



**Food and Agriculture Organization
of the United Nations**



**World Health
Organization**

JOINT FAO/WHO MEETING ON PESTICIDE RESIDUES

Rome, 16-25 September 2014

SUMMARY REPORT

ACCEPTABLE DAILY INTAKES, ACUTE REFERENCE DOSES, SHORT-TERM AND LONG-TERM DIETARY INTAKES, RECOMMENDED MAXIMUM RESIDUE LIMITS AND SUPERVISED TRIALS MEDIAN RESIDUE VALUES RECORDED BY THE 2014 MEETING

Issued October 2014

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

The Meeting evaluated 33 pesticides, of which eight were new compounds, and three were re-evaluated within the periodic review programme of the Codex Committee on Pesticide Residues (CCPR). The Meeting established acceptable daily intakes (ADIs) and acute reference doses (ARfDs).

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 intake of residues of the pesticides reviewed. The allocations and estimates are shown in the table.

Pesticides for which the estimated dietary intakes might, on the basis of the available information, exceed their ADIs are marked with footnotes, which are also applied to specific commodities when the available information indicated that the ARfD of a pesticide might be exceeded when the commodity was consumed. It should be noted that these distinctions apply only to new compounds and those re-evaluated within the CCPR periodic review programme.

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. Both compounds and commodities are listed in alphabetical order.

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

* (following name of pesticide)	New compound
** (following name of pesticide)	Compound reviewed within CCPR periodic review programme
* (following recommended MRL)	At or about the limit of quantification
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 a recommended MRL)	The previous recommendation is withdrawn, or withdrawal of the recommended MRL or existing Codex or draft MRL is recommended.

More information on the work of the Joint FAO/WHO Meeting on Pesticide Residues (JMPR) is available at:

<http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/jmpr/jmpr-rep/en/>

http://www.who.int/foodsafety/areas_work/chemical-risks/jmpr/en/

Established ADI and ARfD values and recommended maximum residue level, STMR and HR values

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		
Aminocyclopyrachlor(272)* ADI: 0-3 mg/kg bw ARfD: Unnecessary	MO 0105	Edible offal (mammalian)	0.3		L: 0.039 K: 0.13	
	MF 0100	Mammalian fats (except milk fats)	0.03		0.01	
	AS 0162	Hay or fodder (dry) of grasses	150			
	MM 0095	Meat (from mammals other than marine mammals)	0.01		0.01	
	ML 0106	Milks	0.02		0.01	
L- Liver; K-Kidney; dw – dry weight						
Definition of the residue (for compliance with MRL and estimation of dietary intake) for animal and plant commodities: <i>Aminocyclopyrachlor</i>						
<i>The residue is not fat soluble.</i>						
Benzovindiflupyr (261) ADI: 0–0.05 mg/kg bw ARfD: 0.1 mg/kg bw	PE 0112	Eggs	0.01*		0	0
	MM 0095	Meat (from mammals other than marine mammals)	0.01*		0	0
	MO 0105	Edible offal (mammalian)	0.01*		0	0
	MF 0100	Mammalian fats (except milk fats)	0.01*		0	0
	ML 0106	Milks	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
	VD 0541	Soya bean (dry)	0.05		0.01	
	OC 0541	Soya bean oil, crude			0.0086	
	OR 0541	Soya bean oil, refined			0.0066	
		Soya fat flour			0.004	
		Soya milk			0.004	
		Soya tofu, pasteurised			0.0055	
	Soya sauce, pasteurised			0.004		
	Soya miso, pasteurised			0.004		
Definition of the residue (for compliance with the MRL and for dietary risk assessment) for plant and animal commodities: <i>benzovindiflupyr</i> .						
<i>The residue is fat soluble.</i>						

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		
Buprofezin (173) ADI: 0–0.009 mg/kg bw ARfD: 0.5 mg/kg bw	SB 0716	Coffee beans	0.4	-	0.08	
	SM 0716	Coffee beans, roasted			0.0256	
		Freeze-dried coffee			0.016	
<p>Definition of the residue (for compliance with MRLs and for estimation of dietary intake) for plant commodities and animal commodities: <i>buprofezin</i></p> <p><i>The residue is not fat soluble.</i></p>						
Chlorantraniliprole (230) ADI: 0–2 mg/kg bw ARfD: Unnecessary	FC 0001	Citrus fruit	0.7	0.5	0.06	
	MF 0100	Mammalian fats (except milk fats)	0.2		0.049	
	PF 0111	Poultry fats	0.01*		0	
	VD 0541	Soya bean (dry)	0.05		0.01	
	JF 0001	Citrus juice			0.037	
	CF 0654	Wheat bran, processed			0.011	
	CF 1211	Wheat flour			0.004	
	CF 1210	Wheat germ			0.012	
<p>Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant and animal commodities: <i>chlorantraniliprole</i></p> <p><i>The residue is fat-soluble</i></p>						
Clothianidin (238) ADI: 0–0.1 mg/kg bw ARfD: 0.6 mg/kg bw	FI 0326	Avocado	0.03 T		0.01 T	0.02 T
	VP 0061	Beans, except broad bean and soya bean	0.2 T		0.07 T	0.1 T
	DH 1100	Hops, dry	0.07 T		0.026 T	0.028 T
	FI 0345	Mango	0.04 T		0.02 T	0.02 T
	HH 0738	Mints	0.3 T		0.11 T	0.12 T
	MO 0105	Edible offal (mammalian) (except liver)			0.02	0.02
	MO 0099	Liver of cattle, goats, pigs and sheep			0.058 T,c	0.14 T,c
	MF 0100	Mammalian fats (except milk fats) Mango pulp			0.02	0.02
		Mango dried			0.02 T ^a	0.02 T
	MM 0095	Meat (from mammals other than marine mammals)			0.13 T	0.13 T
	ML 0106	Milk			0.02	0.02
					0.006 T,c	
<p>Definition of the residue (for compliance with the MRL and for estimation of the dietary intake) for plant and animal commodities: <i>clothianidin</i></p>						

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		
<i>The residue is not fat soluble</i>						
^a Rounded from 0.016 mg/kg						
T = based on thiamethoxam use only; c,T or C,t = combined clothianidin and thiamethoxam use						
Cyflumetofen (273) *	AM 0660	Almond hulls	4		0.67 ^a	
ADI: 0-0.1 mg/kg bw	FC 0001	Citrus fruits	0.3		0.07	
ARfD: Unnecessary	OR 0001	Citrus oil, edible	36		7.77	
	DF 0269	Dried grapes (=currants, Raisins and Sultanas)	1.5		0.51	
	MO 0105	Edible offal (mammalian)	0.02		L: 0.010 K: 0.008	
	FB 0269	Grapes	0.6		0.22	
	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	
	FP 0009	Pome fruits	0.4		0.14	
	FB 0275	Strawberry	0.6		0.18	
	VO 0448	Tomato	0.3		0.07	
	TN 0085	Tree nuts	0.01*		0.01	
	JF 0226	Apple juice			0.036	
		Apple sauce			0.48	
		Canned apple			0.02	
		Canned tomato			0.021	
	DF 0226	Apples, dried			0.076	
	JF 0269	Grape juice			0.048	
		Grape must			0.071	
		Grape wine			0.026	
		Marmalade			0.0098	
	JF 0004	Orange juice			0.0022	
	JF 0448	Tomato juice			0.027	
	VW 0448	Tomato paste			0.12	
		Tomato purée			0.042	
L- Liver; K-Kidney ^a Median						
Definition of the residue (for compliance with the MRL) for plant commodities: <i>cyflumetofen</i>						
Definition of the residue (for estimation of dietary intake) for plant commodities: <i>Sum of cyflumetofen and 2-trifluoromethylbenzoic acid, expressed as cyflumetofen</i>						
Definition of the residue (for compliance with the MRL and estimation of dietary intake) for animal commodities: <i>Sum of cyflumetofen and 2-trifluoromethylbenzoic acid, expressed as cyflumetofen</i>						
<i>Residue is not fat-soluble</i>						

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		
<i>STMR or STMR-P expressed as cyflumetofen</i>						
Dichlobenil (274) *	VB 0040	Brassica (Cole or Cabbage) Vegetables, Head Cabbage, Flowerhead Brassicas	0.05 FL		0.01	0.04
ADI: 0-0.01 mg/kg bw	FB 2005	Cane berries	0.2 D		0.034	0.13
ARfD: 0.5 mg/kg bw	VS 0624	Celery	0.07 FL		0.01	0.04
BAM^a	GC 0080	Cereal grains	0.01* FL		0.01	
ADI: 0-0.05 mg/kg bw	DF 0269	Dried grapes (= currants, Raisins and Sultanas)	0.15 FL		0.028	0.11
ARfD: 0.3 mg/kg bw	MO 0105	Edible offal (mammalian)	0.04 FL		0.01	0.031
	PE 0112	Eggs	0.03 FL		0.01	0.019
	VC 0045	Fruiting vegetables, Cucurbits	0.01* FL		0.01	0.01
Based on a re-evaluation of the data, the Meeting withdrew the ADI and ARfD established by the 2009 JMPR as part of the evaluation of fluopicolide	VO 0050	Fruiting vegetables, other than Cucurbits (except sweetcorn and mushrooms)	0.01* FL		0.01	0.01
	JF 0269	Grape juice	0.07 FL		0.014	0.056
	FB 0269	Grapes	0.05 FL		0.01	0.04
	VL 0053	Leafy vegetables	0.3 FL		0.07	0.19
	MF 0100	Mammalian fats (except milk fats)	0.01* FL		0.01	0.01
	MM 0095	Meat (from mammals other than marine mammals)	0.01* FL		0.01	0.01
	ML 0106	Milks	0.01* FL		0.01	
	VA 0385	Onion, Bulb	0.01* FL		0.01	0.01
	VA 0387	Onion, Welsh	0.02 FL		0.01	0.01
	HS 0444	Peppers Chili, dried	0.01* FL		0.01	0.01
	PO 0111	Poultry, Edible offal of	0.1 FL		0.014	0.081
	PF 0111	Poultry fats	0.02 FL		0.01	0.012
	PM 0110	Poultry meat	0.03 FL		0.01	0.018
	VD 0070	Pulses	0.01* FL		0.01	
	AS 0081	Straw and fodder (dry) of cereal grains	0.4 FL			
	JF 0448	Tomato juice			0.01	
		Tomato purée			0.01	
	VW 0448	Tomato paste			0.01	
Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant and animal commodities: <i>2,6-dichlorobenzamide</i>						

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		
<i>The residue is not fat soluble.</i>						
^a BAM = 2,6-dichlorobenzamide = fluopicolide						
FL = indicates values estimated to accommodate residues of 2,6-dichlorobenzamide arising from fluopicolide use.						
D = indicates values estimated to accommodate residues of 2,6-dichlorobenzamide arising from dichlobenil use.						
Dimethomorph (225)	VS 0620	Artichoke, Globe	2		0.25	1.14
ADI: 0-0.2 mg/kg bw	VB 0400	Broccoli	4	1	1.3	2.6
ARfD: 0.6 mg/kg bw	VB 0041	Cabbages, Head	6	2	1.1	4.6
	VS 0624	Celery	15		2.44	8.8
	DF 0269	Dried grapes (= currants, Raisins and Sultanas)	5	5	1.17	3.4
	VO 0050	Fruiting vegetables, other than Cucurbits	1.5	1	0.13	1.2
	VA 0381	Garlic	0.6		0.17	0.4
	FB 0269	Grapes	3	2	0.60	1.9
	VA 0384	Leek	0.8		0.08	0.69
	VL 0483	Lettuce, Leaf	20 ^a		5.19	10.5
	VP 0534	Lima bean (young pods and/or immature beans)	0.7		0.055	0.48
	VA 0385	Onion, Bulb	0.6		0.17	0.4
	VA 0387	Onion, Welsh	9		2.1	6.6
	VP 0064	Peas, shelled (succulent seeds)	0.15		0.01	0.63
	VA 0388	Shallots	0.6		0.17	0.4
	VL 0502	Spinach	30		8.3	11.5
	VA 0389	Spring onion	9		2.1	6.6
	FB 0275	Strawberry	0.5	0.05	0.02	0.24
	VL 0505	Taro leaves	10		1.64	5.4
		Dried onion			0.022	
		Grapes, wine			0.18	
		Onions, raw without skin			0.014	0.03
		Peas (canned)			0.0014	
		Peas (cooked)			0.002	
		Strawberry jam			0.02	
		Strawberry, canned			0.056	
	JF 0448	Tomato juice			0.065	
	VW 0448	Tomato paste			0.31	2.88
Definition of the residue (for compliance with the MRL and estimation of dietary intake) for plant and animal commodities: <i>Dimethomorph (sum of isomers)</i>						
<i>The residue is not fat soluble</i>						

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		
<p>^a On the basis of information provided to the JMPR it was not possible to conclude from the estimate of short-term intake for dimethomorph, that for children the consumption of leaf lettuce was less than the ARfD.</p>						
Dithiocarbamates (105)/Mancozeb (050) ADI: 0-0.03 mg/kg bw (Group ADI with maneb, metiram and zineb) ARfD: yet to be established	HS 0775	Cardamom seed	0.1		0.52	
	HS 0779	Coriander, seed	0.1		0.52	
	HS 0780	Cumin seed	10		19	
	HS 0731	Fennel, seed	0.1		0.52	
	VR 0604	Ginseng	0.3		0.13	0.41
	DV 0604	Ginseng, dried including red ginseng	1.5		0.71	2
	HS 0790	Pepper, Black; White	0.1		0.52	
	VO 0444	Peppers, Chili	3		4.1	8.9
HS 0444	Peppers Chili, dried	20		28	60	
<p>Definition of the residue (for compliance with MRLs) in plant and animal commodities: <i>Total dithiocarbamates, determined as CS₂, evolved during acid digestion and expressed as mg CS₂/kg.</i></p> <p>Definition of the residue (for the estimation of dietary intake) in plant and animal commodities: mancozeb plus ethylenethiourea (ETU)</p> <p><i>Dithiocarbamate residues are not fat soluble</i></p>						
Emamectin benzoate (247) ADI: 0–0.0005 mg/kg bw ARfD: 0.02 mg/kg bw	VL 0510	Cos lettuce	0.7	1	0.076	0.33
	VL 0483	Lettuce, Leaf	0.7	1	0.076	0.33
	SO 0495	Rape seed	0.005*		0	
	TN 0085	Tree nuts	0.001*		0.001	0.001
<p>Definition of the residue (for compliance with the MRL and estimation of dietary intake) for plant and animal commodities: <i>emamectin B1a benzoate</i></p> <p><i>The residue is not fat soluble</i></p>						
Fenamidone (264) ADI: 0–0.03 mg/kg bw ARfD: 1 mg/kg bw	VP 0061	Beans, except broad bean and soya bean	0.8		1.39	1.96
	VP 0062	Beans, Shelled	0.15		1.2	1.58
	VB 0041	Cabbages, Head	0.9		1.2	1.7
	VR 0577	Carrots	0.2		0.45	0.61
	VS 0624	Celery	40		2.3	3.2
	SO 0691	Cotton seed	0.02*		0.02	
	MO 0105	Edible offal (mammalian)	0.01*		0	0
	PE 0112	Eggs	0.01*		0	0
	VB 0042	Flowerhead brassicas (includes Broccoli: Broccoli, Chinese and Cauliflower)	4		2.3	4.2

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		
	VC 0045	Fruiting vegetables, Cucurbits	0.2		1.29	1.63
	VO 0050	Fruiting vegetables, other than Cucurbits (except chilli pepper, fungi, sweet corn)	1.5		1.53	2.32
	VA 0381	Garlic	0.15		0.42	0.63
	FB 0269	Grapes	0.6		0.175	0.42
	VA 0384	Leek	0.3		0.46	0.63
	VL 00482	Lettuce, Head	20		4.9	13.5
	VL 00483	Lettuce, Leaf	0.9		1.24	1.98
	MM 0095	Meat (from mammals other than marine mammals)	0.01* (fat)		0	0
	FM 0183	Milk fats	0.02		0.01	0.01
	ML 0106	Milks	0.01*		0.01	0.01
	VL 0485	Mustard greens	60 ^a		20	34
	VA 0385	Onion, Bulb	0.15		0.42	0.63
	VA 0387	Onion, Welsh	3		1.05	1.7
	VO 0444	Peppers, Chili	4		2.5	3.2
	HS 0444	Peppers, Chili, dried	30		18	
	VR 0589	Potato	0.02*		0.4	0.5
	PM 0110	Poultry meat	0.01* (fat)		0	0
	PO 0111	Poultry, Edible offal of	0.01*		0	0
	PF 0111	Poultry fats	0.01*	0	0	
	VA 0388	Shallot	0.15		0.42	0.63
	VL 0502	Spinach ^a	60 ^a		20	34
	VA 0389	Spring onion	3		1.05	1.7
	FB 0275	Strawberry	0.04		0.02	0.04
	SO 0702	Sunflower seed	0.02*		0	
		Tomato ketchup	3		3.67	
	VW 0448	Tomato paste	4		5.58	
		Tomato purée	3		3.21	
	VS 0469	Witloof chicory (sprouts)	0.01*		0.01	0.01
	JF 0269	Grape juice			0.063	
		Grape must			0.145	
		Grape wine			0.124	
		Tomato canned fruits			0.69	
	JF 0448	Tomato juice			1.22	

Definition of the residue (for compliance with the MRL) for plant and animal commodities: *Fenamidone*.

Definition of the residue (for estimation of dietary intake) for plant commodities: *Sum of fenamidone, (S)-5-methyl-5-phenyl-3-(phenylamino)-2,4-imidazolidine-dione (RPA 410193), plus 10 x the sum of both (S)-5-methyl-5-phenyl-2,4-imidazolidine-dione (RPA 412636) and (5S)-5-methyl-2-(methylthio)-5-phenyl-3,5-dihydro-4H-imidazol-4-one (RPA 412708), all*

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		
<i>calculated as fenamidone.</i>						
Residue concentration $C_{total} = C_{fenamidone} + C_{RPA\ 410193} + 10 \times (C_{RPA\ 412636} + C_{RPA\ 412708})$						
Definition of the residue (for compliance with the estimation of dietary intake) for animal commodities: <i>Sum of fenamidone plus 10 × the sum of (S)-5-methyl-5-phenyl-2,4-imidazolidine-dione (RPA 412636) and (5S)-5-methyl-2-(methylthio)-5-phenyl-3,5-dihydro-4H-imidazol-4-one (RPA 412708), all calculated as fenamidone.</i>						
Residue concentration $C_{total} = C_{fenamidone} + 10 \times (C_{RPA\ 412636} + C_{RPA\ 412708})$						
<i>The residue is fat soluble</i>						
^a On the basis of information provided to the JMPR it was not possible to conclude from the estimate of short-term intake for fenamidone that for children the consumption of mustard greens and spinach was less than the ARfD.						
Fenprothrin (185) **	AM 0660	Almond hulls	10		3.1	3.6
ADI: 0-0.03 mg/kg bw	MM 0812	Cattle meat	W	0.5 (fat)		
ARfD: 0.03 mg/kg bw	ML 0812	Cattle milk	W	0.1F		
	MO 0812	Cattle, edible offal of	W	0.05		
	FS 0013	Cherries	7 ^a		1.85	3.53
	HS 0444	Peppers Chili, dried	10		2.59	4.9
	FC 0001	Citrus fruits	2		0.02	0.098
	OR 0001	Citrus oil, edible	100		16.5	
	SB 0716	Coffee beans	0.03		0.01	
	SO 0691	Cotton seed	W	1		
	OC 0691	Cotton seed oil, crude	W	3		
	MO 0105	Edible offal (mammalian)	0.01		0.002	0.003
	VO 0440	Egg plant	W	0.2		
	PE 0112	Eggs	0.01*	0.01*	0	
	VC 0425	Gherkin	W			
	FB 0269	Grapes	W	5		
	MF 0100	Mammalian fats (except milk fats)	0.03		0.018	0.026
	MM 0095	Meat (from mammals other than marine mammals)	0.01		0.001 0.018 (fat)	0.002
	ML 0106	Milks	0.01		0.002	
	FS 2001	Peaches (including Nectarine and Apricots)	3 ^a		0.71	1.1
	VO 0051	Peppers	1		0.37	0.70
	FS 0014	Plums (including prunes)	1		0.25	0.71
	FP 0009	Pome fruits	3 ^a		0.73	2
	PF 0111	Poultry fats	0.01*		0	0
	PM 0110	Poultry meat	0.01* (fat)		0	0
	PO 0111	Poultry, Edible offal of	0.01*	0.01*	0	0
	DF 0014	Prunes	3		0.65	1.85
	VD 0541	Soya bean (dry)	0.01		0.01	

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		
	FB 0275	Strawberry	2		0.515	1.2
	DT 1114	Tea, Green, Black (black, fermented and dried)	3	2	0.14	
	VO 0448	Tomato	1		0.19	0.64
	TN 0085	Tree nuts	0.15		0.01	0.1
	JF 0001	Citrus juice			0.007	
	JF 0048	Tomato juice			0.023	
		Tomato canned			0.021	
	VW 0448	Tomato paste			0.145	
<p>Definition of the residue (for compliance with the MRL and for dietary risk assessment) for plant and animal commodities: <i>fenpropathrin</i></p> <p><i>The residue is fat soluble</i></p> <p>^a On the basis of information provided to the JMPR it was not possible to conclude from the estimate of short-term intake for fenpropathrin that for children the consumption of cherries, peaches and pome fruits was less than the ARfD.</p>						
Fluensulfone (265)	VC 0045	Fruiting vegetables, Cucurbits	0.3		0.032	0.16
ADI: 0-0.01 mg/kg bw	VO 0050	Fruiting vegetables, other than Cucurbits (except sweet corn and mushrooms)	0.3		0.045	0.17
ARfD: 0.3 mg/kg bw	HS 0444	Peppers Chili, dried	2		0.32	1.2
	VW 0448	Tomato paste	0.5		0.081	0.31
	DV 0448	Tomato, dried	0.5		0.081	0.31
<p>Definition of the residue (for compliance with the MRLs and dietary intake) for plant commodities: <i>BSA {3,4,4-trifluorobut-3-ene-1-sulfonic acid}</i></p> <p>Note that for dietary intake, exposure estimates should be compared to the ADI and ARfD for fluensulfone, with no correction for molecular weight.</p> <p>Definition of the residue (for compliance with the MRL and for dietary risk assessment) for animal commodities: Unnecessary</p>						
Flufenoxuron (275)*	MO 0105	Edible offal (mammalian)	0.05*		0	
ADI: 0-0.04 mg/kg bw	MM 0095	Meat (from mammals other than marine mammals)	0.05*		0	
ARfD: Unnecessary	MM 0100	Mammalian fats (except milk fats)	0.05*		0	
	ML 0106	Milks	0.01*		0	
	FC 0004	Oranges	0.4		0.05	
	DT 1114	Tea, Green, Black (black, fermented and dried)	20		6.02	

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		
		Tea infusion			0.04	
<p>Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for animal and plant commodities: <i>flufenoxuron</i></p> <p><i>The residue is fat soluble.</i></p>						
Fluopyram (243)	VS 0621	Asparagus	0.01*		0	0
ADI: 0-0.01 mg/kg bw	FB 0264	Blackberries	3.0		0.7	1.2
ARfD: 0.5 mg/kg bw	VB 0400	Broccoli	0.3		0.05	0.14
	VB 0402	Brussels sprouts	0.3		0.06	0.15
	VB 0041	Cabbages, Head	0.15		0.01	0.08
	VB 0404	Cauliflowers	0.09		0.01	0.05
	VA 381	Garlic	0.07		0.01	0.04
	VA 0384	Leek	0.15		0.01	0.07
	VL 0482	Lettuce, Head	15		2.2	8.4
	VL 0483	Lettuce, Leaf	15		2.2	8.4
	VA 0385	Onion, Bulb	0.07		0.01	0.04
	VA 0381	Garlic	0.07		0.01	0.04
	FS 0247	Peach	W	0.4		
	FS 2001	Peaches (including Nectarine and Apricots)	1		0.22	0.69
	FS 0014	Plums (including prunes)	0.5		0.13	0.22
	SO 0495	Rape seed	1		0.33	
	FB 0272	Raspberries, Red, Black	3.0		0.7	1.2
		Cabbage, Washed, cooked			0.004	0.05
	DF 0014	Prunes			0.14	0.24
	OR 0495	Rape seed oil, Edible			0.23	
<p>Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant commodities: <i>fluopyram</i>.</p> <p>Definition of the residue (for compliance with the MRL) for animal commodities: <i>Sum of fluopyram and 2-(trifluoromethyl) benzamide, expressed as fluopyram.</i></p> <p>Definition of the residue (for estimation of dietary intake) for animal commodities: <i>Sum of fluopyram, 2-(trifluoromethyl)benzamide and the combined residues N-{(E)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl benzamide and N-{(Z)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl benzamide, all expressed as fluopyram</i></p> <p><i>The residue is not fat soluble</i></p>						

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		
Glufosinate-ammonium (175) ADI: 0-0.01 mg/kg bw ARfD: 0.01 mg/kg bw	VD 0541	Soya bean (dry)	2	3	0.09	0.39
<p>Definition of the residue (for compliance with MRL and for estimation of dietary intake) for animal and plant commodities: <i>sum of glufosinate, 3-[hydroxy(methyl)phosphinoyl]propionic acid and N-acetyl-glufosinate, calculated as glufosinate (free acid)</i></p> <p><i>The residue is not fat soluble</i></p>						
Imazamox (276) * ADI: 0-3 mg/kg bw ARfD: 3 mg/kg bw	AL 1020	Alfalfa fodder	0.1*		0.2	0.41
	VD 0071	Bean (dry)	0.05*		0	
	VP 0061	Beans, except broad bean and soya bean	0.05*		0	
	MO 0105	Edible offal (mammalian)	0.01*		0	0
	PE 0112	Eggs	0.01*		0	0
	VD 0533	Lentil (dry)	0.2		0.1	
	MF 0100	Mammalian fats (except milk fats)	0.01*		0	0
	MM 0095	Meat (from mammals other than marine mammals)	0.01*		0	0
	ML 0106	Milks	0.01*		0	0
	VD 0072	Peas (dry)	0.05*		0	
	AL 0072	Pea hay or pea fodder (dry)	0.05*		0.075	0.22
	SO 0697	Peanut	0.01*		0	
	VP 0064	Peas, Shelled (succulent seeds)	0.05*		0	
	PF 0111	Poultry fats	0.01*		0	
	PM 0110	Poultry meat	0.01*		0	0
	PO 0111	Poultry, Edible offal of	0.01*		0	0
	SO 0495	Rape seed	0.05*		0	
	GC 0649	Rice	0.01*		0.025	
	AS 0649	Rice straw and fodder, dry	0.01*		0.02	0.03
	VD 0541	Soya bean (dry)	0.01*		0	
	AL 0541	Soya bean fodder	0.01*		0.02	0.06
	SO 0702	Sunflower seed	0.3		0.19	
	GC 0654	Wheat	0.05*		0	
	CM 0654	Wheat bran, unprocessed	0.2		0.34	
	CF 1210	Wheat germ	0.1		0.22	
	AS 0654	Wheat straw and fodder, dry	0.05*		0	0.1

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		
	OR 0702	Sunflower seed oil, edible			0.095	
	CF 1211	Wheat flour			0.12	
Definition of the residue (for compliance with the MRL) for plant and animal commodities: <i>imazamox</i>						
Definition of the residue (for estimation of dietary intake) for plant and animal commodities: <i>sum of imazamox and 5-(hydroxymethyl)-2-(4-isopropyl-4-methyl-5-oxo-2-imazazolin-2-yl) nicotinic acid (CL 263284), expressed as imazamox</i>						
<i>Residue is not fat soluble.</i>						
Mesotrione (277) *	VS 0621	Asparagus	0.01*		0.01	
ADI: 0-0.5 mg/kg bw	FB 2006	Bush berries	0.01*		0	
ARfD: Unnecessary	FB 2005	Cane berries	0.01*		0	
	FB 0265	Cranberry	0.01*		0	
	MO 0105	Edible offal (mammalian)	0.01*		0	
	PE 0112	Eggs	0.01*		0	
	SO 0693	Linseed	0.01*		0.01	
	GC 0645	Maize	0.01*		0	
	MM 0095	Meat (from mammals other than marine mammals)	0.01*		0	
	GC 0646	Millet	0.01*		0	
	ML 0106	Milks	0.01*		0	
	GC 0647	Oats	0.01*		0	
	VO 0442	Okra	0.01*		0.01	
	PO 0111	Poultry, Edible offal of	0.01*		0	
	PM 0110	Poultry meat	0.01*		0	
	VS 0627	Rhubarb	0.01*		0.01	
	CM 0649	Rice, husked	0.01*		0	
	GC 0651	Sorghum	0.01*		0	
	VD 0541	Soya bean (dry)	0.03		0.01	
	GS 0659	Sugar cane	0.01*		0	
	VO 0447	Sweet corn (corn-on- the-cob)	0.01*		0	
		Miso			0.002	
		Soya flour			0.018	
		Soya milk			0.002	
	OR 0541	Soya bean oil, refined			0.002	
		Soya sauce			0.002	
		Tofu			0.002	
Definition of the residue (for compliance with MRL and for estimation of dietary intake) for animal and plant commodities: <i>Mesotrione</i> .						
<i>The residue is not fat soluble.</i>						

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		
Metrafenone (278) * ADI: 0-0.3 mg/kg bw ARfD: Unnecessary	GC 0640	Barley	0.5		0.06	
	AS 0640	Barley straw and fodder, dry	6 (dw)		1.3 (fw)	
	VC 0424	Cucumber	0.2		0.05	
	DF 0269	Dried grapes (=currants, Raisins and Sultanas)	20		2.85	
	MO 0105	Edible offal (mammalian)	0.01		0.01	
	PE 0112	Eggs	0.01*		0	
	VC 0425	Gherkin	0.2		0.05	
	FB 0269	Grapes	5		0.76	
	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	
	VO 0450	Mushrooms	0.5		0.105	
	AS 0647	Oat straw and fodder, dry	6 (dw)		1.3 (fw)	
	GC 0647	Oats	0.5		0.06	
	HS 0444	Peppers Chili, dried	20		1.15	
	VO 0444	Peppers, Chili	2		0.115	
	VO 0445	Peppers, Sweet (including pimento or pimiento)	2		0.115	
	PF 0111	Poultry fats	0.01*		0	
	PM 0110	Poultry meat	0.01*		0	
	PO 0111	Poultry, Edible offal of	0.01*		0	
	GC 0650	Rye	0.06		0.01	
	AS 0650	Rye straw and fodder, dry	10 (dw)		1.9 (fw)	
	VC 0431	Squash, Summer	0.06		0.015	
	FB 0275	Strawberry	0.6		0.13	
	VO 0448	Tomato	0.4		0.1	
	GC 0653	Triticale	0.06		0.01	
	AS 0653	Triticale straw and fodder, dry	10 (dw)		1.9 (fw)	
	GC 0654	Wheat	0.06		0.01	
	CF 0654	Wheat bran, Processed	0.25		0.042	
	AS 0654	Wheat straw and fodder, dry	10 (dw)		1.9 (fw)	
CF 1212	Wheat wholemeal	0.08		0.014		
		Beer			0.009	
		Bread (wholegrain)			0.007	

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		
	JF 0269	Grape juice			0.038	
		Grape must			0.51	
		Malt			0.024	
		Mushrooms (canned)			0.017	
		Pearl barley			0.01	
		Tomato (canned)			0.002	
	JF 0448	Tomato juice			0.034	
	VW 0448	Tomato paste			0.039	
		Tomato purée			0.081	
	CF 1212	Wheat flour			0.002	
		Wine			0.14	
Definition of the residue (for compliance with the MRL and estimation of dietary intake) for plant and animal commodities: <i>Metrafenone</i>						
<i>The residue is fat soluble</i>						
Myclobutanil (181) **	FL 0327	Banana	W	2		
ADI: 0-0.03 mg/kg bw	VP 0061	Beans, except broad bean and soya bean	0.8		0.22	0.49
ARfD: 0.3 mg/kg bw	VB 0040	Brassica (Cole or Cabbage) Vegetables, Head Cabbage, Flowerhead Brassicas	0.05		0.03	0.044
	VA 0035	Bulb vegetables	0.06		0.039	0.052
	FS 0013	Cherries	3		1.05	2.05
	FB 0021	Currants, Black, Red, White	0.9	0.5	0.34	0.47
	DF 0269	Dried grapes (=currants, Raisins and Sultanas)	6		2.14	3.77
	MO 0105	Edible offal (mammalian)	0.01*		0	0.01
	PE 0112	Eggs	0.01*		0	0.01
	VC 0045	Fruiting vegetables, Cucurbits	0.2		0.04	0.16
	FB 0269	Grapes	0.9	1	0.34	0.6
	DH 1100	Hops, dry	5	2	1.52	5.6
	VL 0053	Leafy vegetables	0.05		0.03	0.044
	AL 0157	Legume animal feeds	0.2		0.055	0.093
	MF 0100	Mammalian fats (except milk fats)	0.01*		0	0
	MM 0095	Meat (from mammals other than marine mammals)	0.01*	0.01*	0	0.01
	ML 0106	Milks	0.01*	0.01*	0	0.01
	FS 2001	Peaches	3	-	0.865	1.54
	VO 0051	Peppers	3	-	0.435	2.4
	HS 0444	Peppers Chili, dried	20	-	3.04	16.8

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		
	FS 0014	Plums (including prune)	2	0.2	0.38	1.45
	FP 0009	Pome fruits	0.6	0.5	0.07	0.35
	PF 0111	Poultry fats	0.01*		0	0
	PM 0110	Poultry meat	0.01*	0.01*	0	0.01
	PO 0111	Poultry, Edible offal of	0.01*	0.01*	0	0.01
	DF 0014	Prunes	W	0.5		
	VR 0075	Root and tuber vegetables leaves	0.06	-	0.039	0.052
	FS 0012	Stone fruits (except plums)	W	2		
	AS 0081	Straw and fodder (dry) of cereal grains	0.3	-	0.098	0.18
	FB 0275	Strawberry	0.8	1	0.19	0.69
	VO 0448	Tomato	0.3	0.3	0.07	0.25
	JF 0226	Apple juice			0.012	
		Beer			0.023	
	JF 0269	Grape juice			0.068	
		Grape wine			0.048	
	JF 0448	Tomato juice			0.031	
	VW 0448	Tomato paste			0.27	
		Tomato preserve			0.02	
		Tomato purée			0.093	
<p>Definition of the residue (for compliance with the MRL for plant and animal commodities and for estimation of dietary intake for and animal commodities): <i>myclobutanil</i>.</p> <p>Definition of the residue (for estimation of dietary intake for plant commodities): <i>sum of myclobutanil, α-(4-chlorophenyl)-α-(3-hydroxybutyl)-1H-1,2,4-triazole-1-propanenitrile (RH-9090) and its conjugates, expressed as myclobutanil</i></p> <p><i>The residue is not fat-soluble</i></p>						
Phosmet (103) ADI: 0-0.01 mg/kg bw ARfD: 0.2 mg/kg bw	FB 0265	Cranberry	3		0.845	0.91
<p>Definition of the residue for compliance with MRL and estimation of dietary intake: <i>Phosmet</i></p>						
Propamocarb (148) ADI: 0-0.4 mg/kg bw ARfD: 2 mg/kg bw	VB 0400	Broccoli	3		0.29	1.7
	VB 0402	Brussels sprouts	2		0.47	1.3
	VB 0041	Cabbages, Head	1		0.195	0.36
	VB 0404	Cauliflower	2	0.2	0.035	0.82
	MO 0105	Edible offal (mammalian)	W	0.01*		
	PE 0112	Eggs	0.01*	0.01*	0.001	0.005
	VL 0480	Kale (including among others: Collards, Curly	20		4	11.8

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		
	VA 0384	kale, Scotch kale, thousand-headed kale; not including Marrow- stem kale no. AV 1052 Miscellaneous Fodder and forage crops	30		2.5	15
	MM 0095	Leek	W	0.01*		
	ML 0106	Meat (from mammals other than marine mammals)	W	0.01*		
	VA 0385	Milks	2		0.05	1.4
	PF0111	Onion, Bulb	0.01*		0.001	0.001
	PM 0110	Poultry fat	0.01*	0.01*	0.001	0.003
	PO 0111	Poultry meat	0.01*	0.01*	0.002	0.006
		Poultry, Edible offal of				
		Spinach, cooked			9.9	
	VW 0448	Tomato paste			1.54	
	JF 0448	Tomato juice			0.27	
		Tomato preserve			0.21	
		Tomato purée			0.40	
Definition of the residue (for compliance with MRLs and estimation of dietary intake) for plant commodities: <i>Propamocarb</i>						
Propiconazole (160)	AS 0640	Barley straw and fodder, dry	8	2		
ADI: 0-0.07 mg/kg bw	MO 0105	Edible offal (mammalian)	0.5	0.01*	0.504	1.97
ARfD: 0.3 mg/kg bw	MF 0100	Mammalian fat (except milk fats)	0.01*		0.05	0.115
	MM 0095	Meat (from mammals other than marine mammals)	0.01* (fat)	0.01* (fat)	0.064	0.085
	ML 0106	Milks	0.01*	0.01*	0.035	
	AS 0647	Oat straw and fodder, dry	8	2		
	AS 0650	Rye straw and fodder, dry	15	2		
	AS 0653	Triticale straw and fodder, dry	15	2		
	AS 0654	Wheat straw and fodder, dry	15	2		
Definition of the residue (for compliance with the MRL) for plant and animal commodities: <i>propiconazole</i> .						
Definition of the residue (for the estimation of dietary intake) for plant and animal commodities: <i>propiconazole plus all metabolites convertible to 2,4-dichloro-benzoic acid, expressed as propiconazole</i> .						
<i>The residue is fat-soluble</i>						

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		
Prothioconazole (232) ADI: 0-0.05mg/kg bw ARfD: 0.8 mg/kg bw (woman of child bearing age) ARfD: Unnecessary (general population)	FB 2006	Bush berries	1.5		0.52	0.87
	FB 0265	Cranberry	0.15		0.025	0.9
	VC 0045	Fruiting vegetables, Cucurbits (except watermelon)	0.2		0.045	0.15
	AL 0697	Peanut fodder	15		4.08	11.6
	GC 0656	Popcorn	0.1		0.018	
	VR 0589	Potato	0.02*		0.01	0.01
	GC 0645	Maize	0.1		0.018	
	AS 0645	Maize fodder (dry)	15		3.48	6.7
	VO 0447	Sweet corn (corn-on- the-cob)	0.02		0.018	0.018
	VD 0541	Soya bean (dry)	0.2		0.05	
Prothioconazole - desthio ADI: 0-0.01 mg/kg bw ARfD: 0.01 mg/kg bw (woman of child bearing age) ARfD: 1 mg/kg bw (general population)		Sweet corn fodder	15		3.48	6.7
	CF 1255	Maize flour			0.01	
	OR 0645	Maize oil, edible			0.005	
		Maize starch			0.005	
	OR 0495	Rape seed oil, edible			0.02	
<p>Definition of the residue (for compliance with MRL and estimation of dietary intake) for plant commodities: <i>prothioconazole-desthio</i>.</p> <p>Definition of the residue (for compliance with the MRL) for animal commodities: <i>prothioconazole-desthio</i>.</p> <p>Definition of the residue (for the estimation of dietary intake) for animal commodities: <i>the sum of prothioconazole-desthio, prothioconazole-desthio-3-hydroxy, prothioconazole-desthio-4-hydroxy and their conjugates expressed as prothioconazole-desthio</i></p> <p><i>The residue is not fat soluble</i></p>						
Pymetrozine (279)* ADI: 0-0.03 mg/kg bw ARfD: 0.1 mg/kg bw						
<p>Definition of the residue (for compliance with MRL) for plant commodities, mammalian tissues, poultry tissues and eggs: <i>pymetrozine</i></p> <p>Definition of the residue (for compliance with MRL) for milks: <i>CGA313124 (4,5-dihydro-6-hydroxymethyl-4-[(3-pyridinyl-methylene)amino]-1,2,4-triazine-3(2H)-one)</i></p> <p>Definition of the residue for the estimation of dietary intake: <i>a conclusion could not be reached</i></p> <p><i>The residue is not fat soluble</i></p>						

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		
Pyraclostrobin (210) ADI: 0-0.03 mg/kg bw ARfD: 0.05 mg/kg bw	FS 0013	Cherries	W	3	0.51	1.57
	FS 0013	Cherries (includes all commodities in this subgroup)	3			
	FS 0245	Nectarine	W	0.3	0.07	0.13
	FS 2001	Peaches (including Nectarine and Apricots)	0.3			
	FS 0247	Peach	W	0.3	0.09	0.40
	FS 0014	Plums (includes all commodities in this subgroup)	0.8			
FS 0014	Plums (including Prunes)	W	0.8			
<p>Definition of the residue (for compliance with MRL and for estimation of dietary intake) for plant and animal commodities: <i>Pyraclostrobin</i></p> <p><i>The residue is fat-soluble</i></p>						
Sedaxane (259) ADI: 0-0.1 mg/kg bw ARfD: 0.3 mg/kg bw	GC 0640	Barley	W	0.01*	0	0.018
	AS 0640	Barley straw and fodder, dry	W	0.01*		
	AL 0061	Bean fodder	0.01*			
	GC 0080	Cereal grains	0.01*			
	AS 0647	Oat straw and fodder, dry	W	0.01*		
	GC 0647	Oats	W	0.01*		
	AL 0072	Pea hay or pea fodder (dry)	0.01*			
	VR 0589	Potato	0.02			
	VD 0070	Pulses	0.01*			
	GC 0650	Rye	W	0.01*		
	AS 0650	Rye straw and fodder, dry	W	0.01*		
	VD 0541	Soya bean (dry)	W	0.01*		
	AS 0161	Straw, fodder (dry) and hay of cereal grains and other grass-like plants	0.1			
	VO 0447	Sweet corn (corn-on-the-cob)	0.01*			
	GC 0653	Triticale	W	0.01*		
	AS 0653	Triticale straw and fodder, dry	W	0.01*		
	GC 0654	Wheat	W	0.01*		
AS 0654	Wheat straw and fodder, dry	W	0.01*			
<p>Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant and animal commodities: <i>sedaxane</i>.</p> <p><i>The residue is fat-soluble.</i></p>						

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		
Spirodiclofen (237)	FI 0326	Avocado	0.9		0.07	
ADI: 0-0.01 mg/kg bw	FB 0020	Blueberries	4		0.92	
ARfD: Unnecessary						
Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant commodities: <i>spirodiclofen</i> .						
Definition of the residue (for compliance with the MRL) for animal commodities: <i>spirodiclofen</i> .						
Definition of the residue (for estimation of dietary intake) for animal commodities: <i>the sum of spirodiclofen and spirodiclofen-enol, expressed as spirodiclofen</i> .						
<i>The residue is fat soluble</i>						
Sulfoxaflor (252)	FS 0013	Cherries	1.5		0.34	1.24
ADI: 0-0.05 mg/kg bw	FC 0001	Citrus fruits	W	0.9		
ARfD: 0.3 mg/kg bw	FC 0002	Lemons and limes (including Citron)	0.4		0.038	0.17
	MM 0100	Mammalian fat (except milk fats)	0.1		0.03	0.073
	FC 0003	Mandarins (including Mandarin-like hybrids)	0.8		0.26	0.44
	FC 0004	Oranges, Sweet, Sour	0.8		0.26	0.44
	FS 2001	Peaches (including Nectarine and Apricots)	0.4		0.061	0.2
	FS 0014	Plums (including prunes)	0.5		0.038	0.26
	FP 0009	Pome fruits	0.3	0.4	0.067	0.23
	PF 0111	Poultry fats	0.03		0.005	0.021
	FC 0005	Pummelo and Grapefruits	0.15		0.0125	0.066
	FS0012	Stone fruits	W	3		
	TN 0085	Tree nuts	W	0.015		
	JF 0226	Apple juice			0.027	
		Apple sauce			0.040	
		Cherry juice			0.27	
		Cherry jam			0.37	
		Cherry, dried			1.73	6.32
	JF 0004	Orange juice			0.036	
	OR 0004	Orange oil, edible			< 0.052	
		Orange peel			1.46	2.46
Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant and animal commodities: <i>Sulfoxaflor</i>						
<i>The residue is not fat soluble</i>						

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		
Thiamethoxam (245) ADI: 0-0.08 mg/kg bw ARfD: 1 mg/kg bw	FI 0326	Avocado	0.5		0.08	0.30
	VP 0061	Beans, except broad bean and soya bean	0.3		0.08	0.18
	DH 1100	Hops	0.09		0.028	0.55
	FI 0345	Mango	0.2		0.03	0.11
	HH 0738	Mints ^a	1.5		0.34	0.86
		Mango dried			0.18	0.65
		Mango pulp			0.02	0.07
<p>^a It is noted that there are several types of mints (native mints HH0764, Vietnamese mint HH0765). The reported CCN code is listed for several types of mints, including spearmint and peppermint</p> <p>Definition of the residue (for compliance with the MRL) for animal and plant commodities: <i>thiamethoxam</i>.</p> <p>Definition of the residue (for estimation of the dietary intake) for plant and animal commodities (except poultry): <i>thiamethoxam and clothianidin</i> (considered separately)</p> <p>Definition of the residue (for estimation of the dietary intake) for poultry: <i>sum of thiamethoxam, CGA 265307 and MU3, expressed as thiamethoxam; and clothianidin</i> (clothianidin to be considered separately from thiamethoxam).</p> <p><i>The residue is not fat-soluble.</i></p> <p>The recommendations for CGA322704 are listed in the clothianidin appraisal 2014</p>						
Triadimenol (168) ADI: 0-0.03 mg/kg bw ARfD: 0.08 mg/kg bw	FB 0269	Grapes	0.3		0.025	0.13
	DF 0269	Dried grapes (=currants, Raisins and Sultanas)	1 ^a	10 ^b	0.155	0.4
	JF 0269	Grapes juice			0.011	
		Wine			0.01	
<p>^a based on uses for triadimenol ^b based on uses on triadimefon and triadimenol</p> <p>Definition of the residue (for the estimation of dietary intake and for compliance with MRLs) for plant and animal commodities: <i>sum of triadimefon and triadimenol</i></p>						
Triforine (116)** ADI: 0-0.03 mg/kg bw ARfD: 0.3 mg/kg bw	FP 0226	Apple	W	2		
	FB 0020	Blueberries	0.03	1	0.01	0.018
	VB 0402	Brussels sprouts	W	0.2		
	GC 0080	Cereal grains	W	0.1		
	FS 0013	Cherries	W	2		
	VP 0526	Common bean (pods and immature seeds)	W	1		
	FB 0021	Currants, Black, Red, White	W	1		
	MO 0105	Edible offal (mammalian)	0.01*		0	0
	VO 0440	Egg plant	1	-	0.29	0.39
	VC 0045	Fruiting vegetables, Cucurbits	W	0.5		

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		
	FB 0268	Gooseberry	W	1		
	MM 0100	Mammalian fat (except milk fats)	0.01*			
	MM 0095	Meat (from mammals other than marine mammals)	0.01*		0	0
	ML 0106	Milks	0.01*		0	
	FS 0247	Peach	W	5 Po		
	FS 0014	Plums (including Prunes)	W	2		
	FB 0275	Strawberry	W	1		
	VO 0448	Tomato	0.7	0.5	0.15	0.40
	JF 0448	Tomato juice			0.11	
	VW 0448	Tomato paste			<0.001	
		Tomato purée			0.35	
<p>Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant commodities: <i>Triforine</i></p> <p>Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for animal commodities: <i>Triforine and its metabolites determined as chloral hydrate expressed as triforine</i></p> <p><i>The residue is not fat soluble</i></p>						

Edited versions of these general considerations will be published in the report of the 2014 JMPR. They are reproduced here so that the information is disseminated quickly. These drafts are subject to technical editing.

1. Responses to specific concerns

1.1 Raised by CCPR

1.1.1 Chlorpyrifos-methyl (090)

Background

The 2013 JMPR recommended a MRL of 5 mg/kg (Po) for chlorpyrifos-methyl in cereals, except maize and rice. This recommendation was made based on post-harvest trials conducted on wheat (ten trials) and barley (nine trials) at the rate of 2.5 to 5 g ai/ton, and evaluated by the 2009 JMPR.

The 2014 JMPR received a Concern Form from the Government of Australia, which stated that the above MRL recommendation did “not accord with the commodities permitted to be treated as per the labels provided by Australia”. The Australian GAP for chlorpyrifos-methyl on cereal grains excludes the use on maize, malting barley and rice, and allows one application of up to 10 g ai/ton. The 2013 JMPR erroneously interpreted the content of this label, and did not consider the highest rate allowed.

Comments by JMPR

The 2014 JMPR noted that the residue trials conducted on wheat used lower rates than the critical GAP in Australia. Currently, there is not sufficient evidence that the proportionality principle can be applied to post-harvest treatments so as to allow the scaling of residues found in the trials to the critical GAP. Therefore, the Meeting agreed to withdraw its previous recommendation of 5 mg/kg (Po) for cereals, except maize and rice.

The Meeting also withdraws its previous recommendations of 1.5 mg/kg for rice, husked and or 0.2 mg/kg for rice, polished.

Recommendation

Definition of the residue (for compliance with the MRL and for the estimation of the dietary intake) for plant and animal commodities: *chlorpyrifos-methyl*.

CCN	Commodity name	Recommended maximum residue level (mg/kg)		STMR (P) mg/kg	HR (P) mg/kg
		New	Previous		
GC 0080	Cereals, except maize and rice	W	5 (Po)		
CM 0649	Rice, husked	W	1.5 (Po)		
CM 1205	Rice, polished	W	0.2 (Po)		

1.1.2 Spirotetramat (234)

Background

Spirotetramat was first evaluated by the 2008 JMPR and most recently by the 2013 JMPR. Following the 46th Session of the CPPR a concern form was submitted by the USA relating to the 2013 JMPR not recommending maximum residue levels for pineapples and pomegranates. No recommendation was made as the whole fruits were cut in the field and transferred to the testing laboratory using

freezer packs. The Concern form proposed that field cutting would not affect the validity of the analytical results

Comments by JMPR

The 2014 JMPR noted that in the trials evaluated by the 2013 JMPR, two pomegranate samples taken 1 day after the application of spirotetramat contained parent compound at 0.06 mg/kg and 0.047 mg/kg. The same samples contained residues of enol metabolites at 0.073 mg/kg and 0.07 mg/kg and enol-glycoside at concentrations of 0.022 mg/kg and 0.02 mg/kg, respectively. The presence of the enol-glycoside in these samples indicates that the enol metabolite had further decomposed during sample transportation to the testing laboratory, prior to the samples being deep-frozen. The freezing of which would assure the subsequent stability of any residues present. However, in two other samples taken 1 day post treatment, the parent compound was present at 2-3 times higher concentration than the enol metabolite, and no enol-glycoside (< 0.01 mg/kg) was detected. The results indicate that the parent compound degraded further in the first two samples, as, in addition to the enol metabolite, the enol-glycoside was detected. The enol-glycoside is not included in the residue definition for enforcement purposes.

Consequently, it cannot be excluded that degradation of the parent compound as well as the enol occurred after the fruit was cut. The sample parts were placed together in a plastic bag and cooled using freezer packs, which do not guarantee the integrity of the residues compared to being deep-frozen. The contact of the outer and inner parts of the fruit can accelerate the degradation of the parent compound resulting in an underestimation of the residues as included in the definition for MRL compliance.

Furthermore, it also needs to be noted that the requirement of avoiding cutting of whole fruits has been clearly stated in the Codex Sampling Guidelines adopted in 1999.

The Meeting maintains its opinion that cutting whole fruits and vegetables in the field makes uncertain the validity of the results, unless the stability of residues has been demonstrated, utilising a method as described in section 2.6 of the 2013 JMPR Report. The Meeting therefore confirmed its previous conclusion.

Should the necessary stability tests be carried out, and the results of such studies made available to the Meeting at a later date, the Meeting could reconsider its previous conclusions based on the new results.

1.1.3 Tolfenpyrad (269)

Background

Tolfenpyrad was evaluated by JMPR for the first time in 2013, when the Meeting established an ARfD of 0.01 mg/kg bw for tolfenpyrad based on a NOAEL of 1 mg/kg bw per day for reduced body weight and feed consumption observed during the first days of treatment with tolfenpyrad in a developmental toxicity study in rats at 3 mg/kg bw per day and an overall NOAEL of 1 mg/kg bw per day for vomiting and soft stools observed on the first day of treatment with tolfenpyrad in 28-day, 90-day and 1-year studies in dogs at 5 mg/kg bw per day. A safety factor of 100 was applied. The Meeting considered it unlikely that the acute effects observed in rats and dogs were the result of the unpalatability of tolfenpyrad, as the effects were observed after gavage or capsule administration. The Meeting also considered it unlikely that the acute effects were secondary to local gastrointestinal irritation, as no such effects were reported in any of the studies.

The current Meeting received a concern form from the USA. The USA considers that the endpoints that JMPR used for establishing the ARfD for tolfenpyrad are not appropriate for setting an ARfD, as vomiting and soft stools in dogs may be related to high concentrations following capsule administration and local (irritant) effects, and as the body weight gain decrement in the developmental

toxicity study in rats may be a cumulative effect over a 3-day time period and not truly representative of an acute response.

Comments by JMPR

The present Meeting notes that the 2013 Meeting followed the guidance on establishing an ARfD in reaching its decision on the ARfD for tolfenpyrad. JMPR recognizes that although the body weight gain decrement observed in the developmental toxicity study in rats occurred over a 3-day period, there is no information to exclude the possibility that this could have occurred after a single dose; hence, in line with normal practice, it was assumed that the body weight gain decrement could have been a single-dose effect. The 2013 Meeting discussed at some length the possibility that the effects in the dog were due to local irritation of the gastrointestinal tract. The Meeting considered this unlikely, as no local gastrointestinal irritation was reported in any of the studies. Thus, the Meeting concluded that the effects could well have been due to systemic toxicity. This was reflected in the explanation provided. The present Meeting further notes that vomiting and soft stools in dogs were observed after capsule administration of low doses of tolfenpyrad, indicating that these effects are unlikely to be the result of a high concentration of the test compound.

After reconsidering the database for tolfenpyrad, and taking into account the concerns raised by the USA, the present Meeting confirms its previous interpretation of these studies and considers that there is no basis for a revision of the ARfD for tolfenpyrad.

1.2 Response to concerns raised by other groups

1.2.1 Emamectin benzoate (247)

Emamectin benzoate was evaluated by JMPR for the first time in 2011, when the Meeting established an ARfD of 0.03 mg/kg bw, based on a NOAEL of 5 mg/kg bw for clinical signs of neurotoxicity (tremors and irritability) observed in an acute neurotoxicity study in rats at 10 mg/kg bw. A safety factor of 200 was applied, which included a 2-fold factor based on serious histopathological observations of degeneration of neurons in brain, spinal cord and sciatic nerve at 25 mg/kg bw.

The current Meeting was made aware of a question raised by the 78th meeting of JECFA in 2013, which evaluated emamectin benzoate as a veterinary drug. JECFA considered that dogs were more sensitive than rats to the neurotoxic effects of emamectin benzoate, as in repeated-dose studies in dogs, clinical signs were first observed at doses of 1.0 and 1.5 mg/kg bw per day during week 2 of treatment. JECFA could not exclude the possibility that at higher doses, clinical signs of neurotoxicity would occur after a single dose. It therefore considered the occurrence of clinical signs in dogs as the critical effect upon which to base an ARfD. JECFA recommended that JMPR re-evaluate emamectin benzoate with respect to the ARfD.

The present Meeting re-evaluated emamectin benzoate with respect to its acute toxicity. Based on a critical review of all relevant studies in rats and dogs, a table with the overall NOAELs and lowest-observed-adverse-effect levels (LOAELs) for acute and repeated-dose toxicity studies in rats and dogs was compiled (Table 1).

Table 1 Overview of overall NOAELs and LOAELs in rats and dogs

	Clinical signs of neurotoxicity		Neuropathology	
	NOAEL (mg/kg bw per day)	LOAEL (mg/kg bw per day)	NOAEL (mg/kg bw per day)	LOAEL (mg/kg bw per day)
Rat acute	5	10	10	25
Rat repeated (14-week, 1-year, 2-year studies)	2.5 ^a	5.0 ^a	1.0 ^a	2.5 ^a
Dog after 7 days of treatment (5-week, 14-	1.5	–	1.5 ^b	– ^b

	Clinical signs of neurotoxicity		Neuropathology	
	NOAEL (mg/kg bw per day)	LOAEL (mg/kg bw per day)	NOAEL (mg/kg bw per day)	LOAEL (mg/kg bw per day)
week studies)				
Dog after 13 days of treatment (5-week, 14-week, 1-year studies)	0.75 ^a	1.0 ^a	0.5 ^{b,c}	1.5 ^b
Dog repeated end of study (1-year study)	0.25	0.5	0.25	0.5

^a Overall NOAELs/LOAELs.

^b Data from a 5-week special neurotoxicity study, using a limited number of dogs.

^c Assessed after 5 weeks of treatment.

The data on rat and dog show that in repeated-dose studies, dogs are more sensitive than rats with respect to clinical signs and neuropathological effects. Thus, it was considered likely that the NOAEL for acute toxicity in dogs will be lower than the NOAEL for acute toxicity in rats. As dogs were not treated acutely with emamectin benzoate and were treated only at doses up to 1.5 mg/kg bw per day in repeated-dose studies, an indication of the acute toxicity NOAEL may be obtained from comparison with the rat data. The data on rat show that the NOAEL and LOAEL for clinical signs in repeated-dose studies are about 2 times lower than those in the acute toxicity study. It seems reasonable to assume that a similar small difference between the acute and repeated-dose NOAELs for clinical signs exists in dogs. Thus, the Meeting agreed with JECFA that it cannot be excluded that at single doses 2–3 times above 1.5 mg/kg bw, neurotoxicity might occur in dogs.

The present Meeting concluded that as a conservative approach, it would base the ARfD on the NOAEL of 1.5 mg/kg bw per day, the highest dose at which no clinical signs or neuropathology was observed after 7 days of treatment in repeated-dose studies in the dog. Therefore, the Meeting withdrew the ARfD of 0.03 mg/kg bw, established in 2011.

The Meeting established an ARfD of 0.02 mg/kg bw for emamectin benzoate, on the basis of the absence of clinical signs of neurotoxicity after 7 days of treatment with 1.5 mg/kg bw per day in 5-week and 14-week studies in dogs, and applying a safety factor of 100. The Meeting considered that application of an additional safety factor was not necessary because clinical signs did not occur at 1.5 mg/kg bw per day given for 7 days and because in a 5-week special neurotoxicity study using a limited number of dogs, no signs of neuropathology were observed after 7 days of treatment with 1.5 mg/kg bw per day.

2. General Considerations

2.1 Guidance document for WHO monographers

After the JMPR 2013, the Secretariat organized a workshop to finalize the elaboration of the new guidance document for monographers. The resulting document was agreed to by the participants of the 2013 JMPR and presented to JECFA 79 in order to ensure consistency across FAO/WHO committees.

The present Meeting discussed and adopted a modified version of Chapter 7 of the guidance document on “Considerations on plant and animal metabolites”. The associated assessment scheme, which includes the threshold of toxicological concern (TTC) and read-across approaches, was also modified.

The Meeting also identified minor changes to the standard phrases and templates included in the guidance document.

With these changes, JMPR adopted the guidance document for monographers and recommended that the JMPR Secretariat publish it.

2.2 Update on the revision of the Principles and Methods for the Risk Assessment of Chemicals in Food (EHC 240)

JMPR agreed at its meeting in 2013 that review of EHC 240, WHO's guidance on the general principles underpinning, among others, the risk assessment of pesticides, should be a standing item on its agenda, starting from the present meeting (2014), and that any chapters requiring revision would be identified.

The present Meeting adopted revised guidance for the preparation of monographs, which included a new section on the assessment of the toxicological relevance of plant and animal metabolites of pesticides. The Meeting recommended that consideration should be given to updating the relevant section of EHC 240 to take account of the developments included in this revised guidance.

The Meeting noted ongoing activities within WHO on the development of guidance on evaluating and expressing uncertainty in hazard characterization. This may necessitate revision of EHC 240 in the future. WHO and EFSA have commenced a review of the threshold of toxicological concern (TTC) approach for compounds with limited or no toxicological data. This, and related activities on the TTC approach, may require revision of the relevant sections of EHC 240. The Meeting noted that the first meeting of the WHO Risk Assessment Network will take place in Paris on 8–10 October 2014, the output of which might lead to activities necessitating revision of EHC 240.

2.3 Hazard assessments in the 21st Century: Incorporating data from new mechanistic-based approaches in JMPR evaluations

At the 2012 and 2013 Meetings, JMPR discussed the evaluation of data from new mechanistic-based approaches ("Tox 21") in the risk assessment of dietary exposure to pesticide residues. The Meetings concluded that it would be useful to evaluate data generated using new technologies as they become available, in parallel with the results of traditional toxicity testing, to determine their utility and role in the evaluation of pesticides and their metabolites. To that end, the call for data for the 2014 Meeting included a request for "Data from new molecular, cell and computer-based approaches", with a note that "There has been great interest in the development of new mechanistic-based approaches. It is the opinion of JMPR that scientific developments and understanding are not sufficient at this time to enable the replacement of in vivo testing with in vitro methods to predict hazards and potency for systemic toxicities. However, new approaches can be used to complement traditional testing. In addition, JMPR offers to evaluate without prejudice, in parallel, any data generated using emerging methods that in the view of sponsors could substitute for information obtained using conventional testing methods (see Report of 2012 JMPR)."

The Meeting was disappointed that no such data were submitted for consideration at the 2014 JMPR. There are two possible explanations for this. Either such data are not being generated or, perhaps more likely, there is a lack of confidence in their contribution to the risk assessment of pesticides at this time. The Meeting remains of the view that it would be of value to consider such data in parallel with the results of traditional toxicity testing and would welcome submission of the results of such studies for forthcoming meetings of JMPR.

2.4 Cumulative assessment group methodology

In the report of its 46th Session, CCPR recommended that JMPR review the various approaches for assessing cumulative risk of chemicals in food that are currently under development or in use worldwide. In response, JMPR performed a review of existing guidance, assessments and proposed approaches for cumulative risk assessment related to pesticide residues in food and summarized the main principles and findings.

National approach in the USA

The United States Environmental Protection Agency (USEPA) developed a methodology for the cumulative risk assessment of pesticides that have a common mechanism of toxicity. This methodology is described in *Guidance on Cumulative Risk Assessment of Pesticide Chemicals that Have a Common Mechanism of Toxicity*.¹ “Mechanism of toxicity” is defined as “the major steps leading to a toxic effect following interaction of a pesticide with biological targets”, and “common mechanism of toxicity” is defined as “pertaining to two or more pesticides or other substances that cause a common toxic effect to human health by the same, or essentially the same, sequence of major biochemical events”. The preliminary grouping of substances is based upon initial screening of data related to structural similarities, mechanism of pesticidal action, understanding of general mechanisms of toxicity in mammalian systems and identification of a particular toxic effect. A detailed evaluation of all existing toxicological data on all members of the preliminary group is conducted. As cumulative risk assessment is restricted to chemicals acting by a common mechanism of toxicity, the default assumption is that the only significant type of interaction that might occur will be dose addition.

Cumulative risk assessments must be based on the end-point chosen as a direct consequence of the common mechanism, which is not necessarily the most sensitive adverse effect for all individual chemicals in the group.

Several general procedures have been considered in attempts to conduct combined or cumulative risk assessments with a group of pesticides having similar mechanisms of action:

- hazard index;
- point of departure index;
- relative potency factors;
- combined margins of exposure; and
- cumulative risk index.

The USEPA has conducted cumulative risk assessments for the following groups of compounds:

- **Organophosphorus compounds (OPs):** OPs that inhibit acetylcholinesterase were established as the first common mechanism group, including 50 compounds. The USEPA has performed a cumulative risk assessment for OPs taking into account existing hazard and exposure data and modelling approaches. It was concluded that cumulative exposure to OPs through food was dominated by a few uses of OP pesticides on food crops and that it did not pose a concern to consumers.²
- **Chloroacetanilides:** A group of three compounds was considered a common mechanism group. One of these compounds was excluded from the assessment based on exposure considerations. Evaluation of the total risk from exposure to chloroacetanilides in foods indicated that the cumulative margin of exposure (13 000–53 000) did not raise concern.³
- **Triazines:** Three triazines and three of their metabolites were identified as a common mechanism group. The most important source of exposure was found to be drinking-water, and the determined margin of exposure was always greater than 300. It should be noted that this cumulative risk assessment is being revised, and thus the estimated margins of exposure may change.⁴
- **N-Methyl carbamates:** Ten N-methyl carbamates were identified as a common mechanism group. The USEPA concluded that a few uses of N-methyl carbamate pesticides on certain food crops were the major contributors to the cumulative risk. The target margin of exposure of 10 was reached at the 99.848th and 99.870th percentiles of the

¹ EPA (U.S. Environmental Protection Agency), 2002a. Guidance on Cumulative risk assessment of pesticide chemicals that have a common mechanism of toxicity. Washington, DC.

² EPA (U.S. Environmental Protection Agency), 2002b. Preliminary cumulative organophosphorus risk assessment. Washington, DC

EPA (U.S. Environmental Protection Agency), 2006a. Organophosphorus cumulative risk assessment. 2006 update. Washington, DC.

³ EPA (U.S. Environmental Protection Agency), 2006b. Cumulative risk from chloroacetanilide pesticides. Washington, DC.

⁴ EPA (U.S. Environmental Protection Agency), 2006c. Cumulative risk from triazine pesticides. Washington, DC.

most exposed age groups (children 1–2 and 3–5 years old, respectively). The 99.9th percentile margins of exposure were 7.9 and 8.6 for the same age groups, whereas in the other age groups of the population, they ranged from 12 to 42.⁵

- **Pyrethroids and pyrethrins:** The most recent cumulative assessment deals with pyrethroids and pyrethrins.⁶ For the pyrethroid common mechanism group, those chemicals that pose very low risk (either low toxicity or low exposure) were considered unlikely contributors to cumulative risk and were excluded from the assessment.

National approach in Canada

Canada (Pest Management Regulatory Agency of Health Canada) adapted the USEPA's *Guidance for Identifying Pesticide Chemicals and Other Substances that Have a Common Mechanism of Toxicity* and performed separate cumulative risk assessments of OPs and *N*-methylcarbamates using this guidance.⁷

Approach in the European Union

EFSA proposed a tiered approach to form cumulative assessment groups according to the following scheme: Level 1: target organ; Level 2: specific phenomenological effect; Level 3: mode of action; and Level 4: mechanism of action.⁸ To date, 16 organs have been identified, forming Level 1 cumulative assessment groups; some of these cumulative assessment groups have been further evaluated to obtain Level 2 cumulative assessment groups. EFSA has not yet finalized the methodology to carry out cumulative risk assessment.

Other approaches

Several individual European countries have conducted cumulative risk assessments for OPs and carbamates, following methodology similar to that proposed by the USEPA.

On a case by case basis, JMPR has assessed the combined risk for active ingredients and their metabolites (e.g., fenamidone; see section 5.11 of the 2014 JMPR Report).

JMPR will continue to follow the issue of cumulative risk assessment for pesticides, as it evolves, and consider its applicability to JMPR's work. The Meeting recommended that the Secretariat identify relevant developments and place them on the agenda for discussion at the next appropriate JMPR.

2.5 Characterisation of long-term risk for pesticide residues

The current JMPR procedure for chronic dietary risk assessment for pesticide residues does not consider possible exposure scenarios where the time-weighted average exposure during less than a lifetime is greater than the lifetime average exposure. The current procedure is considered adequate as long as any toxic effects in less-than-lifetime studies occur at significantly higher levels compared with chronic studies. However, experience shows that it is not a rare finding that potency for toxicological effects is similar over a wide range of exposure durations up to chronic exposures. For

⁵ EPA (U.S. Environmental Protection Agency), 2005. Estimation of cumulative risk from N-methyl carbamate pesticides: preliminary assessment. Washington, DC.

EPA (U.S. Environmental Protection Agency). 2007a. Estimation of cumulative risk from N-methyl carbamate pesticides: preliminary assessment. Washington, DC.

EPA (U.S. Environmental Protection Agency), 2007b. Revised N-methyl carbamate cumulative risk assessment, U.S. EPA September 24, 2007.

⁶ EPA (U.S. Environmental Protection Agency), 2011. Pyrethrins/Pyrethroid Cumulative Risk Assessment. 88 pp.

EPA (U.S. Environmental Protection Agency), 2013. Common Mechanism Grouping for the Pyrethrins and Synthetic Pyrethroids August 28, 2013

⁷ PMRA (Canadian Pest Management Regulatory Agency), 2001. Guidance for Identifying Pesticides that have a Common Mechanism of Toxicity for Human Health Risk Assessment January 25, 2001.

⁸ EFSA (European Food Safety Authority), 2013. Scientific Opinion on the identification of pesticides to be included in cumulative assessment groups on the basis of their toxicological profile EFSA Journal 2013;11(7):3293,(131pp)

example, during the current JMPR, for cyflumetofen, similar rat NOAELs were identified in 4-week, 13-week and 104-week studies (37.6, 16.5 and 16.5 mg/kg bw per day, respectively).

The Meeting recommends that the Secretariat convene a multidisciplinary working group in order to develop criteria to identify relevant compounds and develop models to cover exposures longer than 1 day but shorter than lifetime, as needed.

2.6 Incomplete toxicological data packages

During the preparation of the toxicological monographs or even at the meeting, it often appears that several toxicological studies have not been submitted to the JMPR but are publicly available or were submitted in the past to national regulatory authorities. This results in additional pressure on the scarce resources of JMPR, as the new information has to be incorporated at a late stage, which is often not feasible.

Of particular concern is when information on potentially adverse findings is not made available. The Meeting re-emphasized the importance of complete submission of data on the compound and its metabolites to enable JMPR to perform state-of-knowledge risk assessments. In future, if the Meeting becomes aware of significant data that could have been submitted by the sponsor but were not, it will consider postponing the evaluation of the compound for establishing MRLs and/or reference doses.

The Meeting recommended that the Secretariat should ensure that sponsors complete a declaration that, to the best of their knowledge, all available information has been submitted for consideration by JMPR.

2.7 Maximum residue limits for pesticides for minor/specialty crops (comments on proposals from the 46th CCPR)

The Meeting noted that the 46th Session of the CCPR discussed the issue of the minimum number of independent supervised residue trials required to support MRLs for minor or specialty crop⁹ and while emphasising that data submitters should provide as many trials as possible to establish a robust MRL, has asked for JMPR comments on the suitability of using a tiered approach to categorise commodities according to their global or regional consumption patterns and to propose that for the elaboration of MRLs, reduced numbers of trials could be considered for commodities of lesser importance in terms of consumption.

However, rather than using a global or regional consumption-based approach to assess whether enough trials have been provided, the Meeting uses expert judgement to assess whether there are sufficient data points to adequately reflect the likely range of residues that could be expected in commodities from commercially treated crops. Ideally this should require at least 15 data points, as maximum residue level estimates become increasingly unreliable as the number of residue values decrease.

When considering the lists of commodities in the various Categories being proposed by the CCPR, the Meeting noted that in general, for those proposed in Categories 2 and 3, the suggested minimum number of trials are not too dissimilar to current JMPR procedure.

In practice, JMPR is reliant on the data provided by the data submitters, and this in turn often depends on the registration requirements of national regulatory agencies. Generally, for commodities other than those considered 'major', if the number of independent supervised trials are less than 6–8, JMPR will assess the data on a case-by-case basis, taking into account the nature of the crop, the

⁹ Report of the 46th Session of the Codex Committee on Pesticide Residues (REP14/PR), (para 174, Appendix XI)

behaviour of the pesticide, the GAP and the availability of mutually supporting data from similar commodities.

The Meeting notes that as residues in trials are inherently variable, the numbers of trials necessary to support robust maximum residue level estimates at both the national and international level may need to be increased.

2.8 Further consideration of the process for establishing group MRLs

The estimation of commodity group MRLs is common practice by the JMPR¹⁰ with the aim to cover minor crops by a group maximum residue level. The 2013 JMPR provided additional guidance on recommending crop group MRLs¹¹. The main principles were that group MRLs are only estimated if (1) the pesticide is registered for a group or sub-group of commodities as defined by the Codex Classification system and if (2) the median residue of the datasets of the commodities are within the “5 times range” to avoid an overestimation of the MRL beyond the natural variability of the data sets.

Recently, representative commodities for each Codex Classification commodity group/subgroup were defined by the CCPR¹². The Committee has proposed representative crops for fruits. The following principles should be used for the selection of representative commodities:

- A representative commodity is most likely to contain the highest residues.
- A representative commodity is likely to be major in terms of production and/or consumption.
- A representative commodity is most likely similar in morphology, growth habit, pest problems and edible portion to the related commodities within a group or subgroup.

The application of the three principles in the selection of representative commodities is based on the assumption that all commodities of the respective group or subgroup are treated according to a similar use pattern or GAP. It was also agreed by the Committee that, to facilitate the global use of the commodity groups for MRLs, alternative representative commodities may be selected giving flexibility for use of residue research conducted in different countries or regions that may vary due to regional differences in dietary consumption and/or areas of production for certain commodities. In the document is stated:

The JMPR may be advised to use the representative commodities adopted.

The JMPR was requested to provide to the CCPR justification for the use of any alternative representative commodities.

The JMPR welcomes the activities of the CCPR defining principles for the selection of representative crops and extrapolation to commodity groups. However, the Meeting noted that the current CCPR-principles are sometimes inconsistent and often not applicable simultaneously. For example it is not always guaranteed that a commodity, which is representative in terms of morphology, also contains the upper residue within the group. In addition, the selection of representative crops is mainly driven by production and/or consumption rather than likely residues. Therefore the Meeting stated that in some crop groups the range of residues could be significantly different to that found in the representative crop.

The Meeting took note of a review by Australia, presented at the 46th Session of CCPR on group MRLs¹³. In the review, 159 group MRLs recommended by the JMPR from 2004 to 2012 and adopted by the CAC up to 2013, were analysed. The medians of the datasets for individual commodities of the group were divided by the lowest median value. The results confirmed the

¹⁰ FAO Manual. Submission and evaluation of pesticide residues data for the estimation of maximum residue levels in food and feed. FAO plant production and protection paper 197 (ISBN 978-92-5-106436-8). FAO 2009

¹¹ 2013 JMPR Report, 2.9 Guidance for estimating pesticide residue levels for commodity groups.

¹² REP12/PR-Appendix XII. Draft Principles and Guidance on the Selection of Representative Commodities for the Extrapolation of Maximum Residue Limits for Pesticides to Commodity Groups (At Step 8)

¹³ CCPR 2014, 46th Session, CRD 10, Comments from Australia on Group MRLs and Commodity Groups.

approach by the 2013 JMPR and the criteria established. For illustration, the recommendations by the 2014 JMPR on group MRLs are summarized in Table 1.

The Meeting concluded that for estimating a group maximum residue level, it is necessary to have data for those representative commodities of the subgroups likely to have the highest and the lowest residues. If there are sufficient data for a subgroup according to the new Codex classification, the Meeting agreed to estimate maximum residue levels for the subgroup only. For each crop group (or sub-group) critical commodities need to be identified.

Table 1 Group MRL recommendations by the 2014 JMPR

Pesticide, registered use	Commodity, Trials (n)	Median residue	Max. ratio of Medians	Group MRL?	Data set used	Recommendation for Group/Subgroup	MRL
Chlorantraniliprole, Citrus fruits	Orange (7) Mandarin, tangelo (8)	0.22 0.22	1	Yes	Combined	Citrus fruits	0.7
Cyflumetofen, Citrus fruits	Orange (11) Grapefruit (6) Lemon (5)	0.08 0.04 0.02	4	Yes	Combined	Citrus fruits	0.3
Cyflumetofen, Pome fruits	Apple (12) Pear (5)	0.115 0.12	1.04	Yes	Combined	Pome fruits	0.4
Fenamidone, Fruiting vegetables, cucurbits	Cucumber (9) Melons (16)	0.09 0.04	2.25	Yes	Combined	Fruiting vegetables, cucurbits	0.2
Fenamidone, Fruiting vegetables, other than cucurbits	Chili pepper (3) Tomato (17) Sweet pepper (6)	1.3 0.33 0.075	17.3 ^a 4.4	Yes, except chili pepper	Individual based on Tomato	Fruiting vegetables, other than cucurbits, except sweet corn, mushrooms, chili pepper	1.5
Fenpropathrin, Citrus fruits	Lemon (3) Grapefruit (7) Orange (13)	0.56 0.34 0.27	2.07	Yes	Combined	Citrus fruits	2
Fenpropathrin, Pome fruits	Pear (4) Apple (4)	0.75 0.73	1.03	Yes	Combined	Pome fruits	3
Fenpropathrin, Stone fruits	Cherry (6) Peach (10) Plum (7)	1.85 0.705 0.25	7.4	No	Individual	Subgroup Cherries	7
					Individual	Subgroup Peaches	3
					Individual	Subgroup Plums	1
Fenpropathrin, Fruiting vegetables, other than cucurbits	Peppers (10) Tomato (9)	0.37 0.19	1.95	Yes	Combined	Fruiting vegetables other than cucurbits, except sweet corn and mushrooms	1.5
Myclobutanil, Pome fruits	Apple (6) Pear (8)	0.06 0.055	1.09	Yes	Combined	Pome fruits	0.6
Myclobutanil, Stone fruits	Cherry (8) Peach (8) Apricot (7) Plum (8)	0.885 0.705 0.18 0.265	4.91	No	Individual	Subgroup Cherries	3
					Individual	Subgroup Peaches	3
					Individual	Subgroup Plums	2
Myclobutanil, Fruiting vegetables, cucurbits	Melon (6) Squash (9) Cucumber (6)	0.075 0.04 0.035	2.14	Yes	Combined	Fruiting vegetables, cucurbits	0.2
Sulfoxaflor, Citrus fruits	Mandarins (4)	0.31	24.8	No	Mandarin + Orange	Subgroup Mandarin	0.8
	Oranges (6)	0.215			Mandarin + Orange	Subgroup Oranges, Sweet, Sour	0.8
	Lemons (5)	0.038			Lemons	Subgroup Lemons and Limes	0.4
	Grapefruit (6)	0.0125			Grapefruit	Subgroup Pummelos	0.15
Sulfoxaflor, Pome fruits	Apples (21) Pears (13)	0.057 0.086	1.5	Yes	Combined	Pome fruits	0.3
Sulfoxaflor, Stone fruits	Cherry (14) Peach (8) Apricot (2) Nectarine (5) Plum (7)	0.34 0.0545 0.155 0.061 0.038	8.9	No	Cherry	Subgroup Cherries	1.5
					Peach + Apricot + Nectarine	Subgroup Peaches	0.4
					Plums	Subgroup Plums	0.5

^a Chili pepper

2.9 IESTI calculations for kumquat in relation to group MRLs for “Citrus fruits” and “Lemons and Limes”.

The 46th Session of the CCPR in 2014 considered whether it would be appropriate to remove a footnote saying “excluding kumquats” from the MRLs for “citrus fruits” and “lemons and limes” (REP 14/PR, paras 117-131).

The Committee agreed to remove the term “excluding kumquats” from the MRLs for “citrus fruits” and “lemons and limes” in the Codex Database for Pesticide Residues with the exception of the group MRLs for dimethoate, awaiting the periodic review of this pesticide by JMPR in 2019, and to forward the revised groups MRLs for “citrus fruits” and “lemons and limes” for relevant pesticides to the Codex Alimentarius Commission for adoption noting that these were consequential amendments to the revision of the fruit commodity groups in the Codex Classification (kumquats are now included in the subgroup of “lemons and limes”). These revised group MRLs were adopted by the 37th Commission (REC 14/CAC, paras 87–89).

The CCPR also agreed that, unless otherwise specified, group MRLs for “citrus fruits” and “lemons and limes” would also encompass kumquats.

The CCPR requested JMPR to:

- i. calculate IESTI for kumquats when estimating MRLs for “citrus fruits” and “lemons and limes”; and
- ii. consider the appropriateness to use large portion consumption data on kumquats and HR of citrus fruits in whole fruits for the estimation of the group MRLs.

As it is unlikely for JMPR to receive supervised trial data on kumquats, the Meeting concluded that it is appropriate to use the large portion consumption data on kumquats and the HR in whole fruits (“citrus fruits” or “lemons and limes”) for calculating IESTI for kumquats, as the whole fruit of kumquat is edible and consumed. For calculating IESTI for other commodities in the group of “citrus fruits”, the Meeting continues to use the HR in edible portion (i.e., pulp), if such data are available.

The Meeting has already conducted IESTI calculation for kumquats at the current Meeting and agreed to continue doing so in any future evaluations where maximum residue levels for “citrus fruits” or “lemons and limes” are considered.

2.10 Update of the GEMS/Food diets for estimation of the IEDI

In 1997 the WHO introduced the GEMS/Food cluster diets. The first cluster diets were based on the 1990-1994 FAO food supply utilisation account (SUA) data. The method used cluster analysis and an iterative approach based on the use of 19 marker foods to define 13 diets representing 183 countries. The 13 cluster diets were later updated using food SUA data from 1997 to 2001. The updated 13 cluster diets were used by the JMPR to predict pesticide residue exposures in the period 2006–2013.

In 2012, WHO introduced a new methodology to cluster the FAO food SUA data into 17 diets based on statistical similarities between dietary patterns in 179 countries. The new cluster diets were based on the more recent 5-year average FAO food SUA data from 2002–2007. These average data were weighted by the population size to get average consumption in kg/person/cluster over a 5 year period.

The 2013 JMPR used the draft 17 cluster diet IEDI model on the compounds evaluated in the 2013 JMPR to gain experience in the differences in exposure that can be expected and to identify food commodities where more detailed consumption data or additional recalculations are necessary.

Following a FAO/WHO call for data in 2012 several countries submitted their national consumption data. These national consumption data were used to derive split factors for the aggregate consumption data as present in the GEMS/Food 17 cluster diet data. The aggregated data were multiplied by this split factor to get consumption data for the individual commodities.

For example, berries ‘Not Elsewhere Specified’ (NES) in the GEMS/food cluster diets is an aggregated food commodity including inter alia: blackberry (*Morus nigra*); loganberry; white and red mulberry (*M. alba*, *M. rubra*); myrtle berry (*Myrtus communis*); huckleberry; dangleberry (*Gaylussacia* spp.). In order to split the consumption data for this aggregated commodity, consumption data for adults for berries not else specified in the GEMS/food cluster diets were extracted from the national consumption database. In the national consumption database information was available for blackberries, dewberries and mulberries. For example in cluster diet G07, national consumption data were available for France and the United Kingdom. For France the fraction for blackberries was calculated based on the consumption value for blackberries, divided by the sum of the consumption values for blackberries, dewberries and mulberries (see Table 1). The fractions for France and UK were averaged and a split factor for each one was used to split the GEMS/food cluster diet G07 consumption data for berries NES into individual consumption data for blackberries, dewberries and mulberries, respectively (see Table 2). For the other berries for which no national consumption data were available (myrtle berry, huckleberry, dangleberry) a split factor of 0 was used.

National average consumption data were available for 23 countries belonging to 8 clusters. For the 9 clusters where no national consumption data were available, a split factor based on the average split factors of all other clusters was used.

Table 1 Calculation of split factors based on national consumption data

Country	Commodity	National Consumption Mean g/day	Fraction
France	Blackberries	0.0047	0.2632
	Dewberries	0.0000	0.0000
	Mulberries	0.0132	0.7368
UK	Blackberries	0.0516	0.9936
	Dewberries	0.0003	0.0064
	Mulberries	0.0000	0.0000
Average Fractions (i.e. split factors)	Blackberries	-	0.6284
	Dewberries	-	0.0032
	Mulberries	-	0.3684

Table 2 Calculation of consumption values for individual commodities within GEMS/food 17 clusters

Cluster diet G07 Consumption Mean g/day	Individual commodities	Split factors	Consumption mean g/day
0.1453 g/day Berries NES	Blackberries	0.6284	0.0913
	Dewberries	0.0032	0.0005
	Mulberries	0.3684	0.0535
	Myrtle berries	0.0000	No consumption
	Huckleberries	0.0000	No consumption
	Dangleberries	0.0000	No consumption

NES = not elsewhere specified

The consumption data of the individual commodities were incorporated in the JMPR IEDI model by RIVM¹⁴ acting as a WHO collaborating centre. All calculations applied to the original GEMS/food data have been incorporated in the model, in order to provide transparency to the users of the IEDI model. The JMPR IEDI model is an automated Excel spreadsheet for the calculation of long term dietary intake of pesticide residues. To use the IEDI model, estimates made by JMPR (ADI, STMR(-P) and when necessary MRL values) are entered according to the manual attached to the spreadsheet. Then exposure calculations and generation of an overview table are performed automatically.

¹⁴ Rijksinstituut voor Volksgezondheid en Milieu (Dutch National Institute for Public Health and the Environment), Bilthoven, Netherlands

The JMPR used the new 17 cluster diet IEDI model on the compounds evaluated by the JMPR 2009-2013, where a chronic exposure of 20% ADI or higher was found. The dietary exposures obtained with the 13 cluster diet model and the new 17 cluster diet IEDI model are listed in Table 3. Since the new model is more transparent, uses more recent consumption data and clusters are more precisely defined, the JMPR 2014 Meeting decided to use the new 17 cluster diet IEDI model and considers the model final. The new 17 cluster diet IEDI model is available at http://www.who.int/foodsafety/areas_work/chemical-risks/gems-food/en/

Table 3 Comparison between the 13 cluster diet and the new 17 cluster diet IEDI model for some compounds evaluated by the JMPR 2009-2013

Codex Code	Compound	Year	No of entries	%ADI (13 clusters)	%ADI (17 clusters)
25	Dichlorvos	2012	9	5-30%	2-30%
26	Dicofol	2012	1	1-30%	4-50%
81	Chlorothalonil	2012	23	8-50%	8-50%
90	Chlorpyrifos-methyl	2013	39	20-110%	20-90%
112	Phorate	2012	18	10-40%	5-30%
118	Cypermethrins	2011	64	7-30%	7-30%
143	Triazophos	2013	3	1-40%	1-20%
173	Buprofezin	2012	28	2-50%	3-40%
179	Cycloxydim	2012	40	6-50%	6-80%
194	Haloxifop	2009	28	20-80%	10-60%
203	Spinosad	2011	65	10-30%	6-40%
207	Cyprodinil	2013	41	5-40%	6-70%
216	Indoxacarb	2013	46	1-30%	3-40%
217	Novaluron	2010	23	7-50%	5-40%
221	Boscalid	2010	82	10-40%	10-40%
224	Difenoconazole	2013	54	4-60%	5-70%