METALAXYL (138)

EXPLANATION

Metalaxyl was first evaluated in 1982 and has been reviewed several times since, most recently in 1989, 1990 and 1992. At the 1994 CCPR the delegations of France and Germany and the EEC representative questioned the underlying data for the maximum residue level of 0.2 mg/kg in strawberries estimated by the 1992 JMPR (ALINORM 95/24, para 252). The EEC representative stated that the European Union is currently considering an MRL of 0.5 mg/kg for strawberry so the proposal of 0.2 mg/kg would not cover all uses. This was confirmed by the delegation of the USA. The MRL was held at step 7B pending review by the 1995 JMPR.

Since metalaxyl has been proposed for periodic review the Meeting considered only the MRL for strawberry. Information on GAP for other commodities received from Australia, Germany, The Netherlands, Peru and the UK and monitoring data provided by Australia will be kept on file and considered by a future JMPR as part of the periodic review.

The manufacturer provided updated information on GAP, eight new residue reports and an overall assessment of the residue situation for strawberries (Leuthold, 1995). Summaries of information on GAP for strawberries have been provided by Australia (Anon., 1995a), the UK (Anon., 1994a), The Netherlands (Anon., 1994b) and Canada (Anon., 1995b). Information on analytical methods and residue data (Dornseiffen *et al*., 1989a,b) was also made available by The Netherlands.

METHODS OF RESIDUE ANALYSIS

After extraction with dichloromethane, evaporation of the solvent and solution in n-hexane, the quantitative determination of the parent compound metalaxyl has been carried out by GLC with a nitrogen-specific detector (LOD 0.04 mg/kg). Metalaxyl and its metabolites containing 2,6-dimethylaniline have been determined by the same means (LOD 0.03 mg/kg) after extraction with dichloromethane, partitioning into water, acid hydrolysis of metalaxyl and the metabolites to 2,6-dimethylaniline, and bromination to 4-bromo-2,6-dimethylaniline (Anon., 1995b; Dornseiffen *et al*., 1989a,b).

USE PATTERN

The use of metalaxyl on strawberries is registered world-wide. Detailed information is shown in Table 1. Metalaxyl is applied by foliar spray, as a soil drench, soil spread with incorporation, or by dipping plants before planting. The PHI depends on local conditions and varies over a wide range. The critical GAP can be defined as follows.

Foliar spray: 0.7 kg ai/ha and a PHI of 30 days (France)
Broadcast: 2 kg ai/ha and a PHI of 40 days (Italy)
Soil incorporation: 3 kg ai/ha, at planting, no PHI (Japan)
Soil drench: 1.2 kg ai/ha and a PHI of 14 days (Mexico, UK).

Table 1. Registered uses of metalaxyl on strawberries.

Country	Form	Application				PHI, days
		Method	kg ai/ha	kg ai/hl	No.	

Country	Form	Application				PHI, days
		Method	kg ai/ha	kg ai/hl	No.	
Australia	WP	dipping		0.008		
Austria	GR	soil spread before planting	0.5		1	
Belgium	WP	dipping and pouring or spraying (plantation)	0.3		1-2	60
	GR	soil	0.75		2	60
Canada	EC	spray (autumn)	1		2	
	EC	spray post-planting and again in autumn	2.04		1-2	
Chile	GR	soil, 1st post-harvest, 2nd in spring	0.5-1		2	14
Finland	WP	drench of seedlings	0.05[1]	0.024	1	
France	WP	soil drench	0.7-1		1	30
	WP	soil drench end of growing period	0.7		2	30
	SC	foliar spray end of growing period	0.7		2	30
Italy	WP	foliar spray post-planting	0.2		2	40
	GR	broadcast or incorp. into soil pre-transplanting	2		1	40
Japan	GR	soil incorp.	3		1	
Malaysia	GR	broadcast at planting	0.5-1		1	
Mexico	EC	soil	1.2		2	14
Netherlands	GR	spread or row treatment	0.38		1-2	42
Romania	WP	foliar		0.032		40
Spain	GR	soil spread before planting	0.5-1		1	
UK	WP	soil drench after planting	1.24		1	14
USA[2]	EC or WP	ground, drip irrigation	1.12		2-3	

[1] l/plant (corresp. to approx. 1.2 kg ai/ha)
[2] incomplete information on GAP submitted

RESIDUES RESULTING FROM SUPERVISED TRIALS

New data from supervised trials were provided by the manufacturer.

Six studies were carried out in Spain (Kühne, 1994a-f; report nos. 2057/93-2062/93) with three sprayings at two-week intervals at 0.35 kg ai/ha. Fruit were sampled 7, 14 and 21 days after the last application. The residues ranged from 0.12 to 0.46, 0.06 to 0.27 and 0.04 to 0.17 mg/kg after 7, 14 and 21 days PHI respectively.

Two additional studies were carried out in Switzerland (Kühne, 1993a,b), in one trial with one dip treatment in summer and one foliar application in the following spring, and in the other with a single dip in summer. Residues of 0.04 and <0.02 mg/kg respectively were detectable in the fruit the following season.

Four indoor and two outdoor residue trials (report nos. RVA 2108/80, 2109/80, 311-1986, 311-1987) were carried out in The Netherlands (1 or 2 treatments at 0.38-0.83 kg ai/ha) with maximum residues of 0.06 mg/kg (Anon., 1995b; Dornseiffen *et al*., 1989a,b).

The manufacturer also provided reports of a number of other residue trials carried out in

Canada, France, Germany, Italy, Switzerland, the UK and the USA (Leuthold, 1995) which had been submitted for the 1985 and 1987 Meetings. From one to five foliar applications were made with metalaxyl alone or mixed with mancozeb or folpet. Details of the new and the previously reported trials are shown Table 2. The underlined residues are from treatments according to GAP.

Table 2. Residues of metalaxyl in strawberries.

Country, year	Application				PHI, days	Residues, mg/kg		Report
	Form	No	kg ai/ha	kg ai/hl		Parent	Total*	
Outdoor								
Canada, 1980	WP	2	2.0 soil drench		44	0.02		RVA 2450/80
France, 1990	WP	2	0.7 foliar spray	0.007	26	0.26		60/90
Germany, 1981	WP	1	0.2 foliar spray before harvest		10	0.03		2091/82
1981	WP	3	0.2 foliar spray before harvest		10	0.08		2386/81
1982	WP	1	0.12[1] after harvest		289	<0.02		2033/81
					302	<0.02		
1982	WP	1	0.12[1] after harvest		309	<0.02		2051/82
					321	<0.02		
1983	WP	1	0.12[1] after harvest		251	<0.02		2052/82
					259	<0.02		
1983	WP	1	0.12[1] after harvest		233	<0.02		2290/82
					244	<0.02		
1983	WP	1	0.12[1] after harvest		222	<0.02		2291/82
					235	<0.02		
1983	WP	1	0.12[1] after harvest		218	<0.02		2292/82
					228	<0.02		
1983	WP	1	0.12[1] after harvest		229	<0.02		2293/82
					236	<0.02		
1984	WP	2	0.12[1] before flowering		75	0.09		2266/83
					84	0.09		
1984	WP	2	0.12[1] before flowering		91	0.02		2030/83
					96	0.02		
1984	WP	2	0.12[1] before flowering		79	0.16		2031/83
					87	0.11		
1984	WP	2	0.12[1] before flowering		78	0.1		2032/83
					88	0.06		
1987	WP	1	0.12[1] after harvest		239		0.02	RVA 2190/86
					247		<0.02	
1987	WP	1	0.12[1] after harvest		231		0.05	RVA 2191/86
					241		0.04	
1987	WP	1	0.12[1] after harvest		272		0.03	RVA 2192/86
					283		0.02	
1987	WP	1	0.12[1] after harvest		240		0.02	RVA 2193/86
					247		0.02	

Country, year	Application				PHI, days	Residues, mg/kg		Report
	Form	No	kg ai/ha	kg ai/hl		Parent	Total*	
Italy, 1980	GR	1	2.0 start of flowering		38	0.18		RVA 2129/80
1980	WP	1	2.0 full flowering		38	0.28		RVA 2130/80
Netherlands, 1980	WP	2	0.38 2 weeks after planting	0.02	86	<0.02		RVA 2108/80
1986	GR	1	0.38		28	0.04	<0.04	311-1986
					35	<0.04	<0.04	
					42	<0.04	<0.04	
1986	GR	1	0.38		42	0.06	0.06	311-1986
					49	0.06	0.04	
					56	0.04	0.05	
Spain,	WP	3	0.35 spraying before harvest	0.026	7	0.12		2057/93
1993				0.035	14	0.06		
				0.035	21	0.04		
1993	WP	3	0.35 spraying before harvest	0.058	7	0.28		2058/93
					14	0.18		
					21	0.09		
1993	WP	3	0.35 spraying before harvest	0.058	7	0.21		2059/93
					14	0.15		
					21	0.06		
1993	WP	3	0.35 spraying before harvest	0.082	7	0.21		2060/93
				0.073	14	0.15		
				0.073	21	0.06		
1993	WP	3	0.35 spraying before harvest	0.048	7	0.39		2061/93
					14	0.18		
					21	0.11		
1993	WP	3	0.35 spraying before harvest	0.046	7	0.46		2062/93
					14	0.27		
					21	0.17		
Switzerland, 1982	WP	1	0.06[2] 9 days after planting		286	<0.02		2034/81
1990	WP	1		0.05 dip				2116/90
		1	1.0 15-18 new leaves	0.1 foliar	52	0.04		
1990	WP	1		0.05 dip	317	<0.02		2116/90B
UK,	WP	1	0.12[2] soil drench after planting	0.05	71	0.09		RVA 2287/79
1979	WP	1	0.12[2] soil drench after planting	0.05	73	0.08		RVA 2288/79
1979	WP	1	0.12[2] soil drench after planting	0.05	82	<0.02		RVA 2289/79
USA, 1978	GR	5	2.2 young plants	0.24	200	<0.05		AG-A 6034
1982	EC	3	1.1	0.24	21	0.05, 0.08	0.09, 0.21	AG-A 6877

Country, year	Application				PHI, days	Residues, mg/kg		Report
	Form	No	kg ai/ha	kg ai/hl		Parent	Total*	
					28	0.07, 0.09	0.1, 0.11	
					35	<0.05 (2)	0.11 (2)	
1982	EC	3	1.1 foliar spray pre-bloom	0.12	32	0.26, 0.28	0.3, 0.35	AG-A 6979
					39	0.08, 0.21	0.15, 0.35	
1983	EC	3	1.1 foliar spray flowering	0.47	40		0.23, 0.24	AG-A 7402
					48		0.14 (2)	
					54		0.15, 0.17	
1985	GR	4	1.0		32		0.11, 0.12, 0.17, 0.34	AG-A 9225
	GR	1	1.0		34		0.12	
	GR	1	0.2[1]		71		<0.05(2), 0.08	
Indoor								
Netherlands, 1980	WP	1	0.83	0.02 dip	46	<0.02, 0.05		RVA 2109/80
		2		0.04 spray		0.06		
1987	GR	1	0.38		28	<0.05	<0.03	311-1987
					35	<0.05	<0.03	
					42	<0.05	<0.03	
	GR	1	0.38		56	<0.05	<0.05	
					63	<0.05	<0.05	
					70	<0.05	<0.05	

* sum of parent and all metabolites containing 2,6-dimethylaniline
[1] g/m, 0.12 corresponds to approx. 1.2 kg ai/ha
[2] g/plant, 0.12 corresponds to approx. 4.2-4.8 kg ai/ha

NATIONAL MAXIMUM RESIDUE LIMITS

The manufacturer reported only two new national MRLs for strawberries to the Meeting (Japan, USA). All national MRLs available for strawberries are shown below. For the other commodities see the 1992 JMPR evaluation.

National MRLs for strawberries.

Country	MRL in mg/kg
Austria	0.1
Belgium	0.1
France	0.5
Germany	0.1
Italy	0.5
Japan	0.5

Netherlands	0.1
Spain	0.5
USA	10

APPRAISAL

Metalaxyl was first evaluated in 1982 and has been reviewed several times since, most recently in 1992. At the 1994 CCPR the delegations of France, Germany and the EU questioned the basis for the maximum residue level for strawberry originally estimated by the 1985 JMPR and confirmed in 1992 (ALINORM 95/24 para 252). The Session was informed that the proposed MRL of 0.2 mg/kg would not cover all uses in the EU and the USA. The MRL was held at step 7B pending review by the 1995 JMPR.

Since metalaxyl has been proposed for periodic review, the Meeting considered only the MRL for strawberry. Other available information will be kept on file for consideration as part of the periodic review.

The Meeting received updated information on GAP, eight new residue reports and an overall assessment of the residue situation for strawberries by the manufacturer. Information on GAP for strawberries was provided by Canada and the UK. The Netherlands provided information on GAP, analytical methods and data on residues resulting from supervised trials.

The parent compound metalaxyl has been determined after extraction with dichloromethane, evaporation of the solvent and solution in hexane by GLC with nitrogen-specific detection (LOD 0.04 mg/kg). Metalaxyl and the metabolites containing the 2,6-dimethylaniline moiety were determined by GLC with nitrogen-specific detection (LOD 0.03 mg/kg) after extraction with dichloromethane, partitioning into water, acid hydrolysis of metalaxyl and the metabolites to 2,6-dimethylaniline, followed by bromination to 4-bromo-2,6-dimethylaniline. The LOD was 0.03 mg/kg.

The 1992 JMPR concluded that the available data did not support changing the MRL of 0.2 mg/kg. The present Meeting reviewed the new residue data in the context of earlier information.

The use of metalaxyl in strawberries is registered world-wide for foliar spray and broadcast or soil drench application. The Meeting noted the US tolerance for metalaxyl in strawberries (10 mg/kg) and was informed that although US GAP and data supporting the US tolerance were documented they had not been provided to the JMPR. This situation highlights the need for submission of all relevant data to the JMPR.

Only two outdoor residue studies approximating GAP were received. These were from The Netherlands (1 treatment of 0.38 kg ai/ha, 42-day PHI), with maximum residues of 0.06 mg/kg 42 days after treatment. The six new studies carried out in 1993 in Spain and the two from Switzerland were not in accord with current GAP, and the reports provided to previous JMPRs could not be used because the trials they described were not conducted according to current GAP.

In view of the known incompleteness of the submitted information on GAP and the lack of sufficient residue data to estimate a maximum residue level based on European GAP, the Meeting agreed to withdraw the previous recommendation of 0.2 mg/kg for strawberries.

RECOMMENDATIONS

The Meeting recommended the withdrawal of the previous recommendation for strawberry, as shown below.

Definition of the residue: metalaxyl

Commodity		Recommended limit, mg/kg		PHI on which based, days
CCN	Name	New	Previous	
	Strawberry	Withdrawn		

FURTHER WORK OR INFORMATION

Desirable

Residue data from supervised trials carried out in accordance with current use patterns on broccoli, cabbages and cauliflower (from 1992).

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