DIFENOCONAZOLE (224)

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EXPLANATION

Difenoconazole was first evaluated by the JMPR in 2007 for toxicology when an ADI of 0–0.01 mg/kg bw and an ARfD of 0.3 mg/kg bw were established. In 2007 and 2010, the JMPR evaluated the compound for residues and recommended numerous maximum residue levels. The compound was listed by the Forty-fourth Session of the CCPR for residue evaluation for additional maximum residue levels by the 2013 JMPR.

The residue is defined, for compliance with the MRL and for estimation of dietary intake for plant commodities, as parent *difenoconazole*. For animal commodities for compliance with the MRL and for estimation of dietary intake, it is defined as *sum of difenoconazole and 1-[2-chloro-4-(4-chloro-phenoxy)-phenyl]-2-(1,2,4-triazol)-1-yl-ethanol (CGA 205375), expressed as difenoconazole*. The residue is fat soluble.

The current Meeting received supervised residue trial data for oranges, grapefruit, lemons, mandarin, tangerines, apples, pears, grapes, bulb onion, spring onion, head cabbage, broccoli,melons, gherkin, summer squash, sweet pepper, chili pepper, tomato and potatoes. The government of Republic of Korea provided residue trial data for Japanese persimmon and ginseng. Processing studies on oranges, apples, grapes, tomato, potato and ginseng were also provided. The Forty-fourth Session of the CCPR requested the 2013 JMPR to re-evaluate the ginseng processing studies evaluated in 2010, in accordance with the new classification on the processed products, i.e., dried ginseng (including red ginseng) and ginseng extracts.

RESIDUE ANALYSIS

Analytical methods

The manufacture provided information for analytical methods (REM 147.08 and AG-575B) used for analysis of parent difenoconazole in plant matrices.

Method REM 147.08 was considered by the 2007 and 2010 JMPR. The method was used for the analysis of citrus fruits, grapes, onions, brassica vegetable, cucurbits and potatoes. LOQs of the method by LC-MS/MS determination were 0.01 mg/kg in the all matrices and the procedural recoveries by matrix were in the range of 80–106% at various fortification levels.

Method AG-575B is one of the updated versions of AG-575. AG-575 and AG-575A (another updated version of AG-575) were considered by 2007 and 2010 JMPR. The method AG-575B was used for the analysis of apples, pears, peppers and tomatoes. LOQs in all matrices by GC-NPD determination were 0.01 mg/kg. The procedural recoveries by matrix were in the range of 98–109% at various fortification levels.

Table 1 Procedural recovery results for difenoconazole in various crops

Matrix	Range of fortification, mg/kg	No.	Range of recoveries, %	Mean recovery, % ± SD	Method
Oranges	0.01-1.0	18	91-114	104 ± 6.3	REM 147.08
Orange, dried pulp	0.01-5.0	3	94-118	106 ± 12	REM 147.08
Orange oil	0.01-40	3	83-92	86 ± 4.9	REM 147.08
Orange juice	0.01-0. 50	2	94-119	106	REM 147.08
Grapefruit	0.01-0.50	10	83-104	94 ± 6.1	REM 147.08
Lemons	0.01-0.50	8	91-109	102 ± 7.3	REM 147.08
Apple	0.01-2.0	30	83-115	102 ± 9.0	AG-575B
Apple wet pomace	0.01-12	3	78-116	102 ± 21	AG-575B
Apple juice	0.01-0.50	4	100-117	109 ± 8.3	AG-575B
Pear	0.01-5.0	14	64-120	98 ± 14	AG-575B
Grape	0.01-5.0	19	70-113	96 ± 12	REM 147.08

Matrix	Range of fortification, mg/kg	No.	Range of recoveries, %	Mean recovery, % ± SD	Method
Raisins	0.01-10	5	95-108	102 ± 5.7	REM 147.08
Grape juice	0.01-0.50	4	94-107	99 ± 5.6	REM 147.08
Onion, bulb	0.01-5.0	8	85-99	93 ± 5.5	REM 147.08
Spring onion	0.01-7.0	9	92-111	102 ± 7.2	REM 147.08
Cabbage, head	0.01-15	32	71-120	92 ± 12	REM 147.08
Broccoli	0.01 – 2.0	12	72-108	94 ± 10	REM 147.08
Melons	0.01-0.5	12	86-120	97 ± 10	REM 147.08
Cucumber	0.01-0.5	14	89-105	96 ± 4.1	REM 147.08
Squash, summer	0.01-0.1	10	82-99	91 ± 6.3	REM 147.08
Pepper, sweet	0.01 – 2.0	12	91-130	104 ± 13	AG-575B
Chili pepper	0.01 – 0.50	7	94-119	106 ±7.9	AG-575B
Tomato	0.01 – 3.0	30	75-121	105 ± 11	AG-575B
Tomato paste	0.01 – 3.0	3	88-109	101 ± 11	AG-575B
Tomato puree	0.01 – 2.0	3	100-105	102 ± 2.5	AG-575B
Potato	0.01	9	88-119	100 ± 11	AG-575B
	0.1	7	91-116	99 ± 9	REM 147.08
	1.0	4	80-91	85 ± 5	REM 147.08
	10	4	78-88	82 ± 4	REM 147.08
Potato flakes	0.01	6	89-114	100 ± 11	REM 147.08
	0.1	3	85-86	86 ± 1	REM 147.08
	1.0	3	77-86	80 ± 5	REM 147.08
	10	4	74-94	80 ± 10	REM 147.08
Potato chips	0.01	6	94-103	98 ± 4	REM 147.08
	0.1	3	88-95	91 ± 4	REM 147.08
	1.0	3	84-90	87 ± 3	REM 147.08
	10	4	80-87	83 ± 4	REM 147.08
Potato wet peel	0.01	6	83-118	102 ± 13	REM 147.08
	10	1	82	NA	REM 147.08

LOQs were 0.01 mg/kg in all matrices.

For potato and the processed products, recoveries from method validation were included.

In addition, the manufacturer provided information on analytical methods, Meth-160 and Meth-160, Revision #2. After minor modifications, the methods were used for analyzing triazole metabolites 1, 2, 4-triazole (T), triazole alanine (TA), and triazole acetic acid (TAA) in the same substrates subjected to difenoconazole analysis.

The triazole metabolites were extracted from 5.0 grams of sample with 60 mL of methanol:water (80:20, v/v) [Orange oil samples were first diluted with hexane then extracted twice with methanol:water (80:20, v/v), first with 60 mL, then with 30 mL. Extracts were combined and brought to a final volume of 100 mL with methanol:water (80:20, v/v)]. Individual 1.0 mL aliquots of each extract were processed separately through solid phase extraction (SPE) cleanup and/or derivatization steps, which were specific for each analyte. The TAA aliquot was purified through a C-18 SPE cartridge, then derivatized using HCl/butanol esterification. The TA aliquot underwent two derivatizations directly (bypassing a Bond Elut Certify II SPE cartridge cleanup step in order to capture conjugated residues of TA); the first was an esterification using HCl/butanol and the second was an acylation using HFBA (heptafluorobutyric anhydride). The T aliquot did not undergo further cleanup and was directly derivatized with dansyl chloride to produce the dansyl derivative of 1,2,4-triazole. The derivative was partitioned into ethyl acetate which was evaporated to dryness, then re-dissolved in 2.5 mL of acetonitrile:water (30:70, v/v). The TA and TAA derivatized extracts were evaporated to dryness as well, then brought to a final volume of 2.5 mL in acetonitrile:water (30:70, v/v). All three derivatized extracts were submitted to HPLC for individual analysis. Determination and quantitation of derivatives of 1,2,4-triazole, triazole alanine and triazole acetic acid were conducted using HPLC employing mass spectrometric (MS/MS) detection. LOQs for all analytes were 0.01 mg/kg. The procedural recoveries for the metabolites in all substrates were in the range of 70–115% at fortification levels of 0.1–2.0 mg/kg.

The metabolite, triazole alanine in apple, pear, peppers and tomato was analysed by including a Bond Elut Certify II SPE cartridge cleanup step prior to derivatization. As the cleanup removes any conjugated triazole alanine, additional analysis was again conducted without the SPE cartridge cleanup step. The results had no discrepancies in the data of triazole alanine between with or without cleanup procedure.

Table 2 Procedural recovery results and LOQs for triazole metabolites in various crops using Meth-160

Sample	Analyte	Range of fortification, mg/kg	No.	Range of recoveries, %	Mean recovery, % ± SD
Oranges	1,2,4-Triazole	0.01-0.50	16	74-79	87±7.3
	Triazole alanine	0.01-0.50	16	72-110	95 ± 11
	Triazole acetic acid	0.01-0.50	16	89-116	102 ± 8.2
Orange, dried pulp	1,2,4-Triazole	0.01-0.50	2	84-86	85
	Triazole alanine	0.01-0.50	2	70-71	70
	Triazole acetic acid	0.01-0.50	2	90-100	95
Orange oil	1,2,4-Triazole	0.01-0.50	2	77-93	85
	Triazole alanine	0.01-0.50	2	85-92	88
	Triazole acetic acid	0.01-0.50	2	96-106	101
Orange juice	1,2,4-Triazole	0.01-0.50	2	72-93	82
	Triazole alanine	0.01-0.50	2	92-104	98
	Triazole acetic acid	0.01-0.50	2	105-112	108
Grapefruit	1,2,4-Triazole	0.01-0.50	8	70-112	86 ± 12
	Triazole alanine	0.01-0.50	8	84-107	92 ± 7.5
	Triazole acetic acid	0.01-0.50	8	81-108	97 ± 9.4
Lemons	1,2,4-Triazole	0.01-0.50	6	74-90	85 ± 6.2
	Triazole alanine	0.01-0.50	6	81-94	89 ± 5.0
	Triazole acetic acid	0.01-0.50	6	89-99	93 ± 3.7
Apple	1,2,4-Triazole	0.01-0.10	30	85-111	95 ± 5.6
	Triazole alanine	0.01-0.50	30	98-130	110 ± 8.0
	Triazole acetic acid	0.01-0.10	30	98-138	108 ± 7.4
Apple wet pomace	1,2,4-Triazole	0.01-0.10	4	84-95	90 ± 5.2
	Triazole alanine	0.01-0.50	4	84-95	88 ± 4.8
	Triazole acetic acid	0.01-0.10	4	88-95	91 ± 3.3
Apple juice	1,2,4-Triazole	0.01-0.10	4	87-92	89 ± 2.2
	Triazole alanine	0.01 – 1.0	3	94-103	98 ± 4.5
	Triazole acetic acid	0.01 – 0.10	4	96-104	101 ± 3.6
Pear	1,2,4-Triazole	0.01-0.50	14	79-101	92 ± 6.0
	Triazole alanine	0.01 – 1.0	14	86-112	102 ± 7.3
	Triazole acetic acid	0.01-0.50	14	91-97	94 ± 1.8
Grape	1,2,4-Triazole	0.01-0.50	17	78-102	89 ± 6.5
	Triazole alanine	0.01-0.50	16	91-119	99 ± 6.5
	Triazole acetic acid	0.01-0.50	16	92-116	107 ± 6.9
Raisin	1,2,4-Triazole	0.01-0.50	4	78-88	83 ± 4.6
	Triazole alanine	0.01-0.50	4	79-96	90 ± 7.6
	Triazole acetic acid	0.01-0.50	4	78-100	93 ± 10
Grape juice	1,2,4-Triazole	0.01-0.50	4	84-97	90 ± 5.4
	Triazole alanine	0.01-0.50	4	101-111	106 ± 4.4
	Triazole acetic acid	0.01-0.50	4	101-110	106 ± 3.8
Onion, bulb	1,2,4-Triazole	0.01-0.1	10	82-106	96 ± 6.6
	Triazole alanine	0.01-0.8	8	98-104	101 ± 1.8
	Triazole acetic acid	0.01-0.1	8	95-114	100 ± 6.5
Spring onion	1,2,4-Triazole	0.01-0.1	6	85-96	92 ± 3.8
	Triazole alanine	0.05-0.5	6	99-149	109 ± 20
	Triazole acetic acid	0.01-0.1	6	81-121	92 ± 15
Cabbage, head	1,2,4-Triazole	0.01-0.50	32	72-104	86 ± 7.3
	Triazole alanine	0.01 – 1.6	33	73-114	94 ± 8.9
	Triazole acetic acid	0.01-0.50	32	85-114	99 ± 7.6
Broccoli	1,2,4-Triazole	0.01-0.50	12	76-108	92 ± 8.6
	Triazole alanine	0.01-0.50	12	89-119	100 ± 8.8
	Triazole acetic acid	0.01-0.50	12	79-112	98 ± 8.6
Melons	1,2,4-Triazole	0.01-0.1	12	90-106	97 ± 4.7

Sample	Analyte	Range of fortification, mg/kg	No.	Range of recoveries, %	Mean recovery, % ± SD
	Triazole alanine	0.01-0.5	12	96-120	107 ± 7.3
	Triazole acetic acid	0.01-0.1	12	93-111	99 ± 5.2
Cucumber	1,2,4-Triazole	0.01-0.1	12	90-107	96 ± 5.3
	Triazole alanine	0.025-0.25	12	99-118	110 ± 5.6
	Triazole acetic acid	0.01-0.1	12	89-104	98 ± 4.0
Squash, summer	1,2,4-Triazole	0.01-0.1	10	74-104	95 ± 9.0
	Triazole alanine	0.025-0.25	10	90-106	100 ± 4.5
	Triazole acetic acid	0.01-0.1	10	96-104	100 ± 2.5
Pepper, sweet	1,2,4-Triazole	0.01-0.10	14	86-102	91 ± 3.8
	Triazole alanine	0.01-0.10	14	91-110	99 ± 4.7
	Triazole acetic acid	0.01-0.10	14	90-106	99 ± 3.9
Chili pepper	1,2,4-Triazole	0.01-0.20	7	85-99	90 ± 4.6
	Triazole alanine	0.01-0.20	7	91-105	98 ± 4.9
	Triazole acetic acid	0.01-0.20	7	88-107	99 ± 6.1
Tomato	1,2,4-Triazole	0.01-0.10	24	86-104	96 ± 5.5
	Triazole alanine	0.01-0.50	26	92-107	101 ± 3.3
	Triazole acetic acid	0.01-0.10	24	97-113	104 ± 3.6
Tomato paste	1,2,4-Triazole	0.01-0.10	4	72-91	84 ± 8.4
	Triazole alanine	0.01-0.50	5	76-101	92 ± 9.6
	Triazole acetic acid	0.01 – 0.10	4	95-104	97 ± 4.5
Tomato puree					
Tomato puree	1,2,4-Triazole	0.01 – 0.10	4	89-94	92 ± 2.2
	Triazole alanine	0.05 – 0.50	4	100-104	102 ± 1.7
	Triazole acetic acid	0.01 – 0.10	4	96-101	98 ± 2.1
Potato	1,2,4-Triazole	0.01	10	72-100	88 ± 14
		0.1	7	70-87	80 ± 6
		1.0	3	103	103 ± 0
	Triazole alanine	0.02	9	96-118	106 ± 8
		0.2	6	93-120	103 ± 10
		2.0	3	112-117	115 ± 3
	Triazole acetic acid	0.01	9	93-114	107 ± 7
		0.1	6	98-105	102 ± 3
		1.0	3	104-110	108 ± 3
Potato flakes	1,2,4-Triazole	0.01	6	80-100	89 ± 9
		0.1	1	81	NA
		1.0	3	95-99	97 ± 2
	Triazole alanine	0.01	6	97-106	102 ± 4
		0.1	1	91	NA
		1.0	3	97-101	99 ± 2
	Triazole acetic acid	0.01	6	87-109	98 ± 9
		0.1	1	110	NA
		1.0	3	95-100	98 ± 3
Potato chips	1,2,4-Triazole	0.01	6	80-108	93 ± 12
		0.1	1	103	NA
		1.0	3	84-89	87 ± 3
	Triazole alanine	0.01	6	98-110	104 ± 4
		0.1	1	94	NA
		1.0	3	114-118	115 ± 2
	Triazole acetic acid	0.01	6	97-114	104 ± 6
		0.1	1	104	NA
		1.0	3	109	109 ± 0
Potato wet peel	1,2,4-Triazole	0.01	6	76-87	82 ± 4
		0.1	1	80	NA
	Triazole alanine	0.01	6	102-108	105 ± 2
		0.1	1	106	NA
	Triazole acetic acid	0.01	6	104-112	109 ± 3
		0.1	1	105	NA

For potato and the processed products, recoveries from method validation were included.

LOQs were 0.01 mg/kg in all matrices, with the exception of triazole alanine (TA) in potato tubers (0.02 mg/kg).

Meth-160 and Meth-160 Revision #2 were used in pome fruits; Meth-160, in peppers and tomato; Meth-160 Revision #2, in the other crops. Both Meth-160 and Meth-160 Revision #2 were modified and then applied.

Analytical methods of difenoconazole residues for ginseng and the processed products were similar to the methods considered by the JMPR in 2010, other than a change in volume of elution solvents on the florisil column. Analytical method used for fresh ginseng was changed to the method used for dried ginseng. LOQs for difenoconazole based on GC-ECD are 0.003 mg/kg for fresh ginseng and 0.007 mg/kg for the other substrates. Concurrent recoveries were 86–113% at the fortification levels of 0.003–1.0 mg/kg.

Persimmon, Japanese was ground with a blender after removing seeds and stalk. These samples were individually packed in polyethylene bags and stored at-20 °C until analysis. Difenoconazole residues were extracted using acetone and then the extract was partitioned with dichloromethane. The residue concentration was determined with GC-ECD. LOQ of difenoconazole was 0.02 mg/kg and concurrent recoveries of the compound were 88–107% at fortification levels of 0.02–2.0 mg/kg.

Table 3 Recovery results of difenoconazole in ginseng and Japanese persimmon

Matrix	Range of fortification, mg/kg	Mean recovery, % ± SD (n=5)
Ginseng	0.003	86 ± 2[a], 94 ± 4[b]
	0.03	105 ± 2, 92 ± 6
	0.2	102 ± 3, 86 ± 6
Dried ginseng	0.007	109 ± 3, 92 ± 5
	0.07	101 ± 3, 90 ± 8
	0.2	108 ± 1, 93 ± 8
Red ginseng	0.007	108 ± 1, 93 ± 3
	0.07	113 ± 2, 96 ± 4
	0.2	108 ± 1
	0.5	100 ± 5
Dried ginseng extract (ethanol)	0.007	97 ± 5, 98 ± 2
	0.07	91 ± 1, 96 ± 5
	1.0	109 ± 3, 102 ± 3
Dried ginseng extract (Water)	0.007	92 ± 5, 100 ± 5
	0.07	101 ± 1, 95 ± 5
	1.0	98 ± 1, 95 ± 2
Red ginseng extract (ethanol)	0.007	97 ± 5, 90 ± 3
	0.07	92 ± 2, 102 ± 7
	0.5	100 ± 2, 97 ± 6
Red ginseng extract (water)	0.007	86 ± 2, 93 ± 6
	0.07	105 ± 2, 94 ± 6
	0.5	102 ± 3, 100 ± 2
Persimmon, Japanese	0.02	107 ± 6, 106 ± 1
	0.2	90 ± 7, 88 ± 4
	1.0	102 ± 3
	2.0	97 ± 6, 104 ± 7

[a, b] In each case, five replicates were run.

Stability of residues in stored analytical samples

Information provided for the 2007 JMPR indicated that difenoconazole residues were stable at approximately.-20 °C for 1 year in some commodity, but for 2 years in most commodities: banana, cotton seed, cotton seed meal, cotton seed oil, lettuce, potatoes, soya beans, tomatoes, wheat forage, wheat grain and wheat straw. In animal tissues and milk, difenoconazole and metabolite CGA 205375 were also stable at or below-18 °C for approximately 10 months. Difenoconazole residues in ginseng and the processed products were stable for 135 days when stored at or below-20 °C (2010 JMPR).

Stability test data for triazole metabolites (T, TA, TAA) were not provided for the Meeting.

Samples from the trials were stored at ca.-15 or -20 °C until analysis of difenoconazole for the following periods: 5 months in citrus fruits and grape, 8 months in apple and pear, 9 months in onions,

tomato and potato, 11 months in peppers, head cabbage and broccoli, 6 months in cucurbits. For analysis of triazole metabolites, the samples were stored for maximum 12 months under the same frozen conditions.

For ginseng and Japanese persimmon, stability was tested by analysing difenoconazole residues in spiked samples in parallel run when residue in field treated sample was analysed. The untreated samples were spiked at the time of sampling of the treated crops. The spiked and trial samples were kept under the same storage condition, at or below-20 °C.

Table 4 Storage stability of difenoconazole in ginseng and Japanese persimmon

Matrix	Fortification level, mg/kg	Days of storage, stored at ca.-20°C	Remaining, % Mean ± SD, n=5
Ginseng	0.03	17	107 ± 4
	0.2	24	89 ± 5
Dried ginseng	0.07	31	104 ± 1
	0.2	21	102 ± 4
Red ginseng	0.07	30	112 ± 2
	0.2	23	99 ± 1
Dried ginseng ethanol extract	0.07	20	94 ± 2
	1.0	27	103 ± 2
Dried ginseng water extract	0.07	10	101 ± 1
	1.0	28	95 ± 2
Red ginseng ethanol extract	0.07	4	97 ± 2
	0.5	24	104 ± 5
Red ginseng water extract	0.07	28	106 ± 3
	0.5	18	100 ± 3
Persimmon, Japanese	0.2	51, 37	107 ± 8, 95 ± 5

USE PATTERN

Difenoconazole is a broad-spectrum fungicide used for disease control in various crops. The registered uses on crops which were submitted for evaluation by the 2013 JMPR are summarized in Table 5.

Table 5 Registered uses of difenoconazole on crops submitted for evaluation

Crop	Country	Form., %, w/v	Method	Application					PHI, days
				Rate, kg ai/ha	Rate, kg ai/hL	No.	Interval days	Total/season, kg ai/ha	
Citrus fruits	USA	EC 250	Foliar, G, A	0.09-0.14		(4)	7-21	0.56	0
Pome fruits	USA	EC 250	Foliar, G, A	0.078		(5)	7 – 10[a]	0.37	14
Persimmon, Japanese	Rep. of Korea	WP 10 w/w	Foliar, G		0.0054	5	10		7
Grapes	USA	EC 250	Foliar, G, A	0.09-0.13		(4)	10-21[a]	0.52	7
Bulb vegetables (onion bulb, garlic, shallot)	USA	EC 250	Foliar, G, A, C	0.09-0.13		(4)	7-10[a]	0.52	7
Bulb vegetables (spring onion)	USA	EC 250	Foliar, G, A, C	0.09-0.13		(3)	7-10[a]	0.38	7
Brassica (Cole) leafy vegetables (head cabbage, broccoli, Brussels sprouts)	USA	EC 250	Foliar G, A, C	0.09-0.13		(4)	7-10[a]	0.52	1
Fruiting vegetables (melons, cucumber, summer squash)	USA	EC 250	Foliar, G, A, C	0.09-0.13		(4)	7-10[a]	0.52	0
Fruiting vegetables (tomato, peppers)	USA	EC 250	Foliar, G, A, C	0.078-0.13		(4)	7-14[a]	0.52	0
Potato	USA	EC 250	Foliar,	0.078-		(4)	7-14[a]	0.52	14

Crop	Country	Form., %, w/v	Method	Application					PHI, days
				Rate, kg ai/ha	Rate, kg ai/hL	No.	Interval days	Total/season, kg ai/ha	
			G, A, C	0.13					
Potato	USA	FS 360	Post-harvest: in line aq. spray	3.5 g ai/t		1			
Ginseng	Rep. of Korea	SC 11.3 w/w	Foliar, G		0.0030	4	10		7
	Rep. of Korea	SC 10 w/w	Foliar, G		0.0054	5	10		14

For only citrus fruits, there is a recommendation for use of adjuvant in label of EC 250 formulation. For grapes, bulb vegetables, brassica vegetables, fruiting vegetables and potato (for pre-harvest treatment), there is a recommendation for use of adjuvant in the label of SC formulation 11.4%, w/w. In pome fruits, there is no recommendation for adjuvant in any labels.

In the USA, EC 250 formulation is registered for grapes except Concord, Concord seedless and Thomcord.

Potatoes: flowable concentrate for seed treatment (36%, w/v) was used as a post-harvest spray for the control of certain post-harvest rots caused by Silver scurf (*Helminthosporum solani*) and *Fusarium* species; tubers should be tumbling as they are treated; use T-jet controlled droplet applicator (CDA) or similar application system; do not use on seed potatoes or on other seed pieces.

[a] No more than 2 sequential applications before alternating to another fungicide with a different mode of action

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

The Meeting received information on supervised field trials for difenoconazole on the following crops.

Crop group	Commodity	Table No.
Citrus fruits	Orange, mandarin, tangerine	6
	Grapefruit	7
	Lemon	8
Pome fruits	Apple	9
	Pear	10
	Persimmon, Japanese	11
Berries and other small fruits	Grapes	12
Bulb vegetables	Onion, Bulb	13
	Spring onion	14
Brassica (cole or cabbage) vegetables, Head cabbages,	Cabbages, Head	15
Flowerhead cabbages	Broccoli	16
Fruiting vegetables, Cucurbits	Melons (Cantaloupe)	17
	Gherkin	18
	Squash, Summer	19
Fruiting vegetables, other than Cucurbits	Tomato	20
	Peppers, Sweet and Chili	21
Root and tuber vegetables	Potato	22
	Ginseng	23

Most residue trials were carried out in the USA according to GLP principles. Some trials had not been performed in compliance with GLP principles.

In handling duplicate samples, if two field samples were taken or results of two replicate plots were submitted, the mean value was calculated. From two trials carried out side-by-side, the higher residue was chosen.

Residue information from the USA trials included analytical results for triazole metabolites, 1, 2, 4-triazole, triazole alanine and triazole acetic acid. Triazole alanine was detected in field treated samples of most crops, up to maximum 1.5 mg/kg in head cabbage. In control samples, magnitudes of concentration of triazole alanine were nearly equivalent or less than residue concentrations determined in field treated samples.

Citrus fruits

Residue trials on citrus fruits were conducted in California, Florida and Texas in 2007 (oranges–nine trials; mandarins–two trials; tangerines one trial; grapefruits–six trials and lemons–five trials). Difenoconazole EC 250 formulation (250 g/L) was applied to citrus fruits as foliar applications four times at a rate of 0.14–0.15 kg ai/ha with 7 day intervals. Application volumes were between 95 and 935 L/ha for the concentrate sprays and 945 and 3742 L/ha for the dilute cover sprays, including NIS + Silwet or Kinetic non-ionic surfactant (0.125%, v/v) in the spray solution.

Two replicate samples of mature fruit were collected on the last day of application. In the decline trials, samples were collected at 0, 3, 7 and 10 days after last application (DLA).

Table 6 Difenoconazole and metabolite residues in orange, mandarin and tangerine from supervised trials performed in the USA with EC 250 (Report No.: T004712-06)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA [a]	TAA
GAP, USA	0.14				0.56	0					
Orange											
De Leon Springs, FL 2007 (Valencia) E13FL078043	0.14-0.15	4	100	89-91	0.57	0	0.12 0.16	0.14	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Mt. Dora, FL 2007 (Valencia) E13FL078044	0.14	4	700	87-89	0.56	0	0.17 0.12	0.15	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Ft. Pierce, FL 2007 (Hamlin) E13FL078045	0.14	4	3300	89-91	0.56	0	0.28 0.23	0.26	< 0.01 < 0.01	< 0.01 0.01 (0.02)	< 0.01 < 0.01
De Leon Springs, FL 2007 (Hamlin) E13FL078046	0.14	4	700	85-89	0.56	0	0.23 0.23	0.23	nd nd	< 0.01 < 0.01	nd < 0.01
						3	0.16		nd	< 0.01	nd
						7	0.16		nd	< 0.01 (0.03)	nd
						10	0.17		nd	< 0.01	< 0.01
Oviedo, FL 2007 (Valencia) E15FL078041	0.14	4	2300	83	0.56	0	0.13 0.17	0.15	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
	0.70-0.71	4	2300	83	2.8	0	1.3 1.0	1.2	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Eustis, FL 2007	0.14	4	1400	83	0.56	0	0.15	0.13	< 0.01	< 0.01	< 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA [a]	TAA
(Rhode Red) E19FL078047							0.10		< 0.01	< 0.01	< 0.01
Monte Alto, TX 2007 (Marrs) W08TX078053	0.14	4	700	78-83	0.56	0	0.07 0.12	0.095	< 0.01 < 0.01	0.01 0.01 (0.04)	< 0.01 < 0.01
	0.14	4	2300	78-83	0.56	0	0.09 0.13	0.11	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Orland, CA 2007 (Navel) W23CA078055	0.14	4	1400		0.56	0	0.13 0.12	0.13	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Madera, CA 2007 (Washington navels) W29CA078056	0.14	4	500	89	0.56	0	0.25 0.16	0.21	nd nd	< 0.01 < 0.01	< 0.01 nd
						3	0.37		nd	< 0.01	< 0.01
						7	0.34			< 0.01	< 0.01
						10	0.06		nd	< 0.01	< 0.01
Mandarin											
De Leon Springs, FL 2007 (Sunburst) E13FL078042	0.14	4	3300	85-89	0.56	0	0.16 0.17	0.17	< 0.01 < 0.01	0.02 0.02 (0.02)	< 0.01 < 0.01
Sanger, CA 2007 (Satsuma) W30CA078059	0.14	4	700	79	0.56	0	0.30 0.29	0.30	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
	0.14	4	1900	79	0.56	0	0.46 0.30	0.38	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Tangerine											
Umatilla, FL 2007 (Sunburst) E19FL078048	0.14	4	700	83	0.56	0	0.32 0.65	0.49	< 0.01 < 0.01	0.01 0.01 (0.01)	< 0.01 < 0.01

[a] (n): residue concentration in control sample

nd: non-detected.

Table 7 Difenoconazole and metabolite residues in grapefruit from supervised trials performed in the USA with EC 250 (Report No.: T004712-06)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA [a]	TAA
GAP, USA	0.14				0.56	0					
Vero Beach, FL 2007 (Star Ruby) E13FL078050	0.14	4	700	87	0.56	0	0.12 0.13	0.13	< 0.01 < 0.01	0.02 0.02 (0.03)	< 0.01 < 0.01
	0.14	4	3300	87	0.56	0	0.24 0.11	0.18	< 0.01 < 0.01	0.03 0.03 (0.03)	< 0.01 < 0.01
Vero Beach, FL 2007 (Marsh) E13FL078051	0.14	4	100	85-87	0.56	0	0.15 0.20	0.18	< 0.01 < 0.01	0.03 0.03 (0.05)	< 0.01 < 0.01
Eustis, FL 2007 (Flame) E19FL078049	0.14	4	1400	83	0.56	0	0.07 0.08	0.075	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Alamo, TX 2007 (Ruby Red) W08TX078054	0.14	4	700	78-83	0.56	0	0.14 0.11	0.13	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA [a]	TAA
	0.14-0.15	4	2300	78-83	0.57	0	0.08 0.09	0.085	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Porterville, CA 2007 (Mellogold) W32CA078057	0.14	4	800	79-89	0.56	0	0.08 0.10	0.09	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Elderwood, CA 2007 (Duncan) W30CA078060	0.14	4	1900	85	0.56	0	0.13 0.09	0.11	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01

[a] (n): residue concentration in control sample

Table 8 Difenoconazole and metabolite residues in lemon from supervised trials performed in the USA with EC 250 (Report No.: T004712-06)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.14				0.56	0					
Ft. Pierce, FL 2007 (Bearrs) E13FL078052	0.14-0.15	4	500	85-89	0.57	0	0.24 0.17	0.21	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
	0.14	4	2500	85-89	0.56	0	0.24 0.24	0.24	< 0.01 < 0.01	< 0.01 0.01	< 0.01 < 0.01
Sanger, CA 2007 (Lizbon) W30CA078061	0.14	4	700	79	0.56	0	0.08 0.24	0.16	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Porterville, CA 2007 (Pryor) W32CA078058	0.14	4	1900	81-89	0.56	0	0.19 0.15	0.17	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Arroyo Grande, CA 2007 (Eureka) W33CA078062	0.14	4	900	88-89	0.56	0	0.09 0.09	0.09	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Arroyo Grande, CA 2007 (Lisbon) W33CA078063	0.14	4	2100	81	0.56	0	0.18 0.20	0.19	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01

Pome fruits

Apples and pears

Residue trials on apples and pears were conducted in California, Colorado, Idaho, Illinois, Michigan, New York, Oregon, Pennsylvania, Virginia and Washington in 2004. Difenoconazole EC 250 formulation was applied to apples (13 trials) and pears (six trials) as a foliar application five times at a rate of 0.072–0.081 kg ai/ha with 7 day intervals. Application volumes were between 94 and 935 L/ha for the concentrate sprays and between 945 and 3742 L/ha for the dilute cover sprays, non-ionic surfactant (0.125%, v/v) was included in the spray solutions. There is no recommendation for adjuvant for pome fruits in any label of difenoconazole in the USA.

After the last application, duplicate samples of mature fruit were collected 12–16 days for apples and 13–15 days for pears. In the decline trials, samples were collected at 0, 5, 9 or 10, 14 and 19 days after last application.

Table 9 Difenoconazole and metabolite residues in apple from supervised trials performed in the USA with EC 250 (Report No.:T002884-03)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA [a]	TAA
GAP, USA	0.078				0.37	14					
Champaign, IL 2004 (Honey Crisp) 4A-FR-04-5195	0.072-0.078	5	400	77	0.37	12	0.29 0.26	0.28	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Hudson, NY 2004 (Indared) 5A-FR-04-5190	0.075-0.077	5	1100	75-85	0.38	15	0.16 0.09	0.13	< 0.01 < 0.01	0.14 0.13 (0.11)	< 0.01 < 0.01
Hudson, NY 2004 (Indared) 5A-FR-04-5190	0.38-0.39	5	1100	75-85	1.9	15	0.85 0.52	0.69	< 0.01 < 0.01	0.15 0.19 (0.11)	< 0.01 < 0.01
Hudson, NY 2004 (McIntosh) 5A-FR-04-5191	0.076-0.078	5	100	74-88	0.38	14	0.07 0.06	0.07	< 0.01 < 0.01	0.09 0.08	< 0.01 < 0.01
Hereford, PA 2004 (Red Delicious) EB-FR-04-5192	0.076-0.078	5	500	81	0.39	14	0.35 0.59	0.47	< 0.01 < 0.01	0.02 0.03 (0.03)	< 0.01 < 0.01
	0.076-0.079	5	2300	81	0.39	14	0.23 0.16	0.20	< 0.01 < 0.01	0.02 0.03 (0.03)	< 0.01 < 0.01
Covesville, VA 2004 (Yellow Delicious) EB-FR-04-5193	0.078-0.080	5	700	75-85	0.40	14	0.24 0.17	0.21	< 0.01 < 0.01	0.02 0.02 (0.05)	< 0.01 < 0.01
	0.076-0.077	5	2200	75-85	0.38	14	0.09 0.11	0.10	< 0.01 < 0.01	0.02 0.02 (0.05)	< 0.01 < 0.01
Conklin, MI 2004 (Golden Delicious) NL-FR-04-5194	0.076-0.078	5	1700		0.38	0	0.32 0.26	0.29	< 0.01 < 0.01	0.12 0.16 (0.10)	< 0.01 < 0.01
						5	0.30 0.24	0.27	< 0.01 < 0.01	0.12 0.14 (0.10)	< 0.01 < 0.01
						9	0.31 0.29	0.30	< 0.01 < 0.01	0.10 0.14 (0.08)	< 0.01 < 0.01
						14	0.30 0.38	0.34	< 0.01 < 0.01	0.08 0.12 (0.07)	< 0.01 < 0.01
						19	0.37 0.38	0.38	< 0.01 < 0.01	0.10 0.11 (0.06)	< 0.01 < 0.01
Orchard city, CO 2004 (Red Delicious) NM-FR-04-5196	0.077-0.080	5	800		0.39	14	0.06 0.10	0.08	< 0.01 < 0.01	0.04 0.03 (0.04)	< 0.01 < 0.01
	0.076-0.078	5	1500		0.39	14	0.08 0.08	0.08	< 0.01 < 0.01	0.05 0.07 (0.04)	< 0.01 < 0.01
Madera, CA 2004 (Fuji) WC-FR-04-5197	0.077	5	1700		0.38	0	0.46 0.38	0.42	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA [a]	TAA
						5	0.41 0.41	0.41	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						10	0.26 0.17	0.22	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						14	0.47 0.30	0.39	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						19	0.19 0.27	0.23	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Lakeport, CA 2004 (Granny Smith) WD-FR-04-5198	0.076-0.078	5	500	77-79	0.38	16	0.06 0.07	0.07	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Ephrata, WA 2004 (Red Delicious) WF-FR-04-5199	0.076-0.078	5	1900	77-79	0.38	14	0.34 0.16	0.25	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
	0.39	5	1900	77-79	1.9	14	1.5 1.2	1.4	< 0.01 < 0.01	0.02 0.03 (< 0.01)	< 0.01 < 0.01
Ephrata, WA 2004 (Braeburn) WF-FR-04-5200	0.077	5	500	75-88	0.38	14	0.39 0.35	0.37	< 0.01 < 0.01	0.05 0.03 (0.04)	< 0.01 < 0.01
	0.077	5	2800	75-88	0.38	14	0.29 0.27	0.28	< 0.01 < 0.01	0.03 0.03 (0.04)	< 0.01 < 0.01
Hood River, OR 2004 (Jonagold) WF-FR-04-5201	0.076-0.078	5	600		0.38	14	0.02 0.02	0.02	< 0.01 < 0.01	0.03 0.02 (0.04)	< 0.01 < 0.01
Parma, ID 2004 (Rome) WG-FR-04-5202	0.076-0.081	5	2200		0.40	14	0.16 0.15	0.16	< 0.01 < 0.01	0.02 0.02 (0.02)	< 0.01 < 0.01

[a] (n): residue concentration in control sample

Table 10 Difenoconazole and metabolite residues in pear from supervised trials performed in the USA with EC 250 (Report No.:T002884-03)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.078				0.37	14					
Orefield, PA 2004 (Bartlett) EB-FR-04-5203	0.077-0.078	5	100		0.39	14	0.08 0.15	0.12	< 0.01 < 0.01	0.03 0.02 (0.01)	< 0.01 < 0.01
	0.077-0.079		2700		0.39	14	0.07 0.08	0.08	< 0.01 < 0.01	0.03 0.03 (0.01)	< 0.01 < 0.01
Live Oak, CA 2004 (Bartlett) WD-FR-04-5204	0.077	5	1000		0.38	0	0.43 0.45	0.44	< 0.01 < 0.01	0.02 0.01 (< 0.01)	< 0.01 < 0.01
						5	0.31 0.28	0.30	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
						10	0.17 0.18	0.18	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
						14	0.15 < 0.01	0.08	< 0.01 < 0.01	0.03 0.02 (< 0.01)	< 0.01 < 0.01
						19	0.16 0.12	0.14	< 0.01 < 0.01	0.02 0.03 (< 0.01)	< 0.01 < 0.01
Ukiah, CA 2004 (Bartlett) WD-FR-04-5205	0.075-0.076	5	500	75-79	0.38	15	0.07 0.07	0.07	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
Buena, WA 2004 (Bartlett) WF-FR-04-5206	0.077-0.081	5	800		0.39	14	0.23 0.30	0.27	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
Buena, WA 2004 (Bartlett) WF-FR-04-5207	0.077-0.080	5	1200		0.39	14	0.19 0.19	0.19	< 0.01 < 0.01	0.01 < 0.01 (< 0.01)	< 0.01 < 0.01
Hood River, OR 2004 (Red Clapp) WF-FR-04-5208	0.075-0.078	5	600		0.38	13	0.08 0.08	0.08	< 0.01 < 0.01	0.04 0.03 (0.04)	< 0.01 < 0.01
	0.076-0.079		1700		0.39		0.11 0.12	0.12	< 0.01 < 0.01	0.03 0.03 (0.04)	< 0.01 < 0.01

Persimmon, Japanese

Six residue trials were carried out on Japanese persimmon in the Republic of Korea in 2011 (3 trials) and 2012 (3 trials). The trial plots received five foliar applications of WP 10 formulation (%, w/w) at a rate of 0.0054 kg ai/hL with 10 day intervals. In all trials, persimmon was harvested 0, 1, 3, 7, 14 and 21 days following the final application. The seeds and stalk of the fruit were removed prior to grinding, the samples were packed in plastic bags and stored at-20℃. Residue analyses were performed within 51 days after sampling.

In three trials conducted in 2011, five applications were made on the same dates. Likewise, in three trials of 2012, dates of five applications were the same. All six trials were performed with the same variety on different farms located within approximately 10-20 km, using the same hand sprayer with one head nozzle. All residue analyses were made in one laboratory, with four analytical replicates by the same analytical method.

Table 11 Difenoconazole residues in Japanese persimmon treated with WP 10 formulation in the Republic of Korea

Location Year (Variety)	Application [b]			PHI, days	Residue, mg/kg	Study No.
	kg ai/hL	n.	Interval days			
GAP in Rep. of Korea	0.0054	5	10	7		
Gimhae, Gyeongnam 2011 (Fuyu) [a]	0.0054	5	10	0	0.56	S-11-04-2-PSR-999-0-H
				1	0.50	
				3	0.47	
				7	0.37	
				14	0.23	
				21	0.23	
Changwon, Gyeongnam 2011 (Fuyu) [a]	0.0054	5	10	0	0.53	S-11-04-2-PSR-999-0-H
				1	0.52	
				3	0.45	

Location Year (Variety)	Application [b]			PHI, days	Residue, mg/kg	Study No.
	kg ai/hL	n.	Interval days			
				7	0.36	
				14	0.31	
				21	0.28	
Changwon, Gyeongnam 2011(Fuyu) [a]	0.0054	5	10	0	0.53	S-11-04-2-PSR-999-0-H
				1	0.45	
				3	0.40	
				7	0.37	
				14	0.26	
				21	0.22	
Changwon, Gyeongnam 2012 (Fuyu)[b]	0.0054	5	10	0	0.46	S-12-2-PSR-997-0-H
				1	0.45	
				3	0.43	
				7	0.43	
				14	0.35	
				21	0.18	
Changwon, Gyeongnam 2012 (Fuyu)[b]	0.0054	5	10	0	0.45	S-12-2-PSR-997-0-H
				1	0.42	
				3	0.41	
				7	0.39	
				14	0.32	
				21	0.14	
Changwon, Gyeongnam 2012 (Fuyu)[b]	0.0054	5	10	0	0.48	S-12-2-PSR-997-0-H
				1	0.46	
				3	0.41	
				7	0.40	
				14	0.33	
				21	0.19	

WP 10 (%, w/w) formulation was applied.

[a, b] All trials were conducted with the same variety on different farms located within approximately 10-20 km. Three trials of each year were performed at the same dates of application, thus the three trials were not considered as independent.

Berries and other small fruits

Grapes

Twelve residue trials on grapes were conducted in California, New York, Oregon, Pennsylvania and Washington in 2007. Difenoconazole EC 250 formulation was applied to grapes as a foliar application four times at a rate of 0.13 kg ai/ha with 7 day intervals. Treatments were made in varying post foliar spray volumes ranging from about 93 to 930 L/ha, using NIS + Silwet or Kinetic non-ionic surfactant (0.125%, v/v).

Duplicate samples of mature grapes were collected 6–7 days after the last application. In the decline trials, samples were collected at 0, 3, 5, 7 and 14 days after last application.

Table 12 Difenoconazole and metabolite residues in grapes from supervised trials performed in the USA with EC 250 (Report No.: T004711-06)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	7					
Dundee, NY 2007 (Concord)[a] E03NY078021	0.13	4	900	81-89	0.52	7	1.2 1.2	1.2	< 0.01 < 0.01	0.04 0.03 (0.05)	0.02 0.01
	0.39	4	900	81-89	1.6	7	2.3 3.1	2.7	< 0.01 < 0.01	0.06 0.07	0.02 0.01
Orefield, PA 2007 (Fredonia) E04PA078022	0.13	4	600	81	0.52	7	0.37 0.43	0.40	< 0.01 < 0.01	0.04 0.04 (0.05)	0.02 0.02
	0.39	4	700	79-89	1.6	7	0.40 0.37	0.39	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
	0.65	4	700	79-89	2.6	7	1.2 0.57	0.86	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Granger, WA 2007 (Chardonnay) W19WA078031	0.13	4	900		0.52	6	0.45 0.83	0.64	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Hillsboro, OR 2007 (Pinot Noir) W21OR078032	0.13	4	500	81-89	0.52	7	0.52 0.82	0.67	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Orland, CA 2007 (Centurion) W23CA078029	0.13	4	900		0.52	7	0.29 0.08	0.19	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Arbuckle, CA 2007 (Arbuckle) W23CA078030	0.13	4	900		0.52	7	0.22 0.23	0.23	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Aromas, CA 2007 (Tokay) W27CA078028	0.13	4	200		0.52	0	3.12		< 0.01	< 0.01	< 0.01
						3	0.02		< 0.01	< 0.01	< 0.01
						5	1.9		< 0.01	< 0.01	< 0.01
						7	1.8 1.2	1.5	< 0.01 < 0.01	0.02 < 0.01 (< 0.01)	0.02 < 0.01 (< 0.01)
						14	1.2		< 0.01	0.02 (< 0.01)	0.02 (< 0.01)
Kerman, CA 2007 (Thompson Seedless) W28CA078027	0.13	4	900		0.52	7	1.7 0.92	1.3	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Madera, CA 2007 (Thompson Seedless) W29CA078025[b]	0.13	4	700	77-89	0.52	0	0.74		< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						3	0.76		< 0.01	< 0.01	< 0.01
						5	0.51		< 0.01	< 0.01	< 0.01
						7	0.65 0.65	0.65	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						14	0.60		< 0.01	< 0.01	< 0.01
Madera, CA 2007	0.13	4	900	81-88	0.52	7	0.40	0.29	< 0.01	< 0.01	< 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
(Thompson Seedless) W30CA078024[b]							0.18		< 0.01	< 0.01	< 0.01
Rolinda, CA 2007 (Thompson Seedless) W30CA078026	0.13	4	90	81-88	0.52	7	0.08 0.26	0.17	< 0.01 < 0.01	0.02 0.02	< 0.01 < 0.01
Poplar, CA 2007 (Thompson Seedless) W32CA078023	0.13	4	700	79-89	0.52	7	0.09 0.12	0.11	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01

[a] The trial was not selected as use of EC 250 formulation is not permitted for Concord variety.

[b] The trials were conducted with the same variety at the same dates of application under the same weather conditions, using different soil and irrigation type (flood and drip) and different sprayer (airblast, tractor). These trials were not considered independent.

Bulb onions

Onion, Bulb

Eight residue trials on bulb onion were conducted in California, Colorado, Idaho, Illinois, New York, Texas and Washington in 2006. Difenoconazole EC 250 was applied to bulb onions as broadcast foliar spray applications four times at a rate of 0.13 kg ai/ha with 7 day intervals. Treatments were made in varying spray volumes ranging from about 60 to 300 L/ha application, using NIS + Silwet or Kinetic non-ionic surfactant (0.1%, v/v).

Duplicate samples of onion bulbs were collected 7 days after the last application. In the decline trials, samples were collected at 0, 3, 5, 7 and 9 days after last application.

Table 13 Difenoconazole and metabolite residues in bulb onion from supervised trials performed in the USA with EC 250 (Report No.: T020410-04)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	7					
Champaign, IL 2006 (Not provided) 4A-FR-06-7005	0.13-0.14	4	100	45-47	0.53	7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.09 0.09 (0.04)	< 0.01 < 0.01
Hudson, NY 2006 (Stuttgarter) 5A-FR-06-7004	0.13	4	100	45-48	0.52	0	0.03 < 0.01		< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						3	< 0.01 < 0.01		< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						5	0.03 < 0.01		< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						7	< 0.01 0.02	0.02	< 0.01 < 0.01	0.48 0.43 (0.56)	< 0.01 < 0.01
						9	< 0.01 < 0.01		< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Ault, CO 2006	0.13	4	200		0.52	7	< 0.01	0.02	< 0.01	0.02	< 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
(Sequoia) NM-FR-06-7007							0.02		< 0.01	0.02 (< 0.01)	< 0.01
Uvalde, TX 2006 (Cimarron type) SA-FR-06-7006	0.13	4	100		0.52	7	0.02 0.04	0.03	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
Terra Bella, CA 2006 (Stockton red) WC-FR-06-7008	0.13	4	300	77-79	0.52	7	0.05 0.09	0.07	< 0.01 < 0.01	0.04 0.04 (< 0.01)	< 0.01 < 0.01
Hughson, CA 2006 (White sweet Spanish) WD-FR-06-7009	0.13	4	300	73-77	0.52	8	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.03 0.04 (0.02)	< 0.01 < 0.01
Burlington, WA 2006 (Walla Sweet) WF-FR-06-7011	0.13	4	200	71-79	0.52	7	< 0.01 0.01	0.01	< 0.01 < 0.01	0.10 0.10 (0.07)	< 0.01 < 0.01
Parma, ID 2006 (Vaquero) WG-FR-06-7010	0.13	4	300		0.52	7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	< 0.01 0.01 (< 0.01)	< 0.01 < 0.01

Spring onion

Three residue trials on spring onion were conducted in California, Georgia and Texas in 2006. Difenoconazole EC 250 was applied to spring onions as foliar broadcast spray applications three times at rates of 0.13 kg ai/ha with 7 day intervals. Treatments were made in varying post foliar spray volumes ranging from about 160 to 300 L/ha application, using NIS + Silwet or Kinetic non-ionic surfactant (0.1%, v/v).

Duplicate samples of onions (whole plant) were collected 6 or 7 days after the last application. In the decline trial, samples were collected at 0, 3, 5, 7 and 9 days after last application.

Table 14 Difenoconazole and metabolite residues in spring onion from supervised trials performed in the USA with EC 250 (Report No.: T020410-04)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg [a]				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.38	7					
Uvalde, TX 2006 (Cimarron type) SA-FR-06-7002	0.13	3	200		0.39	6	2.9 2.7	2.8	< 0.01 < 0.01	0.01 0.02 (< 0.01)	< 0.01 < 0.01
Sycamore, GA 2006 (Yellow Grannex "Georgia Sweet") SI-FR-06-7001	0.13	3	300	47	0.39	7	2.5 2.0	2.3	< 0.01 < 0.01	0.02 0.03 (0.01)	< 0.01 < 0.01
Sanger, CA 2006 (Southport White 404) WC-FR-06-7003	0.13	3	300	42-49	0.39	0	3.8 3.7		< 0.01 < 0.01	0.05 0.05	< 0.01 0.01
						3	3.5 3.3		< 0.01 < 0.01	0.05 0.06	< 0.01 0.01
						5	2.9 2.6		< 0.01 < 0.01	0.07 0.06	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg [a]				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
						7	4.9 2.7	3.8	< 0.01 < 0.01	0.06 0.07 (0.09)	0.01 < 0.01 (< 0.01)
						9	3.6 2.3		< 0.01 < 0.01	0.06 0.07	0.01 0.01

[a] Portion analysed is whole plant.

Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead brassicas

Cabbages, Head

Six residue trials on head cabbage were conducted in California, Florida, North Carolina, New York, Texas and Wisconsin in 2006. Difenoconazole EC 250 was applied to head cabbage as foliar broadcast spray applications four times at a rate of 0.12-0.13 kg ai/ha with 7 day intervals. Treatments were made with varying spray volumes ranging from about 19 to 190 L/ha of, using NIS + Silwet or Kinetic non-ionic surfactant (0.125%, v/v).

Duplicate samples of mature cabbages were collected 1 and 7 days after the last application. In the decline trials, samples were collected at 0, 1, 3, 5, 7 and 9 days after last application.

Table 15 Difenoconazole and metabolite residues in head cabbage from supervised trials performed in the USA with EC 250 (Report No.: T020412-04)

Location Year (Variety) Trial No.	Application					PHI, days	Residue [a], mg/kg				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	1					
Hudson, NY 2006 (Blue Dynasty) 5A-FR-06-7056	0.13	4	20	44-49	0.52	1	0.06 0.11	0.09	< 0.01 < 0.01	1.5[b] 0.79 (0.98)	0.012 0.012 (0.011)
							< 0.01 *< 0.01*	*< 0.01*	*< 0.01* *< 0.01*	*1.2*[b] *0.97* *(0.76)*	*0.012* *0.012* *(< 0.01)*
							1.0 1.2	1.1	< 0.01 < 0.01	0.71 0.49 (0.64	0.0118 0.016 (0.020)
						7	< 0.01 0.02	0.02	< 0.01 < 0.01	0.92 0.58 (0.87)	< 0.01 < 0.01
							< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.96 0.70 (0.96)	< 0.01 < 0.01
							0.23 0.19	0.21	< 0.01 < 0.01	0.58 0.36 (0.51)	0.016 < 0.01 (0.012)
Seven Springs, NC 2006 (Almanac) SJ-FR-06-7057	0.13	4	200	41-47	0.52	1	0.90 0.97	0.94	< 0.01 < 0.01	0.09 0.08 (0.01)	< 0.01 < 0.01
							< 0.01 *< 0.01*	*< 0.01*	*< 0.01* *< 0.01*	*0.10* *0.11* *(0.01)*	*< 0.01* *< 0.01*

Location Year (Variety) Trial No.	Application					PHI, days	Residue [a], mg/kg				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
							2.9 3.5	3.2	≤ 0.01 ≤ 0.01	0.06 0.06 (< 0.01)	≤ 0.01 ≤ 0.01
						7	0.08 0.34	0.21	< 0.01 < 0.01	0.16 0.15 (0.02)	< 0.01 < 0.01
							< 0.01 *< 0.01*	*< 0.01*	*< 0.01* *< 0.01*	*0.13* *0.17* *(0.01)*	*< 0.01* *< 0.01*
							1.7 2.4	2.1	≤ 0.01 ≤ 0.01	0.05 0.05 (< 0.01)	≤ 0.01 ≤ 0.01
Vero Beach, FL 2006 (Bravo) VC-FR-06-7058	0.12-0.13	4	200	43-49	0.50	0	0.82 1.5	1.7	< 0.01 < 0.01	0.08 0.06 (< 0.01)	0.05 < 0.01 (< 0.01)
							0.01 *< 0.01*	*0.01*	*< 0.01* *< 0.01*	*0.09* *0.11* *(< 0.01)*	*< 0.01* *< 0.01*
							1.5 2.6	2.1	≤ 0.01 ≤ 0.01	0.04 0.04 (< 0.01)	≤ 0.01 ≤ 0.01
						1	0.96 1.6	1.3	< 0.01 < 0.01	0.06 0.09 (< 0.01)	< 0.01 < 0.01
							0.06 *0.11*	*0.09*	*< 0.01* *< 0.01*	*0.07* *0.10* *(< 0.01)*	*< 0.01* *< 0.01*
							2.5 3.0	2.8	≤ 0.01 ≤ 0.01	0.04 0.03 (< 0.01)	0.011 0.010 (< 0.01)
						3	0.80 0.56	0.68	< 0.01 < 0.01	0.08 0.09 (< 0.01)	< 0.01 < 0.01
							0.03 *0.08*	*0.06*	*< 0.01* *< 0.01*	*0.09* *0.10* *(< 0.01)*	*< 0.01* *< 0.01*
							2.4 3.3	2.9	≤ 0.01 ≤ 0.01	0.03 0.02 (< 0.01)	≤ 0.01 ≤ 0.01
						5	0.16 0.55	0.36	< 0.01 < 0.01	0.10 0.10 (< 0.01)	< 0.01 < 0.01
							0.05 *< 0.01*	*0.03*	*< 0.01* *< 0.01*	*0.11* *0.08* *(0.01)*	*< 0.01* *< 0.01*
							1.6 1.9	1.8	≤ 0.01 ≤ 0.01	0.04 0.05 (< 0.01)	≤ 0.01 ≤ 0.01
						7	0.11 0.23	0.17	< 0.01 < 0.01	0.07 0.11 (< 0.01)	< 0.01 < 0.01
							< 0.01 *< 0.01*	*< 0.01*	*< 0.01* *< 0.01*	*0.09* *0.11* *(0.01)*	*< 0.01* *< 0.01*
							0.92 1.01	0.97	≤ 0.01 ≤ 0.01	0.04 0.03 (< 0.01)	≤ 0.01 ≤ 0.01
						9	0.18 0.15	0.17	< 0.01 < 0.01	0.08 0.15	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue [a], mg/kg				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
										(< 0.01)	
							< 0.01 *< 0.01*	*< 0.01*	*< 0.01* *< 0.01*	*0.11* *0.19* *(< 0.01)*	*< 0.01* *< 0.01*
							0.88 0.67	0.78	< 0.01 < 0.01	0.08 0.06 (< 0.01)	< 0.01 < 0.01
Delavan, WI 2006 (Vantage Point) NI-FR-06-7059	0.13	4	200		0.52	1	0.28 0.32	0.30	< 0.01 < 0.01	0.04 0.04 (0.02)	< 0.01 < 0.01
							< 0.01 *0.01*	*0.01*	*< 0.01* *< 0.01*	*0.05* *0.04* *(0.02)*	*< 0.01* *< 0.01*
							1.9 2.7	2.3	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
						7	0.12 0.21	0.17	< 0.01 < 0.01	0.04 0.04 (0.02)	< 0.01 < 0.01
							< 0.01 *< 0.01*	*< 0.01*	*< 0.01* *< 0.01*	*0.05* *0.05* *(0.02)*	*< 0.01* *< 0.01*
							1.6 1.6	1.6	< 0.01 < 0.01	0.03 0.03 (0.02)	< 0.01 < 0.01
Raymondville, TX 2006 (Copenhagen Market) SA-FR-06-7060	0.13	4	200	46-49	0.52	1	0.25 0.22	0.24	< 0.01 < 0.01	0.02 0.04 (< 0.01)	< 0.01 < 0.01
							0.12 *0.02*	*0.07*	*< 0.01* *< 0.01*	*0.05* *0.03* *(< 0.01)*	*< 0.01* *< 0.01*
							5.5 4.9	5.2	< 0.01 < 0.01	0.02 0.02 (< 0.01)	0.01 0.01 (< 0.01)
						7	0.38 0.29	0.34	< 0.01 < 0.01	0.04 0.04 (< 0.01)	< 0.01 < 0.01
							0.05 *0.15*	*0.10*	*< 0.01* *< 0.01*	*0.04* *0.05* *(< 0.01)*	*< 0.01* *< 0.01*
							3.4 4.3	3.9	< 0.01 < 0.01	0.02 0.03 (< 0.01)	0.02 0.02 (< 0.01)
Aromas, CA 2006 (Expresso) WC-FR-06-7061	0.12-0.13	4	200		0.51	1	0.09 0.82	0.46	< 0.01 < 0.01	0.05 0.06 (0.02)	< 0.01 < 0.01
							0.05 *0.03*	*0.04*	*< 0.01* *< 0.01*	*0.07* *0.05* *(0.02)*	*< 0.01* *< 0.01*
							2.9 2.7	2.8	< 0.01 < 0.01	0.02 0.03 (< 0.01)	< 0.01 < 0.01
						7	0.16 0.36	0.26	< 0.01 < 0.01	0.07 0.06 (0.01)	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue [a], mg/kg				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
							0.02 < 0.01	0.02	< 0.01 < 0.01	0.07 0.06 (0.01)	< 0.01 < 0.01
							1.7 1.8	1.8	< 0.01 < 0.01	0.03 0.03 (< 0.01)	< 0.01 < 0.01

[a] Residue concentration for head cabbage with wrapper leaves is indicated with normal letter. For head cabbage without wrapper leaves and wrapper leaves, the residue concentrations are indicated with italic letter and on the dot line, respectively.

[b] The LOQ for TA is 0.02 mg/kg for this sample.

Broccoli

Six residue trials on broccoli were conducted in California, Texas and Washington in 2006. Difenoconazole EC 250 was applied to broccoli as foliar broadcast spray applications four times at a rate of 0.13 kg ai/ha with 7 day intervals. Treatments were made with varying spray volumes ranging from about 190 to 380 L/ha, using NIS + Silwet or Kinetic non-ionic surfactant (0.125%, v/v).

Duplicate samples of mature broccoli were collected 1 and 7 days after the last application. In the decline trial, samples were collected at 0, 1, 3, 5, 7 and 9 days after last application.

Table 16 Difenoconazole and metabolite residues in broccoli from supervised trials performed in the USA with EC 250 (Report No.: T020412-04)

Location Year (Variety) Trial No.	Application					PHI, days	Residue [a], mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	1					
Raymondville, TX 2006 (Southern Comet) SA-FR-06-7050	0.13	4	200	39-47	0.53	1	0.44 0.26	0.35	< 0.01 < 0.01	0.02 0.03 (< 0.01)	< 0.01 < 0.01
						7	0.13 0.28	0.21	< 0.01 < 0.01	0.03 0.03 (< 0.01)	< 0.01 < 0.01
Sanger, CA WC-FR-06-7051	0.13	4	300	41-49	0.52	0	0.35 0.60	0.48	< 0.01 < 0.01	0.15 0.24 (0.28)	< 0.01 < 0.01
						1	0.45 0.61	0.53	< 0.01 < 0.01	0.21 0.24 (0.30)	< 0.01 < 0.01
						3	0.44 0.22	0.33	< 0.01 < 0.01	0.23 0.20 (0.21)	< 0.01 < 0.01
						5	0.30 0.51	0.41	< 0.01 < 0.01	0.31 0.21 (0.25)	< 0.01 < 0.01
						7	0.17 0.21	0.19	< 0.01 < 0.01	0.16 0.22 (0.15)	< 0.01 < 0.01
						9	0.22 0.38	0.30	< 0.01 < 0.01	0.21 0.21 (0.25)	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue [a], mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
Aromas, CA 2006 (Green Belt) WC-FR-06-7052	0.13	4	200		0.52	1	0.33 0.31	0.32	< 0.01 < 0.01	0.18 0.10 (0.04)	< 0.01 < 0.01
						7	0.04 0.02	0.03	< 0.01 < 0.01	0.20 0.11 (0.02)	< 0.01 < 0.01
Nipomo, CA 2006 (Heritage) WC-FR-06-7053	0.13	4	400	41-45	0.52	1	0.18 0.12	0.15	< 0.01 < 0.01	0.05 0.04 (< 0.01)	< 0.01 < 0.01
						7	0.03 0.02	0.03	< 0.01 < 0.01	0.06 0.07 (< 0.01)	< 0.01 < 0.01
Mount Vernon, WA 2006 (Laguna F1) WF-FR-06-7055	0.12-0.13	4	200		0.52	1	0.34 0.39	0.37	< 0.01 < 0.01	0.13 0.11 (0.06)	< 0.01 < 0.01
						7	0.06 0.11	0.09	< 0.01 < 0.01	0.17 0.17 (0.04)	< 0.01 < 0.01
Guadalupe, CA 2006 (Alborada) WC-FR-06-7067	0.13	4	300	43-49	0.52	1	0.38 0.26	0.32	< 0.01 < 0.01	0.04 0.03 (< 0.01)	< 0.01 < 0.01
						7	0.04 0.15	0.10	< 0.01 < 0.01	0.03 0.05 (< 0.01)	< 0.01 < 0.01

[a] Analysed portion was head and stem of broccoli.

Fruiting vegetables, Cucurbits

Melons

Six residue trials on cantaloupe were conducted in California, Georgia, Illinois and Texas in 2006. Difenoconazole EC 250 was applied to melons as post over the top broadcast spray applications four times at a rate of 0.12–0.13 kg ai/ha with 7 day intervals. Treatments were made in varying spray volumes ranging from about 27 to 290 L/ha, using NIS + Silwet or Kinetic non-ionic surfactant (0.125%, v/v).

Melon (whole fruit) samples were collected 0 and 7 days after the last application. In one trial, samples were taken at PHIs of 4 and 7 days due to excessive rain on 0 day. In the decline trial, samples were collected at 0, 1, 3, 5, 7 and 9 days after last application.

Table 17 Difenoconazole and metabolite residues in melons (cantaloupe) from supervised trials performed in the USA with EC 250 (Report No.: T020413-04)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	0					
Athens, GA 2006 (Edisto 47) SI-FR-06-7081	0.13	4	300	75-89	0.52	0	0.26 0.12	0.19	< 0.01 < 0.01	0.11 0.10 (0.02)	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
						7	0.09 0.20	0.15	< 0.01 < 0.01	0.12 0.14 (0.02)	< 0.01 < 0.01
Champaign, IL 2006 (Honey Rock) 4A-FR-06-7082	0.12-0.13	4	30	61-77	0.52	4	0.04 0.18	0.11	< 0.01 < 0.01	0.06 0.11 (0.03)	< 0.01 < 0.01
						7	0.06 0.12	0.09	< 0.01 < 0.01	0.05 0.07 (0.02)	< 0.01 < 0.01
Raymondville, TX 2006 (Mainstream) SA-FR-06-7083	0.13	4	200	73-85	0.52	0	0.09 0.05	0.07	< 0.01 < 0.01	0.06 0.05 (< 0.01)	< 0.01 < 0.01
						7	0.12 0.03	0.08	< 0.01 < 0.01	0.06 0.06 (< 0.01)	< 0.01 < 0.01
Hickman, CA 2006 (Hale's Best Jumbo) WD-FR-06-7084	0.13	4	300	71-79	0.52	0	0.09 0.03	0.06	< 0.01 < 0.01	0.03 0.03 (0.01)	< 0.01 < 0.01
						1	0.05 0.02	0.04	< 0.01 < 0.01	0.04 0.04 (< 0.01)	< 0.01 < 0.01
						3	0.02 0.04	0.03	< 0.01 < 0.01	0.04 0.03 (< 0.01)	< 0.01 < 0.01
						5	0.01 0.03	0.02	< 0.01 < 0.01	0.04 0.04 (0.01)	< 0.01 < 0.01
						7	0.02 0.02	0.02	< 0.01 < 0.01	0.05 0.04 (< 0.01)	< 0.01 < 0.01
						9	< 0.01 0.02	0.02	< 0.01 < 0.01	0.04 0.05 (0.01)	< 0.01 < 0.01
Sanger, CA 2006 (Hale's Best Jumbo) WC-FR-06-7085	0.13	4	100	79-89	0.52	0	0.26 0.44	0.35	< 0.01 < 0.01	0.08 0.09 (0.09)	< 0.01 < 0.01
						7	0.08 0.02	0.05	< 0.01 < 0.01	0.09 0.09 (0.09)	< 0.01 < 0.01
San Ardo, CA 2006 (Hale's Best Jumbo) WC-FR-06-7092	0.13	4	300	45-49	0.52	0	0.10 0.13	0.12	< 0.01 < 0.01	0.05 0.07 (0.01)	< 0.01 < 0.01
						7	0.13 0.14	0.14	< 0.01 < 0.01	0.06 0.08 (< 0.01)	< 0.01 < 0.01

Gherkin

Six residue trials on gherkins were carried out in Florida, Georgia, Michigan, North Carolina, Texas and Wisconsin during 2006 and 2007. Difenoconazole EC 250 was applied to gherkins as foliar broadcast spray applications four times at a rate of 0.13 kg ai/ha with 7 day intervals. Treatments were

made in varying spray volumes ranging from about 19 to 290 L/ha application, using NIS + Silwet or Kinetic non-ionic surfactant (0.125%, v/v).

The fruit samples were collected 0 and 7 days after the last application. In the decline trial, samples were collected at 0, 1, 3, 5, 7 and 9 days after last application.

Table 18 Difenoconazole and metabolite residues in gherkin from supervised trials performed in the USA with EC 250 (Report No.: T020413-04)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	0					
Chula, GA 2006 (Daytona) SI-FR-06-7075	0.13	4	200		0.52	0	0.03 0.04	0.04	< 0.01 < 0.01	0.12 0.11 (0.04)	< 0.01 < 0.01
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.14 0.15 (0.03)	< 0.01 < 0.01
Seven Springs, NC 2006 (Ashley) SJ-FR-06-7076	0.13	4	300	21-77	0.52	0	0.20 0.10	0.15	< 0.01 < 0.01	0.21 0.27 (0.11)	< 0.01 < 0.01
						1	0.16 0.09	0.13	< 0.01 < 0.01	0.21 0.22 (0.05)	< 0.01 < 0.01
						3	0.06 0.03	0.05	< 0.01 < 0.01	0.21 0.25 (0.07)	0.01 0.01 (< 0.01)
						5	0.05 < 0.01	0.03	< 0.01 < 0.01	0.24 0.22 (0.04)	0.02 0.02 (< 0.01)
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.22 0.21 (0.04)	0.03 0.02 (< 0.01)
						9	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.22 0.25 (0.05)	0.02 0.03 (< 0.01)
Conklin, MI 2006 (Marketmore 76) NL-FR-06-7078	0.13	4	20		0.52	0	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.19 0.14 (0.02)	< 0.01 < 0.01
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.13 0.17 (0.02)	< 0.01 < 0.01
Devalan, WI 2006 (Marketmore 86) NI-FR-06-7079	0.13	4	200		0.52	0	0.06 0.02	0.04	< 0.01 < 0.01	0.03 0.03 (0.01)	< 0.01 < 0.01
						7	0.01 < 0.01	0.01	< 0.01 < 0.01	0.04 0.05 (0.01)	< 0.01 < 0.01
Raymondville, TX 2006 (Olympian) SA-FR-06-7080	0.13	4	200	71-77	0.52	0	0.04 < 0.01	0.03	< 0.01 < 0.01	0.05 0.05 (0.01)	< 0.01 < 0.01
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.07 0.07 (< 0.01)	< 0.01 < 0.01
Oviedo, FL 2007 (Parks Bush Whooper II) E15-FL-07-8261	0.13	4	300	63-79	0.52	0	0.01 < 0.01	0.01	< 0.01 < 0.01	0.07 0.07 (< 0.01)	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.08 0.07 (< 0.01)	< 0.01 < 0.01

Squash, Summer

Five residue trials were conducted on summer squash (courgette) in California, Florida, Illinois, New York and South Carolina) during 2006 and 2007.

Difenoconazole EC 250 was applied to summer squash as post over the top broadcast spray applications four times at a rate of 0.13–0.14 kg ai/ha with 7 day intervals. The spray volumes were about 25–464 L/ha including NIS + Silwet or Kinetic non-ionic surfactant (0.125%, v/v). The fruit samples were collected 0 and 7 days after the last application. In the decline trial, samples were collected at 0, 1, 3, 5, 7 and 9 days after last application.

Table 19 Difenoconazole and metabolite residues in summer squash from supervised trials performed in the USA with EC 250 (Report No.: T020413-04)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	0					
Hudson, NY 2006 (Fortune) 5A-FR-06-7087	0.13	4	100	13-62	0.52	0	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.22 0.25 (0.27)	< 0.01 < 0.01
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.18 0.25 (0.22)	< 0.01 < 0.01
Elko, SC 2006 (Dixie Hybrid) SJ-FR-06-7088	0.13	4	200		0.52	0	0.06 0.06	0.06	< 0.01 < 0.01	0.11 0.10 (0.01)	< 0.01 < 0.01
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.08 0.12 (< 0.01)	< 0.01 < 0.01
Champaign, IL 2006 (unknown) 4A-FR-06-7090	0.13-0.14	4	30	61-73	0.54	0	0.02 < 0.01	0.02	< 0.01 < 0.01	0.04 0.06 (0.02)	< 0.01 < 0.01
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.04 0.07 (0.02)	< 0.01 < 0.01
Santa Maria, CA 2006 (Ambassador) WC-FR-06-7091	0.13	4	500	73-77	0.52	0	0.06 0.05	0.06	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
						7	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.05 0.04 (0.01)	< 0.01 < 0.01
Oviedo, FL 2007 (Park's Crookneck) E15-FL-07-8262	0.13	4	300	63-79	0.52	0	0.06 0.03	0.05	< 0.01 < 0.01	0.06 0.06 (< 0.01)	0.01 0.01 (< 0.01)
						1	< 0.01 0.01		< 0.01	0.11 (0.05)	0.02 (< 0.01)
						3	< 0.01 < 0.01		< 0.01	0.06 (0.01)	0.01 (< 0.01)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
						5	< 0.01 < 0.01		< 0.01	0.05 (< 0.01)	0.01 (< 0.01)
						7	< 0.01 < 0.01		< 0.01 < 0.01	0.05 0.04 (0.01)	0.01 0.01 (< 0.01)
						9	< 0.01 < 0.01		< 0.01	0.05 (< 0.01)	0.01 (< 0.01)

Fruiting vegetables, other than Cucurbits

Tomato

Eleven residue trials were carried out on tomato in California, Florida, New York, Ohio, and South Carolina in 2004.

Difenoconazole EC 250 was applied to tomatoes as foliar broadcast spray four times at a rate of 0.12–0.13 kg ai/ha. The intervals between applications were 7 days and all treatments were made at spray volumes ranging from about 19 to 334 L/ha, using non-ionic surfactant (0.125%, v/v). Fruit samples were collected on the last day of application, further, 6–8 days after the last application. In the decline trial, samples were collected at 0, 1, 4, 7 and 9 days after last application.

Table 20 Difenoconazole and metabolite residues in tomato from supervised trials performed in the USA with EC 250 (Report No.: T003262-03)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	0					
Hudson, NY 2004 (Mountain Crest) 5A-FR-04-5215	0.13	4	20	65-81	0.52	0	0.01 0.01	0.01	< 0.01 < 0.01	0.21 0.13 (0.19)	< 0.01 < 0.01
						8	< 0.01 < 0.01	< 0.01	< 0.01 < 0.01	0.21 0.16 (0.18)	< 0.01 < 0.01
Elko, SC 2004 (Celebrity) SJ-FR-04-5216	0.13	4	300		0.52	0	0.26 0.25	0.26	< 0.01 < 0.01	0.03 0.02 (0.01)	< 0.01 < 0.01
						8	0.16 0.20	0.18	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
Vero Beach, FL 2004 (Florida 47) VO-FR-04-5218	0.12-0.13	4	300	41-47	0.50	0	0.10 0.12	0.11	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
						7	0.11 0.08	0.10	< 0.01 < 0.01	0.03 0.02 (< 0.01)	< 0.01 < 0.01
Hickman, CA 2004 (Bobcat) WC-FR-04-5219	0.13	4	200	71-81	0.52	0	0.19 0.13	0.16	< 0.01 < 0.01	0.05 0.02 (0.08)	< 0.01 < 0.01
						7	0.13 0.09	0.11	< 0.01 < 0.01	0.03 0.03 (0.02)	< 0.01 < 0.01
Aromas, CA	0.13	4	200	81-85	0.52	0	0.13	0.14	< 0.01	< 0.01	< 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
2004 (Qualiti 21) WB-FR-04-5220							0.15		< 0.01	< 0.01	< 0.01
						7	0.05 < 0.01	0.03	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
New Holland, OH 2004 (H9423) NK-FR-04-5221	0.13	4	200		0.52	0	0.24 0.41	0.33	< 0.01 < 0.01	< 0.01 0.02 (< 0.01)	< 0.01 < 0.01
						6	0.48 0.30	0.39	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
Visalia, CA 2004 (H-9557) WC-FR-04-5222	0.13	4	100	76-89	0.52	0	0.13 0.17	0.15	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						7	0.09 0.11	0.10	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
Visalia, CA 2004 (H-9557) WC-FR-04-5222	0.64-0.65	4	100	76-89	2.6	0	Fruit	0.41 0.59 Mean: 0.50		0.02 0.02 (< 0.01)	
						7	Fruit	0.56 0.48 Mean: 0.52		0.03 0.03 (< 0.01)	
Madera, CA 2004 (Rio Grande) WC-FR-04-5223	0.13	4	300		0.52	0	0.26 0.20	0.23	< 0.01 < 0.01	0.04 0.02 (,0.01)	0.01 < 0.01 (< 0.01)
						7	0.30 0.24	0.27	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
Brawley, CA 2004 (Sun 6117) WB-FR-04-5224	0.12-0.13	4	200	77-79	0.50	0	0.09 0.10	0.10	< 0.01 < 0.01	< 0.01 0.01 (< 0.01)	< 0.01 < 0.01
						7	0.07 0.07	0.07	< 0.01 < 0.01	0.01 0.02 (< 0.01)	< 0.01 < 0.01
Glenn, CA 2004 (H-9557) WD-FR-04-5225	0.12-0.13	4	200		0.50	0	0.37 0.40	0.39	< 0.01 < 0.01	0.01 0.01 (< 0.01)	< 0.01 < 0.01
						7	0.20 0.19	0.20	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
Glenn, CA 2004 (H-9557) WD-FR-04-5225	0.63-0.65	4	200		2.6	0	1.4 1.5	1.5	< 0.01 < 0.01	0.04 0.04 (< 0.01)	< 0.01 < 0.01
						7	1.4 1.4	1.4	< 0.01 < 0.01	0.01 0.04 (< 0.01)	< 0.01 < 0.01
Maxwell, CA 2004 (Cxd179) WD-FR-04-5226	0.13	4	100		0.52	0	0.17 0.11	0.14	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						1	0.11 0.10	0.11	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						4	0.10 0.04	0.07	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
						7	0.06 0.10	0.08	< 0.01 < 0.01	0.01 0.01 (< 0.01)	< 0.01 < 0.01
						9	0.07	0.10	< 0.01	0.01	< 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
							0.12		< 0.01	0.01 (< 0.01)	< 0.01

Peppers (Sweet and Chili)

Residue trials were conducted on sweet peppers and chili peppers in California, Florida, Illinois, North Carolina and Texas in 2004.

Difenoconazole EC 250 was applied to sweet peppers (6 trials) and chili peppers (3 trials) as foliar broadcast spray four times at a rate of 0.12–0.14 kg ai/ha. The intervals between applications were 7 days and all treatments were made at spray volumes ranging from about 27 to 493 L/ha using non-ionic surfactant (0.125%, v/v). The fruit samples were collected on the last day of application, further, 7 days after the last application. In the decline trials, samples were collected at 0, 1, 4, 7 and 9 days after last application.

Table 21 Difenoconazole and metabolite residues in peppers (Sweet and Chili) from supervised trials performed in the USA with EC 250 (Report No.: T003262-03)

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
GAP, USA	0.13				0.52	0					
Sweet peppers											
Rose Hill, NC 2004 (King Arthur) SJ-FR-04-5227	0.13	4	200		0.52	0	0.06 0.06	0.06	< 0.01 < 0.01	0.05 0.04 (< 0.01)	< 0.01 < 0.01
						7	0.06 0.04	0.05	< 0.01 < 0.01	0.10 0.08 (< 0.01)	< 0.01 < 0.01
Vero Beach, FL 2004 (transplants) VO-FR-04-5228	0.12-0.13	4	300	41-47	0.50	0	0.11 0.14	0.13	< 0.01 < 0.01	0.02 0.03 (0.01)	< 0.01 < 0.01
						7	0.11 0.16	0.14	< 0.01 < 0.01	0.03 0.03 (< 0.01)	< 0.01 < 0.01
Champaign, IL 2004 (Sweet Bell) 4A-FR-04-5229	0.13-0.14	4	30	71-75	0.54	0	0.16 0.05	0.11	< 0.01 < 0.01	0.04 0.04 (0.03)	< 0.01 < 0.01
						7	0.06 0.04	0.05	< 0.01 < 0.01	0.05 0.05 (0.03)	< 0.01 < 0.01
Raymondville, TX 2004 (Capistrano) SA-FR-04-5230	0.13	4	200	71-77	0.52	0	0.17 0.11	0.14	< 0.01 < 0.01	0.03 0.04 (< 0.01)	< 0.01 < 0.01
						7	0.12 0.12	0.12	< 0.01 < 0.01	0.05 0.05 (< 0.01)	< 0.01 < 0.01
Visalia, CA 2004 (Baron) WC-FR-04-5231	0.13	4	100	71-75	0.52	0	0.07 0.08	0.08	< 0.01 < 0.01	0.01 0.02 (< 0.01)	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Residue, mg/kg.				
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha		Parent	Parent, Mean	T	TA	TAA
						1	0.06 0.08	0.07	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
						4	0.12 0.07	0.10	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
						7	0.06 0.09	0.08	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
						9	0.04 0.04	0.04	< 0.01 < 0.01	0.03 0.03 (< 0.01)	< 0.01 < 0.01
Arroyo Grande, CA 2004 (Jupiter) WB-FR-04-5232	0.13	4	500	45-49	0.52	0	0.15 0.20	0.18	< 0.01 < 0.01	< 0.01 0.01 (< 0.01)	< 0.01 < 0.01
						7	0.11 0.08	0.10	< 0.01 < 0.01	0.01 < 0.01 (< 0.01)	< 0.01 < 0.01
Chili peppers											
Raymondville, TX 2004 (Tam-Mild) SA-FR-04-5233	0.13	4	200	41-77	0.52	0	0.29 0.22	0.26	< 0.01 < 0.01	0.06 0.06 (< 0.01)	< 0.01 < 0.01
						7	0.19 0.16	0.18	< 0.01 < 0.01	0.08 0.09 (< 0.01)	< 0.01 0.01 (< 0.01)
Rincon, NM 2004 (Big Jim) SC-FR-04-5234	0.13	4	200		0.52	0	0.11 0.09	0.10	< 0.01 < 0.01	0.01 0.01 (< 0.01)	< 0.01 < 0.01
						7	0.06 0.09	0.08	< 0.01 < 0.01	0.02 0.02 (< 0.01)	< 0.01 < 0.01
Visalia, CA 2004 (Habanero) 2A-FR-04-5235	0.13	4	300	85-89	0.52	0	0.20 0.12	0.16	< 0.01 < 0.01	< 0.01 0.01 (< 0.01)	< 0.01 < 0.01
						7	0.11 0.11	0.11	< 0.01 < 0.01	< 0.01 0.01 (< 0.01)	< 0.01 < 0.01

Root and tuber vegetables

Potato (post-harvest treatment)

Potatoes were obtained from a commercial grower received a post-harvest treatment using difenoconazole FS 360 formulation (g/L). For each trial, information on potato source (soil properties, maintenance fertilizers and pesticides, some harvest/storage) was provided. In one trial, modification after harvest (washing and air-drying the day before post-harvest treatment) was reported. Until post-harvest treatment, the potato tubers were kept in on-site storage for approximately one to four months at 6 to 14 ºC.

Difenoconazole solution was applied once to potatoes (five trials, conducted in Idaho, Maine, Ontario, Washington and Wisconsin) as a post-harvest treatment at a rate of 3.4–3.8 g ai/t tubers. The applications were made with a tank mixture containing also azoxystrobin (SC 250) and fludioxonil (SC 230), each at a rate of 4.5 g ai/t tubers. The spray was directed to tubers falling from a conveyor belt or moving along a roller table. The post-harvest treated tubers (approximately14 tubers) were

collected within 0 day after the test substance had dried. At the Ontario site (trial ON14), tubers were cut in half, retaining half as the sample.

In one trial (ID19), the following additional treatments were also included to evaluate residue levels from different application methods:

Spray directed to tubers placed on a flat surface close together, allowed to dry, turned over, and sprayed again (surface/stationary).
Spray directed to tubers placed close together inside a spray chamber, allowed to dry, turned over, and sprayed again (spray chamber).
Spray directed to tubers placed on a brush table that rolled the potatoes under the spray (brush table).

At the following three sites, additional treated samples were collected for storage study. After the post-harvest treatment and the test substance had dried, tubers were placed in typical potato storage:

Trial ID19: 30 and 231 days at 6 ºC, 95% RH
Trial ON14: 14, 31 and 59 days at 3–5 ºC, 95% RH
Trial WA32: 13, 32, and 61 days at 5–10 ºC.

Until analysis, all samples were kept frozen at below-17 ºC in site facilities and at ca.-20 ºC in the analytical lab. In all control samples, difenoconazole was < 0.01 mg/kg.

Table 22 Difenoconazole and metabolite residues in potato post-harvest treated with FS 360 formulation in the USA (Report No.: TK0003297)

Location Year (Variety) Trial No.	Application				WHP, days	Residue, mg/kg.				
	Method [a]	No.	Delivery rate (L/t)	Rate, g ai/t		Parent	Parent, Mean	T	TA	TAA
GAP, USA, for post-harvest treatment	In line aqueous spray	1		3.5						
Kimberly, ID2009 (Russet Burbank) ID19	Conveyor belt	1	2	3.5-3.6	0	1.9 1.8	1.9	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
					30	0.54 0.74	064	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
					231	0.97 0.67	0.82	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
					0	0.41 (Pre-processing)		< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
					0	< 0.01 (Flake)		< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
					0	0.03 (Chip)		< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
					0	1.3 (Wet peel)		< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
	Surface	1	2	3.5	0	0.74 0.62	0.68	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
	Spray chamber	1	2	3.5	0	2.3 2.4	2.4	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
	Brush table	1	2	3.5	0	1.1 1.2	1.2	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
Corinth, ME 2009 (Frio Lay 1533) ME04	Conveyor belt	1	1	3.8	0	0.62 0.60	0.61	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
Delhi, ON 2009 (Frio Lay 1533) ON14	Roller table	1	2	3.4	0	2.2 1.8	2.0	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application				WHP, days	Residue, mg/kg.				
	Method [a]	No.	Delivery rate (L/t)	Rate, g ai/t		Parent	Parent, Mean	T	TA	TAA
					14	2.5 1.9	2.2	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
					31	1.9 1.8	1.9	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
					59	206 2.1	2.4	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01
Prosser, WA 2009 (Russet Burbank) WA32	Conveyor belt	1	2	3.5	0	1.5 1.1	1.3	< 0.01 < 0.01	0.025 0.024 (0.03)	< 0.01 < 0.01
					13	1.3 0.77	1.0	< 0.01 < 0.01	0.032 0.027 (0.03)	< 0.01 < 0.01
					32	1.2 0.45	0.83	< 0.01 < 0.01	0.028 < 0.02 (0.03)	< 0.01 < 0.01
					61	0.63 0.83	0.73	< 0.01 < 0.01	0.028 0.022 (0.03)	< 0.01 < 0.01
Hancock, WI 2009 (Russet Burbank) WI19	Conveyor belt	1	2	3.6	0	0.90 0.84	0.87	< 0.01 < 0.01	< 0.02 < 0.02	< 0.01 < 0.01

[a] As application equipment, backpack CO_2 sprayer (WA32 trial), conveyor belt with backpack CO_2 sprayer (WI19 trial), CDA applicator with diaphragm pump (ME04 trial), CO_2 sprayer in rolling table chamber (On14) and conveyor belt with backpack CO_2 sprayer (ID19 trial) were used.

Ginseng

There was a request for the re-estimation of maximum residue levels for processed ginseng products as a change in grouping for the processed products was made during the 2011 CCPR Session. The 2010 JMPR recommended maximum residue levels for fresh ginseng and the products, based on the residue levels from five trials conducted in the Republic of Korea in 2009. For the present JMPR evaluation, the country additionally provided data from two trials (Study No. 09072-944 and 09072-945). The new trials were conducted in 2010 at the sites of the two trials that were carried out in 2009 and evaluated by JMPR in 2010.

Ready to harvest ginseng, 5 years in qage, was treated four times with a difenoconazole SC 10 formulation (%, w/w) at a rate of 0.0054 kg ai/hL (10 mL of a formulation with 10% ai in 20 litre of water) with 10 day intervals. Fresh ginseng was harvested 14 days after the last application.

Table 23 Difenoconazole residues in ginseng treated with SC10 formulation in the Republic of Korea

Location Year (Variety)[a]	Application			PHI, days	Sample material	Residue, mg/kg		Study No.
	kg ai/hL	n.	Interval days			Sample results	Mean	
GAP in Rep. of Korea	0.0054[b]	5[b]	10[b]	14[b]				
	0.0030[c]	4[c]	10[c]	7[c]				
Gongju, Chungnam 2009	0.0054	5	10	14	Fresh root	0.018 0.017 (2)	0.017	09072-945
Wonju, Gangwon 2009	0.0054	5	10	14	Fresh root	< 0.02 (3)	< 0.02	
Icheon, Gyunggi 2009	0.0054	5	10	14	Fresh root	< 0.02 (3)	< 0.02	08072-051
Chungju, Chungbuk 2009	0.0054	5	10	14	Fresh root	0.006 (3)	0.006	09072-944
Goesan, Chungbuk 2009[d]	0.0030	4	10	7	Fresh root	0.040 (3)	0.04	08082-016

Location Year (Variety)[a]	Application			PHI, days	Sample material	Residue, mg/kg		Study No.
	kg ai/hL	n.	Interval days			Sample results	Mean	
Chungju, Chungbuk 2010	0.0054	5	10	14	Fresh root	0.045 0.043 0.044	0.044	09072-944
Gongju, Chungnam 2010	0.0054	5	10	14	Fresh root	0.030(3)	0.030	09072-945

Trials conducted in 2009 were evaluated by the 2010 JMPR.

[a] *Panax ginseng* C.A. Mey. (Violet-stem variant)

[b] GAP for SC 10 (%, w/w)

[c] GAP for SC 10.7 (%, w/w) as of 2009. Currently, the formulation composition is 11.3 (%, w/w).

[d] SC 10.7 formulation was used only in the one trial, according to the registered usage.

FATE OF RESIDUES IN STORAGE AND PROCESSING

In processing

The Meeting received information on the fate of difenoconazole residues during the processing of oranges, apples, grapes, tomatoes, potatoes and ginseng.

Oranges (juice, oil and dried pulp)

Orange trees were treated four times with difenoconazole EC 250 by foliar cover spray applications at rates of 0.14 kg ai/ha (total rate 0.56 kg ai/ha) and at an exaggerated rate of 5× (total rate 2.8 kg ai/ha) in one residue trial (Trial No. E15FL078041) conducted in Florida in 2007. Composite samples (~200 kg) of mature fruit were collected on day 0, after the last application, and used for processing of oranges into fresh juice, citrus oil and dried pulp simulating normal commercial processing practices.

Oranges were batch tub washed. Approximately 2.75 kg of oranges per batch were abraded to scarify the flavedo for oil recovery. The scarified fruit was weighed and retained for juice processing.

The collected oil-water emulsion was screened and the scarified flavedo was set aside for later addition to the shredded peel. The first run oil-water emulsion was processed through a cream separator and centrifuge to separate the oil. The free oil was removed and frozen. The residual emulsion was centrifuged, and recovered oil was added to the oil collected the previously. The entire volume of oil collected was placed in frozen storage.

An aliquot of the scarified oranges was transferred to the juice extractor to recover the juice from the peel. The collected juice was screened to remove vesicular membranes, seed, segment membranes and peel fragments.

The peel from a juice extractor was shredded and combined with the scarified flavedo from the scarification process and with rag (the stringy axis and white fibrous membrane) and seeds from the juice finisher extraction process to generate wet peel. Lime was added to the wet peel and mixed. The limed peel was pressed. The wet peel pulp was dried to below 10% moisture and then the dried pulp was milled.

Table 24 Difenoconazole and metabolite residues in processed orange products (Report No.: T004712-06)

Location Year (Variety) Trial No.	Application					PHI, days	Sample analysed	Residue, mg/kg			
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha			Parent	T	TA	TAA
Oviedo, FL 2007	0.14	4	2300	83	0.56	0	Whole fruit	0.10 0.13	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Sample analysed	Residue, mg/kg			
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha			Parent	T	TA	TAA
(Valencia) E15FL078041							(Pre-process)	0.09 Mean: 0.11	< 0.01	< 0.01	< 0.01
							Dried pulp	0.44 *PF*=4.0	< 0.01	0.01	< 0.01
							Oil	4.7 *PF*=42.7	< 0.01	< 0.01	< 0.01
							Juice	< 0.01 *PF*=< 0.09	< 0.01	< 0.01	< 0.01
Oviedo, FL 2007 (Valencia) E15FL078041	0.70-0.71	4	2300	83	2.8	0	Whole fruit (Pre-process)	0.74 0.71 0.81 Mean: 0.75	< 0.01 < 0.01 < 0.01	0.01 0.01 0.01	< 0.01 < 0.01 < 0.01
							Dried pulp	3.0 *PF*=4.0	< 0.01	0.02	< 0.01
							Oil	38 *PF*=50.7	0.03	< 0.01	< 0.01
							Juice	< 0.01 *PF*=< 0.01	< 0.01	< 0.01	< 0.01

Apples (juice and wet pomace)

Apples were treated five times with difenoconazole EC 250 by foliar cover spray applications with a rate of 0.075–0.078 kg ai/ha (total rate 0.38 kg ai/ha) in two residue trials (Trial No. 5A-FR-04-5190 and WF-FR-04-5199) conducted in New York and Washington in 2004. An exaggerated rate of 5× (total rate 0.19 kg ai/ha) was also applied in the each trial. Composite samples (~ 60 kg) of mature fruit were collected 14–18 days after the last application.

Processing of apples into wet pomace and fresh juice was performed under processing conditions simulating commercial practices. Unwashed apples were washed and reduced to crushed apple pulp. The crushed apple pulp was heated with low steam and treated with enzyme. The enzyme treated pulp was pressed and wet pomace and fresh juice was collected.

Table 25 Difenoconazole and metabolite residues in processed apple products (Report No.:T002884-03)

Location Year (Variety) Trial No.	Application					PHI, days	Sample analysed	Residue, mg/kg.			
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha			Parent	T	TA	TAA
GAP, USA	0.078				0.37	14					
Hudson, NY 2004 (Indared) 5A-FR-04-5190	0.075-0.077	5	1100	75-85	0.38	18	Pre-process	0.18	< 0.01	0.08 (0.10)	< 0.01
							Wet pomace	1.2 *PF*=6.67	< 0.01	0.07 (0.07)	< 0.01
							Juice	< 0.01 *PF*=< 0.01	< 0.01	0.16 (0.15)	< 0.01
Hudson, NY 2004 (Indared) 5A-FR-04-	0.38-0.39	5	1100	75-85	1.9	15	Pre-process	0.73	< 0.01	0.19 (0.10)	< 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Sample analysed	Residue, mg/kg.			
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha			Parent	T	TA	TAA
5190											
							Wet pomace	6.5 *PF*=8.90	< 0.01	0.10 (0.07)	< 0.01
							Juice	0.02 *PF*=0.03	< 0.01	0.23 (0.15)	< 0.01
Ephrata, WA 2004 (Red Delicious) WF-FR-04-5199	0.076-0.078	5	1900	77-79	0.38	14	Pre-process	0.18	< 0.01	0.01 (0.01)	< 0.01
							Wet pomace	1.8 *PF*=10.0	< 0.01	0.01 (< 0.01)	< 0.01
							Juice	< 0.01 *PF*=< 0.01	< 0.01	0.03 (0.03)	< 0.01
Ephrata, WA 2004 (Red Delicious) WF-FR-04-5199	0.39	5	1900	77-79	1.9	14	Pre-process	0.89	< 0.01	0.02 (0.01)	< 0.01
							Wet pomace	11 *PF*=12.4	< 0.01	0.01 (< 0.01)	< 0.01
							Juice	< 0.01	< 0.01	0.03 (0.03)	< 0.01

Grapes (raisin and juice)

Grapes were treated four times with difenoconazole EC 250 by foliar broadcast spray applications with a rate of 0.13 kg ai/ha (total rate 0.52 kg ai/ha) in two residue trials (Trial No. E03NY078021 and W32CA078023) conducted in California in 2007. Exaggerated rates of 3× (total rate 1.6 kg ai/ha) and 5× (total rate 2.6 kg ai/ha) were also applied. Composite samples (~ 45 kg) of mature fruit were collected approximately 7 days after the final application. Processing of grapes into juice and raisins was performed under processing conditions that simulated commercial practice.

Table 26 Difenoconazole and metabolite residues in processed grape products (Report No.: T004711-06)

Location Year (Variety) Trial No.	Application					PHI, days	Sample analysed	Residue, mg/kg			
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha			Parent	T	TA	TAA
GAP, USA	0.13				0.52	7					
Dundee, NY 2007 (Concord)[a] E03NY078021	0.13	4	900	81-89	0.52	7	Pre-process	0.49 0.82 0.70 Mean: 0.67	< 0.01 < 0.01 < 0.01	0.05 0.04 0.04 (0.05)	0.01 0.01 0.01 (0.01)
							Raisin	1.97	< 0.01	0.13 (0.12)	0.04 (0.03)
							Juice	0.01	< 0.01	0.03 (0.03)	< 0.01
Dundee, NY 2007 (Concord)[a] E03NY078021	0.39	4	900	81-89	1.6	7	Pre-process	2.5 2.3 2.3 Mean: 2.4	< 0.01 < 0.01 < 0.01	0.06 0.05 0.05 (0.05)	0.02 0.01 0.01 (0.01)

Location Year (Variety) Trial No.	Application					PHI, days	Sample analysed	Residue, mg/kg			
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha			Parent	T	TA	TAA
							Raisin	9.9	< 0.01	0.19 (0.12)	0.07 (0.03)
							Juice	0.06	< 0.01	0.03 (0.03)	< 0.01
Poplar, CA 2007 (Thompson Seedless) W32CA078023	0.13	4	700	79-89	0.52	7	Pre-process	0.11 0.11 0.18 Mean: 0.13	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01
							Raisin	0.56 PF=4.31	< 0.01	0.01 (0.01)	< 0.01
							Juice	0.06 *PF*=0.46	< 0.01	< 0.01	< 0.01
Poplar, CA 2007 (Thompson Seedless) W32CA078023	0.65	4	700	79-89	2.6	7	Pre-process	0.49 0.82 0.70 Mean: 0.67	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01
							Raisin	1.9 *PF*=2.84	< 0.01	0.01 (0.01)	< 0.01
							Juice	0.31 *PF*=0.46	< 0.01	< 0.01	< 0.01

[a] Processing factors were not derived due to use of Concord variety.

Tomato (paste and puree)

Tomatoes were treated four times with difenoconazole EC 250 by post foliar broadcast spray applications with a rate of 0.12–0.13 kg ai/ha (total rate 0.50–0.52 kg ai/ha) in two residue trials (Trial No. WC-FR-04-5222 and WD-FR-04-5225) conducted in California in 2007. Exaggerated rates of 5× (total rate 0.63–0.65 kg ai/ha) were also applied. Composite samples (~ 135 kg) of mature fruit were collected either on day 0, after the spray was completely dry (WD-FR-04-5225) or at 7 days after the final application (WC-FR-04-5222). Processing of tomatoes into paste and puree was performed according to commercial processing practices.

As a first step, tomatoes were washed by the washing system consisted of two sets of washing flumes/spray washers. The washed tomatoes were crushed by a grinder and pumped into the hot break system to be heated to 91–92 °C. Peel and seeds (wet pomace) were removed from the crush, producing tomato juice. Concentration of juice to puree was done using a vacuum evaporator until Natural Tomato Soluble Solids (NTSS) of puree reaches to the target NTSS of 8–16%. Puree transferred to the vacuum kettle evaporator was condensed to paste until the paste reaches the target NTSS, of 24–35%.

Table 27 Difenoconazole and metabolite residues in processed tomato products (Report No.: T003262-03)

Location Year (Variety) Trial No.	Application					PHI, days	Sample analysed	Residue, mg/kg			
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha			Parent	T	TA	TAA
GAP, USA	0.13				0.52	0					
Visalia, CA 2004 (H-9557)	0.13	4	100	76-89	0.52	7	Pre-process	0.09	< 0.01	0.01 (< 0.01)	< 0.01

Location Year (Variety) Trial No.	Application					PHI, days	Sample analysed	Residue, mg/kg			
	kg ai/ha	n	Vol. (L/ha)	BBCH	Total/ season, kg ai/ha			Parent	T	TA	TAA
WC-FR-04-5222											
						7	Paste	0.11 *PF*=1.22	< 0.01	0.06 (0.02)	< 0.01
						7	Puree	0.05 *PF*=0.56	< 0.01	0.02 (< 0.01)	< 0.01
Visalia, CA 2004 (H-9557) WC-FR-04-5222	0.64-0.65	4	100	76-89	2.6	7	Pre-process	0.35	< 0.01	0.03 (< 0.01)	< 0.01
						7	Paste	0.62 *PF*=1.77	< 0.01	0.16 (0.02)	< 0.01
						7	Puree	0.17 *PF*=0.49	< 0.01	0.04 (< 0.01)	< 0.01
Glenn, CA 2004 (H-9557) WD-FR-04-5225	0.12-0.13	4	200		0.50	0	Pre-process	0.18	< 0.01	< 0.01	< 0.01
						0	Paste	0.38 *PF*=2.11	< 0.01	0.05 (< 0.01)	< 0.01
						0	Puree	0.11 *PF*=0.61	< 0.01	0.02 (< 0.01)	< 0.01
Glenn, CA 2004 (H-9557) WD-FR-04-5225	0.63-0.65	4	200		2.6	0	Pre-process	1.4	< 0.01	0.04 (< 0.01)	< 0.01
						0	Paste	1.9 *PF*=1.36	< 0.01	0.13 (< 0.01)	< 0.01
						0	Puree	0.77 *PF*=0.55	< 0.01	0.07 (< 0.01)	0.01 (< 0.01)

Potatoes (wet peel, flake and chip)

A processing study was conducted on treated tubers from one residue trial (Trial No. ID19, Idaho, USA). Potatoes were treated post-harvest with a spray application directed to tubers falling from a conveyor belt. The applications were made with a spray solution containing difenoconazole, fludioxonil and azoxystrobin at a rate of 3.5–3.6, 4.5 and 4.5 g ai/t tubers, respectively. Bulk tuber samples (~ 113 kg) were collected after the test substance had dried (0 day) and used for processing. Processing was conducted according to commercial processing practices.

Potato tubers were washed and representative samples were removed and returned to storage for chip processing. The remaining tubers were steam peeled and scrubbed. The peel was collected, and the peeled tubers were hand trimmed as necessary. The trimmings were added to the collected peel and both were hydraulically pressed to produce the wet peel sample, which was placed in frozen storage.

The peeled tubers were sliced into slabs, washed in cold water, and pre-cooked at 70 to 77 ºC for 20 minutes in a steam-jacketed kettle. The pre-cooked tuber slabs were cooled to less than 32 ºC for approximately 20 minutes and then steam-cooked at 94 to 100 ºC for 40 to 42 minutes. The cooked tuber slabs were mashed in a grinder and mixed with an emulsion of pre-weighed food additives. The cooked mash was dried into a thin sheet, which was broken into large flakes by hand and then fed into a press for milling into potato flakes. After drying on a fluidized bed-dryer, to remove excess moisture, the potato flake samples were placed into frozen storage.

The tubers retained for chips were removed from storage. The tubers were peeled, trimmed and cut into thin slice. The slices were placed in a tub of hot water to remove free starch, drained, and then fried at 163 to 191 °C for approximately 120 seconds. The fried chips were drained, salted and placed in frozen storage for later analysis.

Table 28 Difenoconazole and metabolite residues in processed potato products (Report No.: TK0003297)

Location Year (Variety) Trial No.	Application				WHP, days	Sample analysed	Residue, mg/kg			
	Method [a]	n	Del. rate (l/t)	g ai/t			Parent	T	TA	TAA
GAP, USA, for post-harvest treatment	In line aqueous spray	1		3.5						
Kimberly, ID2009 (Russet Burbank) ID19	Conveyor belt	1	2	3.5-3.6	0	Pre-processing	0.41	< 0.01	< 0.02	< 0.01
					0	Flake	< 0.01 *PF*=< 0.024	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
					0	Chip	0.03 *PF*=0.073	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01
					0	Wet peel	1.3 *PF*=3.17	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01

Ginseng (dried-, red ginseng, the extracts)

Ginseng was treated four times with SC 10 formulation (%, w/w) at a rate of 0.0054 kg ai/hL at 10 day intervals. The fresh ginseng was then harvested at 14-day PHI. Two processing studies (Study No. 09072-944 and 09072-945) were conducted in 2010, in the same manner with the method described in 2010 JMPR evaluation.

Briefly, washed ginseng (RAC, ginseng treated with tap water to remove soil particles) was dried in hot air to produce dried ginseng (water content, 8.0% and 9.6% in each study). The washed ginseng was steamed, dried in hot air, and dried again under sunlight to produce red ginseng (water content, 9.0% and 12.1% in each study).

Ethanol or water extracts of the dried and red ginseng were made by refluxing with ethanol (70%) or with water. The solvents were evaporated until the sugar content in the extract reached 65 or 72 °Brix. Water content in the dried extracted product was as follows: in two studies each, 38.5%, 40.2% in ethanol extract of dried ginseng, 48.5%, 36.8% in water extract of dried ginseng, 38.2%, 37.2% in ethanol extract of red ginseng and 53.4%, 35.9 % in water extract of red ginseng.

Table 29 Difenoconazole residues in processing ginseng products

Location Year (Variety)[a]	Application			PHI, days	Sample analysed	Residue, mg/kg		Study No.
	kg ai/hL	n	Interval days			Results	Mean	
GAP in Rep. of Korea	0.0054[b]	5[b]	10[b]	14[b]				
	0.0030[c]	4[c]	10[c]	7[c]				
Gongju, Chungnam 2009[d]	0.0054	5	10	14	Fresh root		0.017	09072-945
					Dried ginseng	0.065 0.068 (2)	0.067 *PF*=3.9	
					Red ginseng	0.052 0.050 (2)	0.051 *PF*=3.0	
					Ethanol extract of dried ginseng	0.090 0.082 0.077	0.083 *PF*=4.9	
					Water extract of dried ginseng	< 0.007 (3)	< 0.007 *PF*=< 0.4	(?)
					Ethanol extract	0.069	0.070	

Location Year (Variety)[a]	Application			PHI, days	Sample analysed	Residue, mg/kg		Study No.
	kg ai/hL	n	Interval days			Results	Mean	
					of red ginseng	0.068 0.074	*PF*=4.1	
					Water extract of red ginseng	< 0.007 (3)	< 0.007 *PF*=< 0.4	(?)
Wonju, Gangwon 2009[d]	0.0054	5	10	14	Fresh root		< 0.02	
					Dried ginseng	0.067 (2) 0.063	0.066 *PF*=>3.3	
					Red ginseng	< 0.04 (3)	< 0.04	
					Ethanol extract of dried ginseng	0.070 (2) 0.073	0.071 *PF*=>3.6	
					Water extract of dried ginseng	< 0.04 (3)	< 0.04	
					Ethanol extract of red ginseng	0.10 (2) 0.097	0.099 *PF*=>5.0	
					Water extract of red ginseng	< 0.04 (3)	< 0.04	
Icheon, Gyunggi 2009[d]	0.0054	5	10	14	Fresh root		< 0.02	08072-051
					Dried ginseng	0.11 (2) 0.13	0.12 *PF*=>6.0	
					Red ginseng	0.097 (2) 0.10	0.098 *PF*=>5.0	
					Ethanol extract of dried ginseng	0.37 0.36 0.38	0.37 *PF*=>18.5	
					Water extract of dried ginseng	< 0.04 (3)	< 0.04	
					Ethanol extract of red ginseng	0.21 (2)	0.21 *PF*=>10.5	
					Water extract of red ginseng	< 0.04 (3)	< 0.04	
Chungju, Chungbuk 2009[d]	0.0054	5	10	14	Fresh root		0.006	09072-944
					Dried ginseng	0.012 (2) 0.013	0.012 *PF*=2.0	
					Red ginseng	0.011 (3)	0.011 *PF*=1.8	
					Ethanol extract of dried ginseng	0.017 (2) 0.016	0.016 *PF*=2.7	
					Water extract of dried ginseng	0.016 0.015 0.014	0.015 *PF*=2.5	
					Ethanol extract of red ginseng	0.012 (2) 0.011	0.012 *PF*=2.0	
					Water extract of red ginseng	0.012 (3)	0.012 *PF*=2.0	
Goesan, Chungbuk 2009[d]	0.0030	4	10	7	Fresh root		0.04	08082-016
					Dried ginseng	0.072 0.067 0.068	0.069 *PF*=1.7	
					Red ginseng	0.037 0.035 0.038	0.037 *PF*=0.9	
					Ethanol extract of dried ginseng	< 0.07 (3)	< 0.07 *PF*=<1.8	
					Water extract of dried ginseng	< 0.07 (3)	< 0.07 *PF*=*<1.8*	

Location Year (Variety)[a]	Application			PHI, days	Sample analysed	Residue, mg/kg		Study No.
	kg ai/hL	n	Interval days			Results	Mean	
					Ethanol extract of red ginseng	< 0.07 (3)	< 0.07 *PF*=<1.8	
					Water extract of red ginseng	< 0.007 (3)	< 0.007 *PF*=< 0.2	
Chungju, Chungbuk 2010	0.0054	5	10	14	Fresh root		0.044	09072-944
					Dried ginseng	0.13 (2) 0.14	0.13 *PF=3.0*	
					Red ginseng	0.089 0.093 0.095	0.092 *PF=2.1*	
					Ethanol extract of dried ginseng	0.18 0.17(2)	0.17 *PF=3.9*	
					Water extract of dried ginseng	0.19(3)	0.19 *PF=4.3*	
					Ethanol extract of red ginseng	0.11(3)	0.11 *PF=2.5*	
					Water extract of red ginseng	0.12(3)	0.12 *PF=2.7*	
Gongju, Chungnam 2010	0.0054	5	10	14	Fresh root		0.03	09072-945
					Dried ginseng	0.10 0.097 0.11	0.10 *PF=3.3*	
					Red ginseng	0.093 0.094 0.096	0.094 *PF=3.1*	
					Ethanol extract of dried ginseng	0.21(2) 0.20	0.21 *PF=7.0*	
					Water extract of dried ginseng	0.054 0.055(2)	0.055 *PF=1.8*	
					Ethanol extract of red ginseng	0.20(2) 0.21	0.20 *PF=6.7*	
					Water extract of red ginseng	0.047 0.046(2)	0.046 *PF=1.5*	

[a] *Panax ginseng* C.A. Mey. (Violet-stem variant)

[b] GAP for SC 10 (%, w/w)

[c] GAP for SC 10.7 (%, w/w) as of 2009. Presently the formulation composition is changed into 11.3 (%, w/w). In the only one trial (Study No. 08082-016), the SC 10.7 formulation was applied.

[d] Studies evaluated by the 2010 JMPR

Table 30 Summary of processing factors for difenoconazole estimated by the JMPR Meetings

Raw agricultural commodity	Processed commodity	Calculated processing factors [a]	Pf (best estimate)
Orange	Oil	**42.7, 50.7**	47
	Dried pulp	**4.0, 4.0**	4.0
	Juice	**< 0.01, < 0.09**	< 0.01
Apple	Juice	**< 0.01, < 0.01**, < 0.02, **0.03**, <1.0, <1.0	0.03
	Wet pomace	**6.67, 8.90, 10.0, 12.4**	9.5
Grape	Raisin	1.01, 1.4, **2.84, 4.31**	2.1
	Juice	**0.46, 0.46**, < 0.5	0.46
Tomato	Paste	**1.22, 1.36, 1.77, 2.11**	1.6
	Puree	**0.49**, 0.54, **0.55**, **0.56**, 0.58, **0.61**, 0.74, 1.00	0.57
Potato	Flake	**< 0.024**	< 0.024
	Chip	**0.073**	0.073
	Wet peel	**3.17**	3.2

Raw agricultural commodity	Processed commodity	Calculated processing factors [a]	Pf (best estimate)
Ginseng [b]	Dried ginseng	1.7, 2.0, **3.0**, **3.3**, 3.9	
	Red ginseng	0.9, 1.8, **2.1**, 3.0, **3.1**	
	Ginseng, dried including red ginseng	0.9, 1.7, 1.8, 2.0, **2.1,** 3.0, **3.0**, **3.1, 3.3**, 3.9	2.6
	Ethanol extract of dried ginseng	<1.8, 2.7, **3.9**, 4.9, **7.0**	
	Water extract of dried ginseng	< 0.4, < 1.8, **1.8**, 2.5, **4.3**	
	Ethanol extract of red ginseng	< 1.8, 2.0, **2.5**, 4.1, **6.7**	
	Water extract of red ginseng	< 0.2, < 0.4, **1.5**, 2.0, **2.7**	
	Ginseng, extracts	< 0.2, **1.5**, <1.8, <1.8, <1.8, **1.8**, 2.0, 2.0, **2.5**, 2.5, **2.7,** 2.7, **3.9**, 4.1, **4.3**, 4.9, **6.7**, **7.0**	7.0

[a] Bold letter value refers to Pf derived by the present Meeting. The others came from the previous JMPR reports.

[b] For ginseng, the 2010 JMPR derived only one Pf, 3.3 for dried ginseng, due to an uncertainty of the dataset.

APPRAISAL

Difenoconazole was first evaluated by the JMPR in 2007 for toxicology when an ADI of 0–0.01 mg/kg bw and an ARfD of 0.3 mg/kg bw were established. In 2007 and 2010, the JMPR evaluated for residues and recommended numerous maximum residue levels. The compound was listed by the Forty-fourth Session of the CCPR for residue evaluation for additional MRLs by the JMPR in 2013.

The residue is defined, for plant commodities, as parent difenoconazole for compliance with the MRL and for estimation of dietary intake. For animal commodities, it is defined as sum of difenoconazole and 1-[2-chloro-4-(4-chloro-phenoxy)-phenyl]-2-(1,2,4-triazol)-1-yl-ethanol (CGA 205375), expressed as difenoconazole, for compliance with the MRL and for estimation of dietary intake. The residue is fat soluble.

The present Meeting received residue trial information on citrus fruits, pome fruits, grapes, Japanese persimmon, bulb vegetables, brassica vegetables, fruiting vegetables, ginseng and post-harvest treated potato. Further, processing studies on oranges, apples, grapes, tomatoes, potatoes and ginseng were provided. According to a request from the Forty-fourth Session of the CCPR, the Meeting re-evaluated the ginseng processing studies evaluated in 2010 to estimate MRLs complying with the new classification for processed products.

Methods of analysis

The analytical methods used for the determination of difenoconazole in samples from supervised trials, had already considered by the JMPR in 2007 and 2010. The methods are based on LC-MS/MS and GC-NPD determination and the limits of quantitation were 0.01 mg/kg. The validity of the analytical results was supported by validation data on representative crops and results of concurrent recovery studies.

The methods used for ginseng and the processed products were also considered by the 2010 JMPR. The limits of quantitation for difenoconazole based on GC-ECD were between 0.003 and 0.007 mg/kg and concurrent recoveries ranged between 86% and 113%.

Difenoconazole in Japanese persimmon were extracted with acetone and partitioned with dichloromethane. The LOQ by GC-ECD determination was 0.02 mg/kg and concurrent recoveries ranged from between 88% and 107%.

The Meeting additionally received information on analytical methods used for the determination of triazole metabolites 1, 2, 4-triazole, triazole alanine and triazole acetic acid residues in the same plant commodity samples from the supervised trials. The methods involved extraction with organic solvents, SPE clean-up and/or derivatization steps, partition with ethyl acetate and

determination by LC-MS/MS. The limits of quantitation for all metabolites were 0.01 mg/kg and procedural recoveries ranged from 70% to 115%.

Stability of residues in stored analytical samples

The 2007 JMPR concluded that difenoconazole was stable for 2 years in most plant commodities when deep frozen. This covered the stability of difenoconazole in samples from the supervised trials. New data on ginseng and Japanese persimmon were provided. The storage stability tests were conducted simultaneously with storage of field trial sample for 4–31 days in ginseng and the products and for 51 days in Japanese persimmon. The results indicated that residues in the samples were stable during the storage period.

Results of supervised residue trials on crops

Citrus fruits

Difenoconazole is registered in the USA for use on citrus fruits at a GAP of 4 × 0.14 kg ai/ha (total seasonal rate of 0.56 kg ai/ha), 7 day interval and a PHI of 0 days. Residue trials on citrus fruits were conducted in the USA, matching the critical GAP. Residue concentrations of difenoconazole in citrus fruit, determined on a whole fruit basis, were: 0.11, 0.13, 0.13, 0.14, 0.15, 0.15, 0.23, 0.26 and 0.37 mg/kg in oranges (n=9); 0.17, 0.38 mg/kg in mandarin (n=2); 0.49 mg/kg in tangerine (n=1); 0.075, 0.09, 0.11, 0.13, 0.18 and 0.18 mg/kg in grapefruit (n=6); 0.09, 0.16, 0.17, 0.19 and 0.24 mg/kg in lemons (n=5).

The Meeting noted that as the GAP in USA was for citrus fruits and that the medians of data sets for oranges, mandarins, grapefruits and lemons differed by less than 5-fold, agreed to consider a group maximum residue level. In deciding on the data set to use for estimating a group maximum residue level, given a Kruskal-Wallis H-test indicated that the residue populations were not different, it was agreed to combine the results to give a data set of: 0.075, 0.09, 0.09, 0.11, 0.11, 0.13, 0.13, 0.13, 0.14, 0.15, 0.15, 0.16, 0.17, 0.17, 0.18, 0.18, 0.19, 0.23, 0.24, 0.26, 0.37, 0.38 and 0.49 mg/kg (n=23) for citrus.

The Meeting agreed to estimate a maximum residue level of 0.6 mg/kg, an STMR of 0.16 mg/kg and an HR of 0.49 mg/kg for whole citrus fruits.

Pome fruits

Difenoconazole is registered in the USA for use on pome fruits at a GAP of 5 × 0.078 kg ai/ha (total seasonal rate of 0.37 kg ai/ha), 7 day intervals and a PHI of 14 days. Residue trials on apple and pear were conducted in the USA and complied with the US GAP.

Residues in apples were (n=13): 0.02, 0.07, 0.07, 0.08, 0.13, 0.16, 0.21, 0.25, 0.28, 0.37, 0.38, 0.39 and 0.47 mg/kg.

Residues in pears were (n=6): 0.07, 0.12, 0.12, 0.14, 0.19 and 0.27 mg/kg.

A national use pattern in the Republic of Korea permits up to five foliar applications of difenoconazole WP 10 (%, w/w) on Japanese persimmon at a rate of 0.0054 kg ai/L with 10 day intervals and a PHI of 7 days. Six trials were conducted in the Republic of Korea in 2011 (3) and 2012 (3) matching the critical GAP.

However, all trials were conducted with the same variety. In each year, three trials were performed at the same dates of application and under the same weather conditions, thus the trials were not considered as independent. As a result the Meeting considered that for this evaluation, only two residue values (0.37, 0.43 mg/kg) were available. In addition, the GAP differed from that of the US GAP for pome fruits. Consequently, the persimmon residue values could not be combined with residues from apple and pear.

The Meeting noted that the GAP in USA was for pome fruits and that the medians of the apple and pear data sets differed by less than 5-fold and agreed to consider a group maximum residue

level. In deciding on the data set to use for estimating a group maximum residue level, since a Mann-Whitney U-test indicated that the residue populations for apple and pear were not different it was agreed to combine the results to give a data set of: 0.02, 0.07 (3), 0.08, 0.12 (2), 0.13, 0.14, 0.16, 0.19, 0.21, 0.25, 0.27, 0.28, 0.37, 0.38, 0.39 and 0.47 mg/kg (n=19) for pome fruits group.

The Meeting estimated a maximum residue level of 0.8 mg/kg, an STMR of 0.16 mg/kg and an HR of 0.47 mg/kg for pome fruits. The Meeting withdrew its previous recommendation of 0.5 mg/kg for pome fruits.

Grapes

A national use pattern in the USA permits up to four foliar applications of difenoconazole EC 250 (250 g/L) on grapes at a rate of 0.13 kg ai/ha (total seasonal rate of 0.52 kg ai/ha) with 10 days interval and a PHI of 7 days. Twelve trials conducted in the USA matched the critical GAP, of which two trials were not considered independent as they were carried out on the same variety at a nearby location (experiencing the same weather conditions) and shared the same dates of application. In addition, one trial was excluded as it was carried out with a grape variety for which use was not allowed.

Residues in grapes were (n=10): 0.11, 0.17, 0.19, 0.23, 0.40, 0.64, 0.65, 0.67, 1.3 and 1.5 mg/kg.

The 2007 JMPR estimated a maximum residue level of 0.1 mg/kg for grapes, based on residue trials conducted in southern Europe matching Italian GAP (four applications to grape vines with a spray concentration of 0.005 kg ai/hL with a PHI of 21 days).

As the US use pattern is considered the more critical GAP than the Italian GAP, the Meeting recommended a maximum residue level of 3 mg/kg, an STMR of 0.52 mg/kg and an HR of 1.5 mg/kg for grapes, using residue data from the USA. The Meeting withdrew its previous recommendation of 0.1 mg/kg for grapes.

Bulb vegetables

Onion, bulb

A national use pattern in the USA permits up to four foliar applications of difenoconazole EC 250 (250 g/L) on bulb onions at a rate of 0.13 kg ai/ha (total seasonal rate of 0.52 kg ai/ha), with a 7 day interval and a PHI of 7 days.

Residues in onion, bulb were (n=8): < 0.01 (3), 0.01, 0.02, 0.02, 0.03 and 0.07 mg/kg.

Based on the residue values, the Meeting estimated a maximum residue level of 0.1 mg/kg, an STMR of 0.015 mg/kg and an HR of 0.07 mg/kg for onion, bulb.

Spring onion

A national use pattern in the USA permits up to three foliar applications of difenoconazole EC 250 (250 g/L) on green onions including spring onions at a rate of 0.13 kg ai/ha (total seasonal rate of 0.38 kg ai/ha), with 7 days interval and a PHI of 7 days. Three trials conducted in the USA matched the critical GAP.

Residues in whole spring onion were (n=3): 2.3, 2.8 and 3.8 mg/kg.

The Meeting estimated a maximum residue level of 9 mg/kg, an STMR of 2.8 mg/kg and an HR of 3.8 mg/kg for spring onions.

Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead cabbages

A national use pattern in the USA permits up to four foliar applications of difenoconazole EC 250 (250 g/L) on Brassica (cole) leafy vegetables at a rate of 0.13 kg ai/ha (total seasonal rate of

0.52 kg ai/ha) with 7 days interval and a PHI of 1 day. Six trials on head cabbage and broccoli each were conducted in the USA according to the critical US GAP.

Residues in head cabbage with wrapper leaves were (n=6): 0.09, 0.30, 0.34, 0.46, 0.94 and 1.3 mg/kg.

Residues in broccoli (head and stem) were (n=6): 0.15, 0.32, 0.32, 0.35, 0.37 and 0.53 mg/kg.

Based on GAPs of various European countries, the 2007 JMPR recommended a maximum residue level of 0.2 mg/kg for Brussels sprouts, head cabbage and cauliflowers, respectively, and 0.5 mg/kg for broccoli. As the USA GAP allows a shorter PHI (1 day) than the European GAP, the Meeting decided to use the US trials for maximum residue level estimation.

The Meeting noted that the GAP in USA was for Brassica vegetables and that the medians of the two data sets differed by less than 5-fold and agreed to consider a group maximum residue level. In deciding on the data set to use for estimating a group maximum residue level, since a Mann-Whitney U-test indicated that the residue populations for head cabbage and broccoli were not different, it was agreed to combine the results to give a data set of: 0.09, 0.15, 0.3, 0.32, 0.32, 0.34, 0.35, 0.37, 0.46, 0.53, 0.94 and 1.3 mg/kg (n=12) for Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead cabbages.

The Meeting estimated a maximum residue level of 2 mg/kg, an STMR of 0.35 mg/kg and an HR of 1.3 mg/kg for the crop group, Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead cabbages. The meeting withdrew its previous recommendations for Brussels sprouts, Head cabbage and Cauliflowers of 0.2 mg/kg and for Broccoli of 0.5 mg/kg.

Fruiting vegetables, Cucurbits

Melons

A national use pattern in the USA permits up to four foliar applications of difenoconazole EC 250 (250 g/L) on cucurbit vegetables at a rate of 0.13 kg ai/ha (total seasonal rate of 0.52 kg ai/ha), 7 day interval and a PHI of 0 days. Six trials on cantaloupe conducted in the USA were provided for this Meeting. Five trials were performed according to the US critical GAP, however in one trial the harvest was made 4 days after the last application.

Residues in whole melon were (n=5): 0.06, 0.08, 0.14, 0.19 and 0.35 mg/kg.

The Meeting estimated a maximum residue level 0.7 mg/kg, an STMR of 0.14 mg/kg and an HR of 0.35 mg/kg for melons, except watermelon.

Cucumber, summer squash

A national use pattern in the USA permits up to four foliar applications of difenoconazole EC 250 (250 g/L) on cucurbit vegetables at a rate of 0.13 kg ai/ha (total seasonal rate of 0.52 kg ai/ha), 7 day interval and a PHI of 0 days. Six trials on gherkins and five trials on summer squash were provided to the Meeting. The trials were conducted in the USA complied with the critical US GAP.

Residues in gherkin were (n=6): < 0.01, 0.01, 0.03, 0.04, 0.04 and 0.15 mg/kg.

Residues in summer squash were (n=5): < 0.01, 0.02, 0.05, 0.06 and 0.06 mg/kg.

The Meeting noted that the GAP in USA is for fruiting vegetables, cucurbits with edible peel and that the medians of the two data sets differed by less than 5-fold and agreed to consider a group maximum residue level. In deciding on the data set to use for estimating a group maximum residue level, since a Mann-Whitney U-test indicated that the residue populations for gherkin and summer squash were not different it was agreed to combine the results to give a data set of < 0.01, < 0.01, 0.01, 0.02, 0.03, 0.04, 0.04, 0.05, 0.06, 0.06 and 0.15 mg/kg (n=11) for fruiting vegetable, cucurbits with edible peel.

The Meeting estimated a maximum residue level of 0.2 mg/kg, an STMR of 0.04 mg/kg and an HR of 0.15 mg/kg for fruiting vegetables, cucurbits with edible peel (cucumber, gherkin and summer squash).

Fruiting vegetables, other than Cucurbits

A national use pattern in the USA permits up to four foliar applications of difenoconazole EC 250 (250 g/L) on fruiting vegetables (tomatoes and peppers) at a rate of 0.13 kg ai/ha (total seasonal rate of 0.52 kg ai/ha), 7 day interval and a PHI of 0 days. Trials conducted in the USA (11 trials for tomatoes, six trials for sweet peppers, three trials for chili pepper) were provided to the current Meeting. The trials were performed according to the critical US GAP.

Residues in tomato were (n=11): 0.01, 0.10, 0.11, 0.11, 0.14, 0.15, 0.16, 0.26, 0.27, 0.39 and 0.39 mg/kg.

Residues in sweet pepper were (n=6): 0.06, 0.10, 0.11, 0.14, 0.14 and 0.18 mg/kg.

Residues in chili pepper were (n=3): 0.10, 0.16 and 0.26 mg/kg.

Residue data for sweet pepper and chili pepper was combined for mutual support. Further, the Meeting noted that the GAP in USA was for fruiting vegetable other than cucurbits and that the medians of the two data sets differed by less than 5-fold and agreed to consider a group maximum residue level. In deciding on the data set to use for estimating a group maximum residue level, as a Mann-Whitney U-test indicated that the residue populations for tomatoes and peppers were similar, it was agreed to combine the results to give a data set of 0.01, 0.06, 0.10(3), 0.11 (3), 0.14 (3), 0.15, 0.16, 0.16, 0.18, 0.26, 0.26, 0.27, 0.39 and 0.39 mg/kg (n=20) for fruiting vegetables other than cucurbits.

The 2007 JMPR recommended a maximum residue level of 0.5 mg/kg for tomato from eleven trials conducted on tomatoes in Europe (France, Greece, the UK, Spain) matching the Italian GAP (2 applications at 0.13 kg ai/ha with a PHI of 7 days). However, the GAP of the USA was considered to be the critical GAP.

Therefore, based on the combined dataset on tomato and peppers from the US trials the Meeting estimated a maximum residue level of 0.6 mg/kg, an STMR of 0.14 mg/kg and an HR of 0.39 mg/kg for fruiting vegetables other than cucurbits except sweet corn and mushrooms. The Meeting withdrew its previous recommendation for tomatoes of 0.5 mg/kg.

Furthermore, the Meeting estimated a maximum residue level of 5 mg/kg, an STMR of 1.1 mg/kg and an HR of 1.8 mg/kg for chili peppers dried.

Potato (post-harvest treatment)

A national use pattern in the USA permits a single post-harvest application of difenoconazole to potatoes at a rate of 3.19 g ai/t tubers with in an line aqueous spray application using T-jet controlled droplet applicator (CDA) or similar application system. The US GAP does not specify a withholding period.

Residue trials on potatoes involving post-harvest application were conducted at five sites in different regions of the USA. In the trials, difenoconazole FS 360 (360 g/L) was applied once to potatoes as a post-harvest treatment at a rate of 3.5–3.8 g ai/t tubers, spraying directly to tubers falling from a conveyor belt or moving along a roller table. Post-harvest treated tubers were then collected on the day of treatment (0 day) once the test substance had dried. In decline studies, tubers were stored for up to 231 days in typical storage conditions of 5–10 °C.

At one site, potato tubers were cut at the field site. At another one site, in addition to a conveyor belt treatment, three additional application methods (surface, spray chamber and brush table) were utilized. The two methods using surface spraying and spray chamber did not comply with US GAP.

Therefore, in total five trials matching US GAP were available for use in estimating a maximum residue level.

In the USA, a pre-harvest application using difenoconazole formulation is also authorized on potatoes. No residue was detected in pre-treatment samples.

Residues in potatoes from post-harvest treatment (n=5): 0.61, 0.87, 1.2, 1.3 and 1.9 mg/kg.

The Meeting estimated a maximum residue level of 4 mg/kg, an STMR of 1.2 mg/kg and an HR of 1.9 mg/kg for post-harvest treated potato. The Meeting withdrew its previous recommendation of 0.02 mg/kg for potato that had been based on the residues resulting from pre-harvest treatment.

Ginseng

The maximum GAP in the Republic of Korea allows five applications of difenoconazole SC 10 (%, w/w) on ginseng at a rate of 0.0054 kg ai/hL, with a 10 day interval and a PHI of 14 days.

Two trials, using ready to harvest ginseng plantations (5 years old), were conducted in the Republic of Korea, complying with the maximum GAP. The resulting residues were: 0.030 and 0.044 mg/kg.

Of five trials evaluated by the 2010 JMPR, four trials matched the maximum GAP of the Republic of Korea. Thus the residues were (n=6): 0.006, 0.017, < 0.02, < 0.02, 0.030 and 0.044 mg/kg.

The Meeting estimated a maximum residue level 0.08 mg/kg, an STMR of 0.02 mg/kg and an HR of 0.044 mg/kg for ginseng. The Meeting withdrew its previous recommendation of 0.5 mg/kg for ginseng.

Animal feed

Residue information on animal feeds was not provided to the current Meeting.

Fate of residues during processing

The Meeting received information on the fate of difenoconazole residues during the processing of oranges, apples, grapes, tomatoes, potatoes and ginseng. The following table summarizes processing factors, STMR-Ps and HR-Ps estimated by the Meeting.

Raw agricultural commodity	Processed commodity	Pf (best estimate)	RAC STMR/HR	STMR-P/HR-P
Citrus	Citrus juice	< 0.01	0.16	0.002
	Citrus oil	47		7.5
	Citrus dry pulp	4.0		0.64
Pome fruit	Apple juice	0.03	0.16	0.005
	Apple pomace, wet	9.5		1.5
Grape	Raisin	2.1	0.52/1.5	1.1/3.2
	Juice	0.46		0.24
Tomatoes	Paste	1.6	0.14	0.22
	Puree	0.57		0.08
Potato	Flakes	< 0.024	1.2	0.029
	Chips	0.073		0.088
	Peel, wet	3.2		3.8
Ginseng	Dried including red ginseng	2.6	0.02/0.044	0.052/0.11
	Extracts	7.0	-	0.14

For dried grapes (raisin), the Meeting estimated a maximum residue level of 6 mg/kg, based on the processing factor of 2.1 for raisins and the maximum residue level of 3 mg/kg for grapes.

The Meeting re-calculated a processing factor for dried ginseng including processing study results for red ginseng, for a processing factor of 2.6. Based on the processing factor of 2.6 and a maximum residue level of 0.08 mg/kg for the ginseng raw commodity, the Meeting recommended a maximum residue level of 0.2 mg/kg for ginseng, dried including red ginseng. For ginseng extracts, applying the calculated processing factor of 7.0, a maximum residue level of 0.6 mg/kg was estimated.

Residues in animal commodities

Estimated dietary burdens of farm animals

Dietary burden calculations for beef cattle and dairy cattle and poultry are provided below. The dietary burdens were estimated using the OECD diets listed in Appendix IX of the 2009 edition of the FAO Manual.

Potential feed items include: almond hulls, apple pomace, bean forage, cabbages, head, carrot culls, citrus dried pulp, grape pomace, dry, pea vines, potato culls, potato process waste (wet peel), rape seed fodder, rape seed meal, soya bean seed, sugar beet leaves or tops, sunflower seed meal, wheat straw and fodder.

The Japanese animal diet contained only soya bean seed and rape seed meal of those commodities for which the JMPR estimated highest and median residues. The residues in the two commodities resulted in an animal dietary burden of less than 0.01 ppm on dry matter basis, therefore those values are not included in the summary table.

	Livestock dietary burden, difenoconazole, ppm of dry matter diet					
	US-Canada		EU		Australia	
	max	mean	max	mean	max	mean
Beef cattle	12.56	11.42	17.88[a]	15.30[b]	11.39	10.80
Dairy cattle	4.87	4.36	14.91[c]	12.37[d]	11.31	10.71
Poultry, broilers	0.01	0.01	0.96	0.61	0.01	0.01
Poultry, layers	0.01	0.01	1.89[e]	1.11[f]	0.01	0.01

[a] Highest maximum beef or dairy cattle dietary burden suitable for maximum residue level estimates for mammalian meat and edible offal

[b] Highest mean beef of dairy cattle dietary burden suitable for STMR estimates for mammalian meat and edible offal

[c] Highest maximum dairy cattle dietary burden suitable for maximum residue level estimates for milk

[d] Highest mean dairy cattle dietary burden suitable for STMR estimates for milk

[e] Highest maximum broiler or layer poultry dietary burden suitable for maximum residue level estimates for poultry meat, edible offal and eggs

[f] Highest mean broiler or layer poultry dietary burden suitable for STMR estimates for poultry meat, edible offal and eggs

Estimated residues in animal commodities

For MRL estimation, the residues in the animal commodities are the sum of difenoconazole and CGA 205375 (1-[2-chloro-4-(4-chloro-phenoxy)-phenyl]-2-(1, 2, 4-triazol)-1-yl-ethanol)) expressed as difenoconazole.

Cattle

The 2007 JMPR evaluated two animal transfer studies carried out with Holstein dairy cows administering difenoconazole at 1, 3, 10 ppm (study 1) or 1, 5, 15 ppm (study 2) in the dry-weight diet for 29–30 consecutive days. The Meeting concluded that the two feeding studies were generally in good agreement of transfer factors. Thus, the present Meeting used the study with the 5 and 15 ppm feeding levels as most closely bracketing the dietary burdens.

For maximum residue level estimation, the high residues in the tissues were calculated by interpolating the maximum dietary burden of 17.88 ppm (in 2010 it was 2.42 ppm) between the

relevant feeding levels (5 and 15 ppm) from the dairy cow feeding study and using the highest tissue concentrations from individual animals within those feeding groups.

The STMR values for the tissues were calculated by taking the STMR dietary burden of 15.30 ppm between the relevant feeding levels (5 and 15 ppm) from the dairy cow feeding study and using mean residue of the three animals.

The following table shows the expected residues in animal commodities.

	Feed level (ppm) for milk residues	Residues (mg/kg) in milk	Feed level (ppm) for tissue residues	Residues (mg/kg) in			
				Muscle	Liver	Kidney	Fat
Maximum residue level beef or dairy cattle							
Feeding study [a]	5	< 0.005	5	0.012	0.29	0.046	0.058
	15	0.013	15	0.058	0.80	0.14	0.16
Dietary burden and residue estimate	14.91	0.013	17.88	0.071	0.95	0.17	0.19
STMR beef or dairy cattle							
Feeding study [b]	5	< 0.005	5	0.012	0.25	0.043	0.046
	15	0.013	15	0.046	0.70	0.13	0.14
Dietary burden and residue estimate	12.37	0.011	15.30	0.047	0.71	0.13	0.14

[a] Highest residues for tissues and mean residue for milk

[b] Mean residues for tissues and milk

For muscle, the residues arising from dietary burdens of 17.88 ppm and 15.30 ppm were 0.071 mg/kg and 0.047 mg/kg, respectively. In fat, the residues arising from dietary burdens of 17.88 ppm and 15.30 ppm were 0.19 mg/kg and 0.14 mg/kg, respectively.

The residues in milk were 0.013 mg/kg and 0.011 mg/kg from dietary burdens of 14.91 ppm and 12.37 ppm, respectively.

For liver, the residues arising from dietary burdens of 17.38 ppm and 15.30 ppm were 0.95 mg/kg and 0.71 mg/kg, respectively. In kidney, the residues arising from dietary burdens of 17.88 ppm and 15.30 ppm were 0.17 mg/kg and 0.13 mg/kg.

The Meeting estimated a maximum residue level for difenoconazole in mammalian fat of 0.2 mg/kg. STMR and HR values for mammalian muscle and fat were estimated as 0.047 and 0.071 mg/kg in muscle, 0.14 and 0.19 mg/kg in fat, respectively.

For milk, the Meeting estimated a maximum residue level of 0.02 mg/kg and an STMR value of 0.011 mg/kg. Information on fat distribution in milk was not available.

The Meeting estimated a maximum residue level, an STMR value and an HR value for difenoconazole in mammalian edible offal of 1.5, 0.71 and 0.95 mg/kg, respectively, reflecting residues in liver of higher residue level.

The Meeting withdrew its previous recommendations on commodities of mammalian origin and milks.

Poultry

The 2007 JMPR evaluated a transfer study carried out with laying white leghorn hens. Four groups of 15 laying hens were fed rations treated with difenoconazole at 0.3, 1, 3 and 10 ppm for 28 consecutive days. Eggs were collected on 10 occasions for analysis (days 0 before treatment, 1, 3, 6, 9, 13, 16, 20, and 23). Poultry tissue and egg samples from the 0.3 ppm feeding group were not analysed because residues were at or below LOQ (< 0.01 mg/kg) in the 1 ppm feeding group. For poultry tissue, residues in 1 ppm feeding level were also not analysed as the residues in 3 and 10 ppm feeding levels were at or below LOQ (< 0.01 mg/kg).

	Feed level (ppm) for egg residues	Residues (mg/kg) in egg	Feed level (ppm) for tissue residues	Residues (mg/kg) in			
				Muscle	Liver	Skin	Fat
Maximum residue level broiler or laying hen							
Feeding study [a]	1	< 0.01	3	< 0.01	< 0.01	< 0.01	< 0.01
	3	0.046	10	< 0.01	< 0.01	< 0.01	< 0.01
Dietary burden and residue estimate	1.89	0.026	1.89	< 0.01	< 0.01	< 0.01	< 0.01
STMR broiler or laying hen							
Feeding study [b]	1	< 0.01	3	< 0.01	< 0.01	< 0.01	< 0.01
	3	0.032	10	< 0.01	< 0.01	< 0.01	< 0.01
Dietary burden and residue estimate	1.11	0.011	1.11	< 0.01	< 0.01	< 0.01	< 0.01

[a] Highest residues for tissues and mean residues for egg

[b] Mean residues for tissues and mean residues for egg

For poultry tissues, residues arising from the maximum dietary burden of 1.89 ppm were below LOQ (0.01 mg/kg). The Meeting confirmed the maximum residue level recommendation of < 0.01 mg/kg for poultry tissues (fat, edible offal). Further, the Meeting estimated an STMR value and an HR value, 0.001 mg/kg and 0.002 mg/kg, respectively, for the tissues (muscle, fat and edible offal).

For eggs, residues arising from dietary burdens of 1.89 ppm and 1.11 ppm were 0.026 mg/kg and 0.011 mg/kg. The Meeting estimated a maximum residue level of 0.03 mg/kg and an STMR value 0.011 mg/kg and an HR value of 0.026 mg/kg for eggs. The Meeting withdrew its previous recommendation for eggs of 0.01* mg/kg.

RECOMMENDATIONS

On the basis of the data from supervised trials, the Meeting concluded that the residue concentrations listed below are suitable for establishing MRLs and for assessing IEDIs and IESTIs.

Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for plant commodities: *difenoconazole*.

Definition of the residue (for compliance with the MRL and for estimation of dietary intake) for animal commodities: *sum of difenoconazole and 1-[2-chloro-4-(4-chloro-phenoxy)-phenyl]-2-(1,2,4-triazol)-1-yl-ethanol), expressed as difenoconazole*.

The residue is fat-soluble.

CCN	Commodity	Recommended MRL mg/kg		STMR or STMR-P	HR or HR-P
		New	Previous	mg/kg	mg/kg
VB 0040	Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead brassicas	2		0.35	1.3
VB 0400	Broccoli	W	0.5	0.065	0.41
VB 0402	Brussels sprouts	W	0.2	0.065	0.14
VB 0041	Cabbages, Head	W	0.2	0.035	0.19
VB 0404	Cauliflowers	W	0.2	0.02	0.10
FC 0001	Citrus fruits	0.6		0.16	0.49

CCN	Commodity	Recommended MRL mg/kg		STMR or STMR-P	HR or HR-P
		New	Previous	mg/kg	mg/kg
VC 0424	Cucumber	0.2		0.04	0.15
DF 0269	Dried grapes (=currants, raisins and sultanas)	6		1.1	3.2
MO 0105	Edible offal (Mammalian)	1.5	0.2	0.71	0.95
PE 0112	Eggs	0.03	0.01*	0.011	0.026
VO 0050	Fruiting vegetables , other than cucurbits, except sweet corn and mushroom	0.6	0.5 for tomato	0.14	0.39
VO 0448	Tomato	W	0.5		
VC 0425	Gherkin	0.2		0.04	0.15
VR 0604	Ginseng	0.08	0.5	0.02	0.044
DV 0604	Ginseng, dried including red ginseng	0.2		0.052	0.11
DM 0604	Ginseng, extracts	0.6		0.14	
FB 0269	Grapes	3	0.1	0.52	1.5
MM 0095	Meat (from mammals other than marine mammals)	0.2 (fat)	0.05 (fat)	0.047 (muscle) 014 (fat)	0.071 (muscle) 0.19 (fat)
VC 0046	Melons, except watermelon	0.7		0.14	0.35
ML 0106	Milks	0.02	0.005*	0.011	
VA 0385	Onion, Bulb	0.1		0.015	0.07
HS 0444	Peppers, Chili, dried	5		1.1	1.8
FP 0009	Pome fruits	0.8	0.5	0.16	0.47
VR 0589	Potato	4 Po	0.02	1.2	1.9
VA 0389	Spring Onion	9		2.8	3.8
VC 0431	Squash, Summer	0.2		0.04	0.15
JF 0226	Apple juice			0.005	
	Apple pomace, wet			1.5	
JF 0001	Citrus juice			0.002	
OR 0001	Citrus oil, Edible			7.5	
	Citrus pulp dry			0.64	
JF 0269	Grape juice			0.24	
	Grape pomace, dry			6.2	
	Potato chips			0.088	
	Potato flakes			0.029	
	Potato, wet peel			3.8	
VW	Tomato paste			0.22	

CCN	Commodity	Recommended MRL mg/kg		STMR or STMR-P	HR or HR-P
		New	Previous	mg/kg	mg/kg
	Tomato puree			0.08	
	Tomato juice			0.031	
	Tomato canned			0.01	
	Wine			0.094	

DIETARY RISK ASSESSMENT

Long-term intake

The ADI for difenoconazole is 0–0.01 mg/kg bw. The International Estimated Daily Intakes (IEDIs) for difenoconazole were estimated for the 13 GEMS/Food Consumption Cluster Diets using the STMR or STMR-P values estimated by the previous and present JMPR. The results are shown in Annex 3 of the 2013 JMPR Report. The IEDIs ranged 4–60% of the maximum ADI. The Meeting concluded that the long-term intake of residues of difenoconazole from uses considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The ARfD for difenoconazole is 0.3 mg/kg bw. The International Estimate of Short Term Intakes (IESTIs) for difenoconazole were calculated for the food commodities for which STMRs or HRs were estimated by the present Meeting and for which consumption data were available. The results are shown in Annex 4 of the 2013 JMPR Report. The IESTIs varied from 0–30% of the ARfD for children and 0–20% for the general population.

The Meeting concluded that the short-term intake of residues of difenoconazole from other uses that have been considered by the present Meeting is unlikely to present a public health concern.

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