

PARATHION (058)

EXPLANATION

Parathion was originally evaluated in 1965 and has been reviewed several times since. In 1991 the JMPR recommended an MRL of 0.05 mg/kg for apple.

At the 25th Session of the CCPR (1993, ALINORM 93/24 A, para 81) the manufacturers informed the Committee that they would seek re-registration and indicated that a higher MRL for apple was needed. The proposed MRL was held at step 7B by the 1994 CCPR pending a new JMPR review. In 1995 the CCPR was informed that additional trials on apples were in progress; the results would not be available until 1996.

At the 29th Session of the CCPR (1997, ALINORM 97/24, para 52) the Committee kept the MRL at step 7B pending evaluation by the 1997 JMPR.

The Meeting received new residue data on apples, details of the analytical method used in the trials, and information on current GAP for apples in France.

METHODS OF RESIDUE ANALYSIS

Analytical methods

Samples from the trials reported to the Meeting were analysed by the method validated at Huntingdon Life Sciences (Study No. CHV 55).

The method involves macerating with aqueous acetone and filtering, followed by evaporation of the acetone. The aqueous phase is partitioned with dichloromethane and the organic phase is cleaned up by C-18 solid-phase extraction. Parathion and paraoxon are determined by temperature-programmed GLC with an FPD. The limit of determination (LOD) was 0.01 mg/kg for parathion and paraoxon in apples and the limits of detection were 0.0029 and 0.0024 mg/kg for parathion and paraoxon respectively.

Recoveries at fortification levels from 0.01 to 2 mg/kg were 87-105% for parathion and 89-101% for paraoxon.

Stability of pesticide residues in stored analytical samples

In the 1995 evaluation it was reported that parathion and paraoxon added to macerated apples at 1 mg/kg were stable at -20°C for 24 months, with 89-119% of the parathion and 88-106% of the paraoxon remaining.

USE PATTERN

Parathion is an insecticide with registrations in many countries for foliar application to a wide range of horticultural and agricultural crops.

Information on approved uses of parathion was recorded by the 1991 Meeting. The registered uses on apples and pome fruit are listed in Table 1. New information on registered uses on pome fruits was provided only for France.

Table 1. Registered uses of parathion on apples and pome fruits.

Crop	Country	Application			PHI, days
		kg ai/ha	kg ai/hl	No.	
Apples	Finland	0.3-0.6		1-3	21
	France		0.015		
	France		0.0225		
	Mexico	1.5	0.075	1-2	14
	Morocco	0.03-0.09		1-2	
	Netherlands		0.011	1	
	Portugal	0.3-0.45	0.03-0.045	1	21
	Portugal	0.2-0.3	0.02-0.03	1-3	21
Pome fruit	Zimbabwe	0.38-0.75	0.05	2	42
	Greece	0.5	0.05	1	14
	Italy	0.24-0.75	0.016-0.06	1	20
	Spain	0.34-0.9	0.023-0.06	1	21
		1.13	0.075	1	
		0.45-0.75	0.03-0.05	2-3	21

RESIDUES RESULTING FROM SUPERVISED TRIALS

Ten supervised trials carried out in 1968 and 1969 in Germany were evaluated by the 1991 Meeting against French GAP, and supported a maximum residue level of 0.05 mg/kg. Six of the trials were at a lower application rate than French GAP at that time. The residues in apples after one application according to GAP at 0.25-0.35 kg ai/ha and 15 days PHI were 0.03, 0.04, 0.05 and 0.05 mg/kg.

Six field trials on apples were conducted in 1994 on commercially representative sites, four in Central and two in Southern France. The plot sizes were about 75-191 m² (14 trees) in a single row. Parathion 500 g/l EC was applied twice at 0.36 kg ai/ha with a motorized knapsack sprayer with a 14-day interval. The second application was made at the stage of enlarging fruit in trials F1 and F3 and at maturity in trials SI and SII.

Samples were taken for a decline study immediately before the second application and then at 0, 3, 7, 14, 21 and 28 days PHI, with a final sample 33-45 days after the last application. Samples were stored at -20°C until analysis and the SAI was 8-11 months. The results are shown in Table 2. Residues of paraoxon were not detected except in trials F3, F4 and SII at a 0-day PHI where the residues were all <0.01 mg/kg. No residues of parathion were detected after 28 days.

Table 2. Parathion residues from supervised trials in France in 1994 (Cheminova Agro, 1997). All EC 500 g/l formulation. Underlined residues are from treatments according to GAP and were used to estimate maximum residue levels

Trial no., Location, Variety	Application			PHI, days	Parathion, mg/kg
	No.	kg ai/hl	kg ai/ha		
F1, Orleans, Melrose	2		0.36	0	0.13
				3	0.09
				7	0.06
				14	0.02
				21	0.01
				28	n.d

Trial no., Location, Variety	Application			PHI, days	Parathion, mg/kg
	No.	kg ai/hl	kg ai/ha		
F2, Orleans, Golden Delicious	2	0.036	0.36	0	0.16
				3	0.07
				7	0.02
				14	0.02
				21	<0.01
F3, Orleans, Golden Delicious	2	0.036	0.36	0	0.26
				3	0.1
				7	0.06
				14	0.04
				21	0.02
F4, Chinon, Golden Delicious	2	0.036	0.36	0	0.51
				3	0.28
				7	0.16
				14	0.13
				21	0.08
S1, Montauban, Golden Delicious	2	0.036	0.36	0	0.4
				3	0.1
				7	0.06
				14	0.02
				21	0.01
				28	n.d
SII, Montauban, Red Chief	2	0.036	0.36	0	0.21
				3	0.14
				7	0.24
				14	0.11
				21	0.08

FATE OF RESIDUES IN STORAGE AND PROCESSING

No new information was submitted. Processing studies were evaluated by the 1991 JMPR.

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

No information was provided.

NATIONAL MAXIMUM RESIDUE LIMITS

The following MRLs were reported to the 1991 JMPR.

Country	Commodity	MRL, mg/kg
Australia	Fruit, except apricots and peaches	0.5
Austria	Fruit	0.5
Belgium	Fruit	0.5
Canada	Apples	1
Denmark	Fruit	0.5
EU	Fruit	0.5 ¹
Finland	Fruit	0.5 ¹
France	Fruit	0.5 ¹
Germany	General (EU)	0.5 ¹
Greece	Fruit	0.5 ¹
Israel	Fruit	0.5
Italy	Fruit	0.5
Japan	Apples	0.3
Kenya	Fruit except apricots, citrus fruits and peaches	0.5

Country	Commodity	MRL, mg/kg
South Korea	Apples	0.3
Luxembourg	Fruit	0.5
Malaysia	Fruit except apricots, citrus fruits and peaches	0.5
Mexico	Apples	1
Netherlands	Fruit except apricots, citrus fruits and peaches	0.5
New Zealand	Fruit	0.5
Spain	Fruit	0.5
Sweden	Fruit except citrus fruits	0.5 ¹
Switzerland	Fruit	0.5
USA	Apples	1
Venezuela	Fruit	1
Yugoslavia	Fruit	0.5

¹Sum of parathion and paraoxon

APPRAISAL

Parathion was first evaluated by the JMPR in 1965 and extensively re-evaluated in 1991 and 1995. The 1991 JMPR recommended an MRL of 0.05 mg/kg for apple. The proposed MRL was advanced to Step 7B by the 1994 Session of the CCPR and subsequently held there, pending re-evaluation by the present Meeting.

The analytical method used in trials reported to the Meeting was based on temperature-programmed GLC with FP detection. Parathion and paraoxon were both determined with LODs of 0.01 mg/kg and recoveries above 80%.

Information on registered uses and national MRLs was recorded in the 1991 JMPR evaluation. New information on registered uses on pome fruits was provided only for France.

Information was submitted on residues from six supervised trials on apples in central and southern France in 1994. These were studies of residue decline and showed that parathion residues decreased from 0.13-0.51 mg/kg at 0 day to <0.01-0.08 mg/kg after 21 days. Residues of paraoxon were not detected. Since the trials were with a 50% higher application rate than French GAP, the Meeting could not change the previous recommendation.

The Meeting was informed that another eight trials in France and Spain are planned. The Meeting noted that parathion is scheduled for periodic review in 2000.

REFERENCES

Cheminova Agro A/S, 1997. Determination of Residues of Ethyl Parathion and its Metabolite Paraoxon in apples treated with Ethyl Parathion (EC formulation) during Field Trials in France. Study No. CHV 51C, Date 5 June 1997. Unpublished.

