METRAFENONE (278)

The first draft was prepared by Mr David Lunn, Ministry for Primary Industries, Wellington, New Zealand

EXPLANATION

Metrafenone, a benzophenone fungicide active mainly against powdery mildew and eyespot, was first evaluated by the 2014 JMPR where residue definitions were proposed, an ADI of 0–0.3 mg/kg bw was established and an ARfD was not considered necessary. Maximum residue levels were also recommended for a range of commodities where GAP information was available.

The residue definition established by the 2014 JMPR for both MRL-compliance and dietary intake assessment for plant and animal commodities was: *metrafenone*.

Metrafenone was scheduled by the 47th Session of the CCPR for the evaluation of additional MRLs by the 2016 JMPR and the current Meeting received new GAP information and new supporting residue information from the manufacturer for pome fruit, stone fruit and hops and a residue stability study on fresh, quartered melons. The Meeting considered relevant residue information provided to the JMPR in 2014 for fruiting vegetables in light of new GAP information.

In this evaluation, the values presented in the tables are as reported in the various studies, but in the accompanying text, they have generally been rounded to two significant digits.

METHODS OF RESIDUE ANALYSIS

Analytical methods

The 2014 JMPR reviewed and summarized analytical method descriptions and validation data for metrafenone in crop and animal matrices. These included the QuEChERS 1 Method and Method 535/3 which were used to measure metrafenone in the new supervised residue trials on pome fruit, stone fruit and hops.

Table 1 Summary of metrafenone analytical methods used in the new residue trials on pome fruit, stone fruit and hops [Ref: 2014 JMPR Metrafenone Evaluation, Table 27, pp 1194–95]

Matrix	Analyte	Method	Principle	LOQ (mg/kg)	Reference
Wheat forage Wheat straw Wheat grain Cucumber Lemon Beans Oilseed rape (seed) Hops (dry cones)	Metrafenone	QuEChERS 1	Acetonitrile extraction (pH 5–5.5 buffer) SPE clean-up LC-MS/MS analysis m/z 409 → m/z 209 / m/z 409 → m/z 227 m/z 409 → m/z 209 / m/z 411→ m/z 209 for dry hop cones	0.01	2011/7007816
Hops (green cones) Hops (dry cones) Beer	Metrafenone	535/3 (L0076/03)	Methanol/water/HCl extraction cyclohexane partition (alkaline) HPLC-MS/MS analysis m/z 411 → m/z 209 / m/z 411 → m/z 229	0.01	2010/1089964

Data collection methods

QuEChERS (plant matrices)

In this method, homogenised samples were extracted with acetonitrile in frozen conditions, mixed with magnesium sulphate, sodium chloride and citrate salts for buffering to pH 5–5.5, centrifuged for phase separation and an aliquot of the acetonitrile phase was cleaned-up by a dispersive SPE on PSA (primary secondary amine sorbent). Analysis was by LC-MS/MS, monitoring two parent daughter ion transitions (MRM). The LOQ of the method was 0.01 mg/kg for each matrix.

In the new supervised field trials, method validation was also conducted prior to analysis of the field samples. Method validation recovery rates in the new studies are summarized below.

Table 2 Metrafenone analytical validation recovery rates for QuEChERS analytical method

Matrix	Fortification (mg/kg)	Recovery (%)	Mean	Reference
Apple	0.01 0.1	96, 99 95, 103	98 99	2012/7004394
Pear	0.01 1.0	101 101	101 101	
Cherry	0.01 0.1 1.0 2.0	115, 116, 120 119, 119, 125 121, 123, 124 100, 101, 104	117 121 123 102	2013/7001794
Peach	0.01 0.1 1.0	99, 116, 121 102, 103, 105 79, 81, 82	112 103 81	2013/7001835
Hops (green cones)	0.01 0.1 1.0	82, 94, 95 100, 108, 109 92, 96, 101	90 106 96	2013/7001795
Hops (dried cones)	0.01 0.1 1.0 200	84, 92, 97 86, 95, 96 103, 114, 120 92, 103, 104	91 92 112 100	

BASF Method 535/3 (L0076/03)—hops and beer

The BASF Method 535/3 was evaluated by the 2014 JMPR as a suitable data-collection method to measure residues of metrafenone in hop cones (green and dried) and in beer, with an LOQ of 0.01 mg/kg.

Metrafenone residues are extracted with a mixture of methanol water and hydrochloric acid. An aliquot of the extract is centrifuged and partitioned at alkaline conditions against cyclohexane. The final determination is performed by HPLC-MS/MS and the LOQ of the method is 0.01 mg/kg for each matrix.

Table 3 Metrafenone analytical validation recovery rates for BASF method 535/3

Matrix	Fortification (mg/kg)	Recovery (%)	Mean	Reference
Hops (green cones)	0.01 0.1	93, 100, 101, 102, 103 93, 96, 96, 97, 99	100 96	2010/1089964
Hops (dried cones)	0.01 0.1	81, 88, 89, 89, 92 87, 88, 92, 96, 97	88 92	
Beer	0.01 0.1	93, 94, 95, 98, 101 91, 92, 92, 96, 96	96 94	

Analytical (concurrent) recoveries in supervised crop trials

Analytical recovery rates were measured in all the supervised crop field trials, with control samples being fortified with metrafenone at 0.01 mg/kg and at higher levels that generally reflected the range

of expected residues. In the European trials the common analytical method was Method 535/3 and the QuEChERS method was predominantly used in the North American trials.

For each study, average recoveries per fortification level generally fell within the 70–120% range, with a relative standard deviation of 20% or less. Information on the concurrent recovery rates in the new supervised field trials are summarized below and for the trials reviewed by the 2014 JMPR, average concurrent recovery rates are reported in the relevant supervised crop field trial sections.

Table 4 Metrafenone analytical concurrent recovery rates in the supervised field trials

Matrix	Method	Fortification (mg/kg)	Recovery (%)	Mean	Reference
Apple	QuEChERS 1	0.01 0.1 1.0	95, 98 92 99	97 92 99	2012/7004394
Pear	QuEChERS 1	0.01 1.0	101 101	101 101	
Cherry	QuEChERS 1	0.01 0.1 1.0	78, 84, 87, 107 111 83, 107, 107	89 111 99	2013/7001794
Peach	QuEChERS 1	0.01 0.1 1.0	74, 83, 86, 90, 105, 108 114 76, 92, 104, 104, 107, 109, 114	93 114 101	2013/7001835
Hops (green cones)	QuEChERS 1	0.01 1.0 50	85, 103, 110, 112, 113, 114, 116 97 99, 104, 104	108 97 102	2013/7001795
Hops (dried cones)	QuEChERS 1	0.01 1.0 120 200	71, 84, 86, 90, 94, 95, 100, 118 82, 100 86, 107, 116 76	92 91 103 76	
Hops (green cones)	Method 535/3	0.01 1.0	99, 99 90	99 90	2011/1041886
Hops (dried cones)	Method 535/3	0.01 0.1 1.0 100	81, 83, 107 73 65 99	90 73 65 99	
Hops (green cones)	Method 535/3	0.01 0.1 1.0	91 84 90	91 84 90	2011/1041879
Hops (dried cones)	Method 535/3	0.01 0.1 1.0 50	73 79 93 92	73 79 93 92	

Stability of residues

Plant matrices—stored analytical samples

The 2014 JMPR concluded that metrafenone residues were stable in analytical samples stored frozen (–18 to –20 °C) for up to 24 months in representative substrates with a high water content (lettuce, and tomato), a high starch content (carrot), a high protein content (dry peas), a high oil content (soya bean) and a high acid content (grape, and wine); in wheat grain (high starch), wheat forage and straw (high water content) residues were stable for at least 31 months. In general, residues in the stored samples were greater than 80% of the spiked levels.

Plant matrices—fresh analytical sub-samples

The 2014 JMPR noted that in some of the supervised residue field trials conducted on melons in 2009–2010, the fruit samples had been quartered in the field, and although the subsamples had been frozen within 12 hours after sampling, no information was available on the stability of metrafenone residues in chopped or sliced samples.

The Meeting received an ambient storage residue stability study on melons conducted by Meridian, 2015 [Ref 2015/1196811] where an untreated, homogenised, frozen melon was thawed to room temperature and replicate 5 g samples were spiked with 0.01 mg/kg (0-day samples) or 0.1 mg/kg metrafenone, distributed drop-wise onto the melon matrix in centrifuge bottles. The spiked samples were stored at 19 °C ± 1 °C for up to 16 hours before being placed in the freezer at about < -18 °C, until analysis the following day using the BASF LC-MS/MS Method 535/2 (LOQ of 0.01 mg/kg). Control samples were also freshly fortified at each sampling interval and analysed to determine the procedural recovery efficiency.

After 16 hours storage at room temperature, the measured residues of metrafenone in homogenised melon samples were greater than 79% of the spiked levels.

Table 5 Stability of metrafenone residues in homogenised melon samples spiked at 0.01 mg/kg or 0.1 mg/kg respectively and stored at room temperature (19 °C). [Ref 2015/1196811]

Commodity (fortification)	Storage interval (hours)	Residues remaining in stored samples [a]		Procedural recovery [b]	
		mg/kg		mg/kg	%
Melon (0.01 mg/kg)	0			0.00786, 0.00833, 0.00831	79, 83, 83 [82]
Melon (0.1 mg/kg)	0 1 2 4 6 16	– 0.0951, 0.103, 0.0997 0.0919, 0.0946, 0.0876 0.0873, 0.095, 0.101 0.0919, 0.0953, 0.0918 0.0747, 0.0863, 0.0772	– 95, 103, 100 [99] 92, 95, 88 [92] 87, 95, 101 [94] 92, 95, 92 [93] 75, 86, 77 [79]	0.0881 0.0965 0.0931 0.0979 0.0986 0.0873	88 97 93 98 99 87

[a] Metrafenone residues in stored samples and % fortified level, mean% in square brackets

[b] Metrafenone residues in freshly fortified samples, mean% in square brackets

USE PATTERNS

Information on GAP in Europe, the Americas, Asia and the Pacific was provided to the 2014 JMPR on the use of metrafenone, available as SC formulations, often co-formulated with either epoxiconazole and/or fenpropimorph. The Meeting received additional information on recently authorised uses on pome fruit, stone fruit, grapes, fruiting vegetables and hops in North America, Italy and Spain and the critical national GAPs for these crops are summarized in the following table.

Table 6 New registered uses of metrafenone (300 g ai/L or 500 g ai/L SC formulations)

Crop	Country	Application				Max/season		PHI (days)	Comments
		kg ai/ha	kg ai/hL	water L/ha	RTI (days)	no	kg ai/ha		
Pome fruit									
Pome fruit									
	Canada [a]	0.225–0.336			7–14	3	1.01	7	
	USA [a]	0.224–0.336		min 94 (air)	7–14	3	1.01	7	

Crop	Country	Application				Max/season		PHI (days)	Comments
		kg ai/ha	kg ai/hL	water L/ha	RTI (days)	no	kg ai/ha		
Stone fruit									
Cherries									
	Canada	0.225–0.336				2		7	
	USA	0.224–0.336		min 94 (air)	7–14	2	0.67	7	
Peaches (including nectarines)									
	Canada	0.225–0.336				2	0.67	7	
	USA	0.224–0.336		min 94 (air)		2	0.67	7	
Apricot									
	USA	0.224–0.336		min 94 (air)	7–14	2	0.67	7	
Small fruit vine climbing									
Grapes									
	Canada	0.225			14–21	6	1.35	14	
	USA	0.224–0.336		min 94 (air)	14–21	3	1.01	14	
	Spain	max 0.1	0.005–0.01			3		28	
	Italy	0.1–0.125	0.01–0.0125		8–12	3		28	
Fruiting vegetables, Cucurbits									
Cucurbits									
	Canada [b]	0.225–0.336			7–14	3	1.01	0	
	USA [b]	0.224–0.336		min 47 (air)	7–14	3	1.01	0	
	Spain		0.01	200–1000	14 min	2		3	200–1500 L/ha for indoor cucurbits with edible peel
Cucumber									
	France	0.1			7–10	2		3	
	Italy	0.1	0.01		7–10	2		3	
Melon									
	France	0.1			7–10	2		3	
	Italy	0.1	0.01		7–10	2		3	also watermelon
Summer squash									
	France	0.1			7–10	2		3	
	Italy	0.1	0.01		7–10	2		3	as zucchini
Fruiting Vegetables, other than Cucurbits									
Fruiting vegetables									
	Canada [c]	0.225–0.336			7–14	3	1.01	0	max 2 sequential sprays
	USA	0.224–0.336		min 47 (air)	7–14	3	1.01	0	max 2 sequential sprays
Tomato									

Crop	Country	Application				Max/season		PHI (days)	Comments
		kg ai/ha	kg ai/hL	water L/ha	RTI (days)	no	kg ai/ha		
	Spain		0.015	200–1500	14 min	2		3	
	Italy	0.15	0.015		7–10	2		3	
Eggplant									
	Italy	0.15	0.015		7–10	2		3	
	Spain (indoor)		0.015	200–1000	14 min	2		3	
Peppers									
	Italy	0.15	0.015		7–10	2		3	
	Spain (indoor)		0.015	200–1000	14 min	2		3	
	France (indoor)	0.15			7–10	2		3	
Dried herbs									
Hops									
	Canada	0.225–0.336			14	2	0.67	14	not by air
	USA	0.224–0.336			7–14	2	0.67	3	not by air

[a] Pome fruit: apple, Asian pear, azarole, crabapple, [loquat-USA], mayhaw, medlar, pear, quince, Chinese quince, Japanese quince, tejocote.

[b] Cucurbits = chayote, Chinese wax gourd, citron melon, cucumber, gherkin, pumpkin, watermelon; edible gourd (hechima, hyotan, cucuzza, and Chinese okra); *Momordica* spp. (balsam apple, balsam pear, bitter melon, and Chinese cucumber); muskmelon (cantaloupe, casaba, Crenshaw melon, golden Pershaw, melon, honeydew melon, honey balls, mango melon, Persian melon, pineapple melon, Santa Claus melon, and snake melon); summer squash (crookneck squash, scallop squash, straightneck squash, vegetable marrow, and zucchini); winter squash (butternut squash, calabaza, hubbard squash, acorn squash, and spaghetti squash).

[c] Fruiting vegetables: African eggplant, bush tomato, bell pepper, [cocona—USA], currant tomato, eggplant, garden huckleberry, goji berry, groundcherry, martynia, [naranjilla—USA], okra, pea eggplant, pepino, non-bell pepper, roselle, scarlet eggplant, sunberry, tomatillo, tomato, [tree tomato—USA] and cultivars, varieties and hybrids of these commodities.

RESIDUES RESULTING FROM SUPERVISED TRIALS

The Meeting received new information on supervised field trials involving foliar treatments of metrafenone to pome fruit, stone fruit and hops. Trials on grapes and fruiting vegetables evaluated by the 2014 JMPR were also re-assessed in light of new GAP information provided to the Meeting.

Group	Crop	Countries	Table no
Pome fruit	Apple	USA	7
	Pear	USA	8
Stone fruit	Cherry	USA	9
	Peach	USA	10
Small fruit vine climbing	Grapes	USA	11
Fruiting vegetables, Cucurbits	Cucumber	Nth America (JMPR 2014)	12
	Summer squash	Nth America (JMPR 2014)	13
	Melon	Nth America (JMPR 2014)	14
Fruiting vegetables, other than Cucurbits	Peppers	Nth America (JMPR 2014)	15
	Tomato	Nth America (JMPR 2014)	16

Group	Crop	Countries	Table no
Dried herbs	Hops	Nth America	17, 18

The supervised trials were well documented with laboratory and field reports. Laboratory reports included method validation including procedural recoveries with spiking at residue levels, similar to those occurring in samples from the supervised trials. Dates of analyses or duration of residue sample storage were also provided. Although trials included control plots, no control data are recorded in the tables unless residues in control samples exceeded the LOQ. In such cases, the residues found are noted as "c = nn mg/kg" in the Reference and Comments columns. Residue data are recorded unadjusted for recovery.

Results from replicated field plots are presented as individual values. Residue values have been reported as provided in the study reports, although the results from trials used for the estimation of maximum residue levels (underlined) have been rounded to two significant digits (or if close to the LOQ, rounded to one significant digit). If a higher residue level was observed at a longer PHI than the GAP, the higher value has been used for estimating maximum residue levels and for dietary intake assessment. For trials not considered to be independent, the result from the trial yielding the highest residue was selected for maximum residue level estimation and dietary intake assessment.

When multiple applications were made to a crop, the application rate, spray concentration and spray volume were not always identical from one application to the next. In most trials, the actual treatment rates were within 10% of the listed 'target' application rates, but if not, the actual treatment rates are listed.

Pome fruit

The results from 18 supervised trials on apples (12) and pears (6) conducted in USA were provided to the Meeting.

Apples

In the apple trials, three foliar applications of 0.34 kg ai/ha metrafenone (SC) were applied with adjuvant, at 5–9 day intervals in either 550–800 L water/ha ('concentrate') or 940–2400 L water/ha ('dilute') to single replicate 6–8 tree plots using tractor-mounted airblast sprayers.

Duplicate samples of whole fruit (24 units, 2.7–6.9 kg) were frozen within 4 hours after sampling and stored for up to 24 months before analysis for metrafenone using the LC/MS/MS multi-residue QuEChERS 1 method (LOQ of 0.01 mg/kg).

Table 7 Residues in apples from supervised trials in USA involving three foliar applications of metrafenone (SC formulation)

APPLE Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: USA, Canada	3	0.336				PHI: 7		Max 1.01 kg ai/ha/season	
USA, 2010 Alton, NY (Cortland)	3	0.34	0.03	1122	fruit	0 3 7 14 21	0.337, 0.297 0.345, 0.19 0.188, 0.247 0.226, 0.144 0.098, 0.095	0.32 0.27 <u>0.22</u> 0.19 0.1	2012/7004394 R100195
USA, 2010 North Rose, NY (Ida Red)	3	0.34	0.056	608–617	fruit	7 13	0.159, 0.156 0.224, 0.184	0.16 <u>0.2</u>	2012/7004394 R100196
USA, 2010 Hereford, PA (Star Krimson Red Delicious)	3	0.34	0.026	1291–1309	fruit	7 14	0.45, 0.533 0.434, 0.415	0.49 0.43	2012/7004394 R100197

APPLE Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
USA, 2010 (Cana, VA (Yellow Delicious)	3	0.33	0.044	730–767	fruit	6 15	0.408, 0.483 0.383, 0.177	0.45 0.28	2012/7004394 R100198
	3	0.33	0.024	1375–1431	fruit	6 15	0.349, 0.371 0.324, 0.25	0.36 0.29	
USA, 2010 Oregon, WI (Cortland)	3	0.34	0.054	627–645	fruit	7 16	0.3, 0.159 0.181, 0.151	0.23 0.17	2012/7004394 R100199
USA, 2010 Conklin, MI (Red Delicious)	3	0.34	0.019	1786–1843	fruit	7 14	0.236, 0.192 0.184, 0.25	0.21 0.22	2012/7004394 R100200
USA, 2010 Perry, UT (Gala)	3	0.34	0.05	673–692	fruit	7 13	0.355, 0.273 0.223, 0.177	0.31 0.2	2012/7004394 R100201
	3	0.33	0.016	2002–2058	fruit	7 13	0.155, 0.127 0.109, 0.087	0.14 0.1	
USA, 2010 Porterville, CA (Granny Smith)	3	0.34	0.047	720–739	fruit	7 14	0.149, 0.16 0.140 0.075	0.16 0.22	2012/7004394 R100202
	3	0.34	0.014	2282–2348	fruit	7 14	0.152, 0.177 0.173, 0.09	0.165 0.13	
USA, 2010 Marsing, ID (Gala)	3	0.34	0.044	739–804	fruit	0 4 7 13 21	0.165, 0.371 0.097, 0.085 0.066, 0.09 0.038, 0.066 0.028, 0.043	0.27 0.09 0.08 0.05 0.04	2012/7004394 R100203
USA, 2010 Weiser, ID (Law Rome)	3	0.34	0.036	945–954	fruit	6 14	0.467, 0.604 0.49, 0.409	0.54 0.45	2012/7004394 R100204
USA, 2010 Ephrata, WA (Red Delicious)	3	0.34	0.056	608–617	fruit	7 14	0.673, 0.847 0.504, 0.569	0.76 0.54	2012/7004394 R100205
USA, 2010 Ephrata, WA (Braeburn)	3	0.34	0.024	1403–1412	fruit	7 14	0.458, 0.325 0.268, 0.433	0.39 0.35	2012/7004394 R100206 not independent

Pears

In the pear trials, three foliar applications of 0.34 kg ai/ha metrafenone (SC) were applied with adjuvant, at 5–9 day intervals in either 550–800 L water/ha ('concentrate') or 940–2400 L water/ha ('dilute') to single replicate 6–8 tree plots using tractor-mounted airblast sprayers.

Duplicate samples of whole fruit (24 units, 2.7–6.9 kg) were frozen within 4 hours after sampling and stored for up to 24 months before analysis for metrafenone using the LC/MS/MS multi-residue QuEChERS 1 method (LOQ of 0.01 mg/kg).

Table 8 Residues in pears from supervised trials in USA involving three foliar applications of metrafenone (SC formulation)

PEAR Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: USA, Canada	3	0.336				PHI: 7		Max 1.01 kg ai/ha/season	
USA, 2010 Alton, NY (Bartlett)	3	0.33	0.06	552–571	fruit	7 14	0.381, 0.429 0.333, 0.265	0.41 0.3	2012/7004394 R100207
	3	0.34	0.03	1122	fruit	7 14	0.424, 0.393 0.431, 0.303	0.41 0.37	

PEAR Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
USA, 2010 Lindsay, CA (Olympic)	3	0.34	0.05	655–720	fruit	0 3 7 14 21	0.283, 0.281 0.218, 0.233 0.186, 0.191 0.116, 0.149 0.0717, 0.121	0.28 0.23 0.19 0.13 0.1	2012/7004394 R100208
USA, 2010 Porterville, CA (Bartlett)	3	0.34	0.014	2329–2404	fruit	7 14	0.159, 0.123 0.09, 0.094	0.14 0.09	2012/7004394 R100209
USA, 2010 Marsing, ID (Bartlett)	3	0.34	0.048	673–711	fruit	6 13	0.133, 0.187 0.082, 0.114	0.16 0.01	2012/7004394 R100210
USA, 2010 Ephrata, WA (Concorde)	3	0.33	0.024	1403–1412	fruit	7 14	0.519, 0.434 0.313, 0.255	0.48 0.28	2012/7004394 R100211
USA, 2010 Payette, ID (Bartlett)	3	0.34	0.045	758–767	fruit	7 14	0.359, 0.424 0.305, 0.357	0.39 0.33	2012/7004394 R100212

Stone fruit

The results from 32 supervised trials on cherries (16) and peaches (16) conducted in North America were provided to the Meeting.

Cherries

In the North American cherry trials, two foliar applications of 0.34 kg ai/ha metrafenone (SC) were applied with adjuvant, at 5–9 day intervals in 570–1770 L water/ha to single replicate 6–15 tree plots using tractor-mounted airblast sprayers (4–8 nozzles) or single-nozzle hand lances.

Duplicate samples of fruit were hand picked from at least four trees per plot, the stems and stones were discarded and samples of at least 0.9 kg were frozen within 4 hours after sampling and stored for up to 26 months before analysis for metrafenone using the LC/MS/MS multi-residue QuEChERS 1 method (LOQ of 0.01 mg/kg).

Table 9 Residues in cherries from supervised trials in North America involving two foliar applications of metrafenone (SC formulation)

CHERRY Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: Canada, USA	2	0.336				PHI: 7		Max 0.67 kg ai/ha/season	
USA, 2010 Tulare, CA (Tulare) Sweet cherry	2	0.34	0.026	1320	fruit without stone	7 14	0.661, 0.737 0.599, 0.594	0.7 0.6	2013/7001794 10370.10-CA35
USA, 2010 Sunny Slope, ID (Bing) Sweet cherry	2	0.34	0.024	1400	fruit without stone	6 13	0.408, 0.377 0.171, 0.117	0.39 0.14	2013/7001794 10370.10-ID04

CHERRY Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
USA, 2010 Moxee, WA (Bing) Sweet cherry	2	0.33	0.026	1290	fruit without stone	8 14	0.500, 0.358 0.284, 0.285	0.43 0.29	2013/7001794 10370.10-WA*08
USA, 2010 Fennville, MI (Hedelfingen) Sweet cherry	2	0.34	0.031	1080	fruit without stone	7 14	0.515, 0.473 0.358, 0.317	0.49 0.34	2013/7001794 10370.10-MI06 not independent
USA, 2010 Fennville, MI (Montmorency) Sour cherry	2	0.34	0.032	1050– 1070	fruit without stone	7 14	0.591, 0.532 0.363, 0.268	0.56 0.31	2013/7001794 10370.10-MI03 not independent
USA, 2010 Fennville, MI (Montmorency) Sour cherry	2	0.34	0.025	1370	fruit without stone	7 14	0.987, 0.943 0.704, 0.526	0.97 0.63	2013/7001794 10370.10-MI05
USA, 2010 Fennville, MI (Montmorency) Sour cherry	2	0.34	0.032	1070	fruit without stone	7 14	0.608, 0.768 0.426, 0.578	0.69 0.5	2013/7001794 10370.10-MI04 not independent
Canada, 2010 Jordan Station, ON (Hedelfingen) Sweet cherry	2	0.35	0.034	1030– 1040	fruit without stone	7 13	0.354, 0.28 0.129, 0.175	0.32 0.15	2013/7001794 10370.10-ON02
USA, 2010 Hotchkiss, CO (Montmorency) Sour cherry	2	0.34 0.34	0.034 0.033	990 1020	fruit without stone	7 14	0.389, 0.347 0.322, 0.33	0.37 0.33	2013/7001794 10370.10-CO01
USA, 2010 Prosser, WA (Bing) Sweet cherry	2	0.34 0.34	0.024 0.023	1420 1495	fruit without stone	7 14	0.452, 0.424 0.220, 0.282	0.44 0.25	2013/7001794 10370.10-WA07
USA, 2010 Lansing, NY (Galaxy) Sour cherry	2	0.34 0.34	0.06 0.03	570 1130	fruit without stone	7 14	1.17, 1.15 0.682, 0.534	1.2 0.61	2013/7001794 10370.10-NY05
Canada, 2010 Grimbsy, ON (Montmorency) Sour cherry	2	0.35	0.034	1040	fruit without stone	7 14	0.424, 0.56 0.454, 0.418	0.49 0.44	2013/7001794 10370.10-ON03
Canada, 2010 Summerland, BC (Lapins) Sweet cherry	2	0.34	0.022	1540	fruit without stone	7 13	0.362, 0.306 0.339, 0.326	0.33 0.33	2013/7001794 10370.10-BC01 not independent
Canada, 2010 Summerland, BC (Santina) Sweet cherry	2	0.34 0.34	0.022 0.021	1540 1590	fruit without stone	7 14	0.57, 0.622 0.354, 0.369	0.6 0.36	2013/7001794 10370.10-BC02
USA, 2010 Reedley, CA (Brooks) Sweet cherry	2	0.34	0.019	1770	fruit without stone	0 3 7 15 17 21	0.931, 1.07 0.729, 0.829 0.615, 0.679 0.503, 0.565 0.321, 0.562 0.321, 0.317	1.0 0.78 0.65 0.53 0.44 0.32	2013/7001794 10370.10-CA36
Canada, 2010 Niagara-on-the- Lake, ON (Montmorency) Sour cherry	1+ 1	0.33 0.34	0.034 0.034	980 1010	fruit without stone	0 3 7 14 17 21	1.24, 1.19 0.538, 0.524 0.621, 0.473 0.367, 0.285 0.334, 0.423 0.377, 0.319	1.2 0.53 0.55 0.33 0.38 0.35	2013/7001794 10370.10-ON04

Peaches

In the North American peach trials, two foliar applications of 0.34 kg ai/ha metrafenone (SC) were applied with adjuvant, at 6–8 day intervals in 1100–1770 L water/ha to single replicate 5–18 tree plots using tractor-mounted airblast sprayers (4–7 nozzles) or single-nozzle hand lances or mist blowers.

Duplicate samples of at least 24 fruit were hand picked from at least four trees per plot, halved and the stones discarded. In some trials both halves were collected while in others only half-fruit or opposite quarter-fruit were retained. Samples of at least 1.8 kg were frozen within 3 hours after sampling (except in one trial—TX13) and stored for up to 13 months before analysis for metrafenone using the LC/MS/MS multi-residue QuEChERS 1 method (LOQ of 0.01 mg/kg).

Table 10 Residues in peaches from supervised trials in North America involving two foliar applications of metrafenone (SC formulation)

PEACH Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: Canada, USA	2	0.336				PHI: 7		Max 0.67 kg ai/ha/season	
USA, 2011 Cream Ridge, NJ (Suncrest)	2	0.34	0.07	470	fruit without stone	7 14	0.217, 0.199 0.128, 0.128	0.21 0.1	2013/7001835 NJ07
USA, 2011 Cream Ridge, NJ (Loring)	2	0.34	0.05	680	fruit without stone	8 13	0.127, 0.145 0.117, 0.093	0.14 0.11	2013/7001835 NJ08 not independent
USA, 2011 Lansing, NY (Saturn)	2	0.34	0.075	450	fruit without stone	6 14	0.062, 0.041 0.042, 0.029	0.05 0.04	2013/7001835 NY09
USA, 2011 Fennville, MI (Red Haven)	2	0.34	0.08	450	fruit without stone	7 14	0.520, 0.457 0.316, 0.394	0.49 0.36	2013/7001835 MI31
USA, 2011 Jackson Springs, NC (Contender)	2	0.33	0.05	630	fruit without stone	7 15	0.149, 0.128 0.069, 0.068	0.14 0.07	2013/7001835 NC16
USA, 2011 Fredericksburg, TX (Sentinel)	2	0.34	0.07	490	fruit without stone	7 14	0.167, 0.204 0.241, 0.161	0.19 0.2	2013/7001835 TX13
USA, 2011 Parlier, CA (June Flame)	2	0.34	0.06	570	fruit without stone	7 14	0.237, 0.216 0.133, 0.15	0.23 0.14	2013/7001835 CA67
USA, 2011 Parlier, CA (Henry II)	2	0.34	0.08	430	fruit without stone	7 14	0.182, 0.187 0.132, 0.166	0.19 0.15	2013/7001835 CA68 diff spray dates
Canada, 2011 Summerland, BC (Glohaven)	2	0.33	0.02	1500	fruit without stone	7 14	0.214, 0.279 0.201, 0.154	0.25 0.18	2013/7001835 BC09
Canada, 2011 Vineland Station, ON (Loring)	2	0.34 0.33	0.02 0.02	1600 1600	fruit without stone	7 14	0.318, 0.270 0.182, 0.201	0.29 0.19	2013/7001835 ON16
USA, 2011 Jordan Station, ON (Red Haven)	2	0.34 0.33	0.03 0.025	1300 1300	fruit without stone	8 14	0.324, 0.119 0.211, 0.073	0.22 0.14	2013/7001835 ON17
USA, 2011 Jordan Station, ON (Loring)	2	0.33 0.33	0.03 0.03	1000 970	fruit without stone	7 14	0.339, 0.226 0.145, 0.096	0.28 0.12	2013/7001835 ON18 diff spray dates

PEACH Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
USA, 2011 Clarksville, AR (Cresthaven)	2	0.33 0.34	0.07 0.07	500 500	fruit without stone	8 14	0.191, 0.231 [c = 0.015] 0.095, 0.119	0.21 0.11	2013/7001835 AR04
USA, 2011 Clayton, NC (Contender)	2	0.34	0.07	490	fruit without stone	0 3 6 13 15 17	0.270, 0.485 0.259, 0.282 0.284, 0.132 0.14, 0.12 0.174, 0.121 0.101, 0.113	0.38 0.27 0.21 0.13 0.15 0.11	2013/7001835 NC15
USA, 2011 Winters, CA O'Henry Freestone (late)	2	0.34	0.08	440	fruit without stone	0 3 7 14 17 21	0.397, 0.444 0.269, 0.22 0.2, 0.141 0.099, 0.09 0.089, 0.092 0.092, 0.088	0.42 0.25 0.17 0.09 0.09 0.09	2013/7001835 CA69
USA, 2011 Winters, CA O'Henry Freestone (late)	2	0.34 0.33	0.08 0.08	440 430	fruit without stone	7 14	0.144, 0.18 0.084, 0.106	0.16 0.1	2013/7001835 CA70 not independent

Berries and other small fruits

Grape

The 2014 JMPR reviewed the results from supervised trials from the USA on grapes and the summary information from the 2014 Evaluation are also reproduced below.

Results from supervised trials from the USA on grapes conducted in 2011 were provided to the 2014 JMPR. In these trials, three foliar airblast applications of metrafenone (0.33 kg ai/ha, SC formulation) with added non-ionic surfactant were applied to 12–24 vine plots, 14–15 days apart, using about 1000–1500 L water/ha. Grape samples (min 1 kg and at least 12 bunches or part bunches) were frozen within 3 hours of sampling and stored frozen for up to 20 months before analysis of berries for metrafenone using the QuEChERS method. Procedural recovery rates in grapes fortified at 0.01 to 1.5 mg/kg ranged from 74 to 104% (mean 91 ± 10%, n = 10) and the LOQ was 0.01 mg/kg.

Table 11 Residues in grapes from supervised trials in USA involving three foliar applications of metrafenone (SC formulation). [JMPR 2014 Metrafenone Evaluation, Table 40, pp 1222–1223]

GRAPE Country, year	Application				Matrix	DAT	Residues (mg/kg)		Trial Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: USA	3					PHI: 14	RTI: 14–21 d	max 1.01 kg ai/ha/season	
USA, 2011	3	0.337		935	berries	15	0.5, 0.41	0.46	R110152
USA, 2011	3	0.337		945	berries	14	1.1, 0.94	1.0	R110153
USA, 2011	3	0.336		1420–1500	berries	14	0.28, 0.42 (c = 0.015)	0.35	R110154
USA, 2011	3	0.339		1350–1420	berries	13	0.51, 0.45	0.48	R110155
USA, 2011	3	0.337		1330–1370	berries	17	0.58, 0.35	0.47	R110156
USA, 2011	3	0.339		1350–1375	berries	13	0.27, 0.4	0.34	R110157
USA, 2011	3	0.34		1340–1390	berries	14	0.25, 0.2	0.22	R110158
USA, 2011	3	0.333		954	berries	14	0.4, 0.49	0.45	R110159

Fruiting vegetables, Cucurbits

The 2014 JMPR reviewed the results from supervised trials from the USA on cucumbers, zucchini (summer squash) and melons (cantaloupes) and the summary information from the 2014 Evaluation are reproduced below.

Cucumber

In the North American outdoor trials, three foliar applications of 0.34 kg ai/ha metrafenone (SC formulation) with added adjuvant were applied at 6–8 day intervals, using motorized knapsacks or tractor-mounted 4–9 nozzle sprayers to apply about 300–700 L/ha. Plot sizes were larger than 33 square metres.

Duplicate fruit samples (min 2 kg, 12 units) were taken, with the larger cucumber fruit being sub-sampled in the field, frozen within 12 hours of sampling and stored frozen for up 24 months before analysis for metrafenone using the QuEChERS LC-MS/MS method. The average procedural recovery of metrafenone from samples fortified with 0.01 mg/kg or 1.0 mg/kg was 104% and the LOQ was 0.01 mg/kg.

Table 12 Residues in outdoor cucumbers from supervised trials in North America involving three foliar applications of metrafenone (SC formulation). [JMPR 2014 Metrafenone Evaluation, Table 44, p 1227]

CUCUMBER Country, year	Application				Matrix	DAT	Residues (mg/kg)		Trial Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: USA, Canada	3	0.336				PHI: 0	RTI: 7–14 d	Max 1.01 kg ai/ha/season	
USA, 2010	3	0.33	0.11	280	fruit	0	0.11, 0.09	0.1	R100008
USA, 2010	3	0.34	0.12	280	fruit	0	0.13, 0.15	0.14	R100009
USA, 2010	3	0.35	0.12	290	fruit	0	0.09, 0.07	0.08	R100010
USA, 2010	3	0.34	0.12	290	fruit	0	0.15, 0.17	0.16	R100011
USA, 2010	3	0.34	0.12	280	fruit	0	0.05, 0.06	0.05	R100012
USA, 2010	3	0.34	0.12	280	fruit	0	0.11, 0.08	0.1	R100013

Summer squash

In the North American trials, three foliar applications of 0.34 kg ai/ha metrafenone (SC formulation) with added adjuvant were applied at 6–8 day intervals, using motorized knapsacks or tractor-mounted 4–9 nozzle sprayers to apply about 300–700 L/ha. Plot sizes were larger than 33 square metres.

Duplicate fruit samples (min 2 kg, 12 units) were frozen within 12 hours of sampling and stored frozen for up 28 months before analysis for metrafenone using the QuEChERS LC-MS/MS method. The average procedural recovery of metrafenone from samples fortified with 0.01 mg/kg or 1.0 mg/kg as 100% and the LOQ was 0.01 mg/kg.

Table 13 Residues in outdoor summer squash from supervised trials in North America involving three foliar applications of metrafenone (SC formulation). [JMPR 2014 Metrafenone Evaluation, Table 47, pp 1229–1230]

SUMMER SQUASH Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Trial Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: USA, Canada	3	0.336				PHI: 0	RTI: 7–14d	Max 1.01 kg ai/ha/season	
USA, 2010	1+ 2	0.35 0.35	0.12 0.08	290 440	Fruit	0	0.25,0.36	0.31	10478.10-AZ06
Canada, 2010	3	0.34	0.09	380	Fruit	0	0.24, 0.35	0.29	10478.10-BC09
USA, 2010	3	0.34	0.07	480–500	Fruit	0	0.12, 0.13	0.13	10478.10-CA136
USA, 2010	3	0.33	0.05	640–650	Fruit	0	0.1, 0.16	0.13	10478.10-FL40
USA, 2010	3	0.33	0.08	390–400	Fruit	0	0.11, 0.09	0.1	10478.10-MD18

SUMMER SQUASH Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Trial Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
USA, 2010	3	0.34	0.085	400	Fruit	0	0.17, 0.18	0.17	10478.10-NC29
USA, 2010	3	0.33	0.12, 0.06	270, 560	Fruit	0	0.08, 0.07	0.07	10478.10-NY30
Canada, 2010	3	0.33	0.05	690	Fruit	0	0.13, 0.14	0.14	10478.10-ON21
Canada, 2010	1+ 3	0.14+ 0.34	0.04 0.08	380 410	Fruit	0	0.25, 0.18	0.22	10478.10-ON22
Canada, 2010	3	0.35	0.06	600–620	Fruit	0	0.1, 0.1	0.11	10478.10-QC11
USA, 2010	3	0.34	0.07	500–520	Fruit	0	0.08, 0.12	0.1	10478.10-SC13
USA, 2010	3	0.34	0.09	390–400	Fruit	0	0.14, 0.08	0.11	10478.10-TX21
USA, 2010	3	0.34	0.07	510	Fruit	0	0.24, 0.31	0.28	10478.10-TX22
USA, 2010	3	0.34	0.07	500	Fruit	0	0.12, 0.13	0.12	10478.10-WA36

Melons (except watermelon)

In the North American trials, three foliar applications of 0.34 kg ai/ha metrafenone (SC formulation) with added adjuvant were applied at 6–8 day intervals, using motorized knapsacks or tractor-mounted 4–9 nozzle sprayers to apply about 300–700 L/ha. Plot sizes were larger than 33 square metres.

Duplicate fruit samples (min 2 kg, 12 units) were sub-sampled in the field (two opposite quarters, eighths or sixteenths/fruit), frozen within 12 hours and stored frozen for up 27 months before analysis for metrafenone using the QuEChERS LC-MS/MS method. The average procedural recovery of metrafenone from samples fortified with 0.01 mg/kg or 1.0 mg/kg was 104% and the LOQ was 0.01 mg/kg.

Table 14 Residues in outdoor melons (cantaloupes) from supervised trials in North America involving three foliar applications of metrafenone (SC formulation). [JMPR 2014 Metrafenone Evaluation, Table 49, pp 1232–1233]

MELON Country, year	Application				Matrix	DAT	Residues (mg/kg)		Trial Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: USA, Canada	3	0.336				PHI: 0	RTI: 7–14d	Max 1.01 kg ai/ha/season	
USA, 2010	3	0.32	0.07	386–434	fruit	0	0.17, 0.14	0.15	10477.10-AZ05
USA, 2010	3	0.33	0.07	466–471	fruit	0	0.21, 0.24	0.23	10477.10-CA133
USA, 2010	3	0.33	0.07	488–498	fruit	0	0.12, 0.14	0.13	10477.10-CA134
USA, 2010	3	0.35	0.07	466–471	fruit	0	0.07, 0.1	0.09	10477.10-CA135
USA, 2010	3	0.33	0.08	392–405	fruit	0	0.23, 0.33	0.28	10477.10-GA14
USA, 2010	3	0.33	0.08	399–405	fruit	0	0.21, 0.14	0.18	10477.10-MD17
USA, 2010	3	0.34	0.08	409–435	fruit	0	0.15, 0.12	0.13	10477.10-NM13
USA, 2010	3	0.34	0.08	426–442	fruit	0	0.04[a], 0.04[a]	0.04	10477.10-OH-18
Canada, 2010	3	0.34	0.085	402–404	fruit	0	0.13, 0.14	0.13	10477.10-ON20
Canada, 2010	3	0.35	0.08	407–423	fruit	0	0.17, 0.24	0.21	10477.10-QC10
USA, 2010	3	0.34	0.09	391–396	fruit	0	0.19, 0.17	0.18	10477.10-TX20
USA, 2010	3	0.34	0.09	393–396	fruit	0	0.08, 0.08	0.08	10477.10-TX19

Fruiting vegetables, other than Cucurbits

The 2014 JMPR reviewed the results from supervised trials from Europe and USA on peppers and tomatoes and the summary information from the 2014 Evaluation are reproduced below.

Peppers

In the North American trials on outdoor sweet (bell) peppers and chilli (non-bell) peppers, three foliar applications of 0.34 kg ai/ha metrafenone (SC formulation) with added adjuvant were applied at 7 day intervals, using pressurised knapsack sprayers (2–6 nozzles) to apply about 200–300 L/ha. Plot sizes were larger than 28 square metres.

Duplicate whole fruit samples (min 2 kg, 12 large or 24 small fruit) were frozen within 2 hours of sampling and stored frozen (–15 °C) for up 25 months before analysis for metrafenone using the QuEChERS LC-MS/MS method. Average procedural recoveries of metrafenone from samples fortified with 0.01–0.1 mg/kg ranged from 109% to 114% with an overall mean of 112% and the LOQ was 0.01 mg/kg.

Table 15 Residues in outdoor peppers (bell and non-bell) from supervised trials in North America involving three foliar applications of metrafenone (SC formulation). [JMPR 2014 Metrafenone Evaluation, Table 52, pp 1235]

PEPPER	Application				Matrix	DAT	Residues (mg/kg)		Trial
Country, year	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	Reference
GAP: USA, Canada	3	0.336				PHI: 0	RTI: 7–14 d	Max 1.01 kg ai/ha/season	
Bell peppers									
USA, 2010	3	0.34	0.12	280	fruit	0	0.39, 0.43	0.41	R100014
USA, 2010	3	0.34	0.15	230	fruit	0	0.47, 0.33	0.4	R100015
USA, 2010	3	0.33	0.15	220	fruit	0	0.18, 0.11	0.15	R100016
USA, 2010	3	0.33	0.15	230	fruit	0	0.33, 0.17	0.25	R100017
USA, 2010	3	0.34	0.14	250	fruit	0	0.33, 0.21	0.27	R100018
USA, 2010	3	0.36	0.12	280	fruit	0	0.51, 0.34	0.43	R100019
Non-bell peppers									
USA, 2010	3	0.34	0.15	230	fruit	0	0.37, 0.34	0.35	R100020
USA, 2010	3	0.34	0.16	210	fruit	0	0.07, 0.1	0.08	R100021
USA, 2010	3	0.34	0.12	280	fruit	0	0.33, 0.67	0.5	R100022

Tomato

In the North American trials on outdoor tomatoes (large and small fruited varieties), three foliar applications of 0.34 kg ai/ha metrafenone (SC formulation) with added adjuvant were applied at 6–8 day intervals, using knapsack or tractor-mounted boom sprayers (3–11 nozzles) to apply about 300–800 L/ha. Plot sizes were larger than 30 square metres.

Duplicate fruit samples (min 2 kg, 12 large or 24 small fruit) were frozen within 3 hours of sampling and stored frozen (–15 °C) for up 24 months before analysis for metrafenone using the QuEChERS LC-MS/MS method. Average procedural recoveries of metrafenone from samples fortified with 0.01–0.1 mg/kg ranged from 91% to 118% with an overall mean of 105% and the LOQ was 0.01 mg/kg.

Table 16 Residues in outdoor tomatoes from supervised trials in North America involving three foliar applications of metrafenone (SC formulation). [JMPR 2014 Metrafenone Evaluation, Table 55, pp 1237–1239]

TOMATO	Application				Matrix	DAT	Residues (mg/kg)		Trial Reference
Country, year	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: USA, Canada	3	0.336				PHI: 0	RTI: 7–14 d	Max 1.01 kg ai/ha/season	
USA, 2010	3	0.34	0.11	300	fruit	0	0.09, 0.11	0.1	10467.10-GA13
USA, 2010	3	0.34	0.11	300	fruit	0	0.22, 0.18	0.2	10467.10-CA127
USA, 2010	3	0.34	0.09	380	fruit	0	0.08, 0.08	0.08	10467.10-NC28
USA, 2010	3	0.34	0.04	840	fruit	0	0.11, 0.11	0.11	10467.10- NM12
USA, 2010	3	0.34	0.11	300	fruit	0	0.15, 0.19	0.17	10467.10- MI42
USA, 2010	4	0.34	0.09	360	fruit	0	0.1, 0.11	0.11	10467.10- AZ04
USA, 2010	3	0.34	0.11	310	fruit	0	0.17, 0.18	0.18	10467.10- CA125
USA, 2010	3	0.34	0.11	300	fruit	0	0.2, 0.29	0.25	10467.10- CA119
USA, 2010	3	0.34	0.08	430	fruit	0	0.09, 0.09	0.09	10467.10- OH17
USA, 2010	3	0.34	0.06	580	fruit	0	0.29, 0.28	0.29	10467.10- NY27
USA, 2010	3	0.34	0.09	390	fruit	0	0.09, 0.12	0.11	10467.10- CA120
USA, 2010	3	0.34	0.07	470	fruit	0	0.11, 0.08	0.1	10467.10- CA122
USA, 2010	3	0.34	0.07	500	fruit	0	0.13, 0.08	0.1	10467.10- CA121
USA, 2010	3	0.34	0.07	470	fruit	0	0.24, 0.23	0.23	10467.10- CA126
USA, 2010	3	0.34	0.11	310	fruit	0	0.25, 0.26	0.26	10467.10- CA123

TOMATO Country, year	Application				Matrix	DAT	Residues (mg/kg)		Trial Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
USA, 2010	3	0.34	0.11	310	fruit	0	0.4, 0.45	0.43	10467.10- CA128
USA, 2010	3	0.34	0.1	340	fruit	0	0.15, 0.05	0.1	10467.10- CA124
USA, 2010	3	0.34	0.05	620	fruit	0 1 3 7	0.1, 0.04 0.09, 0.06 0.07, 0.08 0.07, 0.11	0.07 0.07 0.08 0.09	10467.10- FL38
USA, 2010	3	0.34	0.05	620	fruit	0	0.18, 0.26	0.22	10467.10- FL39

Hops

Results from supervised trials from Europe and North America on hops were provided to the Meeting.

In the European trials, two foliar applications of 0.32–0.36 kg ai/ha metrafenone (SC formulation) were applied at 6–8 day intervals, using 16-nozzle mist blowers to apply about 3500–3600 L/ha. Plot sizes were 240 m^2 with 54 plants/plot.

Samples of fresh green hops (min 0.5 kg) were frozen within 12 hours and additional 1.2 kg samples were kiln-dried (7–85 hours at 58 °C) to obtain the dried cones samples (min 0.1 kg). All samples were stored frozen for up to 22 weeks before analysis for metrafenone using the LC/MS/MS BASF Method 535 with an LOQ of 0.01 mg/kg.

Table 17 Residues in hop cones from supervised trials in Europe involving two foliar applications of metrafenone (SC formulation)

HOPS Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	
GAP: USA	2	0.336		RTI: 14 d		PHI: 3	Max 0.67 kg ai/ha/season	
Germany, 2010 Weddegast, Saxony (Magnum)	1+ 1	0.36 0.35	0.01 0.01	3600 3540	green cones dried cones	0 1 3 7 3	9.5 9.4 4.5 8.4 34	2011/1041886 L100073
Germany, 2010 Golzern, Saxony (Nugget)	1+ 1	0.35 0.36	0.01 0.01	3500 3630	green cones dried cones	0 1 3 7 3	10.0 6.9 8.5 5.5 33 (c = 0.02)	2011/1041886 L100074
Germany, 2009 Golzern (Nugget)	1+ 1	0.31 0.34	0.01 0.01	3200 3400	green cones dried cones	0 1 2 7 2	4.9 4.4 3.7 2.9 21	2011/1041879 Trial: L090302
Germany, 2009 Hohenebra (Nordischer Brauer)	1+ 1	0.33 0.35	0.01 0.01	3400 3600	green cones dried cones	0 1 3 7 3	3.7 6.7 3.4 4.1 23	2011/1041879 Trial: L090303
Germany, 2009 Kleinbadegast (Magnum)	1+ 1	0.31 0.33	0.01 0.01	3100 3400	green cones dried cones	0 1 3 7 3	3.8 2.6 1.8 3.7 13.3 (c = 0.05)	2011/1041879 Trial: L090304

HOPS Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	
Germany, 2009 Simonshofen (Magnum)	2	0.34	0.01	3500	green cones dried cones	0 1 4 8 4	5.6 4.4 3.1 4.2 <u>20</u>	2011/1041879 Trial: L090305

In the North American trials, two foliar applications of 0.34–0.36 kg ai/ha metrafenone (SC formulation) were applied at 6–10 day intervals, using backpack 1–6 nozzle hand lances or tractor-mounted 6-nozzle airblast sprayers to apply about 790–1600 L/ha with added adjuvant to single 72–400 square metre plots.

Green cones samples (min 0.4 kg) were hand picked or mechanically harvested from at least five vines per plot and additional samples were dried to about 10% moisture content (about 60 °C for 11 hours) to give typical sample weights of at least 0.45 kg. Samples were frozen within 3 hours and stored frozen for up to 27 months before analysis for metrafenone using the LC/MS/MS multi-residue QuEChERS 1 method (LOQ of 0.01 mg/kg).

Table 18 Residues in hop cones from supervised trials in North America involving two foliar applications of metrafenone (SC formulation)

HOPS Country, year Location (Variety)	Application				Matrix	DAT	Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			metrafenone	mean	
GAP: USA	2	0.336				PHI: 3	RTI: 14d	Max 0.67 kg ai/ha/season	
USA, 2010 Parma, ID (Newport)	2	0.34		1510	green cones dried cones	2 2	6.08 15.7, 18.02	6.1 <u>17</u>	2013/7001795 10466.10-ID05
USA, 2010 Hubbard, OR (Nugget)	2	0.34		1630	green cones dried cones	2 2	6.17 20.7, 23.1	6.2 <u>21</u>	2013/7001795 10466.10-OR09
USA, 2010 Prosser, WA (Nugget)	2	0.34		1520	green cones dried cones	4 0 1 4 7 14	5.51 25.0, 21.9 20.6, 21.64 15.27, 10.2 11.87, 12.89 12.19, 9.035	5.5 23 21 <u>13</u> 12 11	2013/7001795 10466.10-WA10
Canada, 2010 Langton, ON (Nugget)	2	0.34		1530	green cones dried cones	2 0 1 2	31.4 129.6, 105.5 88.8, 89.8 105.1, 158.8	31 117 89 132	2013/7001795 10466.10-ON05 See footnote
Canada, 2010 St. Polycarpe, QC (Fuggle)	1+ 1	0.36 0.35		800 790	green cones dried cones	2 2	9.67 25.34, 21.71	9.7 <u>23.5</u>	2013/7001795 10466.10-QC01

In trial ON05, adverse weather conditions (hurricane) resulted in a 10-day retreatment interval and excessive insect damage completely defoliated the vines between the two applications. The crop was not commercially viable.

FATE OF RESIDUES IN STORAGE AND PROCESSING

Processing

Processing studies on apples, grapes, strawberries, tomatoes, barley, wheat and hops were reviewed by the 2014 JMPR and the processing factors estimated by that Meeting are re-presented below:

Table 19 Summary of processing factors for metrafenone [2014 JMPR Metrafenone Evaluation, table 71, pp 1272–1273]

RAC	Matrix	Metrafenone [a]	
		Calculated processing factors	PF median or best estimate
Apple	fruit		
	canned	0.1, 0.14	0.12
	juice	0.19, 0.23	0.21
	wet pomace	1.1, 1.3	1.2
	dried slices	0.39, 0.72	0.56
	sauce	4.1, 4.8	4.45
Grape	grapes		
	must (red wine)	0.03, 0.57, 0.77, 0.78, 0.81, 1.2, 1.3	0.78
	must (white wine)	0.15, < 0.18, 0.26	0.18
	wet pomace	2.8, 3.6	3.2
	young wine (white)	0.07	< 0.2
	young wine (red)	0.03, < 0.17, < 0.19, < 0.21, 0.3, < 0.38, < 0.71	
	wine (white)	0.07, < 0.18, < 0.26	< 0.19
	wine (red)	0.03, < 0.17, < 0.19, < 0.19, < 0.21, < 0.38, < 0.71	
	juice	0.04, 0.06	0.05
	raisins	0.63, < 0.71, 3.6, 3.9	3.75
Strawberry	fruit		
	washed fruit	0.4, 0.45, 0.5, 0.52	0.475
	preserved fruit	0.79, 0.84, 0.99, 1.1	0.915
	jam	0.21, 0.21, 0.24, 0.28	0.225
	syrup	0.15, 0.16, 0.18, 0.19	0.17
Tomato	fresh		
	washed	0.57, 0.62, 0.84, 0.9	0.73
	blanched	0.45, 0.91, 1.3, 0.94	1.1
	peeled	< 0.01, < 0.02, 0.02, 0.05	0.02
	preserved	< 0.02, < 0.02, < 0.02, 0.02	< 0.02
	juice (raw)	0.26, 0.33, 0.35, 0.4	0.34
	wet pomace	3.3, 4.8, 6.2, 6.3	5.5
	peel	3.7, 6.2, 7.5, 7.9	6.85
	paste	0.27, 0.3, 0.47, 0.53	0.385
	ketchup	0.38, 0.42, 0.42, 0.5	0.42
	puree	0.65, 0.79, 0.83, 1.1	0.81
Mushroom	fresh		
	canned	0.16	0.16
Barley	grain		
	pearl barley	< 0.13, 0.13, < 0.2, 0.22	0.165
	pearl barley abrasion	2.5	2.5
	malt	0.4	0.4
	brewers grain	0.3	0.3
	spent hops	< 0.1	< 0.1
	Brewer's yeast	< 0.1	< 0.1
	beer	< 0.1, < 0.13, < 0.17, < 0.33,	< 0.15
Wheat	grain		
	wholemeal flour	0.94, 1.1, 1.7, 1.9	1.4
	flour type 550	0.14, 0.17, 0.21, 0.29	0.19
	bran flour	1.3, 1.6, 2.6, 2.6	2.1
	coarse bran	0.29, 0.33, 0.43, 0.57	0.38

RAC	Matrix	Metrafenone [a]	
		Calculated processing factors	PF median or best estimate
	fine bran	2.6, 3.5, 4.9, 5.3	4.2
	whole grain bread	0.6, 0.64, 0.71, 1.0	0.675
Hops	dried cones		
	extracted hops	1.8, 1.8, 1.8	1.8
	Brewer's yeast	0.008, 0.01, 0.01	0.01
	hops draff	0.24, 0.24, 0.25	0.24
	beer	< 0.0005, < 0.0005, < 0.0006	< 0.0005

[a] Each value represents a separate study where residues were above the LOQ in the RAC. The factor is the ratio of metrafenone residues in the processed item divided by the residue of metrafenone in the RAC.

APPRAISAL

Metrafenone, a benzophenone fungicide, was evaluated for the first time by the 2014 JMPR, where an ADI of 0–0.3 mg/kg bw was established, an ARfD was not considered necessary and a residue definition of *metrafenone* (parent only) was established for plant and animal commodities, for both compliance with MRLs and for dietary intake assessment.

It was scheduled by the 47th Session of the CCPR for the evaluation of additional uses by the 2016 JMPR and the Meeting received new GAP and residue information on pome fruit, stone fruit and hops from the manufacturer.

New GAP information on grapes and fruiting vegetables was also provided by the manufacturer, together with an ambient temperature metrafenone residue stability study in homogenised melons.

Methods of analysis

The 2014 JMPR reviewed and summarized analytical method descriptions and validation data for metrafenone in crop and animal matrices. These included The QuEChERS 1 method and Method 535/3 used to measure metrafenone in the new supervised residue trials. Method validation data for pome fruit, stone fruit and hops were provided to the Meeting. LOQs for all matrices were 0.01 mg/kg.

Stability of pesticide residues in stored analytical samples

Plant matrices–fresh analytical sub-samples

The Meeting received an ambient storage residue stability study on melons where homogenised samples were spiked with 0.1 mg/kg metrafenone and stored at 19 °C±1 °C for up to 16 hours before analysis for metrafenone. Residues were stable (more than 79% residues remaining) for up to 16 hours at room temperature.

The Meeting concluded that if samples from supervised residue field trials were sub-sampled (quartered or sliced) in the field, and frozen within 16 hours of sampling, the results from those trials were suitable for estimating maximum residue levels.

Plant matrices–stored analytical samples

The 2014 JMPR concluded that metrafenone residues were stable for up to 24 months in analytical frozen samples of a range of representative substrates (at least 31 months in high starch and high water content matrices). In general, residues in the stored samples were greater than 80% of the spiked levels. Frozen sample storage times in the new trials were within the storage intervals considered acceptable by the 2014 JMPR

Results of supervised residue trials on crops

The Meeting received new supervised trial data for foliar applications of metrafenone on pome fruit, stone fruit and hops. Trials on grapes and fruiting vegetables evaluated by the 2014 JMPR were re-assessed in light of new GAP information provided to the Meeting.

The results from these new trials and those previously reported by the 2014 JMPR and matching critical GAP were used to estimate maximum residue levels, STMRs and HRs for a number of commodities for which GAP information was available.

Pome fruit

Results from supervised trials on apples and pears conducted in USA were provided to the Meeting.

The critical GAP for metrafenone on pome fruit in Canada and USA is for up to 3 foliar applications of 0.336 kg ai/ha applied at least 7–14 days apart with a PHI of 7 days, applying a total of 1.01 kg ai/ha/season.

In 11 independent trials on apples in USA matching this GAP, residues were: 0.08, 0.2, 0.22, 0.22, 0.22, 0.23, 0.31, 0.45, 0.49, 0.54 and 0.76 mg/kg.

In six independent trials on pears in USA matching this GAP, residues were: 0.14, 0.16, 0.19, 0.39, 0.41 and 0.48 mg/kg.

The Meeting noted that the data sets for apples and pears were not statistically diffferent (Mann-Whitney) and agreed to combine the data sets for apples and pears to estimate a pome fruit group maximum residue level.

The combined data set for metrafenone residues in apples and pears from trials matching the GAP for pome fruit in Canada and USA is: 0.08, 0.14, 0.16, 0.19, 0.2, 0.22, 0.22, 0.22, 0.23, 0.31, 0.39, 0.41, 0.45, 0.48, 0.49, 0.54 and 0.76 mg/kg.

The Meeting estimated an STMR of 0.23 mg/kg and a group maximum residue level of 1 mg/kg for metrafenone on pome fruit.

Stone fruit

Results from supervised trials on cherries and peaches conducted in USA were provided to the Meeting.

Cherries

The critical GAP for metrafenone on cherries in Canada and USA is for up to 2 foliar applications of 0.336 kg ai/ha applied at least 7–14 days apart with a PHI of 7 days, applying a total of 0.67 kg ai/ha/season.

In 12 independent trials in USA matching this GAP, residues in cherries (without stones) were: 0.32, 0.37, 0.39, 0.43, 0.44, 0.49, 0.55, 0.6, 0.65, 0.7, 0.97 and 1.2 mg/kg.

The Meeting noted that the GAP in USA and Canada covered the Codex Cherries sub-group and based on the data for cherries (without stones), estimated an STMR for metrafenone of 0.52 mg/kg for cherries (sub-group).

The Meeting also noted that cherry stones do not contribute significantly to the total fruit weight and agreed to use the above data set to estimate a maximum residue level of 2 mg/kg for metrafenone for cherries (sub-group).

Peaches (including Nectarine and Apricots)

The critical GAP for metrafenone on peaches (including nectarines) in Canada and USA is for up to 2 foliar applications of 0.336 kg ai/ha applied at least 7–14 days apart with a PHI of 7 days, applying a total of 0.67 kg ai/ha/season.

In 14 independent trials on peaches in USA matching this GAP, residues in peaches (without stones) were: 0.05, 0.14, 0.17, 0.19, 0.2, 0.21, 0.21, 0.21, 0.22, 0.23, 0.25, 0.28, 0.29 and 0.49 mg/kg.

The Meeting noted that the GAP in USA for apricots was the same as for peaches, and thus covered the Codex Peaches sub-group (i.e. including apricots) and estimated an STMR for metrafenone of 0.21 mg/kg for peaches sub-group.

The Meeting also noted that peach (and nectarine) stones do not contribute significantly to the total fruit weight and agreed to use the above data set to estimate a maximum residue level of 0.7 mg/kg for metrafenone for peaches (sub-group).

Small fruit vine climbing

Grapes

The Meeting received new GAP information for grapes in USA, up to 3 foliar applications of 0.336 kg ai/ha, 14–21 day retreatment interval and a PHI of 14 days.

In eight independent trials from the USA, evaluated by the 2014 JMPR and matching the new USA GAP, residues in grapes were: 0.22, 0.34, 0.35, 0.45, 0.46, 0.47, 0.48 and 1.0 mg/kg.

Noting that the 2014 JMPR had estimated an STMR of 0.76 mg/kg and a maximum residue level of 5 mg/kg for metrafenone on grapes based on data matching the Canadian GAP (up to 6 foliar applications of 0.225 kg ai/ha, PHI 14 days), the Meeting agreed that the new GAP in USA would be accommodated by the existing STMR and maximum residue level.

Fruiting vegetables, Cucurbits

The Meeting received new GAP information for cucurbits in Canada and USA, up to 3 foliar applications of 0.336 kg ai/ha, 7–14 day retreatment interval and a PHI of 0 days.

Cucumber

The Meeting agreed to review the data on cucumbers provided to the 2014 JMPR in light of the new GAP for fruiting vegetables, cucurbits in Canada and USA.

In six independent trials from USA on cucumbers matching the new GAP in Canada and USA, residues were: 0.05, 0.08, 0.1, 0.1, 0.14 and 0.16 mg/kg.

Squash, Summer

The Meeting agreed to review the data on summer squash provided to the 2014 JMPR in light of the new GAP for fruiting vegetables, cucurbits in Canada and USA.

In 14 independent trials from North America on summer squash matching this new GAP, residues in summer squash were: 0.07, 0.1, 0.1, 0.11, 0.11, 0.12, 0.13, 0.13, 0.14, 0.17, 0.22, 0.28, 0.29 and 0.31 mg/kg.

Melons (except watermelon)

The Meeting noted that the 2014 JMPR had reviewed the data from melon trials but was unable to estimate a maximum residue level because the melon samples had been quartered in the field and no information was available on residue stability in chopped or sliced samples.

Based on new information showing that metrafenone residues were stable for up to 16 hours in homogenised samples at room temperatures, the Meeting reviewed the data on melons provided to the 2014 JMPR in light of the new critical GAP in Canada and USA.

In 12 independent trials on melons (cantaloupes) in North America matching the new GAP in Canada and USA, residues were: 0.04, 0.08, 0.09, 0.13, 0.13, 0.13, 0.15, 0.18, 0.18, 0.21, 0.23 and 0.28 mg/kg.

The Meeting noted that the GAP in Canada and USA was for the cucurbit group, that median residues in cucumber, summer squash and melons were within a 5-fold range (0.1 – 0.14 mg/kg) and that the data sets were not from different populations (Kruskal-Wallis). The Meeting therefore agreed to combine these data sets to recommend a group maximum residue level for fruiting vegetables, cucurbits.

Residues in cucumber, summer squash and melons from trials matching the GAP in Canada and USA for fruiting vegetables, cucurbits were: 0.04, 0.05, 0.07, 0.08, 0.08, 0.09, 0.1 (4), 0.11, 0.12, 0.13 (5), 0.14, 0.14, 0.15, 0.16, 0.17, 0.18, 0.18, 0.21, 0.22, 0.23, 0.28, 0.28, 0.29 and 0.31 mg/kg.

The Meeting estimated an STMR of 0.13 mg/kg and a group maximum residue level of 0.5 mg/kg for metrafenone on fruiting vegetables, cucurbits and to withdraw the previous recommendations for cucumber, summer squash and gherkin.

Fruiting vegetables, other than Cucurbits

The Meeting received new GAP information for fruiting vegetables (other than cucurbits) in Canada and USA, up to 3 foliar applications of 0.336 kg ai/ha, 7–14 day retreatment interval and a PHI of 0 days.

Peppers

In nine independent trials from USA on peppers matching this new GAP, residues were: 0.08, 0.15, 0.25, 0.27, 0.35, 0.4, 0.41, 0.43 and 0.5 mg/kg.

The Meeting noted that the 2014 JMPR had estimated STMRs of 0.115 mg/kg and maximum residue levels of 2.0 mg/kg for metrafenone on sweet pepper and on Chili pepper based on glasshouse sweet pepper trials conducted in Europe matching the GAP in France (up to 2 foliar applications of 0.15 kg ai/ha, PHI 3 days).

The Meeting agreed that the new GAP in Canada and USA would be accommodated by the existing maximum residue level but that since the STMR from the USA trials was higher than that estimated by the 2014 JMPR, the Meeting agreed to use the 0.35 mg/kg STMR from the trials matching the USA GAP for dietary intake estimation for peppers, sweet and peppers, Chili.

Tomato

The Meeting agreed to review the data on tomatoes provided to the 2014 JMPR in light of the new GAP in Canada and USA.

In 19 independent trials from North America on tomatoes matching this new GAP, residues were: 0.08, 0.09, 0.09, 0.1 (3), 0.11 (3), 0.17, 0.18, 0.2, 0.22, 0.23, 0.25, 0.26, 0.29, and 0.43 mg/kg.

The Meeting estimated an STMR of 0.11 mg/kg and a maximum residue level of 0.6 mg/kg for metrafenone on tomato to replace the previous recommendation and noting that the GAP in Canada and USA included use on eggplants, agreed to extrapolate the above estimations to eggplants.

Dried herbs

Results from supervised trials on hops conducted in Europe and North America were provided to the Meeting.

Hops

The GAP for metrafenone on hops in USA is for up to 2 foliar applications of 0.336 kg ai/ha with a PHI of 3 days. In trials in North America matching this GAP, metrafenone residues in dried hop cones were: 13, 17, 21 and 24 mg/kg. In trials conducted in Europe and matching the GAP in USA, residues were 13, 20, 21, 23, 33 and 34 mg/kg.

Since the European and North American data sets were not from different populations (Mann-Whitney), the Meeting agreed to use the global data set approach and combined these data sets to recommend a maximum residue level for hops, dry.

Residues from trials in North America and Europe matching the USA GAP for hops were: 13, 13, 17, 20, 21, 21, 23, 24, 33 and 34 mg/kg

The Meeting estimated an STMR of 21 mg/kg and a maximum residue level of 70 mg/kg for metrafenone on hops, dry.

Fate of residues during processing

Processing studies on apples, tomatoes and hops were among those reviewed by the 2014 JMPR and the processing factors estimated by that Meeting for the commodities considered at this Meeting are summarized below.

Summary of selected processing factors and STMR-P values for metrafenone

RAC	Matrix	Processing Factors [a]	STMR (mg/kg)	STMR-P (mg/kg)
Apple	fruit		0.23	
	canned	0.12		0.028
	juice	0.21		0.048
	wet pomace	1.2		0.28
	dried slices	0.56		0.13
	sauce	4.45		1.0
Tomato	fresh		0.11	
	preserved	< 0.02		< 0.002
	juice (raw)	0.34		0.037
	wet pomace	5.5		0.61
	paste	0.385		0.042
	puree	0.81		0.089
Hops	dried cones		21	
	extracted hops	1.8		38
	brewers yeast	0.01		0.21
	beer	< 0.0005		< 0.01

[a] Each PF value is the median of 2–4 separate studies where residues were above the LOQ in the RAC. The PF in each study was the ratio of the metrafenone residues in the processed item divided by the residues in the RAC.

The Meeting noted that in the above studies, metrafenone residues did not concentrate in food commodities during processing except in tomato sauce and wet tomato pomace and apple pomace.

For dried chili peppers, applying the default processing factor of 10 to the STMR and the maximum residue level estimated for peppers, the Meeting estimated an STMR of 3.1 mg/kg and a maximum residue level of 20 mg/kg for metrafenone on peppers Chili, dried.

Residues in animal commodities

Farm animal dietary burden

The Meeting noted that the 2014 JMPR had calculated beef and dairy cattle maximum dietary burdens of 9.3 ppm (dw) and mean dietary burdens of 4.9 ppm (dw) for beef and dairy cattle based on the Australian livestock diet listed in Appendix IX of the FAO Manual.

Noting that the addition of wet apple pomace would not significantly change the estimated livestock dietary burdens (wet apple pomace not being a component of the Australian beef and dairy cattle livestock diet), the Meeting agreed that the maximum and mean livestock dietary burdens for beef and dairy cattle calculated by the 2014 JMPR did not need to be recalculated.

The Meeting also agreed that the maximum dietary burdens (2.0 ppm dw) and the mean dietary burdens (1.3 ppm dw) for poultry, calculated by the 2014 JMPR did not need to be

recalculated as none of the feed items from the commodities considered by the Meeting contributed to any of the poultry diets.

RECOMMENDATIONS

On the basis of the data from supervised trials the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits and for IEDI assessment.

Definition of the residue (for compliance with the MRL and for dietary risk assessment) for plant and animal commodities: *metrafenone*

The residue is fat soluble.

	Commodity	Recommended Maximum residue level (mg/kg)		STMR or STMR-P
CCN	Name	New	Previous	
FS 0013	Cherries	2		0.52
VC 0424	Cucumber	W	0.2	
VO 0440	Egg plant	0.6		0.11
VC 0045	Fruiting vegetables, Cucurbits	0.5		0.13
VC 0245	Gherkin	W	0.2	
DH 1100	Hops, dry	70		21
FS 2001	Peaches	0.7		0.21
HS 0444	Peppers Chili, dried	20	20	3.5
VO 0444	Peppers, Chili	2	2	0.35
VO 0445	Peppers, Sweet (including Pimento or pimiento)	2	2	0.35
FP 0009	Pome fruits	1		0.23
VC 0431	Squash, Summer	W	0.06	
VO 0488	Tomato	0.6	0.4	0.11
JF 0226	Apple juice			0.048
DF 0226	Apples, dried			0.13
	Apple sauce			1.0
	Apple pomace, wet			0.28
JF 00488	Tomato juice			0.037
JF 00488	Tomato juice			0.037
VW 0488	Tomato paste			0.042
MW 0448	Tomato puree			0.089
	Tomato (canned)			0.002
	Tomato pomace (wet)			0.61
	Beer			< 0.01

DIETARY RISK ASSESSMENT

Long-term dietary exposure

The International Estimated Daily Intake (IEDI) for metrafenone was calculated for the food commodities for which STMRs or HRs were estimated and for which consumption data were available. The results are shown in Annex 3 to the 2016 Report.

The International Estimated Daily Intakes of metrafenone for the 17 GEMS/Food cluster diets, based on estimated STMRs were 0–1% of the maximum ADI of 0.3 mg/kg bw. The Meeting

concluded that the long-term dietary exposure to residues of metrafenone, from uses that have been considered by the JMPR, is unlikely to present a public health concern.

Short-term dietary exposure

The 2014 JMPR decided that an ARfD was unnecessary. The Meeting therefore concluded that the short-term exposure to metrafenone residues is unlikely to present a public health concern.

REFERENCES

Code	Author(s)	Year	Title, Institute, Report reference
JMPR 2014	Anon	2014	Pesticide residues in food—2014 Evaluations. Part I. Residues. Metrafenone (278), pp 1179–1296. FAO Plant Production and Protection Paper 222, 2015. Published.
2010/1089964	Lehmann, A	2010	Validation of BAS 560 F with BASF Method No. 535/3 (L0076/03) in hops and beer. BASF SE, Limburgerhof, Germany Fed.Rep. GLP/GEP: yes. Unpublished
2011/1041879	Braun, D	2011	Determination of residues of BAS 560 F in hops and its processed products after two applications of BAS 560 02 F in Germany. BioChem agrar Labor fuer biologische und chemische Analytik GmbH, Gerichshain, Germany Fed.Rep. GLP/GEP: yes. Unpublished
2011/1041886	Plier, S	2011	Determination of residues of BAS 560 F (Metrafenone) in hops after two applications of BAS 560 02 F in Germany. BioChem agrar Labor fuer biologische und chemische Analytik GmbH, Gerichshain, Germany Fed.Rep. GLP/GEP: yes. Unpublished
2012/7004394	Carringer, SJ	2013	Magnitude and decline of the residue of Metrafenone in or on pome fruit raw agricultural commodities following three foliar applications of BAS 560 03 F fungicide. The Carringers Inc., Apex NC, USA. GLP/GEP: yes. Unpublished
2013/7001794	Homa, K	2013	Metrafenone: Magnitude of the residue on cherry. IR-4 Project Headquarters, Princeton NJ, United States of America. GLP/GEP: yes. Unpublished
2013/7001795	Homa, K	2013	Metrafenone: Magnitude of the residue on hops. IR-4 Project Headquarters, Princeton NJ, United States of America. GLP/GEP: yes. Unpublished
2013/7001835	Homa, K	2013	Metrafenone: Magnitude of the residue on peach. IR-4 Project Headquarters, Princeton NJ, United States of America. GLP/GEP: yes. Unpublished
2015/1196811	Meridian, H	2015	Storage stability of Metrafenone in melon under ambient storage conditions. Eurofins Agroscience Services Chem Ltd., Melbourne Derbyshire DE73 8AG, United Kingdom. GLP/GEP: yes. Unpublished