Summer squash, marrow (patisson))	0,01*
232990	Others	0,01*
233000	(c) Cucurbits-inedible peel	0,01*
233010	Melons (Kiwano)	0,01*
233020	Pumpkins (Winter squash)	0,01*

233030	Watermelons	0,01*
233990	Others	0,01*
234000	(d) Sweet corn	0,01*
239000	(e) Other fruiting vegetables	0,01*
240000	(iv) Brassica vegetables	0,01*
241000	(a) Flowering brassica	0,01*
241010	Broccoli (Calabrese, Chinese broccoli, broccoli raab)	0,01*
241020	Cauliflower	0,01*
241990	Others	0,01*
242000	(b) Head brassica	0,01*
242010	Brussels sprouts	0,01*
242020	Head cabbage (Pointed head cabbage, red cabbage, savoy cabbage, white cabbage)	0,01*
242990	Others	0,01*
243000	(c) Leafy brassica	0,01*
243010	Chinese cabbage (Indian (Chinese) mustard, pak choi, Chinese flat cabbage (tai goo choi), choy sum, peking cabbage (pe-tsai),)	0,01*
243020	Kale (Borecole (curly kale), collards, Portuguese Kale, Portuguese cabbage, cow cabbage)	0,01*
243990	Others	0,01*
244000	(d) Kohlrabi	0,01*
250000	(v) Leaf vegetables & fresh herbs	0,01*
251000	(a) Lettuce and other salad plants including Brassicacea	0,01*
251010	Lamb's lettuce (Italian cornsalad)	0,01*
251020	Lettuce (Head lettuce, lollo rosso (cutting lettuce), iceberg lettuce, romaine (cos) lettuce)	0,01*
251030	Scarole (broad-leaf endive) (Wild chicory, red-leaved chicory, radicchio, curd leave endive, sugar loaf)	0,01*
251040	Cress	0,01*
251050	Land cress	0,01*
251060	Rocket, Rucola (Wild rocket)	0,01*
251070	Red mustard	0,01*
251080	Leaves and sprouts of Brassica spp (Mizuna, leaves of peas and radish and other babyleaf brassica crops (crops harvested up to 8 true leaf stage))	0,01*
251990	Others	0,01*

252000	(b) Spinach & similar (leaves)	0,01*
252010	Spinach (New Zealand spinach, amaranthus spinach)	0,01*
252020	Purslane (Winter purslane (miner's lettuce), garden purslane, common purslane, sorrel, glasswort, Agretti (Salsola soda))	0,01*
252030	Beet leaves (chard) (Leaves of beetroot)	0,01*
252990	Others	0,01*
253000	(c) Vine leaves (grape leaves)	0,01*
254000	(d) Water cress	0,01*
255000	(e) Witloof	0,01*
256000	(f) Herbs	0,01*
256010	Chervil	0,01*
256020	Chives	0,01*
256030	Celery leaves (Fennel leaves, Coriander leaves, dill leaves, Caraway leaves, lovage, angelica, sweet cicely and other Apiacea leaves)	0,01*
256040	Parsley	0,01*
256050	Sage (Winter savory, summer savory,)	0,01*
256060	Rosemary	0,01*
256070	Thyme (Marjoram, oregano)	0,01*
256080	Basil (Balm leaves, mint, peppermint)	0,01*
256090	Bay leaves (laurel)	0,01*
256100	Tarragon (Hyssop)	0,01*
256990	Others (Edible flowers)	0,01*
260000	(vi) Legume vegetables (fresh)	0,01*
260010	Beans (with pods) (Green bean (french beans, snap beans), scarlet runner bean, slicing bean, yardlong beans)	0,01*
260020	Beans (without pods) (Broad beans, Flageolets, jack bean, lima bean, cowpea)	0,01*
260030	Peas (with pods) (Mangetout (sugar peas, snow peas))	0,01*
260040	Peas (without pods) (Garden pea, green pea, chickpea)	0,01*
260050	Lentils	0,01*
260990	Others	0,01*
270000	(vii) Stem vegetables (fresh)	0,01*
270010	Asparagus	0,01*
270020	Cardoons	0,01*
270030	Celery	0,01*

270040	Fennel	0,01*
270050	Globe artichokes	0,01*
270060	Leek	0,01*
270070	Rhubarb	0,01*
270080	Bamboo shoots	0,01*
270090	Palm hearts	0,01*
270990	Others	0,01*
280000	(viii) Fungi	0,01*
280010	Cultivated (Common mushroom, Oyster mushroom, Shi-take)	0,01*
280020	Wild (Chanterelle, Truffle, Morel, Cep)	0,01*
280990	Others	0,01*
290000	(ix) Sea weeds	0,01*
300000	3. PULSES, DRY	0,01*
300010	Beans (Broad beans, navy beans, flageolets, jack beans, lima beans, field beans, cowpeas)	0,01*
300020	Lentils	0,01*
300030	Peas (Chickpeas, field peas, chickling vetch)	0,01*
300040	Lupins	0,01*
300990	Others	0,01*
400000	4. OILSEEDS AND OILFRUITS	0,01*
401000	(i) Oilseeds	0,01*
401010	Linseed	0,01*
401020	Peanuts	0,01*
401030	Poppy seed	0,01*
401040	Sesame seed	0,01*
401050	Sunflower seed	0,01*
401060	Rape seed (Bird rapeseed, turnip rape)	0,01*
401070	Soya bean	0,01*
401080	Mustard seed	0,01*
401090	Cotton seed	0,01*
401100	Pumpkin seeds (Other seeds of cucurbitacea)	0,01*
401110	Safflower	0,01*
401120	Borage	0,01*
401130	Gold of pleasure	0,01*
401140	Hempseed	0,01*
401150	Castor bean	0,01*
401990	Others	0,01*
402000	(ii) Oilfruits	0,01*
402010	Olives for oil production	0,01*
402020	Palm nuts (palmoil kernels)	0,01*
402030	Palmfruit	0,01*
402040	Kapok	0,01*
402990	Others	0,01*

500000	5. CEREALS	0,05
500010	Barley	0,05
500020	Buckwheat (Amaranthus, quinoa)	0,05
500030	Maize	0,05
500040	Millet (Foxtail millet, teff)	0,05
500050	Oats	0,05
500060	Rice	0,05
500070	Rye	0,05
500080	Sorghum	0,05
500090	Wheat (Spelt, triticale)	0,05
500990	Others	0,05
600000	6. TEA, COFFEE, HERBAL INFUSIONS AND COCOA	0,02*
610000	(i) Tea (dried leaves and stalks, fermented or otherwise of Camellia sinensis)	0,02*
620000	(ii) Coffee beans	0,02*
630000	(iii) Herbal infusions (dried)	0,02*
631000	(a) Flowers	0,02*
631010	Camomille flowers	0,02*
631020	Hybiscus flowers	0,02*
631030	Rose petals	0,02*
631040	Jasmine flowers (Elderflowers (Sambucus nigra))	0,02*
631050	Lime (linden)	0,02*
631990	Others	0,02*
632000	(b) Leaves	0,02*
632010	Strawberry leaves	0,02*
632020	Rooibos leaves (Ginkgo leaves)	0,02*
632030	Maté	0,02*
632990	Others	0,02*
633000	(c) Roots	0,02*
633010	Valerian root	0,02*
633020	Ginseng root	0,02*
633990	Others	0,02*
639000	(d) Other herbal infusions	0,02*
640000	(iv) Cocoa (fermented beans)	0,02*
650000	(v) Carob (st johns bread)	0,02*
700000	7. HOPS (dried) , including hop pellets and unconcentrated powder	0,02*
800000	8. SPICES	0,02*
810000	(i) Seeds	0,02*
810010	Anise	0,02*
810020	Black caraway	0,02*
810030	Celery seed (Lovage seed)	0,02*
810040	Coriander seed	0,02*
810050	Cumin seed	0,02*
810060	Dill seed	0,02*

810070	Fennel seed	0,02*
810080	Fenugreek	0,02*
810090	Nutmeg	0,02*
810990	Others	0,02*
820000	(ii) Fruits and berries	0,02*
820010	Allspice	0,02*
820020	Anise pepper (Japan pepper)	0,02*
820030	Caraway	0,02*
820040	Cardamom	0,02*
820050	Juniper berries	0,02*
820060	Pepper, black and white (Long pepper, pink pepper)	0,02*
820070	Vanilla pods	0,02*
820080	Tamarind	0,02*
820990	Others	0,02*
830000	(iii) Bark	0,02*
830010	Cinnamon (Cassia)	0,02*
830990	Others	0,02*
840000	(iv) Roots or rhizome	0,02*
840010	Liquorice	0,02*
840020	Ginger	0,02*
840030	Turmeric (Curcuma)	0,02*
840040	Horseradish	0,02*
840990	Others	0,02*
850000	(v) Buds	0,02*
850010	Cloves	0,02*
850020	Capers	0,02*
850990	Others	0,02*
860000	(vi) Flower stigma	0,02*
860010	Saffron	0,02*
860990	Others	0,02*
870000	(vii) Aril	0,02*
870010	Mace	0,02*
870990	Others	0,02*
900000	9. SUGAR PLANTS	0,01*

900010	Sugar beet (root)	0,01*
900020	Sugar cane	0,01*
900030	Chicory roots	0,01*
900990	Others	0,01*
1000000	10. PRODUCTS OF ANIMAL ORIGIN-TERRESTRIAL ANIMALS	
1010000	(i) Meat, preparations of meat, offals, blood, animal fats fresh chilled or frozen, salted, in brine, dried or smoked or processed as flours or meals other processed products such as sausages and food preparations based on these	
1011000	(a) Swine	
1011010	Meat	
1011020	Fat free of lean meat	
1011030	Liver	
1011040	Kidney	
1011050	Edible offal	
1011990	Others	
1012000	(b) Bovine	
1012010	Meat	
1012020	Fat	
1012030	Liver	
1012040	Kidney	
1012050	Edible offal	
1012990	Others	
1013000	(c) Sheep	
1013010	Meat	
1013020	Fat	
1013030	Liver	
1013040	Kidney	
1013050	Edible offal	
1013990	Others	

1014000	(d) Goat	
1014010	Meat	
1014020	Fat	
1014030	Liver	
1014040	Kidney	
1014050	Edible offal	
1014990	Others	
1015000	(e) Horses, asses, mules or hinnies	
1015010	Meat	
1015020	Fat	
1015030	Liver	
1015040	Kidney	
1015050	Edible offal	
1015990	Others	
1016000	(f) Poultry -chicken, geese, duck, turkey and Guinea fowl-, ostrich, pigeon	
1016010	Meat	
1016020	Fat	
1016030	Liver	
1016040	Kidney	
1016050	Edible offal	
1016990	Others	
1017000	(g) Other farm animals (Rabbit, Kangaroo)	
1017010	Meat	
1017020	Fat	
1017030	Liver	
1017040	Kidney	
1017050	Edible offal	
1017990	Others	

1020000	(ii) Milk and cream, not concentrated, nor containing added sugar or sweetening matter, butter and other fats derived from milk, cheese and curd	
1020010	Cattle	
1020020	Sheep	
1020030	Goat	
1020040	Horse	
1020990	Others	
1030000	(iii) Birds' eggs, fresh preserved or cooked Shelled eggs and egg yolks fresh, dried, cooked by steaming or boiling in water, moulded, frozen or otherwise preserved whether or not containing added sugar or sweetening matter	
1030010	Chicken	
1030020	Duck	
1030030	Goose	
1030040	Quail	
1030990	Others	
1040000	(iv) Honey (Royal jelly, pollen)	
1050000	(v) Amphibians and reptiles (Frog legs, crocodiles)	
1060000	(vi) Snails	
1070000	(vii) Other terrestrial animal products	
	Others	
(*) Indicates lower limit of analytical determination		

Fluoride Ion

(Pesticides - Web Version - EU MRLs

(File created on 27/01/2012 14:41))

Code number	Groups and examples of individual products to which the MRLs apply (a)	Fluoride ion
100000	1. FRUIT FRESH OR FROZEN; NUTS	
110000	(i) Citrus fruit	2*
110010	Grapefruit (Shaddocks, pomelos, sweeties, tangelo (except mineola), uglis and other hybrids)	2*
110020	Oranges (Bergamot, bitter orange, chinotto and other hybrids)	2*
110030	Lemons (Citron, lemon)	2*
110040	Limes	2*
110050	Mandarins (Clementine, tangerine, mineola and other hybrids)	2*
110990	Others	2*
120000	(ii) Tree nuts (shelled or unshelled)	25
120010	Almonds	25
120020	Brazil nuts	25
120030	Cashew nuts	25
120040	Chestnuts	25
120050	Coconuts	25
120060	Hazelnuts (Filbert)	25
120070	Macadamia	25
120080	Pecans	25
120090	Pine nuts	25
120100	Pistachios	25
120110	Walnuts	25
120990	Others	25
130000	(iii) Pome fruit	2*
130010	Apples (Crab apple)	2*
130020	Pears (Oriental pear)	2*
130030	Quinces	2*
130040	Medlar	2*
130050	Loquat	2*
130990	Others	2*
140000	(iv) Stone fruit	2*
140010	Apricots	2*

140020	Cherries (sweet cherries, sour cherries)	2*
140030	Peaches (Nectarines and similar hybrids)	2*
140040	Plums (Damson, greengage, mirabelle, sloe)	2*
140990	Others	2*
150000	(v) Berries & small fruit	2*
151000	(a) Table and wine grapes	2*
151010	Table grapes	2*
151020	Wine grapes	2*
152000	(b) Strawberries	2*
153000	(c) Cane fruit	2*
153010	Blackberries	2*
153020	Dewberries (Loganberries, boysenberries, and cloudberry)	2*
153030	Raspberries (Wineberries, arctic bramble/raspberry, (Rubus arcticus), nectar raspberries (Rubus arcticus x idaeus))	2*
153990	Others	2*
154000	(d) Other small fruit & berries	2*
154010	Blueberries (Bilberries)	2*
154020	Cranberries (Cowberries (red bilberries))	2*
154030	Currants (red, black and white)	2*
154040	Gooseberries (Including hybrids with other ribes species)	2*
154050	Rose hips	2*
154060	Mulberries (arbutus berry)	2*
154070	Azarole (mediterranean medlar) (Kiwiberry (Actinidia arguta))	2*
154080	Elderberries (Black chokeberry (appleberry), mountain ash, buckthorn (sea sawtooth), hawthorn, service berries, and other treeberries)	2*
154990	Others	2*
160000	(vi) Miscellaneous fruit	2*
161000	(a) Edible peel	2*
161010	Dates	2*
161020	Figs	2*
161030	Table olives	2*
161040	Kumquats (Manumi kumquats, nagami kumquats, limequats (Citrus aurantifolia x Fortunella spp.))	2*
161050	Carambola (Bilimbi)	2*
161060	Persimmon	2*

161070	Jambolan (java plum) (Java apple (water apple), pomegranate, rose apple, Brazilian cherry Surinam cherry (grumichama Eugenia uniflora),)	2*
161990	Others	2*
162000	(b) Inedible peel, small	2*
162010	Kiwi	2*
162020	Lychee (Litchi) (Pulasan, rambutan (hairy litchi), mangosteen)	2*
162030	Passion fruit	2*
162040	Prickly pear (cactus fruit)	2*
162050	Star apple	2*
162060	American persimmon (Virginia kaki) (Black sapote, white sapote, green sapote, caristel (yellow sapote), and mammy sapote)	2*
162990	Others	2*
163000	(c) Inedible peel, large	2*
163010	Avocados	2*
163020	Bananas (Dwarf banana, plantain, apple banana)	2*
163030	Mangoes	2*
163040	Papaya	2*
163050	Pomegranate	2*
163060	Cherimoya (Custard apple, sugar apple (sweetsop), llama and other medium sized Annonaceae)	2*
163070	Guava (Red pitaya or dragon fruit (Hylocereus undatus))	2*
163080	Pineapples	2*
163090	Bread fruit (Jackfruit)	2*
163100	Durian	2*
163110	Soursop (guanabana)	2*
163990	Others	2*
200000	2. VEGETABLES FRESH OR FROZEN	2*
210000	(i) Root and tuber vegetables	2*
211000	(a) Potatoes	2*
212000	(b) Tropical root and tuber vegetables	2*
212010	Cassava (Dasheen, eddoe (Japanese taro), tannia)	2*
212020	Sweet potatoes	2*
212030	Yams (Potato bean (yam bean), Mexican yam bean)	2*
212040	Arrowroot	2*

212990	Others	2*
213000	(c) Other root and tuber vegetables except sugar beet	2*
213010	Beetroot	2*
213020	Carrots	2*
213030	Celeriac	2*
213040	Horseradish (Angelica roots, lovage roots, gentiana roots,)	2*
213050	Jerusalem artichokes	2*
213060	Parsnips	2*
213070	Parsley root	2*
213080	Radishes (Black radish, Japanese radish, small radish and similar varieties, tiger nut (Cyperus esculentus))	2*
213090	Salsify (Scorzoneria, Spanish salsify (Spanish oysterplant))	2*
213100	Swedes	2*
213110	Turnips	2*
213990	Others	2*
220000	(ii) Bulb vegetables	2*
220010	Garlic	2*
220020	Onions (Silverskin onions)	2*
220030	Shallots	2*
220040	Spring onions (Welsh onion and similar varieties)	2*
220990	Others	2*
230000	(iii) Fruiting vegetables	2*
231000	(a) Solanacea	2*
231010	Tomatoes (Cherry tomatoes, tree tomato, Physalis, goji berry, wolfberry (Lycium barbarum and L. chinense))	2*
231020	Peppers (Chilli peppers)	2*
231030	Aubergines (egg plants) (Pepino)	2*
231040	Okra, lady's fingers	2*
231990	Others	2*
232000	(b) Cucurbits - edible peel	2*
232010	Cucumbers	2*
232020	Gherkins	2*
232030	Courgettes (Summer squash, marrow (patisson))	2*
232990	Others	2*
233000	(c) Cucurbits-inedible peel	2*
233010	Melons (Kiwano)	2*
233020	Pumpkins (Winter squash)	2*
233030	Watermelons	2*
233990	Others	2*
234000	(d) Sweet com	2*

239000	(e) Other fruiting vegetables	2*
240000	(iv) Brassica vegetables	2*
241000	(a) Flowering brassica	2*
241010	Broccoli (Calabrese, Chinese broccoli, broccoli raab)	2*
241020	Cauliflower	2*
241990	Others	2*
242000	(b) Head brassica	2*
242010	Brussels sprouts	2*
242020	Head cabbage (Pointed head cabbage, red cabbage, savoy cabbage, white cabbage)	2*
242990	Others	2*
243000	(c) Leafy brassica	2*
243010	Chinese cabbage (Indian (Chinese) mustard, pak choi, Chinese flat cabbage (tai goo choi), choi sum, peking cabbage (pe-tsaï),)	2*
243020	Kale (Borecole (curly kale), collards, Portuguese Kale, Portuguese cabbage, cow cabbage)	2*
243990	Others	2*
244000	(d) Kohlrabi	2*
250000	(v) Leaf vegetables & fresh herbs	2*
251000	(a) Lettuce and other salad plants including Brassicacea	2*
251010	Lamb's lettuce (Italian cornsalad)	2*
251020	Lettuce (Head lettuce, lollo rosso (cutting lettuce), iceberg lettuce, romaine (cos) lettuce)	2*
251030	Scarole (broad-leaf endive) (Wild chicory, red-leaved chicory, radicchio, curd leaf endive, sugar loaf)	2*
251040	Cress	2*
251050	Land cress	2*
251060	Rocket, Rucola (Wild rocket)	2*
251070	Red mustard	2*
251080	Leaves and sprouts of Brassica spp (Mizuna, leaves of peas and radish and other babyleaf brassica crops (crops harvested up to 8 true leaf stage))	2*
251990	Others	2*
252000	(b) Spinach & similar (leaves)	2*
252010	Spinach (New Zealand spinach,	2*

	amaranthus spinach)	
252020	Purslane (Winter purslane (miner's lettuce), garden purslane, common purslane, sorrel, glasswort, Agretti (Salsola soda))	2*
252030	Beet leaves (chard) (Leaves of beetroot)	2*
252990	Others	2*
253000	(c) Vine leaves (grape leaves)	2*
254000	(d) Water cress	2*
255000	(e) Witloof	2*
256000	(f) Herbs	2*
256010	Chervil	2*
256020	Chives	2*
256030	Celery leaves (Fennel leaves, Coriander leaves, dill leaves, Caraway leaves, lovage, angelica, sweet cicely and other Apiacea leaves)	2*
256040	Parsley	2*
256050	Sage (Winter savory, summer savory,)	2*
256060	Rosemary	2*
256070	Thyme (Marjoram, oregano)	2*
256080	Basil (Balm leaves, mint, peppermint)	2*
256090	Bay leaves (laurel)	2*
256100	Taragon (Hyssop)	2*
256990	Others (Edible flowers)	2*
260000	(vi) Legume vegetables (fresh)	2*
260010	Beans (with pods) (Green bean (french beans, snap beans), scarlet runner bean, slicing bean, yardlong beans)	2*
260020	Beans (without pods) (Broad beans, Flageolet, jack bean, lima bean, cowpea)	2*
260030	Peas (with pods) (Mangetout (sugar peas, snow peas))	2*
260040	Peas (without pods) (Garden pea, green pea, chickpea)	2*
260050	Lentils	2*
260990	Others	2*
270000	(vii) Stem vegetables (fresh)	2*
270010	Asparagus	2*
270020	Cardoons	2*
270030	Celery	2*
270040	Fennel	2*
270050	Globe artichokes	2*

270060	Leek	2*
270070	Rhubarb	2*
270080	Bamboo shoots	2*
270090	Palm hearts	2*
270990	Others	2*
280000	(viii) Fungi	2*
280010	Cultivated (Common mushroom, Oyster mushroom, Shi-take)	2*
280020	Wild (Chanterelle, Truffle, Morel, Cep)	2*
280990	Others	2*
290000	(ix) Sea weeds	2*
300000	3. PULSES, DRY	2*
300010	Beans (Broad beans, navy beans, flageolet, jack beans, lima beans, field beans, cowpeas)	2*
300020	Lentils	2*
300030	Peas (Chickpeas, field peas, chickling vetch)	2*
300040	Lupins	2*
300990	Others	2*
400000	4. OILSEEDS AND OILFRUITS	2*
401000	(i) Oilseeds	2*
401010	Linseed	2*
401020	Peanuts	2*
401030	Poppy seed	2*
401040	Sesame seed	2*
401050	Sunflower seed	2*
401060	Rape seed (Bird rapeseed, turnip rape)	2*
401070	Soya bean	2*
401080	Mustard seed	2*
401090	Cotton seed	2*
401100	Pumpkin seeds (Other seeds of cucurbitacea)	2*
401110	Safflower	2*
401120	Borage	2*
401130	Gold of pleasure	2*
401140	Hempseed	2*
401150	Castor bean	2*
401990	Others	2*
402000	(ii) Oilfruits	2*
402010	Olives for oil production	2*
402020	Palm nuts (palmoil kernels)	2*
402030	Palmfruit	2*
402040	Kapok	2*
402990	Others	2*

500000	5. CEREALS	2*
500010	Barley	2*
500020	Buckwheat (Amaranthus, quinoa)	2*
500030	Maize	2*
500040	Millet (Foxtail millet, teff)	2*
500050	Oats	2*
500060	Rice	2*
500070	Rye	2*
500080	Sorghum	2*
500090	Wheat (Spelt, triticale)	2*
500990	Others	2*
600000	6. TEA, COFFEE, HERBAL INFUSIONS AND COCOA	
610000	(i) Tea (dried leaves and stalks, fermented or otherwise of Camellia sinensis)	350
620000	(ii) Coffee beans	5
630000	(iii) Herbal infusions (dried)	10
631000	(a) Flowers	10
631010	Camomille flowers	10
631020	Hybiscus flowers	10
631030	Rose petals	10
631040	Jasmine flowers (Elderflowers (Sambucus nigra))	10
631050	Lime (linden)	10
631990	Others	10
632000	(b) Leaves	10
632010	Strawberry leaves	10
632020	Rooibos leaves (Ginkgo leaves)	10
632030	Maté	10
632990	Others	10
633000	(c) Roots	10
633010	Valerian root	10
633020	Ginseng root	10
633990	Others	10
639000	(d) Other herbal infusions	10
640000	(iv) Cocoa (fermented beans)	10
650000	(v) Carob (st johns bread)	10
700000	7. HOPS (dried) , including hop pellets and unconcentrated powder	10
800000	8. SPICES	5
810000	(i) Seeds	5
810010	Anise	5
810020	Black caraway	5
810030	Celery seed (Lovage seed)	5
810040	Coriander seed	5
810050	Cumin seed	5

810060	Dill seed	5
810070	Fennel seed	5
810080	Fenugreek	5
810090	Nutmeg	5
810990	Others	5
820000	(ii) Fruits and berries	5
820010	Allspice	5
820020	Anise pepper (Japan pepper)	5
820030	Caraway	5
820040	Cardamom	5
820050	Juniper berries	5
820060	Pepper, black and white (Long pepper, pink pepper)	5
820070	Vanilla pods	5
820080	Tamarind	5
820990	Others	5
830000	(iii) Bark	5
830010	Cinnamon (Cassia)	5
830990	Others	5
840000	(iv) Roots or rhizome	5
840010	Liquorice	5
840020	Ginger	5
840030	Turmeric (Curcuma)	5
840040	Horseradish	5
840990	Others	5
850000	(v) Buds	5
850010	Cloves	5
850020	Capers	5
850990	Others	5
860000	(vi) Flower stigma	5
860010	Saffron	5
860990	Others	5
870000	(vii) Aрил	5
870010	Mace	5
870990	Others	5
900000	9. SUGAR PLANTS	2*
900010	Sugar beet (root)	2*
900020	Sugar cane	2*
900030	Chicory roots	2*
900990	Others	2*
1000000	10. PRODUCTS OF ANIMAL ORIGIN- TERRESTRIAL ANIMALS	
1010000	(i) Meat, preparations of meat, offals, blood, animal fats fresh chilled or frozen, salted, in brine, dried or smoked or processed as flours or meals other processed products such as sausages and food preparations	1

	based on these	
1011000	(a) Swine	1
1011010	Meat	1
1011020	Fat free of lean meat	1
1011030	Liver	1
1011040	Kidney	1
1011050	Edible offal	1
1011990	Others	1
1012000	(b) Bovine	1
1012010	Meat	1
1012020	Fat	1
1012030	Liver	1
1012040	Kidney	1
1012050	Edible offal	1
1012990	Others	1
1013000	(c) Sheep	1
1013010	Meat	1
1013020	Fat	1
1013030	Liver	1
1013040	Kidney	1
1013050	Edible offal	1
1013990	Others	1
1014000	(d) Goat	1
1014010	Meat	1
1014020	Fat	1
1014030	Liver	1
1014040	Kidney	1
1014050	Edible offal	1
1014990	Others	1
1015000	(e) Horses, asses, mules or hinnies	1
1015010	Meat	1
1015020	Fat	1
1015030	Liver	1
1015040	Kidney	1
1015050	Edible offal	1
1015990	Others	1
1016000	(f) Poultry -chicken, geese, duck, turkey and Guinea fowl-, ostrich, pigeon	1
1016010	Meat	1
1016020	Fat	1
1016030	Liver	1
1016040	Kidney	1
1016050	Edible offal	1
1016990	Others	1
1017000	(g) Other farm animals (Rabbit, Kangaroo)	1
1017010	Meat	1

1017020	Fat	1
1017030	Liver	1
1017040	Kidney	1
1017050	Edible offal	1
1017990	Others	1
1020000	(ii) Milk and cream, not concentrated, nor containing added sugar or sweetening matter, butter and other fats derived from milk, cheese and curd	0,2
1020010	Cattle	0,2
1020020	Sheep	0,2
1020030	Goat	0,2
1020040	Horse	0,2
1020990	Others	0,2
1030000	(iii) Birds' eggs, fresh preserved or cooked Shelled eggs and egg yolks fresh, dried, cooked by steaming or boiling in water, moulded, frozen or otherwise preserved whether or not containing added sugar or sweetening matter	0,2
1030010	Chicken	0,2
1030020	Duck	0,2
1030030	Goose	0,2
1030040	Quail	0,2
1030990	Others	0,2
1040000	(iv) Honey (Royal jelly, pollen)	
1050000	(v) Amphibians and reptiles (Frog legs, crocodiles)	
1060000	(vi) Snails	
1070000	(vii) Other terrestrial animal products	
(*) Indicates lower limit of analytical determination		

ABBREVIATIONS

ADI	acceptable daily intake
ARfD	acute reference dose
a.s.	active substance
BBCH	growth stages of mono- and dicotyledonous plants
bw	body weight
CXL	Codex Maximum Residue Limit (Codex MRL)
CTP	concentration per time per product
d	day
DAR	Draft Assessment Report (prepared under Council Directive 91/414/EEC)
EFSA	European Food Safety Authority
EMS	evaluating Member State
EU	European Union
GAP	good agricultural practice
GC-ECD	gas chromatography with electron capture detector
GS	growth stage
ha	hectare
hL	hectolitre
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
kg	kilogram
LOD	limit of detection
LOQ	limit of quantification (determination)
MRL	maximum residue limit
MS	Member States
PHI	pre-harvest interval
RMS	rappporteur Member State
SEU	Southern European Union
yr	year