Food and Agriculture Organization of the United Nations

World Health Organization

Summary report of the 2024 Joint FAO/WHO Meeting on Pesticide Residues (JMPR)

Acceptable daily intakes, acute reference doses, residue definitions, recommended maximum residue levels, supervised trials, median residue and highest residue values, and general consideration items recorded by the 2024 meeting

Rome, 17–26 September 2024 (extra virtual session on 9 October 2024)

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Abbreviations

µg	microgram(s)
ADI	acceptable daily intake
ar	as received
ARfD	acute reference dose
bw	body weight
CCN	Codex classification number
CCPR	Codex Committee on Pesticide Residues
CIFOCOss	Chronic individual food consumption database – Summary statistics
dw	dry weight
FAO	Food and Agriculture Organization of the United Nations
g	gram(s)
GAP	good agricultural practice
GECDE	global estimate of chronic dietary exposure
HR	highest residue
HR-P	highest residue in a processed commodity (in mg/kg; calculated by multiplying the HR in the raw commodity by the processing factor)
HRP	highest reliable percentile
IEDI	international estimated daily intake
IESTI	international estimate of short-term intake
JMPR	Joint FAO/WHO Meeting on Pesticide Residues
kg	kilogram(s)
m^2	square metre(s)
mg	milligram(s)
MRL	maximum residue limit
OECD	Organisation for Economic Co-operation and Development
Po	the recommendation accommodates post-harvest treatment of the commodity
PoP	the recommendation accommodates post-harvest treatment of the primary food commodity
RAC	raw agricultural commodity
STMR	supervised trials median residue
STMR-P	an STMR for a processed commodity calculated by applying the concentration or reduction factor for the process to the STMR calculated for the raw agricultural commodity
W	the previous recommendation is withdrawn, or withdrawal of the recommended MRL or existing Codex or draft MRL
WHO	World Health Organization

Summary and recommendations

The following extracts of the results of the 2024 Joint FAO/WHO Meeting on Pesticide Residues (JMPR) are provided to make them accessible to interested parties at an early date (see Table 1).

The meeting evaluated 37 pesticides, estimating maximum residue levels, which it recommended for use as maximum residue limits (MRLs) by the Codex Committee on Pesticide Residues (CCPR). It also estimated levels of supervised trials median residue (STMR) and highest residue (HR) as a basis for estimation of the dietary exposure to residues of the pesticides reviewed. The meeting also established new acceptable daily intakes (ADIs) and acute reference doses (ARfDs) when necessary. The allocations and estimates are shown in Table 1.

Table 1 includes the Codex classification numbers (CCN) of the commodities to facilitate reference to the Codex maximum limits for pesticide residues (Codex Alimentarius, Vol. 2B) and other documents of the Codex Alimentarius Commission. Both compounds and commodities are listed in alphabetical order.

In case where the acute exposure from the consumption of a commodity exceeds the ARfD of the pesticide, indicating a potential public health concern, this is marked in Table 1 with a footnote ([a]).

Apart from the abbreviations indicated in the previous paragraphs, the following qualifications are used in Table 1 (see the section, Abbreviations, for a complete list of abbreviations used throughout the document):

- *****: at or about the limit of quantification.
- ******: compound evaluated under the periodic review programme.
- *******: new compound.
- **[a]**: the acute exposure from the consumption of the commodity may present a public health concern.
- **ar**: the median or highest residue is reported at the moisture content of the feed commodity "as received".
- **bw**: body weight.
- **dw**: the value is reported in the dry weight of the feed commodity.
- **HR-P**: highest residue in a processed commodity (in mg/kg), calculated by multiplying the HR in the raw commodity by the processing factor.
- **Po**: the recommendation accommodates post-harvest treatment of the commodity.
- **PoP** (following recommendation for processed foods) (Class D and Class E in the Codex classification): the recommendation accommodates post-harvest treatment of the primary food commodity.
- **RAC**: raw agricultural commodity.
- **STMR-P**: an STMR for a processed commodity calculated by applying the concentration or reduction factor for the process to the STMR calculated for the raw agricultural commodity.
- **W** (MRL withdraw): the previous recommendation is withdrawn, or withdrawal of the recommended MRL or existing Codex or draft MRL.

Table 1. Recommendations made by the 2024 JMPR

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
Acetamiprid (246) ADI: 0–0.07 mg/kg bw ARfD: 0.1 mg/kg bw (2011)	VD 0536	Mung beans (dry)	0.4	–	0.032	–
	VD 2065	Subgroup of dry beans, except soya beans and mung beans	0.2	–	0.025	–
	VD 2066	Subgroup of dry peas	0.24	–	0.025	–
Definition of the residue for compliance with the MRL and for dietary risk assessment for plant commodities: acetamiprid. Definition of the residue for compliance with the MRL and for dietary risk assessment for animal commodities: sum of acetamiprid and desmethyl-acetamiprid, expressed as acetamiprid. The residue is not fat soluble.						
Acibenzolar-S-methyl (228) ADI: 0–0.08 mg/kg bw ARfD: 0.5 mg/kg bw (2016)	VS 0623	Cardoon	0.2	–	0.073	0.10
	VS 0624	Celery	0.2	–	0.073	0.10
	VS 0625	Celtuce	0.2	–	0.073	0.10
	VS 0380	Fennel, bulb	0.2	–	0.073	0.10
	FP 0226	Apple	0.02	0.3	0.01	0.01
	DF 0226	Apple, dried	0.06	–	0.031	0.031
	VS 0627	Rhubarb	0.2	–	0.073	0.10
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.02*	–	0	0
	MF 0100	Group of mammalian fats (except milk fats)	0.02*	–	0	0
	MO 0105	Group of edible offal (mammalian)	0.02*	–	0	0
	ML 0106	Group of milks	0.01*	–	0	0
	MM 0095	Meat (from mammals other than marine mammals)	W	0.02*	–	–
	MF 0100	Mammalian fats (except milk fats)	W	0.02*	–	–
	MO 0105	Edible offal (mammalian)	W	0.02*	–	–
	ML 0106	Milks	W	0.01*	–	–
	PF 0111	Poultry fats	W	0.02*	–	–
	PM 0110	Poultry meat	W	0.02*	–	–
	PO 0111	Poultry, edible offal of	W	0.02*	–	–
	PE 0112	Eggs	W	0.02*	–	–
	PO 0111	Group of avian, edible offal of	0.02*	–	0	0
	PF 0111	Group of avian fats	0.02*	–	0	0
	PM 0110	Group of avian muscle	0.02*	–	0	0
	PE 0112	Group of eggs	0.02*	–	0	0
Definition of the residue for compliance with the MRL for plant and animal commodities: sum of acibenzolar-S-methyl and 1,2,3-benzothiadiazole-7-carboxylic acid (acibenzolar acid) (free and conjugates), expressed as acibenzolar-S-methyl. Definition of the residue for estimation of dietary intake for plant commodities: sum of acibenzolar-S-methyl and 1,2,3-benzothiadiazole-7-carboxylic acid (acibenzolar acid), (free and conjugated) and 1,2,3-benzothiadiazole-4-hydroxy-7-carboxylic acid (4-OH acibenzolar acid) (free and conjugated), expressed as acibenzolar-S-methyl. Definition of the residue for estimation of dietary intake for animal commodities: sum of acibenzolar-S-methyl and 1,2,3-benzothiadiazole-7-carboxylic acid (acibenzolar acid) (free and conjugates), expressed as acibenzolar-S-methyl. The residue is not fat soluble.						

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
Acynonapyr (333)*** ADI: 0–0.1 mg/kg ARfD: unnecessary (2024)	The meeting did not have enough time to conclude on the residue definitions and decided to postpone the evaluation to the 2025 JMPR.					
Definitions of residue: not concluded.						
Azoxystrobin (229) ADI: 0–0.03 mg/kg bw ARfD: unnecessary (2024)	FI 0326	Avocado	1.5	–	0.06 (pulp)	–
	MO 0105	Edible offal (mammalian)	W	0.07	–	–
	PE 0112	Eggs	W	0.01	–	–
	VC 0045	Fruiting vegetables, cucurbits	W	1	–	–
	VC 0045	Fruiting vegetables, cucurbits, except melons and watermelons	1	–	0.17 (whole fruit) 0.2 (pulp)	–
	PO 0111	Group of avian, edible offal of	0.01	–	0	–
	PF 0111	Group of avian fats	0.01	–	0	–
	PM 0110	Group of avian muscle	0.01	–	0	–
	FC 0001	Group of citrus fruit	–	–	0.49 (pulp)	–
	MO 0105	Group of edible offal (mammalian)	0.07	–	0.02	–
	PE 0112	Group of eggs	0.01	–	0	–
	MF 0100	Group of mammalian fats (except milk fats)	0.05	–	0.01	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.01	–	0.01	–
	MU 1100	Hops, dried	40	30	8.4	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.05	–	–
	VC 0046	Melon	5	–	0.02 (pulp)	–
	FI 0353	Pineapple	2	–	0.01 (pulp)	–
	JF 0341	Pineapple juice	–	–	0.026	–
	PF 0111	Poultry fat	W	0.01	–	–
	PO 0111	Poultry liver	W	0.01	–	–
	PM 0110	Poultry meat	W	–	–	–
	VC 0432	Watermelon	5	–	0.02	–
Definition of residues for compliance with the MRL for plant and animal commodities: azoxystrobin. Definition of residues for dietary intake assessment for plant and animal commodities: azoxystrobin. The residue is fat soluble.						
Buprofezin (173) ADI: 0–0.009 mg/kg bw ARfD: 0.5 mg/kg bw (2008)	MO 0105	Edible offal (mammalian)	W	0.01*	–	–
	PE 0112	Eggs	W	0.01*	–	–
	PO 0111	Group of avian, edible offal	0.05*	–	0.05 (liver) 0.05 (kidney)	0.05 (liver) 0.05 (kidney)
	PF 0111	Group of avian fats	0.05*	–	0.05	0.05
	PM 0110	Group of avian muscle	0.05*	–	0.05	0.05
	MO 0105	Group of edible offal (mammalian)	0.05*	–	0.05 (liver)	0.05 (liver)

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
					0.05 (kidney)	0.05 (kidney)
	PE 0112	Group of eggs	0.05*	–	0.05	0.05
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.05*	–	0.05	0.05
	MF 0100	Group of mammalian fats (except milk fats)	0.05*	–	0.05	0.05
	ML 0106	Group of milks	0.01*	–	0.01	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.01*	–	–
	MF 0100	Mammalian fats (except milk fats)	W	0.01*	–	–
	ML 0106	Milks	W	0.01*	–	–
	PM 0110	Poultry meat	W	0.01*	–	–
	PF 0111	Poultry fats	W	0.01*	0.05	0.05
	PO 0111	Poultry, edible offal of	W	0.01*	–	–
Definition of the residue for compliance with the MRL for plant and animal commodities: buprofezin. Definition of the residue for dietary intake assessment for plant and animal commodities: buprofezin. The residue is not fat soluble.						
Carfentrazone-ethyl (338)*** ADI: 0–0.03 mg/kg bw ARfD: 2 mg/kg bw (2024)	As the meeting could not conclude on residue definition for plant and animal commodities, maximum residue levels in plant and animal commodities could not be estimated.					
Definition of residues for compliance with MRL and dietary risk assessment for plant and animal commodities: not concluded.						
Chlorpyrifos (17)** Insufficient toxicological data to establish ADI or ARfD.	As the meeting could not conclude on residue definition for plant and animal commodities, maximum residue levels in plant and animal commodities could not be estimated.					
Definition of the residue for compliance with the MRL and dietary risk assessment for plant and animal commodities: not concluded.						
Chlormequat (015) ADI: 0–0.05 mg/kg bw ARfD: 0.05 mg/kg bw (2017)	GC 0640	Barley	5	2	0.59	–
	GCT 7074	Barley, beer	–	–	0.12	–
	CF 0640	Barley bran, processed	–	–	0.55	–
	CM 0640	Barley, pearled	–	–	0.32	–
	CF 3511	Barley, flour	–	–	0.11	–
	GCT 7013	Barley, malt	–	–	0.12	–
	MO 0105	Edible offal (mammalian)	W	0.5	–	–
	PE 0269	Eggs	W	0.2	–	–
	PO 0111	Group of avian, edible offal of	0.2	–	0.043	0.085
	PF 0111	Group of avian fats	0.04*	–	0.04	0.04
	PE 0269	Group of eggs	0.2	–	0.049	0.094
	PM 0111	Group of avian muscle	0.04*	–	0.04	0.04
	MO 0105	Group of edible offal (mammalian)	0.5	–	0.036 (liver) 0.20 (kidney)	0.11 (liver) 0.40 (kidney)
	MF 0100	Group of mammalian fats (except milk fat)	0.1	–	0.04	0.043

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	ML 0095	Group of milks	0.2	–	0.069	–
	MM 0095	Group of muscle (from mammalians other than marine mammals)	0.2	–	0.04	0.085
	MF 0100	Mammalian fats (except milk fat)	W	0.1	–	–
	MM 0095	Meat (from mammalians other than marine mammals)	W	0.2	–	–
	ML 0095	Milks	W	0.2	–	–
	PO 0111	Poultry, edible offal of	W	0.2	–	–
	PF 0111	Poultry fats	W	0.04*	–	–
	PM 0111	Poultry meat	W	0.04*	–	–
Definition of the residue for compliance with the MRL for plant and animal commodities: chlormequat cation. Definition of the residue for dietary intake assessment for plant and animal commodities: chlormequat cation. The residue is not fat soluble.						
Cyclobutrifluram (339)*** ADI: 0–0.2 mg/kg bw ARfD: unnecessary (2024)	FI 0327	Banana	0.01*	–	0	–
Definition of the residue for compliance with the MRL for plant commodities: cyclobutrifluram. Definition of the residue for compliance with the MRL for animal commodities: sum of residues of cyclobutrifluram and 2-(trifluoromethyl)pyridine-3-carboxamide (SYN510275), expressed as cyclobutrifluram. Definition of the residue for dietary risk assessment for plant commodities: sum of residues of cyclobutrifluram (free and conjugated), N-[(1S,2R)-2-(2,4-dichlorophenyl)-2-hydroxy-cyclobutyl]-2-(trifluoromethyl)pyridine-3-carboxamide (SYN549104) (free and conjugated), 2-(trifluoromethyl)pyridine-3-carboxylic acid (SYN510260) (free and conjugated) and 2-(trifluoromethyl)pyridine-3-carboxamide (SYN510275) (free and conjugated), expressed as cyclobutrifluram. Definition of the residue for dietary risk assessment for animal commodities: sum of residues of cyclobutrifluram, N-[(1S,2R)-2-(2,4-dichlorophenyl)-2-hydroxy-cyclobutyl]-2-(trifluoromethyl)pyridine-3-carboxamide (SYN549104) (free and conjugated) and 2-(trifluoromethyl)pyridine-3-carboxamide (SYN510275) (free and conjugated), expressed as cyclobutrifluram. The residue is not fat soluble.						
Cyproconazole (239) ADI: 0–0.02 mg/kg bw ARfD: 0.06 mg/kg bw (2010)	VD 2065	Dry beans, subgroup of (except soya bean)	0.02	–	0.01	–
	VD 0071	Beans (dry)	W	0.02	–	–
	VD 2066	Dry peas, subgroup of	0.02	–	0.01	–
	VD 0072	Peas (dry)	W	0.02	–	–
	AL 3301	Products of legume feeds with low water (<20%) content (hay), except soya bean and lentil	0.3	–	–	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.01	–	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.01	–	0.003	0.003
	MF 0100	Group of mammalian fats (except milk fats)	0.02	–	0.003	0.02
	ML 0106	Milks	W	0.01	–	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	ML 0106	Group of milks	0.01	–	0.009	–
	MO 0105	Edible offal (mammalian)	W	0.5	–	–
	MO 0105	Group of edible offal (mammalian)	0.5	–	0.14	0.46
	PM 0110	Poultry meat	W	0.01*	–	–
	PM 0110	Group of avian muscle	0.01*	–	0.01	0.01
	PF 0111	Group of avian fats	0.01*	–	0.01	0.01
	PO 0111	Poultry, edible offal of	W	0.01*	–	–
	PO 0111	Group of avian, edible offal of	0.01*	–	0.01	0.01
	PE 0112	Eggs	W	0.01*	–	–
	PE 0112	Group of eggs	0.01*	–	0.01	0.01
Definition of the residue for compliance with the MRL for plant and animal commodities: cyproconazole. Definition of the residue for dietary intake for plant commodities: cyproconazole. Definition of the residue for dietary intake for animal commodities: free and conjugated cyproconazole. The residue is fat soluble.						
Ethoxyquin (035)** Insufficient toxicological data were provided to establish ADI and ARfD.	FP 0230	Pear	W	3 (Po)	–	–
Definition of the residue for compliance with the MRL for plant commodities: ethoxyquin. Definition of the residue for dietary risk assessment for plant commodities: not concluded.						
Etofenprox (184) ADI: 0–0.03 mg/kg bw ARfD: 1 mg/kg bw (2011)	MO 0105	Edible offal (mammalian)	W	0.05*	–	–
	PE 0112	Eggs	W	0.01*	–	–
	PO 0111	Group of avian, edible offal of	0.02	–	0.013	0.013
	PF 0111	Group of avian fats	0.5	–	0.4	0.4
	PM 0110	Group of avian muscle	0.01*	–	0.003	0.003
	MO 0105	Group of edible offal (mammalian)	0.1	–	0.072	0.093
	PE 0112	Group of eggs	0.1	–	0.07	0.07
	MF 0100	Group of mammalian fats (except milk fats)	3	–	1.5	2.4
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.07	–	0.055	0.062
	ML 0106	Group of milks	0.1	–	0.096	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.5 (fat)	–	–
	ML 0106	Milks	W	0.02	–	–
	PO 0111	Poultry, edible offal of	W	0.01*	–	–
	PM 0110	Poultry meat	W	0.01*	–	–
	GC 0649	Rice	9	0.01*	3.1	–
	CM 0649	Rice, husked	0.3	–	0.09	–
	CM 1205	Rice, polished	0.04	–	0.01	–
Definition of the residue for compliance with the MRL for plant and animal commodities: etofenprox. Definition of the residue for estimation of dietary intake for plant and animal commodities: etofenprox.						

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
The residue is fat soluble.						
Fenpropidin (340)*** ADI: 0–0.02 mg/kg bw ARfD: 0.03 mg/kg bw (women of child-bearing age) (2024)	FI 0327	Banana	9	–	0.097 (pulp)	1.2 (pulp)
	GC 0640	Barley	0.15	–	0.055	–
	–	Barley, malt	–	–	0.05	–
	–	Barley, beer	–	–	0.011	–
	PO 0111	Group of avian, edible offal of	0.08	–	0.039	0.074
	PF 0111	Group of avian fats	0.02	–	0.019	0.021
	PM 0110	Group of avian muscle	0.02	–	0.019	0.021
	MO 0105	Group of edible offal (mammalian)	0.4	–	0.3 (liver) 0.0056 (kidney)	0.96 (liver) 0.24 (kidney)
	PE 0112	Group of eggs	0.02	–	0.019	0.021
	MF 0100	Group of mammalian fats (except milk fats)	0.02	–	0.022	0.046
	ML 0106	Group of milks	0.02*	–	0.017	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.02	–	0.036	0.044
	AM 1051	Fodder beet, roots	0.03	–	–	–
	AM 3573	Fodder beet, leaves or tops	30 (dw)	–	–	–
	AS 0081	Straw and hay of cereal grains	4 (dw)	–	–	–
	VR 0596	Sugar beet	0.03	–	–	–
	AM 3599	Sugar beet, dried pulp	0.2	–	–	–
	AV 0596	Sugar beet, leaves or tops (dry)	30 (dw)	–	–	–
	DM 0596	Sugar beet, molasses	–	–	0.0025	–
	DM 3523	Sugar beet, raw/refined sugar	–	–	0.0025	–
	GC 0653	Triticale	0.05	–	0.01	–
	GC 0654	Wheat	0.05	–	0.01	–
	CF 0654	Wheat bran, processed	0.3	–	0.043	–
	CF 1211	Wheat, flour	–	–	0.002	–
	–	Wheat, whole-meal flour	–	–	0.0011	–
	–	Wheat, whole-grain bread	–	–	0.0098	–
Definition of the residue for compliance with the MRL and for dietary risk assessment for plant commodities: fenpropidin. Definition of the residue for compliance with the MRL for animal commodities: sum of fenpropidin and CGA 289267 {2-methyl-2-[4-(2-methyl-3-piperidin-1-yl-propyl)-phenyl]propionic acid}, expressed as fenpropidin. Definition of the residue for dietary risk assessment for animal commodities: sum of fenpropidin, CGA 289267 {2-methyl-2-[4-(2-methyl-3-piperidin-1-yl-propyl)-phenyl]propionic acid}, and SYN 515213 {3-hydroxy-2-methyl-2-[4-(2-methyl-3-piperidin-1-yl-propyl)-phenyl]-propionic acid} (free and conjugated), expressed as fenpropidin. The residue is not fat soluble.						
Fenpyroximate (193) ADI: 0–0.005 mg/kg bw	FP 0226	Apple	0.1	0.2	0.033	0.072
	AB 0226	Apple pomace, dried	1 (dw)	–	2.3	–
	JF 0226	Apple, juice	–	–	0.0053	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
ARfD: 0.005 mg/kg bw (2021)	–	Apple, pasteurized sauce	–	–	0.0059	–
	DF 0226	Apple, dried	0.5	1	0.15	0.32
	VO 2700	Cherry tomato	0.2	–	0.06	0.12
	VC 0424	Cucumber	0.04	–	0.02	0.03
	MO 0105	Edible offal (mammalian)	W	0.8	–	–
	MO 0105	Group of edible offal (mammalian)	0.8[a]	–	0.40	0.77
	MF 0100	Group of mammalian fats (except milk fats)	0.2	–	0.063	0.13
	ML 0106	Group of milks	0.01	–	0.005	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.05	–	0.015	0.041
	MF 0100	Mammalian fats	W	0.2	–	–
	MM 0095	Mammalian meats	W	0.2 (fat)	–	–
	AB 0003	Mandarins, dried pulp	0.8 (dw)	–	0.25	–
	OR 0003	Mandarins, oil, edible	25	150	7.8	–
	ML 0106	Milks	W	0.01	–	–
	VC 2039	Subgroup of cucumbers and summer squashes	W	0.3	–	–
	FC 0003	Subgroup of mandarins (including mandarin-like hybrids)	0.15	1	0.05 (RAC) 0.02 (pulp)	0.10 (RAC) 0.03 (pulp)
	–	Subgroup of mandarins, juice	–	–	0.0050	–
	–	Subgroup of mandarins, marmalade	–	–	0.0025	–
	FC 0004	Subgroup of oranges, sweet, sour (including orange-like hybrids)	0.15	0.7	0.055 (RAC) 0.02 (pulp)	0.07 (RAC) 0.02 (pulp)
	–	Subgroup of oranges, marmalade	–	–	0.0027	–
	VO 2045	Subgroup of tomatoes	W	0.3	–	–
	VO 0448	Tomato	0.2	–	0.06	0.12
	HS 3382	Orange, peel (fresh)	0.5	–	0.155	0.22
	JF 0004	Orange, juice	–	–	0.0054	–
	OR 0004	Orange oil, edible	25	100	8.6	–
	AB 0004	Oranges, dried pulp	0.8 (dw)	4 (dw)	0.28	–
	HS 3383	Satsuma mandarin, peel (fresh)	0.6	–	0.185	0.30
	JF 0448	Tomato, juice	–	–	0.038	–
		Tomato canned	–	–	0.024	0.047
	DM 0448	Tomato puree	–	–	0.043	–

Definition of the residue for compliance with MRLs for plant commodities: fenpyroximate.

Definition of the residue for dietary risk assessment for plant commodities: sum of fenpyroximate and tert-butyl (Z)-α-(1,3-dimethyl-5-phenoxypyrazol-4-ylmethylene-amino-oxy)-p-toluate (its Z-isomer M-1), expressed as fenpyroximate.

Definition of the residue for compliance with the MRL for animal commodities: sum of fenpyroximate and (E)-4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoic acid (M-3), expressed as fenpyroximate.

Definition of the residue for dietary risk assessment for animal commodities: sum of fenpyroximate, 2-hydroxymethyl-2-propyl (E)-4-[(1,3-dimethyl-5-phenoxypyrazol-4-yl)- methylenaminooxymethyl]benzoate (Fen-OH), 2-hydroxy-2-methylpropyl (E)-α-(1,3-dimethyl-5- phenoxypyrazol-4-ylmethyleneamino-oxy)-p-toluate (R-UL-1) and (E)-4-[(1,3-dimethyl-5- phenoxypyrazol-4-yl)methyleneaminooxymethyl]benzoic acid (M-3), expressed as fenpyroximate.

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
The residue is fat soluble.						
Fipronil (202) ADI: 0–0.0002 mg/kg bw ARfD: 0.03 mg/kg bw (2021)	FI 0327	Banana	0.004*	0.004*	0	0
	GC 2087	Barley, similar grains, and pseudocereals with husks, subgroup of	0.002*	0.004*	0.002	–
	AS 0640	Barley straw and fodder, dry	0.05 (dw)	0.07 (dw)	–	–
	HH 0722	Basil	W	0.8	–	–
	SO 0691	Cotton seed	0.003	0.01	0.002	–
	OC 0691	Cotton seed oil, crude	–	–	0.0008	–
	OR 0691	Cotton seed oil, refined	–	–	0.0006	–
	VD 2065	Dry beans, subgroup of (except soya beans)	0.008	0.01	0.001	–
	VD 2066	Dry peas, subgroup of	0.008	–	0.001	–
	MO 0105	Edible offal (mammalian)	W	0.1	–	–
	PO 0111	Group of avian, edible offal of	0.02	–	0.0303	0.0380
	PF 0111	Group of avian fats	0.05	–	0.0382	0.0922
	PM 0110	Group of avian muscle	0.02	–	0.0107	0.0288
	MO 0105	Group of edible offal (mammalian)	0.05	–	0.0141 (liver) 0.0047 (kidney)	0.0590 (liver) 0.0248 (kidney)
	PE 0112	Group of eggs	0.04	0.04	0.0322	0.0566
	MF 0100	Group of mammalian fats (except milk fats)	0.15	–	0.0680	0.1912
	ML 0106	Group of milks	0.02	–	0.0044	–
	FM 0106	Group of milk fat	0.3	–	0.0892	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.015	–	0.0043	0.0221
	VL 0053	Leafy vegetables, group of	0.01	0.01	0	0.02919
	VP 0060	Legume vegetables, group of	W	0.01	–	–
	MF 0100	Mammalian fats (except milk fats)	W	0.4	–	–
	GC 2091	Maize cereals, subgroup of	0.01	0.01	0.004	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.03	–	–
	ML 0106	Milks	W	0.03	–	–
	FM 0183	Milk fat	W	0.3	–	–
	AS 0647	Oat straw and fodder, dry	0.05 (dw)	0.07 (dw)	–	–
	VA 0385	Onion, bulb	0.03	0.03	0.02	0.033
	VR 0589	Potato	0.05	0.05	0.00495	0.0296
	–	Potato washed	–	–	0.00245	0.01465
	–	Potato peeled	–	–	0.00158	0.00947
	–	Potato, cooked peeled	–	–	0.00121	0.00725
	–	Potato, microwave unpeeled	–	–	0.00334	0.01998
	–	Potato, French fries	–	–	0.00183	0.01095
	–	Potato flakes	–	–	0.00223	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	PO 0111	Poultry, edible offal of	W	0.03	–	–
	PF 0111	Poultry fats	W	0.07	–	–
	PM 0110	Poultry meat	W	0.007	–	–
	GC 0649	Rice	0.002	0.4	0.002	–
	CM 0649	Rice, husked	0.001*	0.4	0.002	–
	CM 1205	Rice, polished	0.001*	0.15	0.002	–
	CM 1206	Rice bran, unprocessed	W	2	–	–
	AS 0649	Rice straw and fodder, dry	W	0.6 (dw)	–	–
	VR 0075	Root and tuber vegetables, group of (except potato and sugar beet)	0.002	0.002	0	0.00212
	AS 0650	Rye straw and fodder dry	0.05 (dw)	0.05 (dw)	–	–
	VD 0541	Soya bean (dry)	0.002	0.01	0.002	–
	AB 0541	Soya bean hulls	0.015	0.06	–	–
	VR 0596	Sugar beet	0.004	0.01	0.004	–
	GS 0659	Sugar cane	0.01	0.01	0.003	0.0073
	OC 0541	Soya bean oil, crude	0.01	0.05	0.0088	–
	–	Sugar cane juice	–	–	0.0018	–
	DM 0659	Sugar cane molasses	–	–	0.00007	–
	DM 3524	Sugar (from sugarcane)	–	–	0.00007	–
	SO 2091	Sunflower seeds, subgroup of	0.01	0.004*	0.008	–
	VO 2045	Tomato, subgroup of	0.004*	0.01*	0.008	0.008
	AS 0653	Triticale straw and fodder, dry	0.05 (dw)	0.05 (dw)	–	–
	GC 2086	Wheat, similar grains, and pseudocereals with husks, subgroup of	0.03	0.004*	0.008	–
	AS 0654	Wheat straw and fodder, dry	0.05 (dw)	0.05 (dw)	–	–
Definition of the residue for compliance with the MRL for plant and animal commodities: sum of fipronil and 5-amino-3-cyano-1-(2,6-dichloro-4-trifluoromethylphenyl)-4-trifluoromethylsulfonylpyrazole (MB46136) expressed in terms of fipronil. Definition of the residue for dietary risk assessment for plant and animal commodities: sum of fipronil and 5-amino-3-cyano-1-(2,6-dichloro-4-trifluoromethylphenyl)-4-trifluoromethylsulfonylpyrazole (MB46136), 5-amino-3-cyano-1-(2,6-dichloro-4-trifluoromethylphenyl)-4-trifluoromethylthiopyrazole (MB45950) and 5-amino-3-cyano-1-(2,6-dichloro-4-trifluoromethylphenyl)-4-trifluoromethylpyrazole (MB46513) expressed in terms of fipronil. The residue is fat soluble.						
Florpyrauxifen-benzyl (341) ADI: unnecessary ARfD: unnecessary (2024)	PE 0112	Eggs	0.03*	–	–	–
	PO 0111	Group of avian, edible offal of	0.03*	–	–	–
	PM 0110	Group of avian muscle	0.03*	–	–	–
	PF 0111	Group of avian fats	0.03*	–	–	–
	M0 0105	Group of edible offal (mammalian)	0.09	–	–	–
	MM 0095	Group of muscle (from mammals, other than marine mammals)	0.03*	–	–	–
	MF 0100	Group of mammalian fats (except milk fats)	0.03*	–	–	–
	ML 0106	Group of milks	0.03*	–	–	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	AS 0162	Hay and/or straw of grasses	5 (dw)	–	–	–
	GC 0645	Maize	0.01*	–	–	–
	AS 3557	Maize, hay and/or straw	0.01* (dw)	–	–	–
	GC 0649	Rice	0.3	–	–	–
	AS 0649	Rice, hay and/or straw	2 (dw)	–	–	–
	CM 0649	Rice, husked	0.01*	–	–	–
Definition of the residue for compliance with the MRL for plant commodities: florpyrauxifen-benzyl. Definition of the residue for compliance with the MRL for animal commodities: sum of florpyrauxifen-benzyl, X11966341 and X11438848, expressed as florpyrauxifen-benzyl. Definition of the residue for dietary risk assessment for plant and animal commodities: not necessary. The residue is fat soluble.						
Fluazinam (306)*** ADI: 0–0.01 mg/kg bw ARfD: 0.07 mg/kg bw (women of child-bearing age) (2024)	Not considered for residues by the present meeting.					
Flubendiamide (242) ADI: 0–0.02 mg/kg bw ARfD: 0.2 mg/kg bw (2010)	MO 0105	Edible offal (mammalian)	W	1	–	–
	MO 0105	Group of edible offal (mammalian)	1	–	0.31 (liver) 0.32 (kidney)	0.56 (liver) 0.57 (kidney)
	MF 0100	Group of mammalian fats (except milk fats)	2	–	0.62	1.2
	ML 0106	Group of milks	0.1	–	0.066	–
	FM 0106	Group of milk fats	5	–	1.6	4.0
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.2	–	0.06	0.13
	MM 0095	Meat (from mammals other than marine mammals)	W	2 (fat)	–	–
	ML 0106	Milks	W	0.1	–	–
	FM 0106	Milk fats	W	5	–	–
	GC 0649	Rice	4	–	1.15	–
	CM 0649	Rice, husked	0.1	–	0.03	–
	CM 1205	Rice, polished	0.01*	–	0.01	–
Definition of the residue for compliance with the MRL and dietary risk assessment for plant commodities: flubendiamide. Definition of the residue for compliance with the MRL for animal commodities: flubendiamide. Definition of the residue for dietary risk assessment for animal commodities: flubendiamide and flubendiamide-iodophthalimide. The residue is fat soluble.						
Fluoxapiprolin (342)* ADI: unnecessary	VO 2700	Cherry tomato	0.1	–	–	–
	FB 0269	Grapes	0.15	–	–	–
	DF 0269	Grapes, dried	0.5	–	–	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
ARfD: unnecessary **Fluoxapiprolin-pyrazole-alanine-oxopropanoic acid (BCS-DE72761)** ADI: 0–0.5 mg/kg bw ARfD: unnecessary **Fluoxapiprolin-BDM-pyrazole (BCS-BP32808)** ADI: 0–1.5 µg/kg bw ARfD: 0.02 mg/kg bw **Fluoxapiprolin-pyrazole-carboxylic acid (BCS-CZ38260)** ADI: 0–1.5 µg/kg bw ARfD: 0.02 mg/kg bw (2024)	PO 0111	Group of avian edible offal	0.01*	–	–	–
	PF 0111	Group of avian fats	0.01*	–	–	–
	PM 0110	Group of avian muscle	0.01*	–	–	–
	MO 0105	Group of edible offal (mammalian)	0.01*	–	–	–
	PE 0112	Group of eggs	0.01*	–	–	–
	MF 0100	Group of mammalian fats (except milk fats)	0.01*	–	–	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.01*	–	–	–
	ML 0106	Group of milks	0.01*	–	–	–
	VA 0385	Onion, bulb	0.03	–	–	–
	VR 0589	Potato	0.01*	–	–	–
	VO 0448	Tomato	0.07	–	–	–
	–	Tomato, dried fruit	0.32	–	–	–
Definition of the residue for compliance with the MRL for plant and animal commodities: fluoxapiprolin. Definition of the residue for dietary risk assessment for plant and animal commodities: not necessary. The residue is fat soluble.						
Flupyradifurone (285) ADI: 0–0.08 mg/kg bw ARfD: 0.2 mg/kg bw (2015)	MO 0105	Edible offal, mammalian	W	4	–	–
	PE 0112	Eggs	W	0.7	–	–
	PO 0111	Group of avian, edible offal of	1	–	0.39	0.88
	PF 0111	Group of avian fats	0.3	–	0.11	0.24
	PM 0110	Group of avian muscle	0.8	–	0.27	0.64
	MO 0105	Group of edible offal, mammalian	4	–	0.81 (liver) 0.87 (kidney)	2.75 (liver) 3.4 (kidney)
	PE 0112	Group of eggs	0.7	–	0.15	0.42
	MF 0100	Group of mammalian fats (except milk fats)	1	–	0.15	0.86
	ML 0106	Group of milks	0.7	–	0.11	0.48
	MM 0095	Group of muscle (from mammals other than marine mammals)	1.5	–	0.30	1.27
	MF 0100	Mammalian fats (except milk fats)	W	1	–	–
	MM 0095	Meat (from mammals other than marine mammals)	W	1.5	–	–
	ML 0106	Milks	W	0.7	–	–
	SO 0305	Olives for oil production	5	–	0.495	–
	PF 0111	Poultry fat	W	0.3	–	–
	PM 0110	Poultry meat	W	0.8	–	–
	PO 0111	Poultry, edible offal of	W	1	–	–
	SO 0495	Rape seeds	0.4	–	0.36	–
	FT 0305	Table olives	5	–	0.495	3.3

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	–	Olive oil, crude	–	–	0.09415	–
	–	Olive oil, refined	–	–	0.05435	–
	–	Olive oil, solvent extracted refined	–	–	0.05435	–
Definition of the residue for compliance with the MRL in plant commodities: flupyradifurone. Definition for estimation of dietary intake for plant commodities: sum of flupyradifurone, difluoroacetic acid and 6-chloronicotinic acid, expressed as parent equivalents. Definition for compliance with the MRL and for estimation of dietary intake for animal commodities: sum of flupyradifurone and difluoroacetic acid, expressed as parent equivalents. The residue is not fat soluble.						
Folpet (041)** ADI: 0–0.1 mg/kg bw (also applies to phthalamic acid expressed as folpet) ARfD: unnecessary **Phthalic acid** ADI: 0–0.1 mg/kg bw (2024)	FP 0226	Apple	W	10	–	–
	FI 0327	Banana	2	–	0.060 0.054 (phthalic acid)	–
	VC 0424	Cucumber	W	1	–	–
	GC 0640	Barley	1.5	–	1.5 0.79 (phthalic acid)	–
	AS 0640	Barley, hay and/or straw	40 (dw)	–	–	–
	FB 0265	Cranberries	–	–	7.4 (phthalic acid) 1.8 (phthalamic acid from phosmet use)	–
	FB 0020	Blueberries	–	–	1.7 (phthalic acid) 8.0 (phthalamic acid from phosmet use)	–
	FB 0269	Grapes	W	10	–	–
	DF 0269	Grape, dried (i.e. currants, raisins and sultanas)	W	40	–	–
	AB 0269	Grape pomace, dried	20 (dw)	–	–	–
	JF 0269	Grape juice	–	–	3.5 7.7 (phthalic acid)	–
	PM 0110	Group of avian muscle	0.01*	–	0.040 0 (phthalic acid)	–
	PF 0111	Group of avian fats	0.01*	–	0.040 0 (phthalic acid)	–
	PO 0111	Group of avian, edible offal of	0.01*	–	0.16	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
					0.053 (phthalic acid)	
	MO 0105	Group of edible offal (mammalian)	0.01*	–	0.058 (liver) 0.33 (kidney) 0.051 (phthalic acid)	–
	PE 0112	Group of eggs	0.01*	–	0.10 0.050 (phthalic acid)	–
	MF 0100	Group of mammalian fats (except milk fats)	0.01*	–	0.029 0.064 (phthalic acid)	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.01*	–	0.029 0 (phthalic acid)	–
	ML 0106	Group of milks	0.01*	–	0.024 0 (phthalic acid)	–
	VC 0046	Melons, except watermelon	W	3	–	–
	VL 0482	Lettuce, head	W	50	–	–
	VA 0385	Onion, bulb	W	1	–	–
	VR 0589	Potato	W	0.1	–	–
	VR 0589	Potato	–	–	0.23 (phthalic acid) 0.78 (phthalamic acid from phosmet use)	–
	FB 0275	Strawberry	W	5	–	–
	VO 0448	Tomato	W	3	–	–
	GC 0654	Wheat	0.04	–	0.38 0.32 (phthalic acid)	–
	AS 0654	Wheat, hay and/or straw	40 (dw)	–	–	–
	FB 1236	Wine-grapes	15	–	8.7 4.9 (phthalic acid)	–
	–	Wine	–	–	0.73 5.0 (phthalic acid)	–

Definition of the residue for compliance with the MRL for plant and animal commodities: folpet.

Definition of the residue for folpet dietary risk assessment for plant and animal commodities: sum of folpet and phthalamic acid, expressed as folpet.

Definition of the residue for phthalic acid dietary risk assessment for plant and animal commodities: phthalic acid.

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
The residue is not fat soluble.						
Fosetyl aluminium (302) ADI: 0–1 mg/kg bw ARfD: unnecessary (2017)	OR 0001	Citrus oil, edible	–	–	0.68	–
	MM 0105	Edible offal (mammalian)	W	0.5	–	–
	PE 0112	Eggs	W	0.05*	–	–
	PO 0111	Group of avian, edible offal of	0.05*	–	0	–
	PF 0111	Group of avian fats	0.05*	–	0	–
	PM 0110	Group of avian muscle	0.05*	–	0	–
	MO 0105	Group of edible offal (mammalian)	0.5	–	0.21 (liver) 0.33 (kidney)	–
	PE 0112	Group of eggs	0.05	–	0.02	–
	MF 0100	Group of mammalian fats (except milk fats)	0.3	–	0.13	–
	ML 0106	Group of milks	0.1	–	0.051	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.15	–	0.062	–
	MF 0100	Mammalian fats (except milk fats)	W	0.2	–	–
	–	Marmalade	–	–	5.9	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.15	–	–
	MM 0106	Milks	W	0.1	–	–
	AB 0004	Oranges, dried pulp	150	–	41.2	–
	JF 0004	Orange, juice	–	–	9.8	–
	PO 0111	Poultry edible offal	W	0.05*	–	–
	PF 0111	Poultry fat	W	0.05*	–	–
	PM 0110	Poultry meat	W	0.05*	–	–
	GC 0649	Rice	40	–	12.55	–
	CM 1205	Rice, polished	40	–	8.55	–
	–	Sterilized canned fruit	–	–	6.1	–
	FC 0004	Subgroup of oranges, sweet, sour	50	20	18 (pulp)	–
Definition of residue for compliance with MRLs and dietary risk assessment for plant commodities: sum of fosetyl, phosphonic acid and their salts, expressed as phosphonic acid. Definition of residue for compliance with MRLs and dietary risk assessment for animal commodities: phosphonic acid. The residue is not fat soluble.						
Hexythiazox (176) ADI: 0–0.03 mg/kg bw ARfD: unnecessary (2008)	FB 2005	Cane berries, subgroup of	4	–	1.0	–
	MO 0105	Edible offal, mammalian	W	0.05	–	–
	PE 0112	Eggs	W	0.05	–	–
	PO 0111	Group of avian, edible offal of	0.05	–	0.01	–
	PF 0111	Group of avian fat	0.05	–	0.002	–
	PM 0110	Group of avian muscle	0.05*	–	0	–
	MO 0105	Group of edible offal, mammalian	0.05	–	0.01	–
	PE 0112	Group of eggs	0.05	–	0.002	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	MF 0100	Group of mammalian fats (except milk fats)	0.05	–	0.01	–
	FM 0106	Group of milk fats	0.05	–	0.01	–
	ML 0106	Group of milks	0.05	–	0.01	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.05*	–	0	–
	–	Hops, beer	–	–	0.21	–
	DH 1100	Hops, dried	20	3	6.0	–
	–	Hops, spent	–	–	0.75	–
	MF 0100	Mammalian fats (except milk fats)	W	0.05	–	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.05	–	–
	FM 0183	Milk fats	W	0.05	–	–
	ML 0106	Milks	W	0.05	–	–
	PM 0110	Poultry meat	W	0.05* (F)	–	–
	PO 0111	Poultry, edible offal of	W	0.05	–	–
Definition of the residue for compliance with the MRL in commodities: hexythiazox. Definition for estimation of dietary intake for plant commodities: sum of hexythiazox and all metabolites containing the trans-5-(4-chlorophenyl)-4-methyl-2-oxothiazolidine-moiety (PT-1-3), expressed as hexythiazox. Definition for compliance with the MRL and for estimation of dietary intake for animal commodities: sum of hexythiazox and all metabolites containing the trans-5-(4-chlorophenyl)-4-methyl-2-oxothiazolidine-moiety (PT-1-3), expressed as hexythiazox. The residue is fat soluble.						
Lambda-cyhalothrin (146) ADI: 0–0.02 mg/kg bw ARfD: 0.02 mg/kg bw (2007)	Residue evaluation was not performed by the present meeting.					
Definition of the residue for compliance with the MRL for plant and animal commodities: cyhalothrin, sum of isomers. Definition of the residue for estimation of the dietary exposure for plant and animal commodities: cyhalothrin, sum of isomers. The residue is fat soluble.						
Maleic hydrazide (102) Insufficient toxicologic data were provided to establish ADI and ARfD.	VA 0381	Garlic	W	15	–	–
	VA 0385	Onion, bulb	W	15	–	–
	VR 0589	Potato	W	50	–	–
	VA 0388	Shallot	W	15	–	–
Definition of the residue for compliance with the MRL for plant and animal commodities: maleic hydrazide (free). Definition of the residue for dietary intake assessment for plant and animal commodities: not concluded. The residue is not fat soluble.						
Methoprene (147) ADI: 0–0.09 mg/kg bw ARfD: unnecessary **S-methoprene**	MO 0105	Edible offal (mammalian)	W	0.02	–	–
	PE 0112	Eggs	W	0.02	–	–
	PO 0111	Group of avian, edible offal of	0.02	–	0.007	–
	PF 0111	Group of avian fats	0.02	–	0.007	–
	PM 0110	Group of avian muscle	0.02	–	0.007	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
ADI: 0–0.05 mg/kg bw ARfD: unnecessary (2001)	MO 0105	Group of edible offal (mammalian)	0.02	–	0.014	–
	PE 0112	Group of eggs	0.02	–	0.006	–
	MF 0100	Group of mammalian fats (except milk fats)	0.2	–	0.092	–
	ML 0106	Group of milks	0.1	–	0.044	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.02	–	0.007	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.2 (fat)	–	–
	ML 0106	Milks	W	0.1 (fat)	–	–
	PO 0111	Poultry, edible offal of	W	0.02	–	–
	PM 0110	Poultry meat	W	0.02	–	–
	TN 0085	Tree nuts	3 (Po)	–	2.1	–
Definition of residue for compliance with MRL for methoprene and S-methoprene for plant and animal: methoprene. Definition of residue for dietary intake assessment for methoprene and S-methoprene for plant and animal: methoprene. The residue is fat soluble.						
Novaluron (217) ADI: 0–0.01 mg/kg bw ARfD: unnecessary. (2005)	AM 0660	Almond hulls	15	–	4.46	–
	PE 0112	Eggs	W	0.1	–	–
	MO 0105	Edible offal (mammalian)	W	0.7	–	–
	PO 0111	Group of avian, edible offal of	0.1	–	0.0943	–
	PF 0111	Group of avian fats	1.5	–	0.919	–
	PM 0110	Group of avian muscle	0.04	–	0.0297	–
	MO 0105	Group of edible offal (mammalian)	0.2	–	0.15	–
	PE 0112	Group of eggs	0.3	–	0.1845	–
	MF 0100	Group of mammalian fats (except milk fats)	3	–	0.599	–
	ML 0106	Group of milks	0.2	–	0.1176	–
	MF 0106	Group of milk fats	3	–	2.337	–
	TN 0085	Group of tree nuts	0.08	–	0.015	–
	MM 0095	Meat (from mammals other than marine mammals) [in the fat]	W	10 (fat)	–	–
	ML 0106	Milks	W	0.4	–	–
	FM 0183	Milk fats	W	7	–	–
	MM 0095	Muscle (from mammals other than marine mammals)	0.2	–	0.096	–
	PO 0111	Poultry, edible offal of	W	0.1	–	–
	PM 0110	Poultry meat	W	0.5 (fat)	–	–
	PM 0110	Poultry muscle	0.04	–	0.0297	–
	GC 0649	Rice	5	–	0.6	–
	CM 1205	Rice, polished	0.15	–	0.015	–
Definition of residues for compliance with MRL in plant and animal commodities: novaluron.						

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
Definition of residues for compliance with MRL and for the estimation of dietary exposure in plant and animal commodities: novaluron. The residue is fat soluble.						
Permethrin (120)** Insufficient data were provided to establish ADI and ARfD.	Not considered for residues by the present meeting.					
Phosphonic acid (301) ADI: 0–1 mg/kg bw ARfD: unnecessary (2017)	See **fosetyl aluminium**.					
Definition of residue for compliance with MRLs and dietary risk assessment for plant commodities: sum of fosetyl, phosphonic acid and their salts, expressed as phosphonic acid. Definition of residue for compliance with MRLs and dietary risk assessment for animal commodities: phosphonic acid. The residue is not fat soluble.						
Phosmet (103)** ADI: 0–0.006 mg/kg bw ARfD: 0.03 mg/kg bw **Phthalamic acid** ADI: 0–0.1 mg/kg bw **Phthalic acid (and its anhydride)** ADI: 0–0.1 mg/kg bw (2024)	FS 0240	Apricots	W	10	–	–
	SO 0691	Cottonseed	W	0.05	–	–
	FB 0265	Cranberries	3	3	1.15 1.7 (phthalic acid) 0.94 (phthalamic acid as folpet)	2.2
	FB 0020	Blueberries	20[a]	10	4.5 7.4 (phthalic acid) 4.1 (phthalamic acid as folpet)	17
	FB 0269	Grapes	W	10	–	–
	FC 0001	Group of citrus fruit	W	3	–	–
	FP 0009	Group of pome fruits	W	10	–	–
	TN 0085	Group of tree nuts	W	0.2	–	–
	MM 0095	Meat (from mammals other than marine mammals)	W	1 (fat)	–	–
	ML 0106	Milks	W	0.02	–	–
	FS 0245	Nectarine	W	10	–	–
	FS 0247	Peach	W	10	–	–
	VR 0589	Potato	0.05*	0.05*	0 0.44 (phthalic acid) 0.78 (phthalamic acid as folpet)	0
Definition of the residue for compliance with the MRL for plant and animal commodities: phosmet.						

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
Definition of the residue for phosmet long-term dietary risk assessment for plant commodities: sum of phosmet plus 6-times 2-(dimethoxyphosphoryl-sulfanylmethyl)isoindole-1,3-dione (phosmet-oxon), expressed as phosmet. Definition of the residue for phosmet acute dietary risk assessment for plant commodities: sum of phosmet plus 25-times 2-(dimethoxyphosphoryl-sulfanylmethyl)isoindole-1,3-dione (phosmet-oxon), expressed as phosmet. Definition of the residue for phthalic acid dietary risk assessment for plant and animal commodities: phthalic acid. Definition of the residue for phthalamic acid dietary risk assessment for plant and animal commodities: phthalamic acid, expressed as folpet. The residue is not fat soluble.						
Prochloraz (142)** ADI: 0–0.02 mg/kg bw ARfD: 0.2 mg/kg bw (2023)	FI 0030	Assorted tropical and subtropical fruits – inedible peel	W	7	–	–
	FI 0326	Avocado	5 (Po)	–	1.6	2.9
	GC 0640	Barley	0.6	–	0.0245	–
	–	Barley malt	–	–	0.02107	–
	–	Barley, pearly	–	–	0.0049	–
	–	Barley, pot	–	–	0.00588	–
	–	Barley beer	–	–	0.00588	–
	GC 0080	Cereal grains	W	2	–	–
	FC 0001	Citrus fruits	W	10	–	–
	MO 0105	Edible offal, mammalian	W	10	–	–
	PE 0112	Eggs	W	0.1	–	–
	PO 0111	Group of avian, edible offal of	0.08	–	0.1	0.13
	PF 0111	Group of avian fat	0.01	–	0.01	0.013
	PM 0110	Group of avian muscle	0.01*	–	0.014	0.017
	MO 0105	Group of edible offal, mammalian	0.4	–	0.22 (liver) 0.072 (kidney)	0.27 (liver) 0.091 (kidney)
	PE 0112	Group of eggs	0.2	–	0.13	0.18
	MF 0100	Group of mammalian fats (except milk fats)	0.02	–	0.015	0.019
	ML 0106	Group of milks	0.02	–	0.0057	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.01	–	0.0041	0.005
	SO 0693	Linseed	W	0.05	–	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.5	–	–
	ML 0106	Milks	W	0.05	–	–
	VO 0450	Mushroom	W	3	–	–
	GC 0647	Oats	0.5	–	0.024	–
	HS 0790	Pepper, black, white	W	10	–	–
	PM 0110	Poultry meat	W	0.05	–	–
	PO 0111	Poultry, edible offal of	W	0.2	–	–
	SO 0495	Rape seed	W	0.7	–	–
	GC 0650	Rye	0.15	–	0.012	–
	AS 3560	Rye, hay and/or straw	15 (dw)	–	–	–
	AS 0081	Straw and hay of cereal grains except pseudocereals	40 (dw)	40 (dw)	–	–
	OR 0702	Sunflower seed oil, edible	W	1	–	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	SO 0702	Sunflower seeds	W	0.5	–	–
	GC 0653	Triticale	0.15	–	–	–
	GC 0654	Wheat	0.4	–	0.035	–
Definition of the residue for compliance of MRL for plant and animal commodities: sum of prochloraz, N-propyl-N-[2-(2,4,6-trichlorophenoxy)ethyl]urea (BTS 44595) and N-formyl-N-propyl-N-[2-(2,4,6-trichlorophenoxy)ethyl]urea (BTS 44596), expressed as prochloraz. Definition of the residue for dietary intake assessment for plant commodities: sum of prochloraz and N-formyl-N-propyl-N-[2-(2,4,6-trichlorophenoxy)ethyl]urea (BTS 44596), expressed as prochloraz. Definition of the residue for dietary intake assessment for animal commodities: sum of prochloraz, N-formyl-N-propyl-N-[2-(2,4,6-trichlorophenoxy)ethyl]urea (BTS 44596) and 2,4,6-trichlorophenoxyacetic acid (BTS 9608) (free and conjugated), all expressed as prochloraz. The residue is fat soluble.						
Propiconazole (160) ADI: 0–0.07 mg/kg bw ARfD: 0.3 mg/kg bw (2004)	MO 0105	Edible offal (mammalian)	W	0.2	–	–
	PE 0112	Eggs	W	0.01*	–	–
	PO 0111	Group of avian, edible offal	0.01*	–	–	–
	PF 0111	Group of avian fats	0.01*	–	–	–
	PM 0110	Group of avian muscle	0.01*	–	–	–
	MO 0105	Group of edible offal (mammalian)	0.2	–	–	–
	PE 0112	Group of eggs	0.01*	–	–	–
	MF 0100	Group of mammalian fats (except milk fats)	0.05	–	–	–
	ML 0106	Group of milks	0.01*	–	–	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.01*	–	–	–
	MF 0100	Mammalian fats (except milk fats)	W	0.05	–	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.01* (fat)	–	–
	ML 0106	Milks	W	0.01*	–	–
	PM 0110	Poultry meat	W	0.01* (fat)	–	–
	PF 0111	Poultry fats	W	0.01*	–	–
	PO 0111	Poultry, edible offal of	W	0.01*	–	–
	CM 1205	Rice, polished	3	10	1.95	–
Definition of the residue for compliance with the MRL for plant and animal commodities: propiconazole. Definition of the residue for dietary risk assessment for plant and animal commodities: propiconazole plus all metabolites convertible to 2,4-dichlorobenzoic acid (2,4-DCBA), expressed as propiconazole. The residue is fat soluble.						
Pydiflumetofen (309) ADI: 0–0.1 mg/kg bw ARfD: 0.3 mg/kg bw (2018)	VL 0482	Lettuce, head	20	–	5.25	10
	VL 0483	Lettuce, leaf	30	–	5.3	18
	SB 0716	Coffee bean	0.2	–	0.01	0.01
	–	Coffee, instant	–	–	0.0077	–
	SO 0691	Cottonseed	0.6	–	0.063	–
	AM 3587	Cotton gin trash	7	–	1.7	3.4
	OR 0691	Cotton seed oil, edible	–	–	0.0019	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	MO 0105	Edible offal (mammalian)	W	0.1	–	–
	PE 0112	Eggs	W	0.02	–	–
	PF 0111	Group of avian fats	0.01*	–	0.02	0.02
	PM 0110	Group of avian muscle	0.01*	–	0.02	0.02
	PO 0111	Group of avian, edible offal of	0.01*	–	0.02	0.02
	MO 0105	Group of edible offal (mammalian)	0.1	–	0.09 (liver) 0.09 (kidney)	0.44 (liver) 0.30 (kidney)
	PE 0112	Group of eggs	0.02	–	0.02	0.023
	MF 0100	Group of mammalian fats (except milk fats)	0.1	–	0.02	0.07
	ML 0106	Group of milks	0.01*	–	0.02	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.01*	–	0.02	0.02
	MF 0100	Mammalian fats (except milk fats)	W	0.1	–	–
	FI 0345	Mango	0.08	–	0.01	0.01
	MM 0095	Meat (from mammals other than marine mammals)	W	0.01*	–	–
	ML 0106	Milks	W	0.01*	–	–
	PM 0110	Poultry meat	W	0.01*	–	–
	PF 0111	Poultry fats	W	0.01*	–	–
	PO 0111	Poultry, edible offal of	W	0.01*	–	–
	FI 2540	Pitaya	0.9	–	0.01	0.03
	SM 0716	Roasted coffee	–	–	0.0077	–
	FB 2005	Subgroup of cane berries	4	–	0.815	2.6
Definition of the residue for compliance with the MRL for plant and animal commodities: pydiflumetofen. Definition of the residue for dietary risk assessment for plant commodities: pydiflumetofen. Definition of the residue for dietary risk assessment for animal commodities other than mammalian liver and kidney: sum of pydiflumetofen and 2,4,6-TCP (2,4,6-trichlorophenol) and its conjugates, expressed as pydiflumetofen. Definition of the residue for dietary risk assessment for mammalian liver and kidney: sum of pydiflumetofen, 2,4,6-trichlorophenol (2,4,6-TCP) and its conjugates, and SYN547897 and its conjugates, expressed as pydiflumetofen. The residue is fat soluble.						
Spinosad (203) ADI: 0–0.02 mg/kg bw ARfD: unnecessary (2001)	MF 0812	Cattle fat	3	–	0.565	–
	MM 0812	Cattle meat	W	3	–	–
	MM 0812	Cattle muscle	0.3	–	0.078	–
	MO 0105	Edible offal (mammalian) [except cattle]	W	0.5	–	–
	PE 0112	Eggs	W	0.01	–	–
	PO 0111	Group of avian, edible offal of	–	–	0.01	–
	PF 0111	Group of avian fats	0.2	–	0.05	–
	PM 0110	Group of avian muscle	0.01	–	0.01	–
	MO 0105	Group of edible offal (mammalian) [except cattle]	0.5	–	0.064 (liver)	–

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
					0.032 (kidney)	
	PE 0112	Group of eggs	0.01	–	0.01	–
	MF 0100	Group of mammalian fats (except milk fats) [except cattle]	2	–	0.32	–
	MM 0095	Group of muscle (from mammals other than marine mammals) [except cattle]	0.07	–	0.01	–
	MF 0100	Mammalian fat	W	–	0.32	–
	FI 0345	Mango	0.01*	–	0	–
	MM 0095	Meat (from mammals other than marine mammals) [except cattle]	W	2	0.01 (muscle) 0.32 (fat)	–
	PM 0110	Poultry meat	W	0.2	–	–
	DT 1114	Tea, green or black, fermented and dried, (including concentrates)	10	–	0.325	–
	–	Tea infusion	–	–	0.0004	–
Definition of the residue for compliance with the MRL in plant and animal commodities: sum of spinosyn A and spinosyn D. Definition of the residue for dietary intake assessment in plant and animal commodities: sum of spinosyn A and spinosyn D. The residue is fat soluble for residues in meat but not fat soluble in milk.						
Tebuconazole (189) ADI: 0–0.03 mg/kg bw ARfD: 0.3 mg/kg bw (2010)	HS 0780	Cumin seed	0.9	–	0.22	–
Definition of the residue for compliance with the MRL in plant and animal commodities: tebuconazole. Definition of the residue for dietary intake assessment in plant and animal commodities: tebuconazole. The residue is not fat soluble.						
Tebufenozide (196) ADI: 0–0.02 mg/kg bw (1996) ARfD: 0.9 mg/kg bw (2003)	ML 0812	Cattle milk	W	0.05	–	–
	MO 0105	Edible offal (mammalian)	W	0.02*	–	–
	PO 0111	Group of avian edible offal	0.02*	–	0.02	0.02
	PF 0111	Group of avian fat	0.02*	–	0.02	0.02
	PM 0111	Group of avian muscle	0.02*	–	0.02	0.02
	MO 0105	Group of edible offal (mammalian)	0.06	–	0.028 (liver) 0.02 (kidney)	0.053 (liver) 0.024 (kidney)
	PE 0112	Group of eggs	0.02*	–	0.02	0.02
	MF 0100	Group of mammalian fats (except milk fats)	0.2	–	0.054	0.17
	ML 0106	Group of milks	0.02	–	0.014	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.03	–	0.02	0.029

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
	MM 0095	Meat (from mammals other than marine mammals)	W	0.05 (fat)	–	–
	ML 0106	Milks	W	0.01*	–	–
	PM 0111	Poultry meat	W	0.02*	–	–
	GC 0649	Rice	15	–	4.7	–
	CM 0649	Rice, husked	0.6	0.1	0.175	–
	CM 1205	Rice, polished	0.3	–	0.045	–
Definition of the residue for compliance with the MRL in plant and animal commodities: tebufenozide. Definition of the residue for dietary intake assessment in plant and animal commodities: tebufenozide. The residue is fat soluble.						
Tetraniliprole (324) ADI: 0–0.2 mg/kg bw ARfD: unnecessary (2021)	AS 0640	Barley hay (and/or straw)	0.08 (dw)	–	–	–
	MO 0105	Edible offal (mammalian)	W	1.0	–	–
	PE 0112	Eggs	W	0.01*	–	–
	PO 0111	Group of avian, edible offal of	0.01*	–	0	–
	PF 0111	Group of avian fats	0.01*	–	0	–
	PM 0110	Group of avian muscle	0.01*	–	0	–
	MO 0105	Group of edible offal (mammalian)	1.0	–	0.43	–
	PE 0112	Group of eggs	0.01*	–	0	–
	MF 0100	Group of mammalian fats (except milk fats)	0.15	–	0.26	–
	ML 0106	Group of milks	0.15	–	0.12	–
	MM 0095	Group of muscle (from mammals other than marine mammals)	0.07	–	0.047	–
	MF 0100	Mammalian fats (except milk fats)	W	0.15	–	–
	MM 0095	Meat (from mammals other than marine mammals)	W	0.1	–	–
	ML 0106	Milks	W	0.15	–	–
	PO 0111	Poultry, edible offal	W	0.01*	–	–
	PF 0111	Poultry, fats	W	0.01*	–	–
	PM 0110	Poultry, meat	W	0.01*	–	–
	GC 2088	Rice cereals, subgroup of	0.5	0.02	0.011	–
	GM 0649	Rice, husked	0.03	0.01*	0.01	–
	AS 0649	Rice, hay and/or straw	9 (dw)	20 (dw)	–	–
	GC 2087	Subgroup of barley, similar grains, and pseudocereals with husks	0.01*	–	0.01	–
	GC 2086	Subgroup of wheat, similar grains, and pseudocereals without husks	0.01*	–	0.01	–
	AS 0654	Wheat, hay and/or straw	0.08 (dw)	–	–	–
Definition of the residue for compliance with the MRL for plant and animal commodities: tetraniliprole.						

Compound	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
			New	Previous		
Definition of the residue for dietary risk assessment for plant commodities: tetraniliprole *plus* tetraniliprole-N-methyl-quinazolinone, expressed as tetraniliprole. Definition of the residue for dietary risk assessment for animal commodities: tetraniliprole + tetraniliprole-N-methyl-quinazolinone *plus* tetraniliprole-benzylalcohol, expressed as tetraniliprole. The residue is not fat soluble.						

Notes:

* At or about the limit of quantification.

** Compound evaluated under the periodic review programme.

*** New compound.

[a] The acute exposure from the consumption of the commodity may present a public health concern.

General considerations

1. Developments in dietary exposure methodology for pesticide residues in foods

Background

The purpose of this general consideration is to address the further work identified at the 2023 JMPR and feedback from delegations at the 55th CCPR meeting (CCPR55) in 2024. For further background on these aspects and consideration of the dietary exposure methodologies at JMPR, see the JMPR 2023 report (FAO and WHO, 2024a) and the CCPR55 report (FAO and WHO, 2024b).

At the conclusion of the 2023 meeting, the JMPR agreed to: transition from the use of the international estimated daily intake (IEDI) to the GECDE-mean;[1] continue to investigate implementation and modification options for the GECDE-high for the assessment of dietary exposure to pesticide residues for chronic and less-than-lifetime assessments with the aim of a transition to adoption; and to further investigate the degree of conservatism in the GECDE (mean and high) and the IEDI (FAO and WHO, 2024a).

The outcomes of the 2023 JMPR were presented to CCPR55 in June 2024 (FAO and WHO, 2024b). The CCPR members "noted the general support for the exploration of the transition from the use of the IEDI to the use of GECDE-mean", but requested more information "about the uncertainty associated with the degree of conservatism and transparency of the GECDE methodology by comparison to the IEDI". Consideration of the timeline to transition was also requested. The need to encourage submission of consumption data from more countries to the Chronic individual food consumption database – Summary statistics (CIFOCOss) was also noted. A request was made for JMPR to provide an update of its work in this area to the 2025 CCPR meeting.

Further evaluation of data and the GECDE method

For the 2024 JMPR, further analysis was undertaken covering aspects discussed and recommended during the 2023 meeting and by CCPR55; they are outlined in the following subsections.

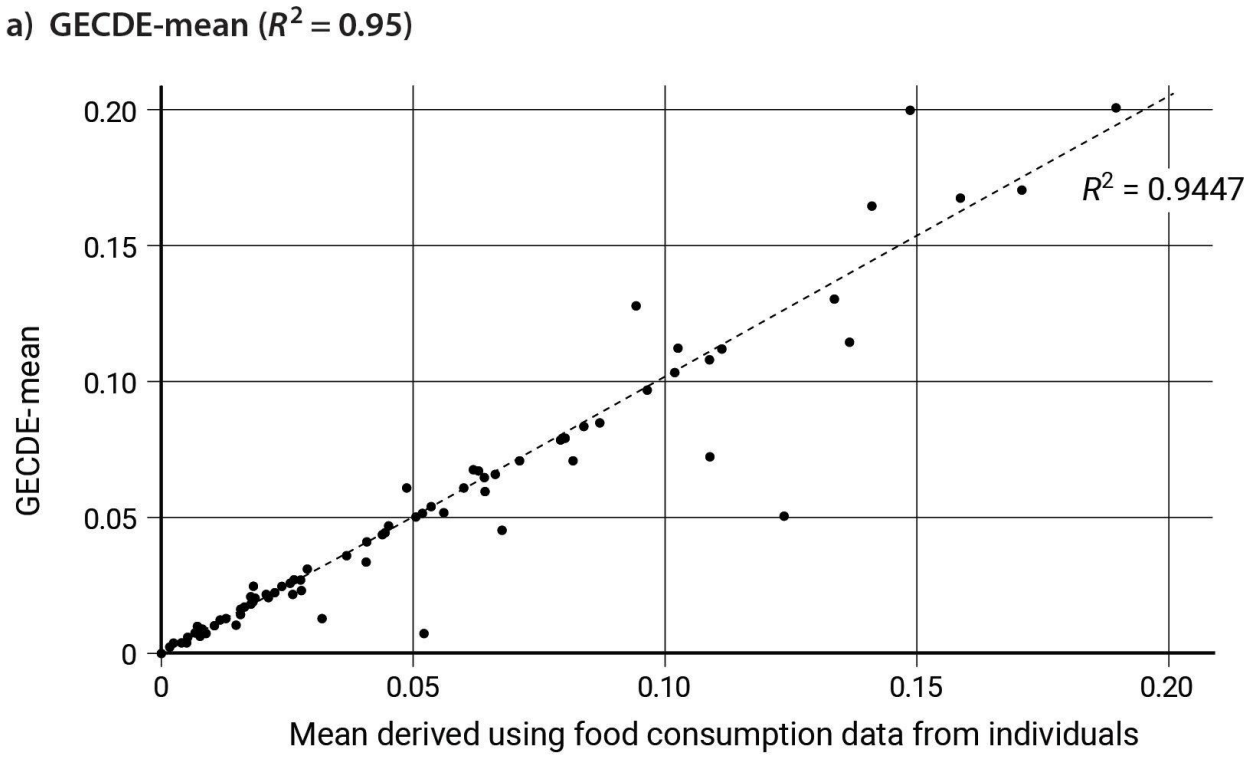
Comparison of dietary exposure estimates based on the GECDE with data from individuals

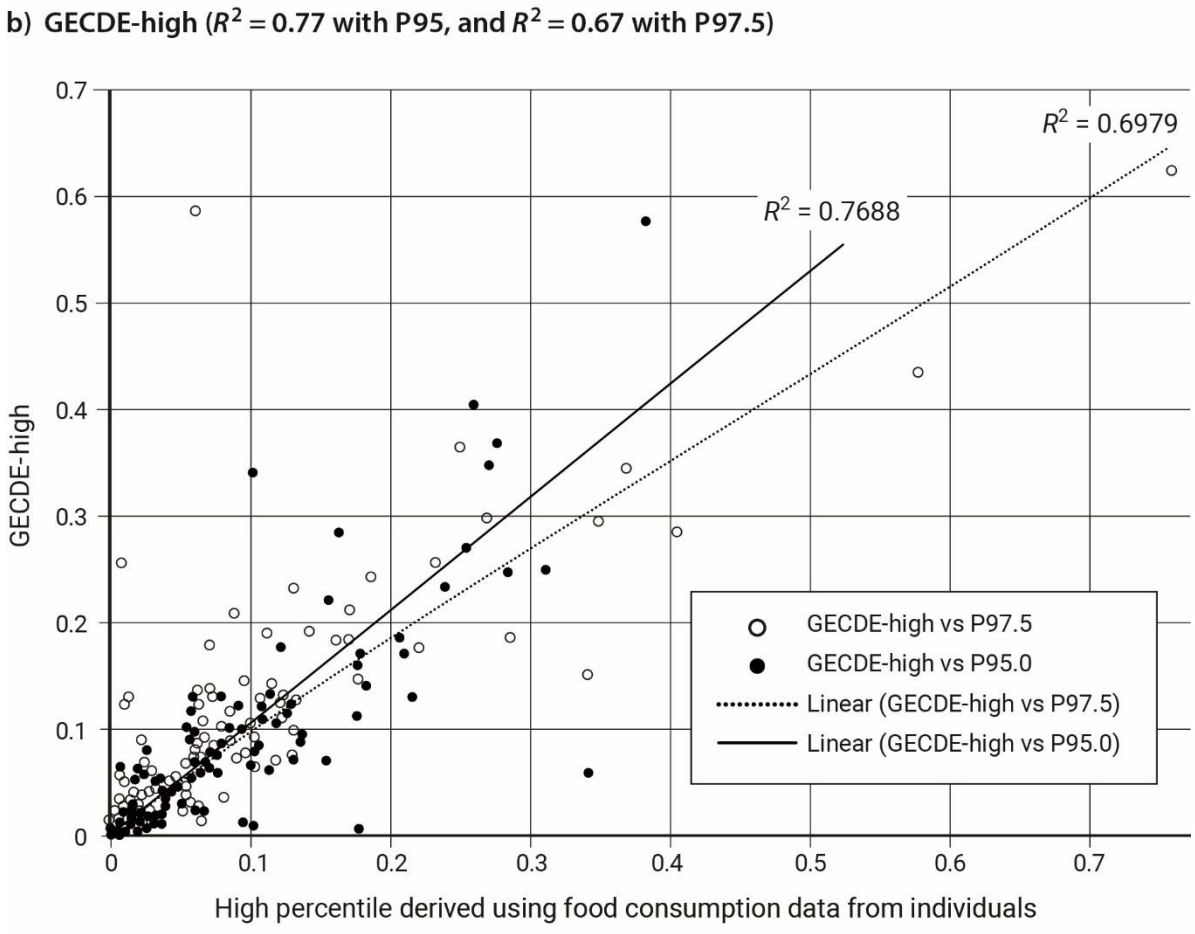
In order to evaluate the degree of conservatism in the GECDE, the JMPR undertook a comparison of dietary exposure estimates derived using food consumption data for individuals from nutrition surveys with the GECDE estimates. Three pesticides were selected for inclusion in the analysis: boscalid, iprodione and piperonyl butoxide. These were selected due to the greater variation in estimates of dietary exposure between the IEDI and the GECDE from among the pesticides considered at the 2023 meeting. There were 61 surveys included in this evaluation from the FAO/WHO Global Individual Food Consumption Data Tool (GIFT) database (FAO and WHO, 2024c). Estimates of dietary exposure used to compare with the GECDE estimates were derived for all respondents using food consumption data from individuals and STMR data from the 2023 JMPR.

This assessment showed good concordance (i.e. high coefficient correlation) between the GECDE and estimates of dietary exposure from the individual dietary records (Figure 1). This was true for both the mean (R^2 = 0.95) and high (R^2 = 0.77 with P95 and R^2 = 0.67 with P97.5) dietary exposures. The GECDE-high typically reflected a high percentile in the range of the P95 and P97.5 derived using the individual food consumption data. In summary, the GECDE, which is a tool for estimating dietary exposure when only summary food consumption statistics are available, produces estimates of dietary exposure closely aligned with those based on dietary survey data for individuals.

[1] GECDE refers to the global estimate of chronic dietary exposure.

Figure 1. Comparison between estimated dietary exposures from the GECDE and food consumption data for individuals





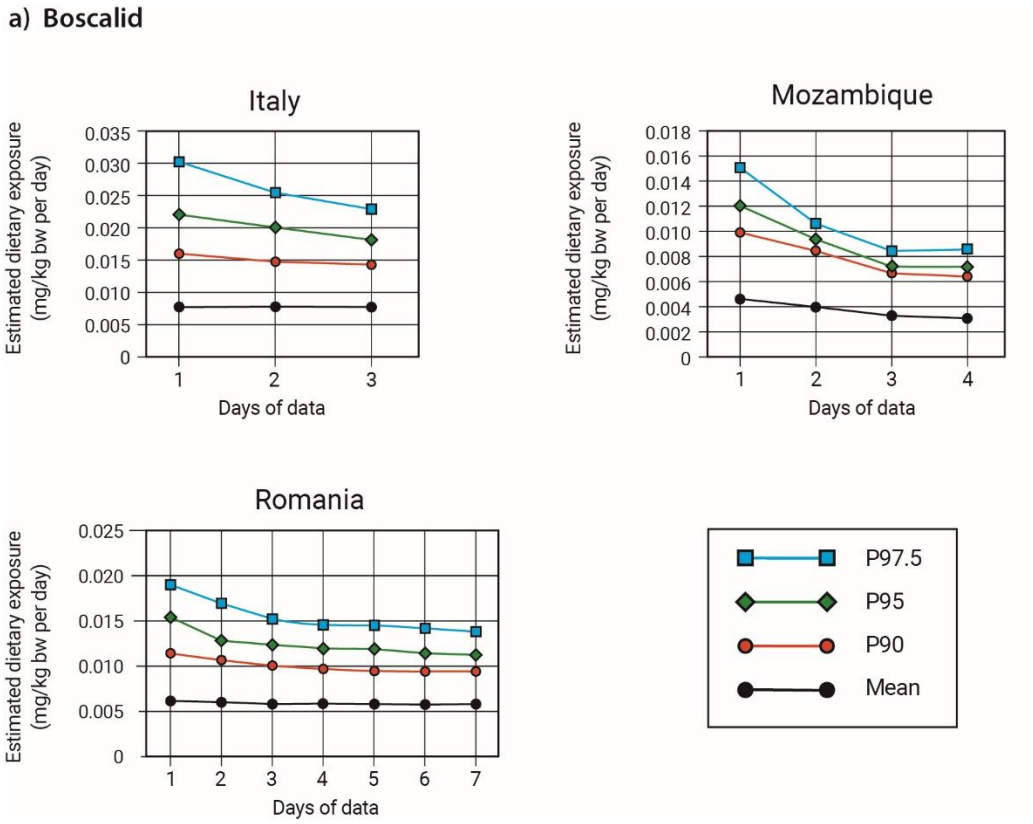
Number of survey days

Sufficiency of two days of consumption data

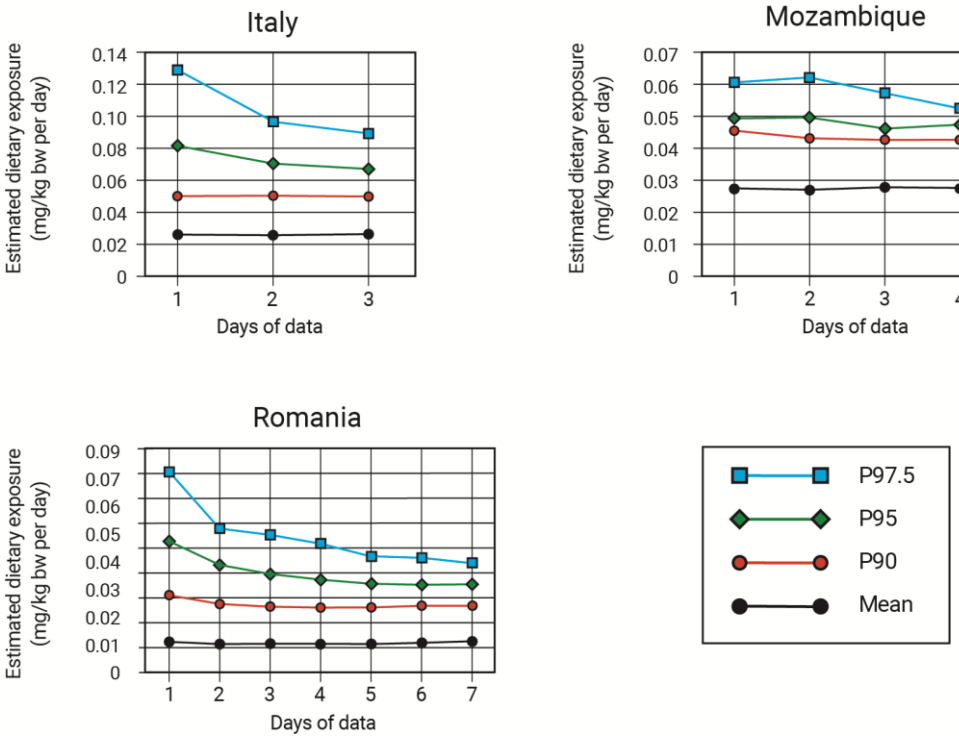
During the 2023 JMPR, it was noted that the use in the GECDE-high of consumers-only high percentiles from two days of dietary survey data may overestimate food consumption amounts, and therefore dietary exposure and risk estimates. The degree of conservatism in the GECDE-high was evaluated at the current meeting. Dietary surveys where individual food consumption data were available for more than two days were selected for the evaluation. These included surveys from Romania with seven days of consumption data, Mozambique with four days of data, and Italy with three days of data. The same three pesticides as noted above were used in the analysis: boscalid, iprodione and piperonyl butoxide. Estimates of dietary exposure were derived for all respondents using food consumption data from individuals and STMR data from the 2023 meeting for day one only, the average of two days, the average of three days and so on for the countries with more days of data.

The results showed that the largest decrease in the estimated dietary exposure was between day one only and the average of two days, followed by a small decrease for results averaged over the subsequent number of days. This was more evident in the high percentiles of dietary exposure (P95 and P97.5), whereas the mean and P90 results were relatively consistent across results using any number of days. Figure 2 shows the results for boscalid and piperonyl butoxide. While the results for iprodione followed the same general pattern, the small number of foods containing iprodione residues made estimates of dietary exposure more erratic.

Figure 2. Estimated dietary exposures to selected pesticides for all respondents for a single day and the average of multiple days for boscalid and piperonyl butoxide



b) Piperonyl butoxide



Notes: Estimated dietary exposures in mg/kg bw per day. Italy, Mozambique and Romania.

The degree of discrepancy in dietary exposure estimates between the use of different numbers of dietary survey days was also quantified. For Italy, where there were three days of food consumption data available, there was a slight degree of overestimation in the two-day average results compared to three-day averages, primarily in the high percentile estimates of dietary exposure (P95 and P97.5), by up to around 10 percent across the pesticides assessed. For Mozambique, there was a slight degree of overestimation in the two-day average compared to the four-day average: up to 20 percent in the high percentiles for piperonyl butoxide, and up to 30 percent in the high percentiles for boscalid. For Romania, there was a slight degree of overestimation in the two-day average compared to the seven-day average: up to 20 percent in the high percentiles for boscalid, and up to 30 percent in the high percentiles for piperonyl butoxide. The degree of overestimation when using two days of food consumption data (which is most of the data in the CIFOCOss dataset used for the GECDE) is very modest, particularly when looking at the numerical estimate of dietary exposure on a unit/kg bw per day basis, and is not likely to change the risk assessment conclusion if more days of data were available. In addition, any modest overestimation is therefore more protective for consumers in the risk assessment.

In summary, there is no substantial benefit of having a larger number of survey days available for estimating less-than-lifetime or chronic dietary exposures. The use of two days of dietary survey data for dietary exposure assessments is consistent with international best practice (FAO and WHO, 2020). It is also what is most commonly collected in national dietary surveys where resources available to conduct such surveys are limited and respondent burden means longer surveys can diminish the willingness to report consumption fully, thereby reducing the quality of the data.

Frequency of consumption

The GECDE-high is based on population mean consumption levels for all except for one food commodity where a high value of consumption is used. This food commodity is the one for which the combination of the highest reliable percentile (HRP) food consumption (for consumers only) and the STMR produces the highest dietary exposure. Concerns have been raised that the selected food, which is a major driver of the GECDE-high, may on occasions be a food eaten by a relatively small proportion of the population. The

frequency of consumption is in effect incorporated in the food consumption amounts derived for use in the GECDE calculations. In a national dietary survey, only a small number of consumers are likely to be captured for occasionally consumed foods. If a food is occasionally consumed, there will be a large number of respondents in a dataset with no consumption on either survey day, meaning their mean consumption is 0 g/day. If there are a small number of respondents who only consumed the food on a single day, their consumption averaged across the two days is half their single day consumption amount. There would be few respondents with consumption on both survey days. If all the two-day average consumption amounts were averaged to get a population mean, this would be skewed down by the large number of zeros in the distribution. For the consumers, only HRP consumption amount for an occasionally consumed food relevant to the GECDE-high calculation; the small number of consumers would influence the percentile chosen, which is less likely to be a higher percentile. Conversely, for commonly consumed foods, if eaten on both days, the mean of the two days will show a consumption amount that is relatively comparable to a single day amount.

By way of example, the foods contributing the most to the highest GECDE-high estimates of dietary exposure in 2023 were assessed to determine if infrequently consumed foods were driving the GECDE-high. As a specific example for boscalid, the highest GECDE-high estimate was for children 0–35 months from Bulgaria, where the main contribution was coming from a vegetable subgroup in a mixed meal, where 21 percent of the cohort were consumers and the ratio of the HRP to mean consumption amount was within expected range (in this case less than two). For piperonyl butoxide the highest GECDE-high estimate was for children 3–5 years from Burkina Faso, where the main contribution was sorghum flour, where 90 percent of the cohort were consumers and the ratio of the HRP to mean consumption amount was within expected range (in this case less than 2.6). At a higher level, this analysis indicated that around 75 percent or more of these are foods are consumed by at least 10 percent of the cohort, with around 50 percent of the foods consumed by 20–55 percent of the cohort (boscalid) and 60 percent of the foods consumed by 20–100 percent of the cohort (piperonyl butoxide).

Further consideration of the IEDI

The current meeting also undertook further evaluation of the results from the IEDI. The dietary exposure estimates from the IEDI presented at the 2023 meeting were compared to the dietary exposure estimates derived using the food consumption data for individuals. The IEDI from the cluster in which each of the assessed countries is included was used for the comparison: Italy (Cluster G10), Mozambique (Cluster G03), and Romania (Cluster G15). This was the case for boscalid and iprodione, where IEDI calculations were done for the 2023 meeting. For piperonyl butoxide, the last IEDI undertaken was in 2002 where the Global Environment Monitoring System (GEMS)/Food Regional Diets (n = 5 diets) were used for IEDI calculations. The IEDI for Italy and Romania were therefore taken from the estimates based on the European diet, and the IEDI for Mozambique used was from the African diet estimate.

For Italy, there is variation in whether the mean estimates of dietary exposure based on food consumption data for individuals are higher or lower than the IEDI across the pesticides assessed, however children tended to have mean estimates of dietary exposure that were higher than the IEDI. The IEDI results are equal to or lower than the high percentile estimates for Italy derived using consumption data for individuals across all population groups assessed. For Mozambique, the mean estimates of dietary exposure based on food consumption data for individuals are typically higher than the IEDI across the pesticides for all population groups included. The IEDI results are typically equal to or higher than the high percentile estimates for Mozambique derived using consumption data for individuals across all population groups assessed, except for boscalid, where results based on individuals are higher than the IEDI. For Romania, all mean and 90th percentile estimates of dietary exposure based on data from individuals are lower than the IEDI for all pesticides and population groups assessed. However, the P95 and P97.5 estimates from individuals are equal to or higher than IEDI.

Overall, these findings show that the cluster (or regional) diets and IEDI estimates do not capture specific dietary patterns within individual countries, the variation of consumption amounts within a distribution (e.g. low and high consumers), or the variation in dietary exposure estimates for pesticides across countries or population subgroups. The range of more specific estimates of dietary exposure can be either higher or lower than the results from the IEDI.

Recommendations

The evaluation undertaken for the current 2024 meeting has shown good concordance between the GECDE and estimates of dietary exposure derived using food consumption data for individuals, for both the GECDE-mean and GECDE-high. It has also shown that the degree of overestimation in estimates of dietary exposure based on two days of food consumption data is relatively modest, compared to estimates based on longer survey durations. Considering the findings of the assessment undertaken, and that most available datasets contain two days of data per subject, the meeting recommends the adoption of the GECDE-high in addition to the GECDE-mean as part of the exposure assessment methodologies used by the JMPR. Inclusion of the GECDE-high will ensure the protection of consumers with a range of consumption patterns within different populations. The JMPR recommends the GECDE-mean estimates replace the IEDI estimates. Consideration of the toxicological profile of the chemical should be used to determine the population groups for which dietary exposures are reported for the GECDE.

The provision of the additional data to assist risk managers in making risk management decisions will also be provided on a routine basis for future meetings. This includes the percent of surveys for which estimates of dietary exposure exceeded the ADI based on the GECDE, and identification of major contributors to dietary exposure where an estimate of dietary exposure exceeds the ADI.

The meeting concluded that the GECDE methodology has been sufficiently well validated to establish its fitness for purpose for use by the JMPR in estimating chronic and less-than-lifetime dietary exposure to residues of pesticides. Also considering the validation work and the conclusions of the European Food Safety Authority and European Medicines Agency report (EFSA and EMA, 2022), the meeting recommends that the GECDE methodology should be adopted for future meetings of the JMPR.

Next steps for consideration

In order to enable others outside of the JMPR to run the calculations and estimate dietary exposure results for the GECDE, a number of datasets and code are required. These inputs include:

- STMR values for each compound (and/or metabolites) for each relevant commodity;
- recipe data file to disaggregate mixed foods to its ingredients, and relevant adjustment factors (i.e. dilution factors to adjust the STMR values between forms of foods such as raw and cooked rice);
- a tool or the code to enable derivation of STMRs in final foods and ingredients (bringing in the recipe file noted above);
- CIFOCOss food consumption datasets (already publicly available);
- code for calculating the GECDE outputs; and
- ADIs for each compound (and/or metabolites), which in themselves are not required for the GECDE calculation, but are used with the result of the GECDE for risk characterization purposes.

A tool for users to bring all these inputs together and run the estimates would ensure transparency, ease of use, and consistency in calculations across users of the method. However, such a tool requires resources for development, testing and validation. The timeline for the availability of any such tool will be dependent on resources available and the time to undertake the required work.

The timeline will be:

- **September 2024**: JMPR report including IEDI and GECDE-mean, and continuation of the trialling for GECDE-high, supported with additional information including percent of surveys resulting in dietary exposures that exceed the ADI and major contributors to dietary exposures.
- **May 2025**: Report to CCPR on the JMPR's findings regarding dietary exposure assessment methodologies used by the JMPR, covering the following:
    - presentation of GECDE method to member states;
    - findings from current methodology investigations;
    - state of efforts towards provision of open source tool, including resource mobilization and advocacy for further support.

  CCPR feedback on the information provided by the JMPR will be sought.
- **September 2025**: JMPR report including GECDE, mean and high. Application by the JMPR of the

decision regarding exclusion or retention of IEDI.

2. Consideration on recommendation of group maximum residue limits for pulses

The 2023 JMPR received data for the use of acetamiprid on various pulses. When reviewing the data, significant differences in residue levels following good agricultural practice (GAP) treatment were identified between the genera of *Phaseolus* or *Vigna* and soya beans, and the meeting decided not to combine the data across these crops. Furthermore, field trials on the individual *Phaseolus* and *Vigna* crops were not sufficient to make a recommendation for their subgroups. Consequently, the 2023 meeting made a recommendation for soya bean only.

As a follow-up, the current meeting performed a preliminary data analysis for a limited number of active substances from field trials on various *Phaseolus* or *Vigna* genera and soya beans. However, a statistically significant difference in residue levels between these species was confirmed for the whole dataset, but not in samples close to harvest, which typically drive the residue. Hence, the 2024 JMPR re-evaluated the 2023 data for acetamiprid on pulses (see Section 5.1) based on the whole dataset submitted. The meeting also noted that for future applications, it would be desirable to obtain field trial data for both *Phaseolus* and *Vigna* genera.

3. Extrapolation of recommendations for tomato and pepper to eggplants (subgroup)

Background

The 2018 JMPR had agreed, as a general principal, to extrapolate residue estimates from peppers to eggplant, provided similar critical GAPs existed for both groups of commodities. The 2018 meeting further agreed that in cases where residue estimates for both peppers and tomatoes are available, the extrapolation to eggplant should be made based on the higher residue estimate for peppers or tomatoes.

At CCPR54, a proposal was made by an observer organization (observer) to conduct an analysis of existing Codex MRLs (CXLs) for both tomato and pepper to prepare a discussion paper presenting proposals for establishing corresponding Codex MRLs in eggplant. The analysis was provided to the 2024 JMPR for consideration.

General comments by the current meeting

The JMPR appreciates the work done by the observer to identify candidate compounds for extrapolation of existing JMPR recommendations for residues in tomato and pepper to eggplant and to compile information regarding registered uses, previous JMPR recommendations, and proposed new recommendations for eggplant. In examining the submission by the observer, the meeting agreed that it provided an efficient approach to evaluate potential extrapolations from existing CXLs to additional commodities. The meeting encourages continued exploration of similar opportunities.

The meeting noted that even if such submissions provide an efficiency gain, their evaluation requires the time of JMPR experts (approximately one evaluation of additional MRLs) that would otherwise be allocated to other JMPR work. Therefore, the meeting recommended that all submissions be coordinated through the CCPR Working Group on Priorities.

With regard to conclusions for specific extrapolations made by the observer, the meeting noted several outcomes that would not be in agreement with current JMPR procedures. As a result, the meeting emphasized that recommendations under the mandate of the JMPR (e.g. toxicological health-based guidance values, maximum residue level recommendations, and dietary risk assessments) should be made to the CCPR only by the JMPR.

Process for identifying candidate compounds

Specific comments on the observer analysis

The observer outlined a stepwise approach for identifying candidate active ingredients for which extrapolation of previous JMPR recommendations for peppers and tomato to eggplant might be supported. The approach is summarized in a discussion paper from CCPR55 (CX/PR 24/55/12). The meeting agreed that the stepwise approach was generally appropriate and suitable, but should be modified to exclude active ingredients which involve application of the threshold of toxicological concern (TTC) approach. Furthermore, it was noted that assessments for chronic exposure in the stepwise approach should be based on all STMR recommendations made by the meeting.

Comments on some specific suggested extrapolations

The meeting noted the following aspects and modification to its assessment practice that may interfere with the observer-suggested direct extrapolation of MRLs from pepper/tomato to eggplant:

- Before implementation of the OECD MRL Calculator,[2] MRLs were estimated under consideration of the "NAFTA Calculator"[3] and/or expert judgement. It needs to be pointed out that direct transition of MRLs may result in deviating estimates which may overestimate or even underestimate MRLs derived according to current principles. In addition, rounding classes introduced with the OECD MRL Calculator have not been considered. For example, the proposed extrapolation of the recommended MRL of 0.2 mg/kg for cyfluthrin based on a use of peppers in the 2007 JMPR report would result in an MRL of 0.3 mg/kg following current practice.
- The meeting transitioned to base its acute dietary exposure assessment on the HR derived from a single highest value, if applicable. HR values derived previously do not reflect this practice and may potentially underestimate international estimate of short-term intake (IESTI) estimates.
- **Flubendiamide**: An insufficient number of trials would be identified based on the data presented in the 2010 JMPR report. Overall, eight trials for pepper and five trials for tomatoes were selected approximating the Australian GAP suggested as basis for extrapolation. The higher MRL estimate of 2 mg/kg was derived based on tomatoes, whereas pepper showed significantly lower residues resulting in an MRL estimate of 0.7 mg/kg. According to the current procedure, tomato data would be used for an extrapolation to eggplant due to higher residues in the fruits. However, eggplant is a major commodity, for which a minimum of six independent supervised field trials results is required. Similarly, three trials on tomatoes and pepper each for pyrethrins are insufficient for a major commodity.
- **Fludioxinil**: The label from the United States of America recommended for extrapolation is unsuitable to extrapolate to eggplant. The 2013 JMPR took note of the previously estimated MRL of 1 mg/kg for peppers based on an Italian and Austrian GAP and concluded that the existing recommendation "accommodates" for residues following treatment according to the US GAP. Residue data itself was significantly lower and would result in an MRL estimation of only 0.5 mg/kg only (based on OECD Calculator without detailed analysis of individual field trial study reports).
- **Flupyradifurone**: For this compound, uptake of residues from the group occurs and the meeting concluded that no group recommendation is appropriate for fruiting vegetables. Only specific data on crops (tomatoes and peppers) was considered for the recommendation. An extrapolation to eggplant without corresponding data on this specific crop may estimate residues and was intentionally not considered by the meeting.
- **Flutriafol**: Residues estimated by the 2015 JMPR were significantly higher in tomatoes (HR: 0.63 mg/kg) compared to peppers (HR: 0.31 mg/kg). The proposed extrapolation of the MRL of 1 mg/kg for peppers in combination with the suggested representative label is inappropriate, since this MRL is based on a previous recommendation from 2011, which was made for peppers (sweet), instead of pepper, and extended to now cover all members of the commodity. Data on pepper itself according to the label from the United States of America would result in an MRL estimate of 0.5 mg/kg only.
- **Methomyl**: Trial reporting in the 2004 report does not follow current assessment principles anymore; relevance of retreatment intervals (RTI) was emphasised in the recent years. In view of the IESTI of 100 percent for children, thorough investigation of the field trials data according to current scientific

[2] OECD refers to the Organisation for Economic Co-operation and Development.
[3] NAFTA refers to the North American Free Trade Agreement.

practice seems necessary.

- **Pyriproxyfen**: The cited label from France specifically states use on tomatoes and aubergines. No description of crop groups or definition of further members of the Codex subgroup eggplants was made. According to current JMPR practice, registered labels for all members of a group or subgroup are required for a respective recommendation. Therefore, the 2018 JMPR decided to limit the extrapolation to eggplants specifically.

4. Transition from commodity of meat to commodity of muscle and fat

The CCPR has finalized the revision of the Classification of Food and Feed (CXA 4-1989), which includes the revised Class B on primary food commodities of animal origin. The revised Class B incorporates new definitions for the terms "meat", "muscle", "fat" and "edible offal" to facilitate harmonization of MRLs between CCPR and the Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF). Table 2 outlines the changes made per the new commodity terms and definitions in the revised Classification (REP22/PR53, paragraphs 179–188, Appendix VIII; REP23/PR54 [Corrigendum], Appendix VIII).

Table 2. Outline of new animal commodity terms and definitions

CCN	Previous commodity definition	New commodity definition
MM 0095	Meat (from mammals other than marine mammals)	Group of muscle (from mammals other than marine mammals)
MF 0100	Mammalian fats (except milk fats)	Group of mammalian fats (except milk fats)
MO 0105	Edible offal (mammalian)	Group of edible offal (mammalian)
FM 0106	Milk fats (Old CCN: FM 0183)	Group of milk fats
ML 0106	Milks	Group of milks
PM 0110	Poultry meat	Group of avian muscle
PF 0111	Poultry fat	Group of avian fats
PO 0111	Poultry, edible offal of	Group of avian, edible offal of
PE 0112	Eggs	Group of eggs

The meeting also notes that all individual commodity definitions that contain the term "meat" (e.g. cattle, meat) should be updated to the term "muscle" (e.g. cattle, muscle) and all commodity definitions that contain the term "poultry" (e.g. poultry, liver) should be updated to the term "avian" (e.g. avian, liver). A full list of the updated commodity definitions can be found in Appendix 8 of the Report of the 54th Session of the CCPR (FAO and WHO, 2024d).

Furthermore, the meeting determined that if the residue is fat soluble, it should be confirmed that the previous MRLs, STMRs and HRs for meat were based on muscle, not fat. If the MRLs were previously based on fat, the new MRLs, STMRs and HRs for muscle should be based on data for muscle and separate MRLs, STMRs and HRs should be established for fat.

The meeting agreed to update the commodity definitions described above for all compounds undergoing review at the current meeting. Furthermore, the meeting agreed to continue with this approach until the commodity terms have been updated for every compound.

5. Interpretation of use patterns for targeted applications

Background

The 2023 and 2024 meetings have received information on registered uses and supervised field trials for insecticide bait-spray products.

Bait sprays are generally not used in a typical broadcast spray scenario where the end-use product is applied uniformly to the growing crop. Rather, applications are made to a small area of the crop (for example, to 1 m^2 of a tree or in a band below the tree canopy).

JMPR considerations

The meeting makes residue recommendations on the basis of supervised residue trials whose use pattern matches, approximates, or can be adjusted to approximate the critical GAP. That expectation applies to spray-bait products as well; however, directed application of a product to a portion of the crop raises questions about the resulting distribution of residues across a treated area and the collection of representative samples from fields, orchards, etc. that receive treatments reflecting directed applications. The meeting further noted that the spot treatments inherent in precision agriculture will raise these same questions for other end-use products.

Sampling of commodities for pesticide residue levels should be fit for purpose for deriving maximum residue levels (reflecting potential for direct treatment of the commodity) as well as residue levels reflecting blending of harvested commodities at the field level. This level of blending can vary significantly from one crop to another (for example, almonds which are shaken from the tree and then collected from the orchard floor versus peaches which are hand-harvested and collected in baskets). The JMPR recommends that regulatory authorities and others (e.g. OECD) that establish guidelines for conducting field trials consider these issues during guideline updates.

6. Update of the pesticide residues in food: guidance document for WHO JMPR monographers and reviewers

Proposed draft updates to the guidance document for WHO monographers and reviewers on procedures, scientific and style guidance were prepared, presented and discussed at the meeting. A revised draft of the document will be circulated for comments among members of the WHO Core Assessment Group after the meeting.

Following consideration of any comments received, a final draft will eventually replace the current WHO guidance on the WHO website after the 2025 JMPR.

7. Strategy and timing for JMPR re-evaluation of dithiocarbamates

Based on the information received regarding the volume of expected data submissions for the periodic re-evaluation of the five notified dithiocarbamates, including their metabolites, and taking into consideration the degree of commonalities between the individual compounds, the JMPR proposes that the re-evaluation be divided into three phases. Each phase needs to be completed before the subsequent phase is initiated. It is expected that a significant part of work done at Phase 1 will be useful to obtain efficiencies in subsequent evaluations under Phase 2 and Phase 3.

JMPR has estimated the evaluation workload of each phase to be equivalent to the following number of standard compound evaluations:

- **Phase 1**: mancozeb and metiram, and their common major metabolite ethylenethiourea (ETU). Workload for the toxicological re-evaluation is estimated to be equivalent to four to five standard evaluations.
- **Phase 2**: propineb, and its major metabolite propylenethiourea (PTU). Workload for the toxicological re-evaluation is estimated to be equivalent to two standard evaluations.
- **Phase 3**: ziram and thiram. Workload for the toxicological re-evaluation is estimated to be equivalent to two standard evaluations.

Depending on other priorities/workloads, it might be: i) that all the work associated with an individual phase cannot be completed at a single JMPR; and/or ii) that a subsequent phase will not be considered at the next JMPR. It is noted that Phase 1 is likely to require the full annual resources usually allocated under the periodic re-evaluation programme, while Phase 2 and Phase 3 will, in total, require a level of resources similar to Phase 1.

The residue analysis for dithiocarbamate compounds uses a total residue method (determined as carbon disulfide). It is therefore efficient to consider the residue aspects of all dithiocarbamate compounds

together. It is proposed, subject to other priorities, to perform the FAO residue evaluations at the same time as Phase 3 of the WHO evaluation, or in the following years.

8. Linear and non-linear toxicokinetics guide progress update

A first draft of the JMPR guidance for the interpretation and use of toxicokinetic data to support the determination of health-based guidance values has been completed. Further refinement of the guidance is required before presenting it for discussion at the 2025 JMPR.

9. Data on pesticide metabolites that are also commodity chemicals

In its risk assessments of pesticide residues, the JMPR, in common with other assessment bodies, considers the dietary risk not only of the pesticide active ingredient but also its metabolites and degradation products. JMPR has developed a systematic approach (decision tree) for assessing the risk from such metabolites and degradation products (WHO, 2015). As with the parent pesticide, this requires that sponsors submit all available data on the toxicology of the metabolites and degradation products. Some of these are common to more than one pesticide, each with a different sponsor, and JMPR has discussed ways in which this could be addressed, most recently in 2023 (FAO and WHO, 2024a).

While compliance for those metabolites and degradation products that are pesticide-specific is generally good, for low molecular weight and less-specific products, this is often not the case. This is because such chemicals are often traded as commodity products in their own right (or are common breakdown products of a range of chemicals) (e.g. trifluoroacetic acid, from fluazinam and cyclobutrifluram; phthalic acid, from folpet and phosmet; 2,4,6-trichlorophenol, from pydiflumetofen – see the forthcoming 2024 JMPR report). Hence, information will have been generated to support such uses and/or occurrence, which will often not have been generated by the pesticide sponsor. They will not necessarily have access to these data. Nevertheless, this information will be useful and perhaps even essential to enable JMPR to complete its assessment.

Sponsors of pesticides on the agenda of JMPR should investigate the availability of and submit such information relevant to the dietary risk assessment, and if they are not the data owner, they are expected to obtain the original data for review by the JMPR.

10. Efficiency of JMPR resources

As highlighted at several past JMPRs (2015, 2018, 2019 and 2023), sponsors have been strongly encouraged to submit chemical dossiers that comply with the quality and scope specified in the CCPR Risk Analysis Principles. The current meeting received several dossiers for new and periodic review compounds which lacked critical residue and toxicology data to establish health-based guidance values, residue definitions for compliance and/or dietary risk assessments (e.g. chlorpyrifos [periodic review], acynonapyr [new compound]). In another case, the dossier for a new compound (cyclobutrifluram) included a very limited use pattern where this use did not give rise to detectable pesticide residues (whole banana).

Dossiers for additional uses for the same compound are then typically submitted in subsequent years and often include several critical studies which require the potential revisiting of the residue definitions. Submissions of such large dossiers for additional uses result in a strain on JMPR capacity, precluding the meeting from focusing on the review of new compounds and periodic review compounds.

Moving forward, JMPR will be prioritizing dossiers for review which include several registered uses, where measurable residues are expected. Priority will also be assigned to those dossiers that are complete and address all the required residue and toxicology data outlined in the JMPR call for data.

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