FENAMIPHOS (85)

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EXPLANATION

Fenamiphos is a systemic organophosphorus nematicide which is registered for use in more than 60 countries. It was first reviewed by the JMPR in 1974 with subsequent residue evaluations in 1977, 1978 and 1980. The compound was evaluated for residues under the periodic review program in 1999 where the Meeting confirmed the existing residue definition, "sum of fenamiphos, its sulfoxide and sulfone, expressed as fenamiphos". The 1999 JMPR recommended 21 new maximum residue levels including six confirmed maximum residue levels while withdrawing nine previously recommended maximum residue levels.

The compound was evaluated toxicologically in 1974, 1985, 1987, 1997 (periodic review) and 2002. The 1997 JMPR allocated an ADI of 0-0.0008 mg/kg bw and concluded that the available data did not permit the establishment of an ARfD different from the ADI. The 2002 JMPR allocated a new ARfD of 0.003 mg/kg bw.

The International Estimated Daily Intakes for the five GEMS/Food regional diets calculated by the 1999 JMPR were in the range of 3–14% of the ADI. The International Estimated Short-term Intakes calculated by the 2002 JMPR for peppers, pineapple and tomato for the general population exceeded the ARfD while those for carrot, grapes, peppers, pineapple, tomato and watermelon exceeded the ARfD for children. The 2003 JMPR refined the IESTI using the variability factor of 3. The refined IESTIs calculated still exceeded the ARfD for tomato for general population and for grapes, sweet peppers, pineapple, tomato and watermelon for children.

The 33rd Session of the Codex Committee on Pesticide Residues (CCPR) in 2001 advanced all the proposed draft MRLs to Step 5 and decided not to advance these MRLs beyond Step 7 until intake concerns were resolved. The 34th and 35th CCPR returned all draft MRLs to Step 6 due to intake concerns. The 36th CCPR decided to return the MRLs for peppers, tomato and watermelon to Step 6 because of acute intake concerns and to advance the remaining MRLs to Step 8, which was subsequently adopted by the Codex Alimentarius Commission in 2004.

The 37th CCPR in 2005 noted that acute intake concerns existed for peppers, tomato and watermelon and decided to return these MRLs to Step 6. It also decided to delete the existing Codex MRLs for carrot, grapes and pineapple. Since this was the third time that the MRLs for peppers, tomato and watermelon were returned to Step 6 due to intake concerns, the CCPR decided to request JMPR to review GAPs that might result in lower MRL recommendations and add fenamiphos to the Priority List for review of GAPs for MRL proposal.

The 38th CCPR in 2006 decided to return the MRLs for peppers, tomato and watermelon to Step 6 noting the acute intake concerns identified by JMPR for these commodities, and agreed to request that JMPR consider using alternative GAPs to recommend lower MRLs for these commodities. The current Meeting received GAP information and new residue trial data on these commodities.

In addition, the Meeting received new trial data on eggplant and melons. Although there was no acute intake concern related to the MRL for melon, the previous data on melons was reviewed because it formed the basis of the existing MRL for watermelon. The data on eggplant was not reviewed because it is outside of the task entrusted to the current Meeting by the CCPR.

USE PATTERN

Fenamiphos may be applied pre-planting, at planting, in established crops, or in seedbeds and nurseries. For effective control, fenamiphos formulations should be incorporated into the soil in the

zones of root growth, as these are exposed to nematodes. Fenamiphos, fenamiphos sulfoxide and fenamiphos sulfone all exhibit nematicidal activity, thereby providing prolonged activity.

Due to acute intake concerns related to residues in some commodities, GAP in Europe has been modified since 2003 to minimize residues in these commodities.

GAP information for countries in Europe, Near East, Central and South America and Australia was provided for the formulations of capsule suspension, emulsifiable concentrate, fine granule and granule. Labels in Australia, Greece, Italy, the Netherlands and Spain were provided. The information relevant to the use for eggplant, melons, peppers, tomato and watermelon is summarized in Table 1.

Information on use for eggplant, melons, peppers, tomato and watermelon contained in the 1999 JMPR Evaluation was also extracted in Table 1.

Table 1. Registered uses of fenamiphos.

Crop	Country	Form.	Application				PHI, days	Notes
			Timing	Method	Rate, kg ai/ha	No		
Vegetables	Greece	10GR 400EC	Before planting	Incorporation In irrigation water or spraying	6-8 4 8 g/hole 4-8 6-8 4	1 1	 60	c d
Cucurbits	Australia	400EC	Pre-planting or pre-transplanting	Soil treatment	9.6	1	-	
Melons	Argentina	240CS		In irrigation water, dripping	3.2-4.0	1	90	
Melons	Belize	15GR		Spreading/incorp.	2.6-5.1	1	60	
Melons	Brazil	400EC	At sowing	In irrigation water	4	1	-	
Melons/ Watermelon	Colombia	10GR		Spreading	0.5-0.8 g ai/plant		90	†
Melons	Costa Rica	10GR 15GR		Spreading Spreading	0.2-2.5 2.6-5.1	1 1	60 60	
Melons/ Watermelon	Dominican Rep.	10GR 12GR 15GR		Spreading/incorp.	2.5-5.0 0.72-1.2 2.5-5.1	1	60	†
Melons	El Salvador	10GR 15GR		Spreading/incorp. Spreading/incorp.	2.5-5.0 2.6-5.1	1 1	60 60	
Watermelon	El Salvador	4GR		Spreading/incorp.	0.6-1.2	1	60	
Melons	Guatemala	10GR 10GR 15GR		Spreading/incorp. Spreading Spreading/incorp.	2.5-5.0 5 2.6-5.1	1 1 1	60 60 60	
Watermelon	Guatemala	4GR		Spreading/incorp.	0.6-1.2	1	60	
Melons	Honduras	10GR 15GR		Spreading/incorp. Spreading/incorp.	2.5-5.0 2.6-5.1	1 1	60 60	
Melons	Italy	5GR		Soil incorporation	9.6-12	1	60	
Melons/ watermelon	Italy	240CS	From transplanting to abt 10 d later	In irrigation water	10	1	60	
Melons	Jordan	10GR		Spreading/incorp.	6	1	90	
Melons	Lebanon	400EC		High-vol. spraying followed by irrigation	4-8 (1.3-2.7 kg ai/hl)	1	90	
Melons	Morocco	10GR		Spreading/incorp.		1	90	
Melons	Libya	10GR		Spreading		1	90	
Melons	Nicaragua	15GR		Spreading/incorp.	2.6-5.1	1	60	
Melons/ Watermelon	Panama	10GR 15GR		Spreading/incorp. Spreading/incorp.	2.5-5.0 2.6-5.1	1 1	60 60	
Melons	Spain	10GR	Pre-planting or pre-sowing	Spreading/incorp.	5-10	1	60	

Crop	Country	Form.	Application				PHI, days	Notes
			Timing	Method	Rate, kg ai/ha	No		
Melons/ Watermelon	Spain	400EC		Spraying	4.8-10	2	60	a
		240CS	Before start of flowering	Soil treatment	4.8-9.6	2	60	b
Peppers, Sweet	Argentina	240CS		In irrigation water, dripping	3.2-4.0	1	90	
Peppers	Dominican Rep.	12GR		Spreading/incorp.	0.72-1.2	1	60	†
Peppers, Sweet	El Salvador	4GR		Spreading/incorp.	0.6-1.2	1	60	
Peppers, Sweet	Guatemala	4GR		Spreading/incorp.	0.6-1.2	1	60	
Peppers	Honduras	12GR		Spreading/incorp.	0.72-1.2	1	60	†
Peppers, Sweet	Iraq	400EC		Spraying/incorp.	8	1	-	
Peppers, Sweet	Italy	240CS	From transplanting to abt 10 d later	In irrigation water	10	1	60	
Peppers, Sweet	Libya	10GR		Spreading		1	90	
Peppers	Spain	10GR	Pre-planting or pre-sowing	Spreading/incorp.	5-10	1	60	
		400EC		Spraying	4.8-10	2	60	a
		240CS	Before start of flowering	Soil treatment	4.8-9.6	2	60	b
Tomato	Algeria	10GR		Put down	3	1	90	
Tomato	Angola	10GR		Spreading/incorp.		1	-	
Tomato	Argentina	240CS		In irrigation water, dripping	3.2-4.0	1	90	
Tomato	Australia	400EC	Pre-planting or pre-transplanting	Spraying	9.6	1	-	
		10GR	Within 7 d of planting	Sprinkling	11	1	-	
		5GR	Within 7 d of planting	Sprinkling over soil	13	1	-	Not Tasmania
Tomato	Belize	15GR		Spreading/incorp.	2.6-5.1	1	60	
Tomato	Brazil	10GR	At planting	Incorporation	3-4	1	90	
Tomato	Chile	400EC	To planted or sown crop	Spraying/incorp.	4-10	1	45	
				Drench	2.8-4.8	1	45	
Tomato	Colombia	10GR	Before or after sowing	Spreading	15	1	60	
				Spreading	20	1	60	
			At transplanting	Spreading	8.2	1	60	
				Spreading	16	1	60	
Tomato	Costa Rica	10GR		Spreading/incorp.	2.5-5.0	1	60	
		15GR		Spreading/incorp.	2.1-2.6	1	60	
Tomato	Dominican Rep.	400EC		Drench	2.8-3.4	1	60	
Tomato	Ecuador	10GR		Spreading	2-4	1	60	
		15GR		Spreading	3-6	1	60	
Tomato	El Salvador	10GR		Spreading/incorp.	2.5-5.0	1	60	
		15GR		Spreading/incorp.	2.6-5.1	1	60	
		4GR		Spreading/incorp.	0.6-1.2	1	60	
Tomato	Guatemala	400EC		Spraying	2.8-3.4	1	60	
		10GR		Spreading	5	1	60	
		10GR		Spreading/incorp.	2.5-5.0	1	60	
		15GR		Spreading/incorp.	2.6-5.1	1	60	
		4GR		Spreading/incorp.	0.6-1.2	1	60	
Tomato	Honduras	10GR		Spreading/incorp.	2.5-5.0	1	60	
		15GR		Spreading/incorp.	2.6-5.1	1	60	
Tomato	Iraq	400EC		Spraying/incorp.	8	1	-	

Crop	Country	Form.	Application				PHI, days	Notes
			Timing	Method	Rate, kg ai/ha	No		
Tomato	Italy	5GR		Soil incorporation	9.6-12	1	60	
		240CS	From transplanting to abt 10 d later	In irrigation water	10	1	60	
Tomato	Jordan	10GR		Spreading/incorp.	6	1	90	
Tomato	Lebanon	400EC		High-vol. spraying followed by irrigation	4-8 (1.3-2.7 kg ai/hl)	1	90	
Tomato	Libya	10GR		Spreading	4.5	1	90 FI 60 GH	
Tomato	Malawi	400EC 10GR		Spraying/incorp. Spreading/incorp.		1 1	- -	
Tomato	Morocco	400EC 10GR		In irrigation water, dripping Spreading/incorp.	4.8 (0.08-0.12 kg ai/hl) 5	1 1	60 90	
Tomato	Mozambique	400EC 10GR		Spraying/incorp. Spreading/incorp.		1 1	42 -	
Tomato	Namibia	400EC 10GR		Spraying/incorp. Spreading/incorp.		1 1	- -	
Tomato	Nicaragua	15GR		Spreading/incorp.	2.5-5.0	1	60	
Tomato	Panama	10GR 15GR		Spreading/incorp. Spreading/incorp.	2.5-5.0 2.6-5.1	1 1	60 60	
Tomato	Paraguay	400EC		In irrigation water	3.2-4.0	1	-	
Tomato	Peru	10GR		Spreading	1.3-2.5	1	90	
Tomato	Portugal	10FG	1st, 1-2 w pre-planting 2nd, 30 d after 1st	Spreading	3.4 (1st) 3.0 (2nd)	2	-	
Tomato	Saudi Arabia	10GR 10GR		Spreading Spreading	10-15 1.5-3.0	1 1	- -	
Tomato	S. Africa	240CS 400EC 10GR	Pre-planting	Spraying Spraying/incorp. Spreading/incorp.	9.8	1 1 1	- - -	
Tomato	Spain	10GR 400EC 240CS	Pre-planting or pre-sowing Before start of flowering	Spreading/incorp. Spraying Soil treatment	5-10 4.8-10 4.8-9.6	1 2 2	60 60 60	 a b
Tomato	Tunisia	10GR		Spreading/incorp.	10	1	20	
Tomato	Turkey	400EC 10GR		Drench/incorp. Spreading in furrow	10 10	1 1	90 -	
Tomato	Uruguay	240CS		Drench	1.6-9.6	1-2	-	
Tomato	Zambia	400EC 10GR		Spraying/incorp. Spreading followed by irrigation		1 1	- -	
Tomato	Zimbabwe	400EC 10GR		Spraying/incorp. Spreading/incorp.		1 1	42 -	

† Included in the 1999 JMPR Evaluation.

a. Up to two applications per season can be given by dividing the dose in half if the duration of the crop makes it possible to observe the safety period. The first application should be before sowing or transplanting or immediately afterwards and the second during the rooting period of the crop before the start of flowering.

b. First application, just before transplanting or sowing or immediately afterwards; and second application, during the rooting period before the start of flowering.

c. To the entire surface with incorporation before sowing or planting, 6-8 kg ai/ha; to the sowing or planting drills, 4 kg ai/ha; to the planting holes, 8 g ai/hole.

d. Vegetables include tomato, eggplant, peppers, melons, watermelon, cabbage and cauliflower. With water on transplantation, 4-8 kg ai/ha; before sowing or planting by spraying the entire soil surface with simultaneous incorporation, 6-8 kg ai/ha; spraying the seed or planting drills or with a dropwise irrigation system, 1 kg ai/ha.

RESIDUES RESULTING FROM SUPERVISED TRIALS

Results of new trials on melons, watermelon, eggplant, sweet peppers and tomato conducted in 1998-1999 were provided. The reports contained necessary information such as trial locations, varieties, methods and timing of application, sampling and analysis including recovery information. The residues in control plots were all below the LOQ and therefore not recorded in the following tables. Residue data are not adjusted for recovery. When residues were not detected they are shown as below the LOQ. Residues, application rates and spray concentrations have generally been rounded to two significant figures or, for residues near the LOQ, to one significant figure.

The summary of trials on these crops is also extracted from the 1999 JMPR Evaluation and reproduced in the following tables.

Data according to the maximum GAP is double-underlined. Data from trials conducted under conditions within GAP and used for the estimation of maximum residue level is single-underlined.

Melons

Fenamiphos is widely registered for use on melon and watermelons. In Europe the GAP had recently been changed as shown in Table 1 in order to minimize the resulting fenamiphos residues.

Six new trials were conducted in 1998 and 1999 with fenamiphos and imidacloprid (CS 246) on melon in greenhouse: one in France, four in Italy and one in Spain (Deissler & Ohs, 1999d; Anderson & Elke, 2000b). The combination product (CS 246) was applied once to the plant at a rate of 10 kg fenamiphos/ha (0.252 kg imidacloprid/ha) via a drip irrigation system. Water rates were 7000 – 100000 L/ha, depending on the given situation in the greenhouses in which the tests were performed.

The relevant trials were extracted from the 1999 JMPR Evaluation. Among those trials, there are nine trials conducted (Heinemann & Ohs, 1997a, Blass 1998a) with fenamiphos alone (CS 240) and with the same application rate and technique as the new trials with the CS formulation.

Trial data are summarized in Table 2. Except where otherwise described in a footnote, procedural recovery of analysis in each study was acceptable.

Table 2. Residues of fenamiphos in melons from trials in Australia, France, Guatemala, Italy, Mexico and Spain.

MELONS Location Year variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Newly submitted trial data								
Italy (Fondi) 1998 Proteo	G	240CS (246CS)	10 in irrigation water (before flowering)	1	59	Fruit	< 0.02	RA-2033/98 1178-98
Italy (Ravenna) 1999 Drake	G	240CS (246CS)	10 in irrigation water (at 1st flowering)	1	30 60 70 90 	Fruit Pulp Peel Whole fruit Fruit Fruit Fruit Pulp Peel Whole fruit	0.03 0.03 0.03 0.03 0.04 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	RA-2058/99 0378－99
Spain (corvera) 1999 Olmedo-Pieldesapo	G	240CS (246CS)	10 in irrigation water (at 1st flowering)	1	32 62 69	Fruit Pulp Peel Whole fruit Fruit Fruit	0.06 0.06 0.05 0.06 0.04 0.03	RA-2058/99 0379-99

MELONS Location Year variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
					89	Fruit Pulp Peel Whole fruit	< 0.02 < 0.02 < 0.02 < 0.02	
France (Montbartier) 1999 Figaro	G	240CS (246CS)	10 in irrigation water (7th flower open)	1	30 61 70 90 	Fruit Pulp Peel Whole fruit Fruit Fruit Fruit Pulp Peel Whole fruit	0.56 0.38 0.75 0.52 0.08 0.05 0.04 0.02 0.04 0.03	RA-2058/99 0380-99
Italy (Badia Polesine) 1999 Baggio	G	240CS (246CS)	10 in irrigation water (1st flower open)	1	28 59 69 88 	Fruit Pulp Peel Whole fruit Fruit Fruit Fruit Pulp Peel Whole fruit	0.05 0.02 0.04 0.03 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	RA-2058/99 0485-99
Italy (Gavello) 1999 Harper	G	240CS (246CS)	10 in irrigation water (1st flower open)	1	30 59 70 88 	Fruit Pulp Peel Whole fruit Fruit Fruit Fruit Pulp Peel Whole fruit	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	RA-2058/99 0487-99
Trial data contained in the 1999 JMPR Monograph								
Italy (Latina) 1996 Proteo	G	240CS	10	1	50 60 90 	Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp	0.041, 0.042 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02 < 0.02	0281-96
Italy (Ravenna) 1996 Drake	G	240CS	10	1	50 60 90 	Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp	0.034, 0.036 0.022, 0.021 0.02, 0.021 < 0.02, < 0.02 < 0.02 < 0.02	0376-96
Italy (Latina) 1996 Mambo	G	240CS	10	1	50 60 90 	Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp	< 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02 < 0.02	0377-96
Italy (Verona) 1996 Golden Star	G	240CS	10	1	50 59 80 90 	Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp	0.046, 0.044 0.021, 0.025 0.025, 0.028 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02 < 0.02	0378-96

MELONS Location Year variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Italy (Verona Sth) 1997 Super market	G	240CS	10	1	50 60 70	Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp	0.03 0.03 < 0.02 < 0.02 < 0.02 < 0.02	0045-97
Italy (Verona Sth) 1997 Super market	G	240CS	10	1	50 61 70	Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0554-97
Italy (Ravenna) 1997 Drake	G	240CS	10	1	60 70	Whole fruit Pulp Whole fruit Pulp	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0555-97
Italy (Ravenna) 1997 Crido	G	240CS	10	1	50 61 67	Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0557-97
Italy (Ravenna Nth) 1997	G	240CS	10	1	50 60 70	Whole fruit Pulp Whole fruit Pulp Whole fruit Pulp	0.03 0.03 < 0.02 < 0.02 < 0.02 < 0.02	0801-97
Australia (QLD) 1971 Hales best	F	400EC	8.9 by boom spray and incorporation with rotary hoe	1	112	mature fruit	< 0.01	33/71a [3]
Australia (QLD) 1971 Hales best	F	400EC	8.9 by boom spray and incorporation with rotary hoe	1	77	mature fruit	< 0.01	33/71b [4]
Brazil (Sao Paulo) 1995 Valenciano	F	400EC	4 spraying	1	90	Whole fruit	< 0.02	BRA-2009-96-A [5]
Brazil (Sao Paulo) 1995 Valenciano	F	400EC	8 spraying	1	90	Whole fruit	< 0.02	BRA-2009-96-B [5]
Guatemala (Zacapa) 1987 Mayan sweet	F	10GR	10 spreading/incorp.	1	85	fruit	< 0.05	GUA-36-87-A [1]
Guatemala (Zacapa) 1987 Mayan sweet	F	10GR	10 spreading/incorp.	1	71	fruit	< 0.05	GUA-36-87-B [1]
Guatemala (Zacapa) 1987 Mayan sweet	F	10GR	4 spreading/incorp.	1	85	fruit	< 0.05	GUA-36-87-C [1]
Guatemala (Zacapa) 1987 Mayan sweet	F	10GR	4 spreading/incorp.	1	71	fruit	< 0.05	GUA-36-87-D [1]
Mexico (Durango) 1983 Sierra gold		15GR	3	1	64	pulp peel whole fruit	< 0.01 < 0.01 < 0.01	96784
Mexico (Durango) 1983 Sierra gold		15GR	3	1	64	pulp peel whole fruit	< 0.01 < 0.01 < 0.01	96784

MELONS Location Year variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Mexico (Coahuila) 1983 Imperial 45		15GR	3	1	62	pulp peel whole fruit	< 0.01 < 0.01 < 0.01	96784
Mexico (Coahuila) 1983 Imperial 45		15GR	3	1	63	pulp peel whole fruit	< 0.01 0.02 < 0.01	96784
Italy (Borgo Piave) 1989 Charantes	F	5GR	15 spreading	1	85 100 105	pulp peel whole fruit pulp peel whole fruit pulp peel whole fruit	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0064-89 [2]

1. Applied at sowing or 14 days before sowing. Recovery, 68% at 0.05 mg/kg.
2. Applied 18 days before planting.
3. Applied 35 days before sowing.
4. Applied 4 days before sowing.
5. Applied at planting.

Watermelon

Four new trials were conducted in 1998 and 1999 with fenamiphos and imidacloprid (CS 246) on watermelon in greenhouse: three in Italy and one in Spain (Deissler & Ohs, 1999d; Anderson & Elke, 2000b). The combination product (CS246) was applied once to the plant at a rate of 10 kg fenamiphos/ha (0.252 kg imidacloprid/ha) via a drip irrigation system. Water rates were 7000–100,000 L/ha, depending on the given situation in the greenhouses in which the tests were performed.

The relevant trials were extracted from the 1999 JMPR Evaluation and the trial data is summarized in Table 3. The procedural recovery of analysis in each study was acceptable.

Table 3. Residues of fenamiphos in watermelon from trials in Italy and Spain.

WATERMELON Location Year Variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Newly submitted trial data								
Italy (Trinitapoli) 1998 Crimson sweet	G	240CS (246CS)	10 in irrigation water (before flowering)	1	60	Fruit	0.02	RA-2033/98 1179-98
Italy (Ravenna) 1999 Trophi	G	240CS (246CS)	10 in irrigation water (5^{th} flower open)	1	30 60 70 90 	Fruit Pulp Peel Whole fruit Fruit Fruit Fruit Pulp Peel Whole fruit	< 0.02 0.04 0.02 0.03 0.04 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	RA-2058/99 0381-99

WATERMELON Location Year Variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Spain (La Hoya Elche) 1999 Reina de Corazones	G	240CS (246CS)	10 in irrigation water (3rd flower initial visible)	1	42 59 70 87	Fruit Pulp Peel Whole fruit Fruit Fruit Fruit Pulp Peel Whole fruit	0.15 0.19 0.17 0.18 0.16 0.16 0.11 0.14 0.08 0.11	RA-2058/99 0382-99
Italy (Vittoria) 1999 Crimson sweet	G	240CS (246CS)	10 in irrigation water (before flowering)	1	60 70 90	Fruit Fruit Fruit Pulp Peel Whole fruit	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02 < 0.02	RA-2058/99 0383-99
Trial data contained in the 1999 JMPR Monograph								
Italy (Latina) 1988 Crimson Sweet	F	5GR	10 spreading	1	99 109	fruit	< 0.02, < 0.02 < 0.02, < 0.02	0197-88 [1]
Italy (Borgo Piave) 1989 Crimson Sweet	F	5GR	10 spreading	1	85 100 105	Pulp Peel Whole fruit Pulp Peel Whole fruit Pulp Peel Whole fruit	< 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02 < 0.02, < 0.02	0062-89 [2]

1. Results in summary form. Applied 20 days before planting.
2. Results in summary form. Applied 2 days before planting.

Peppers, sweet

Fenamiphos is widely registered for use on sweet pepper. In Europe the GAP has recently been changed to minimize the residues, as shown in Table 1.

A total of ten new trials were conducted with fenamiphos and imidacloprid in greenhouses in southern Europe in 1998 and 1999: one in France, two in Greece, four in Italy, one in Portugal and two in Spain (Deissler & Ohs, 1999b; Anderson & Elke, 2000c). Fenamiphos and imidacloprid (CS 246) was applied once to the plant at a rate of 10 kg fenamiphos/ha (0.252 kg imidacloprid/ha) via a drip irrigation system. Water rates were 7000 – 24000 L/ha, depending on the given situation in the greenhouses in which the tests were performed.

The relevant trials were extracted from the 1999 JMPR Evaluation. Among those trials, there are nine trials conducted in Italy (Heinemann & Ohs, 1997c, Blass, 1998a) using fenamiphos CS240 with the same application rate and technique as the new trials in Italy, which are summarized in Table 4. Except where otherwise described, procedural recovery of analysis in each trial was acceptable.

Table 4. Residues of fenamiphos in peppers from trials in France, Greece, Italy, Portugal and Spain.

PEPPERS Location Year Variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Newly submitted trial data								
Italy (Pozzo Ribaudo) 1998 Lux (sweet)	G	240CS (246CS)	10 in irrigation water (17 d after flowing)	1	60	fruit	< 0.02	RA-2034/98 1180-98

PEPPERS Location Year Variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Italy (Santa Croce di Camerina) 1999 Lux (sweet)	G	240CS (246CS)	10 in irrigation water	1	60	fruit	< 0.02	RA-2034/98 1403-98
Italy (Zapponeta) 1999 Marconi R. (sweet)	G	240CS (246CS)	10 in irrigation water (before flowering)	1	60 70 90	fruit	< 0.02 < 0.02 < 0.02	RA-2059/99 0351-99
Spain (Arenys de Munt) 1999 Plana (sweet)	G	240CS (246CS)	10 in irrigation water (before flowering)	1	46 60 70 90	fruit	0.04 0.02 < 0.02 < 0.02	RA-2059/99 0352-99
Italy (Vittoria) 1999 Cosmos	G	240CS (246CS)	10 in irrigation water (4th fruit reaching typical size)	1	30 60 70 90	fruit	0.07 0.04 0.02 < 0.02	RA-2059/99 0367-99
France (St.Remy) 1999 Mariner (sweet)	G	240CS (246CS)	10 in irrigation water (3^{rd} flower)	1	30 60 70 90	fruit	0.97 0.44 0.28 0.17	RA-2059/99 0368-99 [a]
Portugal (Silveira) 1999 Lido (sweet)	G	240CS (246CS)	10 in irrigation water (1^{st} flower bud visible)	1	30 62 70 91	fruit	0.03 < 0.02 < 0.02 < 0.02	RA-2059/99 0369-99
Spain (Arenys de Munt) 1999 Italiano (sweet)	G	240CS (246CS)	10 in irrigation water (before flowering)	1	46 60 70 90	fruit	0.09 < 0.02 < 0.02 < 0.02	RA-2059/99 0370-99
Greece (Crete) 1999 Drango (sweet)	G	240CS (246CS)	10 in irrigation water (7^{th} flower bud visible)	1	33 62 71 91	fruit	< 0.02 < 0.02 < 0.02 < 0.02	RA-2059/99 0480-99
Greece (Crete) 1999 Drango (sweet)	G	240CS (246CS)	10 in irrigation water (3^{rd} flower open)	1	33 62 71 91	fruit	< 0.02 < 0.02 < 0.02 < 0.02	RA-2059/99 0481-99
Trial data contained in the 1999 JMPR Monograph								
Italy (Latina) 1996 Sonar	G	240CS	10	1	30 60 90		0.119, 0.108 < 0.02, < 0.02 < 0.02	0277-96
Italy (Ragusa) 1996 Lux	G	240CS	10	1	31 60 90		0.041, 0.033 < 0.02, < 0.02 < 0.02 (green) < 0.02 (yellow)	0393-96
Spain (Almeria) 1996 Anibal	G	240CS	10	1	31 60 90		0.067, 0.071 0.02, 0.02 < 0.02	0394-96
Spain (Almeria) 1996 Drago	G	240CS	10	1	31 60 90		0.187, 0.177 0.07, 0.064 < 0.02	0395-96
Italy (Latina) 1997 Gordo	G	240CS	10	1	30 60 90		< 0.02, < 0.02 < 0.02, < 0.02 < 0.02	0099-97
Italy (Ragusa) 1996 Soldi	G	240CS	10	1	30 60 90		0.091, 0.088 0.110, 0.096 < 0.02	0558-97
Spain (Almeria) 1996 Roldan	G	240CS	10	1	30 60 90		< 0.02, < 0.02 < 0.02, < 0.02 < 0.02	0559-97
Portugal (Lissabon) 1997 Sonar	G	240CS	10	1	30 60 90		0.306, 0.287 0.080[8], 0.065 < 0.02	0560-97

PEPPERS Location Year Variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Spain (Murcia) 1985 Gedeon	G	400EC	10 drip irrigation	1	1 15 29 56 85		< 0.05, < 0.05 0.18, 0.18 0.28, 0.37 0.19, 0.20 0.25, 0.26	5207-84 [3]
Spain (Alicante) 1986 Gedeon	G	400EC	5 drip irrigation	2	90 118 153		0.13, 0.17 0.05, 0.06 0.05, 0.05	5203-86 [4]
Spain (Alicante) 1987 Lamuyo	F	400EC	10 drench spray	1	50		0.08, 0.08	5217-87 [6]
Spain (Semillas Llad) 1987 Hungaro	F	400EC	10 spraying/incorp.	1	75		0.05, 0.06	5218-87 [7]
Italy (Lonigo) 1980	F	5GR	10	1	84		0.05	5205-80 [1]
Italy (Lonigo) 1980	F	5GR	10	1	84		0.05	5206-80 [1]
Spain (San Javier) 1985 Gedeon	G	10GR	10 spreading/incorp. followed by irrigation	1	1 15 29 56 84		< 0.05, < 0.05 < 0.05, < 0.05 0.05, 0.1 0.09, 0.1 0.31, 0.35	5208-84 [2]
Italy (Sabaudia) 1987 Eldor	F	5GR	14.4 spreading	1	65 81		< 0.02, < 0.02 < 0.02, < 0.02	5224-87 [5]
Spain (Alicante) 1987 Lamuyo	F	10GR	10 in-furrow with slight incorp.	1	63		< 0.05, < 0.05	5235-87
Spain (Semillas Llad) 1987 Hungaro	F	10GR	10 spreading/incorp.	1	75		0.06, 0.06	5236-87

a. The calculation for the application via the irrigation system was done for the whole plot, but the application itself was only performed in the middle of the plot. Therefore a higher amount of fenamiphos per plant was applied, which could lead to higher residues.

1. Recoveries not indicated. Treatment applied 20 days before planting.

2. Applied at the fruiting stage.

3. Applied at the fruiting stage.

4. 1st at planting and 2nd 14 days after planting.

5. Application 11 days after planting. Irrigation every 8-10 days by sprinkler.

6. Application 13 days after planting (8-leaf stage).

7. Application at sowing.

8. In the 1999 JMPR Evaluation, the value was shown as 0.80. It was corrected to 0.080 in the current Evaluation as the value in the original study report was 0.080 mg/kg.

Tomato

Fenamiphos is registered very widely for use on tomato. In Europe the GAP had recently been changed as shown in Table 1 in order to minimize the resulting fenamiphos residues.

A total of seven new trials were conducted with fenamiphos & imidacloprid (CS 246) on tomato in southern Europe in greenhouse: one in France, one in Greece, three in Italy, one in Portugal and one in Spain (Deissler & Ohs, 1999a; Anderson & Elke, 2000a). Fenamiphos and imidacloprid (CS 246) was applied once to the plant at a rate of 10 kg fenamiphos/ha (0.252 kg imidacloprid/ha) via a drip irrigation system. Water rates were 9000–24000 L/ha, depending on the given situation in the greenhouses in which the tests were performed.

The relevant trials were extracted from the 1999 JMPR Evaluation. Among those trials, there are eight trials conducted in Italy, Portugal and Spain (Heinemann & Ohs, 1997b, Blass, 1998b) using fenamiphos CS240 alone with the same application rate and technique as in the new trials in Italy.

Trial data are summarized in Table 5. Except where otherwise described, procedural recovery of analysis in each trial was acceptable.

Table 5. Residues of fenamiphos in tomato from trials in Australia, Brazil, Greece, Italy, Portugal, South Africa and Spain.

TOMATO Location Year Variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Newly submitted trial data								
Italy (Pozzo Bollente) 1998 Felicie	G	240CS (246CS)	10 in irrigation water (more than a month after the 1st flower)	1	60	Fruit	< 0.02	RA-2035/98 1181-98
Spain (Arenys de Munt) 1999 Bond	G	240CS (246CS)	10 in irrigation water (more than a month after the 1st flower)	1	29 60 70 90	fruit	0.12 < 0.02 < 0.02 < 0.02	RA-2051/99 0373-99
Italy (S. Croce di Camerina) 1999 Felicia	G	240CS (246CS)	10 in irrigation water (8 d after the 1st flower)	1	30 60 70 90	fruit	0.03 < 0.02 < 0.02 < 0.02	RA-2051/99 0375-99
Portugal (Santarem (Vale di cavalos)) 1999 Indalo	G	240CS (246CS)	10 in irrigation water (14 d after the 1st flower)	1	30 60 71 90	fruit	0.07 < 0.02 < 0.02 < 0.02	RA-2051/99 0376-99
Italy (Zapponeta) 1999 Camone	G	240CS (246CS)	10 in irrigation water (before flowering)	1	30 60 70 90	fruit	< 0.02 < 0.02 < 0.02 < 0.02	RA-2051/99 0377-99
France (Noves) 1999 Isabella Grefle	G	240CS (246CS)	10 in irrigation water (abt 1 month after the 1st flower)	1	30 60 70 90	fruit	< 0.02 0.04 0.03 < 0.02	RA-2051/99 0483-99
Greece (Thessaloniki) 1999 9070	G	240CS (246CS)	10 in irrigation water (abt 1 month after the 1st flower)	1	46 60 70 90	fruit	0.10 0.22 0.14 0.03	RA-2059/99 0370-99
Trial data contained in the 1999 JMPR Monograph								
Italy (Latina) 1996 Sidonia	G	240CS	10	1	30 60 90		0.381, 0.368 0.02, 0.02 < 0.02	0278-96 [14]
Italy (Sicily) 1996 Sidonia	G	240CS	10	1	30 60 90		0.081, 0.070 < 0.02, < 0.02 < 0.02	0384-96 [14]
Portugal (Lissabon) 1996 Indalo	G	240CS	10	1	50 61 70		< 0.02, < 0.02 < 0.02, < 0.02 < 0.02	0385-96 [14]
Spain (Almeria) 1996 Garbo	G	240CS	10	1	32 60 90		0.066, 0.070 0.092, 0.080 0.042	0386-96 [14]
Italy (Latina) 1996 Arletta	G	240CS	10	1	30 60 90		< 0.02, < 0.02 < 0.02, < 0.02 < 0.02	0046-97 [15]
Italy (Ragusa) 1997 Cencara	G	240CS	10	1	30 60 90		0.079, 0.081 < 0.02, < 0.02 < 0.02	0561-97 [15]

TOMATO Location Year Variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Spain (Barcelona) 1997 Alboran	G	240CS	9.4	1	31 60 90		0.205, 0.167 0.142, 0.144 0.032	0562-97 [15]
Portugal (Lissabon) 1997 Indalo	G	240CS	10	1	30 60 90		< 0.02, < 0.02 < 0.02, < 0.02 < 0.02	0563-97 [15]
Australia (QLD) 1971 Grosse lisse	F	400EC	8.9 by boom to soil; rotary hoed in	1	81		< 0.05	11/71a [2]
Australia (QLD) 1971 Grosse lisse	F	400EC	11.2 by boom to soil; rotary hoed in	1	81		< 0.05	11/71b [2]
Australia (QLD) 1971 Grosse lisse	F	400EC	13.4 by boom to soil; rotary hoed in	1	81		< 0.05	11/71c [2]
Australia (QLD) 1971 Grosse lisse	F	400EC	8.7 by boom spray	1	127 161		0.15 < 0.05	12/71a [3]
Australia (QLD) 1971 Grosse lisse	F	400EC	8.7 by boom spray	1	127 161		< 0.05 < 0.05	12/71b [3]
South Africa 1976	F	400EC	10	1	58 73 88		< 0.05 < 0.05 < 0.05	311/880/P 163 [6]
South Africa 1984 Hibberdene	F	400EC	1 g ai/m, 30 cm band	1	86 99 112		0.17 0.14 0.06	311/88694 /B40 [7]
South Africa 1984 Hibberdene	F	400EC	1 g ai/m, 30 cm band + 0.5 g/m 40cm band	1 + 1	35 48 61		0.15 0.07 0.11	311/88694 /B40 [7]
South Africa 1984 Hibberdene	F	400EC	1 g ai/m, 30 cm band + 0.5 g/m 40cm band	1 + 1 *	0 7 13 20 33		< 0.05 0.10 < 0.05 < 0.05 < 0.05	311/88694 /B40 [7]
Spain (Alicante) 1984 Restino	G	400EC	10 drip irrigation	1	1 15 29 62		< 0.05, < 0.05 0.33, 0.41 0.33, 0.37 0.19, 0.27	5206-84 [8]
Spain (San Javier) 1986 Carmelo	G	400EC	5	2	55 84 112		0.1, 0.13 < 0.01, 0.01 < 0.01, < 0.01	5202-86 [9]
Spain (Moreno) 1986 A-7	F	400EC	10	1	60		< 0.02, < 0.02	0077-88 [10]
Spain (El Masnou) 1988 Carmelo	F	400EC	10	1	66		< 0.02, < 0.02	0078-88 [13]
South Africa 1984 Hibberdene	F	10GR+ 400EC	0.5 g/m 30cm or 40cm band	1 + 1	35 48 61		0.36 0.25 0.16	311/88694 /B40 [7]
Australia (QLD) 1971 Grosse lisse	F	5GR	11.2 scattered by hand to soil; left on surface	1	78		< 0.05	11/71d [1]
Brazil (Agrocica) 1985	F	10GR	2 spreading	1	124		< 0.1	BRA-78900-85A [4]
Brazil (Sao Paulo) 1989 Santa Cruz-Okada	F	10GR	5 spreading	1	70 94		< 0.1 < 0.1	BRA-LYPES89-1-A [5]

TOMATO Location Year Variety	G or F	Application			PHI	Sample	Residues mg/kg	Reference
		Form.	kg ai/ha	No				
Brazil (Sao Paulo) 1989 Santa Cruz-Okada	F	10GR	10 spreading	1	94		< 0.1	BRA-LYPES89-1-B [5]
South Africa 1976	F	10GR	10	1	58 73 88		< 0.05 < 0.05 < 0.05	311/880/P 163 [6]
South Africa 1984 Hibberdene	F	10GR	1 g ai/m, 30 cm band	1	86 99 112		0.30 0.14 0.10	311/88694 /B40 [7]
Spain (St. Boi de Llobregat) 1988 A-7	F	10GR	10	1	60		< 0.02, < 0.02	0075-88 [11]
Spain (Sr. Jordana) 1988 Carmelo	F	10GR	10	1	66		< 0.02, < 0.02	0076-88 [12]
South Africa 1984 Hibberdene	F	250EW	1 g ai/m, 30 cm band	1	86 99 112		0.12 0.09 0.06	311/88694 /B40 [7]

* Second treatment applied 1 week before harvest.

1. Applied 3 days after transplanting.
2. Applied 1 day before transplanting.
3. Applied 21days before transplanting.
4. Applied at planting. No recovery data given.
5. Applied at transplanting.
6. No field data given.
7. No field data given. All results corrected for recovery.
8. Applied at fruit development stage.
9. Applied 28 and 42 days after planting; last application at fruit development.
10. Applied 31 days after transplanting; flowering stage.
11. Applied 30 days after transplanting; flowering stage.
12. Applied 6 days after transplanting.
13. Applied 6 days after planting
14. Applied 6 to 49 days after planting.
15. Applied 21 to 87 days after planting.

APPRAISAL

Fenamiphos is a systemic organophosphorus nematicide which is registered for use in more than sixty countries. It was reviewed by the JMPR on several occasions including the periodic review of toxicological data in 1997 and residue data in 1999. The current ADI is set at 0–0.0008 mg/kg bw and the ARfD at 0.003 mg/kg bw. The residue definition was “sum of fenamiphos and its sulfoxide and sulfone, expressed as fenamiphos.”

Due to acute intake concerns, the MRL for peppers, tomato and watermelon were returned to Step 6 at the 34th, 35th, 36th, 37th and 38th Sessions of the Codex Committee on Pesticide Residues. The 37th Session of the CCPR in 2005 requested JMPR to review GAPs that might result in lower MRL recommendations and added fenamiphos in the Priority List. The 38th CCPR in 2006 reiterated the request to JMPR to consider alternative GAPs to determine whether lower MRLs for these commodities could be recommended.

The current Meeting received GAP information and new residue trial data on these commodities. In addition, it received new trial data on melons and egg plant. Although there was no acute intake concern associated with the MRL for melon, the data on melons were reviewed because

the existing Codex MRL for watermelon was based melons trial data. The data on egg plant was not reviewed as this was outside the purview of the current Meeting.

Results of supervised residue trials

The Meeting received results of new trials on melons, watermelon, sweet peppers and tomato conducted in 1998–1999. Information from trials on these crops submitted to the 1999 JMPR was also used in the current evaluation. A number of trials with a CS formulation were reported by the 1999 JMPR but not used for estimating maximum residue levels because the GAP had been pending. As the GAP has since been approved, these trials were also included for consideration.

Labels from Australia, Greece, Italy, Portugal and Spain were made available to the Meeting.

The existing Codex MRL for watermelon, as recommended by the 1999 JMPR, was based on residues in melons from the supervised trials in accordance with GAP. Consequently, the Meeting again reviewed the results of supervised trials on melons although no short-term intake concern had previously been identified for melons.

Melons

The Meeting received the results of six new melon trials conducted in France, Italy and Spain using a CS formulation applied in a glasshouse. Nine indoor trials in Italy with a CS formulation; two field trials from Australia and two field trials from Brazil with an EC formulation; and four field trials from Guatemala, one field trial from Italy and four trials from Mexico with GR formulations were reviewed by the 1999 JMPR.

Table 6. The current relevant GAP information for melons.

Crop	Country	Form.	Application					Notes
			Timing	Method	Rate, kg ai/ha	No	PHI, days	
Melons/ watermelon	Italy	240CS	From transplanting to about 10 d later	In irrigation water	10	1	60	
Melons/ watermelon	Spain	240CS	Before start of flowering	Soil treatment	4.8-9.6	2	60	a
Cucurbits	Australia	400EC	Pre-planting or pre-transplanting	Soil treatment	9.6	1	-	
Melons	Brazil	400EC	At sowing	In irrigation water	4	1	-	
Melons	Guatemala	10GR 10GR 15GR		Spreading/incorp. Spreading Spreading/incorp.	2.5-5.0 5 2.6-5.1	1 1 1	60 60 60	
Melons	Italy	5GR		Soil incorporation	9.6-12	1	60	

a. First application, just before transplanting or sowing or immediately afterwards; and second application, during the rooting period before the start of flowering.

Six new indoor trials with a CS formulation were conducted in 1998 and 1999 and evaluated against the GAP of the countries where the trials were conducted. In the case of one French trial, Italian GAP was used. Five trials were in accordance with the maximum GAP and residues in fruit in rank order were: < 0.02 (3) and 0.04 (2) mg/kg.

Nine indoor trials were conducted with a CS formulation in Italy in 1996 and 1997. Although no information was available on the timing of application, the application rate, number of application and PHI were in accordance with the GAP of Italy. Residues in fruit at or around the PHI of 60 days were: < 0.02 mg/kg (7), 0.02 and 0.03 mg/kg.

The residues reported in pulp of samples taken 60 days after application were all below the LOQ of 0.02 mg/kg. However, pulp was not analyzed in the two trials that showed the residue level of

0.04 mg/kg in whole fruit taken 60 days after application. Regardless of compliance with GAP, where whole fruit analysis resulted in a residue concentration range of 0.03–0.05 mg/kg, residue levels in pulp were < 0.02– 0.03 mg/kg.

GAP in Argentina for a CS formulation allows one application at a rate of 3.2–4.0 kg ai/ha, with a PHI of 90 days but no trials matched this use pattern.

Two field trials from Australia with an EC formulation were conducted within GAP and residues in fruit were < 0.01 mg/kg (2). One field trial from Brazil with an EC formulation was conducted in accordance with Brazilian GAP and residues in fruit were < 0.02 mg/kg. Even with double rate, residues were still below the LOQ. No data were available for residues in pulp but they were expected to be around the same level as or lower than those in whole fruit.

There is no reported GAP for an EC formulation that would lead to lower residues.

Among trials using GR formulations were, one field trial from Guatemala, conducted in accordance with the current GAP of Guatemala, and four Mexican trials also within the GAP of Guatemala. Residues in fruit were: < 0.01 (4) and < 0.05 mg/kg. Residues in pulp were reported for the Mexican trials and were below the LOQ of 0.01 mg/kg.

Using the GAP of Costa Rica for the GR formulation (0.2–2.5 kg ai/ha, one application, with a 60 day PHI) would exclude trial results from Guatemala.

Watermelon

The Meeting also received the results of four new trials conducted on watermelon in Italy and Spain using a CS formulation in a greenhouse. The 1999 JMPR reviewed two field trials conducted in Italy with a GR formulation.

Among four new trials, two trials were in accordance with GAP and residues were: < 0.02 and 0.02 mg/kg.

In two Italian trials with the GR formulation, samples were not taken and analyzed 60 days after the application and therefore not used for estimating an HR.

The data were insufficient for estimating an HR for watermelon.

As the GAP for melons and watermelon is identical in many countries including Australia, Italy and Spain, the Meeting agreed to use data on melons for short-term intake estimation for watermelon as in the 1999 JMPR. As residue concentrations in pulp are not available for all trials following respective GAP, and the residue concentrations in whole fruit and pulp do not differ significantly due to the systemic nature of fenamiphos, the Meeting decided to use the residue concentrations in whole fruit to estimate an HR.

Since the residues arising from the use of these three formulations did not differ significantly, the Meeting concluded that it was not appropriate to disregard the results of trials with certain formulation(s) when estimating an HR. Based on the combined residues (< 0.01 (6), < 0.02 (11), 0.02, 0.03, 0.04 (2) and < 0.05 mg/kg), the Meeting estimated an HR of 0.04 mg/kg and noted that this HR would result in IESTI for general population being 120% and that for children being 310% of the ARfD (0.003 mg/kg bw).

The Meeting concluded that none of the residue data relating to available GAP suggests a lower maximum residue level than the current proposal.

However, as the residues in two new trials were 0.04 mg/kg, the Meeting decided to recommend a new maximum residue level of 0.05 mg/kg for fenamiphos in watermelon to replace the current proposal of 0.05* mg/kg. The Meeting estimated an STMR of 0.02 mg/kg and an HR of 0.04 mg/kg.

The Meeting noted that these recommendations are also valid for melons, except watermelon.

Pepper, sweet

The Meeting received the results of 10 new trials conducted from France, Greece, Italy, Portugal and Spain using a CS formulation in glasshouse. Four indoor trials in Italy, one indoor trial in Portugal and three indoor trials in Spain with a CS formulation; two field and two indoor trials in Spain with an EC formulation; and three field trials from Italy and one indoor and two field trials from Spain with a GR formulation were reviewed by the 1999 JMPR.

The relevant current GAP information is as follows:

Table 7. The current relevant GAP information for peppers.

Crop	Country	Form.	Application					Notes
			Timing	Method	Rate, kg ai/ha	No	PHI, days	
Peppers, Sweet	Italy	240CS	From transplanting to about 10 d later	In irrigation water	10	1	60	
Peppers, Sweet	Spain	10GR	Pre-planting or pre-sowing	Spreading/incorp.	5-10	1	60	
		400EC		Spraying	4.8-10	2	60	a
		240CS	Before start of flowering	Soil treatment	4.8-9.6	2	60	b

a. Up to two applications per season can be given, by dividing the dose in half if the duration of the crop makes it possible to observe the safety period. The first application should be before sowing or transplanting or immediately afterwards and the second during the rooting period of the crop before the start of flowering.

b. First application, just before transplanting or sowing or immediately afterwards; and second application, during the rooting period before the start of flowering.

Ten new trials were evaluated against the GAP of Italy/Spain. Four trials were conducted in compliance with GAP and residues found were: < 0.02 (3) and 0.02 mg/kg. In two other trials in Italy and two trials from Greece, although application took place after the specified timing residues were below the LOQ of 0.02 mg/kg.

Although no information was available on the timing of application, the application rate, number of applications and PHI of trials conducted with the CS formulation in 1996 and 1997 were in accordance with GAP in Italy. Residues at or around the PHI of 60 days were: < 0.02 (4), 0.02, 0.07, 0.08 and 0.11 mg/kg.

GAP in Argentina for a CS formulation allows one application at the rate of 3.2–4.0 kg ai/ha, with a PHI of 90 days but no trials matched this condition.

Three trials from Spain with an EC formulation were conducted in accordance with Spanish GAP and residues found were: 0.06, 0.08 and 0.26 mg/kg.

There is no reported GAP for the EC formulation that would lead to lower residues.

Three trials in Spain with GR formulation were conducted in accordance with GAP in Spain and residues were: < 0.05, 0.06 and 0.35 mg/kg.

The GAP in some countries allowed lower application rates for GR formulations (single application up to 1.2 kg ai/ha), however, no trials matched such GAP.

Since the residues arising from the use of these three formulations were not significantly different the Meeting concluded that it is not appropriate to disregard results from trials with certain formulation(s) when estimating HR. Based on combined residues (< 0.02 (7), 0.02 (2), < 0.05, 0.06 (2), 0.07, 0.08 (2), 0.11, 0.26 and 0.35 mg/kg) the Meeting estimated an HR of 0.35 mg/kg, the same value as that estimated by the 1999 JMPR. The IESTI for the general population is 100% and that for children is 110% of the ARfD.

The Meeting concluded that none of the residue data relating to available GAP suggests a lower maximum residue level to replace the current proposal of 0.5 mg/kg for fenamiphos in peppers.

Tomato

The Meeting received the results of seven new trials conducted in France, Greece, Italy, Portugal and Spain using a CS formulation in glasshouses. The 1999 JMPR reviewed four trials from Italy, two trials from Portugal and two trials from Spain with CS a formulation in greenhouse; five field trials from Australia, four field trials from South Africa and two field and two indoor trials from Spain with an EC formulation; one field trial from Australia, four field trials from Brazil, two field trials from South Africa and two field trials from Spain with GR formulations; one field trial from South Africa with both GR and EC formulations; and one field trial from South Africa with an EW formulation.

The current relevant country GAPs are shown below.

Table 8. The current relevant GAP information for tomatoes.

Crop	Country	Form.	Application					Notes
			Timing	Method	Rate, kg ai/ha	No	PHI, days	
Tomato	Australia	400EC	Pre-planting or pre-transplanting	Spraying	9.6	1	-	
		10GR	Within 7 days of planting	Sprinkling	11	1	-	
		5GR	Within 7 days of planting	Sprinkling over soil	13	1	-	Not Tasmania
Tomato	Brazil	10GR	At planting	Incorporation	3-4	1	90	
Tomato	Italy	240CS	From transplanting to about 10 days later	In irrigation water	10	1	60	
Tomato	S. Africa	240CS 400EC 10GR	Pre-planting	Spraying Spraying/incorp. Spreading/incorp.	9.8	1 1 1	- - -	
Tomato	Spain	10GR	Pre-planting or pre-sowing	Spreading/incorp.	5-10	1	60	
		400EC		Spraying	4.8-10	2	60	a
		240CS	Before start of flowering	Soil treatment	4.8-9.6	2	60	b

a. Up to two applications per season can be given, by dividing the dose in half if the duration of the crop makes it possible to observe the safety period. The first application should be before sowing or transplanting or immediately afterwards and the second during the rooting period of the crop before the start of flowering.

b. First application, just before transplanting or sowing or immediately afterwards; and second application, during the rooting period before the start of flowering.

Seven new trials were evaluated against GAP in Italy/Spain. One trial was conducted in compliance with GAP and residues were < 0.02 mg/kg. In four other trials from Italy, where application took place later than the specified timing, residues of samples taken 60 days after application were below the LOQ of 0.02 mg/kg.

Although no information was available on the timing of application, application rate, number of applications and PHI, trials with a CS formulation conducted in 1996 and 1997 were in accordance with Italian GAP. Residues at or around the PHI of 60 days were: < 0.02 (5), 0.02, 0.09 and 0.14 mg/kg.

The GAP in Argentina for a CS formulation allows one application at a rate of 3.2–4.0 kg ai/ha, with a PHI of 90 days, however no trials matched this use pattern.

Four trials from Australia, with an EC formulation, were in compliance with Australian GAP and residues found were < 0.05 (3) and 0.15 mg/kg. In four trials from Spain matching Spanish GAP, residues found were < 0.02 (2), 0.13 and 0.27 mg/kg. As no field data was provided fro the trials from South Africa, data from those trials were not used in this evaluation.

The GAP in some countries for the EC formulation allow lower application rates, i.e., single applications at 2.8–3.4 or 3.2–4.0 kg ai/ha. However, no submitted trials matched such a GAP.

One trial from Australia, with a GR formulation, was in compliance with Australian GAP, had residues found of < 0.05 mg/kg. One trial from Brazil, in compliance with Brazilian GAP, had residues found of < 0.1 mg/kg. As no field data was provided for the trials from South Africa, data from those trials were not used in this evaluation.

Two trials from Spain were conducted in accordance with Spanish GAP with residue found of < 0.02 (2) mg/kg.

There is no reported GAP for GR formulations that would lead to lower residues.

Since the residues arising from the use of these three formulations were not significantly different, the Meeting concluded that it was not appropriate to disregard the results of trials with certain formulation(s) when estimating HR. Based on combined residues (< 0.02 (10), 0.02, < 0.05 (4), 0.09, < 0.1, 0.13, 0.14, 0.15 and 0.27 mg/kg), the Meeting estimated an HR of 0.27 mg/kg, similar to that estimated by the 1999 JMPR (0.30 mg/kg). The IESTI for general population is 100% and that for children is 280% of the ARfD.

The Meeting concluded that none of the residue data relating to available GAPs suggests a lower maximum residue level to replace the current proposal of 0.5 mg/kg for fenamiphos on tomato.

RECOMMENDATIONS

On the basis of the data from supervised trials on melons, except watermelon, and on watermelon, the Meeting concluded that the residue concentrations below are suitable for establishing MRLs and for assessing dietary intakes.

Definition of the residue: *Sum of fenamiphos and its sulfoxide and sulfone, expressed as fenamiphos*

Commodity		**Recommended MRL mg/kg**		**STMR/ STMR-P mg/kg**	**HR/HR-P mg/kg**
CCN	**Name**	**New**	**Previous**		
VC 0046	Melons, except watermelon	0.05	0.05*	0.02	0.04
VC 0432	Watermelon	0.05	0.05*	0.02	0.04

The Meeting made no recommendations to amend the MRLs for peppers and tomato.

DIETARY RISK ASSESSMENT

Long-term intake

As the ADI had not been modified since the International Estimated Dietary Intakes of fenamiphos were calculated last time in 1999 (3–14% of the maximum ADI of 0.0008 kg/kg for five regional diets); and the STMRs estimated by the current Meeting for melons, except watermelon and watermelon were identical to those estimated in 1999, IEDI calculation was not conducted by the current Meeting.

Short-term intake

The International Estimated Short-Term Intakes (IESTIs) of fenamiphos by general population and by children were calculated for melons, except watermelon; and watermelon for which HRs were estimated. The ARfD is 0.003 mg/kg and the calculated IESTIs for children up to 6 years of age range from 90 to 310% and those for general population from 40 to 120% of the ARfD. The information provided to the JMPR precludes an estimate that the short-term dietary intake would be below the ARfD for consumption of watermelon by children and by the general population.

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