PROPICONAZOLE (160)

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EXPLANATION

Propiconazole, one of triazole fungicides, was first evaluated by the JMPR in 1987 and re-evaluated for residues in 2007 under a periodic review programme. Further evaluations for residues were made by the JMPR in 2013, 2014 and 2015. In 2004, JMPR established an ADI of 0–0.07 mg/kg and an ARfD of 0.3 mg/kg bw for propiconazole. Residue is defined for plant and animal commodities as propiconazole for compliance with the MRL and propiconazole plus all metabolites convertible to 2,4-dichlorobenzoic acid, expressed as propiconazole for the estimation of the dietary intakes.

This compound was scheduled at the 48th session of the CCPR (2016) for the evaluation of additional MRLs in 2017 JMPR. The Meeting received residue information on citrus fruits, stone fruits and pineapple following post-harvest treatment from the manufacturer. India provided pre-harvest trial information on tea.

RESIDUE ANALYSIS

Analytical methods

Citrus fruits (post-harvest treatment)

Parent propiconazole was analysed using a method REM 130.11, which was considered valid by the 2007 JMPR for various matrices including crops with high acid content. The method involves extraction with methanol:water (80:20, v/v), filtration and determination by LC-MS/MS. Prior to analysis of treated samples, recovery test was performed with citrus fruit samples. Recoveries of the analyte were in the range of 81.8–119% (RSD, <8%) at fortification levels of 0.01 and 1.0 mg/kg. The LOQ value was 0.01 mg/kg in the matrices. Analysis for total residues was not performed.

Table 1 Recovery of parent propiconazole in citrus fruits using the method REM 130.11

Matrix	Fortification, mg/kg	n	Range of recoveries, %	Mean recovery, %	CV, %	Report No./Year
Orange	0.010	3	87.8-93.8	90.6	3	TK0062888/2015
	1.0	3	93.8-96.5	94.9	2	
Grapefruit	0.010	3	112-119	116	3	
	1.0	3	97.4-99.3	98.0	1	
Mandarin	0.010	3	81.8-95.9	89.0	8	
	1.0	3	96.8-100	99.2	2	
Lemon	0.010	3	98.2-104	100	3	
	1.0	3	99.8-101	101	0.8	

LOQ, 0.01 mg/kg

Stone fruits and pineapple (post-harvest treatment)

Parent propiconazole was analysed using a method Meth-180, which was considered valid by the 2007 JMPR for crop with high water content. The method involves extraction with methanol:water (80:20, v/v), partitioning with hexane and determination by LC-MS/MS. Prior to analysis of treated samples, recovery test was performed with sweet cherry and pineapple. Recoveries of the analyte were in the range of 86–115% (RSD, < 8%) at fortification levels of 0.01 and 1.0 mg/kg. The LOQ value was 0.01 mg/kg in the matrices.

Table 2 Recovery of parent propiconazole in sweet cherry and pineapple using the method Meth-180

Matrix	Fortification, mg/kg	n	Range of recoveries, %	Mean recovery, %	CV, %	Report No./Year
Cherry, sweet	0.01	3	86-88	87	1	TK0120136/2014
	1.0	3	86-87	87	1	
Pineapple	0.01	3	91-97	94	3	TK0061924/2013
	1.0	3	98-115	106	8	

LOQ, 0.01 mg/kg

Total residues of propiconazole convertible to 2,4-dichlorobenzoic acid (2,4-DCBA), were measured through determination of 2,4-DCBA by LC-MS/MS, omitting methylation process of 2,4-DCBA. The used method was based on a method AG-626, which was considered valid by 2007 JMPR for various matrices including crops with high water and high acid contents. The original AG-626 involve extraction by refluxing with methanol: ammonium hydroxide (80:20, v/v), oxidation to form 2,4-DCBA, partitioned with hexane and ethyl ether, methylation to form 2,4-DCBA methyl ester, clean-up and determination of 2,4-DCBA methyl ester by GC-ECD. Prior to analysis of treated samples, recovery test was performed with nectarine and pineapple samples. The recoveries were in the range of 77–97% (RSD, < 11%) at fortification levels of 0.05 and 5.0 mg/kg. The LOQ value was 0.05 mg/kg as parent equivalents in the matrices.

Table 3 Recovery of total residues of propiconazole in nectarine and pineapple using a modified AG-626 method (determination of 2,4-DCBA by LC-MS/MS)

Matrix	Fortification, mg/kg	n	Range of recoveries, %	Mean recovery, %	CV, %	Report No./Year
Nectarine	0.05	3	86-97	92	6	TK0120136/2014
	5.0	3	82-87	85	3	
Pineapple	0.05	3	77-93	83	11	TK0061924/2013
	5.0	3	86-95	90	5	

LOQ, 0.05 mg/kg as propiconazole equivalents

Pineapple processing study (including storage period study)

Total residues of propiconazole were determined using the methods AG-454B and AG-626 (revision of AG-454B; using methyl iodide instead of diazomethane as methylation agent). The analytical method in AG-626 was described above.

Table 4 Recovery of total residues of propiconazole in pineapple processed products using AG-626 method

Matrix	Fortification, mg/kg	n	Range of recoveries, %	Mean recovery, %	CV, %	Report No.
Pineapple fruit	0.05	3	63, 71, 85	73	15	06585
	0.5	3	83, 96, 100	93	10	
Pineapple juice	0.05	3	62, 73, 85	73	16	
	0.5	3	73, 78, 93	81	13	
	5	3	89, 95, 100	94	6	

LOQ, 0.05 mg/kg as propiconazole equivalents

Tea

Parent propiconazole in dry made tea (black) was analysed by three methods in India. In one residue trial of Assam region, residues were extracted with n-hexane:acetone (4:1, v/v), partitioned, cleaned up using alumina column and determined by GC-ECD. In the two trials of Tamil Nadu region,

residues were extracted with methanol:water (1:1), partitioned with dichloromethane, cleaned up using florisil and determined by HPLC-DAD. Analytical method used in one residue trial of West Bengal region involved extraction using QuEChERS method and determination by LC-MS/MS. Recovery of parent propiconazole was within 70–120% (RSD, < 20%) in the three methods. LOQ values were 0.05 mg/kg. Analysis of total residues was not performed.

Parent in tea brew was analysed by partitioning the residues into n-hexane and determining residues by GC-ECD. Procedural recovery test was not performed.

Table 5 Recovery of parent propiconazole in dry made tea

Matrix	Fortification, mg/kg	n	Range of recoveries, %	Mean recovery, %	CV, %	Trial location
Dry made tea, black	0.5	3	94.5, 92.2, 93.8	93.5	1	Assam, India
	1	3	91.2, 93.9, 91.7	92.3	2	
	0.05	3	88.4, 89,0, 90.4	89.3	1	Tamil Nadu, India
	0.1	3	87.5, 88.9, 89.9	88.8	1	
	50	1	107			West Bengal, India
	100	1	87.3			
Tea brew	0.0025	3	77.8, 87.7, 96.0	87.2	10	
	0.005	3	92.7, 96.5, 98.4	95.8	3	
	0.025	3	85.4, 91.2, 95.5	90.7	6	
	0.05	3	74.5, 78.6, 83.2	78.8	6	

LOQ, 0.05 mg/kg

Stability of residues in stored analytical samples

In a pineapple processing study (Report No. 06585), storage stability for total propiconazole was studied on fruit (without crown), juice and process residue samples stored at -20 °C. The analytical method is described in the section above. Total residues of propiconazole, fortified at 2 mg/kg, as propiconazole equivalents were stable for at least 720 days in fruit, 734 days in juice and 741 days in process residue.

Table 6 Storage stability periods of total residues of propiconazole in pineapple stored at -20 °C

Matrix	Storage period (days)	Fortification level (mg eq/kg)*	Procedural recovery (%)	Remaining (%)
Pineapple fruit	760	5	102	
		2		90, 91, 92
Pineapple juice	734	5	99	
		2		77, 85, 87
Pineapple process residues	741	5	103	
		2		92, 93, 94

* As propiconazole equivalents

Storage stability periods of propiconazole residues were demonstrated with various crop matrices in evaluations by the JMPR. The information is summarized in the Table 7.

Table 7 Summary for storage period of propiconazole residues in crops (food) stored frozen at -15 °C or -20 °C

Analyte	Matrix	Commodity type	Storage duration Month (days)	Reference
Propiconazole (parent only)	Cherries (without pits or stems)	High water	6 (189)	2013 JMPR
	Citrus fruit	High acid	6.5 (207)	2013 JMPR

Analyte	Matrix	Commodity type	Storage duration Month (days)	Reference
	Orange juice	High acid	5 (155)	2013 JMPR
	Dried citrus pulp (orange)	High acid	5 (154)	2013 JMPR
	Soya bean	High protein	6 (180)	2007 JMPR
	Cereal grain	High starch	21 (630)	2007 JMPR
	Orange oil	High oil	7 (224)	2013 JMPR
Total propiconazole (measuring 2,4-DCBA moiety)	Tomato	High water	5 (160)	2013 JMPR
	Carrot	High water	10 (297)	2007 JMPR
	Banana	High water	36 (1102)	2007 JMPR
	Peach	High water	36 (1102)	2007 JMPR
	Celery	High water	36 (1111)	2007 JMPR
	Pineapple fruit (without crown)	High acid	24 (760)	2017 JMPR
	Pineapple juice	High acid	24 (734)	2017 JMPR
	Pineapple process residue	High acid	24 (741)	2017 JMPR
	Soya bean	High protein	6 (180)	2007 JMPR
	Peanut nutmeat	High protein	36 (1099)	2007 JMPR
	Wheat grain	High starch	36 (1090)	2007 JMPR
	Corn oil	High oil	36 (1096)	2007 JMPR

USE PATTERN

Propiconazole is a systemic compound which provides protective and curative activity. Information on use of propiconazole relevant to the submission to the 2017 JMPR are summarised in Table 8.

Table 8 Registered uses of propiconazole relevant to evaluation by 2017 JMPR

Country	Crop	Formulation	Application			PHI (days)
			Method	No.	Rate	
USA	Citrus fruits	EC 9.7%	In-Line Dip/Drench	2	26.4-52.7 g ai/ 100 L	na
			In-line aqueous or fruit coating spray application		0.88-1.77 g ai/1000 kg fruits	na
USA	Stone fruits (not including cherries)	SE 9.3%	In-line dip/drench (nectarines only)	1	12.9 g ai/100 L	na
			In-line aqueous or fruit coating spray application (all)	1	0.54 g ai/1000 kg fruits	na
USA	Cherries	SE 9.3%	In-line dip/drench	1	12.9 g ai/100 L	na
			In-line aqueous or fruit coating spray application	1	2.16 g ai/1000 kg fruits	na
USA	Pineapple	SE 9.3%	Drench high volume (dilute) application	1*	25.8 g ai/100 L	na
			Directed peduncle spray (dilute) application	1**	25.8 g ai/100 L	na
India	Tea	EC 25%	Outdoor, foliar spray (high volume) at active vegetative growth stage	1	0.1 kg ai/ha (0.025 kg ai/hL; 400 L water/ha)	7

na, not applicable

Emulsion concentrate (EC) formulation: 9.7% propiconazole (105 g/L); 25% (250 g/L)

Suspo-emulsion (SE) formulation: 21.7% fludioxonil and 9.3% propiconazole (103 g/L)

In-line Dip/Drench: Mix the formulation in an appropriate water, wax/ oil emulsion, or aqueous dilution of wax/oil emulsion and dip fruits for a minimum of 30 seconds and allowed to drain.

In-line aqueous or fruit coating spray application: mix the formulation in an appropriate water, wax/oil emulsion, or aqueous dilution of a wax/oil emulsion. Use T-jet, CDA, or similar application system

[*] One application is defined as a drench and a directed peduncle spray. Mix the formulation in appropriate water, wax/emulsion. Use cascade, drench or similar application system.

[**] One application is defined as a drench and a directed peduncle spray. Mix the formulation in appropriate water, wax/emulsion. Use T-jet or similar application system.

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

The Meeting received post-harvest treated residue trials on citrus fruits, stone fruits and pineapple. The all trials were carried out in the USA. India provided pre-harvest treatment data on tea. The details are summarised in the tables below.

Crop group	Commodity	Table No.
Citrus fruits	Orange, mandarin, lemon, grapefruit	9
Stone fruits	Peach, nectarine, plum, cherry (sweet, tart)	11
Assorted tropical and sub-tropical fruits-inedible rough or hairy peel - large	Pineapple	12
Derived edible products of plant origin	Tea, black	13

Analytical method used in all trials was described under residue analysis section. In the all trials, procedural recovery of analyte in each matrix was in the range of 70–120% on the average (RSD, < 20%).

Citrus fruits – Post-harvest treatment

A total of sixteen post-harvest trials on orange, mandarin, lemon and grapefruit were conducted in 2014 in the USA, using EC formulation (105 g ai/L), mixed with fruit wax or coatings in two scenarios, dip applications and packing line sprays (Report No. TK00062888).

Mature citrus fruits were either harvested with known pesticide history or obtained from an organic supplier. At least 24 fruit per sample were used. Scenario one consisted of dip application, at either 26.4 g ai/100 L or 52.7 g ai/100 L of solution for 30 seconds. Scenario two consisted of simulated packing line spray, at either 0.88 g ai/1000 kg of fruit or 1.77 g ai/1000 kg of fruit. Each scenario consisted of two applications of the test substance mixed first with storage wax and then with packing wax once dried.

In all trials, samples were collected after the second application had dried on the fruit. All samples were frozen within 34 minutes after collection and kept frozen until analysis. Fruit samples were ground and homogenized with dry ice. The maximum storage interval for treated samples was 97 days.

In this study, total residues of propiconazole were not measured. From the post-harvest treatment trials for stone fruit and pineapple (described later), conversion factor from parent to parent plus metabolites could be estimated as 1.2 (Table 9). Thus the factor, 1.2, was used to estimate the total residue value for citrus fruits, taking it into account that already-harvested fruits will undergo near-negligible metabolism in case of post-harvest treatment.

Table 9 Residues in citrus fruits following post-harvest treatment with propiconazole in the USA (EC 105 g/L)

Location, Year (Variety)	Post-Harvest Application			DALA (days)	Portion analysed	Residues (mg/kg)		Report No. Trial No.
	Rate	Method	No.			Propiconazole	Total	
GAP: USA, Citrus fruits	26.4- 52.7 g ai/100L	Dip/Drench	2	0				
	0.88-1.77 g ai/1000 kg fruits	In-line spray application or coating		0				
Orange								
Oviedo, FL 2014 (Valencia)	52.7 g ai /100L	Dip	2	0	Fruit	2.6, 2.4, 2.4 [2.5]**	3.0	TK0062888 Trial 1
					Peel	4.9	5.9	
					Pulp	0.14	0.17	
	26.4 g ai /100L	Dip	2	0	Fruit	1.0, 1.1 [1.1]	1.3	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.6, 2.0 [1.8]	2.2	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.0, 1.1 [1.1]	1.3	
Oviedo, FL 2014 (Valencia)	52.7 g ai /100L	Dip	2	0	Fruit	2.4, 2.5, 2.1 [2.3]	2.8	TK0062888 Trial 2
					Peel	5.4	6.5	
					Pulp	0.29	0.35	
	26.4 g ai /100L	Dip	2	0	Fruit	1.1, 1.3 [1.2]	1.4	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.7, 2.0 [1.9]	2.2	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.0, 1.1 [1.1]	1.3	
Porterville, CA 2014 (Valencia)	52.7 g ai /100L	Dip	2	0	Fruit	3.3, 4.3, 3.6 [3.7]	4.5	TK0062888 Trial 3
					Peel	8.2	9.8	
					Pulp	0.13	0.16	
	26.4 g ai /100L	Dip	2	0	Fruit	2.0, 2.5 [2.3]	2.7	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.04, 1.10 [0.57]	0.68	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.02, 0.17 [0.10]	0.12	
Porterville, CA 2014 (Valencia)	52.7 g ai /100L	Dip	2	0	Fruit	3.2, 3.6, 4.2 [3.6]	4.3	TK0062888 Trial 4
					Peel	7.1	8.5	
					Pulp	0.09	0.11	
	26.4 g ai /100L	Dip	2	0	Fruit	2.5, 3.7 [3.1]	3.7	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.51, 0.52 [0.52]	0.62	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.04, 0.10 [0.07]	0.08	
Mandarin								
Oviedo, FL 2014 (Minneola)	52.7 g ai /100L	Dip	2	0	Fruit	3.7, 3.7, 3.3 [3.6]	4.3	TK0062888 Trial 5
					Peel	5.6	6.7	

Location, Year (Variety)	Post-Harvest Application			DALA (days)	Portion analysed	Residues (mg/kg)		Report No. Trial No.
	Rate	Method	No.			Propiconazole	Total	
					Pulp	0.06	0.07	
	26.4 g ai /100L	Dip	2	0	Fruit	1.6, 1.5 [1.6]	1.9	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	2.7, 2.2 [2.5]	2.9	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.3, 1.0 [1.2]	1.4	
Oviedo, FL 2014 (Minneola)	52.7 g ai /100L	Dip	2	0	Fruit	3.3, 3.2, 2.8 [3.1]	3.7	TK0062888 Trial 6
					Peel	5.3	6.4	
					Pulp	0.16	0.19	
	26.4 g ai /100L	Dip	2	0	Fruit	1.5, 1.5 [1.5]	1.80	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	2.7, 2.4 [2.6]	3.1	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.3, 1.5 [1.4]	1.7	
Porterville, CA 2014 (Cuties 559)	52.7 g ai /100L	Dip	2	0	Fruit	6.0, 6.1, 5.7 [5.9]	7.1	TK0062888 Trial 7
					Peel	18	22	
					Pulp	0.32	0.38	
	26.4 g ai /100L	Dip	2	0	Fruit	4.0, 3.9 [4.0]	4.7	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.85, 1.1 [0.98]	1.2	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.54, 0.53 [0.54]	0.65	
Porterville, CA 2014 (Cuties 559)	52.7 g ai /100L	Dip	2	0	Fruit	4.7, 5.2, 4.4 [4.8]	5.7	TK0062888 Trial 8
					Peel	15	18	
					Pulp	0.28	0.34	
	26.4 g ai /100L	Dip	2	0	Fruit	3.1, 3.4 [3.3]	3.9	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.98, 1.3 [1.1]	1.4	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.68, 0.94 [0.81]	0.97	
Lemon								
Oviedo FL 2014 (Choice)	52.7 g ai /100L	Dip	2	0	Fruit	2.9, 3.1, 3.3 [3.1]	3.7	TK0062888 Trial 9
					Peel	4.0	4.8	
					Pulp	0.19	0.23	
	26.4 g ai /100L	Dip	2	0	Fruit	1.4, 1.4 [1.4]	1.7	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.7, 2.5 [2.1]	2.5	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.0, 1.0 [1.0]	1.2	
Oviedo, FL 2014 (Choice)	52.7 g ai /100L	Dip	2	0	Fruit	3.4, 3.3, 2.8 [3.2]	3.8	TK0062888 Trial 10
					Peel	5.5	6.6	
					Pulp	0.36	0.43	
	26.4 g ai	Dip	2	0	Fruit	1.3, 1.5	1.7	

Location, Year (Variety)	Post-Harvest Application			DALA (days)	Portion analysed	Residues (mg/kg)		Report No. Trial No.
	Rate	Method	No.			Propiconazole	Total	
	/100L					[1.4]		
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	2.1, 2.2 [2.2]	2.6	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.1, 1.5 [1.3]	1.6	
Porterville, CA 2014 (Eurek)	52.7 g ai /100L	Dip	2	0	Fruit	5.8, 6.4, 4.7 [5.6]	6.8	TK0062888 Trial 11
					Peel	8.4	10	
					Pulp	0.17	0.20	
	26.4 g ai /100L	Dip	2	0	Fruit	3.4, 3.4 [3.4]	4.1	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.61, 0.73 [0.67]	0.80	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.57, 0.67 [0.62]	0.74	
Porterville, CA 2014 (Eureka)	52.7 g ai /100L	Dip	2	0	Fruit	6.4, 6.8, 6.7 [6.6]	8.0	TK0062888 Trial 12
					Peel	12	14	
					Pulp	0.30	0.36	
	26.4 g ai /100L	Dip	2	0	Fruit	4.0, 4.3 [4.2]	5.0	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.73, 0.78 [0.76]	0.91	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.39, 0.45 [0.42]	0.50	
Grapefruit								
Oviedo, FL 2014 (Ruby, Choice, Floride)	52.7 g ai /100L	Dip	2	0	Fruit	1.9, 1.7, 1.4 [1.6]	1.9	TK0062888 Trial 13
					Peel	4.2	5.0	
					Pulp	0.07	0.08	
	26.4 g ai /100L	Dip	2	0	Fruit	0.54, 0.66 [0.60]	0.72	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	2.1, 2.3 [2.2]	2.6	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.5, 1.6 [1.55]	1.9	
Oviedo, FL 2014 (Ruby, Choice, Floride)	52.7 g ai /100L	Dip	2	0	Fruit	1.6, 1.6, 1.5 [1.6]	1.9	TK0062888 Trial 14
					Peel	3.4	4.1	
					Pulp	0.13	0.16	
	26.4 g ai /100L	Dip	2	0	Fruit	0.89, 0.81 [0.85]	1.0	
	1.77 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	2.8, 2.7 [2.8]	3.3	
	0.88 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	1.5, 1.2 [1.35]	1.6	
Porterville, CA 2014 (Star, Ruby)	52.7 g ai /100L	Dip	2	0	Fruit	2.7, 2.1, 2.2 [2.3]	2.8	TK0062888 Trial 15
					Peel	5.6	6.7	
					Pulp	0.11	0.13	
	26.4 g ai /100L	Dip	2	0	Fruit	1.8, 1.9 [1.9]	2.2	
	3.54 g ai	Packing line	2	0	Fruit	1.2, 0.48	1.0	

Location, Year (Variety)	Post-Harvest Application			DALA (days)	Portion analysed	Residues (mg/kg)		Report No. Trial No.
	Rate	Method	No.			Propiconazole	Total	
	/1000 kg fruits	spray				[0.84]		
	1.76 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.22, 0.05 [0.14]	0.17	
Porterville, CA 2014 (Star, Ruby)	52.7 g ai /100L	Dip	2	0	Fruit	2.3, 2.1, 2.1 [2.2]	2.7	TK0062888 Trial 16
					Peel	6.1	7.3	
					Pulp	0.06	0.07	
	26.4 g ai /100L	Dip	2	0	Fruit	1.2, 1.4 [1.3]	1.6	
	3.54 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.54, 0.69 [0.62]	0.74	
	1.76 g ai /1000 kg fruits	Packing line spray	2	0	Fruit	0.60, 0.42 [0.51]	0.61	

*Total residue value was calculated using conversion factor, 1.2, which was estimated from the stone and pineapple data. See Table 10.

**[ ]: mean of residues from replicate samples

Table 10 Concentrations of parent propiconazole and the total residues in stone fruit and pineapple following post-harvest treatment

Treatment	Commodity	Propiconazole (mg/kg)	Total residue (mg/kg)	Conversion Factor
Drench + Peduncle spray	Pineapple	0.92	1.13	1.23
		1.24	1.6	1.29
		0.97	1.08	1.11
		1.13	1.48	1.31
Dip/Drench	Cherry	1.43	1.57	1.10
		1.28	1.75	1.37
		0.73	0.77	1.05
		2.52	2.51	1.00
Packing line spray	Cherry	0.42	0.43	1.02
		0.47	0.41	0.87
		0.68	0.82	1.21
Dip/ Drench	Peach/ Nectarine	2.58	4.75	1.84
		0.82	0.94	1.15
		0.77	0.6	0.78
		2.29	3.45	1.51
Packing line spray	Peach/ Nectarine	0.44	0.58	1.32
		0.11	0.14	1.27
Packing line spray	Plum	0.12	0.14	1.17
		0.12	0.15	1.25
		0.06	0.09	1.50
			Median	1.2
			Mean	1.2

Stone fruits – Post-harvest

Post-harvest trials on cherry, peach, nectarine and plum were conducted in 2012 growing seasons in the USA, using SE formulation (fludioxonil, 21.7% and propiconazole, 9.3%). The fruits were obtained from local growers, trees located at the field facility, local farm stands, or organically grown

domestic produce from local grocery stores. At least 24 fruit units were collected for each sample weighing a minimum of ca. 1 kg for cherries, and ca. 2 kg for peaches, nectarines, and plums.

Peach, nectarine and plum were treated once with a rate of 12.9 g ai/100 L of solution for dip and drench treatments for 30 seconds and with a rate of 0.54 g ai/1000 kg of fruits for packing line spray treatments. For cherry (sweet and tart), a higher rate of 2.16 g ai/1000 kg fruit was applied once to cherries in packing line spray treatment. Dip and drench treatment methods were the same with those of other stone fruits. All trials were performed using a wax, vegetable or mineral oil for dip and packing line spray treatments; and Tween 20 for dip treatments.

On the same day as application, after draining and air-drying at least 24 fruit were randomly selected for each sample. Each fruit sample weighed a minimum of ca. 1 kg for cherries, and ca. 2 kg for peaches, nectarines and plums. Samples were placed with ice packs for transport to storage freezers or directly into freezer storage, and shipped frozen to the analytical facility. All samples were pitted to remove stones and then ground in the presence of dry ice before being stored frozen until analysis.

Storage period of frozen sample, until analysis of parent propiconazole, was 40–132 days, except trial 04 (849 days). Until analysis of total residues, storage period of frozen sample was 61–187 days, except trial 04 (852 days).

Table 11 Residues in stone fruits following post-harvest treatment with propiconazole in the USA (SE 103 g/L)

Location, Year (Variety)	Post-Harvest Application			DALA (days)	Portion analysed	Residues (mg/kg)		Report No. Trial No.
	Rate	Method	No.			Propiconazole	Total	
GAP: USA Stone fruit (not including cherries)	12.9 g ai /100L	Dip/Drench (nectarine only)	1	0				
	0.54 g ai /1000 kg fruits	In-line spray application or coating	1	0				
Peach								
Perry, UT 2014 (Hale)	12.9 g ai /100L	Dip	1	0	Fruit	2.54, 2.61 [2.6]	2.84, 1.91 [2.4]	TK0120136 Trial 05
Perry, UT 2014(Monre)	0.54 g ai /1000 kg fruit	Packing line spray	1	0	Fruit	0.45, 0.42 [0.44]	0.66, 0.50 [0.58]	
Perry, UT 2014 (Hale)	12.9 g ai /100L	Drench	1	0	Fruit	1.93, 1.75 [1.8]	2.19, 3.72 [3.0]	
Sodus, NY 2014 (Coral star)	12.9 g ai /100L	Dip	1	0	Fruit	2.82, 1.76 [2.3]	3.52, 3.38 [3.5]	TK0120136 Trial 08
Nectarine								
Morven, GA 2014 (Suncoast)	12.9 g ai /100L	Dip	1	0	Fruit	0.84, 0.79 [0.82]	0.94, 0.94 [0.94]	TK0120136 Trial 06
	0.54 g ai / 1000 kg fruit	Packing line spray	1	0	Fruit	0.11,0.11 [0.11]	0.11, 0.16 [0.14]	
	12.9 g ai /100L	Drench	1	0	Fruit	0.72, 0.75 [0.74]	0.73, 1.11 [0.92]	
Morven, GA 2014 (Suncoast)	12.9 g ai /100L	Dip	1	0	Fruit	0.75, 0.78 [0.77]	0.61, 0.58 [0.60]	TK0120136 Trial 07
Plum								
Madera, CA 2014 (Fortune)	12.9 g ai /100L	Dip	1	0	Fruit	0.34, 0.41 [0.36]	0.40, 0.46 [0.43]	TK0120136 Trial 09
	0.54 g ai	Packing line spray	1	0	Fruit	0.12, 0.12	0.12, 0.15	

Location, Year (Variety)	Post-Harvest Application			DALA (days)	Portion analysed	Residues (mg/kg)		Report No. Trial No.
	Rate	Method	No.			Propiconazole	Total	
	/ 1000 kg fruit					[0.12]	[0.14]	
	12.9 g ai /100L	Drench	1	0	Fruit	0.53, 0.55 [0.54]	0.47, 0.61 [0.54]	
Madera, CA 2014 (Red Beaut)	12.9 g ai /100L	Dip	1	0	Fruit	0.32, 0.34 [0.33]	0.39, 0.41 [0.40]	TK0120136 Trial 10
	0.54 g ai /1000 kg fruit	Packing line spray	1	0	Fruit	0.13, 0.11 [0.12]	0.18, 0.12 [0.15]	
	12.9 g ai /100L	Drench	1	0	Fruit	0.54, 0.52 [0.53]	0.64, 0.58 [0.61]	
Dinuba, CA 2014 (Fryers)	12.9 g ai /100L	Dip	1	0	Fruit	0.46, 0.21 [0.34]	0.51, 0.24 [0.38]	TK0120136 Trial 10 (11)
	12.9 g ai /100L	Drench	1	0	Fruit	0.96, 0.83 [0.88]	0.81, 0.98 [0.90]	
Planada, CA 2014 (Burgandy)	12.9 g ai /100L	Dip	1	0	Fruit	0.81, 0.58 [0.70]	0.94, 0.88 [0.91]	TK0120136 Trial 12
	0.54 g ai /1000 kg fruit	Packing line spray	1	0	Fruit	0.05, 0.06 [0.06]	0.08, 0.09 [0.09]	
	12.9 g ai /100L	Drench	1	0	Fruit	0.48, 0.40 [0.44]	0.66, 0.70 [0.68]	
Sweet cherry								
Plainview, CA 2014 (Tulare)	12.9 g ai /100L	Dip	1	0	Fruit	0.95, 0.77 [0.86]	1.15, 0.89 [1.0]	TK0120136 Trial 01
	12.9 g ai /100L	Drench	1	0	Fruit	1.59, 1.27 [1.4]	1.55, 1.59 [1.6]	
Fresno, CA 2014 (Brooks)	12.9 g ai /100L	Dip	1	0	Fruit	0.96, 1.01 [0.99]	1.20, 0.93 [1.1]	TK0120136 Trial02
	12.9 g ai /100L	Drench	1	0	Fruit	1.22, 1.34 [1.3]	1.71, 1.78 [1.8]	
	2.16 g ai /1000 kg fruit	Packing line spray	1	0	Fruit	0.41, 0.43 [0.42]	0.41, 0.45 [0.43]	
Tart cherry								
Willard, UT 2014 (Montmorency)	12.9 g ai /100L	Dip	1	0	Fruit	0.30, 0.32 [0.31]	0.26, 0.29 [0.28]	TK0120136 Trial 03
	12.9 g ai /100L	Drench	1	0	Fruit	0.70, 0.76 [0.73]	0.84, 0.69 [0.77]	
	2.16 g ai /1000 kg fruit	Packing line spray	1	0	Fruit	0.47, 0.46 [0.47]	0.39, 0.42 [0.41]	
Union Gap, WA 2014 (Montmorency)	12.9 g ai /100L	Dip	1	0	Fruit	0.75, 0.81 [0.78]	1.0, 0.72 [0.87]	TK0120136 Trial 04
	12.9 g ai /100L	Drench	1	0	Fruit	2.49, 2.54 [2.5]	2.54, 2.48 [2.5]	
	2.16 g ai /1000 kg fruit	Packing line spray	1	0	Fruit	0.80, 0.56 [0.68]	1.01, 0.62 [0.82]	

Pineapple – Post-harvest

Four post-harvest residue trials in pineapple were conducted in the USA, using SE formulation (fludioxonil, 21.7% and propiconazole, 9.3%). Pineapples were treated with a nominal rate of 25.8 g ai/100 L treatment solution as drench and peduncle targeted spray. The drench application was performed utilising Sta-Fresh 2952 fruit wax.

Pineapple samples were obtained from growers in Costa Rica. A total of ten fruit were used for each treatment type. Following the drench application, a second application was made to each fruit as a targeted spray to the peduncle. Each peduncle was sprayed with approximately 4 mL of the fungicide/water solution at a rate of 25.8 g ai/100 L. Sampling of treated whole fruit began after the treatment solution had dried completely on the surface. 4 fruits were randomly selected and the crowns removed and the fruits cut into quarters. Two opposite quarters from each of the four fruits were placed in bags. The samples were promptly placed in a freezer at ≤-10 ºC within 30 minutes of collection and kept frozen for 3–4 days until shipment to the analytical laboratory. The pineapple samples were ground in the presence of dry ice then immediately placed in frozen storage (-20 ºC). A maximum storage period of frozen sample was 48 days.

Table 12 Residues in pineapple following post-harvest treatment with propiconazole in the USA (SE 103 g/L)

Location, Year (Variety)	Post-harvest application			DALA (days)	Portion analysed	Residues (mg/kg)		Report No. Trial No.
	Rate	Method	No.			Propiconazole	Total	
GAP: USA	25.8 g ai /100 L	Drench Directed peduncle spray	1 1	0				
Sanger, CA 2013 (MD2)	25.8 g ai /100 L	Drench Peduncle spray	1 1	0	Whole fruit	0.84, 1.00 [0.92]	1.23, 1.02 [1.1]	TK0061924 Trial 01
Sanger, CA 2013 (Montelirio)	25.8 g ai /100 L	Drench Peduncle spray	1 1	0	Whole fruit	1.41, 1.07 [1.2]	1.66, 1.53 [1.6]	TK0061924 Trial: 02
Auburn, AL 2013 (MD2)	25.8 g ai /100 L	Drench Peduncle spray	1 1	0	Whole fruit	0.95, 0.99 [0.97]	0.99, 1.17 [1.1]	TK0061924 Trial 03
Auburn, AL 2013 (Montelirio)	25.8 g ai /100 L	Drench Peduncle spray	1 1	0	Whole fruit	1.11, 1.14 [1.1]	1.56, 1.39 [1.5]	TK0061924 Trial 04

Tea – Pre-harvest treatment

Residue trials on tea plant were carried out in 2006-2007 and 2014 in India. Foliar spray was made once on tea plants at vegetative growth stage with EC formulation (25%) at a rate of 0.1 kg ai/ha. Tea leaves of 1–2 kg were collected by hand pluck. The sample comprised of minimum 70% two leaves and a bud which was manufactured in the tea factory under controlled condition following normal black tea manufacturing process. The manufacturing process involved withering (reduction of moisture in the plucked shoots), rolling, oxidation (fermentation) and drying (95–115 °C). The dry made tea sample was analysed immediately upon receipt in the laboratory (analysed amount, 0.2 kg).

Table 13 Propiconazole residues in dry black tea following foliar application with EC 25%

Location, Year (Variety)	Application				DALA (days)	Sample analysed	Propiconazole	Total Residues*
	kg ai/ha	Water L/ha	kg ai/hL	No.				
GAP: India	0.1	400	0.025	1	PHI, 7 days			
Assam, India 2006 (mixture of cultivars)	0.1	400	0.025	1	0	Black tea	56	
					7		1.7	

Location, Year (Variety)	Application				DALA (days)	Sample analysed	Propiconazole	Total Residues*
	kg ai/ha	Water L/ha	kg ai/hL	No.				
					14		0.34	
Tamil Nadu, India 2006 (mixture of cultivars)	0.1	400	0.025	1	0	Black tea	11	
					7		0.64	
					10		0.25	
					14		< 0.1	
Tamil Nadu, India 2007 (dry season) (mixture of cultivars)	0.1	400	0.025	1	0	Black tea	4.2	
					7		0.42	
					10		0.29	
					14		< 0.1	
West Bengal, India 2014 (dry season) (mixture of cultivars)	0.1	400	0.025	1	0	Black tea	19	
					3		11	
					7		3.0	
					14		0.45	

* Not determined

FATE OF RESIDUES IN STORAGE AND PROCESSING

Processing study on pineapple

A processing study on pineapples was conducted during the 1998 growing season in Hawaii, USA (Report No. 06585). Pineapples grown in Hawaii were dipped once in solution of propiconazole formulation (EC 41.8%) at a rate of 15 g ai/100 L. Following treatment, the pineapples were allowed to dry and the crowns were removed from six pineapples and the remainder processed into edible fresh pulp, peel, juice and process residue. Pineapple cores were collected as part of the edible fresh pulp. Juice was prepared from some of the remaining cores, eradicated material, and end cuts, and processed following commercial cooking and cooling procedures. The process residue was prepared by dicing the remaining end cuts, peels, and juice pulp, and cycling them through a press to be moisture content of 76.3%.

Processed samples were packed with ice packs and stored frozen at -20 °C until sample preparation. The samples except juice were chopped with dry ice. The maximum storage intervals were 720 days for pineapple fruit, 727 days for edible fresh pulp, 710 days for peel, 701 days for juice, and 710 days for processing residue.

Processing factors for propiconazole in pineapple peel, process residue, pulp and juice were 0.81, 1.55, < 0.12 and < 0.12, respectively.

Transfer of residues into tea brew (tea infusion)

Tea brew was prepared using the black tea sample (7 DALA sample from the Assam trial) following the standard of International Organization for Standardization (ISO) for organoleptic testing of teas for preparation of infusion. This involves extracting black tea leaves with boiling hot water (black tea:hot water, 1:50) for 5–6 min. Parent only in tea brew was analysed.

Residue value of parent propiconazole in dry black tea and tea brew was 1.7 mg/kg and 0.22 mg/kg dry black tea, respectively.

Table 14 Residues and processing factors for total propiconazole in pineapple processed products

Location, Year (Variety)	Post-harvest application			Samples	Total residues (mg/kg)	Pf	Report No.
	Rate	Method	No.				
Haliimaile, Hawaii, 1998 (Smooth Cayenne)	15 g ai/100 L	Dipping for 30 sec	1	Pineapple Fruit without crown	0.43		06585
				Edible fresh pulp	< 0.05	< 0.12	
				Peel	0.35	0.81	
				Juice	< 0.05	< 0.12	
				Process residue (wet pomace)	0.67	1.6	

EC formulation (41.8%) was used.

APPRAISAL

Propiconazole was last evaluated by the JMPR in 2015 for residues. The JMPR established an ADI of 0–0.07 mg/kg bw and an ARfD of 0.3 mg/kg bw for propiconazole in 2004. The residue is defined for plant and animal commodities as propiconazole for compliance with the MRL and propiconazole plus all metabolites convertible to 2,4-dichlorobenzoic acid, expressed as propiconazole for the estimation of the dietary intakes.

This compound was scheduled at the 48th Session of the CCPR (2016) for the evaluation of additional MRLs at the 2017 JMPR. The Meeting received residue information on citrus fruits, stone fruits and pineapple following post-harvest treatment from the manufacturer. India provided pre-harvest trial information on tea.

Methods of analysis

Analysis of parent propiconazole in citrus fruits, stone fruits and pineapple was performed using method REM 130.11 and method Meth-180 (REM 130.11, modified), which were considered valid by the 2007 JMPR. These methods were fully validated for analysis of propiconazole in citrus fruits, stone fruits and pineapple samples (LOQ, 0.01 mg/kg).

Total residues, convertible to 2,4-DCBA, in stone fruits and pineapple, were analysed based on method AG-626 with the modification: determination of 2,4-DCBA by LC-MS/MS. The modified method used was fully validated for analysis of total residues in stone fruits and pineapple samples (LOQ, 0.05 mg/kg as parent equivalents). For citrus fruit trials, total residues were not analysed.

In tea trials only the parent compound was analysed in dry black tea. The three methods used involved extraction with different organic solvents or by QuEChERS, and determination by GC-ECD, HPLC-DAD or LC-MS/MS (LOQ, 0.05 mg/kg). The parent compound in tea brew was analysed by partitioning with organic solvent and determination by GC-ECD. Recoveries of parent in the analysis of dry black tea and tea brew were satisfactory.

Stability of residues in stored analytical samples

New storage stability data on pineapple fruit, juice and process residues demonstrated that the total residues were stable for at least 760 days, 734 days and 741 days, respectively when stored at -20 °C. Based on information previously submitted to the JMPR (parent and total residues), and the new information (total residues in pineapple matrices), the stability of the parent and total residues in the residue trial and processing samples (except one trial sample of tart cherry) was demonstrated for the period of frozen storage. In one trial sample of tart cherry, the integrity of parent was not assured as the storage period (849 days) was not covered by the verified period (189 days).

Results of supervised residue trials on crops

Residue trials for post-harvest treatments on citrus fruits, stone fruits and pineapple and pre-harvest treatment on tea were provided. In stone fruits and pineapple trials, both parent and total residues were analysed. In citrus fruit trials, only the parent compound was analysed. The total residues were estimated using a conversion factor of 1.2, which was based on the ratios of parent and total residue values in stone fruit trials provided for evaluation by this Meeting. In tea trials, only the parent compound was analysed.

Citrus fruits

Propiconazole is registered for post-harvest treatment on citrus fruits in the USA. The USA critical GAP is for two applications at a rate of 52.7 g ai/100 L by dip/drench. Residue trials from the USA, matching the GAP, were submitted. The previously submitted residue information on citrus fruits that was evaluated by the 2013 JMPR was also considered.

Residue values of parent in whole orange were (n=8): 2.2 (old), 2.3, 2.5 (old), 2.5, 3.4 (old), 3.6, 3.7 (old) and 3.7 mg/kg. Total residues (measured parent×1.2) in orange pulp were (n=4): 0.11, 0.16, 0.17 and 0.35 mg/kg.

Residue values of parent in whole mandarin were (n=4): 3.1, 3.6, 4.8, and 5.9 mg/kg. Total residues (measured parent×1.2) in mandarin pulp were (n=4): 0.070, 0.19, 0.34 and 0.38 mg/kg.

Residue values of parent in whole lemon were (n=4): 3.1, 3.2, 5.6 and 6.6 mg/kg. Total residues (measured parent×1.2) in lemon pulp were (n=4): 0.20, 0.23, 0.36 and 0.43 mg/kg.

Residue values of parent in whole grapefruit were (n=4): 1.6, 1.6, 2.2, and 2.3 mg/kg. Total residues (measured parent×1.2) in grapefruit pulp were (n=4); 0.07, 0.080, 0.13 and 0.16 mg/kg.

The residue distributions among the citrus fruits were considered similar by Kruskal-Wallis test, except for grapefruit. Therefore, the Meeting decided to combine the residue values for orange, mandarin and lemon.

The combined data set for parent in whole orange, mandarin and lemon was (n=16): 2.2 (old), 2.3, 2.5 (old), 2.5, 3.1, 3.1, 3.2, 3.4 (old), 3.6, 3.6, 3.7 (old), 3.7, 4.8, 5.6, 5.9 and 6.6 mg/kg.

The combined data set for total residues (measured parent×1.2) in whole orange, mandarin and lemon was (n=16): 2.6, 2.8, 3.0, 3.0, 3.7, 3.7, 3.8, 4.1, 4.3, 4.3, 4.4, 4.5, 5.7, 6.8, 7.1 and 8.0 mg/kg

The combined data set for total residues (measured parent×1.2) in pulp of orange, mandarin and lemon was (n=12); 0.070, 0.11, 0.16, 0.17, 0.19, 0.20, 0.23, 0.34, 0.35, 0.36, 0.38, 0.43 mg/kg.

The Meeting estimated a maximum residue level of 15 mg/kg (Po), an STMR of 0.22 mg/kg and an HR of 0.43 mg/kg for orange (Subgroup), mandarin (Subgroup) and lemon (Subgroup) based on a post-harvest treatment thus replacing its previous recommendation of 9 mg/kg (Po) for oranges.

The Meeting estimated a maximum residue level of 6 mg/kg (Po), an STMR of 0.11 mg/kg and an HR of 0.16 mg/kg for pummelo and grapefruits (Subgroup) based on a post-harvest treatment.

Stone fruits

Propiconazole is registered for post-harvest treatment on stone fruits in the USA. The USA critical GAP on cherry and nectarine is a single application at a rate of 12.9 g ai/100 L by in-line dip/drench method. Residue trials on cherry and nectarine conducted in the USA matching the GAP were submitted. The previously submitted residue information on cherry evaluated by the 2013 JMPR was also considered.

Residue values of parent in cherry were (n=5): 0.67 (old), 0.73, 0.85 (old), 1.3 and 1.4 mg/kg. The total residues in cherry were (n=5): 0.77, 0.80 (old), 1.0 (old), 1.6 and 1.8 mg/kg.

Residue values of parent in nectarine were (n=2): 0.77 and 0.82 mg/kg. The total residues in nectarine were (n=2): 0.60 and 0.94 mg/kg.

The Meeting estimated a maximum residue level of 3 mg/kg (Po), an STMR of 1.0 mg/kg and an HR of 1.8 mg/kg for cherries (Subgroup) with post-harvest treatment. The Meeting did not estimate a maximum residue level for nectarine as the number of trials was not sufficient.

The USA critical GAP on peach and plum is a single application at a rate of 0.54 g ai/1000 kg by in-line aqueous or fruit coating spray method. Residue trials on peach and plum conducted in the USA, matching the GAP, were submitted. The previously submitted residue information on peach and plum evaluated by the 2013 JMPR was also considered.

Residue values of parent in peach were (n=3): 0.44, 0.49 (old) and 0.50 (old) mg/kg. The total residues in peach were (n=3): 0.58, 0.59 and 0.60 mg/kg.

The Meeting replaces its previous recommendations with a maximum residue level of 1.5 mg/kg (Po), an STMR of 0.59 mg/kg and an HR of 0.60 mg/kg for peach.

Residue values of parent in plum were (n=5): 0.06, 0.12, 0.12, 0.16 (old), and 0.19 (old) mg/kg. The total residues in plum were (n=5): 0.09, 0.14, 0.15, 0.19 (old) and 0.23 (old) mg/kg.

The Meeting replaces its previous recommendations with a maximum residue level of 0.5 mg/kg (Po), an STMR of 0.15 mg/kg and an HR of 0.23 mg/kg for plums (Subgroup).

Pineapples

Propiconazole is registered for post-harvest treatment on pineapple in the USA. Pineapple is allowed to be treated at rates of 25.8 g ai/100 L, once by drench and once by directed peduncle spray. Residue trials from the USA matching the GAP were submitted.

Residue values of parent in whole pineapple were (n=4): 0.92, 0.97, 1.1 and 1.2 mg/kg.

Total residues of propiconazole in whole pineapple were (n=4): 1.1, 1.1, 1.5 and 1.6 mg/kg.

The Meeting estimated a maximum residue level of 4 mg/kg (Po) for pineapples, an STMR of 0.16 (1.3×P*f*, < 0.12) mg/kg and an HR of 0.19 (1.6×P*f*, < 0.16) mg/kg for pineapple flesh.

Tea, black (pre-harvest treatment)

Propiconazole is registered for foliar use on tea in India at a rate of 1x0.1 kg ai/ha with a 7-day PHI. Residue trials from India matching the GAP were submitted.

Residue values of parent in dry black tea were 0.42, 0.64, 1.7 and 3.0 mg/kg.

The Meeting did not estimate a maximum residue level for black tea as the number of trials was not sufficient.

Fate of residues in storage and processing

One separate processing study on pineapple was received. Total residues of propiconazole in pineapple following post-harvest treatment were 0.43 mg/kg in fruit without crown, < 0.05 mg/kg in pulp, < 0.05 mg/kg in juice and 0.67 mg/kg in process residue. Processing factors and STMR-P values were estimated below. For orange, processing factors for juice, dried pulp and oil were estimated by the 2013 JMPR. Based on a processing factor for orange oil, the Meeting estimated a maximum residue level of 2800 mg/kg for citrus oil (15 mg/kg, multiplied by P*f*, 185).

RAC	Product	Pf	RAC, STMR	STMR-P	RAC, HR	HR-P
Orange	Whole fruit		4.2		8.0	
	Juice	< 0.011		0.046		
	Oil	185		777		
	Dried pulp	1.4		5.9		
Pineapple	Whole fruit		1.3		1.6	
	Flesh (raw edible)	< 0.12		0.16		0.19
	Juice	< 0.12		0.16		
	Wet pomace (moisture of 76.25%)	1.6		2.1		

Residue value of parent propiconazole in dry black tea and tea brew was 1.7 mg/kg and 0.22 mg/kg of dry black tea, respectively. The Meeting did not estimate a processing factor for tea brew as the total residue values were not available.

Residues in animal commodities

It is unlikely that post-harvest treated product (dried orange pulp, pineapple process residue) would to be fed to livestock and reference is made to the 2013 JMPR consideration. Therefore, this Meeting did not make new recommendations for animal commodities.

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 use in dietary exposure assessment.

For compliance with MRLs for plant and animal commodities: *propiconazole*

For estimation of dietary intake for plant and animal commodities: *propiconazole plus all metabolites convertible to 2,4-dichlorobenzoic acid, expressed as propiconazole*

The residue is fat soluble.

Commodity		Recommended MRL (mg/kg)		STMR or STMR-P (mg /kg)	HR, HR-P, highest residue (mg /kg)
CCN	Name	New	Previous		
FC 0004	Subgroup of Oranges, Sweet, Sour (including Orange-like hybrids)	15 Po	9 Po	0.22	0.43
FC 0003	Subgroup of Mandarins (including Mandarin-like hybrids)	15 Po		0.22	0.43
FC 0002	Subgroup of Lemons and Limes (including Citron)	15 Po		0.22	0.43
FC 0005	Subgroup of Pummelo and Grapefruits (including Shaddock-like hybrids)	6 Po		0.11	0.16
FS 0247	Peach	1.5 Po	5 Po	0.59	0.60
FS 0013	Subgroup of Cherries (includes all commodities in this subgroup)	3 Po		1.0	1.8
FS 0014	Subgroup of Plum including Prunes) (includes all commodities in this subgroup)	0.5 Po	0.6 Po	0.15	0.23
FI 0353	Pineapple	4 Po		0.16	0.19
OR 0001	Citrus oil, edible	2800		777	
JF 0004	Orange juice			0.046	
JF 0341	Orange dried pulp			5.9	
	Pineapple juice			0.16	
	Pineapple wet pomace			2.1	

DIETARY RISK ASSESSMENT

Long-term dietary exposure

The 2004 JMPR established an ADI of 0–0.07 mg/kg bw for propiconazole. The International Estimated Daily Intakes (IEDIs) of propiconazole were calculated for the 17 GEMS/Food cluster diets using STMRs and STMR-Ps estimated by the current and previous Meeting. The results are shown in Annex 3 in the 2017 JMPR Report.

The calculated IEDIs represented 0–6% of the maximum ADI. The Meeting concluded that the long-term dietary exposure to residues of propiconazole from the uses considered by the JMPR is unlikely to present a public health concern.

Short-term dietary exposure

The 2004 JMPR established an ARfD of 0.3 mg/kg bw. The International Estimate of Short Term Intakes (IESTIs) of propiconazole were calculated for the food commodity using an HR estimated by the current Meeting. The results are shown in Annex 4 in the 2017 JMPR Report.

The IESTIs represented 0–6% of the ARfD for general population and 0–10% of the ARfD for children. The Meeting concluded that the short-term dietary exposure to propiconazole resulting from uses considered by the current Meeting is unlikely to present a public health concern.

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Report number	Author(s)	Year	Study title
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