PROCYMIDONE (136)

EXPLANATION

Procymidone was reviewed by the Joint Meeting in 1981, 1989 and 1990. The 1992 CCPR held all MRLs at step 7B in view of the need to ensure that the available residue data, most of which were reviewed in 1981, reflected current GAP.

The manufacturer indicated that residue data on common beans, cucumbers, grapes, head lettuce, bulb onions and tomatoes, together with information on current GAP, would be submitted to the JMPR.

Extensive information was provided by the manufacturer and some member countries on use patterns, with some residue data from supervised field trials and the monitoring of food commodities. The new information is evaluated in this monograph.

USE PATTERNS

Procymidone is a preventive and curative fungicide which is moderately systemic. It is especially effective for the control of Botrytis, Cocliobolus, Helmintosporium, Sclerotinia and Monilia species in fruits, vegetables, field crops and ornamental plants.

The current recommended or registered use patterns are summarized in Table 1.

RESIDUES RESULTING FROM SUPERVISED TRIALS

Additional residue data were provided from several countries (Tables 2-8). Most of the trials were conducted in accordance with the national use patterns or at about double rates. In the Tables the countries are indicated by the following codes: ARG-Argentina, AUL-Australia, AUS-Austria, BEL-Belgium, FRA-France, GER-Germany, HUN-Hungary, ITA-Italy, JPN-Japan, LUX-Luxembourg, NET-Netherlands, NZE-New Zealand, POR-Portugal, SAF-South Africa,SPA-Spain, SWI-Switzerland, URU-Uruguay, VEN-Venezuela. Underlined residues are from treatments according to GAP.

Cherries, sour. A cherry orchard was treated with Sumilex 50 WP at the maximum rate according to registered uses in Hungary. Samples were taken from days 1 to 21 after application. The residues found are shown in Table 2.

Grapes. Residue trials were conducted by Landis Europe SA at sites in seven regions in Europe where wine grapes are grown. Two of the trials were located in France, two in Italy, two in Spain, and one in Hungary. Six separate trials at each of the sites (a total of 42 trials) provided data on the residues of procymidone in or on mature, whole wine grapes and in wine prepared from them. In each test, four applications of Sumisclex 50 WP or Sumisclex 50 L were made using ground equipment. The first three applications were at growth stages of petal fall, cluster closing and colour change. The last application was at a prescribed time before harvest (28, 21, 15, and 5 days) in order to test the effect of the PHI on the residue level. Application was at the maximum rate found on any labels (1x) for four tests per trial site and at twice the maximum rate (2x) for two tests per site for the respective countries. These application rates were equivalent to 250 and 500 g ai/ha for Spain, and 750 and 1500 g ai/ha for France, Italy and Hungary.

Table 1. Registered or approved uses of procymidone

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
Almond	Lebanon	50 WP	*	25-50		14
Apple	Lebanon	50 WP	*	25-50		14
Apple	Japan	50 WP	4	25		90
Apricot	Bulgaria	50 WP	3-4	75		14
Apricot	France	50 WP, 50 FL	*	75		15
Apricot	Japan	50 WP	3	37.5		14
Apricot	Jordan	50 WP	*	25-50		14
Apricot	Lebanon	50 WP	*	25-50		14
Apricot	Turkey	50 WP	*	100		15
Barley	Czechoslovakia	50 WP	1[1]		1500	
Beans, Adzuki	Japan	50 WP	4	25-50		21
Beans	Chile	50 WP	*		375-600	
Beans	France	50 WP, 50 FL	1-2		375	15
Beans	Jordan	50 WP	*	25-50		3
Beans	Lebanon	50 WP	*	25-50		3
Beans	New Zealand	25 FL	2		1000	3
Beans	Poland	50 WP	2-3		500	
Beans	South Africa	25 SC	2		375	14
Beans	Thailand	50 WP	At 7-10 d intervals	15-30		
Beans (seed)	Czechoslovakia	50 WP	2	50		
Beans, Dwarf	Austria	WG 50 %	*	50		7
Beans, Dwarf	Germany	WG 50 %	3		380	7
Beans, Dwarf	Netherlands	50 WP/FL	2		500	14
Beans, Faba	Australia	50 WP	4-5		250	
Beans, Faba	Australia	27.5 FL	4-5		275	2
Beans, Green	Australia	50 WP	2[6]	50	500-750	
Beans, Green	Australia	27.5 FL	2		550-825	2
Beans, Haricot	Belgium	50 WP			500	14
Beans, Kidney	Japan	50 WP	4	25-50		21
Beans, Navy	Australia	50 WP	2		500-750	
	Australia	27.5 FL	2		550-825	2
Beans, Runner	Netherlands	50 WP/FL	1-2		1000	14
Blackberries	Switzerland	50 WG	2		750-1000	14
Cabbage	Greece	WG 50 %	8-10	62.5		3
Cabbage	Japan	50 WP	4	50-75		14
Cabbage	Jordan	50 WP	*	25-50		3
Cacao	Venezuela	50 WP	*		500-750	3
Carrot	Hungary	50 WP	2-3		500	14
Carrot	Yugoslavia	50 FL				

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
Cauliflower	Greece	WG 50 %	8-10	62.5		3
Celery	Japan	50 WP	5	25-50		14
Celery	Jordan	50 WP	*	25-50		3
Celery	Venezuela	50 WP	*		500-750	3
Cherries	Hungary	50 WP	3		600-750	14
Cherries	Japan	50 WP	3	25-37.5		14
Cherries	Jordan	50 WP	*	25-50		14
Cherries	Lebanon	50 WP	*	25-50		14
Cherries, sour	Yugoslavia	50 WP		50		28
Cherries, sour	Yugoslavia	50 FL		75		28
Chicory	France	50 WP/(50 FL)	3-4		750	21
Citrus	Peru	50 WP	1	25-50		
Clover	Czechoslovakia	50 WP	1-2		500	
Coffee	Thailand	50 WP	At 7-10 d intervals	15-30		
Cotton	Thailand	50 WP	At 7-10 d intervals	15-30		
Cucumbers	China	50 WP	*		300-375	
Cucumbers	CIS	50 WP	*	30-37.5		
Cucumbers	Greece	WG 50 %	8-10	50		1
Cucumbers	Italy	12.3/49 WP[2]	1-2	12.3-24.6		
Cucumbers	Japan	25 D	6		750	1
	Japan	30 SA	6		1800	1
	Japan	50 WP	6	25		1
Cucumbers	Jordan	50 WP	*	25-50		3
Cucumbers	Lebanon	50 WP	*	25-50		3
Cucumbers	Netherlands	50 WP, 50 FL	*	25		3
Cucumbers	Poland	50 WP	*	50-75		3
Cucumbers	Portugal	50 WP	*	75		7
Cucumbers	Rep. of Korea	50 WP	3		800	5
Cucumbers	Turkey	50 WP	*	37.5		15
Currant	Czechoslovakia	50 WP	1	75[3]		
Durian	Thailand	50 WP	*[1]	25-50		
Egg plant	Greece	WG 50 %	8-10	50		
Egg plant	Japan	25 D	6		750	1
	Japan	30 SA	6		1800	1
	Japan	50 WP	6	25-50		1
Egg plant	Jordan	50 WP	*	25-50		3
Egg plant	Lebanon	50 WP	*	25-50		3
Egg plant	Netherlands	50 WP, 50 FL	*	25		3
Egg plant	Poland	50 WP	*	50-75		3
Endive	France	50 WP, 50 FL	1[3]	30		
	France	50 WP, 50 FL	1[4]		1500	

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
	France	50 WP, 50 FL	1-2[5]		1500	
Endive	Netherlands	50 WP, 50 FL	2		750	
Fruits	Thailand	50 WP	1[6]	40-80		
Garlic	Australia	27.5 FL	1		5.5 g/kg	
	Australia	50 WP	1		5 g/kg[7]	
Garlic	France	50 WP, 50 FL	1[8]		1.5 g/kg[8]	
Garlic	Poland	50 WP	1[8]		2 g/kg	
	Poland	50 WP	1	150		
Garlic	Thailand	50 WP	At 10-14 d intervals	25-50		
Garlic	Uruguay	50 WP	1		500	
Garlic	Venezuela	50 WP	1		500-1000	1
Gherkins	Netherlands	50 WP, 50 FL	*	25		3
Grapes	Argentina	50 WP	2	37.5-50		28
Grapes	Australia	27.5 FL	4		550	5
	Australia	50 WP	2		500	5
	Austria	WG 50 %	2	37.5-50		21
Grapes	Bulgaria	50 WP	4	50		14
Grapes	Chile	50 WP	*	25-37.5		
Grapes	CIS	50 WP	4		500-750	30
Grapes	Czechoslovakia	50 WP	1-2	50		21
Grapes	France	50 WP, 50 FL	1-2		750	14
Grapes	Germany	WG 50 %	3	37.5	380-680	28
Grapes	Greece	WG 50 %	*	50		28[9]
	Greece	WG 50 %	*	62.5		14[10]
Grapes	Hungary	50 WP	2		500-750	14
Grapes	Italy	12.3/49 WP[2]	3-4	24.6		21
Grapes	Italy	22.5/45 WP[11]	*	45-56.2		21
	Italy	25 SC	3-4	50-75		21
	Italy	50 FL	3-4	50-75		21
	Italy	50 WP	3-4	50-75	250-500[12]	21
	Italy	5 D	3-4		1000-1250	21
	Italy	75 DFL	3-4	52.5-75		21
Grapes	Luxembourg	50 WP	3	37.5		28
Grapes	New Zealand	25 FL	3		1000	1
Grapes	Peru	50 WP	2		250-500	
Grapes	Portugal	50 WP	4	75		21
Grapes	Rep. of Korea	50 WP	*		1250	3
Grapes	Romania	50 WP	*		500-750	
Grapes	South Africa	25 SC	1-2	50		7[9], 28[10]
Grapes	Spain	3 E 3 D)	*		600-900	15
	Spain	50 WP	*	75		5

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
Grapes	Switzerland	50 WG	4	50	1000	
Grapes	Thailand	50 WP	At 7-10 d intervals	10-15		
Grapes	Turkey	50 WP	*	37.5		21
Grapes	Uruguay	50 WP	1-2	37.5-50	500-750	28
Grapes	Venezuela	50 WP	*		500-1000	3
Grapes	Yugoslavia	50 FL	4		500	28
Grapes	Yugoslavia	50 WP			500	28
	Zimbabwe	50 WP	4		500	21
Kiwifruit	Italy	25 SC	5	75-100		14
Lemon	Thailand	50 WP	At 10-14 d intervals	25-50		
Lettuce	Argentina	50 WP	*	50		7
Lettuce	Australia	27.5 FL	3-4		310-660	2
	Australia	27.5 FL	1	275	1000	
	Australia	50 WP	3-4		281-600	2
	Australia	50 WP	1	250	1000	2
Lettuce	Austria	WG 51 %	*	50		7
Lettuce	Belgium	50 WP			5-7.5 g/acre	21
Lettuce	France	50 WP, 50 FL	3-4		750	21
Lettuce	Greece	WG 50 %	8-10	62.5		
Lettuce	Japan	50 WP	5	25-50		7
Lettuce	Jordan	50 WP	*			3
Lettuce	Lebanon	50 WP	*			3
Lettuce	Netherlands	50 WP, 50 FL	1		2000	
Lettuce	Poland	50 WP	2		500-750	21
Lettuce	Rep. of Korea	50 WP	*		700	3
Lettuce	Taiwan	50 WP	4		375-500	3
Lettuce	Uruguay	50 WP	*	50		
Lettuce	Venezuela	50 WP	*		500-750	3
Lettuce	Yugoslavia	50 FL	3		300	35
	Yugoslavia	50 WP			300-750	
Litchi	Thailand	50 WP	At 10-14 d intervals	25-50		
Longan	Thailand	50 WP	At 10-14 d intervals	25-50		
Lupins	Australia	50 WP			1 g/kg[7]	
	Australia	27.5 FL			1.1 ml/kg	
Mango	Thailand	50 WP	At 10-14 d intervals	25-50		
Melon	France	50 WP, 50 FL	*		750	7
Melon	Netherlands	50 WP, 50 FL	*	25		3
Melon	Poland	50 WP	*	50-75		3
Melon	Thailand	50 WP	At 7-10 d	15-30		

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
			intervals			
Nectarine	Uruguay	50 WP	*		500-750	7
Onions	Argentina	50 WP	*	50		7
Onions	Australia	27.5 FL	1		11 g/kg	28
	Australia	27.5 FL	2		1000	28
	Australia	27.5 FL	1	55[7]		28
	Australia	50 WP	1		10 g/kg red	28
	Australia	50 WP	1		2000	28
	Australia	50 WP	1		1000	28
	Australia	50 WP	1	500[7]		28
Onions	Austria	WG 50 %	*	50		7
Onions	Egypt	50 WP			5 g/kg[8]	
Onions	Greece	WG 50 %	8-10	62.5		1
Onions	Japan	50 WP	5	25		1
Onions	Jordan	50 WP	*	25-50		3
Onions	Netherlands	50 WP, 50 FL	1		250	28
Onions	New Zealand	10 % granule	1		2000	1
	New Zealand	25 FL	*		1000	21
Onions	Poland	50 WP	1[1]		2.5 g/kg	14
	Poland	50 WP	1		5-15 g/kg	14
	Poland	50 WP	1[7]	150		14
Onions	Spain	50 WP		75		5
Onions	Thailand	50 WP	At 10-14 d intervals	25-50		
Onions	Uruguay	50 WP	*		750	
Onion	Venezuela	50 WP	*		500-1000	1
Orange	Japan	25 D	3		2000	
	Japan	30 SA	3		3000	
	Japan	50 WP	3	37.5-75		
Papaya	Thailand	50 WP	At 10-14 d intervals	25-50		
Parsley	Hungary	50 WP	2-3		500	14
Peaches	Chile	50 WP	*		375-600	
Peaches	France	50 WP, 50 FL	2	75		8
Peaches	Italy	12.3/49 WP[2]	3-5	24.6-30.75		14
	Italy	25 SC	3	75-100		14
	Italy	25 SC	4-5	50-75		14
	Italy	50 WP	3	75-100		14
	Italy	50 WP	4-5	50-75		14
	Italy	50 FL	3	75-100		14
	Italy	50 FL	4-5	50-75		14
	Italy	75 DFL	3	70-97.5		14
	Italy	75 DFL	4-5	52.5-75		14

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
Peaches	Japan	50 WP	3	25-37.5		3
Peaches	Jordan	50 WP	*	25-50		3
Peaches	Lebanon	50 WP	*	25-50		14
Peaches	Morocco	50 WP	*	250		3
Peaches	Romania	50 WP	*	50-75		
Peaches	South Africa	25 SC	2	37.5		7
Peaches	Uruguay	50 WP	*	25-37.5	500-750	7
Peaches	Venezuela	50 WP	*		500-750	3
Peanut	Japan	50 WP	4	25-50		21
Peanut	South Africa	25 SC	2-3		375	14
Peanut	Venezuela	50 WP	*	50-100		21
Pear	Italy	50 WP	*	50-75		
	Italy	50 FL	*	50-75		14
	Italy	25 SC	*	50-75		14
	Italy	75 DFL	*	52.5-75		14
Peas	France	50 WP, 50 FL	1-2		375	15
Peas	Germany	WG 50 %	1		500	14
Peas	South Africa	25 SC	2-3		375	14
Peppers	Austria	WG 50 %	*	50		7
Peppers	Greece	WG 50 %	8-10	62.5		3
Peppers	Jordan	50 WP	*	25-50		3
Peppers	Lebanon	50 WP	*	25-50		3
Peppers	Portugal	50 WP	*	75		7
Peppers	Thailand	50 WP	At 7-10 d intervals	15-30		
Peppers, Chilli	Thailand	50 WP	At 7-10 d intervals	15-30		
Peppers, Green	Hungary	50 WP	*		500	3
Peppers, Green	Japan	30 SA	5		1800	1
	Japan	50 WP	5	25-50		7
Peppers, Green	Netherlands	50 WP, 50 FL	*	25		3
Peppers, Red	Poland	50 WP	*	50-75		3
Peppers, Red	Rep. of Korea	50 WP	5		800	7
Plum	France	50 WP, 50 FL	1	75		8
Plum	Lebanon	50 WP	*	25-50		14
Prune, dried	France	50 WP, 50 FL	2-3	75		8
Pome fruits	Switzerland	50 WG	2		1000	
Potatoes	Japan	50 WP	4	25-37.5		21
Potatoes	Jordan	50 WP	*	25-50		3
Potatoes	Lebanon	50 WP	*	25-50		3
Potatoes	South Africa	25 SC	1-2		125-250	35
Potatoes	Thailand	50 WP	At 10-14 d intervals	25-50		

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
Quince	Turkey	50 WP	*	100		15
Rambutan	Thailand	50 WP	At 10-14 d intervals	25-50		
Rape seed	China	50 WP	*		225-450	
Rape seed	CIS	50 WP	*		225-450	
Rape seed	France	50 WP, 50 FL	1-2		375-750	
Rape seed	Germany	WG 50 %	1		500	56
Rape seed	Poland	50 WP	*		750	56
Rape seed	Yugoslavia	50 WP			300-750	42
Raspberries	Hungary	50 WP	3		500-600	14
Raspberries	Poland	50 WP	2		1250	7
Raspberries	Switzerland	50 WG	2		750-1000	14
Rice	Thailand	50 WP	At 7-10 d intervals	15-30		
Shallot	Netherlands	50 WP, 50 FL	1[7]		1000	14
Soya bean	Japan	50 WP	4	25-50		21
Soya bean	Venezuela	50 WP	*		500-1000	21
Squash, Summer (Courgettes)	Netherlands	50 WP, 50 FL	*	25		3
Stone fruits	Australia	27.5 FL	1	27.5-55[6]		1
	Australia	50 WP	4-5	25-37.5		1
	Australia	50 WP	1	50[6]		
Stone fruits	Chile	50 WP	*	25-50		
Stone fruits	Greece	WG 50 %	*	50-75		
Stone fruits	New Zealand	25 FL	2-3		750-1000	1
Stone fruits	Switzerland	50 WG	2	50		
Strawberries	Austria	WG 50 %	*	37.5		10
Strawberries	Belgium	50 WP			750	3
Strawberries	Bulgaria	50 WP	3	50		14
Strawberries	Chile	50 WP	*	25-37.5		
Strawberries	CIS	50 WP	2		500	
Strawberries	Czechoslovakia	50 WP	2	50	1000	
Strawberries	France	50 WP, 50 FL	3-4		750	7
Strawberries	Germany	WG 50 %	3	37.5	750	7
Strawberries	Greece	WG 50 %	*	50-62.5		3
Strawberries	Hungary	50 WP	3		500-600	14
Strawberries	Italy	12.3/49 WP[2]	3	24.6-30.7		14
	Italy	22.5/45 WP	*	45-56.2		14
	Italy	25 SC	3	40-50		14
	Italy	50 FL	3	40-50		14
	Italy	50 WP	3	40-50		14
	Italy	5 D	3		1000	14
	Italy	75 DFL	3	37.5-52.5		14

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
Strawberries	Japan	25 D	3		750	7
	Japan	30 SA	3		1800	1
	Japan	50 WP	3	50		3
Strawberries	Jordan	50 WP	*	25-50		3
Strawberries	Netherlands	50 WP, 50 FL	*		225-375	14
Strawberries	New Zealand	25 FL	3		500-1000	1
Strawberries	Peru	50 WP	1-3		250-500	3
Strawberries	Poland	50 WP	1-2		750-1250	7
Strawberries	Portugal	50 WP	*	75		7
Strawberries	Romania	50 WP	*	50		
Strawberries	Rep. of Korea	50 WP	*		700	2
	Rep. of Korea	FW Smoke pellet	3		360	2
Strawberries	Spain	3 E (3 D)	*		600-900	5
	Spain	50 WP		75		5
Strawberries	Switzerland	50 WG	2	50		14
Strawberries	Taiwan	50 WP	1-2		250	5
Strawberries	Thailand	50 WP		10-15[7]		
Strawberries	Uruguay	50 WP	1-3		500-750	
Strawberries	Venezuela	50 WP	*		500-1000	1
Strawberries	Yugoslavia	50 FL	3		750	21
	Yugoslavia	50 WP			300-750	21
Sugar beet	Czechoslovakia	50 WP		150		
Sugar beet	Poland	50 WP	1[6]	0.5		
	Poland	50 WP	1[1]	0.75-1		
Sunflower	Bulgaria	50 WP	*		500	14
Sunflower	CIS	50 WP	1[11]		2 g/kg	
Sunflower	Czechoslovakia	50 WP	2		500	
Sunflower	Hungary	50 WP	*		500	21
Sunflower	Romania	50 WP			500 g/ton[1]	
Sunflower	Yugoslavia	50 WP			300-750	42
Tea	Thailand	50 WP	At 7-10 d intervals	15-30		
Tomatoes	Australia	27.5 FL	2-3		310-660	2
	Australia	50 WP	2-3		281-600	2
Tomatoes	Bulgaria	50 WP	*	50		14
Tomatoes	Chile	50 WP	*	25-37.5		
Tomatoes	China	50 WP	*		375-750	
Tomatoes	CIS	50 WP	*			
Tomatoes	France	50 WP, 50 FL	As needed		750	7
Tomatoes	Greece	WG 50%	8-10	50		1
Tomatoes	Hungary	50 WP	*		500	3
Tomatoes	Italy	12.3/49 WP[2]	*	24.6-30.7		14

Crop	Country	Application				PHI, days
		Formulation	No.	g ai/hl	g ai/ha	
	Italy	22.5/45 WP	8-10	45-56.2		14
	Italy	25 SC	*	40-50		14
	Italy	50 FL	*	40-50		14
Tomatoes	Italy	50 WP	At 15 d intervals	40-50		14
	Italy	5 D	*		750-1000	14
	Italy	75 DFL	*	37.5-52.5		14
Tomatoes	Japan	25 D	3		750	3
	Japan	30 SA	3		1800	1
	Japan	50 WP	3	25-50		3
Tomatoes	Jordan	50 WP	*	25-50		3
Tomatoes	Lebanon	50 WP	*	25-50		3
Tomatoes	Netherlands	50 WP, 50 FL	*		370-750	3
Tomatoes	Morocco	50 WP	3-4		375-500	7
Tomatoes	New Zealand	25 FL	3		1000	3
Tomatoes	Poland	50 WP	*	50-75		3
Tomatoes	Portugal	50 WP	*	75		7
Tomatoes	Rep. of Korea	50 WP	5		800	3
Tomatoes	Romania	50 WP	*	50		
Tomatoes	South Africa	25 SC	1-3	25		3
Tomatoes	Thailand	50 WP	At 7-10 d intervals	15-30		
Tomatoes	Turkey	50 WP	*	37.5		15
Tomatoes	Venezuela	50 WP	*		500-750	3
Tomatoes	Yugoslavia	50 FL			500	21
	Yugoslavia	50 WP			300-750	
Tomatoes	Zimbabwe	50 WP	1-2		250	7
Vegetables	Algeria	50 WP	*	25-50		21
Vegetables	Chile	50 WP	*		375-600	
Vegetables	Spain	3 E (3 D)	*		600-900	5
	Spain	50 WP	*	75		5
Vegetables	Thailand	50 WP	*	25-50		
Watermelon	Japan	25 D	5		750	21
Watermelon	Jordan	50 WP	*	25-50		3
Watermelon	Lebanon	50 WP	*	25-50		3

Notes: see next page.

Notes to Table 1:

* Not specified
[1] Seed treatment
[2] Procymidone/thiram 12.3/49 WP
[3] Conservation in cold store
[4] Forcing
[5] Forcing in a forcing bed
[6] Stored product protection
[7] Oil treatment before sowing/planting
[8] Bulb treatment against white rot before planting
[9] Wine grapes
[10] Table grapes
[11] Procymidone/chlorothalonil 22.5/45 WP
[12] Dry treatment

For tests using 2x rates, grapes were harvested 15 and 5 days after the last application. Grapes were treated at the higher rates in order to ensure sufficient residues for wine-processing trials. All analyses were performed at the same laboratory. The results are summarized in Table 3.

Examination of the results indicates that average procymidone levels from treatments at the 1x application rate varied considerably between sites. In all, 84 separate analyses of grapes were completed for 1x applications at PHIs of 15 days or longer. None of the 84 results exceeded the 5 mg/kg TMRL for procymidone in grapes. An additional 28 analyses were completed on grapes after 1x application and a 5-day PHI. Only one residue exceeded 5 mg/kg, with a level of 5.39 mg/kg.

Raspberry. Raspberry fields were treated with Sumilex 50 WP at maximum rates according to registered uses in Hungary and Poland. Samples were taken from 1 to 14 days after application. The residues found are shown in Table 2.

Table 2. Residues of procymidone in various crops from supervised trials.

Commodity, Country, Year	Application			Residues (mg/kg) at days after last application					Ref.
	Form.	kg ai/ha	No.	0-1	3	7	14	21	
Cherries, Sour, HUN, 1992	WP	0.7	1	0.8	0.63	0.52	0.77[2] 0.52	0.32	3
Egg plant, POL, 1992	WP	0.6	1	0.6	0.93	0.82	0.53[2] 0.42		9
Potato[6], JPN, 1977	WP	0.5	4				0.02[3]	0.05 0.03[4] 0.02[5]	22
Potato, JPN, 1977	WP	0.5	4				0.08[3]	0.05[4] 0.02 0.03[5]	23
Raspberry, HUN, 1992	WP	0.6	1	4.38	3.98	0.97	0.56[2] 0.52[7] 0.21[8]		1
Raspberry, POL, 1992	WP	1.25	2	3.1	2	1.4	0.73[2] 0.51		2
Green beans, SPA, 1990	WP	0.75	1	1.28	0.73[1]	0.59	0.36[2] 0.51		21
	WP	0.75	1	1.0	0.81[1]	0.46	0.43[2] 0.27		21
	WP	0.75	1	1.56	0.65[1]	0.56	1.15[2] 0.39		21

Commodity, Country, Year	Application			Residues (mg/kg) at days after last application					Ref.
	Form.	kg ai/ha	No.	0-1	3	7	14	21	
	WP	0.75	1	1.31	0.69[1]	0.67	0.89[2] 0.17		21
Green beans, SPA, 1992	WP	0.45	1	0.98	0.67	0.38	0.30	0.08	21
	WP	0.45	1	0.99	0.78	0.28	0.26	0.07	21
	WP	0.45	1	0.95	0.86	0.36	0.32	0.08	21
Haricot beans, FRA, 1991	L	0.75	2			0.39			14
	L	0.75	1			0.54			14
	L	0.75	1			0.57			14
Sunflower	WP	0.5	3 1					0.12[4] 0.11[4] 0.04	6

[1] Samples were taken 2 days after application
[2] Samples were taken 10 days after application
[3] Samples were taken 19 days after application
[4] Samples were taken 28 days after application
[5] Samples were taken 30 days after application
[6] Peeled potatoes
[7] Unripe fruits
[8] Ripe fruits

Strawberry. Supervised trials were reported from Hungary and Spain. Sumilex 50 WP was applied according to registered uses at rates of 0.6-1 kg ai/ha. Residues detected in samples taken between days 0 and 21 following application are shown in Table 4.

Shallots. Procymidone was used for seed treatment in France at a rate of 150 g ai/100 kg seed. At harvest the crop contained 0.05 mg/kg residue 116 days after sowing (Macdonald *et al.*, 1992e).

Table 3. Residues of procymidone in grapes from supervised trials

Country, location	Application			Residues (mg/kg) at days after last application			
	Form.	kg ai/ha	Sray l/ha	5	15	21	28
FRA, Tours	50L	0.79	198	2.16 2.63 2.68 3.05	2.59 2.24 2.64 2.65	2.45 2.32 2.51 1.69	2.12 2.16 1.93 2.40
	50L	1.57	198	9.62 9.66 5.45 5.47	5.72 7.09 5.51 8.87		
FRA, Avignon	50L	0.75	194	1.12 1.31 1.20 1.38	1.06 1.07 0.86 0.86	1.07 0.92 1.09 1.50	0.55 0.92 1.08 0.98
	50L	1.50	194	4.21 3.88 3.49 5.03	2.16 3.11 2.90 2.85		
SPA, Toledo	50 WP	0.25	200	0.74 1.72 1.53 1.98	1.47 0.55 0.95 1.43	0.59 0.56 3.10 1.47	0.99 0.84 0.61 0.41
	50 WP	0.48	200	4.82 3.75 4.03 2.60	2.24 2.94 3.29 2.39		
SPA, Cordoba	50 WP	0.24	197	0.42 0.42 0.34	0.56 0.36 0.40	0.28 0.37 0.40	0.18 0.30 0.29

Country, location	Application			Residues (mg/kg) at days after last application			
	Form.	kg ai/ha	Sray l/ha	5	15	21	28
				0.35	0.55	0.32	0.26
	50 WP	0.50	197	1.04 0.69 1.08 0.96	1.06 0.70 0.80 1.27		
SPA (Ref. 21)	WP	0.6		0.40	0.24	0.22	
ITA, Asti	50 WP	0.74	324	2.93 2.53 2.18 1.78	2.14 2.46 2.13 2.50	1.83 2.93 1.99 2.61	2.72 3.62 2.28 2.69
	50 WP	1.42	324	4.62 4.09 3.28 3.74	5.64 4.83 4.84 6.55		
ITA, Bologna	50 WP	0.74	1200	2.83 2.72 2.11 3.19	2.94 2.85 3.53 3.15	2.56 2.62 3.17 2.56	2.22 2.72 2.06 2.13
	50 WP	1.49	1200	7.24 5.29 7.44 5.80	6.29 5.23 5.05 4.97		
HUN, Balaton	50 WP	0.75	168	2.30 5.39 1.33 4.16	4.60 3.63 1.59 1.89	2.11 2.04 2.56 2.70	1.81 1.35 2.12 2.19
	50 WP	1.52	168	3.95 6.79 4.80 3.84	4.36 6.25 5.26 4.47		

Table 4. Residues of procymidone in strawberries from supervised trials. All single applications of WP.

Country Year	Kg ai/ha	Residues (mg/kg) at days after last application					Ref.
		0	3	7	14	21	
HUN, 1987	0.6	0.39 0.59 0.42	0.3 0.44 0.42	0.17* 0.4* 0.22*			10
SPA, 1985	1	2.77	2.20	1.30	0.50		21
SPA, 1986	1	1.70	1.06	3.71	1.60	0.80	21
		1.90	1.30	3.50	2.10	0.80	
		1.74	0.92	4.24	1.50	0.96	
SPA, 1987	0.75	4.20	2.55	1.33	0.80	0.52	21
		4.90	4.30	1.65	1.25	0.46	
		4.80	4	1.80	1.50	0.52	
SPA, 1988	1.25	2.80	1.50	1.06	0.60	0.50	21

		1.75	1.35	0.95	0.56	0.40	
		1.80	1.30	0.87	0.40	0.28	

* Samples taken 5 days after application.

Cucumber. Field trials were conducted in Spain in 1990 and 1991, applying procymidone one to five times at rates of 0.5-0.91 kg ai/ha. The residues found in samples taken between 2 and 16 days after application are shown in Table 5.

Egg plant. Residues from a supervised field trial in Poland, applying procymidone at a rate of 0.6 kg ai/ha, are shown in Table 2.

Peppers, Sweet. The results of supervised trials in glasshouses in Spain are summarized in Table 6.

Tomatoes. Supervised trials were conducted in France and Italy following recommended use patterns. Procymidone was applied 4 or 6 times at rates of 0.5 and 0.75 kg ai/ha respectively. Residues at 0 to 21 days after the lastp application are presented in Table 7.

Table 5. Residues of procymidone in cucumbers from supervised trials in Spain in 1990 and 1991. All WP. Reference 13.

Year	Application		Residues (mg/kg) at days after last application				
	kg ai/ha	No.	2	5	8	12-13	16
1991	0.5	5	0.06	0.38	0.11	0.12	0.06
	0.56	5	0.51	0.41	0.20	0.08	0.09
	0.56	5	0.73	0.29	0.16	0.08	0.08
1990	0.75	1	0.28	0.09[1]	0.11[2]	0.07[3]	
1991	0.91	5	0.90	0.30	0.21	0.07	0.06

[1] Samples were taken 7 days after last application.
[2] Samples were taken 10 days after last application.
[3] Samples were taken 15 days after last application.

Table 6. Residues of procymidone in peppers, grown indoors, from supervised trials in Spain. All single applications of WP, 0.75 kg ai/ha. Reference 21.

Year	Residues (mg/kg) at days after last application				
	0	2-3	7	10 -11	15
1989	2.61	0.42	0.73	0.85	0.32
	2.51	0.52	0.57	0.72	0.48
	1.17	0.71	1.30	0.51	0.52
	0.88	0.44	0.72	0.42	0.52
1988		0.91	1.2	0.51	0.27
		0.33	1.07	0.42	0.34
		0.9	0.17	0.22	0.16
		0.93	0.34	0.33	0.18

Lettuce. Supervised field trials were performed in France and Spain applying Sumilex 50 WP and L formulations one to four times at rates of 0.75 or 0.85 kg ai/ha. Residues measured in samples taken between days 0 and 21 are summarized in Table 8.

Beans. Green beans and haricot beans were treated according to registered uses with powder and liquid formulations of procymidone in France and Spain. Residues found after 0-21 days are shown in Table 2.

Potato. Trials were reported from Japan in which Sumilex 50 WP was applied four times at 0.5 kg ai/ha. Whole and peeled potatoes were analyzed for procymidone residues. The results are shown in Table 2.

Table 7. Residues of procymidone in tomatoes from supervised trials in France and Italy, 1991.

Country	Application			Residues (mg/kg) at days after last application					Ref.
	Form.	kg ai/ha	No.	0-1	3	7	14	21	
FRA	L	0.75	6		0.96				11
	L	0.75	6		0.41				11
ITA	WP	0.5	4	0.48	0.45	0.51	0.43	0.27	12
	WP	0.5	4	0.93	1.08	0.32	0.46	1.58	12
	WP	0.5	4	0.56	0.40	0.19	0.14	0.06	12
	WP	0.5	4	0.78	0.67	0.28	0.12	0.08	12
	WP	0.5	4	0.39 0.37	0.11[1]	0.15	0.12[2]		12
	WP	0.5	4	0.35	0.46	0.32	0.17[2]		12

[1] Sample was taken 4 days after last application.
[2] Samples were taken 10 days after last application.

Sunflower. Supervised field trials were conducted in Hungary, applying Sumilex 50 WP one and three times at the maximum registered rate. Samples were taken 21 and 28 days after the last application. The residues detected in the seeds are shown in Table 2.

Table 8. Residues of procymidone in lettuce from supervised trials.

Country, Year	Application			Residues (mg/kg) at days after last application					Ref.
	Form.	kg ai/ha	No.	0	3	7	14	21	
SPA, 1990	WP	0.75	1	3.8 4.05 9.6	1.3 0.9 2.1	0.98 0.85 1.05	0.38 0.4 0.38	0.2 0.42 0.4	20
FRA, 1991	L	0.75	3					0.17	15
	L	0.75	4					0.15	15
	L	0.75	3					0.17	15
SPA, 1989	WP	0.85	1	4.85 4.5 4.25		0.65 0.55 0.53		0.07* 0.05* 0.07*	20

* Samples were taken 22 days after last application

FATE OF RESIDUES

In processing

Grapes were harvested from the 42 separate treated test plots detailed above ("Residues resulting from supervised trials", where other details are given) and fermented into wine. At each site at least 50 kg of grapes were collected from the control plot. For the treated plots, at least 14 kg of grapes were collected from each of the sub-plots (replicates), and subsequently combined at the laboratory into a 50-kg processing sample for vinification. The processing samples were shipped to the processing laboratory in Grabels, France. All shipments were completed within 24 hours of harvest.

Processing of the grapes began shortly after receipt. The vinification procedure used for grapes from each site was chosen to match the procedure used locally in the country or region of origin. The use of different procedures, each typical of the locale in which the grapes originated, allowed a realistic estimate of residues to be expected in commercially-produced wine.

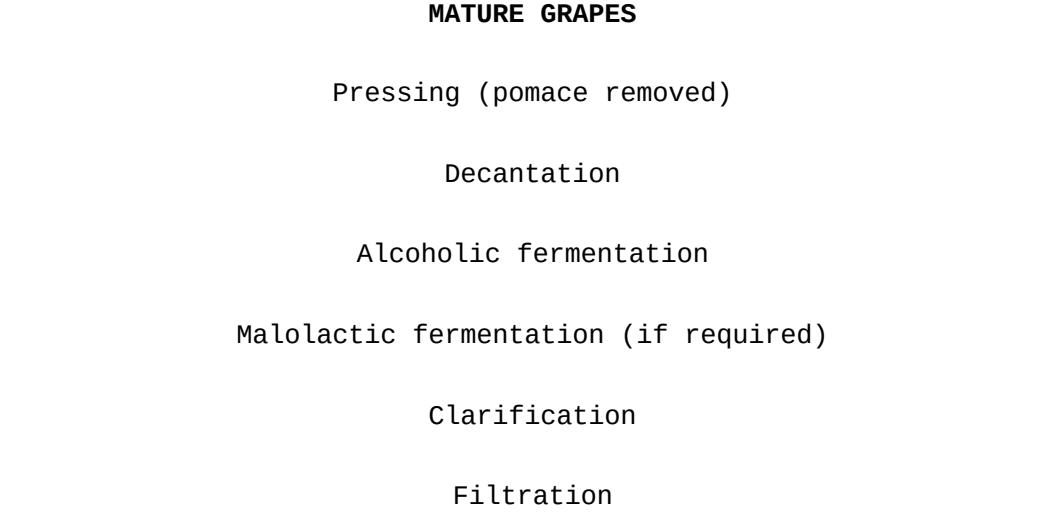
The process for making white wine is shown in Figure 1. The basic steps followed in producing all white wines are pressing to remove pomace, decantation, alcoholic fermentation, clarification and filtration before bottling. The principal differences between the local practices were in the amount and point of addition of potassium bisulphite, the amount of added rehydrated yeast, the addition of sugar to the fermentation media, the addition of clarification aids, and the use of a pectolytic enzyme.

The process for making red wine is showed in Figure 2. The basic steps followed in producing all red wines are crushing, alcoholic fermentation, pressing to remove pomace, malolactic fermentation, clarification, and filtration before bottling. The principal differences between local practices were in the amount, if any, of added rehydrated yeast and the use of natural or added malolactic bacteria.

Each grape lot was sampled and analyzed for procymidone. Fresh wine was sampled at the time of bottling, which varied with the vinification process, and analyzed for procymidone and 3,5-dichloroaniline (DCA) which may be formed during or just after vinification.

The results are summarized in Table 9. Apparent residues of procymidone in or on control samples of whole grapes from the 7 locations were <0.01 mg/kg (undetectable) or 0.01 mg/kg (just detectable). Average levels of procymidone in the grapes used for vinification ranged between 0.20 mg/kg and 2.68 mg/kg in or on the 84 samples from tests at 1x application rates which were harvested after 5, 15, 21 or 28 days. Residues of procymidone ranged between 0.81 mg/kg and 7.48 mg/kg in or on the corresponding 42 samples from application at the 2x rate harvested after PHIs of 5 and 15 days. Procymidone residues in 56 samples of fresh wine from test plots treated at the 1x rate ranged between 0.01 and 0.43 mg/kg. Residues of procymidone in 26 samples of fresh wine from treatments at the 2x rate ranged between 0.13 and 1.35 mg/kg.

Figure 1. The basic process for making white wine.



WINE

Bottling

Residues of DCA were below the limit of detection (0.01 mg/kg) in untreated control samples of fresh wine, representing wine from all seven locations. Residue levels of DCA in fresh wine from each location at the 1x application rates ranged between <0.01 mg/kg and 0.08 mg/kg. DCA levels in wine produced from the grapes treated at the 2x rate ranged between 0.01 and 0.20 mg/kg.

Table 9. Residues of procymidone and 3,5-dichloroaniline (DCA) in fresh wine prepared from grapes treated wtih Sumilex 50WP or 50L.

Country, Location	Rate kg ai/ha	Residues (mg/kg) at days after last application					
		Commodity	Compound	5	15	21	28
FRA, Tours	0.79	grape wine	parent parent DCA	2.4 0.32 0.07	2.26 0.31 0.07	2.46 0.34 0.07	1.14 0.30 0.06
	1.57	grape wine	parent parent DCA	7.42 1.01 0.20	5.53 0.98 0.15		
FRA, Avignon	0.75	grape wine	parent parent DCA	0.90 0.19 0.05	1.45 0.24 0.03	0.87 0.22 0.03	1.16 0.20 0.03
	1.5	grape wine	parent parent DCA	2.99 0.54 0.09	3.39 0.48 0.09		
SPA, Toledo	0.25	grape wine	parent parent DCA	1.22 0.28 0.03	1.07 0.19 0.04	0.42 0.15 0.04	0.67 0.20 0.04
	0.48	grape wine	parent parent DCA	4.85 * *	2.28 0.59 0.10		
SPA, Cordoba	0.24	grape wine	parent parent DCA	0.33 0.04 <0.01	0.34 0.03 <0.01	0.35 0.03 <0.01	0.20 0.01 <0.01
	0.50	grape wine	parent parent DCA	0.81 0.19 0.02	1.16 0.13 0.01		
ITA, Asti	0.74	grape wine	parent parent DCA	2.08 0.36 0.06	1.72 0.41 0.03	2.24 0.38 0.07	2.37 0.39 0.08
	1.42	grape wine	parent parent DCA	4.52 0.81 0.16	5.15 0.78 0.15		
ITA, Bologna	0.74	grape wine	parent parent DCA	2.26 0.25 0.05	1.89 0.14 0.03	2.68 0.11 0.02	1.90 0.12 0.02
	1.49	grape wine	parent parent DCA	5.32 0.48 0.11	3.74 0.48 0.08		
HUN, Balaton	0.75	grape wine	parent parent DCA	2.11 0.43 0.04	1.76 0.40 0.03	2.70 0.35 0.03	1.74 0.21 0.02
	1.52	grape wine	parent parent DCA	7.48 1.35 0.10	4.65 0.74 0.06		

* Samples were not received

Figure 2. The basic process for making red wine

MATURE GRAPES

Crushing

Alcoholic fermentation

Pressing (pomace removed)

Malolactic fermentation

Clarification

Filtration

WINE

Bottling

Sunflower seeds treated one or three times at rates of 0.5 kg ai/ha were processed with small-scale laboratory equipment. However, the processing technology very closely resembled the industrial process. The scheme of processing, the yield and the loss of oil at various steps are shown in Figure 3. The residues in the seed and crude and refined oil are summarized in Table 10 (Ambrus, 1992c). The results indicate concentration factors ranging between about 2 and 3 from seed to crude oil, and about 1 and 2 from seed to refined oil.

Figure 3. Production of oil from sunflower seed.

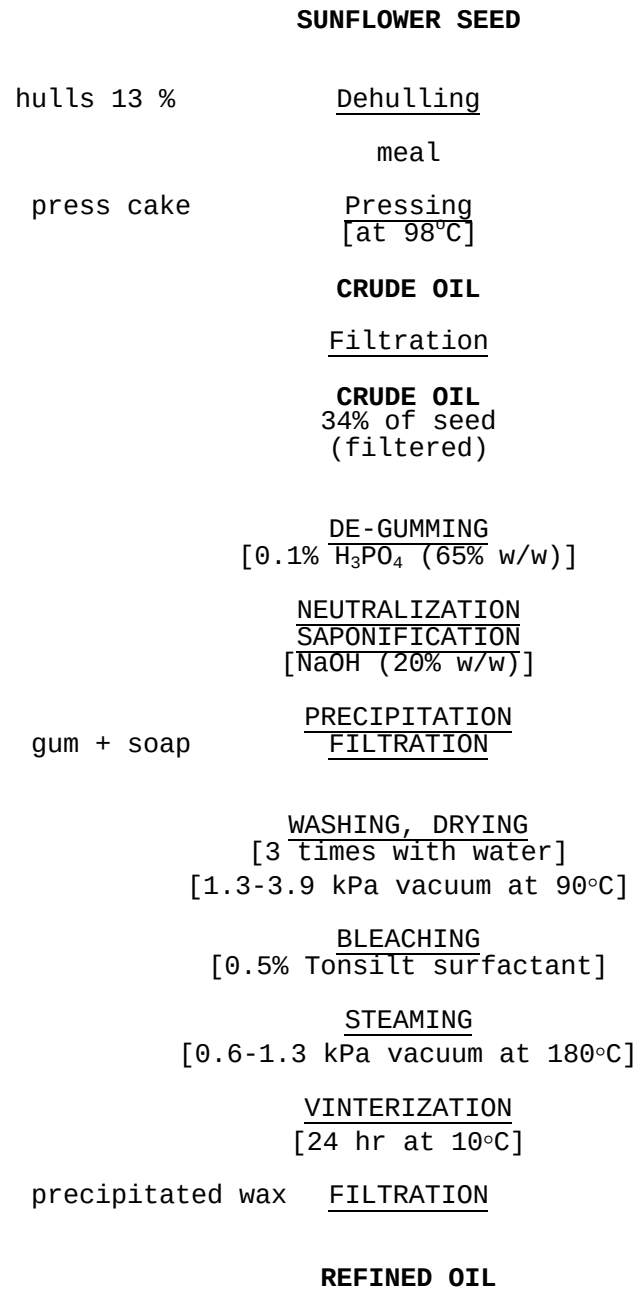


Table 10. Residues (mg/kg) of procymidone in sunflower seed and oil.

Seed	Crude oil	Refined oil
0.12	0.23	0.13
0.11	0.34	0.14
0.04	0.09	0.08
0.04	0.10	0.08

Stability of residues in stored analytical samples

Fresh grapes were fortified at levels of 0.05, 0.50 and 5.0 mg/kg, and the samples were stored at about -20°C. Over a period of 12 months, no loss of procymidone was observed at any level. Procymidone residues have been demonstrated to be stable in wine at -20°C for at least one month, in an on-going investigation. The interim results show that at the level of 0.5 mg/kg, DCA recovery was approximately 75% after storage for 30 days (Roberts *et al.*, 1992).

Strawberry samples were fortified at 0.05 and 0.5 mg/kg and stored at about -26°C. Residues determined after 6 months and one year did not show any significant changes (Halasz-Laky, 1992).

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

In 1987 and 1988, 37 samples of grape juice, 144 samples of young vines and 9 samples of cognac were examined in The Netherlands. Residues above the limit of determination (0.02 mg/kg) were found in 2 samples of grape juice (both 0.03 mg/kg), and in 41 samples of French vines, ranging from 0.02 to 0.32 mg/kg. No residues of procymidone were detected in vines from Spain, Italy or Germany, or in the French cognac (Netherlands, 1993).

In Finland about 3000 consignments of imported fruits and vegetables were analyzed during 1990-1991 (Finland, 1993). Table 11 shows the results.

METHODS OF RESIDUE ANALYSIS

Procymidone residues reported in this monograph were determined by similar methods to those used for the earlier trials. Samples with a high water content were extracted with either acetone or methanol and extraction was followed by partition into dichloromethane, clean-up on Silica gel, Florisil or alumina, if necessary, and GLC with an ECD or nitrogen/phosphorus thermionic detector. Capillary and packed columns were equally suitable. The limit of determination ranged from 0.01 to 0.02 mg/kg with recoveries between 70 and 120%.

Analytical methods suitable for the determination of procymidone residues in various plant commodities have been reviewed recently (Ambrus *et al.*, 1991).

For the determination of DCA in wine a sample aliquot was transferred to a Merck Extelut 20 solid-phase extraction column, rinsed in with methanol-water and eluted with hexane. The hexane was evaporated, the residue was taken up in methanol and determined directly on a LiChrosorb RP-18 reversed-phase HPLC column, eluting with acetonitrile-water (1:1 v/v) and detecting by absorption at 250 nm (Roberts *et al.*, 1992).

Table 11. Residues of procymidone detected in imported commodities in Finland.

Commodity	Number of		Highest residue, mg/kg
	Consignments	Positives.	
Broccoli	18	5	0.42
Celery	82	6	0.8
Chinese cabbage	44	3	0.04
Cucumber	196	93	0.43
Dill	144	11	6.2
Lettuce	39	3	0.11
Lollo Rosso	28	14	6.2
Nectarine	52	3	0.23
Plum	89	3	0.13
Parsley	93	9	2.3
Peach	53	4	0.23
Pear	210	136	1.6
Pepper, Sweet	331	87	0.32
Squash, Summer	28	7	0.16
Strawberry	32	10	0.75
Tomato	213	32	0.92

NATIONAL MAXIMUM RESIDUE LIMITS

National MRLs reported to the Meeting are shown in the Tables below.

Country codes: ARG-Argentina, AUL-Australia, AUS-Austria, BEL-Belgium, FRA-France, GER-Germany, HUN-Hungary, ITA-Italy, JPN-Japan, LUX-Luxembourg, NET-Netherlands, NZE-New Zealand, PER-Peru, POR-Portugal, ROK-Republic of Korea, SAF-South Africa,SPA-Spain, SWI-Switzerland, URU-Uruguay, VEN-Venezuela.

Commodity/Country	MRL, mg/kg									
	AUL	AUS	ARG	BEL	FRA	GER	HUN	ITA	LUX	NET
apricot					2					
beans										1
beans, dwarf, fresh dry		2				1 0.1				
beans, faba	2									
beans, green	2									
beans, haricot				0.2						
beans, navy	2									
beans, runner										1

Commodity/Country	MRL, mg/kg									
carrot							3			
cherry, sour							3			
chicory					5					
cucumbers										1
egg plant										1
endive					5					1
garlic	5				2					
gherkins										1
grapes grapes, wine		2	1.5		5	5 8	3	1.5	5	
kiwifruit								1.5		
lettuce	2	2	1	0.02	5					1
melon					2					1
okra										1
onions	0.2	2	1							0.5
parsley							3			
patisson										1
peaches					2			1.5		
pear								1.5		
peas, fresh peas, dry						1 0.1				
pepper		2					1	1.5		
pepper, green, sweet										1
plum					2					
prune, dried					2					
rape seed					1.5	1				
rape seed oil					5					
raspberries							3			
shallot										0.2
squash, summer (courgettes)										1
stone fruits	10									
strawberries		10		5	2	10	3	1.5		3
sunflower							3			
tomatoes	2				2		1	1.5		1
watermelon										1

Commodity/Country	NEZ	PER	POR	ROK	SAF	SPA	SWI	URU	VEN
beans	2				1.0				
blackberries							1.5		
cacao									3
celery									2
citrus		3							
cucumbers			2	2					

Commodity/Country	NEZ	PER	POR	ROK	SAF	SPA	SWI	URU	VEN
garlic								5	2
grapes	5		5	5	5	5	5	5	3
grape juice							2		
lettuce				5					2
nectarine								5	
onions	0.1					0.2		5	2
peaches					10			5	3
peanut					0.5				2
peas					0.1				
pepper			5						
pepper, red				5					
pome fruits							0.05		
potato					0.2				
raspberries							1.5		
soya bean									2
stone fruits	3						0.05		
strawberries	0.5	3	10	10		5	1.5	5	2
tomatoes	1		5	5	3				2
vegetables						2			
watermelon				1					

APPRAISAL

Procymidone was reviewed by the Joint Meeting in 1981, 1989 and 1990. The 1992 CCPR retained all MRLs at step 7B in view of the need to ensure that the residue data which were reviewed in 1981 reflected current GAP.

Residue data for common beans, cucumbers, grapes, lettuce, bulb onions and tomatoes were required together with information on current GAP.

In response to the request of the CCPR extensive information was provided by the manufacturer and some member countries on use patterns, together with some residue data from supervised field trials and monitoring.

In order to estimate maximum residue levels, the residues resulting from supervised trials published in the previous evaluations which accorded with current use patterns (GAP) were also taken into consideration.

Apples. GAP was reported from Japan and the Lebanon. Two trials reported from Japan in 1981 do not reflect GAP in either country. The previous recommendation (5 mg/kg) is withdrawn.

Cherries. GAP was reported from 6 countries. The maximum dosage rate is 0.75 kg ai/ha with a PHI of 14-28 days. A single trial in Hungary corresponds to current GAP. However the initial residues (0.8 mg/kg) are much lower than in the Australian trials (2.1-6.2 mg/kg) reflecting GAP which were reported in 1990. The previous recommendation (5 mg/kg) is replaced by 10 mg/kg.

Beans. GAP was reported from 6 countries with PHIs ranging between 2 and 21 days. Residues, reported in 1981, 1989 and 1993, deriving from corresponding national GAP (7-14 days, maximum 0.75 kg ai/ha) range from 0.1 to 0.8 mg/kg. The current GAP leads to lower residues, consequently the recommended limit is 1 mg/kg.

Cucumbers and gherkins. GAP was reported from 12 countries with PHIs ranging between 1 and 15 days. Trials reported in 1981 from Japan which reflect current GAP showed residues of 0.33-1.2 mg/kg at day 1. The previous recommendation (2 mg/kg) is maintained.

Currants. GAP was reported from one country where procymidone is used for stock treatment. Two trials reported in 1981 involved foliar applications to black currants. The residue limit established previously is not supported by current GAP, so the recommendation (10 mg/kg) is withdrawn.

Egg plants. GAP was reported from 6 countries with PHIs of 1-3 days. Residues from a trial in Poland ranged from 0.6 to 0.93 mg/kg at days 1 and 3. A trial reported from France in 1981 showed a residue level of 1.5 mg/kg at 14 days. The data are insufficient to estimate a maximum residue level, so the recommendation (2 mg/kg) is withdrawn.

Grapes. GAP was reported from 27 countries with PHIs of 1-28 days, 1-4 applications at 0.25-1.0 kg ai/ha. An extensive trial programme was conducted in seven wine-growing regions of Europe. Dosage and pre-harvest intervals were selected according to the relevant national GAP which cover the world-wide uses. Residues deriving from recommended uses ranged from 0.34 mg/kg to 4.6 mg/kg. They are in the same range as those obtained in earlier trials. The present limit (5 mg/kg) is reaffirmed and it should no longer be temporary.

Kiwifruit. GAP was reported from Italy. The trial conditions reported from New Zealand in 1981 reflect the current Italian GAP, but there was no information on the comparability of climatic conditions and cultural practices. Consequently the previous recommendation (7 mg/kg) is withdrawn.

Lettuce. GAP was reported from 16 countries with PHIs of 2-35 days. The number of applications is from 1 to 10, and the rates are between 0.28 and 2 kg ai/ha. Residues reported from France (indoor and outdoor) and Spain were in the range of 0.07 to 3.4 mg/kg 21-22 days after the last application. The residues derived from glass-house applications were about 2 to 4 times those from trials conducted outdoors. The previous recommendation (5 mg/kg) is reaffirmed.

Melons. GAP was reported from 4 countries. Trials reported in 1981 reflect the current use patterns, but no residues were reported in the whole commodity. The data base is considered inadequate for estimating a maximum residue level. The previous recommendation (1 mg/kg) is withdrawn.

Onions. GAP was reported from 14 countries with PHIs of 1-28 days. Trial conditions reported in 1981 are within the current recommended uses and lead to residues in the range of 0.01-0.14 mg/kg which support the present limit (0.2 mg/kg).

Peaches and nectarines. GAP for foliar and post-harvest applications was reported from 15 countries with PHIs of 1-14 days and maximum rates of 0.37-1.0 kg ai/ha applied 2-5 times. The trial conditions reported from Australia and New Zealand in 1981 and 1990 are in line with present use recommendations. The previous recommendation (10 mg/kg) is reaffirmed.

Peppers. GAP was reported from 11 countries on sweet, green and chilli peppers with PHIs of 1-7 days. The trials reported from Japan in 1981 reflect the current use and lead to residues up to 3.8 mg/kg one day after the last application. The present limit (5 mg/kg) is reaffirmed.

Potatoes. GAP was reported from 5 countries with PHIs of 3-35 days. In two Japanese trials, carried out in 1977 but reported in 1981 and again in 1993, the residues were 0.02, 0.03, 0.05 and 0.08 mg/kg in potatoes 19-28 days after the last application. The data base was considered inadequate to estimate a maximum residue level. The previous recommendation (0.1 mg/kg) is withdrawn.

Raspberries. GAP was reported from 3 countries with PHIs of 7-14 days. In German trials reported in 1989 residues ranged from 0.59 to 6.9 mg/kg at 14 days after applications according to current GAP. Trials in France in 1989 and in Hungary and Poland in 1992 resulted in lower residues, but the combined data support the present limit (10 mg/kg).

Rice. GAP was reported from Thailand where the application is repeated every 7-10 days. Results reported in 1981 were from samples taken 19-22 days after the last application with about 2.5 times the rate registered in Thailand. The trial conditions cannot be related to GAP, so the recommendations (rice, husked: 3 mg/kg and rice, polished: 1 mg/kg) are withdrawn.

Strawberries. GAP was reported from 27 countries with PHIs of 2-21 days and application rates of 0.23-1.0 kg ai/ha. Residues from field trials in France, Germany, The Netherlands and Poland in 1981 ranged from 0.4 to 5.1 mg/kg. Following glasshouse application in Japan, the residues were between 0.9 and 8.0 mg/kg. Residues reported from Spain in 1993 were in the range of 1.3-4.24 mg/kg. The previous recommendation (10 mg/kg) is maintained.

Sunflower seed. GAP was reported from 6 countries with PHIs of 14-42 days. Residues deriving from treatments with recommended and double rates were in the range of 0.02 to 0.12 mg/kg 14-28 days after the last application. The Meeting considered the results of a single trial leading to high residues atypical and estimated a maximum residue level of 0.2 mg/kg which replaces the previous recommendation (2 mg/kg).

Tomatoes. GAP was reported from 25 countries with PHIs of 1-21 days and maximum rates of 0.5-1.8 kg ai/ha. Residues reported from France, Japan and New Zealand in 1981, from New Zealand in 1990 and from Italy in 1993 ranged from 0.1 to 2.1 mg/kg with a residue of 2.5 mg/kg at day 1 from a glasshouse trial in Japan. The previous recommendation (5 mg/kg) is maintained.

The fate of residues in wine processing was extensively studied. Grapes were harvested from 42 separately treated test plots and fermented into wine. The vinification procedure used for grapes from a given site was chosen to match the procedure used locally in the country or region of origin. The use of different procedures, each typical of the locale in which the grapes originated, allows a realistic estimation of residues expected in commercially-produced wine.

In addition to procymidone, 3,5-dichloroaniline (DCA), which may be formed during or just after vinification, was also determined in the wine.

When grapes were treated according to GAP, the wine contained procymidone residues between 0.04 and 0.59 mg/kg. The level of DCA ranged from <0.01 to 0.07 mg/kg in the same samples.

The results indicate that procymidone residues remaining in or on grapes after treatment show no tendency to concentrate in the wine. The average wine/grape ratio for procymidone ranged between 0.07 and 0.27, with an overall average of 0.16. DCA amounted to a maximum of 20% of the procymidone concentration in wine.

Sunflower seeds, containing residues of 0.04-0.12 mg/kg, were processed to oil. The

crude and refined oil samples contained residues of 0.1-0.34 mg/kg and 0.08-0.14 mg/kg respectively. The concentration factors were between 2 and 3 for seed to crude oil, and between 1 and 2 for seed to refined oil.

A survey of procymidone residues in fresh fruits and vegetables imported by Finland gave positive results in 16 commodities. The maximum values were below the recommended limits in all cases. The commodities in which the positive results exceeded 10% were the following: broccoli 28%, cucumber 47%, pear 65%, sweet pepper 26%, strawberry 32%, tomato 15%. It is to be noted that maximum residue levels have not been estimated by previous Meetings for broccoli or pears. Furthermore, information on current GAP indicates that the compound is registered for pears only in Italy and not at all for broccoli.

RECOMMENDATIONS

On the basis of data on residues from supervised trials the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits.

Definition of the residue: procymidone

Commodity		Recommended MRL (mg/kg)		PHI on which based, days
CCN	Name	New	Previous	
FP 0226	Apple	W	5	
FS 0013	Cherries	10	5	1
VP 0526	Common bean (pods and/or immature seeds)	1	2	7-14
VC 0424	Cucumber	2	2	1-3
FB 0021	Currants, Black, Red, White	W	10	
VO 0440	Egg plant	W	2	
VC 0425	Gherkin	2	2	1-3
FB 0269	Grapes	5	5 T	5-21
FI 0341	Kiwifruit	W	7	
VL 0482	Lettuce, Head	5	5	21[1]
VC 0046	Melons, except Watermelon	W	1	
FS 0245	Nectarine	10	10	1
VA 0385	Onion, Bulb	0.2	0.2	1-14
FS 0247	Peach	10	10	1
VO 0051	Peppers	5	5	1
VR 0589	Potato	W	0.1	
FB 0272	Raspberries, Red, Black	10	10	14

Commodity		Recommended MRL (mg/kg)		PHI on which based, days
CCN	Name	New	Previous	
CM 0649	Rice, husked	W	3	
CM 1205	Rice, polished	W	1	
FB 0275	Strawberry	10	10	1-3
SO 0702	Sunflower seed	0.2	2	14-28
OR 0702	Sunflower seed-oil, edible	0.5		
VO 0448	Tomato	5	5	1-3

[1] In glasshouse
W: the limit is withdrawn

REFERENCES

1. Ambrus, A., Buys, M., Miyamoto, J.,Otto, S. and Smart, N.A., 1991. Analysis of residues of dicarboximide fungicides in food. Pure & Appl. Chem., Vol 63, No. 5, pp. 747-762.

2. Ambrus, A., 1992. Determination of procymidone residues in raspberry. Sumitomo Chemical Co. Ltd. Osaka , Unpublished Report No.: BR-21-0277

3. Ambrus, A., 1992a. Determination of procymidone residues in sour cherry. Sumitomo Chemical Co. Ltd. Osaka, Unpublished Report No.: BR-21-0279

4. Ambrus, A., 1992b. Determination of procymidone residues in sunflower seed. Sumitomo Chemical Co. Ltd. Osaka, Unpublished Report No.: BR-21-0281

5. Ambrus, A., 1992c. Determination of procymidone residues in crude and refined sunflower seed oil. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-21-0282

6. Finland, 1993. Information on compounds on the CCPR priority list.

7. Halasz-Laky, V., 1992a. Final report on determination of procymidone storage stability in strawberry samples. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-21-02838.

8. Halasz-Laky, V., 1992b. Final report on determination of procymidone residues in raspeberry samples. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-21-0284

9. Halasz-Laky, V., 1992c. Determination of procymidone residue in egg plant samples. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-31-0294

10. Hungary, 1990. Information on compounds on the CCPR priority list.

11. Macdonald, I. A., Gillis, N. A. and Howie D., 1992a. Determination of residual concentrations in tomatoes from field trials in France. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-21-0260.

12. Macdonald, I. A., Gillis, N. A. and Howie, D. 1992b. Determination of residual concentrations in tomatoes from field trials in Italy. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-21-0261

13. Macdonald, I. A., Gillis, N. A. and Howie, D. 1992c. Determination of residual concentrations in cucumbers from field trials in Spain. Sumitomo

Chemical Co. Osaka, Unpublished Report No.: BR-21-0264

14. Macdonald, I. A., Gillis, N. A. and Howie, D. 1992d. Determination residual procymidone concentrations in haricot beans from field trials in France. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-21-0265

15. Macdonald, I. A., Gillis, N. A. and Howie, D. 1992e. Determination of residual concentrations in lettuce from field trials in France. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-21-0266

16. Macdonald, I. A., Gillis, N. A. and Howie, D. 1992f. Determination of residual concentrations in shallots from field trials in France. Sumitomo Chemical Co. Osaka, Unpublished Report No.: BR-21-0268

17. Netherlands, 1993. Information on compounds on the CCPR priorites list.

18. New Zealand, 1993. Information on compounds on the CCPR priority list.

19. Roberts, N. L., Macdonald, I. A. and Gillis, N. A. 1992. Procymidone - Magnitude of residues in grapes and processed commodities of grapes - 1991 European trials. Sumitomo Chemical Co. Osaka, Japan, Unpublished Report No.: BR-21-0258

20. Spain, 1992. Information on compounds on the CCPR priority list.

21. Spain, 1993. Information on compounds on the CCPR priority list.

22. Sumitomo Chemical Co. Ltd. 1992. Residue report of procymidone on potatoes. Unpublished, Report No.: BR-70-0256

23. Sumitomo Chemical Co. Ltd. 1992. Residue report of procymidone on potatoes. Unpublished, Report No.: BR-70-0257