

## CARBENDAZIM (072)

[See also BENOMYL (069) and THIOPHANATE-METHYL (077)]

### EXPLANATION

Carbendazim was first evaluated in 1973 and has been reviewed on 7 other occasions. The 1988 JMPR initiated a re-evaluation of residues arising from the use of benomyl, carbendazim and thiophanate-methyl, all to be expressed as carbendazim, in response to concerns expressed at the 1988 CCPR (ALINORM 89/24, para. 82-84). The 1989 CCPR requested that the recommendations for a group MRL for carbendazim in cereals should be replaced by separate MRLs for individual crops, while at the 1992 CCPR (ALINORM 93/24, para. 105) several MRLs were held at step 7B pending further review by the JMPR. Although some information was provided for the 1990 JMPR, the Meeting concluded that it would be premature to review the compounds until all of the required data became available and consideration was deferred to the 1992 JMPR. However, because of the workload on that Meeting, the re-evaluation was again postponed until the 1993 JMPR. The data submitted for the 1990 and 1992 JMPRs, together with additional data provided in 1993, have now been reviewed with particular attention to the GAP information and some new residue data.

### USE PATTERN

Information on the uses of carbendazim was provided by three manufacturers, BASF (1993), Du Pont de Nemours (1990) and Hoechst (1993) and also by the European Commission (EC, 1993), and several countries (Canada, 1993; Netherlands, 1993; New Zealand, 1993; Germany, 1993; Spain, 1993). This is summarized in Tables 1-4 and clearly shows the extensive applications of this fungicide. Although it is known that post-harvest uses have been withdrawn in several countries, there are still registered post-harvest uses on fruits in many countries. The commodities include apricots, cherries, citrus fruits, nectarines, peaches, pineapples, plums, and pome fruits, all of which were held at step 7B by the 1988 CCPR. The other 7B commodities, bean fodder, berries and other small fruits, carrots, cereal grains, head lettuce, mushrooms, peppers, sugar beet leaves or tops and tomatoes, are not subject to post-harvest treatments.

Table 1. Carbendazim - registered use rates and patterns on fruits.

Crop	Country	Application				PHI, days	Comments	
		Form.	Conc%	kg ai/ha	No.			
<b>Fruits</b>	Algeria	WP	50	0.125-0.25	-	-		
	Colombia	SC	50	0.25	-	-		
	Mexico	SC	50	0.18-0.3	-	-	"General use"	
					[60-120g/hl]	1	-	Post-harvest dip
	Paraguay	SC	50	0.18-0.3	-	-	"General use"	

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	kg ai/ha	No.		
				[60-120g/hl]	1	-	Post-harvest dip
	Saudi Arabia	WP	50	0.2	1-3	-	
	Syria	WP	50	0.2	-	-	
	Tunisia	WP	50	0.01	-	-	
Fruit trees	Ecuador	WP	60	0.6	3	15	Post-flowering
<b>Citrus fruits</b>	Angola	WP	50	0.1	4-6	-	
	Argentina	SC/WG	50-75	-	2	7	
	Australia	SC/WP	50-75	[17-65g/hl]	1	-	Post-harvest dip
	Bolivia	SC	50	[25-50g/hl]	-	-	
	Cyprus	SC	50	[25-50g/hl]	-	-	
	Greece	SC/WP	50	[0.1-0.13g/hl]	-	60	Post-harvest dip/spray
	N. Zealand	SC/WP	50	[25g/hl]	-	-	
	S. Africa	SC	50	[14-40g/hl]	-	-	
	Thailand	SC/WP	50	0.04-0.08	10	7-14	5-year trees
	Turkey	WP	50	[25g/hl]	1	21	Post-harvest dip
	Uruguay	SC/WP	50	[25g/hl]	2	15	
<b>Pome fruits</b>							
Apple	Angola	WP	50	0.1	4-6	-	
	Argentina	SC/WG	50-75	-	2-4	7	
	Australia	SC/WP	50-75	[10-30g/hl]	1	7	Post-harvest dip
	Belgium	SC	50	0.2-0.3	1-2	14	
	Cyprus	SC	50	[25-50g/hl]	-	7	
	Denmark	SC	50	0.6	1-2	14	At flowering
	Ecuador	SC	50	-	4	3	
	Germany	WP	50	0.374	3	14	Before ripening
	Greece	SC/WP	50	0.3-0.75	-	15	
				[30g/hl]	1	60	Post-harvest dip/spray
	Iraq	WP	50	0.3	1-2	-	
	Ireland	-	50	0.375	-	-	
	Israel	WP	50	[15-30g/hl]	-	7	
	Italy	SC/WP	50-80	0.4-0.5	1-2	15	
	Korea	WP	50-60	0.375-0.45	1-5	7	7-10 day intervals
	Netherlands	WP/WG	47-80	0.22-0.45	1-2	14	
				0.28-1.08	1-2	-	Trees after harvest
		SC/WP	50	[60g/hl]	1	60	Post-harvest spray
	N. Zealand	SC/WP	50	max. 0.375	1-2	7	
	S. Africa	WP	50	0.26-0.875	-	14	

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	kg ai/ha	No.		
	Spain	WP	50	0.375-0.6	-	15	
	Turkey	WP	50	0.15	1-2	14	
	UK	SC/WG	50/80	0.48-0.56	1-4	-	14-21 day intervals
		SC/WG	50	[51g/hl]	1	-	Post-harvest dip
	Uruguay	SC/WP	50	[15-25g/hl]	-	15	
	Zimbabwe	WP	50	[25-50g/hl]	-	-	
Pear	Argentina	SC/WG	50	-	2-4	7	
	Australia	SC/WP	50-75	[10-30g/hl]	1	7	Post-harvest dip
	Belgium	SC	50	0.2-0.3	2	14	
	Cyprus	SC	50	[25-50g/hl]	-	7	
	Denmark	SC	50	0.6	1-2	-	
	Germany	WP	50	0.374	3	14	
	Greece	SC/WP	50	0.3-1.25	-	15	
				[30g/hl]	1	60	Post-harvest dip/spray
	Iraq	WP	50	0.3	1-2	-	
	Ireland	WP	50	0.375	-	-	
	Israel	WP	50	[15-30g/hl]	-	7	
	Italy	SC/WP	50-80	0.4-0.5	1-2	15	
	Korea	WP	60	0.375-0.45	1-10	14	7-10 day intervals
	Netherlands	WP/WG	47-80	0.22-0.6	2	14	
				0.28-1.08	1-2	-	Trees after harvest
		SC/WP	50	[60g/hl]	1	60	Post-harvest spray
	N. Zealand	SC/WP	50	max. 0.375	1-2	7	
	S. Africa	WP	50	0.26-0.875	-	14	
	Spain	WP	50	0.375-0.6	-	15	
	UK	SC/WG	50/80	0.48-0.56	1-4	15	14-21 day intervals
		SC	50	[51g/hl]	1	-	Post-harvest dip
	Uruguay	SC/WP	50	[15-25g/hl]	-	15	
<b>Stone fruits</b>	Australia	SC/WP	50-75	[10-40g/hl]	4	1	
				[30-60g/hl]	1	-	Post-harvest dip
	Croatia	SC/WP	50	[25g/hl]	-	42	
	Cyprus	SC	50	[25-50g/hl]	-	7	
	Greece	SC/WP	50	0.3-0.7	-	15	
	Italy	SC/WP	50-80	0.3-0.4	1-3	21	
	N. Zealand	SC/WP	50	max. 0.5	3	1	Up to shuck fall
	Spain	WP	50	0.375-0.6	-	15	
	UK	SC/WP	50	0.55	1-2	14	
	Zimbabwe	WP	50	[17.5-25g/hl]	-	-	

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	kg ai/ha	No.		
Apricot	Bulgaria	SC	16.5	[25g/hl]	-	-	
	Israel	WP	50	[25g/hl]	-	-	
Cherries	Belgium	SC	50	0.25	1	14	
	Denmark	SC	50	0.6	-	14	
	Netherlands	WP/SG	47-80	0.22-0.45	2-3	-	
Peach	Ecuador	SC	50	0.15-0.25	2-4	3	
	Uruguay	SC/WP	50	[30-50g/hl]	-	15	
Plums	Denmark	SC	50	0.6	1-2	-	
	Israel	WP	50	[25g/hl]	-	-	
	Netherlands	WP/SG	47-80	0.22-0.45	2-3	-	
	UK	SC/WP/ WG	50	0.5	1-2	14	
<b>Berries and other small fruits</b>							
Blueberry	UK	WP	50	0.55	-	-	
Currants, Black, Red, White	Denmark	SC/WP	50	0.4-0.6	1-2	-	
	UK	SC/WG	50/80	0.48-0.56	1-6	-	14 day intervals
Gooseberry	Denmark	SC/WP	50	0.4-0.6	1-2	-	
	UK	SC/WG	50/80	0.48-0.56	1-4	-	14 day intervals
Grapes	Algeria	WP	50	0.125-0.25	-	-	Wine grapes
	Argentina	SC/WG	50	-	3-5	14	
	Australia	SC/WP	50-75	0.73	1-4	1	
	Cyprus	SC	50	[25-50g/hl]	-	14	Wine grapes
	France	WP	50	0.5	-	-	
	Greece	SC/WP	50	0.125-0.6	1	15	
	Italy	SC/WP	50-80	0.3-0.4	1-3	15	Wine grapes
	Luxembourg	SC	50	0.5	1-4	21	
	S. Africa	SC	50	[25g/hl]	-	-	Wine grapes
	Spain	WP	50	0.1-0.45	-	15	Wine grapes
	Sri Lanka	WP	50	0.3	-	7	Wine grapes
	Thailand	SC/WP	50	0.055-0.11	3	7-14	
	Turkey	WP	50	0.18	2-4	15	
	Uruguay	SC/WP	50	[25-50g/hl]	4	15	Wine grapes
	Zimbabwe	WP	50	[25g/hl]	-	-	Wine grapes
Raspberry	Denmark	SC/WP	50	0.4-0.6	1-2	-	
	UK	SC/WG	50/80	0.48-0.56	-	-	As necessary
Strawberry	Argentina	SC/WG	50-75	-	3	3	
		SC	14.3	0.4	1	20	At flowering
	Australia	SC/WP	50-75	[17-30g/hl]	-	2	7-14 day intervals

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	kg ai/ha	No.		
	Belgium	SC	50	0.3-0.5	-	14	8-10 day intervals
	Chile	WP	50	0.5	-	7	
	Colombia	SC/WP	50	0.125-0.75	-	-	
	Cyprus	SC	50	[25-50g/hl]	-	3	
	Denmark	SC	50	0.37-0.45	1-2	-	
	Ecuador	SC	50	0.15-0.25	4	3	
	Greece	SC/WP	50-60	0.3-0.75	-	15	Field or Greenhouse
	Ireland	WP	50	0.45-0.52	-	-	
	Israel	WP	50	0.2-0.4	-	7	
	Korea	WP	60	0.375-0.45	2	-	
	Luxembourg	SC	50	0.5	-	-	
	Netherlands	WP	50-80	0.28-0.67	-	14	Field
				0.35-0.67	4-6	14	Greenhouse
	Portugal	WP	60	0.45-0.6	2-3	7	
	Spain	WP	50	0.2-0.25	-	15	Field or Greenhouse
	UK	SC/WG	50/80	0.48-0.56	1-4	14	10-14 day intervals
	Uruguay	SC/WP	50	[25-50g/hl]	-	15	
<b>Tropical and sub-tropical fruits - edible peel</b>							
Fig	Spain	EC	50	0.45	-	15	
Olive	Cyprus	SC	50	[25-50g/hl]	-	-	
<b>Tropical and sub-tropical fruits - inedible peel</b>							
Avocado	Bolivia	SC	50	[25g/hl]	-	-	
	Dominican Rep.	SC	50	0.25-0.75	-	-	
	N. Zealand	WP	50	max. 0.875	3	14	
	Rwanda	WP	60	[50g/hl]	-	28	
Banana	Angola	WP	50	0.1	4-6	-	
	Australia	SC/WP	50-75	[17-50g/hl]	1	-	Post-harvest dip
	Bolivia	SC	50	[25-50g/hl]	-	-	
	Colombia	SC	50	0.125-0.25	-	-	
	Costa Rica	SC	50	0.125	-	8	
	Dominican Rep.	SC	50	0.125-0.15	-	-	
	Ecuador	SC	50	0.15-0.25	-	-	
	El Salvador	SC	50	0.125	-	-	
	France	WP	50	0.125	-	-	
	Greece	SC/WP	50	0.3	-	15	
	Rwanda	WP	60	0.25-0.5	-	-	

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	kg ai/ha	No.		
	Thailand	WP	50/75	[22.5-50g/hl]	1	-	Post-harvest dip
	Zimbabwe	WP	50	[100g/hl]	-	-	
Mango	Bolivia	SC	50	[25g/hl]	-	-	
	Costa Rica	SC	50	0.25-0.4	-	8	
	Dominican Rep.	SC	50	0.25-0.75	-	-	
	Rwanda	WP	60	[50g/hl]	-	28	10-28 day intervals
	Thailand	SC/WP	50	0.125-0.25	10	7-14	7 year trees
		WP	50/75	[22.5-50g/hl]	1	-	Post-harvest dip
Papaya	Bolivia	SC	50	0.25-0.4	-	-	
Passion fruit	Ecuador	SC	50	-	3-4	3	
	India	WP	50	0.005	2-3	-	
Pineapple	Bangladesh	WP	50	[50g/hl]	-	-	Dip
	Bolivia	SC	50	[50-150g/hl]	-	-	
	Colombia	SC	50	0.125-0.25	-	-	
	Spain	EC	50	0.45	-	15	
	Thailand	SC/WP	50	0.285-0.85	4	7-14	
Rambutan	Thailand	SC/WP	50	0.075-0.15	5	7-14	
		WP	50/75	[22.5-50g/hl]	1	-	Post-harvest dip

Table 2. Carbendazim - registered use rates and patterns on vegetables.

Crop	Country	Application				PHI, days		Comments
		Form.	Conc%	(kg ai/ha)	No.			
<b>Vegetables</b>	Algeria	WP	50	0.125-0.25	-	-		
	Angola	WP	50	0.1	-	-		
	Colombia	SC	50	0.3	-	-		
	Cyprus	SC	50	[25-50g/hl]	-	2		
	Denmark	SC	50	0.39-0.46	>1	14		
	Ecuador	WP	60	0.12	2	15		
	Italy	WP	6	[15g/100kg seed]	-	-	Seed dressing	
	Mexico	SC	50	0.18-0.3	-	-	"General use"	
	Paraguay	SC	50	0.18-0.3	-	-	"General use"	
	Saudi Arabia	WP	50	0.2	1-3	-		
	Syria	WP	50	0.2	-	-		
	Thailand	SC/WP	50	0.095-0.19	5	7-14		
	<b>Bulb vegetables</b>							
Garlic	Bolivia	SC	50	[100g/hl]	-	-		
	Dominican Rep.	SC	50	0.25-0.5	-	-		
	Indonesia	WP	60	0.18-0.27	1-3	14		
Leek	Belgium	WP	50	[250g/hl]	1	-	Plant dipping	
	Bolivia	SC	50	[100g/hl]	-	-		
	Dominican Rep.	SC	50	0.25-0.5	-	-		
	Netherlands	WP/SG	50-80	[100-120g/hl]	-	-	Plant dipping	
Onion, bulb	Bolivia	SC	50	[100g/hl]	-	-		
	Dominican Rep.	SC	50	0.25-0.5	-	-		
	Greece	SC/WP	50	0.18-0.3	4	7		
	Ireland	WP	50	0.52-0.55	-	-	Seed dressing	
	Netherlands	WP/SG/EC	6-80	0.17-0.30	1-3	28	On crop	
		WP	25	[1g/kg seed]	1	-	Seed dressing	
	N. Zealand	SC/WP	50	0.125	-	-		
Portugal	WP	60	0.45-0.6	2	21			
UK	SC/WP/WG	50	0.55	-	-			
Shallot	Indonesia	WP	60	0.18-0.27	1-4	14		
	Netherlands	SC/WP/WG	8-50	0.25	1-2	28		

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
		WP	80	[12g/hl]	-	-	Seed dressing
<b>Brassica vegetables</b>							
Brussels sprouts	Netherlands	WP/SG/EC	10-80	0.2-0.6	1-2	21	
		WP	25	[1g/kg seed]	1	-	Seed dressing
Cauliflower	Netherlands	WP/SG/EC	50-80	0.5	1-2	21	
		WP	25	[1g/kg seed]	1	-	Seed dressing
	UK	SC	50	0.55	1-5	14	
Cabbages, Head	Colombia	SC	50	0.125-0.25	-	-	
	Costa Rica	SC	50	0.175-0.225	-	8	
	India	WP	50	[250-500g/hl]	1	-	
	Netherlands	WP/SG/EC	50-80	0.5	1-2	21	
		WP	25	[1g/kg seed]	1	-	Seed dressing
	UK	SC	50	0.5	1-5	14	
<b>Fruiting vegetables, Cucurbits</b>							
Cucurbits	Australia	WP	75	0.25-0.365	-	-	7-14 day intervals
	Belgium	SC	50	0.5	-	3	10-14 day intervals
	Colombia	SC	50	0.25	-	-	
	Costa Rica	SC	50	0.125-0.175	-	8	
	India	SC	50	0.15	-	-	
	Mexico	SC	50	0.25	1-2	-	
	Sri Lanka	WP	50	0.3	-	7	
	Turkey	WP	50	0.1	1-3	15	
Cucumber	Belgium	SC	50	0.5	-	3	10-14 day intervals
	Bolivia	SC	50	[25-50g/hl]	-	-	
	Brazil	SC	50	0.3-0.5	2	3	
	Greece	SC/WP	50	0.18-0.45	3	7	Field or Greenhouse
	Israel	WP	50	0.4	-	7	
	Netherlands	WP/SG	47-80	0.25-0.75	2	3	10-14 day intervals
	Spain	WP	50	0.45	-	7-15	Field or Greenhouse
	UK	SC/WG	50/80	[24-26g/hl]	-	-	Greenhouse, as required
Gherkin	Belgium	SC	50	0.5	-	3	10-14 day intervals
	Greece	SC/WP	50	0.18-0.45	3	7	Field or Greenhouse
	Netherlands	WP/SG/EC	47-80	0.22-0.75	-	3	10-14 day intervals
				[0.25g/plant]	4	3	Greenhouse drench
Melons	Belgium	SC	50	0.5	-	3	10-14 day intervals



Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
	Bolivia	SC	50	[25-50g/hl]	-	-	
	Cyprus	SC	50	[25-50g/hl]	-	2	
	Greece	SC/WP	50	0.3	-	15	14 day intervals
	India	WP	50	0.15	2-3	-	
	Indonesia	WP	60	0.18	1-2	14	
	Israel	WP	50	0.4	-	7	
	Netherlands	WP/SG	47-80	0.22-0.75	2-3	3	
		WP/SG	47-80	[0.25g/plant]	2	3	Soil drench
Pumpkin	India	WP	50	0.15-0.3	2-3	-	
	Israel	WP	50	0.4	-	7	
	Zimbabwe	WP	50	[25g/hl]	-	-	
Squash, Summer	Greece	SC/WP	50	0.3	-	7	
	Netherlands	WP/SG	47-80	0.22-0.75	-	3	10-14 day intervals
	Spain	WP	25	0.38-0.57	-	3	Field or Greenhouse
Watermelon	Bolivia	SC	50	[25-50g/hl]	-	-	
	Greece	WP	50	0.3	-	7	
<b>Fruiting vegetables, other than Cucurbits</b>							
Peppers	Belgium	SC	50	[25g/hl]	1	3	10-15 day intervals
	Bolivia	SC	50	[50g/hl]	-	-	
	Chile	WP	50	0.5	-	3	
	Colombia	SC	50	0.125-0.25	-	-	
	Greece	WP	50-60	0.18-0.5	4-5	7	Foliar spray
		WP	50-60	[0.5l/plant]	1	7	Plants, 2-3 leaves
	Indonesia	WP	60	0.16-0.24	1-3	7	Chili pepper
	Israel	WP	50	0.2	-	7	
	Netherlands	WP/SG	47-80	0.22-0.75	>1	3	10-14 day intervals
Egg plant	Bolivia	SC	50	[50g/hl]	-	-	
	Chile	WP	50	0.5	-	3	
	Greece	WP	50-60	0.18-0.5	4-5	7	Foliar spray
				[0.5l/plant]	1	-	Plants, 2-3 leaves
	India	SC	50	0.15	3	-	
	Israel	WP	50	0.4	-	7	
	Netherlands	WP/SG	47-80	0.22-0.75	-	3	10-14 day intervals
	Spain	WP	25	0.38-0.57	-	3	Field or Greenhouse
Mushrooms	Greece	SC/WP	50	[0.03kg/sq m]	-	-	Drench
	Ireland	WP	50	[0.85g/sq m]	-	-	Drench

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
	Netherlands	WP/SG/EC	50-80	5	1-2	5	
				[12.5g/hl]	1	5	Soil drench
	Taiwan	WP	50	1.3-3	3	7	
	UK	SC/WP/WG	50	12.5	1	-	
	Zambia	WP	60	[0.3-0.8g/sq m]	1	-	Soil drench
Sweet corn	Netherlands	WP	25	[1g/kg seed]	1	-	Seed dressing
Tomato	Bolivia	SC	50	[50g/hl]	-	-	
	Bulgaria	SC	16.5	[20g/hl]	-	-	
	Chile	WP	50	0.5	-	3	
	Colombia	SC	50	0.125-0.25	-	-	
	Costa Rica	SC	50	0.175-0.225	-	8	
	Ecuador	SC	50	0.15-0.25	2	3	
	Greece	SC/WP	50	0.25-0.45	1-3	7	14 day intervals
	Indonesia	WP	60	0.16-0.32	-	14	
	Ireland	WP	50	[25-50g/hl]	-	-	Soil drench
	Israel	WP	50	0.2-0.4	-	7	
	Mexico	SC	50	0.25	1-2	-	
	Netherlands	WP/SG	47-80	0.3-0.6	>1	3	
	N. Zealand	SC/WP	50	1	-	3	
	Portugal	WP	60	0.45-0.6	2-3	4	Field or Greenhouse
	Spain	EC	50	0.45	-	7-15	Field or Greenhouse
	Sri Lanka	WP	50	0.3	-	7	
	UK	SC/WG	50/80	[48-51g/hl]	-	-	Greenhouse, as required
<b>Leafy vegetables</b>							
Chard	Netherlands	WP	25	[1g/kg seed]	1	-	Seed dressing
Lettuce	Argentina	SC/WG	50-75	0.172	1-3	7-15	
	Belgium	SC	50	0.45	-	-	15 days intervals
	Bolivia	SC	50	[25-50g/hl]	-	-	
	Ecuador	SC	50	0.2-0.25	1-4	21	
	Greece	SC/WP	50	0.18-0.5	3-4	7	Foliar spray
	Israel	WP	50	0.4	-	7	
	Luxembourg	SC	50	0.75	-	-	
	N. Zealand	SC/WP	50	1-1.1	-	21	
	Portugal	WP	60	0.45-0.6	2-3	21	
Spinach	Netherlands	WP	25	[1g/kg seed]	1	-	Seed dressing
<b>Legume vegetables</b>							

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
Legumes	Costa Rica	SC	50	0.175-0.225	-	8	
Broad bean	UK	SC/WP/WG	50	0.25-0.5	1-2	-	
Common bean	Argentina	SC/WG	50-75	0.4	-	7	
	Belgium	SC	50	0.4	2	6	
	Bolivia	SC	50	[15-30g/hl]	-	-	
	Greece	SC/WP	50	0.175-1.3	-	7	
	Indonesia	WP	50	0.25	-	-	
	Ireland	SC/WG	50/80	0.26-0.55	-	-	
	Netherlands	WP/SG	47-80	0.5-1.2	1-2	14	
		WP	12	[0.5g/kg seed]	1	-	Seed dressing
	N. Zealand	SC/WP	50	1	-	14	
	Spain	WP	50	0.15-0.45	-	15	
	Thailand	SC/WP	50	0.0375-0.075	3	7-14	
	Trinidad	SC	50	0.25-0.55	1-2	-	3 week interval
	UK	SC/WG	50/80	0.5	1-2	-	
Cowpea	India	WP	50	0.25	2-3	-	
Garden pea	Belgium	SC	50	0.4	-	7	
	Bolivia	SC	50	[2g/kg seed]	-	-	Seed dressing
	Denmark	WP	50-51.6	0.25-0.5	-	14	
	France	SC	25	0.25	-	-	
	India	SC	50	0.125-0.25	2-3	-	
	Netherlands	WP/WG	25	[1.5-2g/kg seed]	1	-	Seed dressing
	Pakistan	SC	50	[25-50g/hl]	-	15	
	UK	SC	50	0.55	1-2	-	
Mung bean	India	WP	50	0.25	2-3	-	
<b>Pulses</b>	Spain	WP	50	0.45	-	15	
Soya bean	Ecuador	WP	60	0.18	1	3	
	France	SC	25	0.25	-	-	
	Mexico	WP	50	0.25	1-3	-	
<b>Root and tuber vegetables</b>							
Beetroot	Greece	SC/WP	50	0.175-0.18	-	7	
Carrot	Belgium	SC	8.8	0.37	3-4	21	
	Greece	WP	50-60	0.18-0.3	5	7	
	Sri Lanka	WP	50	0.3	-	7	
Cassava	India	WP	50	0.001	1	-	
Celeriac	Netherlands	WP/SG/EC	47-80	0.27-0.36	1-3	28	10-14 day intervals
Potato	Bolivia	SC	50	[250g/tonne]	-	-	Tuber dressing
	Denmark	SC	50	[150g/tonne]	1	-	Tuber dressing

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
	Italy	WP	6	0.09-0.12	1	-	Seed treatment
	Netherlands	WP/SG/SC	50-80	[16-25g/tonne]	1	60	Post-harvest
				[150-160g/hl]	1	-	Drench before seeding
Radish	Netherlands	WP	25	[1g/kg seed]	1	-	Seed dressing
Scorzonera	Netherlands	WP/SG/SC	47-80	0.22-0.3	2-3	14	10-14 day intervals
Sugar beet [and beets]	Belgium	SC	50	0.15	1	21	
	Croatia	SC/WP	50	0.125-0.25	-	42	
	France	WP	50	0.15	-	-	
	Greece	SC/WP	50	0.175-0.18	1-3	7	
	India	WP	50	0.1	-	-	
	Italy	WP	6-8	[15-32g/100kg]	-	-	Seed dressing
	Luxembourg	SC	12.5	0.15-0.188	1	21-28	
	Netherlands	WP/SG	47-80	0.25	1	28	
	Spain	WP	50	0.09	-	15	
	Turkey	WP	50	0.08	1	7	
	Uruguay	SC/WP	50	0.1-0.125	-	42	
Swede	Ireland	WP	50	0.55	-	-	
	Netherlands	WP/SG/EC	47-80	0.46-0.6	1	28	
<b>Stalk and stem vegetables</b>							
Asparagus	Greece	SC/WP	50	[125g/hl]	1	-	Dipping
	Netherlands	WP/SG/EC	50-80	[100g/hl]	1	-	Dipping
Celery	Belgium	SC	50	0.2	-	14	10-15 day intervals
	Costa Rica	SC	50	0.125-0.175	-	8	
	Greece	SC/WP	50	0.175-0.18	-	7	
	Ireland	WP	50	0.52	-	-	Crop spraying
	Israel	WP	50	0.2-0.4	-	7	
	UK	SC/WG	50/80	0.56	-	-	As necessary
	Zimbabwe	WP	50	[25g/hl]	-	-	
Witloof chicory (sprouts)	Netherlands	WP/SG/EC	50-80	[25g/tonne]	1	-	Before storage

Table 3. Carbendazim - registered use rates and patterns on cereals and other grasses

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
<b>Cereal grains</b>							
Cereals	Angola	WP	50	0.1	-	-	
	Belgium	SC	50	0.15-0.2	1-2	28	
	Chile	Wp	50	0.35	-	-	
	Czechoslovakia	SC	50	0.15-0.25	-	14	
	Denmark	DS	15	[2-3g/tonne]	1	-	Seed dressing
	France	SC	50	0.2	1	30	
	Greece	SC/WP	50	0.3	-	35	
	Italy	WP	6-8	[15g/100kg]	1	30	Seed dressing
	N. Zealand	SC/WP	50	0.15-0.25	-	60	
	Rumania	SC	50	0.3	-	-	
	Spain	WP	50	0.1-0.18	-	15	
	UK	SC	50	0.15	1-2	28	
Barley	Belgium	WP/SC	6.5-20	0.1-0.25	1-2	28-42	
	Denmark	WP	51.6	0.36-0.52	-	-	
	France	SC/WG	50	0.2-0.25	1	30	
	Germany	WP/SC	8-52.4	0.12-0.18	1	56	Winter barley
		FS	35	[52.5-70 g/100kg]	1	-	Seed dressing
	Greece	WP/SC	50-60	0.3	2-3	35	
	Ireland	SC/WG	50/80	0.12-0.31	1	-	
	Luxembourg	SC	5-6.5	0.15-0.2	2	-	
	Netherlands	WP	8	0.24	1	35	Winter barley
	Trinidad	SC	50	0.25-0.5	1-2	-	Spring/winter barley
	UK	SC/WG	50/80	0.25-0.255	1-2	-	Spring/winter barley
		WG	12.4	0.28	1-2	-	Winter barley
Maize	India	SC	50	0.175	1	-	
	Italy	WP	6-8	[15-20g/100kg]	1	-	Seed dressing
Oats	Belgium	WP/SC	6.5-20	0.1-0.25	1-2	28-42	
	Czechoslovakia	SC	50	[62.5g/100kg]	-	-	Seed dressing
	Germany	FS	35	[52.5-70g/100kg ]	1	-	Seed dressing
	Luxembourg	SC	5-6.5	0.15-0.2	2	-	
	UK	WP	50	0.25	1-3	-	
Rice	Bolivia	SC	50	0.125-0.25	-	-	

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
	Colombia	SC	50	0.25	2	-	
	Costa Rica	SC	50	0.175-0.225	-	8	
	Dominican Rep.	SC	50	0.125-0.25	-	-	
	Ecuador	WP	60	0.18	2	-	
	Greece	SC/WP	50	0.6	-	35	
	Guatemala	SC	50	0.175-0.225	1	90	
	India	SC	50	0.125-0.25	3	-	
	Italy	WP	6-8	[12-20g/kg]	1	-	Seed dressing
	Mexico	SC	50	0.18-0.3	-	-	
	Paraguay	SC	50	0.18-0.3	-	-	
	Sri Lanka	WP	50	0.3	-	7	
	Thailand	SC/WP	50	0.0375-0.075	2	7-14	
	Turkey	WP	50	0.75	1-2	21	
	Uruguay	SC/WP	50	0.125-0.25	-	56	
Rye	Germany	WP/SC	8-52.4	0.12-0.18	1	56	Winter rye
		FS	35	[52.5-70 g/100kg]	1	-	Seed dressing
	Ireland	WP	50	0.25	1-2	-	Winter rye
	UK	WP	50	0.25	2-3	-	Spring/winter rye
Sorghum	Colombia	SC	50	0.25	-	-	
	Italy	WP	8	[15-20g/kg]	1	-	Seed dressing
Triticale	Belgium	WP/SC	6.5-20	0.1-0.25	1-2	28-42	
	Luxembourg	SC	5-6.5	0.15	-	-	
	UK	WP	50	0.25	2-3	-	
Wheat	Belgium	WP/SC	6.5-20	0.1-0.25	1-2	28-42	
	Brazil	SC	50	0.3	2	35	
	Croatia	SC/WP	50	0.1-0.2	-	42	
	Czechoslovakia	SC	50	0.25	-	-	
	Ecuador	SC	50	0.15-0.25	-	-	
	France	SC/WG	50	0.2-0.3	-	-	
	Germany	WP/SC	8-52.4	0.12-0.18	1	56	Winter wheat
		FS	35	[52.5-70 g/100kg]	1	-	Seed dressing
	Iran	SC	50	0.3-0.4	2	-	
	Ireland	SC/WG	50/80	0.20.25	1	-	
	Italy	SC/WG	50	0.2-0.3	1-2	35	
	Luxembourg	SC	5-6.5	0.15-0.2	2	-	
	Mexico	SC	50	0.18-0.3	-	-	

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
	Netherlands	WP/SG/EC	6-80	0.2-0.3	1	35	
	Paraguay	SC	50	0.18-0.3	-	-	
	Portugal	WP	60	0.18-0.24	1	35	
	Trinidad	SC	50	0.25	1-2	-	Winter wheat
	Tunisia	WP	6	0.15-0.18	-	-	
	UK	SC/WG	50/80	0.25-0.255	1-2	28	
		WG	12.4	0.28	1-2	-	Winter wheat
	Uruguay	WP	50	0.125-0.25	-	56	
<b>Grasses for sugar or syrup production</b>							
Sugar cane	Australia	WP	75	[40g/hl]	1	-	Cut seed pieces
	Bangladesh	WP	50	[50g/hl]	-	-	Dip seed pieces
	Bolivia	SC	50	[25-30g/hl]	-	-	
	Thailand	SC/WP	50	0.055-0.11	1	7-14	

Table 4. Carbendazim - registered use rates and patterns on nuts, seeds, herbs and spices.

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
<b>Tree nuts</b>							
Almonds	Greece	WP	50	0.6-0.75	3-4	15	
	Israel	WP	50	[25g/hl]	-	-	
	Italy	SC/WP	50	[25g/hl]	-	15	
	Spain	EC	50	0.375	2-4	15	
<b>Oilseed</b>							
Cotton	India	SC	50	0.125	-	-	
Linseed	Netherlands	EC	17.5	[0.44g/kg seed]	1	-	Seed dressing
Peanut	Argentina	SC/WG	50-75	0.25	1-3	7	
	Australia	WP	75	0.1	1	28	
	Ecuador	SC	50	0.15-0.25	2	14	
	Greece	SC/WP	50	0.175-0.18	-	7	
	India	SC	50	0.11	-	-	
	Mexico	WP	50	0.2	1-3	-	
	Zimbabwe	WP	50	0.15-0.25	-	-	
Rape seed	Czechoslovakia	SC	50	0.25	-	-	
	Denmark	SC	50	0.35-0.5	1	14	
	France	SC/WG	16.5-50	0.25-0.5	1	45	
	Ireland	SC/WG	50/80	0.5-0.625	-	-	Spring application
	UK	SC/WG	50/80	0.5	1-2	-	Stem extension
		WG	12.4	0.28	1-2	-	Before flowering
Sunflower	Croatia	SC/WP	50	0.5	-	42	
	Czechoslovakia	SC	50	0.25	-	-	
	France	SC	50	0.25	-	-	
	Rumania	SC	50	0.75	-	-	
<b>Seed for beverages and sweets</b>							
Cacao	Colombia	SC	50	0.125-0.25	-	-	
Coffee	Bolivia	SC	50	[25g/hl]	-	-	
	Colombia	SC	50	0.125-0.25	-	-	
	Costa Rica	SC	50	0.15-0.2	-	8	
	Dominican Rep.	SC	50	[25-50g/hl]	-	-	

Crop	Country	Application				PHI, days	Comments
		Form.	Conc%	(kg ai/ha)	No.		
	Ecuador	SC	50	0.15-0.25	-	-	
	Guatemala	SC	50	15	2-3	700	60-day intervals
	Zimbabwe	WP	50	0.15-0.25	-	-	
<b>Herbs and Spices</b>							
Hops	Spain	EC	50	0.125-0.25	-	15	
Ginger	Australia	SC	50	[1kg/hl]	-	-	

## RESIDUES RESULTING FROM SUPERVISED TRIALS

### Fruits and vegetables (Table 5)

Apples. Data from 23 trials on apples carried out in Germany from 1975 to 1987 were made available by Hoechst AG. Results ranged up to 2.5 mg/kg at a 5-day PHI but the majority were below 1 mg/kg.

Peas. In a trial in The Netherlands in 1988 residues in peas were below 0.01 mg/kg and below 2 mg/kg in the pea straw.

Carrots. Post-harvest treatments of carrots in The Netherlands gave a maximum of 3.5 mg/kg after 84 days, although most results were below 1 mg/kg. This use is not now registered.

Table 5. Residues of carbendazim in fruit and vegetables from supervised trials.

Crop, Country / 'Year	Application	No. of Trials	Residues (mg/kg) at intervals (days) after application	Ref.
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	Form.	kg/ha	No.			
Apple						
Germany '75	WP 60	0.36	13	1	1.0 (7), 1.6 (10), 1.7 (14)	A06164
'86	SC 32	0.432	3	4	0.2-0.7 (14), 0.25-0.69 (98), 0.22-0.67 (182)	A39727-30
'87	SC 32	0.432	3	2	0.2,0.33 (14), 0.24,0.25 (98), 0.17,0.18 (182)	A39725-6
'87	SC 32	0.432	4	2	0.16,0.18 (14), 0.22,0.28 (98), 0.23,0.34 (182)	A39723-4
'75	WP 60	0.6	2	9	<0.03-1.3 (7), 0.03-0.8 (10), 0.1-0.7 (14)	A06156-7, 61-3,65-6,8,70
'77	WP 60	0.6	4	1	1.4 (5), 1.0 (10), 0.9 (14)	A13946
	WP 60	0.6	6	1	0.5 (5), 0.3 (10), 0.4 (14), 0.2 (60)	A15870
'79	WP 60	0.6	13	3	0.5-2.5 (5), 0.2-1.7 (14), 0.2-0.5 (146)	A18833, 20393-4
Peas						
N'lands '88	SC 87.5	0.26	2	3	<0.01 peas; <2.0 pea straw	N'lands, 1993
Carrot						
N'lands '78	WP 60	[21g/t]	1	1	0.7-3.5 mean 1.8 (84) [Post-harvest]	N'lands, 1993
'82	WP 60	[36g/t]	1	2	0.21-0.76 mean 0.6 (7) [Post-harvest]	
			1	1	0.49 (77) [Post-harvest]	
'83	WP 60		1	1	0.6-0.7 (128) [Post-harvest]	
[All A..... references are from Hoechst, 1993]						

### Cereals (Table 6)

**Barley.** In twelve trials on barley in Germany from 1974 to 1988 the maximum residue found was 0.04 mg/kg at 64 days PHI. Most results were below the relevant limit of determination (0.01 to 0.06 mg/kg).

**Oats.** Following 6 trials in Germany, using carbendazim as a seed dressing, residues were below the limits of determination, 0.03 or 0.15 mg/kg respectively, at PHIs of 130 to 176 days.

**Rye.** All residues in the four trials on rye carried out in Germany from 1982 to 1988 were below the limit of determination after 75 to 94 days.

**Wheat.** Data were made available from 42 trials on Summer wheat and 43 trials on Winter wheat, all in Germany from 1974 to 1989. All residues in the grain were below the relevant limit of determination (0.01 to 0.1 mg/kg).

Table 6. Residues of carbendazim in cereals from supervised trials.

Crop, Country /'Year	Application	No. of Trials	Residues (mg/kg) at intervals (days) after application	Ref.
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	Form.	kg/ha	No.			
Barley						
Germany '88	SC 50	0.175	1	1	<0.05 grain and straw (70)	Du Pont, 1990
Germany '74	WP 60	0.18	1	5	<0.01-<0.06 (49-91)	Hoechst, 1993
'82	SC 32	0.18	1	2	0.03 (57), 0.04 (64)	
'83	SC 43	0.25	1	1	<0.01 (56,72)	
	SC 32	0.252	1	1	<0.01 (56,72)	
'84	WP 59	0.196	1	1	<0.02 (73)	
	WG 79	0.198	1	1	<0.02 (73)	
Oats						
Germany '75	WP 60	[60g/100kg]	1	6	<0.03 - <0.15 (130-176) [Seed dressing]	Hoechst, 1993
Rye						
Germany '88	SC 50	0.175	1	1	<0.05 grain and straw (94)	Du Pont, 1990
Germany '82	SC 32	0.18	1	1	<0.01 (75)	Hoechst, 1993
'83	SC 32	0.252	1	1	<0.01 (90)	
'83	SC 43	0.25	1	1	<0.01 (90)	
Wheat, Summer						
Germany '74	WP 60	0.18	1	4	<0.01-<0.1 (47,65,90,91)	Hoechst, 1993
		1.8	1	3	<0.06 (49,49,84)	
'75		0.18	1	12	<0.03-<0.1 (34-68)	
		0.18	2	7	<0.03-<0.1 (34-55)	
		0.6	1	2	<0.03 (62,68)	
		0.6	2	2	<0.03 (47,68)	
		1.8	1	1	<0.06 (84)	
'76		0.18	1	11	<0.1 (33-47)	
Wheat, Winter						
Germany '87	SC 50	0.175	1	1	<0.05 grain; 0.11 straw (98)	Du Pont, 1990
Germany '73	WP 60	0.18	1	8	<0.08 (54-96)	Hoechst, 1993
		0.18+0.3	2	1	<0.08 (61)	
		0.24	1	2	<0.08 (94,95)	
		0.3	1	2	<0.08 (54,60)	
		0.36	1	4	<0.08 (61-89)	
'80	SC 50	0.216	1	9	<0.05 (95-119)	
'83	SC 43	0.25	1	2	<0.01 (56)	
	SC 32	0.252	1	2	<0.01 (56)	
'84	WP 59	0.196	1	2	<0.02 (109,114)	
	WG 79	0.198	1	2	<0.02 (109,114)	
'89	SC 32	0.18	1	4	<0.02 (92-120)	
	WG 72	0.18	1	4	<0.02 (92-120)	

## RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

Information on residues found in the monitoring programmes of the Food Inspection Services in The Netherlands covering the years from 1981 to 1991 was provided (Netherlands, 1993). This showed that apart from several instances concerning mushrooms, in very few cases were the MRLs in force exceeded. Of the 1161 examples recorded, 11 out of 81 samples of mushrooms exceeded the MRL of 0.5 mg/kg, the maximum reported being in the range 5 to 10 mg/kg. Only 4 other commodities showed levels greater than the respective MRL of 3 mg/kg, namely celery (3 to 5 and 5 to 10 mg/kg), endive (3 to 5 mg/kg), lettuce (3 to 5 mg/kg), and turnip tops (3-5 mg/kg); no actual results were given. These findings are in full agreement with most other such studies.

In monitoring and selective studies in Hungary in 1990 to 1992, small residues of carbendazim were found in 5 samples of fruits and vegetables (Hungary, 1993):-

Raspberry:	0.4 mg/kg	MRL 2 mg/kg
Strawberry:	0.5 and 0.6 mg/kg	MRL 2 mg/kg
Tomato:	0.03 mg/kg	MRL 0.05 mg/kg
Lettuce:	0.22 mg/kg	MRL 2 mg/kg

In these studies 293 samples were examined, of which 272 contained no residue above the limit of determination.

### NATIONAL MAXIMUM RESIDUE LIMITS

The following national MRLs were reported to the Meeting.

Crop	MRL, mg/kg, expressed as carbendazim													
	Country	AU	AT	CA	EU	FI	DE	HU	IT	NL	NZ	ES	CH	UK
Almonds												1		
Apple										3				
Apricot				5										
Asparagus										3				
Banana			1			0.2						1		
Barley							0.5							
Berries					5		1.5					5		
Blackberry				6										
Blackcurrants														5
Boysenberry				6										
Brussels sprouts										3				0.5
Cabbages, Head										3				
Carrot				5	5									
Cauliflower										3				
Celeriac										3				
Celery													0.1	2
Cereals			0.5									0.5	0.3	0.5
Cherries				5						3			3	

Citrus fruits	10			5	2					7	3	10
Citrus pulp						1						
Common bean			1					3				
Cucumber		0.5				0.5					0.1	0.5
Cucurbits			0.5					3				
Egg plant								3				
Fig										1		
Fruiting veg.										2		
Fruits									5			
Garden pea								3				
Gooseberry						0.05						
Grapes			5				1			5	2	10
Leafy veg.				2						5		
Leek								3				
Legume veg.										2		
Lettuce						2						5
Lima bean			1									
Maize				0.1*								
Mushrooms			5					0.5		2	2	1
Nectarine												10
Oats						0.5						
Olive										1		
Onion, bulb								3				2
Other crops		0.1				0.1				.1		
Other fruit					1					1		
Other root veg.				0.1*								
Other veg.						1				1		
Peach			10									10
Pear								3				
Pepper, sweet								3				
Pineapple										1		
Plums			5	2				3				5
Pome fruit	5		5	2		2		1		5	3	5
Potato				0.1*						3		3
Pulses										0.1		
Rape seed											0.1	
Raspberry			6			2						5
Redcurrants						2						
Root veg.										0.1		
Rye						0.5						
Scorzonera								3				
Shallot								3				
Stone fruit	5							0.5		5		
Strawberry	5		5			2						5

Sugar beet										0.1	0.1	
Swede								3				
Tomato						0.05		3		3	5	
Vegetables				0.5								
Wheat					0.5		0.5	0.1*				
Countries:	AU = Australia, AT = Austria, CA = Canada, EC = Ecuador, FI = Finland, DE = Germany, HU = Hungary, IT = Italy, NL = Netherlands, NZ = New Zealand, ES = Spain, CH = Switzerland, UK = United Kingdom.											

## APPRAISAL

Carbendazim was first evaluated in 1973 and has been reviewed on seven other occasions. The 1988 JMPR initiated a re-evaluation of residues arising from the use of benomyl, carbendazim and thiophanate-methyl, all to be expressed as carbendazim, in response to concerns expressed at the 1988 CCPR (ALINORM 89/24, paras. 82-84). The 1989 CCPR requested that the recommendations for a group MRL for carbendazim in cereals should be replaced by separate recommendations for MRLs for individual crops, while at the 1992 CCPR (ALINORM 93/24, para. 105) several other MRLs were held at step 7B pending further review by the JMPR. Although some information was provided for the 1990 JMPR, it was concluded that it would be premature to review the compounds until all of the required data became available and consideration was deferred to the 1992 JMPR. However, because of the work-load at that Meeting, the re-evaluation was again postponed until 1993. The data submitted for the 1990 and 1992 Meetings, together with additional data provided in 1993, have now been reviewed with particular attention to the information on GAP and some new residue data.

Information on the uses of carbendazim that was available from several sources clearly showed the extensive applications of this fungicide. Although it is known that post-harvest uses have been withdrawn in several countries, there are still registered post-harvest uses on fruits in others. The treated commodities include apricots, cherries, citrus fruits, nectarines, peaches, pineapples, plums, and pome fruits, all of which were held at step 7B by the 1988 CCPR. The other 7B commodities, bean fodder, berries and other small fruits, carrots, cereal grains, head lettuce, mushrooms, peppers, sugar beet leaves or tops, and tomatoes, are not subject to post-harvest treatments with carbendazim, according to the available information on GAP.

Very few results from residue trials on fruit and vegetables were provided. Some new data covered treated apples and peas. There were also data from the post-harvest dipping of carrots in The Netherlands, but these were from 1983 and earlier and had already been reviewed by the 1988 JMPR. More extensive data were supplied on residues in barley, oats, rye and wheat, although again the bulk of the information was obtained before 1984.

Some information regarding the residues of carbendazim found during monitoring studies in Hungary and The Netherlands was also provided. This showed that occurrences were generally rare, only mushrooms in The Netherlands showing some occasions on which the national MRL of 0.5 mg/kg was exceeded.

Any assessment of the residues arising from the use of carbendazim must also take into account those arising from benomyl and/or thiophanate-methyl treatments, since all three pesticides yield carbendazim as the residue of prime importance. Recommendations concerning all three compounds are therefore dealt with together, and are shown in Annex I.

All of the MRLs for which recommendations have been made are at CCPR Step 7B at present. There was insufficient information on which to base any recommendations relating to the existing CXLs. However, there were indications that more recent data from supervised trials

were needed in order to be able to assess the continued suitability of the present recommendations for lettuce, peppers, tomato and sugar beet, in particular.

## RECOMMENDATIONS

On the basis of the data on residues resulting from supervised trials using benomyl, carbendazim and/or thiophanate-methyl the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits.

Definition of the residue: carbendazim

[Note: Limits apply to carbendazim residues occurring as a metabolic product of benomyl or thiophanate-methyl, or from the direct use of carbendazim.]

Commodity		Recommended MRL (mg/kg)		PHI basis days	Source of data <sup>2</sup>
CCN	Name	New	Previous		
FS 0240	Apricot	0.1	10 Po	88	B
GC 0640	Barley	0.1	0.5 <sup>1</sup>	56	C T
AL 0061	Bean fodder	W	50	---	C
FB 0018	Berries and other small fruits	1	3	3-7	B T
VR 0577	Carrot	W	5 Po	---	C
GC 0080	Cereal grains	W	0.5	---	B C T
FS 0013	Cherries	2	10 Po	7	T
FC 0001	Citrus fruits	W	10 Po	---	B C T
VL 0482	Lettuce, Head	5	5	7	T
VO 0450	Mushrooms	1	1	12-21	B T
FS 0245	Nectarine	2	2	7	B
GC 0647	Oats	0.1	0.5 <sup>1</sup>	56	C
FS 0247	Peach	2	10 Po	7	B
VO 0051	Peppers	0.1	5	14	T
FI 0353	Pineapple	W	20 Po	---	B
FS 0014	Plums (including Prunes)	0.5	2 Po	7	T
FP 0009	Pome fruits	2	5 Po	14	B C T
GC 0649	Rice	W	0.5 <sup>1</sup>	---	B C T
GC 0650	Rye	0.1	0.5 <sup>1</sup>	56	C T
AV 0596	Sugar beet leaves or tops	5	10	14	B T
VO 0448	Tomato	0.1	5	14	T
GC 0654	Wheat	0.1	0.5 <sup>1</sup>	56	B C T

<sup>1</sup> Group MRL for cereal grains

<sup>2</sup> Source of data: B = benomyl, C = carbendazim, T = thiophanate-methyl

All of the above MRLs are at CCPR Step 7B at present. There was insufficient information on which to base any recommendations relating to the existing CXLs. However,

there were indications that more recent data from supervised trials were needed in order to be able to assess the continued suitability of the present recommendations for lettuce, peppers, tomato and sugar beet, in particular.

## **FURTHER WORK OR INFORMATION**

### Desirable

1. Residue data from supervised trials of carbendazim using currently registered post-harvest treatments of citrus, pome and stone fruits, potatoes, carrots and any other fruits or vegetables for which post-harvest treatment is registered.
2. Residue data from supervised trials of carbendazim on rice to enable a recommendation for an MRL to be made.
3. Residue data from supervised trials of carbendazim at the currently registered rates of use on lettuce, peppers, tomatoes and sugar beet.
4. Supporting residue data from supervised trials of carbendazim at the currently registered rates of use on all other crops for which CXLs are currently listed.

## **REFERENCES**

(All references are unpublished)

1. BASF, 1993. Data on GAP and residues supplied by BASF AG, Germany.
2. Canada, 1993. Data on GAP supplied by Canada for the JMPR.
3. Du Pont, 1990. Data on GAP and residues supplied by Du Pont de Nemours, USA for the 1990 JMPR.
4. EC, 1993. Data on GAP supplied by the European Commission for the JMPR.
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6. Hungary, 1993. Data on residues supplied by Hungary for the JMPR.
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8. New Zealand, 1993. Data on GAP supplied by New Zealand for the JMPR.
9. Spain, 1993. Data on GAP supplied by Spain for the JMPR.