

DIMETHOATE (027)

EXPLANATION

Dimethoate was evaluated for residues by the JMPR in 1967, 1970, 1973 (in the review of formothion), 1977, 1978, 1983, 1984, 1986, 1987, 1988 and 1990. It is a metabolite of formothion and a pesticide in its own right. Omethoate is a metabolite of dimethoate (and indirectly of formothion) and is also a pesticide in its own right. The JMPR was informed by the manufacturer that omethoate would no longer be supported in the CCPR or in the EU. It was therefore removed from the review schedule.

Earlier dimethoate limits were for the combined residues of dimethoate and omethoate, but the 1986 JMPR revised the definition of the residue to include only dimethoate at the request of the CCPR. Separate limits for omethoate accommodate its residues resulting from the use of dimethoate or omethoate. MRLs were not affected by the changed definition of the residue, but the 1986 Meeting recommended limits for a number of individual vegetables to replace the 2 mg/kg MRL for "vegetables (except as otherwise listed)".

Views have been expressed at the CCPR for several years that many of the proposed MRLs were based on old data (often on combined residues of dimethoate and omethoate), and that data based on current GAP and analytical methods with separate analyses for dimethoate and omethoate were needed. Repeated requests have been made for this information, and a number of MRLs have been held at Step 7C or 7B.

The 1992 CCPR recommended that Step 7C limits for beans (except broad beans and soya beans), broccoli, cauliflower, cucumber and leaf lettuce should be withdrawn if information was not provided. MRLs for Brussels sprouts, head cabbage, head lettuce, peaches, plums (including prunes) and wheat were held at Step 7B awaiting further consideration by the JMPR. The 1993 CCPR was informed that no new data would be provided for commodities with limits at Step 7C, although data developed in the 1960s could be supplied. Residue data and information on GAP were promised from Italy on wheat and rice and from the UK on lettuce. The Netherlands would make detailed comments on the limits for Brussels sprouts, head cabbages and plums. The 1993 CCPR retained the Step 7B and 7C proposals pending the 1993 JMPR review.

The Meeting received comprehensive information on GAP, as well as residue trials data from around the world, some relevant to the limits at Steps 7B and 7C and some on other crops. However, many of the trials were very old and relied on outdated analytical procedures, were reported in summary form only, or in some cases the reports were illegible. The Meeting was informed that the results of additional trials being conducted in the United States on peas, sorghum, oranges, maize, wheat, cotton seed and potatoes were expected to be available in 1995. The Meeting also received information on national MRLs as well as country comments on a few proposals.

The Meeting concentrated its review primarily on the more recent data and relevant GAP, and

government comments on proposals at Steps 7C and 7B. Other information on GAP, data on crops for which MRLs are not at issue, and other submitted information will be reserved for review at a future Meeting. The Meeting was unable to evaluate studies reported only in summary form.

USE PATTERN

Although substantial information was submitted on world-wide uses of dimethoate, the Meeting reviewed only that which was relevant to the new data provided. Details of GAP are given below with the discussion of the trials data.

RESIDUES RESULTING FROM SUPERVISED TRIALS

MRLs for vegetables currently at Steps 7C and 7B were recommended by the 1986 JMPR to replace the previous 2 mg/kg MRL for vegetables. They referred to residues of dimethoate only and were based on extensive data briefly summarized by the 1984 JMPR. The GAP to which the estimates related was not recorded but it was noted that the exclusion of omethoate from the residue did not significantly affect the residue levels.

MRLs at Step 7C: beans (except broad beans and soya beans), broccoli, cauliflower, cucumber and leaf lettuce.

The 1992 CCPR recommended withdrawal if no new data were provided to the 1993 JMPR.

Beans (except broad beans and soya beans). The only new residue data provided were summaries of 1988 Canadian trials on bush beans (Canada, 1993). The four-row 20 m plot of green bush beans was sprayed with 800l/ha by a tractor-mounted sprayer with a 4.8E formulation at 0.6 kg ai/ha. This may be compared with Canadian GAP of 0.34 to 0.48 kg ai/ha and a 7-day PHI. Details (analytical methods, intervals from sampling to analysis etc.) were not provided. The effects of various cooking and treatment procedures on residue levels were also summarized. The residues after PHIs of 2 and 9 days and the losses caused by subsequent treatments were as follows.

Treatment	PHI, days	
	2	9
	Residue, mg/kg	
	0.7	0.3
None	0.7	
	Residue loss, %	
Trimmed (ends removed)	31	1.6
Ends	0.7	0.4
30 sec. water rinse	0.0	32.8
Boiled 10 min.	78	61
Boiled 10 min. French style	38	93

Treatment	PHI, days	
	2	9
Microwave cooking	23	29
Frozen -20°C, 2 months	0.0	1.6
Blanched, frozen 2 months	0.0	45

Broccoli, cauliflower, cucumber. The current proposals are all 2 mg/kg. No new residue data were provided. A Hungarian efficacy study on cucumbers was supplied (Cheminova, 1993).

Leaf lettuce. The current proposal is 2 mg/kg. Relatively detailed summary data on 1983-84 supervised trials in the UK on butter-head lettuce (Hill and Lontay, undated) were available. UK GAP is 0.34 kg ai/ha (low volume) and 34 g ai/hl (high volume), with a PHI of 7 days for field and 28 days for glasshouse applications. The detailed reports were not provided. Results are summarized in Table 1.

Table 1. Residues of dimethoate and omethoate in protected butterhead lettuce (single-head samples) resulting from 1983-1984 supervised trials in the UK with a 40EC formulation at a nominal rate of 30 g ai/hl (Hill and Lontay, undated).

No. samples	No. appl.	PHI, days	Dimethoate			Omethoate		
			Residue, mg/kg		%CV	Residue, mg/kg		%CV
			mean	range		mean	range	
<u>Trial 1¹</u>								
60	3	3	5.7	1.6-12	34	0.25	0.06-0.8	52
60		7	5	1.8-9.4	32	0.22	0.03-0.5	53
60		10	2.4	0.7-8.9	64	0.23	0.04-0.7	65
<u>Trial 2¹</u>								
30	2	4	1.9	0.8-4.6	50	0.18	0.06-0.3	37
29		7	1	0.5-2.3	38	0.15	0.06-0.3	38
30		11	0.9	0.3-1.8	62	0.2	0.04-0.7	75
<u>Trial 3¹</u>								
30	2	9	2.1	0.1-4.6	55	0.14	0.04-0.3	42
30		14	1.4	0.1-3.5	56	0.13	0.02-0.2	45
30		17	1.4	0.3-4	62	0.18	0.03-0.5	65
<u>Trial 4²</u>								
10	1	18	1.9	1-5.3	67	0.15	0.09-0.4	
10		23	-	-	-	-	-	52
10		28	<u>1</u>	0.4-1.7	49	<u>0.16</u>	0.07-0.2	-
10		32	<u>1.1</u>	0.4-2.8	63	<u>0.16</u>	0.09-0.4	40
								57
10 ³	1	18	1.8	1.2-2.9	34	-	-	-
10 ³		23	1.8	0.8-3.8	47	0.18	0.1-0.3	34
10 ³		28	1.1	<u>0.7-1.8</u>	31	0.15	<u>0.1-0.2</u>	22
10 ³		32	1.2	<u>0.7-2.4</u>	42	0.16	<u>0.1-0.3</u>	27
<u>Trial 5¹</u>								
<u>Early spray</u>	2							
5		7	3.6	2.8-4.6 0.3-2.5	18	0.4	0.09-1.1	95
13		14	1.4	0.4-2.8	48	0.13	0.04-0.3	47

No. samples	No. appl.	PHI, days	Dimethoate			Omethoate		
			Residue, mg/kg		%CV	Residue, mg/kg		%CV
			mean	range		mean	range	
10	2	21	1.3	0.5-2.1	57	0.15	0.06-0.3	50
10		28	<u>1.2</u>	0.3-2.1	47	0.18	0.1-0.3	34
10		35	<u>0.9</u>		71	0.17	0.1-0.3	39
<u>Late spray</u>								
20	1	7	1.4	0.3-2.5	44	0.14	0.06-0.3	34
20		14	1.4	0.2-8.5	122	0.15	0.04-0.7	88
20		21	1	0.1-2.2	52	0.15	0.04-0.3	49
20		28	<u>0.79</u>	0.01-1.8	61	0.13	0.02-0.3	55
10		35	<u>1.2</u>	0.5-1.7	42	0.13	0.07-0.2	42

¹ Polyethylene tunnel

² Glasshouse

³ No. of 10-head samples = 100 heads total at each interval

MRLs at Step 7B: Brussels sprouts, head cabbage, head lettuce, peaches, plums (including prunes) and wheat. The MRLs were retained by the 1993 CCPR pending further consideration by the JMPR.

Brussels sprouts and head cabbages. The current 2 mg/kg proposals were recommended by the 1986 JMPR. Three additional trials on Brussels sprouts in Germany were reviewed by the 1988 JMPR. These showed maximum residues after 14 days (the GAP PHI) of 0.05 mg/kg dimethoate and 0.3 mg/kg omethoate from applications up to 0.36 kg ai/ha (3/4 of the maximum German GAP rate). Eight supervised trials on head cabbage in the same country were also available to the 1988 JMPR. Maximum residues after a PHI of 14 days were about 0.04 mg/kg dimethoate and 0.7 mg/kg omethoate from two row or plant-foot treatments followed by 2 spray treatments at 0.24 kg ai/ha. This appears to be reasonably reflective of reported German and/or Netherlands GAP. The 1988 JMPR concluded that the limited data from one country were not adequate to lower the proposed limit as had been suggested at the CCPR.

No new data were provided to the present Meeting. The government of The Netherlands expressed a general concern that the 1986 recommendations were based on old and inadequate data (Netherlands, 1993). The Netherlands also questioned the use of a 7-day PHI by the 1986 JMPR for Brussels sprouts and head cabbage, and noted that maximum residues were <1 mg/kg. It did not agree with the conclusion of the 1988 JMPR that data from one country were not sufficient to lower earlier estimates.

Head lettuce. The current proposal is 2 mg/kg. Over several years at the CCPR some delegations have considered the limit too high, and data and comments have been requested. The limit was recommended by the 1986 JMPR on the basis of GAP summarized in 1984 and, implicitly, data in earlier monographs (although which specific data is not clear) and was linked to the recommendation of separate MRLs for dimethoate and its metabolite omethoate and of individual MRLs to replace the group MRL for "vegetables (not otherwise listed)". The proposal was based on a 7-day PHI.

The information on GAP available to the Meeting included the following.

	Form.	g ai/hl (kg ai/ha)	Interval PHI No. (days)	(days)
UK	EC	34(0.34)		7 (field) 28 (glass)
Germany (head lettuce)	EC	40 (0.24)	8-14	21
Canada EC		(0.34)		7
From <u>1984 JMPR</u>				
Australia	-	30(0.32)	1-3	7
France -		30		15
USA	-	0.25		14

Data reviewed by the 1988 JMPR (five German trials) indicated residues of ≤ 0.34 mg/kg dimethoate and ≤ 0.06 mg/kg omethoate from two applications at the registered rate of 0.24 kg ai/ha and PHI of 21 days, but these limited data were not considered adequate to revise the limit. The 1993 Meeting received new summaries of 1982 and 1989 Canadian trials on Ithaca crisp head lettuce (a loose type of head lettuce) as well as Canadian GAP (EC formulation at 0.34 kg ai/ha and a 7-day PHI) (Canada, 1993). The number of applications was not specified. Results are shown in Table 2.

Table 2. Residues of dimethoate and omethoate on Ithaca head lettuce resulting from supervised trials in Canada with dimethoate emulsifiable concentrate formulations (Canada, 1993).

Year	No. Applic.	Applic. Rate, kg ai/ha	PHI, days	Residue, mg/kg ¹	
				Dimethoate	Omethoate
1982	2	0.15	2	4.6	0.3
			4	1.4	0.3
			7	0.2 (0.007)	0.08 (trace)
			14	0.01 (trace)	0.01 (ND)
			1	2.7 (0.02)	0.07 (ND)
			7	0.5 (0.03)	0.02 (trace)
	2	0.3	15	0.03 ²	0.03 ²
			2	8.4	0.4
			4	1.2	0.2
			7	0.3 (0.04)	0.1 (0.01)
			14	0.06 (trace)	0.04 (trace)
			1	6.5 (0.01)	0.1 (ND)
1989	1	0.34	7	1 (0.03)	0.3 (trace)
			15	0.09 ²	0.05 ²
			0	1.7	0.03
			1	1.1	0.08

Year	No. Applic.	Applic. Rate, kg ai/ha	PHI, days	Residue, mg/kg ¹	
				Dimethoate	Omethoate
			3	0.3	0.06
			7	0.2	0.03
			14	0.02	0.04
			21	ND	ND
			1	0.3, 0.2	-
			14	0.02, 0.01	-
			21	ND, ND	-
			28	ND, ND	-
			35	ND, ND	-

¹ Residues in parentheses = level in head leaves only. Trace = <0.005 mg/kg. ND = not detectable = <0.001 mg/kg for both compounds in 1982 trials, <0.005 mg/kg in 1989 trials.

² Residues in a composite sample of outer and head leaves.

Peaches. The current proposal is 2 mg/kg. Since 1991 several delegations to the CCPR have taken the position that available data would support a 1 mg/kg limit and the 1992 CCPR urgently requested governments to send detailed comments. None have been received, although The Netherlands questioned in general the recommendation of limits based on older data. Additional data from Hungary (Cheminova, 1993) are summarized below, together with previous results.

JMPR	Country/year	No.	Application Rate	PHI (days)	Residue (mg/kg)
1967	unspecified/?	?	30 g ai/hl 14	1-1.5	
1970	unspecified/?	?	40 g ai/hl 10	0.2-0.4	
1984	Portugal/1982	2	40 g ai/hl 14	0.73	
		3	40 g ai/hl 14	1.2	
1990	Hungary/1976	1	0.4 kg ai/ha	15	0.5
1993	S. Africa/1989 ¹	1	40 g ai/hl 18	0.34	
		1	40 g ai/hl 28	0.1	
		3	40 g ai/hl 18	0.22	
1993	Hungary/1991	1	0.4 kg ai/ha	7	0.07, 0.2, 0.3, 1.6, 1 ²

¹ No GAP information. The summary data submission was from Spain whose GAP is 2 applications at 40-60 g ai/hl and a 21-day PHI (Spain, 1993). Other summarized South African data indicate similar residues in canned peaches, but the detailed report was not provided.

² Corrected for 70% recoveries. Limit of determination 0.007 mg/kg (2:1 signal:noise ratio).

Plums (including prunes). The current 2 mg/kg proposal has been retained at Step 7B since 1987 awaiting details of trials according to current GAP and of current analytical methods, reported in accordance with current standards. Some delegations to the CCPR have supported the current level and others have supported lower limits. The most recent review of data was by the 1988 JMPR, which had access to the results of 6 new German supervised trials in which maximum residues were 0.11 mg/kg dimethoate and 0.14 mg/kg omethoate at the recommended 21-day PHI. The 1988 Meeting concluded that data from a single country were not adequate to revise the limit. The 1991 CCPR again retained the proposal at Step 7B to await detailed comments from The Netherlands.

The Meeting received comments from The Netherlands (Netherlands, 1993), as well as supervised trials data from Hungary (Cheminova, 1993). In addition to a general comment questioning the retention of limits based on old data, The Netherlands noted that all residues in the 1988 evaluations were <1 mg/kg and did not agree with the conclusion of the 1988 JMPR that data from one country were not sufficient to lower earlier estimates.

The 1991 Hungarian trials were with 4 applications of an EC formulation containing 400 g ai/l ("Agro D-10") at a spray concentration of 0.08% product applied at 1000 l/ha (0.032% ai and hence 0.32 kg ai/ha). Hungarian GAP was not provided in the language of the Meeting, although German GAP (a 1991 submission for an EC formulation: 0.04-0.06% ai = 0.6-0.9 kg ai/ha and a 14-day PHI or 0.028% ai = 0.3 kg ai/ha, 21-day PHI, depending on the pest) and relevant GAP from EC countries was reported as shown below.

<u>Country</u>	<u>Application</u>		<u>PHI, days</u>
	<u>Rate</u> % ai	<u>No.</u>	
Netherlands	0.02	1-2	21
France	0.03		15
Greece	0.03-0.05		25
Germany	0.04-0.15	1*	14 or 21
Italy (stone fruit)	0.02-0.05 (0.2-0.5)		20
UK	(0.5-0.7)		7
Spain	0.05-0.06 (0.6-0.9)		21

* or 3, depending on the source of information

Reported residues in the Hungarian trials were as shown below.

<u>Day</u>	<u>Residues (mg/kg)</u>			<u>Average</u>
	1	2	3	
0	0.3	0.3	0.4	0.3
3	0.1	0.1	0.1	0.1
5	0.08	0.07	0.06	0.07
10	0.04	0.04	0.01	0.03
14	0.01	0.01	0.01	0.01

The maximum residues in previous trials were as follows.

JMPR	Country	Applications		PHI, days	Residue, mg/kg
		No.	Rate		
1984	Netherlands	?	?	0 ?	0.3 7-14 <0.01 "mostly"
1988	Germany/1983	3-4	0.5-0.7 kg ai/ha	14 0.12 21	0.11

Wheat. The current 0.2 mg/kg proposal for wheat has been held at this step since 1990 as a result of varying opinions at the CCPR. Some delegations believed that more trials using current methods were needed and others held the view that the existing data supported a lower limit. The proposal was based on 3 supervised trials in Germany in 1982 and apparently took into account trials reported in the 1967 monograph (0.2 mg/kg after 58 days from 30 g ai/hl applications). In the German trials reviewed in 1988 residues in wheat grain were recorded as <0.05 mg/kg 35 and 51 days after applications at the German GAP rate of 0.24 kg ai/ha and <0.01 mg/kg after 56 days. GAP in other EU countries involves similar rates but PHIs of 14 to 20 days, and in the UK applications are at 0.34 to 0.68 kg ai/ha with a PHI of 7 days.

The Meeting received a comprehensive summary of EU GAP from the manufacturer and information on Italian GAP (28 g ai/hl or 0.28 kg ai/ha, 20-day PHI), generally comparable to that from some other countries, although as noted above PHIs vary (Italy, 1992). A summary report of the German trials which were reviewed by the 1988 JMPR (Germany, 1991) and data from a 1991 Hungarian trial (Cheminova, 1993) were also provided.

In the Hungarian trial replicated single applications were made to 0.4 ha plots of winter wheat with a liquid formulation at 1.0 l product/ha (0.4 kg ai/ha). A label in Hungarian was provided in the submission, but does not appear to refer to the product used in the trial. Plants were sampled at various intervals and grain 31 days after treatment. Samples were extracted with acetone, cleaned up by acetone/water/dichloromethane partition and analyzed by GLC. Residues, corrected for 82% recoveries, were as shown below.

Whole plant	Residue, mg/kg at interval (days) after treatment							
	0	1	2	3	5	7	10	14
Rep 1	5.1	2.3	1.3	0.8	0.3	0.2	<0.05	<0.05
Rep 2	5.5	2.6	1.7	1.1	0.4	0.2	<0.05	<0.05
Rep 3	5.3	2.4	1.5	0.9	0.4	0.2	<0.05	<0.05
Controls	<0.05 all intervals							
Grain	31 days							
7 samples	<0.05							
Controls	<0.05							

FATE OF RESIDUES

In storage and processing

The effects of various treatments on residue in green beans are tabulated in "Residues resulting from supervised trials" above.

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

The monitoring of 200 peach samples in Sweden during 1990-1992 showed a residue of 0.14 mg/kg in a single sample (Sweden, 1993).

NATIONAL MAXIMUM RESIDUE LIMITS

Although information on national maximum residue limits was provided, it is being retained for a future more comprehensive review.

APPRAISAL

Dimethoate is an insecticide used on many crops world-wide. It has been evaluated many times for residues since 1967. It is a metabolite of formothion and a pesticide in its own right. Similarly, omethoate is a metabolite of dimethoate (and indirectly of formothion) and is also a pesticide in its own right. The Meeting was informed by the manufacturer that omethoate would no longer be supported in the CCPR or in the EU. It was therefore removed from the review schedule.

Until 1986 dimethoate limits were for the combined residues of dimethoate and omethoate, owing in part to the nature of the data base, the early non-specific analytical methods and the ways in which national regulations have been framed. After repeated requests from the CCPR, and earlier rejection of a change by the JMPR, the 1986 Meeting revised the definition of the residue to refer only to dimethoate. Separate limits were proposed for omethoate to accommodate its residues resulting from the use of dimethoate or omethoate. MRLs were not affected by the changed definition of the residue, but the 1986 Meeting recommended limits for a number of individual vegetables to replace the 2 mg/kg MRL for "vegetables (except as otherwise listed)".

Since 1986 many delegations to the CCPR have expressed either support for or objections to the proposed limits. Objections have mainly centred on the wisdom of adopting limits based on very old data, with specific concerns that in many of the older trials combined residues were reported instead of separate residues of dimethoate and omethoate, that the original uses might no longer be current, and that many of the results were based on analytical methods which would no longer be acceptable.

This situation has led to repeated requests by the CCPR for governments and other interested parties to provide more recent and reliable data, with the result that a number of proposals have been retained at Step 7B or 7C since 1986. The 1987, 1988 and 1990 JMPRs reviewed additional information on GAP and selected residue data, estimated new maximum residue levels for olives and wheat (1988),

recommended that the 2 mg/kg limit for grapes should be lowered to 1 mg/kg and that the limit for apricots should be withdrawn (1990), but otherwise did not consider that the limited submissions, often from only one country, provided an adequate basis for lowering limits when it had been clear that uses were on a broad range of crops world-wide. The longer the subject has been debated, the more outdated the data bases have become.

The 1992 CCPR recommended that the limits at Step 7C for beans (except broad beans and soya beans), broccoli, cauliflower, cucumber and leaf lettuce should be withdrawn if information was not provided. The MRLs for Brussels sprouts, head cabbage, head lettuce, peaches, plums (including prunes) and wheat were held at Step 7B awaiting further consideration by the JMPR. The 1993 CCPR was informed by the manufacturer that no new data would be provided for commodities with limits at Step 7C, although data from trials in the 1960s could be supplied. Residue data and information on GAP were promised from Italy on wheat and rice and from the UK on lettuce. The Netherlands would make detailed comments on the limits for Brussels sprouts, head cabbages and plums. The 1993 CCPR retained the Step 7B and 7C proposals pending the 1993 JMPR review.

The Meeting received rather comprehensive information on GAP, in the form both of labels (in the native languages) and summary lists, as well as data on residue trials from around the world. Many of the trials were very old however (some previously reported) and relied on outdated analytical procedures, some were reported in summary form only, and some reports were illegible. The Meeting was informed that the results of additional trials being conducted in the United States on peas, sorghum, oranges, maize, wheat, cotton seed and potatoes were expected to be available in 1995. The Meeting also received information on national MRLs as well as comments from countries on a few proposals.

The Meeting concentrated its review mainly on the more recent data and relevant GAP, and government comments on proposals at Steps 7C and 7B. National MRLs, other information on GAP, and data on crops for which MRLs are not at issue will be reserved for review at a future Meeting. The Meeting placed little emphasis on the summary data.

Step 7C proposals

The Meeting received no additional information on broccoli, cauliflower or cucumber and recommended that the proposed MRLs should be withdrawn. The only new residue data to support the current 2 mg/kg proposal for beans (except broad beans and soya beans) were summary reports of trials on green beans from Canada. The Meeting also recommended withdrawal of this proposal.

The 1992 CCPR recommended withdrawal of the 2 mg/kg proposal for leaf lettuce unless additional data were provided to the 1993 JMPR. A relatively detailed summary was provided of extensive trials in the UK in 1983-1984, some of which approximated maximum GAP conditions. Most of the data were from analyses of multiple single-head samples from individual plots, the mean values of which could be considered relevant to the estimation of maximum residue levels. Only the ranges of residues were provided for the few multiple-head samples. In three of the 5 trials, and part of the 4th, samples were taken at intervals of ≤ 18 days compared with the 28-day PHI which is GAP for protected leaf lettuce in the UK. After ≥ 28 days the maximum residues (mean of single-head sample analyses and high end of the range for 10-head samples) were 1, 1.1, 1.8, 2.4, 1.2, 0.9, 0.8 and 1.2 mg/kg of dimethoate and 0.2, 0.2, 0.2, 0.3, 0.2, 0.2, 0.1 and 0.1 mg/kg of omethoate. The submitted country evaluation emphasized the high residues found after 7 days as an indication that the currently proposed limit may be too low, since pre-harvest intervals are not always certain.

The Meeting did not consider PHIs shorter than 28 days to be in accordance with the reported UK GAP for protected leaf lettuce, nor did it consider that the results could be applied to field uses for which the GAP PHI is 7 days and for which there were no data. Although additional possibly valid results were provided the Meeting concluded, taking into account that the report was only a summary and that previously reviewed trials had been considered inadequate by current standards, that the data were insufficient to estimate a maximum residue level. They suggest that reported uses could result in dimethoate residues exceeding the current 2 mg/kg proposal and that the 0.2 mg/kg CXL for omethoate might also be exceeded, but in the absence of adequate data to replace those previously available the Meeting recommended that the proposal should be withdrawn.

Step 7B proposals

The Meeting received comments from one country questioning the current proposals of 2 mg/kg for Brussels sprouts and head cabbages, which were recommended by the 1986 JMPR. The linking of the recommendation to a PHI of 7 instead of 14 days was also questioned. The additional data from one country on Brussels sprouts and Savoy cabbage reviewed by the 1988 JMPR, which indicated maximum residues reflecting GAP of 0.05 mg/kg dimethoate and 0.3 mg/kg omethoate in Brussels sprouts and of 0.5 mg/kg dimethoate and 0.7 mg/kg omethoate in head cabbage, were cited as evidence that the current limit is too high. A general reservation was also expressed on the 1986 Meeting's use of old data which may be unreliable by current standards.

While the Meeting agreed with the comment on the PHI, especially since the PHI of the country where the trials reviewed in 1988 were conducted is 14 days, information provided to the Meeting reported GAP PHIs as short as 7 days in the USA and UK with application rates the same as or higher than those in the cited trials. The Meeting concurred with the 1988 JMPR in concluding that adequate data had not been provided to support revision of the current proposals, and agreed to maintain the current recommendations of 2 mg/kg for Brussels sprouts and head cabbage.

In recent years several delegations to the CCPR have expressed the view that the current 2 mg/kg limit for head lettuce is too high. Data reviewed by the 1988 JMPR (maximum residue from treatments according to GAP 0.34 mg/kg) and summary Canadian data submitted to the present Meeting (maximum residue from GAP treatments 1 mg/kg dimethoate and 0.3 mg/kg omethoate) suggest that this may be the case. However the Meeting concluded that the more recently submitted data, alone, are too limited to support the recommendation of a limit and therefore inadequate as a basis for lowering the current proposal. The Meeting agreed to maintain the current recommendation of 2 mg/kg for head lettuce.

The current limit of 2 mg/kg for peaches has been retained for several years pending the submission of additional data from trials according to current GAP. Some delegations to the CCPR have suggested that available data support a lower limit, although after evaluating additional data and re-examining previous JMPR reviews the 1990 Meeting did not recommend a revision. The Meeting did not receive a response to the urgent request of the 1992 CCPR to governments for detailed comments, although one general comment was received. Additional data were received from Hungary (residues up to 1.6 mg/kg after 7 days from applications apparently according to GAP). Although most of the limited data suggest that a case might be made for a 1 mg/kg limit, residues up to 1.5 mg/kg from GAP treatments in the older trials, up to 1.2 mg/kg in more recent trials from a GAP rate and PHI (albeit after 3 applications instead of the 2 allowed by GAP), and up to 1.6 mg/kg in the new Hungarian trials suggest that 1 mg/kg could be exceeded. The Meeting concluded that insufficient data reflecting current GAP were available to support a

revision of the current proposal and agreed to maintain the current recommendation of 2 mg/kg.

The current 2 mg/kg proposal for plums (including prunes) has also been held at Step 7B for several years pending the submission of data reflecting current GAP and reporting standards. It was again retained at this step by the 1991 CCPR to wait a review by the JMPR of detailed comments to be submitted by The Netherlands. The Meeting reviewed comments from The Netherlands supporting a 1 mg/kg limit and new Hungarian data based on use patterns consistent with the GAP of EU countries.

The Netherlands generally questioned the retention of MRLs based on old data and did not agree with the 1988 JMPR conclusion that data from one country were not sufficient to lower the proposed limit. Maximum residues in the new Hungarian trials were ≤ 0.1 mg/kg at the PHIs (≥ 7 days) of other European countries. In 6 German trials reviewed by the 1988 JMPR residues were < 0.2 mg/kg after 14 to 21 days from applications according to GAP. Although the 1988 JMPR considered a PHI of 21 days to be GAP, information provided to the present Meeting indicates that 14 days is also GAP for the control of some pests. While the summary of GAP in EU countries received by the Meeting indicated that 1 application is GAP in Germany, other information provided indicates that 3 or 4 applications may be made (as in the trials reviewed by the 1988 JMPR).

When the new data are taken into account, residues in trials in three countries over several years have been well below 0.5 mg/kg even at very short PHIs. While only marginally sufficient data are available from trials according to GAP, the Meeting concluded that a limit of 0.5 mg/kg could be supported.

The 0.2 mg/kg limit for wheat recommended by the 1988 JMPR has been retained at Step 7B for several years as a result of varying opinions at the CCPR, and to await the submission of current information. The Meeting reviewed some additional information on GAP and additional residue data from Hungary, but the Hungarian trials were not reported in sufficient detail for the estimation of a maximum residue level. The Meeting agreed that data from the 3 supervised trials in Germany reviewed by the 1988 JMPR, considered alone, suggest the possibility of a lower limit. This conclusion would be supported by the Hungarian trials if they were carried out according to GAP. However, the Meeting also took note of the 0.2 mg/kg residue from a treatment according to GAP reported in the 1967 monograph and the fact that most EU GAP allows much shorter PHIs (7 to 20 days) than the 35 to 56 days in the German trials or 31 days in the Hungarian trials. The Meeting agreed to withdraw the previous recommendation of 0.2 mg/kg for wheat on the basis that the available data were insufficient by current standards.

In general the Meeting shared the doubts expressed by a number of countries at the CCPR regarding draft MRLs for dimethoate based on old data which may not meet current standards in several respects, including relevance to current GAP, acceptable analytical methods, adequate reporting (e.g. the inclusion of such details as sample storage periods and conditions, intervals from sampling to analysis, critical supporting studies etc.). These same concerns might also apply to existing CXLs if they were re-examined.

The difficulty is that in most of the controversial cases the data are quite limited by current standards. Disregarding the older studies from which the data may or may not still be valid is likely to leave an even less satisfactory data base. While the JMPR over several years has attempted to review *ad hoc* submissions to address specific concerns, it is clear that the general problem cannot be adequately considered until a comprehensive periodic review of a complete current data base can be conducted. Only then will there be an adequate basis to determine whether any of the current CXLs or remaining draft limits

should be revised or revoked.

The Meeting noted that the manufacturer no longer supports omethoate in either the CCPR or the European Union, and recommended that any future periodic review of dimethoate should also include a re-evaluation of current Codex MRLs for omethoate with a view to estimating omethoate residues which result from the use of dimethoate (or formothion).

RECOMMENDATIONS

On the basis of the available data, the Meeting concluded that the recommended MRL for plums should be lowered, and other MRLs withdrawn, as shown in the Table below.

Definition of the residue: dimethoate

Commodity CCN Name	Recommended MRL (mg/kg)	
	New	Previous
VP 0061 Beans, except Broad bean and soya bean	W ¹	2
VB 0400 Broccoli	W	2
VB 0404 Cauliflower	W	2
VC 0424 Cucumber	W	2
VL 0483 Lettuce, Leaf	W	2
FS 0014 Plums (including Prunes)	0.5	2
GC 0654 Wheat	W	0.2

¹ Recommended for withdrawal

REFERENCES

1. Canada. 1993. More Recent Comments on Compounds Scheduled for the 1993 JMPR. Letter, Taylor to Murray, May 5, 1993 and attachments 5 (GAP) and 6 (residue data for Ithaca crisp head lettuce (Pesticide Research Reports, 1982 and 1989), beans (Pesticide Research Report, 1988, page 299), blueberry and egg plant).
2. Cheminova. 1993. Report on Zoocide Trials and Supervised Trials For Residue Analysis 1991 (includes Hungarian data for cucumber, peach, lucerne, sunflower, sugar beet, peas, wheat and pepper); Report, Study of Biological Efficiency and Decomposition Dynamics of Agor M-5 and Agro D-10 Insecticides, 1991 (includes Hungarian data for vines, apples, plums, pears, cherries, sour cherries, currants, raspberries, quince and strawberries); Cheminova Hungary Ltd. label for Danadim 40Ec; United Agri Products labels for Dimethoate 400 and Dimethoate 25W. Older studies submitted include:
3. Elenewski, C.A. 1976. Cygon Dimethoate (CL 12,880 and Dimethoxon (CL 28,580: the Gas Chromatographic Determination of Dimethoate and Dimethoxon in Fortified Soil and Follow Crops (Snapbeans, Sugarbeets, Red beets, Wheat, and Oats). Unpublished American Cyanamid Report No. C-952.

4. Orloski, E.J. 1963. Dimethoate Residues in Peppers. Unpublished American Cyanamid Report C-32.
5. Orloski, E.J. 1964. Cygon Residues in Lima Beans. Unpublished American Cyanamid Report C-58.
6. Orloski, E.J. 1964. Cygon Residues in Snap Beans. Unpublished American Cyanamid Report C-57.
7. Orloski, E.J. 1965. Cole Crops and Leafy Vegetables. Broccoli, Cauliflower, Cabbage, Lettuce, Endive (escarole), spinach, beet greens, collards, chard, kale, mustard greens, turnip greens, water cress. Unpublished American Cyanamid Report No. C-86.
8. Orloski, E.J. 1966. Cygon Residues in Cucumbers. Unpublished American Cyanamid Report C-114.
9. Orloski, E.J. 1969. Cygon. Dimethoate and its Analog on Cucumbers. Unpublished American Cyanamid Report C-200.
10. Summary of Residue Studies in Beans and Peas. American Cyanamid Co.
11. Summary of Cygon Residue Studies. American Cyanamid Co., 1993. Cheminova transmittal.
12. Germany, 1991. German government response to ALINORM 91/24A, Nos. 78, 86, and 196. Includes German GAP, summary data for 1972 to 1983 German supervised trials (summarized by the 1988 JMPR); Data from 8 supervised trials on radishes and relevant information. J. Peters to Kopisch-Obuch, September 5, 1991.
13. Hill, A.C. and Lontay, K.E. Undated Report. Harvest Residues Arising From Permitted Usage of Dimethoate, Iprodione and Pirimicarb on Protected Lettuce (United Kingdom submission to FAO, ref. PRD 1234, R. Hignett, 2/5/93). Based on MAFF file PPC 62 "Pesticide Residue Trials: Dimethoate, Iprodione and Pirimicarb on Protected Lettuce at Lee Valley EHS and Luddington EHS, 1983-84.
14. Italy, 1992. GAP information and National MRLs submitted by the Comitato Nazionale italiano per il Codex Alimentarius, la Segreteria, August, 6, 1992.
15. Netherlands, 1993. Dimethoate, Written Comments of The Netherlands with Regard to Proposed MRLs for Brussels sprouts, Cabbage, Head and Plums Held in Step 7B Upon Their Request (ALINORM 91/24A, par. 82, 85). Ministerie van WVC, Directoraal Generaal van de Volksgezondheid, Information to the JMPR 1993, J.W. Dornseiffen to F. Ives.
16. Spain, 1993. Documentation: Spanish GAP for Dimethoate; Spanish GAP and Formothion Residue Studies in Peaches (94), Cherries (4), Canned Peaches (3), oranges (8), olives (6) and Spanish Omethoate GAP and Residues Studies in orange (3), Mandarins 930, Lemon (3). Secretaría General de Producciones y Mercado Agrarios, Dirección General de Sanidad de la Producción Agraria. Angel Yague Martinez de Tejada to F. Ives according to FAO instructions.
17. Sweden, 1993. Subject: Report of the 24th Session of the Codex Committee on Pesticide Residues. Ref. CL 1992/12-PR. Eva Lonberg, National Food Administration Codex Contact Point.