

ALDICARB (117)

EXPLANATION

Aldicarb was re-evaluated for residues in 1994 under the CCPR Periodic Review Programme. The JMPR recommended MRLs for a wide range of commodities, including a temporary MRL of 0.5 mg/kg for potatoes, and the withdrawal of the MRL for bananas. The TMRL for potatoes was recommended as an MRL in 1996. At the 30th Session of the CCPR, it was noted that new data on bananas and potatoes, based on amended GAP, would be reported to the 2000 JMPR (ALINORM 99/24). The 2000 JMPR decided to postpone evaluation until 2001. The present Meeting received the results of residue trials on bananas and potatoes, information on GAP for potatoes in Europe, a processing study on potatoes, and estimates of acute dietary intake based on the Monte Carlo model.

USE PATTERN

Aldicarb is registered for use on bananas in Argentina, Belize, Cameroon, Egypt, France (Guadeloupe and Martinique), the Ivory Coast, South Africa and Zimbabwe. GAP in France and in Côte d'Ivoire allows 2 applications/2 g ai/plant, with a PHI of 180 days.

Aldicarb is registered for use on potatoes in the USA, using positive-displacement (PDA) application of 3.36 kg ai/ha; the PHI is 100 and 150 days in the Florida and Pacific Northwest States, respectively. GAP in The Netherlands is a furrow application at 12.8 g ai/100 m, equivalent to 1.7 kg ai/ha, or a broadcast application at 3.36 kg ai/ha with a PHI of 90 days. In Italy, Greece and Spain, critical GAP is a furrow application of 2.5 kg ai/ha, and a PHI of 90 days.

ANALYTICAL METHODS

The analytical method used in all trials determines the residues separately by high-performance liquid chromatography with post-column reaction and fluorescence detection. The analytical recoveries from banana peel and pulp and potato tubers at fortification levels of 0.01 to 5.0 mg/kg ranged from 68 to 121% for aldicarb, aldicarb sulfoxide and aldicarb sulfone. The limit of quantification (LOQ) was 0.01 or 0.03 mg/kg for each compound.

Stability of residues in stored analytical samples

In a study in 1998 to determine the stability of aldicarb and its metabolites a fortification level of 0.1 mg/kg was used. Bananas and their processed fractions were stored for up to 6 months at -29 to -15°C. 64-87% of the added compounds remained after 5 months in the pulp, 56-80% in the peel, 61-98% in purée and 57-71% in chips (Table 1).

Table 1. Storage stability of bananas and their processed products, % remaining.

Sample	Storage, months	Aldicarb	Aldicarb sulfoxide	Aldicarb sulfone
Pulp	0	84, 83	79, 87	77, 104
	1	87, 85	77, 74	93, 91
	3	78, 77	68, 78	83, 87
	5	84, 76	68, 64	72, 82
Peel	0	81, 81	70, 77	94, 88
	1	78, 66	62, 66	80, 83
	3	56, 56	67, 68	93, 91
	5	60, 56	58, 62	80, 78
Purée	0	93, 89	81, 83	102, 110
	1	91, 90	77, 81	87, 87

Sample	Storage, months	Aldicarb	Aldicarb sulfoxide	Aldicarb sulfone
Chips	3	88, 90	81, 69	87, 79
	5	95, 86	74, 61	94, 98
	0	82, 77	90, 77	93, 95
	1	45, 49	49, 63	58, 69
	3	52, 51	62, 61	67, 65
	5	57, 66	61, 64	66, 71

RESIDUES RESULTING FROM SUPERVISED TRIALS

The total residue is the sum of the parent aldicarb and the metabolites aldicarb sulfone and aldicarb sulfoxide, expressed as aldicarb.

Soil application was used in all trials, and aldicarb was not detected in any samples. In the following Tables, underlined residues were used for the estimation of maximum residue levels and double underlined for estimation of STMRs and HRs (highest residues).

Bananas. Trials were conducted in major banana production sites in Guadeloupe and Martinique from 1996 to 1998 and in the Ivory Coast from 1997 to 1999 (Table 2). A rate of 2 g of aldicarb/plant was applied to each generation up to 5 months after planting, and samples harvested after 134 to 286 days. Samples consisted of 12 bananas (bagged or unbagged) taken from the lower, middle and upper position of the bunch. Each banana finger was halved. One half was peeled and the pulp and peel composited separately for analysis (Table 2). The pulp of the other half was used to determine the residues in the pulp of individual bananas (Tables 3-5). Individual peel samples were not analysed separately.

Table 2. Residues of aldicarb in bananas after single applications to the soil per generation.

Location	Generation	Application (g ai/plant)	PHI, days	Sample	Residues (mg/kg)					
					Aldicarb	Aldicarb sulfone	Aldicarb sulfoxide	Total, as aldicarb		
Guadeloupe ^{1,2} bagged	1st	2	286	fruit	<0.003	<0.005	<0.005	0.01		
				pulp	<0.003	<0.005	<0.005	0.01		
		2	161	fruit	<0.003	0.010	<0.005	<u>0.02</u>		
				pulp	<0.003	0.010	<0.005	<u>0.02</u>		
	2.2	134	fruit	<0.003	0.10	0.013	<u>0.12</u>			
			pulp	<0.003	0.10	0.010	<u>0.10</u>			
		2nd	2.2	249	fruit	<0.003	<0.005	<0.005	0.01	
					pulp	<0.003	<0.005	<0.005	0.01	
2.2	180		fruit	<0.003	<0.005	<0.005	<u>0.01</u>			
			pulp	<0.003	<0.005	<0.005	<u>0.01</u>			
2.2	150	fruit	<0.003	<0.005	<0.005	<u>0.01</u>				
		pulp	<0.003	<0.005	<0.005	<u>0.01</u>				
	Guadeloupe ² unbagged	1st	2	286	fruit	<0.003	<0.005	<0.005	0.01	
					pulp	<0.003	<0.005	<0.005	0.01	
2			161	fruit	<0.003	0.010	<0.005	<u>0.02</u>		
				pulp	<0.003	0.010	<0.005	<u>0.02</u>		
2.2		134	fruit	<0.003	0.091	0.011	<u>0.10</u>			
			pulp	<0.003	0.090	0.010	<u>0.09</u>			
		Ivory Coast ³ unbagged	1 st	1.63	249	fruit	<0.01	<0.01	<0.01	<0.03
						pulp	<0.01	<0.01	<0.01	<0.03
2.04	186			fruit	<0.01	<0.01	<0.01	<u><0.03</u>		
				pulp	<0.01	<0.01	<0.01	<u><0.03</u>		
2.04	158	fruit	<0.01	<0.01	<0.01	<u><0.03</u>				

Location	Generation	Application (g ai/plant)	PHI, days	Sample	Residues (mg/kg)			
					Aldicarb	Aldicarb sulfone	Aldicarb sulfoxide	Total, as aldicarb
				pulp	<0.01	<0.01	<0.01	<u><0.03</u>
bagged	2nd	1.84	252	fruit	<0.01	<0.01	<0.01	<0.03
				pulp	<0.01	<0.01	<0.01	<0.03
		1.84	221	fruit	<0.01	<0.01	<0.01	<u><0.03</u>
				pulp	<0.01	<0.01	<0.01	<u>0.03</u>
		1.84	190	fruit	<0.01	<0.01	<0.01	<u><0.03</u>
				pulp	<0.01	<0.01	<0.01	<u><0.03</u>
Martinique ^{1,2} bagged	1st	2.2	257	fruit	<0.003	<0.005	<0.005	0.01
				pulp	<0.003	<0.005	<0.005	0.01
		2.2	178 ± 14	fruit	<0.003	<0.005	<0.005	<u>0.01</u>
				pulp	<0.003	<0.005	<0.005	<u>0.01</u>
		2.2	150 ± 14	fruit	<0.003	0.010	<0.005	<u>0.01</u>
				pulp	<0.003	<0.005	<0.005	<u>0.01</u>
unbagged	2nd	2.2	199	fruit	<0.003	<0.005	<0.005	<u>0.01</u>
				pulp	<0.003	<0.005	<0.005	<u>0.01</u>
		2.2	167	fruit	<0.003	<0.005	<0.005	<u>0.01</u>
				pulp	<0.003	0.010	<0.005	<u>0.01</u>
		2.2	136	fruit	<0.003	0.005	0.005	<u>0.02</u>
				pulp	<0.003	0.005	0.005	<u>0.02</u>
Martinique ^{1,2,3} unbagged	1st	2.2	257	fruit	<0.003	<0.005	<0.005	0.01
				pulp	<0.003	<0.005	<0.005	0.01
		2.2	178 ± 14	fruit	<0.003	<0.005	<0.005	<u>0.01</u>
				pulp	<0.003	<0.005	<0.005	<u>0.01</u>
		2.2	150 ± 14	fruit	<0.003	<0.005	<0.005	<u>0.01</u>
				pulp	<0.003	<0.005	<0.005	<u>0.01</u>

¹ Residues in fruit (pulp + peel) were calculated from residues in the composite pulp and peel samples and % of each substrate in the sample

² It was assumed that undetected residues were at limit of detection for each substrate (pulp and peel 0.003 and 0.005 for aldicarb and aldicarb sulfone respectively, and 0.005 and 0.004 for aldicarb sulfoxide)

³ Residues in fruit, peel and pulp were <LOQ (0.01 mg/kg) for each analyte.

Table 3. Residues of aldicarb in pulp samples from individual bagged and unbagged bananas in a trial in Guadeloupe, 1st generation, PHI 161 days at 2 g ai/plant.

Sample ref.	Position in bunch	Aldicarb (mg/kg)	Aldicarb sulfoxide (mg/kg)	Aldicarb sulfone (mg/kg)	Total as aldicarb (mg/kg)
BAGGED					
RR21845	Upper	<0.003	0.01	<0.005	0.015
RR21853	Upper	<0.003	0.021	0.005	0.025
RR21861	Upper	<0.003	<0.0054	<0.005	0.011
RR21869	Upper	<0.003	0.008	<0.005	0.014
RR21909	Middle	<0.003	0.005	<0.005	0.011
RR21917	Middle	<0.003	0.006	<0.005	0.012
RR21925	Middle	<0.003	0.005	<0.005	0.011
RR21933	Middle	<0.003	0.008	<0.005	0.014
RR21963	Lower	<0.003	<0.0054	<0.005	0.011
RR21969	Lower	<0.003	<0.0054	<0.005	0.011

Sample ref.	Position in bunch	Aldicarb (mg/kg)	Aldicarb sulfoxide (mg/kg)	Aldicarb sulfone (mg/kg)	Total as aldicarb (mg/kg)
RR21975	Lower	<0.003	0.011	<0.005	0.016
RR21981	Lower	<0.003	0.005	<0.005	0.011
Mean total as aldicarb 0.0135 mg/kg; SD 0.0041; RSD 30.0%; highest/mean 1.85					
UNBAGGED					
RR21877	Upper	<0.003	0.007	<0.005	0.013
RR21885	Upper	<0.003	0.007	<0.005	0.013
RR21893	Upper	<0.003	0.009	0.004	0.014
RR21901	Upper	<0.003	0.009	0.004	0.014
RR21939	Middle	<0.003	0.007	<0.005	0.013
RR21945	Middle	<0.003	0.006	<0.005	0.012
RR21951	Middle	<0.003	0.005	<0.005	0.011
RR21957	Middle	<0.003	0.007	<0.005	0.013
RR21987	Lower	<0.003	0.007	<0.005	0.013
RR21993	Lower	<0.003	0.016	0.005	0.021
RR21999	Lower	<0.003	0.006	ND	0.012
RR22005	Lower	<0.003	0.005	ND	0.011
Mean total as aldicarb 0.0133 mg/kg; SD 0.0026; RSD 19.5%; highest/mean 1.575					

Table 4. Residues of aldicarb in banana pulp in trial in Guadeloupe, 1st generation, PHI 134 days at 2 g ai/plant on bagged and unbagged bananas.

Sample ref	Sample	Aldicarb (mg/kg)	Aldicarb sulfoxide (mg/kg)	Aldicarb sulfone (mg/kg)	Total, as aldicarb (mg/kg)
BAGGED					
RR21846	Upper	<0.003	0.067	0.008	0.067
RR21854	Upper	<0.003	0.043	0.005	0.044
RR21862	Upper	<0.003	0.071	0.008	0.07
RR21870	Upper	<0.003	0.102	0.011	0.099
RR21910	Middle	<0.003	0.112	0.012	0.109
RR21918	Middle	<0.003	0.100	0.011	0.098
RR21926	Middle	<0.003	0.079	0.008	0.077
RR21934	Middle	<0.003	0.138	0.013	0.132
RR21964	Lower	<0.003	0.044	0.006	0.045
RR21970	Lower	<0.003	0.047	0.006	0.048
RR21976	Lower	<0.003	0.049	0.006	0.05
RR21982	Lower	<0.003	0.124	0.011	0.117
Mean total as aldicarb 0.0797 mg/kg; SD 0.0306; RSD 38.4%; highest/mean 1.657					
UNBAGGED					
RR21878	Upper	<0.003	0.057	0.007	0.057

Sample ref	Sample	Aldicarb (mg/kg)	Aldicarb sulfoxide (mg/kg)	Aldicarb sulfone (mg/kg)	Total, as aldicarb (mg/kg)
RR21886	Upper	<0.003	0.111	0.012	0.108
RR21894	Upper	<0.003	0.153	0.018	0.149
RR21902	Upper	<0.003	0.153	0.016	0.147
RR21940	Middle	<0.003	0.151	0.009	0.14
RR21946	Middle	<0.003	0.073	0.010	0.074
RR21952	Middle	<0.003	0.033	0.006	0.036
RR21958	Middle	<0.003	0.093	0.011	0.092
RR21988	Lower	<0.003	0.036	0.006	0.039
RR21994	Lower	<0.003	0.050	0.007	0.051
RR22000	Lower	<0.003	0.043	0.007	0.045
RR22006	Lower	<0.003	0.035	0.007	0.039
Mean total as aldicarb 0.0714 mg/kg; SD 0.0448; RSD 55.0%; highest/mean 1.83					

Table 5. Residues of aldicarb in banana pulp in a trial in Martinique, 2nd generation, PHI 136 and 167 days at 2 g ai/plant on bagged bananas.

Sample ref	Sample	Aldicarb (mg/kg)	Aldicarb sulfoxide (mg/kg)	Aldicarb sulfone (mg/kg)	Total, as aldicarb (mg/kg)
167 days					
RR22184	Upper	<0.003	0,006	<0.005	0,012
RR22192	Upper	<0.003	<0.0054	<0.005	0,011
RR22200	Upper	<0.003	0,008	0,005	0,014
RR22208	Upper	<0.003	<0.0054	<0.005	0,011
RR22248	Middle	<0.003	0,005	<0.005	0,011
RR22256	Middle	<0.003	0,006	<0.005	0,012
RR22264	Middle	<0.003	0,009	<0.005	0,015
RR22272	Middle	<0.003	0,005	<0.005	0,011
RR22302	Lower	<0.003	<0.0054	<0.005	0,011
RR22308	Lower	<0.003	0,008	<0.005	0,014
RR22314	Lower	<0.003	0,007	<0.005	0,013
RR22320	Lower	<0.003	0,009	<0.005	0,015
Mean total as aldicarb 0.0125 mg/kg; SD 0.0016; RSD 13.0%; highest/mean 1.2					
136 days					
RR22186	Upper	<0.003	0,012	ND	0,017
RR22194	Upper	<0.003	0,007	ND	0,013
RR22202	Upper	<0.003	0,008	ND	0,014
RR22210	Upper	<0.003	0,012	0,004	0,017
RR22250	Middle	<0.003	0,007	ND	0,013
RR22258	Middle	<0.003	0,012	0,005	0,017

Sample ref	Sample	Aldicarb (mg/kg)	Aldicarb sulfoxide (mg/kg)	Aldicarb sulfone (mg/kg)	Total, as aldicarb (mg/kg)
RR22266	Middle	<0.003	0,007	ND	0,013
RR22274	Middle	<0.003	0,008	ND	0,014
RR22304	Lower	<0.003	0,01	ND	0,015
RR22310	Lower	<0.003	0,005	ND	0,011
RR22316	Lower	<0.003	0,009	ND	0,015
RR22322	Lower	<0.003	0,012	ND	0,017
Mean total as aldicarb 0.0147 mg/kg; SD 0.002; RSD 13.7%; highest/mean 1.159					

Data from the 1996 JMPR Evaluation

Bananas. In two trials in Martinique in 1987, reported to the 1996 JMPR, after two applications of 2 g ai/plant and PHIs of 148-205 days, the residues as total aldicarb were 0.02 and 0.03 mg/kg in the pulp.

Potatoes. Twenty three residue trials were conducted in Europe (Greece, Italy, The Netherlands, Spain and the UK) using 1 soil application of 2.5 to 3.4 kg ai/ha or 13 g ai/100 m. Some of the trials were decline studies with samples harvested from 90 to 120 days after treatment. Each tuber was halved and one half was used to make a composite sample for analysis. The other half was used to determine residues in individual tubers, which are reported in Tables 7 to 9. In sixteen trials in the USA with single soil applications at-planting PDA of 3.6 kg ai/ha two samples were collected each consisting of 24 tubers taken at random from the plot after 120 days. Residues in the tubers in all trials ranged from <0.03 to 0.45 mg/kg (Table 6).

Samples from sixty commercial potato fields randomly selected in Washington, Idaho and Oregon collected within a five-day window before harvest at PHIs of 150 to 192 days were analysed for aldicarb and its metabolites. The limit of quantification was about 0.02 mg/kg for each analyte. The maximum residue was 0.126 mg/kg as aldicarb, with an average of 0.041 ± 0.02 mg/kg, but full details of the trials were not provided.

Table 6. Residues of aldicarb in potato samples after 1 soil application.

Country, year	Type of application	Application rate	PHI, days	Residue (mg/kg)				Site
				Aldicarb	Aldicarb sulfone	Aldicarb sulfoxide	Total as aldicarb	
Greece, 1996	In furrow	2.5 kg ai/ha	87	<0.01	0.019	<0.01	<u>0.04</u>	96662 GR1
1998	In furrow	2.8 kg ai/ha	91	<0.01	<0.01	0.013	<u>0.03</u>	98694GR1
			101	<0.01	<0.01	0.017	0.03	
			112	<0.01	<0.01	0.011	0.03	
			121	<0.01	<0.01	0.013	0.03	
	In furrow	2.8 kg ai/ha	89	<0.01	0.013	0.018	0.04	98694GR2
			99	<0.01	0.024	0.033	<u>0.06</u>	
			110	<0.01	0.022	0.030	0.06	
Italy, 1998	In furrow	2.6 kg ai/ha	90	<0.01	<0.01	<0.01	0.03	98702BO1
			100	<0.01	0.021	<0.01	<u>0.04</u>	
			110	<0.01	<0.01	<0.01	0.03	
			120	<0.01	<0.01	<0.01	0.03	
	In furrow	2.6 kg ai/ha	90	<0.01	<0.01	<0.01	<u>0.03</u>	98694GR2
			100	<0.01	<0.01	<0.01	0.03	

Country. year	Type of application	Application rate	PHI, days	Residue (mg/kg)				Site
				Aldicarb	Aldicarb sulfone	Aldicarb sulfoxide	Total as aldicarb	
			110	<0.01	<0.01	<0.01	0.03	
			120	<0.01	<0.01	<0.01	0.03	
Netherlands. 1998	broadcast	3.4 kg ai/ha	90	<0.01	0.14	0.13	0.24	NL1
			100	<0.01	0.14	0.16	<u>0.27</u>	
			111	<0.01	0.077	0.073	0.14	
			120	<0.01	0.069	0.067	0.13	
	In furrow	13 g/100m	90	<0.01	0.039	0.097	0.13	NL1
			100	<0.01	0.034	0.073	0.11	
			111	<0.01	0.051	0.13	<u>0.17</u>	
			120	<0.01	0.041	0.076	0.11	
	broadcast	3.4 kg ai/ha	90	<0.01	0.083	0.13	<u>0.20</u>	NL2
			100	<0.01	0.050	0.078	0.12	
			111	<0.01	0.037	0.047	0.08	
			120	<0.01	0.038	0.064	0.10	
In furrow	13 g ai/100m	100	<0.01	0.019	0.056	0.08	NL2	
		111	<0.01	0.024	0.072	<u>0.10</u>		
		120	<0.01	0.024	0.075	0.10		
Spain. 1996 1998	In furrow	3 kg ai/ha	99	<0.01	0.41	0.074	<u>0.45</u>	96642M1
	In furrow	3 kg ai/ha	104	<0.01	0.035	0.015	<u>0.06</u>	96642V1
	In furrow	2.5 kg ai/ha	90	<0.01	0.038	0.25	<u>0.27</u>	98580SE1
			100	<0.01	0.028	0.22	0.24	
			110	<0.01	0.031	0.16	0.18	
			120	<0.01	0.020	0.17	0.18	
	In furrow	2.5 kg ai/ha	93	<0.01	<0.01	0.028	<u>0.04</u>	98580SE2
			100	<0.01	<0.01	0.027	0.04	
			111	<0.01	<0.01	0.018	0.04	
			120	<0.01	<0.01	0.019	0.04	
UK.1998 Study 98661	In furrow	13 g ai/100m	90	<0.01	0.033	0.075	<u>0.11</u>	RP1
		13 g ai/100m	91	<0.01	0.038	0.070	<u>0.11</u>	RP2
		13 g ai/100m	90	<0.01	0.036	0.044	<u>0.08</u>	RP3
		12 g ai/100m	90	<0.01	0.035	0.066	<u>0.10</u>	IRI
Study 98662	broadcast	3.3 kg ai/ha	90	<0.01	0.014	<0.01	<u>0.03</u>	RP1
		3.2 kg ai/ha	91	<0.01	0.089	0.10	<u>0.18</u>	RP2
		3.2 kg ai/ha	90	<0.01	0.14	0.25	<u>0.36</u>	RP3
		3.4 kg ai/ha	90	<0.01	0.065	0.06	<u>0.12</u>	IRI
Study 98667	In furrow	13 g ai/100m	91	<0.01	0.027	0.092	<u>0.12</u>	RP1
			100	<0.01	0.018	0.060	0.08	
			110	<0.01	0.016	0.033	0.05	
			120	<0.01	0.014	0.025	0.04	
	In furrow	13 g ai/100m	90	<0.01	<0.01	<0.01	<u><0.03</u>	RP2
			100	<0.01	<0.01	<0.01	<0.03	
			110	<0.01	<0.01	<0.01	<0.03	
			120	<0.01	<0.01	<0.01	<0.03	
	In furrow	13 g ai/100m	91	<0.01	0.023	0.044	<u>0.07</u>	RP3
			100	<0.01	0.017	0.032	0.05	
			110	<0.01	0.018	0.036	0.06	
			120	<0.01	0.011	0.030	0.05	
	In furrow	13g ai/100m	90	<0.01	0.011	0.035	0.05	IRI
			100	<0.01	<0.010	<0.01	0.09 ¹	
			110	<0.01	0.011	0.022	0.04	
			120	<0.01	0.027	0.075	<u>0.10</u>	

Country. year	Type of application	Application rate	PHI, days	Residue (mg/kg)				Site
				Aldicarb	Aldicarb sulfone	Aldicarb sulfoxide	Total as aldicarb	
Study 98668	broadcast	3.3 kg ai/ha	91	<0.01	<0.01	<0.01	<u><0.03</u>	RP1
			100	<0.01	<0.01	<0.01	<0.03	
			110	<0.01	<0.01	<0.01	<0.03	
			120	<0.01	<0.01	<0.01	<0.03	
	broadcast	3.2 kg ai/ha	90	<0.01	<0.01	<0.01	<u><0.03</u>	RP2
			100	<0.01	<0.01	<0.01	<0.03	
			110	<0.01	<0.01	<0.01	<0.03	
			120	<0.01	<0.01	<0.01	<0.03	
	broadcast	3.2 kg ai/ha	91	<0.01	0.045	0.043	<u>0.09</u>	RP3
			100	<0.01	0.019	0.013	0.04	
			110	<0.01	0.023	0.020	0.05	
			120	<0.01	0.19	0.017	0.04	
	broadcast	3.4 kg ai/ha	90	<0.01	0.031	0.11	0.13	IRI
			100	<0.01	0.033	0.11	<u>0.14</u>	
			110	<0.01	<0.01	0.015	0.03	
			120	<0.01	0.015	0.048	0.07	
USA. 1996 ² CO	PDA	3.6 kg ai/ha	120	<0.003	0.011	0.02	<u>0.03</u>	11218-05
	PDA	3.6 kg ai/ha	120	<0.003	0.043	0.176	<u>0.20</u>	11218-06
ID	PDA	3.6 kg ai/ha	120	<0.003	<0.02	<0.02	<u>0.03</u>	10525-01
	PDA	3.6 kg ai/ha	120	<0.003	<0.003	<0.003	<u><0.02</u>	10525-02
	PDA	3.6 kg ai/ha	120	<0.003	<0.02	<0.02	<u>0.03</u>	10525-08
	PDA	3.6 kg ai/ha	120	<0.003	0.02	0.03	<u>0.04</u>	10528-10
MI	PDA	3.6 kg ai/ha	120	<0.003	0.05	0.081	<u>0.11</u>	11218-01
	PDA	3.6 kg ai/ha	120	<0.003	0.021	0.029	<u>0.04</u>	11218-02
ND	PDA	3.6 kg ai/ha	120	<0.003	0.05	0.09	<u>0.13</u>	11218-04
OR	PDA	3.6 kg ai/ha	120	<0.003	<0.003	<0.02	<u>0.02</u>	10523-03
	PDA	3.6 kg ai/ha	120	<0.003	<0.003	<0.02	<u>0.02</u>	10525-04
	PDA	3.6 kg ai/ha	120	<0.003	0.02	0.03	<u>0.04</u>	10525-09
SD	PDA	3.6 kg ai/ha	120	<0.003	0.039	0.072	<u>0.10</u>	11218-03
WA	PDA	3.6 kg ai/ha	120	<0.003	0.02	0.06	<u>0.06</u>	10525-05
	PDA	3.6 kg ai/ha	120	<0.003	<0.02	0.04	<u>0.05</u>	10525-06
	PDA	3.6 kg ai/ha	120	<0.003	0.03	0.06	<u>0.06</u>	10525-07

¹ Result obtained on sample labelled "untreated". As <0.028 mg/kg was found on sample labelled "treated", labels were assumed to have been reversed

² In calculating total residue, 0.00 mg/kg is used for values reported as undetected (<0.003 mg/kg) and 0.02 mg/kg for those reported as <0.02 mg/kg

The results of further trials on potatoes conducted according to GAP, reported to the 1999 JMPR, in rank order were <0.03 (5), 0.03-0.048 (5), 0.053-0.08 (7), 0.09 (2), 0.1-0.18 (6), 0.23 (2), 0.24, 0.25 (2), 0.3 (2), 0.35, 0.4 (2), 0.43 and 0.7 mg/kg as aldicarb sulfone. To be expressed as aldicarb, the results were multiplied by 0.856 giving residues of <0.03 (5), 0.03-0.04 (5), 0.04-0.07 (7), 0.08 (2), 0.08-0.15 (6), 0.20 (3), 0.21(2), 0.26(2), 0.3, 0.34 (2), 0.39 and 0.6 mg/kg.

Table 7. Residues of aldicarb in individual potato tubers in trials in the UK and The Netherlands.

Trial 98-661 – UK plot AK/4092RP1		Trial 98-661 – UK plot IR392338/1		Trial 98-687NL1/ND – plot 3 R1	
Sample reference	Total aldicarb, mg/kg	Sample reference	Total aldicarb, mg/kg	Sample reference	Total aldicarb, mg/kg
45815/1	0.033	52976/1	0.081	145831	0.037
45815/2	0.079	52976/2	0.050	145832	0.249

Trial 98-661 – UK plot AK/4092RP1		Trial 98-661 – UK plot IR392338/1		Trial 98-687NL1/ND – plot 3 R1	
Sample reference	Total aldicarb, mg/kg	Sample reference	Total aldicarb, mg/kg	Sample reference	Total aldicarb, mg/kg
45815/3	0.046	52976/3	0.107	145833	0.116
45815/4	0.112	52976/4	0.057	145834	0.046
45815/5	0.057	52976/5	0.074	145835	0.137
45815/6	0.197	52976/6	0.286	145836	0.075
45815/7	0.130	52976/7	0.070	145837	0.174
45815/8	0.262	52976/8	0.184	145838	0.426
45815/9	0.063	52976/9	0.072	145839	0.201
45815/10	0.111	52976/10	0.080	145840	0.051
45815/11	0.039	52976/11	0.124	145841	0.058
45815/12	0.043	52976/12	0.055	145842	0.289
45815/13	0.103	52976/13	0.066	145843	0.075
45815/14	0.098	52976/14	0.033	145844	0.124
45815/15	0.048	52976/15	0.050	145845	0.077
45815/16	0.055	52976/16	0.090	145846	0.073
45815/17	0.068	52976/17	0.030	145847	0.084
45815/18	0.087	52976/18	0.338	145848	0.034
45815/19	0.091	52976/19	0.040	145849	0.079
45815/20	0.098	52976/20	0.181	145850	0.244
45815/21	0.047	52976/21	0.095	145851	0.401
45815/22	0.169	52976/22	0.064	145852	0.211
45815/23	0.169	52976/23	0.052	145853	0.028
45815/24	0.115	52976/24	0.067	145854	0.158
45815/25	0.133	52976/25	0.028	145855	0.041
45815/26	0.111	52976/26	0.069	145856	0.031
45815/27	0.197	52976/27	0.039	145857	0.097
45815/28	0.045	52976/28	0.109	145858	0.032
45815/29	0.225	52976/29	0.110	145859	0.128
45815/30	0.059	52976/30	0.340	145860	0.048
45815/31	0.048	52976/31	0.079	145861	0.074
45815/32	0.191	52976/32	0.028	145862	0.033
45815/33	0.081	52976/33	0.030	145863	0.044
45815/34	0.195	52976/34	0.143	145864	0.063
45815/35	0.203	52976/35	0.058	145865	0.067
45815/36	0.075	52976/36	0.055	145866	0.071
45815/37	0.091	52976/37	0.091	145867	0.045
45815/38	0.121	52976/38	0.072	145868	0.034
45815/39	0.148	52976/39	0.052	145869	0.078
45815/40	0.051	52976/40	0.209	145870	0.052

Trial 98-661 – UK plot AK/4092RP1		Trial 98-661 – UK plot IR392338/1		Trial 98-687NL1/ND – plot 3 R1	
Sample reference	Total aldicarb, mg/kg	Sample reference	Total aldicarb, mg/kg	Sample reference	Total aldicarb, mg/kg
45815/41	0.107	52976/41	0.039	145871	0.048
45815/42	0.049	52976/42	0.028	145872	0.085
45815/43	0.034	52976/43	0.088	145873	0.034
45815/44	0.084	52976/44	0.138	145874	0.089
45815/45	0.083	52976/45	0.059	145875	0.364
45815/46	0.076	52976/46	0.071	145876	0.064
45815/47	0.042	52976/47	0.115	145877	0.330
45815/48	0.146	52976/48	0.181	145878	0.070
45815/49	0.033	52976/49	0.052	145879	0.085
45815/50	0.067	52976/50	0.067	145880	0.075
Max	0.262	Max	0.340	Max	0.426
Mean	0.100	Mean	0.094	Mean	0.113
St Dev	0.057	St Dev	0.072	St Dev	0.101
Median	0.086	Median	0.071	Median	0.075
Max/mean	2.61	Max/mean	3.62	Max/mean	3.79
RSD	57%	RSD	77%	RSD	89%

Table 8. Residues of aldicarb in individual potato tubers in trials in Spain and Italy.

Trial 98580/Spain/SE1		Trial 98580/Spain/SE1		Trial 98702BO1/ Italy		Trial 98702BO2/Italy	
Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg
9	0.230	19	<0.028	9	0.030	52	<0.028
10	0.263	20	0.037	10	<0.028	54	<0.028
11	0.379	21	0.031	11	0.029	81	<0.028
12	0.205	22	0.033	12	0.030	91	<0.028
13	0.394	23	<0.028	13	<0.028	79	<0.028
14	0.393	24	0.067	14	0.032	93	<0.028
15	0.094	25	0.050	15	<0.028	84	<0.028
16	0.309	26	0.107	16	<0.028	62	<0.028
17	0.079	27	0.032	17	0.029	122	<0.028
18	0.709	28	0.032	18	<0.028	74	<0.028
19	0.206	29	0.031	19	0.030	112	0.029
20	0.184	30	0.047	20	0.038	138	0.043
21	0.297	31	0.033	21	0.031	78	<0.028
22	0.390	32	0.033	22	0.031	61	<0.028
23	0.534	33	0.067	23	0.037	82	<0.028
24	0.173	34	0.036	24	<0.028	115	<0.028

Trial 98580/Spain/SE1		Trial 98580/Spain/SE1		Trial 98702BO1/ Italy		Trial 98702BO2/Italy	
Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg
25	0.309	35	0.037	25	<0.028	109	<0.028
26	1.068	36	0.044	26	0.043	68	0.031
27	0.724	37	<0.028	27	0.031	61	<0.028
28	0.325	38	0.067	28	0.034	107	<0.028
29	0.493	39	0.031	29	<0.028	112	<0.028
30	0.218	40	<0.028	30	0.032	105	0.053
31	0.477	41	<0.028	31	0.035	133	<0.028
32	0.291			32	0.138	194	<0.028
33	0.221			33	0.037	53	<0.028
34	0.141			34	0.083	65	<0.028
35	0.472			35	0.034	72	<0.028
36	0.207			36	0.031	75	<0.028
37	0.412			37	0.031	70	<0.028
38	0.299			38	<0.028	76	<0.028
39	0.291			39	0.040	101	<0.028
40	0.143			40	0.044	137	<0.028
41	0.211			41	0.030	111	<0.028
42	0.111			42	<0.028	143	<0.028
43	0.200			43	0.053	62	<0.028
44	0.182			44	<0.028	65	<0.028
45	0.325			45	0.035	92	<0.028
46	0.146			46	<0.028	72	<0.028
47	0.433			47	0.058	59	<0.028
48	0.280			48	0.034	69	<0.028
49	0.242			49	0.032	58	<0.028
50	0.273			50	<0.028	102	0.053
51	0.203			51	<0.028	79	<0.028
52	0.246			52	<0.028	60	<0.028
53	0.290			53	0.037	54	<0.028
54	0.192			54	<0.028	275	0.065
55	0.310			55	0.076	128	0.047
56	0.236			56	0.034	68	<0.028
57	0.190			57	0.030	139	0.037
58	0.629			58	<0.028	120	<0.028
Max	1.068	Max	0.107	Max	0.138	Max	0.065
Mean	0.313	Mean	0.042	Mean	0.037	Mean	0.031
St Dev	0.181	St Dev	0.019	St Dev	0.018	St Dev	0.008
Median	0.276	Median	0.033	Median	0.031	Median	<0.028

Trial 98580/Spain/SE1		Trial 98580/Spain/SE1		Trial 98702BO1/ Italy		Trial 98702BO2/Italy	
Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg
Max/mean	3.42	Max/mean	2.57	Max/mean	3.79	Max/mean	2.11
RSD	58%	RSD	46%	RSD	51%	RSD	25%

Table 9. Residues of aldicarb in individual potato tubers in trials in Greece (Trials 98694R1 and 98694/R2, Greece Rep 2).

Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg
153312	0.032	153362	0.029	153412	0.045	153462	<0.028
153313	0.032	153363	0.036	153413	0.036	153463	0.030
153314	0.041	153364	0.037	153414	0.051	153464	<0.028
153315	0.031	153365	<0.028	153415	0.071	153465	<0.028
153316	0.039	153366	<0.028	153416	0.059	153466	<0.028
153317	<0.028	153367	0.033	153417	0.042	153467	0.037
153318	0.031	153368	0.032	153418	0.103	153468	<0.028
153319	0.031	153369	0.031	153419	0.046	153469	0.033
153320	0.043	153370	<0.028	153420	0.082	153470	<0.028
153321	0.030	153371	0.039	153421	0.078	153471	0.030
153322	<0.028	153372	0.031	153422	0.113	153472	0.031
153323	0.034	153373	<0.028	153423	0.039	153473	0.050
153324	0.031	153374	0.030	153424	<0.028	153474	0.037
153325	0.033	153375	0.047	153425	0.074	153475	<0.028
153326	0.029	153376	0.041	153426	0.074	153476	0.071
153327	0.036	153377	0.042	153427	0.088	153477	0.054
153328	<0.028	153378	0.035	153428	0.036	153478	0.046
153329	0.029	153379	0.031	153429	0.050	153479	0.041
153330	<0.028	153380	<0.028	153430	0.087	153480	0.065
153331	0.050	153381	0.031	153431	0.032	153481	0.046
153332	<0.028	153382	<0.028	153432	<0.028	153482	0.053
153333	<0.028	153383	0.030	153433	<0.028	153483	0.032
153334	0.036	153384	<0.028	153434	0.063	153484	0.079
153335	0.041	153385	0.034	153435	0.087	153485	0.034
153336	<0.028	153386	<0.028	153436	0.038	153486	0.033
153337	<0.028	153387	0.035	153437	0.052	153487	0.029
153338	0.036	153388	<0.028	153438	0.071	153488	0.030
153339	0.044	153389	0.035	153439	0.102	153489	<0.028
153340	0.035	153390	0.045	153440	0.040	153490	0.088
153341	0.044	153391	0.030	153441	<0.028	153491	0.038
153342	<0.028	153392	0.037	153442	<0.028	153492	0.032

Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg	Sample no.	Total aldicarb, mg/kg
153343	0.040	153393	0.040	153443	<0.028	153493	0.031
153344	0.036	153394	0.037	153444	<0.028	153494	0.063
153345	<0.028	153395	<0.028	153445	0.032	153495	0.092
153346	<0.028	153396	0.043	153446	<0.028	153496	0.071
153347	0.042	153397	0.033	153447	<0.028	153497	0.074
153348	0.030	153398	0.043	153448	0.042	153498	<0.028
153349	0.027	153399	0.031	153449	0.035	153499	<0.028
153350	0.035	153400	0.042	153450	<0.028	153500	<0.028
153351	0.036	153401	0.036	153451	<0.028	153501	0.085
153352	0.030	153402	<0.028	153452	0.044	153502	0.045
153353	0.042	153403	0.043	153453	0.030	153503	0.030
153354	<0.028	153404	<0.028	153454	0.056	153504	0.037
153355	<0.028	153405	0.039	153455	0.052	153505	0.051
153356	0.037	153406	0.031	153456	0.080	153506	0.081
153357	0.031	153407	0.035	153457	0.031	153507	<0.028
153358	0.030	153408	0.051	153458	0.029	153508	0.040
153359	0.032	153409	0.038	153459	0.056	153509	0.042
153360	0.042	153410	0.043	153460	0.051	153510	<0.028
153361	<0.028	153411	0.031	153461	0.039	153511	0.100
Max	0.050	Max	0.051	Max	0.113	Max	0.100
Mean	0.033	Mean	0.035	Mean	0.051	Mean	0.044
St Dev	0.006	St Dev	0.006	St Dev	0.024	St Dev	0.020
Median	0.031	Median	0.033	Median	0.043	Median	0.035
Max/mean	1.49	Max/mean	1.49	Max/mean	2.22	Max/mean	2.24
RSD	17%	RSD	18%	RSD	46%	RSD	46%

FATE OF RESIDUES IN STORAGE AND PROCESSING

In storage

The stability at room temperature of aldicarb and its metabolites was studied in banana pulp and peel samples fortified at 0.1 mg/kg. The results are shown on Table 10.

Table 10. Stability of residues of aldicarb and metabolites in bananas at room temperature (% remaining).

Sample	Storage, days	Aldicarb	Aldicarb sulfoxide	Aldicarb sulfone
pulp	0	84, 87	71, 70	87, 86
	2	74, 84	77, 78	94, 91
	4	75, 77	97, 73	84, 84
	6	63, 73	0, 0	85, 89
peel	0	68, 68	68, 72	98, 91
	2	28, 32	80, 82	100, 97

	4	27, 30	67, 70	98, 94
	6	37, 36	77, 70	82, 81

In processing

A processing study was carried out on potatoes from 3 fields in Spain commercially treated with aldicarb at planting. Tuber samples (average size 3-4 cm) taken 67 to 88 days after treatment had total aldicarb residues expressed as aldicarb of 0.06, 0.15 and 0.45 mg/kg. After microwave boiling, tubers had on average 70% of the residues before cooking (processing factors: 0.72; 0.72 and 0.65).

RESIDUES IN FOOD IN COMMERCE OR AT CONSUMPTION

Preliminary evaluations of dietary intake in Europe show the UK population as a high consumer of foods identified as the main potential sources of residues of aldicarb (potatoes, bananas, carrots and citrus fruit). Data from field trials, adjusted to reflect market share information and import statistics, were combined with consumption data for the UK adult (16 to 64 years) and toddler population (2½ to 4½ years) to estimate the potential exposure of the population to aldicarb (Barraj and Petersen, 1999). The probabilistic Monte Carlo exposure model was used, following guidelines outlined by the UK Ministry of Agriculture, Fisheries and Food. The results indicate that potential dietary exposure is well below the acute reference dose (acute RfD) of 0.003 mg/kg bw/day (JMPR, 1995). The UK adult and toddler exposures at the 97.5th percentile are 0.00014 mg/kg bw/day (4.7% of acute RfD) and 0.00023 mg/kg bw/day (7.7% of the acute RfD).

A reanalysis of the dietary exposure assessment using the Monte Carlo exposure model was conducted to include new results from June 1999 and detailed consumption data for the UK infant (less than 1 year). The estimated UK adult and toddler exposures at the 99th percentile are 0.000449 mg/kg (15% of the acute RfD) and 0.000776 mg/kg (26% of the acute RfD) respectively. The estimated UK infant exposure at the 99th percentile is 0.000626 mg/kg (21% of the acute RfD).

APPRAISAL

Aldicarb was last evaluated for residues in 1994 by the JMPR within the CCPR periodic review programme. The 1994 Meeting estimated maximum residue levels for a wide range of commodities and estimated a temporary maximum residue level of 0.5 mg/kg for potato, pending the submission of data from supervised trials corresponding to current use patterns; it withdrew the MRL for banana. In 1996, new data on residues in banana and potato were evaluated, and the MRL of 0.5 mg/kg on potatoes was confirmed. At its Thirtieth Session, the CCPR noted that new data on banana and potato based on amended GAP use would become available (ALINORM 99/24). At the present Meeting, data on residues in trials on banana and potato, residues in individual units of banana and potato, a study on processing of potato, and an estimate of short-term dietary intake by a probabilistic method were provided.

Stability of residues in stored analytical samples

Aldicarb and its metabolites were relatively stable at a concentration of 0.1 mg/kg in banana and in processed fractions stored for up to 5 months in a freezer. After storage, 64–87% of the added compounds remained in banana pulp, 56–80% in peel, 61–98% in purée and 57–71% in banana chips. No new studies were provided on potato samples.

Results of supervised trials

In Guadeloupe, Martinique and Côte d'Ivoire, the GAP for banana is 2 g ai/plant. The labels either states that a period of 180 days is necessary between the last treatment and the expected harvesting date or specifies a PHI of 180 days. The Meeting agreed that, if bananas were treated with aldicarb with the intention of harvesting 180 days later, the use would be considered at GAP if the bananas were harvested at maturity.

Twenty-four trials were conducted in these countries, with 1 x 2 g/plant applied to the first and/or the second generation, on bagged and/or unbagged bananas (PHI, 134–286 days). The concentrations of residues of aldicarb in bagged banana were 0.01 (4), 0.02, < 0.03 (3) and 0.12 mg/kg, and those in bagged banana pulp were 0.01 (4), 0.02, < 0.03 (2), 0.03 and 0.10 mg/kg. The concentrations in unbagged banana fruit were 0.01 (9), 0.02 (2), < 0.03 (3) and 0.10 mg/kg, and those in unbagged banana pulp were 0.01 (9), 0.02 (2), < 0.03 (3) and 0.09 mg/kg, as aldicarb. Residues after culture by GAP on bagged and unbagged banana applied to a single population, and were combined. The residue concentrations in fruit, in ranked order (median underlined), were: 0.01 (13), 0.02 (3), < 0.03 (6), 0.10 and 0.12 mg/kg, and those in pulp were 0.01 (13), 0.02 (3), < 0.03 (5), 0.03, 0.09 and 0.10 mg/kg, as aldicarb.

On the basis of the concentrations in the fruit, the Meeting estimated a maximum residue level of 0.2 mg/kg for aldicarb in banana. On the basis of the concentrations in pulp, the Meeting estimated an STMR of 0.01 mg/kg, and an HR of 0.10 mg/kg for aldicarb in banana.

Individual pulp units from four trials (12 units per trial from four bunches) conducted in Guadeloupe (first-generation; PHI, 134 days for bagged and 161 days for unbagged bananas) and from two trials conducted in Martinique (second-generation; PHI, 167 and 136 days for bagged banana) were analysed. The distribution of residues in the 12 units did not represent the expected distribution of residues among plants on a treated field. Aldicarb is a systemic insecticide, which is taken up by the plant from the soil. The residues are equally distributed in the peel and the pulp, and there is no difference between the concentrations in bagged and unbagged banana. Furthermore, the main source of variation in concentrations is differences in uptake. The sampling plan used, in which only four bunches were selected from the treated area, would not indicate the probable variation in concentrations, and, consequently, no variability factor could be estimated. The Meeting agreed that a default variability factor of 5 should be used to estimate short-term dietary intake of aldicarb from banana; the unit weight of the whole portion includes more than one finger and is > 250 g (see section 3).

Overall, 29 trials were conducted with aldicarb on potato in Europe (three in Greece, four in The Netherlands, two in Italy, four in Spain and 16 in the United Kingdom). GAP in The Netherlands involves furrow application of a dose of 12.8 g/100 m, equivalent to 1.7 kg ai/ha, or broadcast application of 3.36 kg/ha and a PHI of 90 days. The residue concentrations in four trials conducted in The Netherlands according to GAP were 0.10, 0.17, 0.20 and 0.27 mg/kg. Seventeen trials conducted in the United Kingdom according to GAP in The Netherlands gave concentrations of < 0.03 (3), 0.03, 0.07, 0.08, 0.09, 0.10 (2), 0.11 (2), 0.12 (2), 0.14, 0.18 and 0.36 mg/kg. In Greece, Italy and Spain, critical GAP is furrow application of 2.5 kg ai/ha and a PHI of 90 days. The concentrations in trials conducted according to GAP were 0.04, 0.03 and 0.06 mg/kg in Greece, 0.04 and 0.03 mg/kg in Italy and 0.45, 0.06, 0.27 and 0.04 mg/kg in Spain.

In the USA, 16 trials were conducted according to the GAP rate of 3.36 kg ai/ha, a PHI of 100 or 150 days and positive displacement application, in Colorado, Idaho, Michigan, North Dakota, South Dakota and Washington. The concentrations of aldicarb residues in tubers after 120 days were < 0.02, 0.02 (2), 0.03 (3), 0.04 (3), 0.05, 0.06 (2), 0.10, 0.11, 0.13 and 0.20 mg/kg.

The concentrations of residues in trials conducted in Europe and the USA were considered to apply to a single population and were combined, in ranked order, as follows: < 0.02, 0.02 (2), < 0.03

(3), 0.03 (6), 0.04 (5), 0.05, 0.06 (4), 0.07, 0.08, 0.09, 0.10 (3), 0.11 (3), 0.12 (2), 0.13, 0.14, 0.18, 0.20, 0.27, 0.36 and 0.45 mg/kg, as aldicarb equivalents. The Meeting confirmed the previous recommended MRL of 0.5 mg/kg and estimated an STMR values of 0.06 mg/kg and a highest residue of 0.45 mg/kg for aldicarb in potato, as aldicarb equivalents.

The Meeting considered the database from 26 supervised field trials on potato submitted to the 1996 JMPR that had been carried out in the USA with the recommended positive displacement application of aldicarb. In each trial, 30–100 individual potato tubers were analysed. The observed maximum concentrations of residues in individual tubers in each trial were, in rank order, 0.045 (2), 0.046, 0.048, 0.063, 0.065, 0.072, 0.11, 0.17 (2), 0.20, 0.22, 0.23, 0.25, 0.26, 0.27, 0.29, 0.31, 0.32, 0.34, 0.51, 0.61, 0.94, 1.1 and 1.2 (2) mg/kg. Data on individual tubers were submitted to the present Meeting from 11 supervised trials conducted in Europe according to GAP, with furrow application. In each trial, 27–50 individual potato tubers were analysed. The observed maximum concentrations of residues in individual tubers in each trial were, in rank order, 0.05, 0.051, 0.065, 0.10 (2), 0.11, 0.138, 0.262, 0.34, 0.426 and 1.07 mg/kg. The Meeting agreed that the maximum residue levels in individual tubers in Europe and the USA comprised a single population and could be combined, in ranked order, as follows: 0.045 (2), 0.046, 0.048, 0.05, 0.051, 0.063, 0.065 (2), 0.072, 0.1 (2), 0.112, 0.11, 0.14, 0.17 (2), 0.2, 0.22, 0.23, 0.25, 0.26, 0.262, 0.27, 0.29, 0.31, 0.32, 0.34 (2), 0.43, 0.51, 0.61, 0.94, 1.1 (2) and 1.2 (2) mg/kg.

The Meeting agreed that the highest residue in this data set (1.2 mg/kg) could be used to estimate short-term intake of aldicarb from consumption of potato. When this value is used, no variability factor need be applied to the first part of the equation for calculation of the IESTI in case 2a (see section 3). The HR value estimated from the composite sample, 0.45 mg/kg, was used in the second part of the equation.

Fate of residues during storage

A study of the fate of residues of aldicarb and its metabolites present at 0.1 mg/kg in banana pulp and peel at room temperature showed that 36–82% of the residues remained after 6 days.

Fate of residues during processing

A study was conducted on processing of potato obtained from three fields in Spain that had been commercially treated with aldicarb at the time of planting. Samples taken 67–88 days after treatment (average size of tubers, 3–4 cm) contained residues of total aldicarb, expressed as aldicarb, at concentrations of 0.06, 0.15 and 0.45 mg/kg. After microwave boiling, the tubers contained an average of 70% of the residues present before cooking (processing factors, 0.72, 0.72 and 0.65). On the basis of the average processing factor for microwaved potato (0.7), the estimated STMR of 0.06 mg/kg and an HR of 0.45 mg/kg for potato, the Meeting estimated an STMR-P of 0.042 and an HR-P of 0.315 mg/kg for aldicarb in microwaved potato.

On the basis of the highest residue of 1.2 mg/kg for potato, the Meeting estimated a highest residue of 0.84 mg/kg for aldicarb in microwaved potato. This value can be used to estimate short-term intake of aldicarb from the consumption of microwaved potato, and no variability factor need be applied to the first part of the equation for calculation of the IESTI in case 2a (see section 3). The HR-P value estimated for the composite sample (0.315 mg/kg) was used in the second part of this equation.

In processing studies submitted to the 1996 JMPR, the average processing factors were 0.75 for potato flakes, 0.48 for chips, 0.29 for frozen fries and 0.39 for cooked fries. On the basis of the estimated STMR and HR values for potato, the Meeting estimated an STMR-P value for aldicarb in potato flakes of 0.045 mg/kg and an HR-P value of 0.338 mg/kg; an STMR-P value for potato chips

of 0.0288 mg/kg and an HR-P value of 0.216 mg/kg; an STMR-P value for frozen fries of 0.0174 mg/kg and an HR-P value of 0.131 mg/kg; and an STMR-P value for cooked fries of 0.0234 mg/kg and an HR-P value of 0.176 mg/kg for aldicarb in potato.

The Meeting received the result of use of a probabilistic method for estimating short-term dietary intake. The model and data applied only to the situation in the United Kingdom.

RECOMMENDATIONS

On the basis of data from supervised residue trials the Meeting estimated the maximum residue levels and STMRs listed below. The maximum residue levels are recommended for use as MRLs.

Definition of the residue for compliance with MRLs and estimation of dietary intake for plant commodities: sum of aldicarb, aldicarb sulfoxide and aldicarb sulfone, expressed as aldicarb. Acute RfD: 0.003 mg/kg bw

ADI (mg/kg bw)	Commodity		Recommended MRL (mg/kg)		STMR, STMR-P (mg/kg)	HR HR-P (mg/kg)
	CCN	Name	New	Previous		
0-0.003	FI 0327	Banana	0.2	W	0.01	0.10
	VR 0589	Potato	0.5	0.5	0.06	0.45
		Potato, microwaved			0.042	0.315
		Potato flakes			0.045	
		Potato chips			0.228	
		Potato frozen fries			0.0174	
		Potato cooked fries			0.0234	

Dietary risk assessment

Long-term intake

Currently (1995), the ADI for aldicarb is 0–0.003 mg/kg bw. The dietary intake was calculated of the 21 commodities for human consumption for which CXLs exist and for banana and potato on the basis of the STMRs estimated in this evaluation. The results are shown in Annex 3 (Report 2001). The estimated dietary intake of aldicarb ranged from 6% of the ADI in the African diet to 20% in the Middle Eastern diet. The Meeting concluded that the intake of residues of aldicarb resulting from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term intake

An acute RfD of 0.003 mg/kg bw for aldicarb was established by the 1999 JMPR. The IESTI for aldicarb was calculated for banana and potato (Annex 4-Report 2001). For banana, it was 140% of the acute RfD for the general population and 330% of the acute RfD for children. For potato, it was 230% of the acute RfD for the general population and 560% of the acute RfD for children. The IESTI for microwaved potato was 160 and 400% of the acute RfD for the general population and children, respectively. The information provided to the Meeting precluded a conclusion that the acute dietary intake of banana and potato by children and adults would be below the acute RfD.

REFERENCES

- Barraj, L. M. and Petersen, B. J. 1999. A re-assessment of the potential exposure to aldicarb in food for the UK population using recently generated potato and carrot residue data. Novigen Sciences. Inc. Washington. DC. (Interim report with data available as of June 1999).
- Carringer, S. J. 1998. Aldicarb: magnitude of total aldicarb residues in bananas treated with TEMIK® 10GG at extended preharvest intervals(French West Indies). Rhône-Poulenc Study No. 96T10149. Rhone-Poulenc Ag Products Co.
- D'Accriscio, M. and Maestracci, M. 1997. Aldicarb and metabolites (sulfoxide and sulfone). formulation EXP05356A (GR) trial Greece 1996. residues in potato. Rhône-Poulenc Study No. 96-662. Rhone-Poulenc Agrochimie.
- D'Accriscio, M. and Maestracci, M. 1997. Aldicarb and metabolites (sulfoxide and sulfone). formulation EXP05356A (GR) trials Spain 1996. residues in potato. Rhône-Poulenc Study No. 96-642. Rhone-Poulenc Agrochimie.
- Gateaud, L. and Yslan, F. 1999. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05356A (GR). North/United Kingdom/1998 - 4 decline study trials. Residues in potato (composite). Rhône-Poulenc Study No. 98-666. Rhone-Poulenc Agrochimie.
- Gateaud, L. and Yslan, F. 1999. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05356A (GR). North/The Netherlands/1998 - 2 decline study trials. Residues in potato (composite and individual tuber). Rhône-Poulenc Study No. 98-702. Rhone-Poulenc Agrochimie.
- Gateaud, L. and Yslan, F. 1999. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05356A (GR). North/United Kingdom/1998 -4 harvest trials. Residues in potato (composite and individual tuber). Rhône-Poulenc Study No. 98-661. Rhone-Poulenc Agrochimie.
- Gateaud, L. and Yslan, F. 1999. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05356A (GR). North/United Kingdom/1998 -4 decline study trials. Residues in potato (composite). Rhône-Poulenc Study No. 98-667. Rhone-Poulenc Agrochimie.
- Gateaud, L. and Yslan, F. 1999. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05421A (GR). South/Italy/1998 - 2 decline study trials. Residues in potato (composite and individual tuber). Rhône-Poulenc Study No. 98-702. Rhone-Poulenc Agrochimie.
- Gateaud, L. and Yslan, F. 1999. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05356A (GR). North/United Kingdom/1998 -4 harvest trials. Residues in potato (composite and individual tubers). Rhône-Poulenc Study No. 98-662. Rhone-Poulenc Agrochimie.
- Gateaud, L. and Yslan, F. 1999. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05356A (GR). South/Greece/1998 - 2 decline study trials. Residues in potato (composite and individual tuber) and processed products (microwaved potato). Rhône-Poulenc Study No. 98-694. Rhone-Poulenc Agrochimie.
- Gateaud, L. and Barriere, I. 2000. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05356A (GR). Ivory Coast/1997-1998-1999-2000 - Harvest trials (1st and 2nd generation). Residues in banana (fruit, flesh and peel). composite and individual results. Rhône-Poulenc Study No. 98-621. Rhone-Poulenc Agro.
- Maestracci, M. 1998. Aldicarb formulation EXP05356A (GR) residues in processed product (potato microwave boiling procedure). Rhône-Poulenc Study No. AR 03-98/98-2001. Rhone-Poulenc Agrochimie.
- Petersen, B. J., Barraj, L. M. and Tomerlin, J. R. 1998. Assessment of the potential exposure to aldicarb in foods for the European population. Novigen Sciences. Inc. Washington. DC.
- Szuter, S. 1998. Aldicarb: storage stability of total aldicarb residues in banana RAC pulp and peel and the processed fractions of puree and chips (5 month interim study report. McKenzie Laboratories Study No. MK12-97. McKenzie Laboratories. Inc.
- Tew, E. L. 1996. TEMIK: magnitude of aldicarb residues in Pacific Northwest potatoes harvested 120 days after an at-planting. in-furrow application of TEMIK 15G at 3 lb ai/Acre. RPAC Study No. 96T10525. File No. 45187. Rhone-Poulenc Ag Co.
- Tew, E. L. 1997. TEMIK: magnitude of residues in potatoes from Regions V and IX harvested 120 days after an at-planting application of TEMIK 15G at 3 lb ai/acre. RPAC Study No. 96T11218. File No. 45257. Rhone-Poulenc Ag Co.
- Tew, E. L. 1997. TEMIK: Pacific Northwest potato farmgate study. RPAC Study No. 96T11379. File No. 45217. Rhone-Poulenc Ag Co.
- Venet, C. and F, Yslan. 1999. Aldicarb and metabolites (aldicarb sulfone and aldicarb sulfoxide) formulation EXP05356A (GR). South/Spain/1998 - 2 decline study trials. Residues in potato (composite and individual tuber) and processed products (microwaved potato). Rhône-Poulenc Study No. 98-580. Rhone-Poulenc Agrochimie.

