Food and Agriculture Organization of the United Nations

World Health Organization

JOINT FAO/WHO MEETING ON PESTICIDE RESIDUES

Geneva, 17-26 September 2019

SUMMARY REPORT

**ACCEPTABLE DAILY INTAKES, ACUTE REFERENCE DOSES,
ACUTE AND LONG-TERM DIETARY EXPOSURES,
RECOMMENDED MAXIMUM RESIDUE LEVELS, SUPERVISED TRIALS MEDIAN RESIDUE VALUES
AND OTHER VALUES RECORDED
BY THE 2019 MEETING**

Issued October 2019

The following extracts of the results of the 2019 Joint FAO/WHO Meeting on Pesticide Residues (JMPR) are provided to make them accessible to interested parties at an early date.

The Meeting evaluated 28 pesticides and in addition, a number of pesticides used on spices were considered. The Meeting estimated maximum residue levels, which it recommended for use as maximum residue limits (MRLs) by the CCPR. It also estimated supervised trials median residue (STMR) and highest residue (HR) levels as a basis for estimation of the dietary exposure to residues of the pesticides reviewed. The allocations and estimates are shown in the Table 1.

Pesticides for which the estimated dietary exposures might, on the basis of the available information, exceed their acceptable daily intakes (ADIs) are marked with footnotes, which are also applied to specific commodities when the available information indicated that the acute reference dose (ARfD) of a pesticide might be exceeded when the commodity was consumed.

The table includes the Codex reference numbers of the compounds and the Codex classification numbers (CCNs) of the commodities, to facilitate reference to the Codex maximum limits for pesticide residues (Codex Alimentarius, Vol. 2B) and other documents and working documents of the Codex Alimentarius Commission. Compounds and commodities are both listed in alphabetical order.

Apart from the abbreviations indicated above, the following qualifications are used in Table 1.

* (following name of pesticide)	New compound
** (following name of pesticide)	Compound reviewed within CCPR periodic review programme
(*) (following a recommended maximum residue level)	At or about the limit of quantification
ar	The median or highest residue is reported at the moisture content of the feed commodity "as received"
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) (classes D and E in the Codex classification)	The recommendation accommodates post-harvest treatment of the primary food 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 (in place of previous recommendations)	The previous recommendation is withdrawn, or withdrawal of the recommended Maximum residue level or existing Codex or draft MRL is recommended.

1. Acceptable daily intakes (ADIs), acute reference doses (ARfDs), acute and long-term dietary exposures, recommended maximum residue levels, supervised trials median residue values (STMRs) and other values recorded by the 2019 JMPR meeting.

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
Afidopyropen (312)*	AM 0660	Almond hulls	0.6 (dw)		Median: 0.064 (ar)	
ADI: 0–0.08 mg/kg bw ARfD: 0.2 mg/kg bw (for women of child-bearing age) ARfD: 0.3 mg/kg bw (for general population)	DF 0226	Apple, dried (peeled)	0.02		0.013	0.019
	VB 0041	Cabbages, Head	0.5		0.02	0.10
	FS 0013	Cherries, Subgroup of	0.03		0.02	0.031
	FC 0001	Citrus Fruit, Group of	0.15		0.0535 [a]	0.086 [a]
	OR 0004	Citrus oil [b]	0.7		0.22	
	AB 0001	Citrus pulp, dry [b]	0.4		0.13	
	HH 3209	Coriander, leaves	5		2.5	4.8
	AB 1204	Cotton gin trash	1.5		Median: 0.65	Highest: 1.0
	SO 0691	Cotton seed	0.08		0.02	
	VC 0424	Cucumber	0.7		0.17	0.60
	HH 0730	Dill, leaves	5		2.5	4.8
	MO 0096	Edible offal (mammalian)	0.2		liver: 0.22 kidney: 0.13	liver: 0.34 kidney:0.13
	PE 0112	Eggs	0.01(*)		0.022	0.098
	VO 2046	Eggplants, Subgroup of	0.15		0.030	0.12
	VB 0042	Flowerhead Brassicas, Subgroup of	0.4		0.135	0.34
	VC 2040	Fruiting vegetables, Cucurbits – Melon, Pumpkins and Winter squashes, Subgroup of	0.05		0.027 [a]	0.048 [a]
	HS 0784	Ginger, rhizome (fresh)	0.01(*)		0	0
	VL 2050	Leafy greens, Subgroup of	2		0.88	2.6
	VL 0054	Leaves of Brassicaceae, Subgroup of	5		2.5	4.8
	MF 0100	Mammalian fats (except milk fats)	0.01(*)		0.13	0.13
	MM 0095	Meat (from mammals other than marine mammals)	0.01(*)		muscle: 0.18 fat: 0.13	muscle: 0.26 fat: 0.13
	ML 0106	Milks	0.001(*)		0.020	
	HH 0740	Parsley, leaves	5		2.5	4.8
	FS 2001	Peaches, Subgroup of	0.015		0.02	0.022
	VO 0051	Peppers, Subgroup of, excluding okra, martynia and roselle	0.1		0.036	0.11
	HS 0444	Peppers, chili dried	1		0.36	1.1
	FP 0009	Pome fruit, Group of, excluding persimmon	0.03		0.021	0.029
	FS 0014	Plums, Subgroup of	0.01(*)		0.02	0.02
	PO 0111	Poultry, edible offal of	0.01(*)		0.024 (Liver)	0.11 (Liver)
	PF 0111	Poultry, fats	0.01(*)		0.022	0.098

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
	PM 0110	Poultry, meat	0.01(*)		0.022	0.098
	VD 0541	Soya bean (dry)	0.01(*)		0.02	
	VS 2080	Stem and Petioles, Subgroup of	3		0.54	2.2
	VC 0431	Summer squash	0.07		0.039	0.050
	VO 2045	Tomatoes, Subgroup of	0.15		0.030	0.12
	VO 0448	Tomatoes, dried	0.7		0.17	0.70
	TN 0085	Tree nuts, Group of	0.01(*)		0.02	0.02
	VR 0071	Tuberous and corm vegetables, Subgroup of	0.01(*)		0	0
	HS 0794	Turmeric, root (fresh)	0.01(*)		0	0
	JF 0226	Apples, juice (pasteurized)			0.013	
	FP 0226	Apples, canned			0.013	
	FP 0226	Apples, sauce/puree			0.013	
	OR 0691	Cotton seed (refined oil)			0.0013	
	JF 0004	Citrus juice (raw) [b]			0.012	
		Citrus peel (fresh) [b]			0.096	0.15
	FC 0004	Marmalade [b]			0.012	
	VO 0448	Tomatoes, canned			0.016	0.065
	JF 0448	Tomatoes, juice (raw)			0.0026	
	VO 0448	Tomatoes, paste (concentrates sauce/puree)			0.016	
	VO 0448	Tomatoes, sauce/puree (single strength)			0.0072	

[a] Based on whole fruit, since no data were submitted on flesh only.

[b] Based on processing studies on oranges.

Definition of the residue for compliance with the MRL for plant commodities: *Afidopyropen.*

Definition of the residue for dietary risk assessment for plant commodities: *Sum of afidopyropen + dimer of [(3R,6R,6aR,12S,12bR)-3-[(cyclopropanecarbonyl)oxy]-6,12-dihydroxy-4,6a,12b-trimethyl-11-oxo-9-(pyridin-3-yl)-1,3,4,4a,5,6,6a,12,12a,12b-decahydro-2H,11H-naphtho[2,1-b]pyrano[3,4-e]pyran-4-yl]methyl rac-cyclopropanecarboxylate (M007), expressed as afidopyropen.*

Definition of the residue for compliance with the MRL for animal commodities: *Afidopyropen.*

Definition of the residue for dietary risk assessment for animal commodities, excluding liver: *Afidopyropen + (3S,4R,4aR,6S, 6aS, 12R,12aS,12bS)-3,6,12-trihydroxy-4-(hydroxymethyl)-4,6a, 12b-trimethyl--9-(pyridin-3-yl)-1, 3,4,4a,5,6,6a,12, 12a,12b-decahydro-2H,11H-benzo- [f] pyrano[4,3-b]chromen-11-one (M001) + Cyclopropane carboxylic acid (CPCA/M061) and (2R)-3-carboxy-2- [(cyclopropyIcarbonyI)oxy]- N, N, N-trimethylpropan-1- aminium chloride (CPCA-carnitine conjugate/M060), expressed as afidopyropen.*

Definition of the residue for dietary risk assessment for animal commodities, liver: *Afidopyropen + (3S,4R,4aR,6S, 6aS, 12R,12aS,12bS)-3,6,12-trihydroxy-4-(hydroxymethyl)-4,6a, 12b-trimethyl--9-(pyridin-3-yl)-1, 3,4,4a,5,6,6a,12, 12a,12b-decahydro-2H,11H-benzo- [f] pyrano[4,3-b]chromen-11-one (M001) + Cyclopropane carboxylic acid (CPCA/M061) and (2R)-3-carboxy-2- [(cyclopropyIcarbonyI)oxy]- N, N, N-trimethylpropan-1- aminium chloride (CPCA-carnitine conjugate/M060) + [(3S,4R,4aR,6S,6aS,12R,12aS,12bS)-3-(cyclopropylcarbonyl)oxy]-6,12-dihydroxy-4,6a,12b-trimethyl-9-(1-oxidopyridin-3-yl)-11-oxo-1,3,4,4a,5,6,6a,12,12a,12b-decahydro-2H, 11H-benzo[f]pyrano[4,3-b]chromen-4-yl]methyl cyclopropane-carboxylate (M017), expressed as afidopyropen.*

The residue is not fat-soluble

Benzovindiflupyr(261) ADI: 0–0.05 mg/kg bw ARfD: 0.1 mg/kg bw	VA 2031	Bulb onion, Subgroup of	0.02	-	0.01	0.015
	GS 0659	Sugar cane	0.4	0.04	0.069	0.25
	DM 0659	Sugar cane, molasses	-	-	0.006	-
		Sugar cane refined sugar	-	-	0.003	-

Definition of the residue for compliance with the MRL and for dietary risk assessment for plant and animal commodities: *Benzovindiflupyr.*

The residue is fat-soluble.

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
Bifenthrin (178) ADI: 0–0.01 mg/kg bw ARfD: 0.01 mg/kg bw	FB 0275	Strawberry [c]	3[c]	3	0.46	2.3
	AS 0081	Straw and fodder (dry) of cereal grains	1 (dw)	-	Median: 0.26 (ar)	Highest: 0.45 (ar)
[c] On the basis of the information provided to the JMPR it was concluded that the estimated acute dietary exposure to residues of bifenthrin for the consumption of strawberries may present a public health concern. Definition of the residue for compliance with the MRL for plant and animal commodities and dietary risk assessment for plant commodities: *Bifenthrin (sum of isomers).* The residue is fat-soluble.						
Buprofezin (173) ADI: 0–0.009 mg/kg bw ARfD: 0.5 mg/kg bw	AB 0001	Citrus pulp, dry	5	2	Median: 0.97	Highest: 1.9
	OR 0001	Citrus oil, edible	6		1.2	
	OC 0305	Olive oil, crude	20		3.9	
Aniline ADI: 0–0.02 mg/kg bw ARfD: 0.02 mg/kg bw	TN 0085	Group of tree nuts	0.05(*)		0.05	0.05
	AM 0660	Almond hulls	3	2	Median: 0.22	
	TN 0660	Almond	W	0.05(*)	--	
	MF 0100	Mammalian fats except milk fats	0.01(*)		0	0
	PE 0112	Eggs	0.01(*)		0	0
	PO 0111	Poultry, edible offal of	0.01(*)		0	0
	PF 0111	Poultry fats	0.01(*)		0	0
	PM 0110	Poultry meat	0.01(*)		0	0
		Citrus flesh			0.039	0.078
		Citrus peel			0.67	1.3
	JF 0001	Citrus juice			0.12	
		Orange marmalade			0.25	
	DF 0226	Apples, dried			0.17	0.59
		Apple canned			0.015	
		Apple puree			0.019	
		Apple jelly			0.015	
	JF 0226	Apple juice			0.16	
	AB 1230	Apple pomace wet			Median: 0.56	
	DF 0269	Dried grapes			0.27	1.2
	JF 0269	Grape juice			0.073	
		Grape wine			0.2	
		Olive canned (pickled, fermented)			0.76	1.2
Definition of the residue for compliance with the MRL and for dietary risk assessment for plant and animal commodities: *Buprofezin.* The residue is not fat-soluble.						
Clethodim (187) ** ADI: 0–0.2 mg/kg bw ARfD: Unnecessary	AL 1020	Alfalfa fodder	W	10		
	AL 0061	Beans fodder	W	10		
	VD 0071	Beans (dry)	W	2		
	VP 0061	Beans, except broad bean and soya bean	W	0.5(*)		
	SO 0691	Cotton seed	W	0.5		
	OC 0691	Cotton seed oil, crude	W	0.5(*)		
	OR 0691	Cotton seed oil, edible	W	0.5(*)		
	MO 0105	Edible offal (Mammalian)	W	0.2(*)		
	PE 0112	Eggs	W	0.05(*)		

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
	VD 0561	Field pea (dry)	W	2		
	AM 1051	Fodder beet	W	0.1(*)		
	VA 0381	Garlic	W	0.5		
	MM 0095	Meat (from mammals other than marine mammals)	W	0.2(*)		
	ML 0106	Milks	W	0.05(*)		
	VA 0385	Onion, Bulb	W	0.5		
	SO 0697	Peanut	W	5		
	VR 0589	Potato	W	0.5		
	PM 0110	Poultry meat	W	0.2(*)		
	PO 0111	Poultry, Edible offal of	W	0.2(*)		
	SO 0495	Rape seed	W	0.5		
	OC 0495	Rape seed oil, Crude	W	0.5(*)		
	OR 0495	Rape seed oil, Edible	W	0.5(*)		
	VD 0541	Soya bean (dry)	W	10		
	OC 0541	Soya bean oil, crude	W	1		
	OR 0541	Soya bean oil, refined	W	0.5(*)		
	VR 0596	Sugar beet	W	0.1		
	SO 0702	Sunflower seed	W	0.5		
	OC 0702	Sunflower seed oil, crude	W	0.1(*)		
	VO 0448	Tomato	W	1		

Definition of the residue for compliance with the MRL for plant commodities: *Sum of clethodim and its metabolites convertible to dimethyl 3-[2-(ethylsulfonyl)propyl]-pentanedioate (DME) and dimethyl 3-[2-(ethylsulfonyl)propyl]-3-hydroxy-pentanedioate (DME-OH), expressed as clethodim.*

Definition of the residue for compliance with the MRL for animal commodities: *Sum of clethodim and its metabolites convertible to dimethyl 3-[2-(ethylsulfonyl)propyl]-pentanedioate (DME), expressed as clethodim.*

Definition of the residue for dietary risk assessment for plant and animal commodities: *A conclusion could not be reached.*

The residue is fat-soluble.

Cyclaniliprole (207) ADI: 0–0.04 mg/kg bw ARfD: Unnecessary	TN 0660	Almonds	0.03		0.019	
	AM 0660	Almond hulls	6		Median: 1.7	
	FB 20006	Bush berries, Subgroup of	1.5		0.275	
	FB 0267	Elderberries	1.5		0.275	
	FB 2254	Guelder rose	1.5		0.275	
	FB 20005	Cane berries, Subgroup of	0.8		0.27	
	FS 0013	Cherries, Subgroup of	0.7	0.9	0.14	
	VB 0041	Cabbages, head	0.7		0.0325	
	VO 2700	Cherry Tomato	W	0.1		
	FC 0001	Citrus fruit, Group of	0.4	-	0.087	
	OR 0001	Citrus oil, edible	50		10.1	
	VC 2039	Cucumbers and summer squashes, Subgroup of	0.05	0.06	0.021	
	DV 0448	Tomato, dried	0.35	0.4	0.11	
	MO 0105	Edible offal (mammalian)	0.2	0.01(*)	kidney 0.052 liver 0.061	
	VO 2046	Subgroup of Eggplants	0.15	0.1	0.0525	
	PE 0112	Eggs	0.01(*)		0	
	VB 0042	Flowerhead Brassicas, Subgroup of	0.8	1	0.28	
	FB 0269	Grapes	0.6	0.8	0.12	
	VB 2036	Head Brassicas, Subgroup of	W	0.7		
	VL 2050	Leafy greens, Subgroup of	7		2.4	
	VL 0054	Leaves of Brassicaceae, Subgroup of	10	15	3.5	

Pesticide (Codex reference number)	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)	0.25 (fat)	0.01(*) (fat)	muscle 0.016 fat 0.064	
	FB 2009	Low growing berries, Subgroup of (except cranberries)	0.4		0.12	
	VC 2040	Melons, pumpkins and winter squashes, Subgroup of	0.1	0.15	0.041	
	MF 0100	Mammalian fats (except milk fats)	0.25	0.01(*)	0.064	
	ML 0106	Milks	0.01	0.01(*)	0.004	
	FM 0183	Milk fats	0.2	0.01(*)	0.054	
	VO 0051	Peppers, Subgroup of (except Martynia, Okra and Roselle)	0.15	0.2	0.0525	
	HS 0444	Peppers, Chili, dried	1.5	2	0.525	
	FS 2001	Peaches (including Apricots and Nectarines) , Subgroup of	0.3	0.3	0.053	
	FP 0009	Pome fruits	W	0.3		
	FP 0009	Pome fruits, Group of (excluding Japanese persimmons)	0.2	-	0.057	
	FS 0014	Plums, Subgroup of	0.15	0.2	0.052	
	PO 0111	Poultry, edible offal	0.01(*)	0		
	PF 0111	Poultry, fats	0.01(*)	0		
	PM 0110	Poultry, meat	0.01(*)	0		
	DT 1114	Tea, green, black (black, fermented and dried)	50		12.5	
	VO 2045	Tomatoes, Subgroup of	0.08		0.033	
	VR 2071	Tuberous and corm vegetables, Subgroup of	0.01(*)		0	
	DF 0014	Prunes	0.6	0.8	0.19	
	VO 0448	Tomato	W	0.1		
		Citrus juice			0.01	
	JF 0226	Apple, juice			0.019	
		Grape, must			0.08	
	JF 0269	Grape, juice			0.04	
		Grape, wine			0.04	
		Potato crisps			0	
		Potato flakes/granules			0	
		Tea infusion			1.8	
		Tomato, canned			0.005	
	VW 0448	Tomato, paste			0.04	
	JF 0448	Tomato, juice			0.03	

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

Definition of the residue for estimation of dietary risk assessment for plant commodities: *Cyclaniliprole + 3-bromo-2-((2-bromo-4H- pyrazolo[1,5-d]pyrido[3,2-b]-[1,4]oxazin-4-ylidene)amino)-5-chloro-N-(1-cyclopropylethyl)benzamide (NK-1375), expressed as cyclaniliprole equivalents.* The molecular weight conversion factor to express NK-1375 in cyclaniliprole equivalents = 1.064.

Definition of the residue for estimation of dietary risk assessment for animal commodities: *Cyclaniliprole.*

The residue is fat-soluble.

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
Cypermethrin (118) ADI: 0–0.02 mg/kg bw ARfD: 0.04 mg/kg bw	VR 0604	Ginseng	0.03(*)		0.03	0.03
	DV 0604	Ginseng, dried including red ginseng	0.15		0.06	0.10
	DM 0604	Ginseng, extracts	0.06(*)		0.06	0.06
Definition of the residue for compliance with the MRL and for dietary risk assessment for plant and animal commodities: *Cypermethrin (sum of isomers).* The residue is fat-soluble.						
Dimethoate (027)**	VS 0620	Artichoke, globe	W	0.05		
ADI: 0–0.001 mg/kg bw	VS 0621	Asparagus	W	0.05(*)		
ARfD: 0.02 mg/kg bw	GC 0640	Barley	W	2		
	VB 0402	Brussels sprouts	W	0.2		
	VB 0403	Cabbage, Savoy	W	0.05(*)		
	MO 0812	Cattle, Edible offal of	W	0.05(*)		
	VB 0404	Cauliflower	W	0.2		
	VS 0624	Celery	W	0.5		
	FS 0013	Cherries	W	2		
	FC 0001	Citrus fruits	W	5		
	PE 0112	Eggs	W	0.05(*)		
	VL 0482	Lettuce, Head	W	0.3		
	MF 0100	Mammalian fats (except milk fats)	W	0.05(*)		
	FI 0345	Mango	W	1 (Po)		
	MM 0096	Meat of cattle, goats, horses, pigs and sheep	W	0.05(*)		
	ML 0107	Milk of cattle, goats and sheep	W	0.05(*)		
	FP 0230	Pear	W	1		
	VP 0063	Peas (pods and succulent=immature seeds)	W	1		
	HS 0444	Peppers Chili, dried	W	3		
	VO 0445	Peppers, sweet (including pimento or pimiento)	W	0.5		
	VR 0589	Potato	W	0.05		
	PF 0111	Poultry fats	W	0.05(*)		
	PM 0110	Poultry meat	W	0.05(*)		
	PO 0111	Poultry, edible offal of	W	0.05(*)		
	MO 0822	Sheep, edible offal of	W	0.05(*)		
	HS 0191	Spices, fruits and berries	W	0.5		
	HS 0193	Spices, roots and rhizomes	W	0.1(*)		
	HS 0190	Spices, seeds	W	5		
	VR 0596	Sugar beet	W	0.05		
	FT 0305	Table olives	W	0.5		
	VL 0506	Turnip greens	W	1		
	VR 0506	Turnip, Garden	W	0.1		
	GC 0654	Wheat	W	0.05		
	AS 0654	Wheat straw and fodder, dry	W	1		
The residue definition for compliance with the MRL in plant and animal commodities is: *Dimethoate and omethoate (measured and reported separately).* Definition of the residue for dietary risk assessment for plant and animal commodities: *The Meeting was unable to recommend a definition for dietary risk assessment.* The residue is not fat-soluble.						

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
Fluazifop-p-butyl (283)[d] ADI: 0–0.004 mg/kg bw ARfD: 0.4 mg/kg bw	FB 2005	Cane berries, Subgroup of	0.08	0.01(*)	0.021	0.074
	FB 0021	Currants, black, red, white	W	0.01(*)		
	FB 0268	Gooseberry	W	0.01(*)		
	FB 2006	Bush berries, Subgroup of	0.3	-	0.021	0.26
	FB 0267	Elderberries	0.3		0.021	0.26
	FB 2254	Guelder rose	0.3		0.021	0.26
	FB 0275	Strawberry	3	0.3	0.685	1.5

[d] Based on the decision of CCPR 2017 (REP17/PR) to withdraw the draft MRLs for sweet potato and yam, long-term dietary exposure is unlikely to present a public health concern.

Definition of the residue for compliance with the MRL for plant commodities: *Total fluazifop, defined as the sum of fluazifop-P-butyl, fluazifop-P-acid (II) and their conjugates, expressed as fluazifop-P-acid.*

Definition of the residue for dietary risk assessment for plant commodities: *The sum of fluazifop-P-butyl, fluazifop-P-acid (II), 2-[4-(3-hydroxy-5-trifluoromethyl-2-phenoxy)pyridyloxy] propionic acid (XL), 5-trifluoromethyl-2-pyridone (X) and their conjugates, expressed as fluazifop-P-acid.*

Definition of the residue for compliance with MRLs and for dietary risk assessment for animal commodities: *Total fluazifop, defined as the sum of fluazifop-P-butyl, fluazifop-P-acid (II) and their conjugates, expressed as fluazifop-P-acid.*

The residue is fat-soluble.

Fluensulfone (265) ADI: 0–0.01 mg/kg bw ARfD: 0.3 mg/kg bw	FC 0001	Citrus fruit, Group of	0.2		0.01	0.063
	FP 0009	Pome fruit, Group of (except Persimmon, Japanese)	0.2		0	0
	FS 0012	Stone fruit, Group of	0.09		0	0
	FB 2008	Small fruit vine climbing, Subgroup of	0.7		0	0
	GS 0659	Sugar cane	0.06		0.01	0.01
	TN 0085	Tree nuts, Group of	0.025(*)		0.01	0.01
	SB 0716	Coffee bean	0.05		0	
	GC 2086	Wheat, similar grains, and pseudocereals without husks, Subgroup of	0.08		0.01	
	GC 2087	Barley, similar grains, and pseudocereals with husks, Subgroup of	0.08		0.01	
	GC 2091	Maize cereals, Subgroup of	0.15		0.01	
	GC 2090	Sweet corns, Subgroup of	0.15		0.01	
	GC 2088	Rice cereals, Subgroup of	0.04		0.01	
	GC 2089	Sorghum grain and millet, Subgroup of	0.04		0.01	
	AS 0162	Hay or fodder (dry) of grasses except maize fodder and rice straw and fodder, dry	15 (dw)		0.01 (ar) [median]	0.02 (ar) [highest]
	AS 0645	Maize fodder	0.6 (dw)		0.01 (ar) [median]	0.01 (ar) [highest]
	AS 0649	Rice straw and fodder, dry	0.06 (dw)		0.01 (ar) [median]	0.01 (ar) [highest]
	AS 0081	Straw or fodder (dry) of cereal grains (except maize fodder and rice straw and fodder, dry)	6 (dw)		0.01(ar) [median]	0.01 (ar) [highest]
	AM 0660	Almond hulls	7 (dw)		0.01 (ar) [median]	

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
	AB 0001	Citrus pulp, dry	1.5		0.01 [median]	
	OR 0001	Citrus oil, edible	1.5		0.34	
	JF 0226	Apple juice	0.4		0	
	DF 0226	Apples, dried	1		0	0
	DF 0014	Prunes	0.3		0	0
	DF 5259	Dried grapes	2		0	0
	DM 0659	Sugar cane molasses	0.5		0	0
Definition of the residue for compliance with the MRL for plant commodities: *Sum of fluensulfone and 3,4,4-trifluorobut-3-ene-1-sulfonic acid (BSA), expressed as fluensulfone equivalents.* Definition of the residue for dietary risk assessment for plant commodities: *Fluensulfone.* Definition of the residue for compliance with the MRL and for dietary risk assessment for animal commodities: *Fluensulfone*. The residue is fat-soluble.						
Fluxapyroxad (256) ADI: 0–0.02 mg/kg bw ARfD: 0.3 mg/kg bw	FC 0001	Citrus fruit, Group of	W	1	--	--
	FC 0002	Lemons and Limes (including Citron), Subgroup of	1	--	0.38	0.46
	FC 0003	Mandarins, Subgroup of	1	--	0.38	0.46
	FC 0004	Oranges, Sweet, Sour (including Orange-like hybrids), Subgroup of	1.5	--	0.395	0.59
	FC 0005	Pummelo and Grapefruits (including Shaddock-like hybrids, among other Grapefruit), Subgroup of	0.6	--	0.15	0.27
	OR 0001	Citrus oil, edible	90	60	23	--
	AB 0001	Citrus pulp, dry	8	--	1.9	--
		Lemon/lime/mandarin juice (raw)	--	--	0.015	--
	JF 0004	Orange juice (raw)	--	--	0.016	--
	JF 0203	Grapefruit juice (raw)	--	--	0.006	--
		Grapefruit oil	--	--	8.9	--
		Lemon/lime peel (fresh)	--	--	0.72	0.87
		Orange peel (fresh)	--	--	0.72	1.1
		Citrus wet pomace	--	--	0.47	0.71
		Marmalade	--	--	0.026	--
Definition of the residue for compliance with the MRL for plant and animal commodities: *Fluxapyroxad*. Definition of the residue for dietary risk assessment for plant commodities: *Sum of fluxapyroxad and 3-difluoromethyl)- N-(3',4',5'-trifluoro[1,1'- biphenyl]-2-yl)-1H-pyrazole-4-carboxamide (M700F008) and 3-(difluoromethyl)- 1-(ß-D-glucopyranosyl)-N-(3',4',5'-triflurobipheny-2-yl)-1H-pyrzaole-4- carboxamide (M700F048) and expressed as parent equivalents.* Definition of the residue for dietary risk assessment for animal commodities: *Sum of fluxapyroxad and 3-(difluoromethyl)-N-(3',4',5'-trifluoro[1,1'- biphenyl]-2-yl)-1H-pyrazole-4-carboxamide (M700F008) expressed as parent equivalents.* The residue is fat-soluble.						
Isofetamid (290) ADI: 0-0.05 mg/kg bw ARfD: 3 mg/kg bw	FB 2006	Bush berries, Subgroup of	4	5	0.31	3
	VD 2065	Dry beans (except soya beans), Subgroup of	0.09	0.05	0.01	
	VD 2066	Dry peas, Subgroup of	0.09	0.05	0.01	
Definition of the residue for compliance with the MRL and for dietary risk assessment for plant commodities: *Isofetamid.* Definition of the residue for compliance with the MRL and for dietary risk assessment for animal commodities: *Sum of*						

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
isofetamid and 2-[3-methyl-4-[2- methyl-2-(3-methylthiophene-2-carboxamido) propanoyl]phenoxy]propanoic acid (PPA), expressed as isofetamid. The residue is fat-soluble.						
Kresoxim-methyl (199) ADI: 0–0.3 mg/kg bw ARfD: Unnecessary	FP 0009	Pome fruit	W	0.2		
	FP 0009	Pome fruit (except Persimmon, Japanese)	0.15		0.11	
		Apple sauce			0.032	
	JF 0226	Apple juice			0.022	
	DF 0226	Apples, dried			0.043	
Definition of the residue for compliance with the MRL for plant commodities: *Kresoxim-methyl*. Definition of the residue for dietary risk assessment for plant commodities: *Sum of kresoxim-methyl and metabolites (2E)-(methoxyimino){2-[(2-methylphenoxy)methyl]phenyl}acetic acid (490M1) and (2E)-{2-[(4-hydroxy-2-methylphenoxy)methyl]phenyl}(methoxyimino)acetic acid (490M9) including their conjugates expressed as kresoxim-methyl.* Definition of the residue for compliance with the MRL and dietary risk assessment for animal commodities: *Sum of metabolites (2E)-(methoxyimino){2- [(2-methylphenoxy)methyl]phenyl}acetic acid (490M1), and (2E)-{2-[(4-hydroxy-2-methylphenoxy)methyl]phenyl}(methoxyimino)acetic acid (490M9) expressed as kresoxim-methyl.* The residue is not fat-soluble.						
Mandestrobin (307)* ADI: 0–0.2 mg/kg bw ARfD: 3 mg/kg bw (for women of child-bearing age)	FB 0269	Grapes	5	-	1.4	3.7
	DF 0269	Grapes, dried (=Currents, Raisins and Sultanas)	10		2.8	7.4
	MF 0100	Mammalian fats (except milk fats)	0.01(*)	-	0	0
	ML 0106	Milks	0.01(*)	-	0	-
	MM 0095	Meat (from mammals other than marine mammals)	0.01(*)	-	0 (muscle) 0 (fat)	0 (muscle) 0 (fat)
	MO 0105	Edible offal (mammalian)	0.01(*)	-	0 (liver) 0 (kidney)	0 (liver) 0 (kidney)
	PE 0112	Eggs	0.01(*)	-	0	0
	PF 0111	Poultry fats	0.01(*)	-	0	0
	PM 0110	Poultry meat	0.01(*)	-	0 (muscle) 0 (fat)	0 (muscle) 0 (fat)
	PO 0111	Poultry, edible offal of	0.01(*)	-	0	0
	FB 0275	Strawberry	3.0	-	0.84	2.0
	SO 0495	Rape seed	0.2	-	0.02	-
	OR 0495	Rape seed oil	-	-	0.0012	
Definition of the residue for compliance with MRL in plant and animal commodities and for dietary risk assessment in plant commodities: *Mandestrobin.* Definition of the residue for acute dietary risk assessment in animal commodities: *The sum of parent, (2RS)-2-[2-(4-hydroxy-2,5-dimethylphenoxymethyl)phenyl)-2-methoxy-N-methylacetamide (4-OH-mandestrobin) + (2RS)-2-(2-hydroxymethylphenyl)-2-methoxy-N-methylacetamide (De-XY-mandestrobin) + 2RS)-2-[2-(2-hydroxymethyl-5-methylphenoxymethyl)phenyl]-2-methoxy-N-methylacetamide (2-CH_2-OH-mandestrobin) + 2-({2-[(1RS)-1-methoxy-2-(methylamino)-2-oxoethyl]benzyl}oxy)-4-methylbenzoic acid (2-COOH-mandestrobin), + 3-({2-[(1RS)-1-methoxy-2-(methylamino)-2-oxoethyl]benzyl}oxy)-4-methylbenzoic acid (5-COOH-mandestrobin) and their conjugates, expressed as parent compound.*						

Pesticide (Codex reference number)	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 long-term dietary risk assessment in animal commodities: *The sum of parent, (2RS)-2-[2-(4-hydroxy-2,5-dimethylphenoxymethyl)phenyl)-2-methoxy-N-methylacetamide (4-OH-mandestrobin), and its conjugates, expressed as parent compound.* The residue is fat-soluble.						
Metconazole (313)* ADI: 0–0.04 mg/kg bw ARfD: 0.04 mg/kg bw **Triazole alanine and Triazole acetic** ADI: 0–1 mg/kg bw ARfD: Unnecessary **1,2,4-triazole** ADI: 0–0.2 mg/kg bw ARfD: 0.3 mg/kg bw	FI 0327	Banana	0.1(*)		0.1	0.1
	FB 0020	Blueberries	0.5		0.14	0.31
	VP 0061	Beans with pods (Phaseolus spp.) immature pods and succulent seeds)	0.05(*)		0	0
	SO 0691	Cotton seed	0.3		0.0345	
	MO 0105	Edible offal (mammalian)	0.04(*)		0	0
	PE 0112	Eggs	0.04(*)		0	0
	VA 0381	Garlic	0.05(*)		0.05	0.05
	TN 0085	Tree nuts, Group of	0.04(*)		0	0
	GC 0645	Maize	0.02		0.01	
	MF 0100	Mammalian fats (except milk fats)	0.04(*)		0	0
	MM 0095	Meat (from mammals other than marine mammals)	0.04(*)		0	0
	ML 0106	Milks	0.04(*)		0	
	VA 0385	Onion, bulb	0.05(*)		0.05	0.05
	SO 0697	Peanut	0.04(*)		0.04	
	PO 0111	Poultry, Edible offal of	0.04(*)		0	0
	PF 0111	Poultry fats	0.04(*)		0	0
	PM 0110	Poultry meat	0.04(*)		0	0
	SO 0495	Rape seed	0.15		0.02	
	FS 0013	Cherries, Subgroup of	0.3		0.07	0.14
	VD 2065	Subgroup of dry beans except soya beans	0.04(*)		0.04	
	VD 2066	Dry peas, Subgroup of	0.15		0.041	
	FS 2001	Peaches, Subgroup of	0.2		0.045	0.085
	FS 0014	Plums, Subgroup of	0.1		0.040	0.045
	SO 2091	Sunflower seeds, Subgroup of	0.4		0.068	
	VR 2071	Tuberous and corm vegetables, Subgroup of	0.04(*)		0	0
	VR 0596	Sugar beet	0.07		0.02	
	VD 0541	Soya bean (dry)	0.04		0.01	
	GS 0659	Sugar cane	0.06		0.0205	0.036
	GC 0447	Sweet corn (Corn-on–the-cob)	0.01(*)		0.01	0.01
	DF 0014	Prunes, dried	0.5		0.092	0.104
	OR 0495	Rape seed oil, Edible	0.5		0.032	
	OR 0697	Peanut oil, Edible	0.06		0.056	
	OR 0691	Cotton seed oil, Edible	-		0.004	
	OR 0541	Soya bean oil, refined	-		0.005	
	AL 3354	Soya bean hay	8 (dw)		Median: 1.7 (ar)	Highest: 3.1 (ar)
	AS 0640	Barley straw and fodder, dry	25 (dw)		Median: 5.9 (ar) (hay), 2.3 (ar) (straw)	Highest: 13 (ar) (hay), 8.5 (ar) (straw)
	AS 0647	Oat straw and fodder, dry	25 (dw)		Median: 5.9 (ar) (hay), 2.3 (ar) (straw)	Highest: 13 (ar) (hay), 8.5 (ar) (straw)

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
	AS 0650	Rye straw and fodder, dry	25 (dw)		Median: 5.9 (ar) (hay), 2.3 (ar) (straw)	Highest: 13 (ar) (hay), 8.5 (ar) (straw)
	AS 0653	Triticale straw and fodder, dry	25 (dw)		Median: 5.9 (ar) (hay), 2.3 (ar) (straw)	Highest: 13 (ar) (hay), 8.5 (ar) (straw)
	AS 0654	Wheat straw and fodder, dry	25 (dw)		Median: 5.9 (ar) (hay), 2.3 (ar) (straw)	Highest: 13 (ar) (hay), 8.5 (ar) (straw)
	AB 1204	Cotton gin trash	10 (dw)		Median: 2.65 (ar)	Highest:4.1 (ar)
	AS 0645	Maize fodder (dry)	7 (dw)		Median: 1.85 (ar)	Highest:3.2 (ar)
		Sugar, sugar beet			0.012	
		Sugar cane, refined sugar			0.002	
Definition of the residue for compliance with MRL for plant and animal commodities: *Metconazole (sum of cis and trans isomer).* Definition of the residue for dietary risk assessment for plant commodities: *Metconazole (sum of cis and trans isomer).* Definition of the residue for compliance with MRL and dietary risk assessment for animal commodities: *Sum of metconazole (cis and trans-isomer) and metabolites (1SR,2SR,5RS)-5-(4-chlorobenzyl)-2-(hydroxymethyl)-2-methyl-1-(1H-1,2,4-triazol-1-ylmethyl)cyclopentanol (M1) and (1RS,2SR,3RS)-3-(4-chlorobenzyl)-2-hydroxy-1-methyl-2-(1H-1,2,4-triazol-1-ylmethyl)cyclopentanecarboxylic acid (M12), expressed as metconazole.* The residue is not fat-soluble.						
Omethoate (055)	HS 0191	Spices, fruits and berries	W	0.01		
	HS 0193	Spices, roots and rhizomes	W	0.05		
These MRLs applied to residues that may have resulted from the use of dimethoate.						
Penthiopyrad (253) ADI: 0–0.1 mg/kg bw ARfD: 1 mg/kg bw	FB 2005	Cane berries, Subgroup of	10		3.7	4.8
	FB 2006	Bush berries, Subgroup of	7		1.7	4.0
	FB 0267	Elderberries	7		1.7	4.0
	FB 2254	Guelder rose	7		1.7	4.0
Definition of the residue for compliance with MRL for plant commodities: *Penthiopyrad.* Definition of the residue for compliance with MRL for animal commodities and for dietary risk assessment for plant and animal commodities: *Sum of penthiopyrad and 1-methyl-3-trifluoromethyl-1H-pyrazole-4-carboxamide (PAM), expressed as penthiopyrad.* The residue is not fat-soluble.						
Picoxystrobin (258) ADI: 0-0.09 mg/kg bw ARfD: 0.09 mg/kg bw	GC 0651	Sorghum Grain	0.02		0.01	
	SO 0691	Cottonseed	2		0.205	
	SB 0716	Coffee bean	0.04		0.01	
	DT 1114	Tea, Green, Black (black, fermented and dried)	15		1.2	
	MO 0105	Edible offal (Mammalian)	0.02	0.02	Liver: 0.006 Kidney: 0	Liver: 0.01 Kidney: 0
	MF 0100	Mammalian fats (except milk fats)	0.02	0.02	0.008	0.015
	MM 0095	Meat (from mammals other than marine mammals)	0.02 (fat)	0.02 (fat)	Muscle: 0 Fat: 0.008	Muscle: 0 Fat: 0.015
	ML 0106	Milks	0.01(*)	0.01(*)	0	
	AL 1020	Alfalfa fodder	10 (dw)		Median:1.3 (dw)	Highest: 7.4 (dw)

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
	AS 0651	Sorghum straw and fodder, dry	1 (dw)		Median: 0.042 (dw)	Highest: 0.053 (dw)
Definition of the residue for compliance with the MRL and dietary risk assessment for plant commodities: *Picoxystrobin.* Definition of the residue for compliance with the MRL and dietary risk assessment for animal commodities: *Picoxystrobin.* The residue is fat-soluble.						
Propiconazole (160) ADI: 0–0.07 mg/kg bw ARfD: 0.3 mg/kg bw	FS 2001	Peaches, Subgroup of	4 (Po)	0.7 (Po)	1.7	2.5
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-dichloro-benzoic acid, expressed as propiconazole.* The residue is fat-soluble.						
Pydiflumetofen (309)	GC 2087	Barley, similar grains, and pseudocereals with husks, Subgroup of	3		0.23	
ADI: 0–0.1 mg/kg bw ARfD: 0.3 mg/kg bw	AS 0640	Barley straw and fodder, dry	50 (dw)		Median: 9.2 (dw)	Highest: 40 (dw)
	VB 0040	Brassica vegetables (except Brassica leafy vegetables), Group of	0.1		0.02	0.09
	SO 0691	Cottonseed	0.3		0.08	
	VD 2065	Dry beans, Subgroup of	0.4		0.028	
	VD 2066	Dry peas, Subgroup of	0.4		0.028	
	MO 0105	Edible offal (Mammalian)	0.1		Liver: 0.044 Kidney: 0.051	Liver: 0.43 Kidney: 0.29
	PE 0112	Eggs	0.02		0.02	0.03
	VC 0045	Fruiting vegetables, Cucurbits, Group of	0.4		0.12	0.27
	VO 0050	Fruiting vegetables, other than Cucurbits, Group of (except Martynia, Okra and Roselle)	0.5		0.11	0.42
	VL 2050	Leafy greens, Subgroup of [e]	40 [e]		12.5	17
	VL 0054	Leaves of Brassicaceae, Subgroup of	0.1		0.02	0.09
	VL 2052	Leaves of root and tuber vegetables, Subgroup of (except leaves of tuber vegetables)	0.07		0.02	0.02
	AL 0157	Legume animal feeds	30 (dw)		Median: 9.2 (dw)	Highest: 15 (dw)
	VP 0060	Legume vegetables, Group of	0.02		0.02	0.02
	GC 2091	Maize cereals, Subgroup of	0.04		0.03	
	CF 1255	Maize flour	0.07		0.048	
	AS 0645	Maize fodder	18 (dw)		3.1 (ar)	13 (ar)
	OR 0645	Maize oil, edible	0.08		0.057	
	VO 2709	Martynia	0.02		0.02	0.02
	MF 0100	Mammalian fats (except milk fats)	0.1		0.015	0.069
	MM 0095	Meat (from mammals other than marine mammals)	0.1 (fat)		Muscle: 0.02 Fat: 0.015	Muscle: 0.02 Fat: 0.069

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
	ML 0106	Milks	0.01(*)		0.02	
	AS 0646	Millet fodder, dry	0.3 (dw)		Median: 0.08 (ar)	Highest:0.28 (ar)
	AS 0647	Oat straw and fodder, dry	50 (dw)		Median: 9.2 (dw)	Highest: 40 (dw)
	VO 0442	Okra	0.02		0.02	0.02
	SO 0697	Peanut	0.05		0.03	
	OR 0697	Peanut oil, edible	0.15		0.072	
	HS 0444	Peppers, Chili, dried	5		1.1	4.2
	DV 0589	Potato, dried	0.5		0.13	0.36
	PO 0111	Poultry, Edible offal of	0.01(*)		0.02	0.02
	PF 0111	Poultry fats	0.01(*)		0.02	0.02
	PM 0110	Poultry meat	0.01(*)		0.02	0.02
	GC 2088	Rice cereals, Subgroup of	0.03		0.03	
	AS 0649	Rice straw and fodder, dry	0.3 (dw)		Median: 0.08 (ar)	Highest:0.28 (ar)
	VR 2070	Root vegetables, Subgroup of	0.1		0.02	0.07
	VO 0446	Roselle	0.02		0.02	0.02
	AS 0650	Rye straw and fodder, dry	50 (dw)		Median: 9.2 (dw)	Highest: 40 (dw)
	SO 2090	Small seed oilseeds, Subgroup of	0.9		0.0945	
	GC 2089	Sorghum Grain and Millet, Subgroup of	0.03		0.03	
	AS 0651	Sorghum straw and fodder, dry	0.3 (dw)		Median: 0.08 (ar)	Highest:0.28 (ar)
	VS 2080	Stems and petioles, Subgroup of	15		4.4	9.3
	SO 2091	Sunflower seeds, Subgroup of	0.3		0.08	
	GC 2090	Sweet Corns, Subgroup of	0.03		0.03	0.03
	DV 0448	Tomato, dried	7		1.2	4.4
	AS 0653	Triticale straw and fodder, dry	50 (dw)		Median: 9.2 (dw)	Highest: 40 (dw)
	VR 2071	Tuberous and corm vegetables, Subgroup of	0.1		0.03	0.084
	CM 0654	Wheat bran, processed	1		0.14	
	CF 1211	Wheat germ	0.6		0.091	
	GC 2086	Wheat, similar grains, and pseudocereals without husks, Subgroup of	0.4		0.063	
	AS 0654	Wheat straw and fodder, dry	50 (dw)		Median: 9.2 (dw)	Highest: 40 (dw)
		Barley bran			0.083	
		Barley flour			0.053	
		Maize bran			0.14	
		Maize germs			0.063	
		Maize grits			0.013	
	CF 0645	Maize meal			0.028	
		Maize starch			0.013	
		Miso			0.004	
		Oats bran			0.003	
		Oats flour			0.011	
		Pearled barley			0.01	
		Potato chips			0.014	
		Potato crisps			0.014	
		Potato flakes			0.014	
		Potato starch			0.014	
		Potato, baked (unpeeled)			0.014	0.038

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
		Potato, boiled (peeled)			0.014	0.038
		Rape seed refined oil			0.035	
		Rolled oats			0.003	
		Soya bean flour			0.002	
		Soya bean milk			0.002	
	OR 0541	Soya bean oil, refined			0.005	
		Soya sauce			0.002	
		Tofu			0.004	
	JF 0048	Tomato juice (pasteurised)			0.005	
	VW 0448	Tomato paste			0.075	
		Tomato puree			0.037	
		Tomato wet pomace			0.43	
		Tomato, canned			0.005	0.019
	CF 1211	Wheat flour			0.02	
		Wheat gluten			0.11	
		Wheat starch			0.002	
		Wheat, wholemeal bread			0.027	
[e] On the basis of the information provided to the JMPR it was concluded that the estimated acute dietary exposure to residues of pydiflumetofen for the consumption of Leafy greens may present a public health concern. Definition of the residue for compliance with the MRL and for dietary risk assessment for plant commodities: *Pydiflumetofen.* Definition of the residue for compliance with the MRL for animal commodities: *Pydiflumetofen.* Definition of the residue for dietary risk assessment for animal commodities, except mammalian liver and kidney: *Sum of pydiflumetofen and 2,4,6-trichlorophenol (2,4,6-TCP) 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 3-(difluoromethyl)-N-methoxy-1-methyl-N-[1-methyl-2-(2,4,6-trichloro-3-hydroxy- phenyl) ethyl]pyrazole-4-carboxamide (SYN547897) and its conjugates, expressed as pydiflumetofen.* The residue is fat-soluble.						
Pyflubumide (314)*	FP 0226	Apple [f]	1 [f]		0.41	0.55
ADI: 0–0.007 mg/kg bw ARfD: 0.008 mg/kg bw	DT 1114	Tea, Green, Black (black, fermented and dried) [f]	80 [f]		13	
	JF 0226	Apple juice			0.001	
		Apple sauce			0.008	
	DF 0226	Apples, dried			0.02	0.028
		Tea infusion			0.004	
[f] On the basis of the information provided to the JMPR it was concluded that the estimated acute dietary exposure to residues of pyflubumide for the consumption of apple and tea may present a public health concern. Definition of the residue for compliance with MRL for plant commodities: *Pyflubumide.* Definition of the residue for estimation of dietary risk assessment for plant commodities: *Sum of pyflubumide and 3′-isobutyl-1,3,5-trimethyl-4′-[2,2,2-trifluoro-1-methoxy-1-(trifluoromethyl)ethyl]pyrazole-4-carboxanilide, expressed as pyflubumide*.						
Pyraclostrobin (210)	VR 2070	Root vegetables, Subgroup of	W	0.5		
ADI: 0–0.03 mg/kg bw ARfD: 0.7 mg/kg bw	VR 2070	Root vegetables, Subgroup of (includes all commodities in the subgroup except sugar beet)	0.5	-	0.12	0.3
	VL 0502	Spinach	0.6	1.5	0.071	0.31

Pesticide (Codex reference number)	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 compliance with MRL and for dietary risk assessment for plant and animal commodities: *Pyraclostrobin.* The residue is fat-soluble.						
Pyridate (315)*						
ADI: 0–0.2 mg/kg bw ARfD: 2 mg/kg bw						
Pyrifluquinazon (316)*						
ADI: 0–0.005 mg/kg bw ARfD: 1 mg/kg bw						
Definition of the residue for compliance with the MRL and dietary risk assessment for plant commodities: *Sum of pyrifluquinazon and 1,2,3,4-tetrahydro-3-[(3-pyridylmethyl)amino]-6-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]quinazolin-2-one (IV-01) expressed as pyrifluquinazon.* Definition of the residue for compliance with the MRL for animal commodities: Tissues: *Sum of 1,2,3,4-tetrahydro-3-[(3-pyridylmethyl)amino]-6-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]quinazolin-2-one (IV-01) and 1,2,3,4-tetrahydro-6-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]quinazolin-2,4-dione (IV-203) and their conjugates (expressed as pyrifluquinazon).* Milk: *1,2,3,4-tetrahydro-3-[3-(1-oxy-pyridylmethylene)amino]-6-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]quinazolin-2-one (IV-04).* Definition of the residue for dietary risk assessment for animal commodities: *a conclusion could not be reached.* The residue is not fat-soluble.						
Pyriofenone (310) ADI: 0–0.09 mg/kg bw ARfD: Unnecessary	MF 0100	Mammalian fats (except milk fats)	0.01(*)	-	0	
	ML 0106	Milks	0.01(*)	-	0	
	MM 0095	Meat (from mammals other than marine mammals)	0.01(*)	-	0 (muscle) 0 (fat)	
	MO 0105	Edible offal (mammalian)	0.01(*)	-	0	
	PE 0112	Eggs	0.01(*)	-	0	
	PF 0111	Poultry fats	0.01(*)	-	0	
	PM 0110	Poultry meat	0.01(*)	-	0 (muscle) 0 (fat)	
	PO 0111	Poultry, edible offal of	0.01(*)	-	0	
Definition of the residue for compliance with the MRL and dietary risk assessment for plant and animal commodities: *Pyriofenone.*						
Pyriproxyfen (200)	FI 0345	Mango	0.02(*)		0.02	
ADI: 0–0.1 mg/kg bw ARfD: Unnecessary						
Definition of the residue for compliance with the MRL and dietary risk assessment in plant and animal commodities: *Pyriproxyfen.* The residue is fat-soluble.						
Tolclofos-methyl (191)**	VL 0482	Lettuce, head	W	2		
ADI: 0–0.07 mg/kg bw ARfD: Unnecessary	VL 0483	Lettuce, leaf	W	2		
	VL 2050	Leafy greens except spinach, purslane and chard	0.7		0.36	
	VR 0589	Potato	0.3	0.2	0.060	

Pesticide (Codex reference number)	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)	0.01(*)		0.0055 (kidney) 0.0033 (liver)	
	PE 0112	Eggs	0.01(*)		0	
	MF 0100	Mammalian fats (except milk fats)	0.01(*)		0	
	MM 0095	Meat (from mammals other than marine mammals)	0.01(*)		0	
	ML 0106	Milks	0.01(*)		0	
	PF 0111	Poultry fats	0.01(*)		0	
	PM 0110	Poultry meat	0.01(*)		0	
	PO 0111	Poultry, Edible offal of	0.01(*)		0	
	VR 0494	Radish	W	0.1		
Definition of the residue for compliance with the MRL for plant and animal commodities: *Tolclofos-methyl*.						
Definition of the residue for dietary risk assessment for plant commodities: *Sum of tolclofos-methyl, 2,6-dichloro-4-methylphenol (ph-CH_3, incl. conjugates), O,O-dimethyl O-2,6-dichloro-4-(hydroxymethyl) phenylphosphorothioate (TM-CH_2OH, incl. conjugates), O-methyl O-hydrogen O-2,6-dichloro-4-(hydroxymethyl) phenylphosphorothioate (DM-TM-CH_2OH) and O-methyl O-hydrogen O-(2,6-dichloro-4-methylphenyl) phosphorothioate (DM-TM), expressed as tolclofos-methyl.*						
Definition of the residue for dietary risk assessment for animal commodities*: Sum of tolclofos-methyl and 3,5-dichloro-4-hydroxybenzoic acid (ph-COOH), expressed as tolclofos-methyl.*						
The residue is fat-soluble.						
Tolfenpyrad (269) ADI: 0–0.006 mg/kg bw ARfD: 0.01 mg/kg bw	FC 0002	Lemons and Limes, Subgroup of	0.9		0.085	0.18
	FC 0003	Mandarins, Subgroup of	0.9		0.085	0.18
	FC 0004	Oranges, Sweet, Sour, Subgroup of	0.6		0.061	0.13
	FC 0005	Pummelo and Grapefruits, Subgroup of	0.6		0.042	0.099
	VA 2031	Bulb Onions, Subgroup of	0.09		0.0125	0.057
	VO 2045	Tomatoes, Subgroup of [g]	0.7 [g]		0.13	0.5
	VO 0051	Peppers, Subgroup of (except okra, martynia, and roselle)	0.5		0.11	0.32
	VO 2046	Eggplants,Subgroup of [g]	0.7 [g]		0.13	0.5
	AB 0001	Citrus pulp, dry	6		Median: 1.7	--
	OR 0001	Citrus oil, edible	80		22	--
	HS 0444	Peppers chili, dried	5		1.1	3.2
	ML 0106	Milks	0.01(*)		0.0038	
	MF 0100	Mammalian fats except milk fats	0.01(*)		0.0022	0.0022
	MM 0095	Meat (from mammals other than marine mammals)	0.01(*)		0.0043	0.0043
	MO 0105	Edible offal (mammalian)	0.4		0.29	0.38
	PE 0112	Eggs	0.01(*)		0	0
	PO 0111	Poultry, edible offal of	0.01(*)		0	0
	PF 0111	Poultry fats	0.01(*)		0	0
	PM 0110	Poultry meat	0.01(*)		0	0
		Lemon + Mandarin Juice			0.058	--
		Lemon + Mandarin peel			1.3	2.7
		Lemon + Mandarin Marmalade/Jam			0.032	0.068
		Orange Peel (fresh)			0.91	2.0
	JF 0004	Orange Juice			0.042	--
		Orange Marmalade/Jam			0.023	0.050
		Grapefruit Peel (fresh)			0.62	1.5
	JF 0203	Grapefruit Juice			0.029	--

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
		Tomato Puree			0.044	--
		Tomato Paste			0.14	--
[g] On the basis of the information provided to the JMPR it was concluded that the estimated acute dietary exposure to residues of tolfenpyrad for the consumption of these commodities may present a public health concern. Definition of the residue for compliance with the MRL and for dietary risk assessment for plant commodities: *Tolfenpyrad.* Definition of the residue for compliance with the MRL and for dietary risk assessment for animal commodities: *Sum of tolfenpyrad, and free and conjugated PT-CA (4-[4-[(4-chloro-3-ethyl-1-methylpyrazol-5-yl)carbonylaminomethyl]phenoxy]benzoic acid_and OH-PT-CA (4-[4-[[4-chloro-3(1-hydroxyethyl) -1-methylpyrazol-5-yl]carbonylaminomethyl]phenoxy] benzoic acid) (released with alkaline hydrolysis) expressed as tolfenpyrad.* The residue is not fat-soluble.						
Triflumuron (317)*						
ADI: 0–0.008 mg/kg bw						
ARfD: Unnecessary						
4-trifluoromethoxyaniline (metabolite M07)						
ADI: 0-0.02 mg/kg bw						
ARfD: 0.02 mg/kg bw						
Definition of the residue for compliance with the MRL for animal and plant commodities: *Triflumuron.* Definition of the residue for dietary risk assessment for animal and plant commodities: *A conclusion could not be reached.* The residue is fat-soluble.						
Valifenalate (318)*	VO 0440	Eggplants	0.4		0.049	
ADI: 0–0.2 mg/kg bw	FB 0269	Grapes	0.3		0.079	
ARfD: Unnecessary	VA 0385	Onion, bulb	0.5		0.0375	
	VA 0388	Shallot	0.5		0.0375	
	VO 0448	Tomato	0.4		0.049	
	MO 0105	Edible offal (mammalian)	0.01(*)		0	
	PE 0112	Eggs	0.01(*)		0	
	ML 0106	Milks	0.01(*)		0	
	MM 095	Meat (from mammals other than marine mammals)	0.01(*)		0	
	MF 0100	Mammalian fats (except milk fats)	0.01(*)		0	
	PO 0111	Poultry edible offal	0.01(*)		0	
	PF 0111	Poultry fat	0.01(*)		0	
	PM 0110	Poultry meat	0.01(*)		0	
	-	Grape, must	-	-	0.079	-
	JF 0269	Grape, juice	-	-	0.043	-
	-	Grape, wine	-	-	0.051	-
	-	Tomato, canned	-	-	0.005	
	VW 0448	Tomato, paste	-	-	0.040	-
	JF 0448	Tomato, juice	-	-	0.016	-
Definition of the residue for compliance with the MRL for plant and animal commodities: *Valifenalate* Definition of the residue for dietary risk assessment for plant and animal commodities: *Valifenalate and 3-(4-chlorophenyl)-3-[[N-(isopropoxycarbonyl)-L-valyl]amino]propionic acid (valifenalate-acid), expressed as valifenalate.* The residue is not fat-soluble.						
Recommended MRLs, STMRs and HR values for Spices						
Active substance	CCN	Commodity name	Recommended maximum		STMR or	

Pesticide (Codex reference number)	CCN	Commodity	Recommended maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
			New	Previous		
			residue level, mg/kg		STMR- P, mg/kg	
			New	Previous		
Acetamiprid	HS 0775	Cardamom, pods and seeds	W	0.1		
	HS 0190	Spices, seeds, Subgroup of	2	-	Median: 0.57[h]	
Carbendazim	HS 0190	Spices, seeds, Subgroup of	5		Median: 0.525[h]	
[h] based on monitoring data						

2. General Consideration items

2.1 Update to Chapter 5 of the Environmental Health Criteria (EHC) 240: Dose–response assessment and derivation of health-based guidance values

Although the benchmark dose (BMD) was introduced some years ago as an alternative to the NOAEL as the point of departure (POD) in toxicity studies, only relatively recently has it seen broad adoption by a number of authorities. However, the number of options that can be used in determining a BMD has resulted in a lack of harmonization of the resulting PODs. For this reason, together with advances in hazard assessment practice led to the Eighty-third Joint FAO/WHO Expert Committee on Food Additives (JECFA 2017) recommending that Chapter 5 of EHC 240 should be updated. The Meeting was informed on the progress made on this update. WHO convened a working group, consisting of international experts on benchmark dose modelling and toxicologists to prepare a draft update of the guidance in Chapter 5. The draft was discussed by experts from various countries and organizations, including members of JECFA and JMPR, at a workshop held 25–29 March 2019 in Geneva. Participants approved the general outline of the Chapter, with subsections for dose-response assessment, determining the point of departure and establishing health based guidance values. The draft document was discussed and necessary changes and additions were agreed upon.

Main changes in the update of the guidance:

- In the section on dose-response modelling detailed information is provided on the principles of dose-response modelling with descriptions of mathematical functions for modelling various types of data (continuous, quantal, counts, etc.), model uncertainty, model parameter constraints, model averaging, benchmark dose (BMD) software (BMDS, PROAST) and modelling of epidemiological data.

  An Annex provides specialist information about BMD analysis, and gives worked out examples of the use of the BMD software programs BMDS and PROAST.

- The section on determining the point of departure (NOAEL and BMDL) provides guidance on the determination of the benchmark response (BMR) for BMD modelling using a tiered approach, and on the reporting of BMD results (e.g. size of BMR, software used, models used for averaging, BMDL and BMDU, etc).

- The section on establishing health-based guidance values has been updated, among others, with information on International Programme on Chemical Safety (IPCS) guidance on the Mode of Action Human Relevance Framework, guidance on the use of epidemiological data, and on the consideration of the need for establishing a microbiological ADI or ARfD.

A decision tree provides guidance for a structured approach to the process of selecting critical endpoints, dose-response modelling, identification of the POD and establishing a health based guidance value (HBGV).

The guidance is being revised in line with the feedback from experts, and should be ready for public consultation in late 2019 or early 2020. Once finalized, it will replace Chapter 5 in EHC 240.

2.2 Combined exposure to multiple chemicals

Regulatory authorities are increasingly including consideration of exposure to multiple chemicals in their risk assessments of substances in food. In Europe, this resulted in the Euromix project, funded by Horizon 2020, which ran from 2015–2019, developing approaches and methods for the assessment of risks posed by combined exposures to multiple chemicals. A key objective of Euromix was to identify and promote opportunities to harmonize different approaches taken to such assessments, to which end Euromix arranged four international workshops on harmonization. A EuroMix web-based toolbox and handbook were developed to provide databases and methods for the tiered assessment of combined exposure to chemicals whatever the level of data available on each substance. Both exposure and hazard can be addressed using the tool. Details can be found at www.euromixproject.eu.

Complementary to Euromix, a joint FAO/WHO expert consultation was convened in Geneva, 16–18 April 2019. This involved 15 experts from European Union (EU) and non-EU countries, to develop guidance for the risk assessment of combined exposure to multiple chemicals. The ultimate objective is to publish guidance for consideration by FAO/WHO expert committees, such as JECFA and JMPR, and other experts who may find it valuable. A report on the consultation can be found at www.who.int/foodsafety/areas_work/chemical-risks/Euromix_Report.pdf.

Participants agreed to restrict their recommendations to substances that are not DNA-reactive mutagens, which they suggested should instead be addressed by the WHO working group on Guidance for the Evaluation of Genotoxicity of Chemical Substances in Food. Participants then developed a suggested approach for the assessment of risk resulting from combined exposure to multiple chemicals in food. It was intended that this might be piloted by JMPR and JECFA at future meetings. The approach proposed for assessment of food chemicals is as follows:

- If the estimated dietary exposure for an individual substance exceeds the relevant HBGV or the margin of exposure (MoE) is considered low and of concern, the substance should be referred to risk managers (Codex Committee on Food Additives (CCFA), Codex Committee on Contaminants in Foods (CCCF), Codex Committee on Pesticide Residues (CCPR), Codex Committee on Residues of Veterinary Drugs in Foods (CCRVDF) for appropriate consideration, as is current practice.
- If the substance belongs to an established chemical group previously considered in a risk assessment of combined exposure to multiple chemicals, it should be assessed as part of that group. Such chemical groups might be based on structure (for example, organophosphates), toxicological effects or mode of action (MOA).
- If the substance is not part of an established assessment group, to the best knowledge of the experts, the need to include it in a risk assessment of combined exposure to multiple chemicals should be determined.
- As a pragmatic cut-off, if estimated dietary exposure for the chemical is ≤ 10% of the relevant HBGV for all populations, there is no need to consider the compound further for an assessment of combined exposure.
- If estimated dietary exposure for the chemical is > 10% of the relevant HBGV for at least one population, the need to include the compound in a risk assessment of combined exposure to multiple chemicals should be considered.
- For chemicals in a risk assessment group, standard procedures for hazard identification and characterization should be followed, including deriving relative potency factors where appropriate.
- For dietary exposure assessment, probabilistic approaches are recommended, ideally using individual food consumption and concentration data for each country. Different approaches will be necessary for acute and chronic exposure.
- Mean chronic dietary exposure for the general population (consumers and non-consumers) should be calculated assuming mean/median concentration and mean food consumption levels

for individual countries, or mean amounts of food available for consumption using the WHO cluster diets.

- For those chemicals for which combined exposure may be of concern, dose additivity should be assumed, unless there is evidence to the contrary. Combined risk should be assessed using standard approaches, such as the (adjusted) hazard index or relative potency factors.
- The key risk drivers should be identified, including the chemicals contributing most to the overall risk, those contributing most to total estimated dietary exposure and/or foods contributing to exposure from each chemical.
- For pesticide residues, JMPR experts should determine using weight of evidence, whether there is toxicological evidence for combined effects of the substance with other pesticides. This should be based on structural similarities, toxicological profiles for MOAs/adverse outcome pathways (AOPs), and shared adverse effects, referring to previous assessments at a national or regional level as necessary. The possibility of synergistic interactions between chemicals should be considered on a case-by-case basis.
- If it is concluded that the substance does belong to a chemical group, the potential for co-exposure (from co-occurrence or internal exposure) should be assessed. Information that could be useful for this purpose for pesticide residues includes good agricultural practice, use profiles, existing data on mean dietary exposure, toxicokinetics (internal exposure), and biomonitoring data.
- When considering which chemicals might be grouped, consideration will also need to be given to dual/multiple use compounds (e.g. used as a veterinary drug and as a pesticide) and discontinued persistent pesticides that occur as contaminants (POPs).

Participants recommended that the approach should be evaluated at forthcoming meetings of JECFA and JMPR and that after its application for 2–3 years, it should be evaluated and revised as necessary, including the pragmatic cut-off point. Once agreed, and if appropriate, the approach to risk assessment for combined exposure to chemical mixtures should be included in the updated FAO/WHO EHC 240, in Chapter 6 Dietary exposure assessments and Chapter 7 Risk characterization.

The Meeting agreed to pilot the approach based on chronic dietary exposure for compounds being evaluated for the first time at the present meeting. The only relevant compound for which the estimated dietary exposure exceeded 10% of the upper bound of the ADI was pyflubumide, which does not belong to an established assessment group for combined exposure to multiple pesticides.

2.3 Guidance for the evaluation of genotoxicity of chemical substances in food

Following recent meetings of JECFA and JMPR (JMPR May 2016, 2018, JECFA 2017, 2019), it had been agreed that the guidance on the evaluation of genotoxicity of chemicals in food provided in subchapter 4.5 of the EHC 240 needed to be updated and expanded. WHO therefore convened an electronic working group to prepare a draft update of the guidance in subchapter 4.5. This was discussed at a workshop held 8–10 October, 2018 in Ann Arbor, Michigan, USA. Experts from a number of countries and organisations participated, including several members of JMPR.

Participants agreed on the general outline of the guidance, including a decision tree, and identified sections that required further discussion. The guidance was revised in line with the feedback from experts, and should be ready for public consultation late this year or early next year. Once finalized, it will replace subchapter 4.5 in EHC 240.

Main sections of the guidance comprise:

- an introduction, comprising risk analysis context and problem formulation, including a decision tree illustrating issues to be considered in assessing the genotoxic potential of different types of substances that can be found in food;

- a description of the available tests for different types of genetic toxicity;
- guidance on the interpretation of test results, including identification of relevant studies, weighting and integration of results, adequacy of the genotoxicity database, integration of carcinogenicity and genotoxicity;
- special considerations, including in silico approaches, the threshold of toxicological concern, and grouping and read-across approaches;
- considerations for specific situations, including mixtures, flavouring agents, minor constituents, and secondary metabolites in enzyme preparations;
- recent developments and future directions, including novel in vitro and in vivo tests, adverse outcome pathways, and quantitative assessment.

2.4 Results for probabilistic modelling of acute dietary exposure to evaluate the IESTI equations

As part of the process to review the International Estimate of Short-term Intake (IESTI) equations, the acute dietary exposure assessment for 47 pesticide residues in food for different populations/countries was performed by WHO, based on a probabilistic approach combining data from national food consumption surveys and reported concentrations of pesticide residues from official monitoring programmes.

A presentation of the assessment, including results for Australia, Brazil, Canada, four European countries (Czech Republic, France, Italy and the Netherlands) and the United States of America (USA) was made to the Meeting. An assessment of acute dietary exposure estimates exceeding the ARfD, expressed as a proportion of the ARfD, based on two different modeling exercises was reported.

In the first exercise, the acute dietary exposure estimates from the probabilistic models were compared to the IESTI results, using the same residue definition for each approach. In the probabilistic models, two scenarios were tested: 10% use of the pesticide, i.e., only 10% of non-quantifiable samples were assumed to contain the pesticide (90% concentrations assigned a zero value; 10%, the LOQ) and 100% use (all commodities are treated and 100% of the non-quantifiables were assigned the LOQ). Conversion factors were applied to national food consumption data to convert foods reported as consumed to raw commodities, where appropriate. Results were reported for adults (≥ 16 years) and children (≤ 6 years).

From the probabilistic models there was a zero risk of exceeding the relevant ARfD in all countries for all populations tested. For adults, the 97.5th percentile of acute dietary exposure was < 10% ARfD, for children < 50% ARfD. From comparison with the IESTI results, the IESTI equation was considered protective for acute risk.

In the second exercise, the level of protection (LoP) of Codex MRLs was assessed by using the relevant MRL as the concentration value for each commodity in a survey individual's diet, rather than the distribution of actual results as above. The LoP is expressed as the proportion of individuals in a national survey with an acute dietary exposure estimate that exceeds the ARfD. For this exercise, the acute dietary exposure estimate describes a worst-case scenario where all commodities are assumed to contain the pesticide residue at the MRL and food consumption is the reported amounts consumed of each food with an MRL. If no acute dietary exposure estimates exceeded the ARfD, the LoP would be 100%. For any given dietary survey from which commodity consumption values are taken, LoPs can be calculated for the overall population or any specific subgroup.

The highly conservative acute dietary exposure estimates for each pesticide residue obtained for individuals in the national dietary surveys included were compared with the relevant ARfD to assess the LoP. From this scenario, the LoP for 14 pesticides was 100%; none of the calculated acute exposures exceeded the ARfD for these pesticides. For another 22 pesticides >99% were below the ARfD and seven were between 90% and 99%. For the remaining four pesticides, the LoP was less than 90% in at least one population tested. The IESTI equation is not designed to assess the LoP.

Based on the information presented, the JMPR concluded that given the extremely conservative estimates produced when assuming all commodities have residues present at the MRL, a LoP of less than 100% does not necessarily indicate that approved uses will lead to an exceedance of the ARfD in practice. The JMPR suggests that a more realistic assessment of the LoP could be made by assuming residues at the MRL for a single commodity and residues from monitoring data for other commodities in the assessment.

The Meeting agreed that a probabilistic approach to acute dietary exposure assessments should be considered in the future when adequate data and appropriate tools are available.

2.5 Need for a guidance on toxicological interpretation due to the shift from maximum tolerated dose (MTD)-based to kinetically-derived maximum dose (KMD)-based evaluation of pesticide residues

In guideline studies of the toxicity of pesticides, the chemicals are evaluated using a dose-selection protocol that includes a maximum tolerated dose (MTD), designed to maximize the detection of any toxicity in experimental animals by the treatment. The introduction of concurrent in-life toxicokinetics into repeat-dose studies has revealed that in a number of such studies absorption is highly non-linear, and that in some cases there is no additional systemic exposure above a certain dose. Not only does this complicate interpretation of dose-response relationships, but it also results in the unnecessary use of animals, as no useful information is obtained from those dose groups above the point of saturation.

But non-linear toxicokinetics may be manifest not only in saturation of absorption but also in saturation of distribution, metabolism and/or elimination of the parent and/or its metabolites. This confounds toxicological interpretation of the studies.

Most pesticides are toxic at high doses when people are directly exposed to pesticides (Factsheet, WHO 2018[1]), however people are not exposed to pesticides at saturated blood levels through residues in the diet. Thus, consideration of internal exposure to pesticides and/or their metabolites is key to effective dietary risk assessment of pesticide residues with extrapolation to humans.

A top dose for use in animal toxicity testing based on evidence of dose non-proportionality has been termed the kinetically-derived maximum dose (KMD). If sufficient data are available for KMD-based evaluation, it is considered appropriate that the toxicological evaluation of pesticide residues shifts from MTD-based to KMD-based, both from the perspective of dietary risk assessment of pesticide residues with extrapolation to humans and from the viewpoint of scientific progress. In particular, the KMD-based toxicological interpretations are likely to contribute to evaluation on the carcinogenicity observed at high doses and on the results of teratogenicity studies conducted by oral gavage.

However, in order to increase the consistency and transparency of such toxicity assessments, guidance on KMD-based toxicity interpretation is needed.

It is recommended that the Joint Secretariat convene a group of experts to prepare guidance on the KMD-based evaluation of pesticide residues.

2.6 Comments on chlorpyrifos

The Meeting is aware of new information from the European Food Safety Authority (EFSA) statement on the available outcomes of the human health assessment in the context of the peer review of chlorpyrifos.

The EFSA stated that an in vivo Comet assay, proposed in order to clarify the positive findings observed in an in vitro chromosome aberration test and in two studies on unscheduled DNA synthesis, was not provided.

[1] WHO Fact Sheet 2018. Pesticide Residues in Food. https://www.who.int/news-room/fact-sheets/detail/pesticide-residues-in-food

According to EFSA's opinion, chlorpyrifos can produce DNA damage through topoisomerase II inhibition, which might be involved as a molecular initiating event for infant leukaemia that has also been associated with pesticide exposure in some epidemiological studies.

EFSA also stated that a Comet assay study might not be sufficient to rule out this concern, supporting the need for additional data to address the concerns regarding chromosome aberration and DNA damage caused by oxidative stress or through topoisomerase II inhibition.

An additional concern highlighted by EFSA was neurodevelopmental toxicity, based on the effects (decrease in cerebellum height corrected by brain weight) observed in rats and also supported by the available epidemiological evidence related to developmental neurological outcomes in children.

Given the 20-year gap since chlorpyrifos was last reviewed by the JMPR and the magnitude of potential concerns identified by the EU, the Meeting strongly recommends chlorpyrifos be prioritized for periodic re-evaluation. It was noted that aspects of epidemiology should be included.

2.7 Possible need for amendments to the Environmental Health Criteria (EHC) 240 guidance on appropriate use of toxicological historical control data (HCD)

The Meeting noted a certain degree of recurring inconsistencies in the use of HCD. Although there is guidance in EHC 240 on the role of historical control data in the overall evaluation of toxicological data some points might need amendment. The Joint Secretariat was asked to set up an electronic working group that will identify and, if necessary, propose amendments to relevant paragraphs in EHC 240.

2.8 Use of monitoring data for the estimation of maximum residue levels

The JMPR estimates maximum residue levels primarily based on supervised residue trial data conducted according to good agricultural practice GAP. They are recommended to the Codex Alimentarius Commission as MRLs. However, monitoring data were used as a basis of estimating extraneous maximum residue levels.

For a number of years, the CCPR had considered possibilities of setting MRLs for commodities of importance to developing countries. The Thirty-sixth Session of CCPR in 2004 agreed that MRLs for spices should be set on the basis of monitoring data because of the diverse production practices with spices and as GAP information was not available for spices. Noting that there had already been Codex MRLs for a number of pesticides in/on sweet/chili peppers and tea, the CCPR also agreed that chili peppers, tea and herbs fell outside of the definition of “spices” for the purposes of setting MRLs on the basis of monitoring data (irrespective of the Codex Classification). For these commodities, GAP and corresponding supervised trial data should be used for the estimation of maximum residue levels. The Thirty-sixth CCPR also requested JMPR to review existing MRLs on peppers with the view of setting MRLs for dried chili peppers using processing/dehydration factors as appropriate. (ALINORM 04/27/24, paras. 235-247)

The 2002 JMPR elaborated guidelines for selective surveys to provide residue data for estimating maximum residue levels in spices (JMPR Report 2002, Section 2.7). The 2004 JMPR, in response to the request of the Thirty-sixth CCPR above, developed principles and methodology for evaluating monitoring data on spices and estimated a number of maximum residue levels for spices based on monitoring data (JMPR Report 2004, Section 2.6 and 4.27). The principles and methodologies were refined by the 2015 JMPR (JMPR Report 2015, Section 5.30)(FAO Manual, 3rd Ed., 2016; Sections 3.9, 5.11, and 11.1).

The current Meeting received monitoring data on a number of spice commodities including dried chili peppers (HS 0444 in the Spice Group) and fresh curry, leaves (HH 0729, in the Herb Group).

The Meeting stressed that it prefers supervised trials conducted according to GAP as the basis of estimating maximum residue levels and confirmed its previous decisions to use monitoring data only for estimation of extraneous residue levels and of maximum residue levels for spices. It further

confirmed that for estimation of maximum residue levels for dried chili peppers, supervised residue trials on peppers conducted according to GAP should be the basis. Noting also the decision of the Thirty-sixth CCPR, the Meeting did not use the monitoring data on dried chili peppers or curry, leaves for estimating maximum residue levels.

3. Responses to specific concerns raised by the Codex Committee on Pesticide Residues (CCPR)

3.1 Buprofezin (173)

A public health concern was raised by the European Union (EU) about the potential for the formation of aniline from residues of buprofezin in commodities which are subject to processing. According to a communication from the European Food Safety Authority (EFSA), the concern form was triggered not by new toxicological studies that would require a revision of the health-based guidance values for buprofezin, but because aniline was considered a genotoxic carcinogen and a threshold could not be determined.

The Meeting received a new in vivo genotoxicity study in transgenic rats on aniline and a proposal for a mode of action for the splenic tumours seen in rats exposed to aniline.

The Meeting evaluated data on aniline and concluded that based on the absence of gene mutations in the spleen and a clear threshold for splenic tumours by the established mode of action aniline is unlikely to be carcinogenic to humans at estimated dietary exposure levels.

The Meeting established an ADI for aniline of 0–0.02 mg/kg bw based on the NOAEL of 0.2 mg/kg bw per day for increases in methaemoglobin levels in a human volunteer study. As this observation was made in humans no interspecies safety factor was necessary, and a safety factor of 10 was applied. There is a margin of 1100 between the upper bound of the ADI and the LOAEL for spleen tumours in the rat.

An ARfD of 0.02 mg/kg bw was established on the same basis as the ADI.

The Meeting concluded that the predicted exposures to aniline from residues of buprofezin in commodities, which are subsequently processed, did not represent a public health concern (see 5.5 of the 2019 JMPR Report).

3.2 Diflubenzuron (130)

A public health concern was raised by the European Union (EU) about a plant metabolite of diflubenzuron, 4-chloroaniline. According to a communication from the European Food Safety Authority (EFSA), the concern form was triggered not by new toxicological studies that would require a revision of the health-based guidance values for diflubenzuron, but because 4-chloroaniline was considered a genotoxic carcinogen and a threshold could not be determined.

The Meeting did not receive any new data on 4-chloroaniline but was aware that the JECFA veterinary drugs meeting scheduled for October 2019 was reviewing diflubenzuron.

3.3 Fluxapyroxad (256)

Background

Fluxapyroxad was evaluated for new maximum residue levels by the 2018 JMPR. In evaluating fluxapyroxad residues in citrus fruits, the 2018 Meeting noted that the median residues from lemon (0.38 mg/kg), grapefruit (0.15 mg/kg), and orange (0.375 mg/kg) are within a 5-fold range, and that the single residue from mandarin (0.33 mg/kg) is encompassed by the residue data for the other citrus subgroups. Noting the overall similarity in the residues across citrus fruits and in an effort to provide a recommendation that covered the subgroup of mandarins, the 2018 Meeting estimated a maximum residue level, STMR, and HR for the Group of Citrus Fruit.

At the Fifty-first Session of the CCPR a concern was raised to the advancement of the proposed draft MRLs for citrus fruits. It was noted that the residue populations from oranges, lemons, and

grapefruit are significantly different and the approach taken by JMPR in making its recommendation was not supported. Furthermore, only one trial was submitted for mandarin.

Comments by the current Meeting

Mandarins

Regarding the general issue of lack of field trials for mandarins, the Meeting recalled the guiding principles and the criteria for crop group of the Codex Classification (CL 2017/22-PR) and noted that the characteristics for commodity grouping are:

1. Commodity's similar potential for pesticide residues;
2. Similar morphology;
3. Similar production practices, growth habits, etc;
4. Edible portion;
5. Similar GAP for pesticide uses;
6. Similar residue behaviour;
7. To provide flexibility for setting (sub) group tolerances.

A review was conducted of the residue potential of the commodities in the citrus subgroups. Residues of foliar applied pesticides are to a large extent governed by the initial spray deposits which in turn depend on a number of plant parameters including the relative surface area of the fruit compared to leaves and stems, the wettability of the fruit and leaf surfaces, as well as crop morphology.

Residues on the day of application of foliar sprays provide a good indication of relative residue potential for different commodities, with the ranking of residue potential largely preserved with increasing time after application.

A measure of the initial spray deposits can be gained by collating residue levels in the commodities on the day of application following a single spray. To expand the database, the Meeting considered data from trials where more than one spray had been applied could be used provided there was sufficient evidence to conclude that the earlier spray did not contribute more than 25% to the observed residue. The Meeting utilised JMPR evaluations in the period 1993 to 2017 and supplemented these with other publically available information such as published scientific papers and EU draft Assessment Reports to assemble a database of initial residue levels normalised to an application rate of 1 kg ai/ha.

A summary of the initial residue deposits for the different commodities is shown in Figure 1 in the form of box-plots. The boxes cover 50% of values (25th to 75th percentiles) while the whiskers cover 95% of values with the median represented by the dark horizontal lines.

Median residues were 0.74 mg/kg (n=55) for lemons and limes, 0.62 (n=102) for mandarins, 0.47 (n=177) for oranges and 0.37 (n=27) for grapefruit.

Therefore, the Meeting decided that for foliar uses, extrapolation of residue estimates from lemon or limes to mandarins is reasonable.

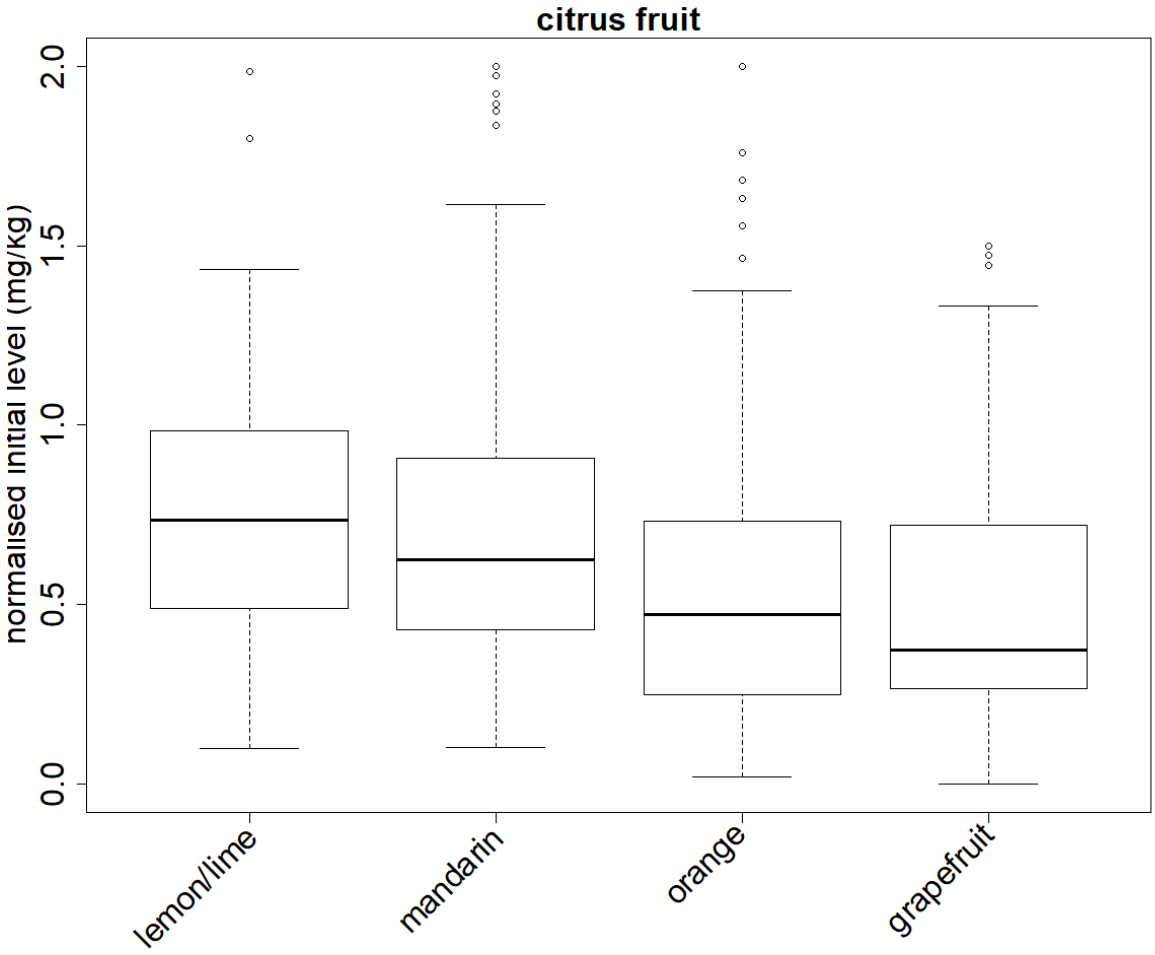

Figure 1. Box-plots of initial spray deposits for foliar treatments close to harvest (normalised to an application rate of 1 kg ai/ha) for citrus.

Fluxapyroxad in citrus

As to the specific concern regarding fluxapyroxad, the 2019 JMPR has re-examined the data for residues of fluxapyroxad in citrus. Noting that it is not standard practice to use combined data to estimate residue levels when they are shown to be from different populations, the Meeting considered making a recommendation for the citrus subgroups based on the data for the representative commodities.

Residues of **fluxapyroxad, *per se,*** were:

Lemon (n=7): 0.15, 0.16, 0.37, 0.38, 0.40 (2), and 0.45 mg/kg;

Mandarin (n=1): 0.33 mg/kg;

Orange (n=10): 0.16, 0.18, 0.32, 0.33, 0.37, 0.38, 0.44, 0.50, 0.52, and 0.58 mg/kg; and

Grapefruit (n=5): 0.10, 0.15 (2), 0.24, and 0.27 mg/kg.

Residues of **total fluxapyroxad** were:

Lemon (n=7): 0.15, 0.16, 0.37, 0.38, 0.40, 0.41, and 0.46 mg/kg;

Mandarin (n=1): 0.33 mg/kg;

Orange (n=10): 0.16, 0.18, 0.32, 0.33, 0.39, 0.40, 0.44, 0.50, 0.52, and 0.59 mg/kg; and

Grapefruit (n=5): 0.10, 0.15 (2), 0.24, and 0.27 mg/kg.

The current Meeting estimated maximum residue levels, STMR values, and HR values applicable to citrus subgroups as follows:

Subgroup of Lemons and Limes: 1, 0.38, and 0.46 mg/kg

Subgroup of Oranges, Sweet, Sour: 1.5, 0.395, and 0.59 mg/kg, and

Subgroup of Pummelo and Grapefruits: 0.6, 0.15, and 0.27 mg/kg.

On the basis of the analysis discussed above for mandarins, the Meeting agreed to extrapolate the data from lemon to the Subgroup of Mandarins.

The 2018 Meeting derived processing factors from studies with orange. The Meeting agreed to extrapolate those factors to citrus fruits (Table 2).

Table 2. Processing factors derived by the 2018 JMPR for fluxapyroxad, per se, and total fluxapyroxad in citrus.

	Fluxapyroxad	Total fluxapyroxad
Commodity	Processing factors [best estimate]	Processing factors [best estimate]
Wet pomace	1.2, 1.15 [1.2]	1.2, 1.15 [1.2]
Dried pulp	6.2, 3.48 [4.8]	6.2, 3.48 [4.8]
Peel	2.5, 1.23 [1.9]	2.5, 1.23 [1.9]
Juice	0.12, 0.018 [0.12]	0.032, 0.048 [0.040]
Marmalade	0.045, 0.039 [0.042]	0.065, 0.069 [0.067]
Oil	65, 53 [59]	65, 53 [59]

Table 3. Residues of fluxapyroxad (maximum residue level) and total fluxapyroxad (STMR-P, HR-P) in processed citrus commodities.

		mg/kg		
Crop	Processed Commodity	Maximum residue level	STMR-P	HR-P
Lemon and mandarin Max. res. level = 1 mg/kg STMR = 0.38 mg/kg HR = 0.46 mg/kg	Peel	--	0.72	0.87
	Juice (raw)	--	0.015	--
	Oil	60	22	--
Orange Max. res. level = 1.5 mg/kg STMR = 0.395 mg/kg HR = 0.59 mg/kg	Wet pomace	--	0.47	0.71
	Dried pulp	8	1.9	--
	Peel	--	0.75	1.1
	Juice (raw)	--	0.016	--
	Marmalade	--	0.026	--
	Oil	90	23	--
Grapefruit Max. res. level = 0.6 mg/kg STMR = 0.15 mg/kg HR = 0.27 mg/kg	Juice (raw)	--	0.006	--
	Oil	--	8.9	--

The Meeting estimated a maximum residue level for fluxapyroxad in citrus oil of 90 mg/kg to replace its previous estimate of 60 mg/kg, with an STMR of 23 mg/kg.

The Meeting estimated a maximum residue level for fluxapyroxad in citrus pulp, dry of 8 mg/kg and an STMR of 1.9 mg/kg.

RECOMMENDATIONS

On the basis of the available data, the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits and for dietary risk assessment.

The definition of the residue for compliance with the MRL for plant and animal commodities: *fluxapyroxad*.

The definition of the residue for estimating dietary risk from plant commodities: *Sum of fluxapyroxad and 3-difluoromethyl)*-N-*(3',4',5'-trifluoro[1,1'- biphenyl]-2-yl)-1*H-*pyrazole-4-carboxamide (M700F008) and 3-(difluoromethyl)- 1-(ß-D-glucopyranosyl)*-N-*(3',4',5'-triflurobipheny-2-yl)-1*H-*pyrzaole-4-carboxamide (M700F048), expressed as parent equivalents*.

The definition of the residue for estimating dietary risk from animal commodities: *Sum of fluxapyroxad and 3-(difluoromethyl)*-N-*(3',4',5'-trifluoro[1,1'- biphenyl]-2-yl)-1*H-*pyrazole-4-carboxamide (M700F008), expressed as parent equivalents*.

The residue is fat soluble.

Table 4. Residue levels (for fluxapyroxad) suitable for establishing maximum residue limits and for IEDI and IESTI assessments.

Commodity		Recommended MRL, mg/kg			
CCN	Name	New	Previous	STMR or STMR-P, mg/kg	HR or HR-P, mg/kg
FC 0001	Group of citrus fruit	W	1		
FC 0002	Subgroup of Lemons and Limes (including Citron)	1		0.38	0.46
FC 0003	Subgroup of Mandarins	1		0.38	0.46
FC 0004	Subgroup of Oranges, Sweet, Sour (including Orange-like hybrids)	1.5		0.395	0.59
FC 0005	Subgroup of Pummelo and Grapefruits (including Shaddock-like hybrids, among other Grapefruit)	0.6		0.15	0.27
OR 0001	Citrus oil, edible	90	60	23	
AB 0001	Citrus pulp, dry	8		1.9	
For dietary burdens and risk assessment					
	Lemon/lime/mandarin juice (raw)			0.015	
	Orange juice (raw)			0.016	
	Grapefruit juice (raw)			0.006	
	Grapefruit oil			8.9	
	Lemon/lime peel (fresh)			0.72	0.87
	Orange peel (fresh)			0.75	1.1
	Citrus wet pomace			0.47	0.71
	Marmalade			0.026	

The new recommendations do not result in changes to the dietary exposure estimates (up to 20% of the maximum ADI, up to 10% of the ARfD) or conclusions provided by the 2018 Meeting.

3.4 Iprodione (111)

A public health concern was raised by the European Union (EU) about the safety of iprodione residues. According to a communication from the European Food Safety Authority (EFSA), the concern form related to estimated intakes exceeding the EU ADI and ARfD by 2.7 and 17 fold respectively.

The EU ADI of 0.02 mg/kg bw is based on a LOAEL for adrenal vacuolation of 6 mg/kg bw per day and a safety factor of 300. The 1995 JMPR established an ADI of 0.06 mg/kg bw based on the same study and end-point but used a 100 fold safety factor as it considered that 6 mg/kg bw per day was a NOAEL.

The EU ARfD of 0.06 mg/kg bw is based on a LOAEL for umbilical hernia of 20 mg/kg bw per day in a rabbit developmental study and a safety factor of 300. The JMPR was not routinely establishing ARfDs at the time of the last review in 1995. The toxicology monograph for the 1995

JMPR includes an evaluation of the same rabbit developmental study but does not mention the umbilical hernia as a critical effect.

The current Meeting did not have access to the iprodione toxicology database and therefore could not assess if it agreed with the EU ADI and ARfD values.

Given the 24-year gap since iprodione was last reviewed by JMPR and the magnitude of potential concerns for acute intakes identified by the EU, the Meeting strongly recommends iprodione be prioritized for periodic re-evaluation. It was noted that aspects of epidemiology should be included.

3.5 Isofetamid (290) – Reconsideration of the maximum residue levels for bush berries, dry beans and dry peas

Background

At the Fifty-first Session of the CCPR, the EU, Norway and Switzerland stated that the MRL for bush berries, the MRL for the subgroup of dry beans, except soya bean and the MRL for the subgroup of dry peas needed to be revised.

For bush berries the EU, Norway and Switzerland stated the MRL should be 4 mg/kg and not 5 mg/kg as recommended by the 2018 JMPR.

For dry beans and dry peas the EU, Norway and Switzerland highlighted that the HR observed in the trials was 0.08 mg/kg and based on the residue trials data set the MRL proposal should be 0.09 mg/kg and not 0.05 mg/kg as recommended by the 2018 JMPR.

Comments by the current Meeting

The scaled residues in bush berries in rank order were (n=10): 0.14, 0.19, 0.20, 0.23, 0.27, 0.35, 0.59, 0.68, 0.77 and 3.0 mg/kg.

The current Meeting estimated a maximum residue level of 4 mg/kg, an STMR of 0.31 mg/kg and a HR of 3 mg/kg for bush berries. Therefore, the Meeting recommended that the MRL of 4 mg/kg replace the previous recommendation of 5 mg/kg.

For dry beans and dry peas the residues in rank order were (n=19): < 0.01 (16), 0.020, 0.036 and 0.080 mg/kg.

The current Meeting estimated a maximum residue level of 0.09 mg/kg and an STMR of 0.01 mg/kg for the subgroup of dry beans, except soya beans and for the subgroup of dry peas. Therefore, the Meeting recommended that the MRL of 0.09 mg/kg replace the previous recommendation of 0.05 mg/kg for the subgroup dry beans, except soya bean, and for the subgroup of dry peas.

The IEDIs and the IESTIs undertaken by the JMPR in 2018 are still applicable to this re-consideration of the maximum residue levels for bush berries and the subgroup of dry beans, except soya bean and the subgroup of dry peas. The Meeting concluded that the long-term and acute dietary exposures to residues of isofetamid resulting from the uses on bush berries, dry beans and dry peas are unlikely to present a public health concern.

Table 5. Residue levels (for isofetamid) suitable for establishing maximum residue limits and for IEDI and IESTI assessments.

CNN	Commodity name	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
		New	Previous		
FB 2006	Bush berries, Subgroup of	4	5	0.31	3
VD 2065	Dry beans (except soya beans), Subgroup of	0.09	0.05	0.01	
VD 2066	Dry peas, Subgroup of	0.09	0.05	0.01	

3.6 Picoxystrobin (258)

A public health concern was raised by the European Union (EU) about a number of aspects of picoxystrobin, which had resulted in no reference doses being established in the EU. According to a communication from the European Food Safety Authority (EFSA), the concern form related to:

- genotoxicity of picoxystrobin
- clastogenicity/aneugenicity of a metabolite of picoxystrobin, IN-H8612
- uncertainty regarding whether the specification of the material tested in the toxicity studies was equivalent to that sold commercially
- the absence of information relating to EU-specific requirements such as "endocrine disruption".

JMPR reviewed picoxystrobin in 2012, establishing an ADI of 0-0.09 mg/kg bw and ARfD of 0.09 mg/kg bw, both based on a combined NOAEL from 90-day and one year dog studies. The 2012 JMPR noted the weakly positive response in the mammalian cell gene mutation assay with metabolic activation, identified as a concern of EFSA, but concluded that picoxystrobin was unlikely to be genotoxic.

In 2013 JMPR evaluated a new in vivo micronucleus study on IN-8612, performed to investigate the positive response in one of two in vitro mammalian cell chromosome aberration assays. JMPR concluded that the results of the new study were negative and that IN-8612 could be assessed using the TTC as not genotoxic. EFSA concluded that the same study was equivocal.

JMPR and EFSA differ in their interpretations of the genotoxicity data for picoxystrobin and IN-H8612. At the 2012 and 2013 Meetings, the WHO panel of JMPR included a specialist genotoxicity expert.

The specification issue is outside the remit of the JMPR, is considered to be of questionable relevance to residues in treated commodities, but could be referred to the JMPS.

The meeting noted the lack of information on EU specific requirements such as "endocrine disruption". Within the EU framework, endocrine disruption is a hazard identification process but JMPR includes these aspects as part of their risk assessments.

The Meeting concluded that the concerns identified about dietary exposures to picoxystrobin were unlikely to represent a public health concern.

3.7 Propiconazole (160) – Reconsideration of the maximum residue level for peach

Background

At the Fifty-first Session of the CCPR, it was requested that the maximum residue level of 5 mg/kg (Po) for propiconazole in peach be retained as the GAP considered by the 2013 JMPR was still authorized in the USA.

The 2017 and 2018 JMPR had considered a new GAP authorized in the USA on peaches and plums and recommended replacement of the previous recommendation of 5 mg/kg (Po) with a maximum residue level of 0.7 mg/kg (Po) for peach.

Comments by the current Meeting

The current Meeting received confirmation that the GAP considered for peach by the 2013 JMPR was still authorized in the USA. The GAP is a post-harvest in-line dip/drench treatment to peach and involves one application of 0.014 kg ai/hL.

The Meeting noted that the maximum residue level of 5 mg/kg (Po) recommended by the 2013 JMPR was based on 3*mean in the OECD MRL calculator. In accordance with the decision of the 2018 JMPR, for post harvest uses when homogenous residues are expected the "mean + 4*SD" should be used as the basis for the maximum residue level.

Residues of propiconazole in peach in rank order were (n = 4): 1.2, 1.4, 1.7 and 2.1 mg/kg with the highest analytical result reported as 2.2 mg/kg.

Total residues (propiconazole plus all metabolites convertible to 2,4-dichlorobenzoic acid) in peach in rank order were (n = 4): 0.73, 1.1, 2.3 and 2.5 mg/kg.

The Meeting recommended a maximum residue level of 4 mg/kg (Po) for peach, an STMR of 1.7 mg/kg and a HR of 2.5 mg/kg to replace the previous recommendation.

Long-term dietary exposure

The ADI for propiconazole is 0–0.07 mg/kg bw. The International Estimated Daily Intakes (IEDIs) for propiconazole were estimated for the 17 GEMS/Food Consumption Cluster Diets using the STMR values estimated by the 2017 JMPR and the STMR considered in this Meeting for peaches. The results are shown in Annex 3 of the 2019 JMPR Report.

The IEDIs ranged from 1–7% of the maximum ADI. The Meeting concluded that long-term dietary exposure to residues of propiconazole from uses considered by the JMPR is unlikely to present a public health concern.

Acute dietary exposure

The ARfD for propiconazole is 0.3 mg/kg bw. The IESTIs for propiconazole were calculated for peaches. The results are shown in Annex 4 of the 2019 JMPR Report.

The IESTIs varied from 0–40% of the ARfD for children and 2–20 % of the ARfD for the general population. The Meeting concluded that acute dietary exposure to residues of propiconazole from the use considered by the present Meeting on peach is unlikely to present a public health concern.

3.8 Pyraclostrobin (210)

Background

At the Fifty-first Session of the CCPR (2019), it was noted that there was an incorrect HR value in the 2018 JMPR report for spinach and that for root and tuber vegetables the maximum residue level recommendation should exclude sugar beet.

Comment by the JMPR

The current Meeting revisited the pyraclostrobin residue data for spinach and agreed that a residue in a trial from Italy had been incorrectly recorded by the 2018 JMPR as 0.91 mg/kg when the correct value is 0.091 mg/kg.

As noted by the 2018 JMPR, the critical GAPs for pyraclostrobin on spinach in European countries is that of Germany (2 × 0.1 kg ai/ha, a RTI of 8 days and a 14-day PHI) and Italy (2 × 0.1 kg ai/ha, a RTI of 7 days and a 14-day PHI).

In 10 trials conducted in France, Germany and Italy, and matching cGAP, residues in spinach were < 0.01, 0.02 (2), 0.05 (2), 0.091, 0.13 (2), 0.28 and 0.31 mg/kg.

The Meeting estimated a maximum residue level of 0.6 mg/kg, a STMR of 0.071 mg/kg and a HR of 0.31 mg/kg for pyraclostrobin in spinach.

The meeting withdrew its previous maximum residue level recommendation of 1.5 mg/kg for spinach.

Regarding root and tuber vegetables, the Meeting noted that the registration in the USA is for the US Crop Subgroup 1B (Root vegetables, except sugar beet) and also separately for sugar beet. Members of the US Crop Subgroup 1B (except sugar beet) include: Garden beet, burdock, carrot, celeriac, turnip-rooted chervil, chicory, ginseng, horseradish, turnip-rooted parsley, parsnip, radish, oriental radish, rutabaga, salsify, black salsify, Spanish salsify, skirret, and turnip.

As the US Crop subgroup 1B closely matches the new Codex Subgroup 16A Root vegetables, and the GAPs in the USA for root and tuber vegetables and sugar beet are different, the Meeting decided to revise its previous recommendation for root vegetables, Subgroup of (includes all commodities in the subgroup) to be replaced by a recommendation for Root vegetables, Subgroup of (includes all commodities in the subgroup except sugar beet).

Table 6. Residue levels (for pyraclostrobin) suitable for establishing maximum residue limits and for IEDI and IESTI assessments.

CNN	Commodity name	Recommended maximum residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
		New	Previous		
VR 2070	Root vegetables, Subgroup of (includes all commodities in the subgroup)	W	0.5	0.12	0.3
VR 2070	Root vegetables, Subgroup of (includes all commodities in the subgroup except sugar beet)	0.5	-	0.12	0.3
VL 0502	Spinach	0.6	1.5	0.071	0.31

3.9 Request from CCPR concerning okra

Background

At the Fifty-first Session of the CCPR (2019), some member countries expressed concerns at the JMPR's recommendations for the subgroup peppers (*i.e.* that the exclusion of okra from MRLs for the subgroup Peppers could impact trade). They requested that JMPR find more suitable commodity groups for which an MRL could be extrapolated to okra.

CCPR was informed that monitoring data for okra showed non-compliances for okra were low when compared to peppers, even when both were covered by a group MRL.

CCPR noted the need to find a solution for extrapolation of an MRL to okra and encouraged member countries and interested organisations to submit data from residue field trials as well as monitoring data for consideration by the JMPR as follows:

- In the absence of specific data for okra, what scientific evidence would JMPR consider in the extrapolation to facilitate the elaboration of an MRL that can ensure the protection of public health while facilitating trade.
- That a comparison of monitoring data for okra and other fruiting vegetables be done to determine if differences in residues observed in trade between these commodities are similar to the difference observed in supervised trials and hence confirm extrapolation principles.

Comment by the JMPR

The current Meeting received monitoring data from Canada for tomatoes (domestic and import), non-bell peppers and okra imported into Canada from the USA.

Focusing on just the US samples (where it was suggested that the use pattern on all three fruiting vegetables is similar), the data included analyses for 383 compounds. The current Meeting reviewed the data and noted:

- Residues were detected for eight compounds in both okra and non-bell peppers. The average ratio of maximum residues in okra to non-bell peppers was 4.
- Residues were detected for ten compounds in both okra and tomatoes. The average ratio of maximum residues in okra to tomatoes was close to 7.

The average ratios from the Canadian monitoring data are consistent with the results observed from supervised field trials (previously provided to CCPR) where residues in okra are higher than in both non-bell peppers (where median normalized initial residues were 4–7× higher in okra vs. non-bell peppers/chili peppers) and tomatoes (where median normalized initial residues were 14× higher in okra vs. tomatoes).

The Canadian monitoring data provides further evidence that residues of pesticides in okra are significantly higher than residues in other fruiting vegetable commodities such as non-bell peppers and tomatoes. As such, the Meeting concluded that the Canadian monitoring data confirms residues in peppers and tomatoes are not representative of residues in okra and should not be used to extrapolate an MRL to okra given that the use of these data would likely result in MRL recommendations that would be too low for this commodity.

The current Meeting considered other commodity groups for extrapolation to okra but were unable to identify one with an appropriate representative crop. One of the criteria for the selection of representative commodities is that it is most likely to contain the highest residues. Given okra's unique crop morphology (ridged and slight hairy surface) and its potential for higher residues, the Meeting is unable to suggest a commodity group/subgroup to extrapolate an MRL to okra. One option would be to include okra in Group 012 (Fruiting Vegetables other than Cucurbits) in a separate "Others" subgroup.