METHOMYL (094)

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EXPLANATION

Methomyl was evaluated for residues and toxicology by the JMPR in 2001 under the periodic review programme, where the residue definition for estimation of dietary intake and for compliance with the MRL was defined (the sum of thiodicarb and methomyl, expressed as methomyl) and MRLs for a number of commodities were recommended for methomyl, arising from the use of either methomyl or thiodicarb.

The 2001 JMPR estimated an ARfD of 0.02 mg/kg bw for methomyl and estimated short-term intakes that exceeded this ARfD for apples, broccoli, Brussels sprouts, head cabbage, cauliflower, celery, water melon, grapes, kale, head lettuce, leaf lettuce, spinach, sweet corn and tomato (JMPR Report 2001, p 598).

At the 38th Session of the CCPR in 2006, the Committee requested JMPR to consider using alternative GAPs to recommend lower MRLs for apples; brassica vegetables; celery; fruiting vegetables, cucurbits; grapes; leafy vegetables and pears (FAO/WHO, 2006).

Information on current and proposed GAPs and new supervised trials data were submitted by the manufacturers to the 2008 JMPR for cucurbits (cucumbers, courgettes, melons), grapes, lettuce and pears, and additional residue trials information was also provided for tomatoes.

PHYSICAL AND CHEMICAL PROPERTIES

Pesticide specifications for methomyl were established for TC, SP-SB, SP and SL formulations through the Joint FAO/WHO Meeting on Pesticide Specifications (JMPS), and published in 2002 as FAO Specifications and Evaluations for Agricultural Pesticides – Methomyl. (http://www.fao.org/ag/agp/agpp/pesticid/Default.htm).

METHODS OF RESIDUE ANALYSIS

Analytical methods

Analytical methods used in the new supervised trials involved either Method AMR 3015-94 (Reverse phase HPLC-fluorescence, previously reported and evaluated by the 2001 JMPR) or Method DuPont 12895 (LC-MS/MS).

Table 1 Methomyl Analytical Methods

Dry pea seed & hay, sorghum forage & hay, soyabean hay and sugar beet foliage JMPR 2001 Evaluations pp 436-458			
Analytes:	Methomyl	HPLC	AMR 3015-94
LOQ:	0.02 mg/kg		
Description	Samples were soaked with water for 10-minutes, followed by an acetonitrile extraction using a homogenizer. For processed apple or grape samples, the same extraction procedure was used, but the water soak was omitted. Purification by acetonitrile/hexane partitioning, followed by a Florisil SPE clean up of the acetonitrile layer. After elution with 50:50 acetone:hexane, the eluate was evaporated to dryness and reconstituted in 15:85 acetonitrile:water. Analysis was by reverse-phase HPLC-fluorescence (postcolumn hydrolysis with 0.2N sodium hydroxide forming methylamine and derivatization with o-phthalaldehyde and N,N-dimethyl-2-mercaptoethylamine, emission wavelengths of 330 and 466 nm respectively)		
Cotton seed, oranges, tobacco and wheat grain Foster, Sherratt and Cairns, 2003 – Appendix 5 [Ref: DuPont 12677]			
Analytes:	Methomyl	LC-MS/MS	Method 0352
LOQ:	0.01 mg/kg		

Description Samples were soaked with water for 10-minutes, homogenised in acetone, shaken in a mixture of dichloromethane and petroleum ether before centrifuging and evaporation to dryness. Clean-up was by solid phase extraction (aminopropyl cartridge, dichloromethane eluant), followed by evaporation and resuspension in formic acid for analysis by LC-MS/MS (positive ion electrospray, transition ions m/z = 163.1 to 88.1 and m/z =163.1 to 106.1

Recovery values reported in the new supervised residue trials are reported below.

Table 2 Analytical recoveries for spiked methomyl in various substrates

Commodity	Analyte	Spike conc, mg/kg	n	Recovery%		Method	Reference
				mean	RSD		
Cucumber	methomyl	0.01 0.1	6 6	81 80	8 13	Method 0352	DuPont 16974
Grape	methomyl	0.01 0.1	4 4	87 89	10 12	Method 0352	DuPont 12677
Grape	methomyl	0.01 0.1 1.5	5 5 2	87 97 89	12 7 ±5	Method 0352	DuPont 14003
Lettuce	methomyl	0.01 0.1 0.2 0.5	6 6 2 2	84 90 88 80	8 6 ±2 ±3	Method 0352	DuPont 14310
Lettuce	methomyl	0.01 0.1	3 5	88 87	9 3	Method 0352	DuPont 12674
Melon peel	methomyl	0.01 0.1 0.5	7 7 7	86 91 76	12 9 4	Method 0352	DuPont 14309
Melon peel	methomyl	0.01 0.1	8 8	91 93	14 13	Method 0352	DuPont 12673
Melon peel	methomyl	0.01 0.1 0.5	6 6 2	92 82 83	17 10 ±3	Method 0352	DuPont 16977
Melon pulp	methomyl	0.01 0.1	8 8	84 81	17 12	Method 0352	DuPont 14309
Melon pulp	methomyl	0.01 0.1	8 8	89 92	17 14	Method 0352	DuPont 12673
Melon pulp	methomyl	0.01 0.1	10 10	74 86	17 12	Method 0352	DuPont 16977
Tomato	methomyl	0.01 0.1	6 6	81 80	8 13	Method 0352	DuPont 16975

USE PATTERN

A summary of registered uses for methomyl relevant to the commodities under review was reported to the Meeting and those for which labels were also available are shown in Table 3.

The Meeting was also informed that because of a pending EU regulatory review, revised GAP for EC Member States has been proposed.

Table 3 Registered uses of methomyl (foliar applications) on pome fruit, grapes and lettuce

Crop	Country	Formulation		Application				PHI (days)	Comments
		Type	Conc	Method (Note 1)	Max No	kg ai/hL	kg ai/ha		
Apples	France	SL	200 g/L	F	3	0.05-0.075		7	
Apples	USA	SP	900 g/L	F	5		0.5-1.0	14	
Nashi	France	SL	200 g/L	F	3	0.075		7	
Pears	France	SL	200 g/L	F	3	0.075		7	
Pome fruits	Spain	SL	200 g/L	F		0.03-0.05	0.4-0.5	7	
Quince	France	SL	200 g/L	F	3	0.075		7	
Grape	France	SL	200 g/L	F	2		0.4-0.5	28	Table grapes
Grape	France	SL	200 g/L	F	3		0.4-0.5	7	Wine grapes
Grape	Greece	WP	250 g/kg	F	2	0.04		35	Table grapes
Grape	Greece	WP	250 g/kg	F	3	0.02-0.027		35	Table grapes
Grape	Greece	WP	250 g/kg	F	3	0.02-0.054		20	Wine grapes
Grape	USA	SP	900 g/kg	F	5		0.5 to 1.0	1 14	Table grapes Wine grapes
Cucumber	USA	SP	900 g/kg	F	12		0.5 to 1.0	1 3	
Summer Squash	USA	SP	900 g/kg	F	12		0.5 to 1.0	1 3	
Zucchini	Greece	WP	250 g/kg	F,G,I	3		0.45	15	
Cantaloupe	USA	SP	900 g/kg	F	12		0.5 to 1.0	1 3	
Melon	Greece	WP	250 g/kg	F,G,I	3		0.45	20	
Melon	Philippines	SP	400 g/kg			0.05-0.088	0.44	1	
Melons	USA	SP	900 g/kg	F	12		0.5 to 1.0	1 3	
Melon	Venezuela	SL	250 g/L				0.38	NS	
Tomato	Greece	WP	250 g/kg	F	3		0.45	3	
Tomato	Greece	WP	250 g/kg	F	3		0.45	7	
Tomato	Philippines	SP	400 g/kg			0.05-0.088	0.44	1	
Tomato	Spain	SL	200 g/L	F,G,I	2	0.025-0.045	0.5	7	
Tomato	USA	SP	803 g/kg	F	16		0.5-1	1	
Tomato	Venezuela	SL	250 g/L				1	NS	
Lettuce	France	SL	200 g/L	F	2		0.3	14	
Lettuce	France	SL	200 g/L	F	3		0.25	14	
Lettuce	Spain	SL	200 g/L	F	2	0.03-0.05	0.5	14	
Lettuce, Head	USA	SP	900 g/kg	F	15		0.25-0.5 0.5-1.0	7 10	
Lettuce, Leaf	USA	SP	900 g/kg	F	8		0.25-0.5 0.5-1.0	7 10	
Lettuce	Venezuela	SL	250 g/L				0.75	NS	

Note 1: F= Outdoor or field use, G= greenhouse application, I = indoor use

NS: Not Specified

RESIDUES RESULTING FROM SUPERVISED TRIALS

Relevant data from trials on pears, grapes and lettuce, evaluated by the 2001 JMPR are interpreted in light of current GAP and the Meeting received new information on supervised field trials involving methomyl (foliar applications) on grapes, cucumbers/courgettes, melons, tomato and on both head and leaf lettuce.

Commodity		Situation	Country	Table No.
Apples	JMPR 2001		Belgium, France, Italy, Spain	Table 4
Grapes	JMPR 2001	Outdoor	France, Italy and Portugal	Table 5
Grapes (wine)			France, Italy	Table 6
Grapes (table)			France, Greece, Spain	Table 7
Cucumber/Courgette		Protected	France, Greece, Spain	Table 8
Melons		Outdoor	Greece, France, Spain	Table 9
Melons		Protected	France, Greece, Italy, Spain	Table 10
Tomato		Protected	France, Greece, Italy, Spain	Table 11
Lettuce		Outdoor	France, Spain	Table 12

The new supervised trials were well documented with laboratory and field reports. Laboratory reports included method validation including procedural recoveries with spiking at residue levels similar to those occurring in samples from the supervised trials. Dates of analyses or duration of residue sample storage were also provided. Although trials included control plots, no control data are recorded in the tables unless residues in control samples exceeded the LOQ. Residue data are recorded unadjusted for recovery. Where duplicate samples were taken from a site, the higher of the reported residue values was taken into consideration.

Results from replicated field plots are presented as individual values. When residues were not detected they are shown as below the LOQ (e.g., < 0.01 mg/kg). Residues and application rates have generally been rounded to two significant figures. However, in the more recent studies, residues close to the LOQ have been reported to two significant figures. Residue values from the trials used for the estimation of maximum residue levels are <u>double underlined</u>.

Intervals of freezer storage between sampling and analysis were recorded for all trials and were covered by the conditions of the freezer storage stability studies in most cases. Where extended storage periods were reported, these have been noted.

Apples

Results from supervised trials on apples in Belgium, France, Italy and Spain were provided to the 2001 JMPR. Data from these trials are interpreted in the light of current GAP in Table 4.

Table 4 Residue interpretation table for methomyl residues on apples. GAP and trial conditions are compared for treatments considered valid for MRL and STMR estimation

			Use pattern			PHI days	Methomyl mg/kg	Trial [a]
Crop	Country	Form	kg ai/ha	kg ai/hL	No			
Pome fruit	Spain GAP	SL	0.4-0.5	0.03-0.05		7		
Apples	Belgium, 1996	WP	0.68	0.06	3	-0 0 1 3 5 7	< 0.02 0.34, 0.18 < 0.02, 0.21 0.1, 0.21 < 0.02, 0.1 <u>0.06</u>, 0.05	AMR 3941-96
Apples	Belgium, 1996	WP	0.66	0.061	3	7	<u>0.15</u>, 0.02	AMR 3942-96
Apples	Belgium, 1997	WP	0.714	0.061	3	7	<u>0.05</u>, 0.03	AMR 4505-97

			Use pattern			PHI days	Methomyl mg/kg	Trial [a]
Crop	Country	Form	kg ai/ha	kg ai/hL	No			
Apples	France, 1996	SL	0.82	0.06	3	-0 0 1 3 5 7	< 0.02 0.2, 0.24 0.11, 0.11 0.11, 0.15 0.1, 0.14 0.1, 0.13	AMR 3941-96
Apples	France, 1996	SL	0.6	0.06	3	-0 0 1 3 5 7	< 0.02 0.12, 0.2 0.11, 0.09 0.1, 0.13 0.08, 0.11 0.11, 0.05	AMR 3941-96
Apples	France, 1996	SL	0.69	0.06	3	7	0.03, 0.02	AMR 3942-96
Apples	France, 1996	SL	0.58	0.06	3	7	0.09, 0.07	AMR 3942-96
Apples	France, 1996	WP	0.78	0.061	3	-0 0 1 3 5 7	< 0.02 0.17, 0.1 0.16, 0.12 < 0.02, < 0.02 0.08, 0.06 0.16, 0.08	AMR 3941-96
Apples	France, 1997	SL	0.575	0.06	3	7	0.09, 0.02	AMR 4505-97
Apples	France, 1997	WP	0.967	0.06	3	-0 0 1 3 5 7	< 0.02 0.14, 0.43 0.16, 0.22 0.17, 0.19 0.16, 0.16 0.1, 0.09	AMR 4505-97
Apples	France, 1997	WP	0.606	0.06	3	7	0.17, 0.13	AMR 4505-97
Apples	Italy, 1996	SL	0.9	0.06	3	-0 0 1 3 5 7	< 0.02 0.47, 0.37 0.13, 0.22 0.18, 0.2 0.18, 0.17 0.08, 0.05	AMR 3941-96
Apples	Italy, 1996	WP	0.9	0.06	3	-0 0 1 3 5 7	< 0.02 0.53, 0.32 0.24, 0.18 0.13, 0.17 0..09, 0.12 0.09, 0.08	AMR 3941-96
Apples	Spain, 1996	WP	0.64	0.06	3	7	0.06, 0.04	AMR 3942-96
Apples	Spain, 1997	SL	0.633	0.061	3	7	0.08, 0.07	AMR 4505-97

[a] See JMPR 2001 Report pp 495-497, Table 24

Grapes

Results from supervised trials on table and wine grapes in France, Italy and Portugal were provided to the 2001 JMPR. Data from these trials are interpreted in the light of current GAP in Table 5.

Table 5 Residue interpretation table for methomyl residues on grapes. GAP and trial conditions are compared for treatments considered valid for MRL and STMR estimation.

Crop	Country	Form	kg ai/hL	kg ai/ha calculated	No	PHI (days)	Methomyl (mg/kg)	Trial [a]
Grape	GAP: France	SL	0.05	0.5		7 (wine grapes), 28 (table grapes)		
Grape	France, 1997 (Gros vert)	WP	0.06	0.304	3	7	0.09, 0.06	AMR 4498-97
Grape	France, 1997 (Carignan)	WP	0.06	0.304	3	-1 h + 3 h 1 3 5 7	< 0.02, < 0.02 0.20, 0.17 0.13, 0.19 0.15, 0.11 0.06, 0.06 0.02, 0.03	AMR 4498-97
Grape	France, 1997 (Chardonnay)	SL	0.06	0.37	3	-1 h +1 h 1 3 5 7	0.03, 0.03 0.53, 0.33 0.20, 0.29 0.19, 0.22 0.14, 0.18 0.10, 0.09	AMR 4498-97
Grape	France, 1997 (Chardonnay)	WP	0.06	0.358	3	-1 h +1 h 1 3 5 7	0.06, 0.06 0.32, 0.41 0.25, 0.25 0.16, 0.17 0.06, 0.13 0.14, 0.12	AMR 4498-97
Grape	France, 1997 (Chenin Blanc)	SL	0.06	0.553	3	- 1 h + 3 h 1 3 5 7	< 0.02, < 0.02 0.06, 0.05 0.26, 0.15 0.16, 0.07 0.08, 0.18 0.09, 0.05	AMR 4498-97
Grape	France, 1997 (Chenin Blanc)	SL	0.06	0.568	3	7	0.09, 0.06	AMR 4498-97
Grape	France, 1997 (Gros vert)	SL	0.06	0.304	3	7	0.12, 0.09	AMR 4498-97
Grape	France, 1997 (Pinot Meunier)	WP	0.06	0.36	3	7	0.07, 0.06	AMR 4498-97
Grape	Portugal 1997 (Seminario)	SL	0.06	0.517	3	7	0.09, 0.09	AMR 4498-97

[a] See JMPR 2001 Report pp 509-510, Table 32).

The Meeting received new residue trials on wine and table grapes conducted as reverse decline studies in Belgium, France, Greece, Italy and Spain. In these trials, methomyl as an SL formulation was applied as a foliar spray to grape vines at a concentration of 0.06–0.13 kg ai/hL, using from 340–780 L of spray mix/ha (from 0.45–0.5 kg ai/ha). Two applications, about 14 days apart, were made to each plot using knapsack sprayers and or motorised mist blowers at varying intervals from harvest. All samples were harvested on the same date in each trial.

Mature grape bunches (12) were sampled, frozen within 11 h and analysed within 6 months, using Method M-0352. The limit of quantification of this method was 0.01 mg/kg with mean recovery rates between 87% and 97% at fortification levels of 0.01–1.5 mg/kg (See Table 2 above).

Table 6. Residue data summary of supervised trials on wine grapes in France and Italy involving foliar applications of methomyl (Reverse decline studies).

GRAPES Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: France	SL	0.5		2	7 (wine)		Table grape PHI 28 days
France (N), 2003 Bussieres (Gamay)	SL 200	0.46	0.06	2	0	0.17	DuPont 12677
France (N), 2003 Bussieres (Gamay)	SL 200	0.45	0.06	2	7	0.04	DuPont 12677
France (N), 2003 Bussieres (Gamay)	SL 200	0.46	0.06	2	14	0.01	DuPont 12677
France (N), 2003 Bussieres (Gamay)	SL 200	0.46	0.06	1	14	< 0.01	DuPont 12677
France (N), 2003 Bussieres (Gamay)	SL 200	0.44	0.06	2	21	< 0.01	DuPont 12677
France (N), 2003 Bussieres (Gamay)	SL 200	0.46	0.06	2	28	< 0.01	DuPont 12677
France (N), 2003 Bussieres (Gamay)	SL 200	0.46	0.06	2	35	< 0.01	DuPont 12677
France (N), 2003 Mancey (Chardonnay)	SL 200	0.46	0.06	2	0	0.14	DuPont 12677
France (N), 2003 Mancey (Chardonnay)	SL 200	0.45	0.06	2	7	0.05	DuPont 12677
France (N), 2003 Mancey (Chardonnay)	SL 200	0.46	0.06	2	14	< 0.01	DuPont 12677
France (N), 2003 Mancey (Chardonnay)	SL 200	0.46	0.06	1	14	< 0.01	DuPont 12677
France (N), 2003 Mancey (Chardonnay)	SL 200	0.44	0.06	2	21	< 0.01	DuPont 12677
France (N), 2003 Mancey (Chardonnay)	SL 200	0.46-0.45	0.06	2	28	< 0.01	DuPont 12677
France (N), 2003 Mancey (Chardonnay)	SL 200	0.46	0.06	2	35	< 0.01	DuPont 12677
France (S), 2003 Arnas (Gamay)	SL 200	0.45-0.46	0.06	2	0	0.39	DuPont 12677

GRAPES Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: France	SL	0.5		2	7 (wine)		Table grape PHI 28 days
France (S), 2003 Arnas (Gamay)	SL 200	0.45- 0.46	0.06	2	7	0.01	DuPont 12677
France (S), 2003 Arnas (Gamay)	SL 200	0.45	0.06	2	14	< 0.01	DuPont 12677
France (S), 2003 Arnas (Gamay)	SL 200	0.45	0.06	1	14	< 0.01	DuPont 12677
France (S), 2003 Tulette (Carignan)	SL 200	0.46	0.06	2	0	0.8	DuPont 12677
France (S), 2003 Tulette (Carignan)	SL 200	0.45	0.06	2	7	0.08	DuPont 12677
France (S), 2003 Tulette (Carignan)	SL 200	0.46	0.06	2	14	0.04	DuPont 12677
France (S), 2003 Tulette (Carignan)	SL 200	0.46	0.06	1	14	0.04	DuPont 12677
France (S), 2003 Tulette (Carignan)	SL 200	0.45	0.06	2	21	0.06	DuPont 12677
France (S), 2003 Tulette (Carignan)	SL 200	0.46	0.06	2	28	0.02	DuPont 12677
France (S), 2003 Tulette (Carignan)	SL 200	0.45	0.06	2	35	< 0.01	DuPont 12677
Italy, 2003 Ziano Piacentino (Malvasia)	SL 200	0.46	0.06	2	0	0.43	DuPont 12677
Italy, 2003 Ziano Piacentino (Malvasia)	SL 200	0.46	0.06	2	7	0.2	DuPont 12677
Italy, 2003 Ziano Piacentino (Malvasia)	SL 200	0.46	0.06	2	14	0.18	DuPont 12677
Italy, 2003 Ziano Piacentino (Malvasia)	SL 200	0.46	0.06	1	14	0.07	DuPont 12677
Italy, 2003 Ziano Piacentino (Malvasia)	SL 200	0.45- 0.46	0.06	2	21	0.02	DuPont 12677
Italy, 2003 Ziano Piacentino (Malvasia)	SL 200	0.46	0.06		28	< 0.01	DuPont 12677

GRAPES Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: France	SL	0.5		2	7 (wine)		Table grape PHI 28 days
France, 2005 Champagne (Chardonnay)	SL 200	0.45	0.08	2	0	0.62	DuPont 14003
France, 2005 Champagne (Chardonnay)	SL 200	0.45	0.07	1	14	0.08	DuPont 14003
France, 2005 Champagne (Chardonnay)	SL 200	0.46	0.07	2	21	0.14	DuPont 14003
France, 2005 Champagne (Chardonnay)	SL 200	0.46	0.07	2	28	0.03	DuPont 14003
France, 2005 Champagne (Chardonnay)	SL 200	0.45	0.07	2	35	< 0.01	DuPont 14003
France, 2005 Chessy, Rhone-Alps (Gamay)	SL 200	0.49- 0.46	0.13	2	0	1.2	DuPont 14003
France, 2005 Chessy, Rhone-Alps (Gamay)	SL 200	0.49	0.13	1	14	0.18	DuPont 14003
France, 2005 Chessy, Rhone-Alps (Gamay)	SL 200	0.46- 0.45	0.13	2	21	0.04	DuPont 14003
France, 2005 Chessy, Rhone-Alps (Gamay)	SL 200	0.46- 0.45	0.13	2	28	0.02	DuPont 14003
France, 2005 Chessy, Rhone-Alps (Gamay)	SL 200	0.43- 0.44	0.13	2	35	0.013	DuPont 14003
France, 2005 Lancie, Rhone-Alps (Gamay)	SL 200	0.44	0.07	2	0	0.42	DuPont 14003
France, 2005 Lancie, Rhone-Alps (Gamay)	SL 200	0.44	0.08	1	14	< 0.01	DuPont 14003
France, 2005 Lancie, Rhone-Alps (Gamay)	SL 200	0.45- 0.46	0.07	2	21	< 0.01	DuPont 14003
France, 2005 Lancie, Rhone-Alps (Gamay)	SL 200	0.43- 0.46	0.08	2	28	< 0.01	DuPont 14003
France, 2005 Lancie, Rhone-Alps (Gamay)	SL 200	0.46- 0.44	0.08	2	35	0.012	DuPont 14003

Table 7 Residue data summary of supervised trials on table grapes in France, Greece and Spain involving foliar applications of methomyl (Reverse decline studies)

GRAPES Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: France	SL	0.5		2	28 (table)		Wine grape PHI 7 days
France, 2005 Cote d'Azur (Italia)	SL 200	0.46-0.45	0.08	2	0	0.81	DuPont 14003
France, 2005 Cote d'Azur (Italia)	SL 200	0.45	0.07	1	14	0.3	DuPont 14003
France, 2005 Cote d'Azur (Italia)	SL 200	0.46-0.45	0.07	2	21	0.23	DuPont 14003
France, 2005 Cote d'Azur (Italia)	SL 200	0.44-0.45	0.08	2	29	0.08	DuPont 14003
France, 2005 Cote d'Azur (Italia)	SL 200	0.47-0.44	0.07	2	34	0.13	DuPont 14003
Greece, 2005 Chalkidiki (Victoria)	SL 200	0.45	0.07	2	0	0.42	DuPont 14003
Greece, 2005 Chalkidiki (Victoria)	SL 200	0.45	0.07	1	14	< 0.01	DuPont 14003
Greece, 2005 Chalkidiki (Victoria)	SL 200	0.45-0.46	0.07	2	21	< 0.01	DuPont 14003
Greece, 2005 Chalkidiki (Victoria)	SL 200	0.45	0.07	2	28	< 0.01	DuPont 14003
Greece, 2005 Chalkidiki (Victoria)	SL 200	0.45	0.07	2	35	< 0.01	DuPont 14003
Spain, 2005 Palacios Andalucia (Airen)	SL 200	0.47-0.45	0.07	2	0	0.72	DuPont 14003
Spain, 2005 Palacios Andalucia (Airen)	SL 200	0.47	0.08	1	14	0.05	DuPont 14003
Spain, 2005 Palacios Andalucia (Airen)	SL 200	0.46-0.45	0.07	2	21	0.1	DuPont 14003
Spain, 2005 Palacios Andalucia (Airen)	SL 200	0.46-0.45	0.07	2	28	0.05	DuPont 14003
Spain, 2005 Palacios Andalucia (Airen)	SL 200	0.47-0.45	0.07	2	35	< 0.01	DuPont 14003

GRAPES Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: France	SL	0.5		2	28 (table)		Wine grape PHI 7 days
Spain, 2005 Palacios Andalucia (Sholuc)	SL 200	0.45	0.07	2	0	0.06	DuPont 14003
Spain, 2005 Palacios Andalucia (Sholuc)	SL 200	0.45	0.07	1	14	< 0.01	DuPont 14003
Spain, 2005 Palacios Andalucia (Sholuc)	SL 200	0.45- 0.46	0.07	2	21	< 0.01	DuPont 14003
Spain, 2005 Palacios Andalucia (Sholuc)	SL 200	0.45	0.07	2	28	< 0.01	DuPont 14003
Spain, 2005 Palacios Andalucia (Sholuc)	SL 200	0.45	0.07	2	35	< 0.01	DuPont 14003

Cucumbers and Courgettes

The Meeting received new trials on protected cucumbers and courgettes conducted in France, Greece and Spain. In these trials, methomyl as an SL formulation was applied as a foliar spray at rates of 0.44–0.46 kg ai/ha using about 1000 litres of spray mix/ha. Two applications were made by motorised knapsack sprayers, 14 days apart, to plots of 36–42 m^2 in area containing 35–72 plants. Samples of mature fruit (2+ kg) were frozen within 9 h of sampling and analysed within 6 months using Method 0352. The limit of quantification of this method was 0.01 mg/kg and the mean recovery rate was 81% at fortification levels of 0.01–0.1 mg/kg (See table 2 above).

Table 8 Residue data summary of supervised trials on cucumbers and courgettes (protected) in France, Greece and Spain involving foliar applications of methomyl

CUCUMBERS/ COURGETTES Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
France, 2005 Lucenay (Bowing) Cucumber	SL 200	0.45-0.46	0.045	2	-0 0 3 7 10 14	< 0.01 0.05 0.01 < 0.01 < 0.01 < 0.01	DuPont 16974
France, 2005 Salon de Provence (Columbia) Cucumber	SL 200	0.44-0.46	0.045	2	-0 0 3 7 10 14	< 0.01 0.05 0.03 0.01 < 0.01 0.02	DuPont 16974
Greece, 2005 Profitis (Hobbot F1) Courgette	SL 200	0.44	0.05	2	-0 0 3 7 10 14	< 0.01 0.07 0.04 < 0.01 < 0.01 < 0.01	DuPont 16974

CUCUMBERS/ COURGETTES Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
Spain, 2005 Los Palacios (Jelida) Courgette	SL 200	0.45	0.045	2	-0 0 3 6 10 14	< 0.01 0.11 0.02 < 0.01 < 0.01 < 0.01	DuPont 16974

Melons

Outdoor melons

The Meeting received new information on outdoor melons from trials in France, Greece, Italy and Spain. In these reverse decline trials, methomyl (SL formulation) was applied twice, 4–15 days apart, at a nominal rate of 0.45 kg ai/ha (0.06 kg ai/100 litres) to melons, with the last application being made from 0–21 days before commercial harvest. Plot sizes ranged in area from 18–24 m^2 with sprays being applied by knapsack and lance or by mini-boom. Samples of mature melon peel and pulp (after removal of the seeds) from at least 12 melons were frozen within 14 h of sampling and analysed by LC-MS/MS (Method 0352) within 8 months. The limit of quantification of the method was 0.01 mg/kg and the average recovery rates were 85% (peel) and 83% (pulp) at fortification levels of 0.01–0.5 mg/kg (See Table 2 above).

Table 9 Residue data summary of supervised trials on outdoor melons in France, Greece and Spain involving foliar applications of methomyl. (Reverse decline studies)

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)			Reference & Comments
	Form	kg ai/ha	kg ai/hL	no		Peel	Pulp	Total (calc)	
France (N) 2003 Vouille-les-Marais (Heliobel)	SL 200	0.46-0.45	0.06	2	0	0.19	< 0.01	0.08	DuPont 12673
France (N) 2003 Vouille-les-Marais (Heliobel)	SL 200	0.45-0.47	0.06	2	1	0.14	< 0.01	0.05	DuPont 12673
France (N) 2003 Vouille-les-Marais (Heliobel)	SL 200	0.44-0.45	0.06	2	3	0.03	< 0.01	0.01	DuPont 12673
France (N) 2003 Vouille-les-Marais (Heliobel)	SL 200	0.44-0.45	0.06	2	7	0.05	< 0.01	0.02	DuPont 12673
France (N) 2003 Vouille-les-Marais (Heliobel)	SL 200	0.44-0.43	0.06	2	10	0.02	< 0.01	0.01	DuPont 12673
France (N) 2003 Vouille-les-Marais (Heliobel)	SL 200	0.45-0.44	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 12673
France (N) 2003 Vouille-les-Marais (Heliobel)	SL 200	0.46	0.06	1	15	< 0.01	< 0.01	< 0.01	DuPont 12673
France (N), 2003 Brain Sur L'Authion (Amigo)	SL 200	0.45-0.44	0.06	2	0	0.06	< 0.01	0.03	DuPont 12673

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)			Reference & Comments
	Form	kg ai/ha	kg ai/hL	no		Peel	Pulp	Total (calc)	
France (N), 2003 Brain Sur L'Authion (Amigo)	SL 200	0.46-0.47	0.06	2	1	0.04	< 0.01	0.02	DuPont 12673
France (N), 2003 Brain Sur L'Authion (Amigo)	SL 200	0.47	0.06	2	3	0.05	< 0.01	0.03	DuPont 12673
France (N), 2003 Brain Sur L'Authion (Amigo)	SL 200	0.44-0.47	0.06	2	7	0.04	< 0.01	0.02	DuPont 12673
France (N), 2003 Brain Sur L'Authion (Amigo)	SL 200	0.46-0.5	0.06	2	10	< 0.01	< 0.01	< 0.01	DuPont 12673
France (N), 2003 Brain Sur L'Authion (Amigo)	SL 200	0.45	0.06	1	14	< 0.01	< 0.01	< 0.01	DuPont 12673
France (N), 2003 Brain Sur L'Authion (Amigo)	SL 200	0.47	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 12673
Greece, 2003 Mesimeri (Ananas)	SL 200	0.46-0.47	0.06	2	0	0.28	< 0.01	0.17	DuPont 12673
Greece, 2003 Mesimeri (Ananas)	SL 200	0.47	0.06	2	1	0.4	0.04	0.27	DuPont 12673
Greece, 2003 Mesimeri (Ananas)	SL 200	0.46-0.47	0.06	2	3	0.08	0.03	0.05	DuPont 12673
Greece, 2003 Mesimeri (Ananas)	SL 200	0.43-0.47	0.06	2	7	0.04	< 0.01	0.02	DuPont 12673
Greece, 2003 Mesimeri (Ananas)	SL 200	0.46	0.06	1	14	0.01	< 0.01	< 0.01	DuPont 12673
Greece, 2003 Mesimeri (Ananas)	SL 200	0.47-0.46	0.06	2	14	0.01	< 0.01	0.01	DuPont 12673
Spain, 2003 Daimiel (Sancho)	SL 200	0.44-0.45	0.06	2	0	0.13	< 0.01	0.06	DuPont 12673
Spain, 2003 Daimiel (Sancho)	SL 200	0.45	0.06	2	1	0.08	< 0.01	0.03	DuPont 12673
Spain, 2003 Daimiel (Sancho)	SL 200	0.44-0.45	0.06	2	3	0.04	< 0.01	0.02	DuPont 12673
Spain, 2003 Daimiel (Sancho)	SL 200	0.44	0.06	2	7	< 0.01	< 0.01	< 0.01	DuPont 12673
Spain, 2003 Daimiel (Sancho)	SL 200	0.44	0.06	2	10	0.01	< 0.01	< 0.01	DuPont 12673

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)			Reference & Comments
	Form	kg ai/ha	kg ai/hL	no		Peel	Pulp	Total (calc)	
Spain, 2003 Daimiel (Sancho)	SL 200	0.45	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 12673
Spain, 2003 Daimiel (Sancho)	SL 200	0.44	0.06	1	15	< 0.01	< 0.01	< 0.01	DuPont 12673
Spain, 2003 Manzanares (Cantasapo)	SL 200	0.44	0.06	2	0	0.08	< 0.01	0.03	DuPont 12673
Spain, 2003 Manzanares (Cantasapo)	SL 200	0.44-0.45	0.06	2	1	0.04	< 0.01	0.02	DuPont 12673
Spain, 2003 Manzanares (Cantasapo)	SL 200	0.45	0.06	2	3	0.03	< 0.01	0.02	DuPont 12673
Spain, 2003 Manzanares (Cantasapo)	SL 200	0.45-0.44	0.06	2	7	0.04	< 0.01	0.019	DuPont 12673
Spain, 2003 Manzanares (Cantasapo)	SL 200	0.45-0.44	0.06	2	10	< 0.01	< 0.01	< 0.01	DuPont 12673
Spain, 2003 Manzanares (Cantasapo)	SL 200	0.45-0.44	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 12673
Spain, 2003 Manzanares (Cantasapo)	SL 200	0.44	0.06	1	15	0.02	< 0.01	0.01	DuPont 12673
Greece, 2003 Mesimeri (Ananas)	SL 200	0.43-0.46	0.06	2	10	0.07	0.02	0.04	DuPont 12673 (possible sample contam)
France (N), 2004 Brain Sur L'Authion (Galia)	SL 200	0.46-0.48	0.06	2	0	0.27	< 0.01	0.14	DuPont 14309
France (N), 2004 Brain Sur L'Authion (Galia)	SL 200	0.45-0.46	0.06	2	1	0.32	< 0.01	0.17	DuPont 14309
France (N), 2004 Brain Sur L'Authion (Galia)	SL 200	0.47	0.06	2	3	0.06	< 0.01	0.04	DuPont 14309
France (N), 2004 Brain Sur L'Authion (Galia)	SL 200	0.47	0.06	2	7	0.04	< 0.01	0.024	DuPont 14309
France (N), 2004 Brain Sur L'Authion (Galia)	SL 200	0.45-0.47	0.06	2	10	0.03	< 0.01	0.02	DuPont 14309
France (N), 2004 Brain Sur L'Authion (Galia)	SL 200	0.46	0.06	1	14	0.01	< 0.01	0.01	DuPont 14309

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)			Reference & Comments
	Form	kg ai/ha	kg ai/hL	no		Peel	Pulp	Total (calc)	
France (N), 2004 Brain Sur L'Authion (Galia)	SL 200	0.47-0.46	0.06	2	14	0.03	< 0.01	0.02	DuPont 14309
France (N), 2004 Chalonnes Sur Loire (Galia Total)	SL 200	0.46	0.06	2	0	0.27	< 0.01	0.15	DuPont 14309
France (N), 2004 Chalonnes Sur Loire (Galia Total)	SL 200	0.45-0.48	0.06	2	1	0.42	< 0.01	0.23	DuPont 14309
France (N), 2004 Chalonnes Sur Loire (Galia Total)	SL 200	0.46-0.44	0.06	2	3	0.06	< 0.01	0.03	DuPont 14309
France (N), 2004 Chalonnes Sur Loire (Galia Total)	SL 200	0.45	0.06	2	7	0.03	< 0.01	0.02	DuPont 14309
France (N), 2004 Chalonnes Sur Loire (Galia Total)	SL 200	0.45	0.06	2	10	0.05	0.014	0.032	DuPont 14309
France (N), 2004 Chalonnes Sur Loire (Galia Total)	SL 200	0.46	0.06	1	14	0.04	0.01	0.03	DuPont 14309
France (N), 2004 Chalonnes Sur Loire (Galia Total)	SL 200	0.48-0.46	0.06	2	14	0.04	< 0.01	0.02	DuPont 14309
Greece, 2004 Chalkidiki (Galia)	SL 200	0.46-0.48	0.06	2	0	0.24	< 0.01	0.14	DuPont 14309
Greece, 2004 Chalkidiki (Galia)	SL 200	0.44-0.46	0.06	2	1	0.21	< 0.01	0.11	DuPont 14309
Greece, 2004 Chalkidiki (Galia)	SL 200	0.44-0.46	0.06	2	3	0.14	< 0.01	0.08	DuPont 14309
Greece, 2004 Chalkidiki (Galia)	SL 200	0.44-0.46	0.06	2	7	0.04	0.01	0.03	DuPont 14309
Greece, 2004 Chalkidiki (Galia)	SL 200	0.47-0.48	0.06	2	10	0.02	< 0.01	0.01	DuPont 14309
Greece, 2004 Chalkidiki (Galia)	SL 200	0.46	0.06	1	14	0.01	< 0.01	< 0.01	DuPont 14309
Greece, 2004 Chalkidiki (Galia)	SL 200	0.46	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 14309
Greece, 2004 Mesimeri (Ananas)	SL 200	0.48-0.45	0.06	2	0	0.04	< 0.01	0.03	DuPont 14309

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)			Reference & Comments
	Form	kg ai/ha	kg ai/hL	no		Peel	Pulp	Total (calc)	
Greece, 2004 Mesimeri (Ananas)	SL 200	0.44-0.45	0.06	2	1	0.16	< 0.01	0.09	DuPont 14309
Greece, 2004 Mesimeri (Ananas)	SL 200	0.44-0.46	0.06	2	3	0.08	0.03	0.06	DuPont 14309
Greece, 2004 Mesimeri (Ananas)	SL 200	0.45	0.06	2	7	0.025	< 0.01	0.016	DuPont 14309
Greece, 2004 Mesimeri (Ananas)	SL 200	0.45-0.46	0.06	2	10	< 0.01	< 0.01	< 0.01	DuPont 14309
Greece, 2004 Mesimeri (Ananas)	SL 200	0.46-0.44	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 14309
Greece, 2004 Mesimeri (Ananas)	SL 200	0.48	0.06	1	14	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Alcala de Guadaira (Nicolas)	SL 200	0.45-0.46	0.06	2	0	0.07	< 0.01	0.03	DuPont 14309
Spain, 2004 Alcala de Guadaira (Nicolas)	SL 200	0.45-0.46	0.06	2	1	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Alcala de Guadaira (Nicolas)	SL 200	0.46-0.44	0.06	2	3	0.02	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Alcala de Guadaira (Nicolas)	SL 200	0.46	0.06	2	7	0.04	0.01	0.018	DuPont 14309
Spain, 2004 Alcala de Guadaira (Nicolas)	SL 200	0.45	0.06	2	10	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Alcala de Guadaira (Nicolas)	SL 200	0.45-0.46	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Alcala de Guadaira (Nicolas)	SL 200	0.45	0.06	1	15	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Hermanas (Sancho)	SL 200	0.46-0.45	0.06	2	0	0.06	< 0.01	0.03	DuPont 14309
Spain, 2004 Hermanas (Sancho)	SL 200	0.45	0.06	2	1	0.13	< 0.01	0.05	DuPont 14309
Spain, 2004 Hermanas (Sancho)	SL 200	0.46-0.45	0.06	2	3	0.03	< 0.01	0.01	DuPont 14309

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)			Reference & Comments
	Form	kg ai/ha	kg ai/hL	no		Peel	Pulp	Total (calc)	
Spain, 2004 Hermanas (Sancho)	SL 200	0.45-0.46	0.06	2	7	0.02	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Hermanas (Sancho)	SL 200	0.45-0.46	0.06	2	10	0.02	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Hermanas (Sancho)	SL 200	0.45	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Hermanas (Sancho)	SL 200	0.46	0.06	1	15	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Villalba del Alcor (Nicolas)	SL 200	0.45	0.06	2	0	0.02	< 0.01	0.01	DuPont 14309
Spain, 2004 Villalba del Alcor (Nicolas)	SL 200	0.46-0.45	0.06	2	1	0.02	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Villalba del Alcor (Nicolas)	SL 200	0.46	0.06	2	3	0.02	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Villalba del Alcor (Nicolas)	SL 200	0.46-0.45	0.06	2	7	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Villalba del Alcor (Nicolas)	SL 200	0.45-0.46	0.06	2	10	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Villalba del Alcor (Nicolas)	SL 200	0.46	0.06	2	14	< 0.01	< 0.01	< 0.01	DuPont 14309
Spain, 2004 Villalba del Alcor (Nicolas)	SL 200	0.45	0.06	1	15	< 0.01	< 0.01	< 0.01	DuPont 14309

Total fruit residues calculated from peel and pulp measurements (excluding seeds), with a value of 0.005 mg/kg used for residues reported as < 0.01 mg/kg.

Indoor melons

The Meeting received new information on indoor melons from trials in France, Greece, Italy and Spain, where two applications of methomyl (SL formulation) were made 13–14 days apart to maturing melons at a nominal rate of 0.45 kg ai/ha (0.045 kg ai/hL). Plot sizes ranged in area from 36–75 m^2 and sprays were applied using knapsack sprayers or gas-powered plot sprayers. Samples of 1–2 kg peel and pulp (without seeds) were taken from at least 12 plants, frozen within 10 h and analysed by LC-MS/MS using Method 0352 within 5 months. The limit of quantification of the method was 0.01 mg/kg and the average recovery rates were 86±15% (n=14) in peel and 80±20% (n=16) in pulp at fortification levels of 0.01–0.5 mg/kg.

Table 10 Residue data summary of supervised trials on indoor melons in France, Greece, Italy and Spain involving foliar applications of methomyl

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)			Reference & Comments
	Form	kg ai/ha	kg ai/hL	no		Peel	Pulp	Total (calc)	
France, 2005 Pernes les Fontaines (Anasta) (plastic tunnel)	SL 200	0.45-0.46	0.045	2	-0 0 3 7 10 14 21	0.07 0.25 0.14 0.04 < 0.01 0.03 0.01	< 0.01 < 0.01 0.01 < 0.01 0.01 0.01 0.01	0.03 0.11 0.08 0.02 < 0.01 0.02 0.01	DuPont 16977
France, 2005 Rillieux la Pape (Diablo) (plastic tunnel)	SL 200	0.43-0.46	0.06	2	-0 0 3 7 10 14 21	< 0.01 0.10 0.04 0.03 0.02 0.01 < 0.01	< 0.01 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 0.06 0.03 0.016 0.01 < 0.01 < 0.01	DuPont 16977
Greece, 2005 Profitis (Gallia) (greenhouse)	SL 200	0.45	0.045	2	-0 0 3 7 10 14 21	< 0.01 0.12 0.09 0.11 0.05 < 0.01 0.02	< 0.01 < 0.01 0.01 0.02 0.01 < 0.01 < 0.01	< 0.01 0.06 0.05 0.066 0.03 < 0.01 0.01	DuPont 16977
Spain, 2005 Sanlucar de Barrameda (Gallia) (greenhouse)	SL 200	0.45	0.045	2	-0 0 3 7 10 14 21	0.04 (c=0.02) 0.16 0.38 0.22 0.17 (c=0.02) 0.14 0.07	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 (c=0.006) < 0.01 < 0.01	0.02 0.09 0.14 0.06 0.05 0.06 0.03	DuPont 16977
Spain, 2005 Los Palacios y Villafranca (Sancho) (greenhouse)	SL 200	0.45	0.045	2	-0 0 3 7 10 14 21	< 0.01 0.04 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 0.02 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	DuPont 16977
Spain, 2005 Barbate (Nicolas) (greenhouse)	SL 200	0.46-0.45	0.045	2	-0 0 3 7 10 14 20	< 0.01 0.1 0.03 0.03 0.034 0.03 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 0.04 0.01 0.01 0.015 0.01 < 0.01	DuPont 16977
Spain, 2005 Conil (Galia) (greenhouse)	SL 200	0.45	0.045	2	-0 0 3 7 10 14 20	< 0.01 0.1 0.06 0.07 0.05 0.02 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 0.03 0.03 0.025 0.02 < 0.01 < 0.01	DuPont 16977

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)			Reference & Comments
	Form	kg ai/ha	kg ai/hL	no		Peel	Pulp	Total (calc)	
Italy, 2005 Casteldinone (Macigno) (plastic tunnel)	SL 200	0.44	0.045	2	-0 0 3 7 10 14 21	< 0.01 0.4 0.26 0.17 0.07 (c=0.028) 0.02 < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	< 0.01 0.16 0.1 0.064 0.03 0.01 < 0.01	DuPont 16977

Total fruit residues calculated from peel and pulp measurements (excluding seeds), with a value of 0.005 mg/kg used for residues reported as < 0.01 mg/kg.

Tomatoes

Indoor tomatoes

The Meeting received new information on indoor tomatoes from trials in France, Greece, Italy and Spain. In these new trials, two applications of methomyl (SL formulation) were applied 13–15 days apart, at a nominal rate of 0.45 kg ai/ha (0.05 kg ai/hL). Plot sizes ranged from 20–42 m^2 with sprays applied using either knapsack sprayers or motorised plot sprayers. Samples of 12 fruit (or a minimum 2 kg) were frozen within 10 h and stored for up to 5 months before LC-MS/MS analysis using Method 0352. The limit of quantification of the method was 0.01 mg/kg and the average recovery rate was 81±16% (*n*=112) at fortification levels of 0.01–0.1 mg/kg.

Table 11 Residue data summary of supervised trials on indoor tomatoes in Belgium, France, Greece, Netherlands, Italy and Spain involving foliar applications of methomyl

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
France, 2005 Salon de Provence (Roma)	SL 200	0.46	0.05	2	-0 0 3 7 10 14	< 0.01 0.02 < 0.01 < 0.01 < 0.01 < 0.01	DuPont 16975
France, 2005 Ville sur Anjou (Kathy)	SL 200	0.47-0.46	0.05	2	-0 0 3 7 10 14	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	DuPont 16975
Greece, 2005 Thessalonika (Alma)	SL 200	0.47-0.46	0.05	2	-0 0 3 7 10 14	< 0.01 0.01 < 0.01 < 0.01 < 0.01 < 0.01	DuPont 16975
Spain, 2005 El Poal (Refta)	SL 200	0.45-0.44	0.05	2	-0 0 3 7 10 14	< 0.01 0.01 < 0.01 < 0.01 < 0.01 < 0.01	DuPont 16975

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
Italy, 2005 Mediglia (Nerina)	SL 200	0.46	0.05	2	-0 0 3 7 10 14	< 0.01 0.08 < 0.01 < 0.01 < 0.01 < 0.01	DuPont 16975

Lettuce

Outdoor lettuce

The Meeting received new information on outdoor lettuce (both head lettuce and open-bunched lettuce) from trials in France and Spain In these reverse decline trials, methomyl (SL formulation) was applied twice, 12–16 days apart, at a nominal rate of 0.45 kg ai/ha (0.1 kg ai/100 litres), with the last application being made from 0–28 days before commercial harvest. Plot sizes ranged from 18–24 m^2 with sprays applied by knapsack and lance or by mini-boom. Samples of mature lettuce heads or bunches (at least 12 units or 1 kg) were frozen within 12 h of sampling and analysed by LC-MS/MS (Method 0352) within 8 months. The limit of quantification was 0.01 mg/kg and the average recovery was 86±12% (*n*=24) at fortification levels of 0.01–5.0 mg/kg.

Table 12 Residue data summary of supervised trials on outdoor lettuce in France and Spain involving foliar applications of methomyl. (Reverse decline studies)

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: Spain	SL	0.5	0.03-0.05	2	14		
France (S), 2003 Lucenay (Estelle) Closed head	SL 200	0.47-0.46	0.1	2	0	2.8	DuPont 12674
France (S), 2003 Lucenay (Estelle) Closed head	WP 250	0.47	0.1	2	7	0.11	DuPont 12674
France (S), 2003 Lucenay (Estelle) Closed head	SL 200	0.47	0.1	2	7	0.11	DuPont 12674
France (S), 2003 Lucenay (Estelle) Closed head	SL 200	0.45-0.46	0.1	2	10	0.08	DuPont 12674
France (S), 2003 Lucenay (Estelle) Closed head	SL 200	0.47	0.1	1	14	0.02	DuPont 12674

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: Spain	SL	0.5	0.03-0.05	2	14		
France (S), 2003 Lucenay (Estelle) Closed head	SL 200	0.47	0.1	2	14	0.07	DuPont 12674
France (S), 2003 Lucenay (Estelle) Closed head	SL 200	0.46-0.48	0.1	2	21	< 0.01	DuPont 12674
France (S), 2003 Lucenay (Estelle) Closed head	SL 200	0.49-0.45	0.1	2	28	< 0.01	DuPont 12674
France (S), 2003 St Just-St Rambert (Pulman) Closed-head	SL 200	0.46-0.45	0.1	2	0	1.1	DuPont 12674
France (S), 2003 St Just-St Rambert (Pulman) Closed-head	WP 250	0.45-0.44	0.1	2	7	0.08	DuPont 12674
France (S), 2003 St Just-St Rambert (Pulman) Closed-head	SL 200	0.47-0.45	0.1	2	7	0.04	DuPont 12674
France (S), 2003 St Just-St Rambert (Pulman) Closed-head	SL 200	0.46-0.45	0.1	2	10	< 0.01	DuPont 12674
France (S), 2003 St Just-St Rambert (Pulman) Closed-head	SL 200	0.46	0.1	1	13	< 0.01	DuPont 12674
France (S), 2003 St Just-St Rambert (Pulman) Closed-head	SL 200	0.46-0.44	0.1	2	14	0.03	DuPont 12674
France (S), 2003 St Just-St Rambert (Pulman) Closed-head	SL 200	0.45-0.47	0.1	2	21	< 0.01	DuPont 12674

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: Spain	SL	0.5	0.03-0.05	2	14		
France (S), 2003 St Just-St Rambert (Pulman) Closed-head	SL 200	0.47-0.44	0.1	2	28	< 0.01	DuPont 12674
Spain, 2004 Palafolls (Trocadero) Closed-head	SL 200	0.48-0.44	0.1	2	0	0.91	DuPont 14310 (Autumn)
Spain, 2004 Palafolls (Trocadero) Closed-head	SL 200	0.46-0.49	0.1	2	7	0.16	DuPont 14310 (Autumn)
Spain, 2004 Palafolls (Trocadero) Closed-head	WP 250	0.47-0.48	0.1	2	7	0.1	DuPont 14310 (Autumn)
Spain, 2004 Palafolls (Trocadero) Closed-head	SL 200	0.45-0.46	0.1	2	10	0.02	DuPont 14310 (Autumn)
Spain, 2004 Palafolls (Trocadero) Closed-head	SL 200	0.48	0.1	1	14	0.01	DuPont 14310 (Autumn)
Spain, 2004 Palafolls (Trocadero) Closed-head	SL 200	0.45-0.47	0.1	2	14	0.04	DuPont 14310 (Autumn)
Spain, 2004 Palafolls (Trocadero) Closed-head	SL 200	0.46-0.44	0.1	2	21	< 0.01	DuPont 14310 (Autumn)
Spain, 2004 Palafolls (Trocadero) Closed-head	SL 200	0.47-0.45	0.1	2	28	< 0.01	DuPont 14310 (Autumn)
France, 2004 Lucenay (Estelle) Closed-head	SL 200	0.46-0.47	0.1	2	0	1.3	DuPont 14310 (Spring)

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: Spain	SL	0.5	0.03-0.05	2	14		
France, 2004 Lucenay (Estelle) Closed-head	WP 250	0.46	0.1	2	7	0.18	DuPont 14310 (Spring)
France, 2004 Lucenay (Estelle) Closed-head	SL 200	0.47-0.45	0.1	2	7	0.03	DuPont 14310 (Spring)
France, 2004 Lucenay (Estelle) Closed-head	SL 200	0.46	0.1	2	10	0.01	DuPont 14310 (Spring)
France, 2004 Lucenay (Estelle) Closed-head	SL 200	0.46	0.1	2	14	< 0.01	DuPont 14310 (Spring)
France, 2004 Lucenay (Estelle) Closed-head	SL 200	0.46	0.1	1	15	< 0.01	DuPont 14310 (Spring)
France, 2004 Lucenay (Estelle) Closed-head	SL 200	0.47	0.1	2	20	< 0.01	DuPont 14310 (Spring)
France, 2004 Lucenay (Estelle) Closed-head	SL 200	0.45	0.1	2	28	< 0.01	DuPont 14310 (Spring)
Spain, 2003 Palafolls (Maravilla) Open-head	SL 200	0.44-0.47	0.1	2	0	0.16	DuPont 12674
Spain, 2003 Palafolls (Maravilla) Open-head	SL 200	0.48-0.44	0.1	2	7	0.02	DuPont 12674
Spain, 2003 Palafolls (Maravilla) Open-head	SL 200	0.47-0.44	0.1	2	10	0.01	DuPont 12674

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: Spain	SL	0.5	0.03-0.05	2	14		
Spain, 2003 Palafolls (Maravilla) Open-head	SL 200	0.46-0.47	0.1	2	14	< 0.01	DuPont 12674
Spain, 2003 Palafolls (Maravilla) Open-head	SL 200	0.44	0.1	1	15	< 0.01	DuPont 12674
Spain, 2003 Palafolls (Maravilla) Open-head	SL 200	0.45-0.48	0.1	2	21	< 0.01	DuPont 12674
Spain, 2003 Palafolls (Maravilla) Open-head	SL 200	0.43-0.46	0.1	2	28	< 0.01	DuPont 12674
Spain, 2003 Palafolls (Maravilla) Open-head	WP 250	0.49-0.44	0.1	2	7	0.03	DuPont 12674
Spain, 2004 Palafolls (Romana) Open-head	WP 250	0.47-0.46	0.1	2	7	0.06	DuPont 14310 (Spring)
France, 2004 Lucenay (Batavia) Open-head	SL 200	0.46-0.45	0.1	2	0	5.1	DuPont 14310 (Autumn)
France, 2004 Lucenay (Batavia) Open-head	SL 200	0.45	0.1	2	8	0.09	DuPont 14310 (Autumn)
France, 2004 Lucenay (Batavia) Open-head	WP 250	0.46-0.44	0.1	2	8	0.19	DuPont 14310 (Autumn)
France, 2004 Lucenay (Batavia) Open-head	SL 200	0.47-0.45	0.1	2	11	0.03	DuPont 14310 (Autumn)

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: Spain	SL	0.5	0.03-0.05	2	14		
France, 2004 Lucenay (Batavia) Open-head	SL 200	0.46	0.1	1	14	< 0.01	DuPont 14310 (Autumn)
France, 2004 Lucenay (Batavia) Open-head	SL 200	0.44-0.45	0.1	2	15	< 0.01	DuPont 14310 (Autumn)
France, 2004 Lucenay (Batavia) Open-head	SL 200	0.45-0.44	0.1	2	22	< 0.01	DuPont 14310 (Autumn)
France, 2004 Lucenay (Batavia) Open-head	SL 200	0.44-0.45	0.1	2	29	< 0.01	DuPont 14310 (Autumn)
Spain, 2004 Utrera (FilipV) Open-head	SL 200	0.46-0.45	0.1	2	0	2.1	DuPont 14310 (Autumn)
Spain, 2004 Utrera (FilipV) Open-head	SL 200	0.45-0.46	0.1	2	7	0.26	DuPont 14310 (Autumn)
Spain, 2004 Utrera (FilipV) Open-head	WP 250	0.46	0.1	2	7	0.13	DuPont 14310 (Autumn)
Spain, 2004 Utrera (FilipV) Open-head	SL 200	0.44-0.45	0.1	2	10	< 0.01	DuPont 14310 (Autumn)
Spain, 2004 Utrera (FilipV) Open-head	SL 200	0.46	0.1	1	14	0.02	DuPont 14310 (Autumn)
Spain, 2004 Utrera (FilipV) Open-head	SL 200	0.45	0.1	2	14	0.025	DuPont 14310 (Autumn)

Country, year (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	kg ai/ha	kg ai/hL	no			
GAP: Spain	SL	0.5	0.03-0.05	2	14		
Spain, 2004 Utrera (FilipV) Open-head	SL 200	0.45	0.1	2	19	0.034	DuPont 14310 (Autumn)
Spain, 2004 Utrera (FilipV) Open-head	SL 200	0.49-0.45	0.1	2	28	< 0.01	DuPont 14310 (Autumn)
Spain, 2004 Palafolls (Romana) Open-head	SL 200	0.47-0.46	0.1	2	0	2.8	DuPont 14310 (Spring)
Spain, 2004 Palafolls (Romana) Open-head	SL 200	0.48-0.47	0.1	2	7	0.1	DuPont 14310 (Spring)
Spain, 2004 Palafolls (Romana) Open-head	SL 200	0.46-0.48	0.1	2	10	0.01	DuPont 14310 (Spring)
Spain, 2004 Palafolls (Romana) Open-head	SL 200	0.47	0.1	1	14	0.02	DuPont 14310 (Spring)
Spain, 2004 Palafolls (Romana) Open-head	SL 200	0.48-0.47	0.1	2	15	< 0.01	DuPont 14310 (Spring)
Spain, 2004 Palafolls (Romana) Open-head	SL 200	0.45-0.47	0.1	2	21	< 0.01	DuPont 14310 (Spring)
Spain, 2004 Palafolls (Romana) Open-head	SL 200	0.46-0.48	0.1	2	28	< 0.01	DuPont 14310 (Spring)

FATE OF RESIDUES IN STORAGE AND PROCESSING

The Meeting received information on the fate of methomyl residues during the processing of grapes.

Grapes

In four grape processing studies in France, reported by Nathan, Dubey, Steiner and Mattou, 2001 [Ref: DuPont 4452], methomyl (200 g ai/litre SL formulation) was applied twice (14 days apart) to unreplicated plots of red (2) and white (2) wine grape varieties twice, at 14 day intervals, at a rate of 0.45 kg ai/ha in 280-600 litres water/ha, with the last application being 14 days before harvest.

From each trial, at least 80 kg of grapes were processed into wine according to commercial wine and juice making practices in France within 1-2 days of harvest. Samples of wine and other processed grape fractions were taken for analysis, stored frozen for up to 11 months before analysis using the Netherlands MRM-2 method for N-methylcarbamates (acetone then dichloromethane/petroleum ether extraction, SPE cartridge clean-up and HPLC detection. The Limit of Quantification of the method was 0.01 mg/kg and recovery rates ranged from 69-108% (RSD 88 ±12%, n=31) in the various substrates fortified with 0.01 and 0.1 mg/kg (0.2 mg/kg for wet pomace).

Table 13 Residues in grapes and processed grape fractions following foliar applications of methomyl (SL formulation) to grape vines in France [Ref: DuPont 4452]

Country, year (variety)	Application			PHI, (days)	Processed Fraction	Residues [a] (mg/kg)	Transfer factors
	kg ai/ha	kg ai/hL	no				
France, 2000 St Avit di Soulège (Semillon)	0.448 0.443	0.15 0.15	1+ 1	14	Grapes (white) Must Wet Pomace Oven-dried Pomace Must Deposit Young Wine [c] Wine Juice Wet Pomace (from juice) Raisins	0.1 [b] 0.079 0.12 0.023 0.01 0.1 0.084 0.012 0.053 < 0.01	 0.76 1.1 0.22 0.1 1 0.8 0.11 0.51 < 0.1
France, 2000 Beaumont du Ventoux (Grenache)	0.447 0.43	0.15 0.15	1+ 1	14	Grapes (red) Must Wet Pomace Oven-dried Pomace Young Wine [c] Lees Wine Juice Wet Pomace (from Juice) Raisins	0.097 0.13 0.04 0.071 0.033 < 0.01 0.012 0.015 0.16 < 0.01	 1.29 0.41 0.73 0.34 < 0.1 0.12 0.15 1.65 < 0.1
France, 2000 Loire-Atlantique (Muscadet)	0.442 0.471	0.11 0.09	1+ 1	14	Grapes (white) Must Wet Pomace Oven-dried Pomace Must Deposit Young Wine [c] Wine Juice Wet Pomace (from Juice) Raisins	0.038 0.046 0.073 0.028 0.06 0.046 0.042 0.01 0.045 < 0.01	 1.23 1.95 0.73 1.59 1.23 1.12 0.27 1.2 < 0.27

Country, year (variety)	Application			PHI, (days)	Processed Fraction	Residues [a] (mg/kg)	Transfer factors
	kg ai/ha	kg ai/hL	no				
France, 2000	0.450	0.076	1+		Grapes (red)	0.031	
Aube	0.442	0.076	1	14	Must	0.028	0.89
Pinot Noir)					Wet Pomace	0.014	0.44
					Oven-dried Pomace	< 0.01	< 0.32
					Young Wine [c]	0.011	0.35
					Lees	< 0.01	< 0.32
					Wine	< 0.01	< 0.32
					Juice	< 0.01	< 0.32
					Wet Pomace (from Juice)	0.022	0.71
					Raisins	< 0.01	0.32

[a] Average residue from duplicate determinations for individual samples and rounded to 2 significant figures

[b] Samples taken from a different plot in a parallel trial conducted at the same test site.

[c] Samples taken from young wine just after alcoholic fermentation and before natural clarification (white wine) or malolactic fermentation (red wine).

Table 14 Summary of grape processing factors for methomyl residues

Processed grape commodity	Calculated processing factors.	Mean or best estimate	
Red wine	0.8, 1.12	0.96	0.59
White wine	0.12, < 0.32	0.22	
Young red wine	0.34, 0.35	0.35	0.73
Young white wine	1, 1.23	1.1	
Juice	0.11, 0.15, < 0.23, 0.27		0.19
Pomace, wet (from red wine)	0.41, 0.44	0.43	0.97
Pomace, wet (from white wine)	1.1, 1.95	1.5	
Pomace, wet (from juice)	0.51, 0.71, 1.2, 1.65		1
Must	0.76, 0.89, 1.23, 1.29		1
Raisins	< 0.1, < 0.1, < 0.27, < 0.32		< 0.2

APPRAISAL

Methomyl was evaluated for residues and toxicology by the JMPR in 2001 under the periodic review programme, where MRLs for methomyl, arising from the use of either methomyl or thiodicarb on a number of commodities, were recommended.

The 2001 JMPR estimated short-term intakes that exceeded the ARfD of 0.02 mg/kg bw for apples, broccoli, Brussels sprouts, head cabbage, cauliflower, celery, water melon, grapes, kale, head lettuce, leaf lettuce, spinach, sweet corn and tomato.

At the 38th Session of the CCPR in 2006[6], the Committee requested JMPR to consider using alternative GAPs to recommend lower MRLs for apples, brassica vegetables, celery, fruiting vegetables, cucurbits, grapes, leafy vegetables and pears.

Information on current GAPs and new supervised trials data were submitted to the 2008 JMPR for cucurbits (cucumbers, courgettes and melons), grapes, lettuce and pears, and additional residue trials information was also provided for tomatoes. The Meeting also noted that the future of methomyl uses in EC Member States was uncertain.

No new residue data or information was available for brassica vegetables and celery and the Meeting agreed that the information evaluated by the 2001 JMPR was not sufficient to support the evaluation of an alternative GAP for these commodities.

[6] Codex Alimentarius Commission. *Report of the 38th Session of the Codex Committee on Pesticides Residues, 3–8 April 2006, Fortaleza, Brazil,* (ALINORM 06/29/24)

Results of supervised residue trials on crops

Apples

Based on US GAP and residue data for thiodicarb and methomyl, the 2001 JMPR estimated a maximum residue level of 2 mg/kg, an STMR of 0.41 mg/kg and an HR (from the use of thiodicarb) of 1.6 mg/kg for methomyl in apples but indicated that the estimated short-term intakes for apples were 770% (children) and 260% (general population) of the ARfD (0.02 mg/kg bw).

The Meeting noted that the US GAP for thiodicarb, on which the 2001 JMPR had based its recommendations was no longer supported and that thiodicarb authorisations in EC Member States were also no longer supported.

Residue trials with methomyl, evaluated by the 2001 JMPR from trials in Europe matching the current GAP of Spain (0.05 kg ai/hL, PHI 7 days) and France (0.05–0.75 kg ai/hL) reported residues of 0.03, 0.05, 0.06, 0.06, 0.08, 0.08, 0.09, 0.09, 0.09, 0.1, 0.11, 0.13, 0.15, 0.16, and 0.17 mg/kg.

The Meeting estimated a maximum residue level of 0.3 mg/kg for methomyl in apples and estimated an STMR of 0.09 mg/kg and an HR of 0.17 mg/kg. The Meeting withdrew its previous recommendation of 2 mg/kg.

Pears

Based on GAP for methomyl in France and Spain and using methomyl residue data on pears and apples from Europe, the 2001 JMPR estimated a maximum residue level of 0.3 mg/kg, an STMR of 0.09 mg/kg and an HR of 0.18 mg/kg for methomyl in pears and indicated that the estimated short-term intakes for pears were 50% (children) and 30% (general population) of the ARfD (0.02 mg/kg bw).

The Meeting noted that a revised variability factor used in the IESTI calculations had been adopted since 2001 and based on a re-calculation of the short-term intake estimation, the Meeting estimated revised short-term intakes of 40% (children) and 20% (general population) of the ARfD.

The Meeting agreed that an alternate GAP evaluation was therefore not required for methomyl on pears and confirmed the maximum residue level of 0.3 mg/kg for pears, as recommended by the 2001 JMPR.

Grapes

Based on GAPs and residue data for methomyl and thiodicarb on grapes in USA and France, the 2001 JMPR estimated a maximum residue level of 7 mg/kg, an STMR of 0.86 mg/kg and an HR (from the use of methomyl) of 5.2 mg/kg for methomyl in grapes but indicated that the estimated short-term intakes for grapes were 1600% (children) and 470% (general population) of the ARfD (0.02 mg/kg bw).

The results of new methomyl residue trials in France, Greece, Italy and Spain were made available to the Meeting. The Meeting noted that thiodicarb authorisations in the EC were also no longer supported and that the use of thiodicarb on grapes was also no longer supported in USA.

GAP for methomyl in France is 0.5 kg ai/ha (max), PHI 7 days for wine grapes and 28 days for table grapes. Residues in trials matching the GAP for wine grapes in France (at a PHI of 7 days) in trials evaluated by the 2001 JMPR and in the more recent trials were: 0.01, 0.04, 0.05, 0.07, 0.08, 0.09, 0.09, 0.09, 0.1, 0.14 and 0.2 mg/kg (n = 11).

In trials matching the GAP for table grapes in France (at a PHI of 28 days), residues were: < 0.01, < 0.01, < 0.01, < 0.01, < 0.01, < 0.01, 0.02, 0.02, 0.03, 0.05 and 0.08 mg/kg (n = 11).

The Meeting agreed it was appropriate to use the data supporting the GAP for table grapes to determine an STMR and HR for dietary intake estimation and the data supporting the GAP for wine grapes to determine an STMR-P for wine and to estimate a maximum residue level.

The Meeting estimated a maximum residue level of 0.3 mg/kg for methomyl in grapes based on the results matching the wine grape GAP and estimated an STMR of 0.01 mg/kg and an HR of 0.08 mg/kg based on the results matching the table grape GAP.

Fruiting vegetables, Cucurbits

Based on GAPs in France and Netherlands and using residue data for methomyl on cucumbers, summer squash and melons in Europe and based on US GAP and residue data on watermelons, the 2001 JMPR estimated a maximum residue level of 0.1 mg/kg, an STMR of 0.02 mg/kg and an HR of 0.07 mg/kg for methomyl in cucurbit vegetables but indicated that the estimated short-term intake for watermelon was 140% of the ARfD (0.02 mg/kg bw) for children.

The Meeting noted that a revised variability factor used in the IESTI calculations had been adopted since 2001 and based on a re-calculation of the short-term intake estimation, the Meeting decided that the recommendations from the 2001 JMPR did not result in any dietary intake concern with the highest short-term intake being for watermelons, at 80% of the ARfD for children.

The Meeting agreed that an alternate GAP evaluation was therefore not required for methomyl on cucurbit vegetables and confirmed the maximum residue level of 0.1 mg/kg for cucurbit vegetables, as recommended by the 2001 JMPR.

Tomato

Based on GAPs and residue data for thiodicarb on protected tomatoes in Australia and Spain, the 2001 JMPR estimated a maximum residue level of 1 mg/kg, an STMR of 0.16 mg/kg and an HR (from the use of thiodicarb) of 0.73 mg/kg for methomyl in tomatoes but estimated that the short-term intake for tomatoes was 190% of the ARfD (0.02 mg/kg bw) for children.

The Meeting noted that a revised variability factor used in the IESTI calculations had been adopted since 2001 and based on a re-calculation of the short-term intake estimation; the Meeting decided that the recommendations from the 2001 JMPR did not result in any dietary intake concern, with the highest short-term intake being 100% of the ARfD for children.

The Meeting agreed that an alternate GAP evaluation was therefore not required for methomyl on tomato and confirmed the maximum residue level of 1 mg/kg for tomato, as recommended by the 2001 JMPR.

Leafy vegetables

Based on GAPs for methomyl and/or thiodicarb on lettuce, spinach and collards in USA and on residue data from USA on head lettuce (thiodicarb), leaf lettuce (thiodicarb), collards (thiodicarb) and spinach (methomyl and thiodicarb), the 2001 JMPR estimated a maximum residue level of 30 mg/kg, an STMR of 1.4 mg/kg and an HR (from the use of thiodicarb) of 25 mg/kg for methomyl in leafy vegetables but estimated that the respective short-term intakes for head lettuce, leaf lettuce and spinach were 3000%, 3800% and 7200% of the ARfD (0.02 mg/kg bw) for children and 2000%, 1500% and 2800% of the ARfD for the general population.

The Meeting noted that no additional information had been received to support consideration of an alternative GAP for thiodicarb on leafy vegetables and agreed to evaluate an alternative GAP for methomyl alone.

Lettuce

The Meeting received results of new residue trials with methomyl on lettuce in France, Italy. In Spain, GAP for lettuce is 0. 5 kg ai/ha, maximum 2 applications/season (at least 14 days apart), PHI 14 days and in trials in France and Spain matching this GAP, residues were: < 0.01, < 0.01, < 0.01 < 0.01, 0.03, 0.03, 0.04 and 0.07 mg/kg.

Residues following treatments matching the GAP of Spain but involving a single application were: < 0.01, < 0.01, < 0.01, < 0.01, 0.01, 0.02, 0.02 and 0.02 mg/kg.

The Meeting agreed that the residues from these two data sets could be combined because the residues from the initial application, at least 28 days before harvest would not contribute significant to the final residue. The combined data set was: < 0.01 (8), 0.01, 0.02, 0.02, 0.02, 0.025, 0.03, 0.04 and 0.07 mg/kg.

The Meeting estimated a maximum residue level of 0.2 mg/kg for methomyl in lettuce, head and lettuce, leaf and estimated an STMR of 0.01 mg/kg and an HR of 0.07 mg/kg for lettuce.

The Meeting also agreed to withdraw the previous recommendation for a maximum residue level of 30 mg/kg for methomyl on leafy vegetables.

Fate of residues during processing

The Meeting estimated STMR-Ps for apples juice and tomato paste using the methomyl processing factors reported for these commodities by the 2001 JMPR.

Using the processing factor of 0.29 for apple juice and the STMR of 0.09 mg/kg proposed for apples, the Meeting estimated an STMR-P of 0.026 mg/kg for apple juice.

Using the processing factor of 0.053 for tomato paste and the STMR of 0.16 mg/kg confirmed for tomatoes, the Meeting estimated an STMR-P of 0.0085 mg/kg for tomato paste.

The Meeting received information on the fate of incurred residues of methomyl during the processing of grapes. Based on the results of four processing studies conducted in France, processing factors were calculated for a range of processing fractions including red wine (0.96), white wine (0.22), grape juice (0.19), raisins (< 0.2) and grape pomace (1).

Based on the STMR value of 0.09 mg/kg for wine grapes (estimated from the results matching the GAP for wine grapes) and the median processing factors of 0.59 (red and white wine combined), 0.22 for grape juice, < 0.2 for raisins and 1 for wet pomace, the STMR-Ps for methomyl residues were 0.053 mg/kg in wine, 0.0198 mg/kg in grape juice, 0.018 mg/kg in dried grapes and 0.09 mg/kg in grape pomace, wet.

Based on the HR of 0.2 mg/kg estimated for table grapes (estimated from the results that matched the table grape GAP) and the processing factor of 0.2 for raisins, the Meeting estimated an HR-P of 0.04 mg/kg for methomyl in dried grapes.

RECOMMENDATIONS

As a result of an evaluation of alternative GAPs to recommend lower MRLs for apples; brassica vegetables; celery; fruiting vegetables, cucurbits; grapes; leafy vegetables and pears, the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue levels and for IEDI assessment.

CCN	Commodity Name	MRL (mg/kg) New	MRL (mg/kg) Previous	STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
FP 0226	Apple	0.3	2 [b]	0.09	0.17
	Brassica (cole or cabbage) vegetables, Head cabbages, Flowerhead brassicas	W	7 [c]		
	Celery	W	3 [a]		
VC 0045	Fruiting vegetables, Cucurbits	0.1 [d]	0.1 [a]	0.02	0.07
FB 0269	Grapes	0.3 [a]	7 [a]	0.01 0.09 (for processing)	0.08 0.2 (for processing)
VL 0482	Lettuce, Head	0.2 [a]		0.01	0.07
VL 0483	Lettuce, Leaf	0.2 [a]		0.01	0.07
VL 0053	Leafy vegetables	W	30 [c]		

CCN	Commodity Name	MRL (mg/kg) New	MRL (mg/kg) Previous	STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
FP 0230	Pear	0.3 [d]	0.3 [a]	0.09	0.18
VO 0448	Tomato	1 [d]	1 [b]	0.16	0.73
	Apple juice			0.026	
	Tomato paste			0.0085	
	Wine			0.053	
	Grape juice			0.0198	
	Dried grapes			0.018	0.04
	Grape pomace (wet)			0.09	

[a] Resulting from data on supervised trials with methomyl

[b] Resulting from data on supervised trials with thiodicarb

[c] Resulting from data on supervised trials with methomyl plus thiodicarb

[d] Previous MRL confirmed

DIETARY RISK ASSESSMENT

Long-term intake

This evaluation of methomyl has resulted in revised recommendations for MRLs and STMRs for raw and processed commodities based on the evaluation of alternative GAPs leading to lower maximum residue levels. Consumption data were available for 40 food commodities and were used in the dietary intake calculation. The results are shown in Annex 3 of the 2008 Report of the JMPR.

The International Estimated Daily Intakes in the 13 GEMS/Food cluster diets, based on the estimated STMRs were in the range 0–3% of the maximum ADI of 0.02 mg/kg bw (Annex 3). The Meeting concluded that the long-term intake of residues of thiodicarb and methomyl from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The International Estimated Short-term Intake (IESTI) for methomyl was calculated for the food commodities (and their processing fractions) for which maximum residue levels and HRs were estimated and for which consumption data were available. The results are shown in Annex 4 of the 2008 Report of the JMPR.

The IESTI varied from 0–50% of the ARfD (0.02 mg/kg bw) for the general population. The IESTI varied from 0–100% of the ARfD for children 6 years and below. The Meeting concluded that the short-term intake of residues of methomyl from used considered by the Meeting was unlikely to present a public health concern.

REFERENCES

Code	Author	Year	Title, Institute, Report reference
DuPont 12673	Foster, A, Sherratt, R and Cairns, S.	2004	Decline of methomyl residues in melons (inedible - peel cucurbits) grown on open field following applications of DPX-X1179 20SL - Europe; 2003. Inveresk Research International (IRI) Limited (Scotland). DuPont Report No. 12673. Unpublished.
DuPont 12674	Foster, A, Sherratt, R and Cairns, S.	2004	Decline of methomyl residues in lettuce (leaf vegetables) grown on open field following applications of DPX-X1179 20SL and DPX-X1179 25WP - Europe, 2003. Inveresk Research International (IRI) Limited (Scotland). DuPont Report No. 12674. Unpublished.

Code	Author	Year	Title, Institute, Report reference
DuPont 12677	Foster, A, Sherratt, R and Cairns, S.	2004	Decline of Methomyl Residues in Wine Grapes (Berries and Small Fruits) Following Applications of DPX-X1179 20SL – Europe, 2003. Inveresk Research, Tranent, EH33 2NE, Scotland. DuPont Report No. 12677. Unpublished.
DuPont 14003	Anderson, I, Kakkonen, J and Cairns, S.	2006	Magnitude and Decline of Methomyl Residues in Table and Wine Grapes (Berries and Small Fruit) Following Foliar Applications of DPX-X1179 20SL – Europe, 2005. Charles River Laboratories, Tranent, Edinburgh, EH33 2NE, UK. DuPont Report No. 14003
DuPont 14309	Old, J, Gibson, G, Anderson, I, Kakkonen, J and Cairns, S.	2005	Decline of methomyl residues in melons (inedible-peel cucurbits) grown on open field following applications of DPX-X1179 20SL - northern and southern Europe, season 2004. Inveresk Research International (IRI) Limited (Scotland). DuPont Report No. 14309. Unpublished.
DuPont 14310	Anderson, I, Kakkonen, J and Cairns, S.	2005	Decline of methomyl residues in lettuce (leaf vegetables) grown on open field following applications of DPX-X1179 20SL and DPX-X1179 25WP formulations - southern Europe, season 2004. Inveresk Research International (IRI) Limited (Scotland). DuPont Report No. 14310. Unpublished.
DuPont 16974	Anderson, I, Kakkonen, J and Cairns, S.	2006	Magnitude and decline of methomyl residues in protected cucumbers and courgettes (fruiting vegetables, edible-peel cucurbits) following foliar applications of DPX-X1179 20SL - Europe, 2005. Charles River Laboratories (UK). DuPont Report No. 16974. Unpublished.
DuPont 16975	Anderson, I, Davidson, J and Cairns, S.	2006	Magnitude and decline of methomyl residues in protected tomatoes (fruiting vegetables, solanacea) following foliar applications of DPX-X1179 20SL –Europe, 2005. Charles River Laboratories (UK). DuPont Report No. 16975. Unpublished.
DuPont 16977	Anderson, I, Davidson, J and Cairns, S.	2006	Magnitude and decline of methomyl residues in protected melons (fruiting vegetables, inedible-peel cucurbits) following foliar applications of DPX-X1179 20SL - Europe, 2005. Charles River Laboratories (UK). DuPont Report No. 16977. Unpublished.
DuPont 4452	Nathan, E, Dubey, L, Steiner, C and Mattou, H	2001	Residues of Methomyl in Processed Fractions of Wine Grapes (Berries and Small Fruit) Following Applications of Methomyl 20SL Formulation - Europe, Season 2000