ACEPHATE (095) AND METHAMIDIPHOS (100)

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EXPLANATION

Acephate, a broad spectrum organophosphorus insecticide, has been evaluated many times by JMPR since 1976. It was reviewed for residues under the Periodic Re-evaluation Programme in 2003. The 2005 JMPR established an ADI of 0–0.03 mg/kg bw and an ARfD of 0.1 mg/kg bw.

Acephate was included in the Priority List at the Forty-second Session of the CCPR in 2010 for the evaluation by the 2011 JMPR. Summary data were provided for estimation of an MRL for rice by the Government of People's Republic of China.

METABOLISM

Plant metabolism

The 2003 JMPR reviewed plant metabolism studies on bean, cabbage and tomato seedlings, cotton and beans. No information is available on metabolism of acephate in rice and no maximum residue levels were estimated for cereals.

Environmental fate in soil and water-sediment systems

The 2003 JMPR evaluated information on photodegradation on soil, photodegradation in solution, aerobic metabolism, anaerobic metabolism, mobility, aqueous hydrolysis, and aerobic sediment/water for acephate and methamidophos.

METHODS OF RESIDUE ANALYSIS

Analytical methods

Analysis of acephate and methamidophos in rice involves extraction of ground husked rice with a mixture of acetonitrile and water (70:5), evaporation of the supernatant at 40 ^{o}C, dissolving the resulting dry matter in acetone, and quantitation of acephate and methamidophos using gas chromatography equipped with FPD. This method is also used for analysis of acephate and methamidophos in rice bran and straw.

The method performance was tested through recovery tests using husked rice, husk and straw. Typical results are shown in Table 1.

Overall recovery of acephate fortified between 0.01 and 5.0 mg/kg ranges 77–98% with RSD of 2.1–9.9% for husked rice, 83–99% with RSD of 5.0–7.1% for husk, and 82–106% with RSD of 1.9–9.3% for straw.

Overall recovery of methamidophos fortified between 0.01 and 5.0 mg/kg ranges 79–92% with RSD of 3.2–6.8% for husked rice, 83–97% with RSD of 3.5–7.2% for husk, and 81–100% with RSD of 2.7–5.0% for straw.

Table 1 Recovery of acephate and methamidophos fortified at various concentrations in husked rice, husk and straw samples

Fortification (mg/kg)	Matrix	Recovery (%)						RSD(%)
		1	2	3	4	5	Mean	
Acephate								
0.01	Husked rice	94	98	104	91	102	98	5.5
	Husk	98	92	102	97	107	99	5.7
	Straw	106	108	108	106	103	106	1.9

Fortification (mg/kg)	Matrix	Recovery (%)						RSD(%)
		1	2	3	4	5	Mean	
0.05	Husked rice	96	93	92	91	94	93	2.1
	Husk	95	84	82	85	79	85	7.1
	Straw	103	101	96	86	87	95	8.3
0.10	Husked rice	76	87	85	78	88	83	6.6
	Husk	88	83	88	97	93	90	6.0
	Straw	91	92	93	96	91	93	2.2
0.50	Husked rice	80	88	83	83	87	84	3.9
	Husk	93	98	91	94	83	92	6.0
	Straw	91	89	80	75	75	82	9.3
1.00	Husked rice	83	95	82	95	82	87	8.0
	Husk	89	86	81	78	79	83	5.7
	Straw	92	94	88	87	86	89	3.8
5.00	Husked rice	71	90	74	79	73	77	9.9
	Husk	91	86	91	88	98	91	5.0
	Straw	84	88	80	85	91	86	4.9
Methamidophos								
0.01	Husked rice	90	92	99	85	94	92	5.6
	Husk	98	96	92	101	99	97	3.5
	Straw	94	103	104	97	100	100	4.2
0.05	Husked rice	90	87	91	88	97	91	4.3
	Husk	96	88	82	82	82	86	7.2
	Straw	90	85	87	84	83	86	3.2
0.10	Husked rice	81	80	82	73	84	80	5.2
	Husk	83	82	85	94	94	88	6.8
	Straw	87	88	86	92	87	88	2.7
0.50	Husked rice	78	88	82	84	85	83	4.5
	Husk	95	92	88	94	84	91	5.0
	Straw	87	88	81	80	79	83	5.0
1.00	Husked rice	86	89	85	94	82	87	5.2
	Husk	85	87	83	78	83	83	4.0
	Straw	89	94	89	88	89	90	2.7
5.00	Husked rice	77	77	80	83	78	79	3.2
	Husk	83	80	83	76	93	83	7.6
	Straw	82	80	78	78	86	81	4.1

Recovery test was conducted in all the laboratories participating in the supervised residue trials generally with acceptable results.

Stability of residues in stored analytical samples

Acephate and methamidophos were added to husked rice, bran and straw samples at a fortification level of 1mg/kg for each compound. These fortified samples were stored in -15 to -20 ºC freezer, and the samples were analysed after 3, 7, 15, 30, 45, 60, 90, 120, 150, 180, 210, 240 and 360 days using the analytical method described above.

The results in Table 2 indicate that acephate and methamidophos were relatively stable in these samples throughout the storage period of 360 days under -15 to -20 ºC. Comparing with the concentrations in samples on 0.083 day, 85, 91 and 94% of acephate remained and 89, 90 and 84% of methamidophos remained in husked rice, husk and straw respectively. Concurrent procedural recovery of acephate at 1 mg/kg was 70–84% for husked rice, 70–84% for husk, 68–83% and while concurrent procedural recovery of methamidophos at 1 mg/kg was 74–85% for husked rice, 68–81% for husk, and 69–80% for straw.

Table 2 Storage stability of acephate and methamidophos in husked rice, bran, and straw stored at -15 to -20 °C

Storage Interval, days	Acephate						Methamidophos					
	Husked rice		Husk		Straw		Husked rice		Husk		Straw	
	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%	mg/kg	%
0.083	0.826	100	0.749	100	0.743	100	0.828	100	0.769	100	0.808	100
3	0.765	92.6	0.709	94.6	0.749	100.8	0.795	96.1	0.737	95.8	0.744	92.1
7	0.704	85.3	0.728	97.2	0.799	107.6	0.765	92.4	0.718	93.4	0.745	92.2
15	0.725	87.8	0.733	97.8	0.824	111.0	0.767	92.6	0.746	97.0	0.795	98.5
30	0.728	88.2	0.687	91.7	0.841	113.3	0.760	91.8	0.713	92.7	0.773	95.7
45	0.757	91.6	0.687	91.7	0.782	105.3	0.775	93.6	0.707	91.9	0.755	93.5
60	0.782	94.8	0.696	92.9	0.817	110.1	0.800	96.6	0.743	96.6	0.806	99.8
90	0.797	96.6	0.732	97.7	0.787	105.9	0.819	98.9	0.762	99.1	0.780	96.5
120	0.844	102.3	0.798	106.5	0.798	107.4	0.872	105.3	0.774	100.6	0.805	99.7
150	0.796	96.4	0.780	104.1	0.804	108.3	0.805	97.2	0.781	101.6	0.812	100.6
180	0.816	98.8	0.825	110.2	0.794	106.9	0.847	102.3	0.799	103.9	0.804	99.5
210	0.798	96.6	0.805	107.4	0.829	111.6	0.797	96.3	0.782	101.7	0.783	97.0
240	0.715	86.6	0.721	96.2	0.743	100.1	0.756	91.3	0.714	92.8	0.730	90.4
360	0.702	85.1	0.679	90.6	0.702	94.5	0.736	88.9	0.689	89.6	0.681	84.3

USE PATTERN

The authorized use on rice in China is summarized in the Table below.

Table 3 Registered uses of acephate on rice in China

Crop	Country	Formulation (g/kg or g/L and type)	Application			PHI (days)
			Method	Max. rate kg ai/ha	Max. No.	
Rice	China	300 EC	Spray	1.01	2	45
		750 SP	Spray	1.13	2	45

RESIDUES RESULTING FROM SUPERVISED TRIALS

The Meeting received information on supervised field trials on rice conducted in China, which is summarized in the following Table.

Where trials were conducted in the same location, with the same varieties, similar formulations or different salt types, and at the same or similar timing, they are not regarded as independent and the highest residues from these trials was recorded.

Cereal grains

Rice

Supervised field residue trials were conducted in 2009 growing season in eight different provinces in China using two formulations applied at the maximum GAP rate or ca. 1.5× of that rate.

In all trials, rice grain samples were collected at mature harvest stage. Straw samples were also obtained simultaneously. Rice grain samples were divided into two parts: one part dried under natural conditions, i.e., in the shade; other part dried using machinery (referred in the Table, "dried in oven") at 45±1 ºC. Each rice grain sample was husked immediately after the moisture reached ≤ 13.5%. Husked rice samples were kept frozen at -15 ºC to -20 ºC until analysis. Analysis was conducted less than one month after sampling. For analysis of acephate and methamidophos, the method described in the analytical method section was used.

Sum of acephate and 7.5 times methamidophos was calculated for long-term dietary intake estimation and sum of acephate and 10 times methamidophos for short-term dietary intake estimation

for those trials matching GAP. Where the residue of either acephate or methamidophos was below the respective LOQ, the value of LOQ was used for summing up.

Residue concentrations used for estimating a maximum level and STMR were underlined.

Table 4 Residues of acephate and methamidophos in husked rice from supervised trials on rice conducted in China

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
GAP in China	300 EC	1.01 (max)	2 (max)	45					
	750 SP	1.13 (max)	2 (max)	45					
2009 Guangdong (Huanhuazuan) Trial No. 1	300 EC	1.01	2	15 30 45 60	Husked rice (dried in the shade)	0.256 0.148 < 0.01 < 0.01	0.081 0.053 < 0.05 -	0.86 0.55 0.39 -	1.07 0.68 0.51 -
				15 30 45 60	Husked rice (dried in the oven)	0.389 0.266 0.035 < 0.01	0.154 0.157 < 0.05 < 0.05	1.54 1.44 0.41 0.39	1.93 1.84 0.54 0.51
2009 Guangdong (Huanhuazuan) Trial No. 1.1	750 SP	1.13	2	15 30 45 60	Husked rice (dried in the shade)	0.450 0.143 0.024 < 0.01	0.144 0.058 0.017 < 0.01	1.53 0.58 0.15 0.09	1.89 0.72 0.19 0.11
				15 30 45 60	Husked rice (dried in the oven)	0.425 0.205 0.036 0.018	0.218 0.117 < 0.05 -	2.06 1.08 0.41 -	2.61 1.38 0.54 -
2009 Guangxi (Zhongzheyou-1) Trial No. 2.1	750 SP	1.13	2	15 30 45 60	Husked rice (dried in the shade)	0.278 0.171 0.065 < 0.01	0.125 0.038 < 0.01 -	1.22 0.46 0.14 -	1.53 0.55 0.17 -
				15 30 45 60	Husked rice (dried in the oven)	0.125 0.066 0.027 -	0.056 < 0.05 < 0.05 -	0.55 0.44 0.40 -	0.69 0.57 0.53 -
2009 Guangxi (Zhongzheyou-1) Trial No. 2	300 EC	1.01	2	15 30 45 60	Husked rice (dried in the shade)	0.125 0.066 0.027 < 0.01	0.056 < 0.05 < 0.05 -	0.55 0.44 0.40 -	0.69 0.57 0.53 -
				15 30 45 60	Husked rice (dried in the oven)	0.365 0.127 < 0.01 < 0.01	0.154 0.296 < 0.05 < 0.05	1.52 2.35 0.39 0.39	1.91 3.09 0.51 0.51
2009 Zhejiang (Jia991) Trial No. 3	300 EC	1.01	2	15 30 45 60	Husked rice (dried in the shade)	1.60 1.39 0.69 0.11	0.36 0.39 0.38 0.05	4.30 4.32 3.54 0.49	5.20 5.29 4.49 0.61
				15 30 45 60	Husked rice (dried in the oven)	2.32 1.81 0.40 0.10	0.34 0.43 0.19 0.07	4.87 5.04 1.83 0.63	5.72 6.11 2.30 0.80
2009 Zhejiang (Jia991) Trial No. 3.1	750 SP	1.13	2	15 30 45 60	Husked rice (dried in the shade)	3.01 3.18 0.51 0.08	0.69 0.96 0.32 0.06	8.19 10.38 2.91 0.53	9.91 12.78 3.71 0.68
				15 30 45 60	Husked rice (dried in the oven)	3.15 3.77 0.62 0.10	0.60 1.00 0.35 0.06	7.65 11.27 3.25 0.55	9.15 13.77 4.12 0.70

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
2009 Anhui (Zhon2yu1286) Trial No. 4	300 EC	1.01	2	15 30 45 60	Husked rice (dried in the shade)	0.97 0.15 0.01 < 0.01	0.53 0.10 < 0.01 < 0.01	4.95 0.90 0.09 0.09	6.27 1.15 0.11 0.11
				15 30 45 60	Husked rice (dried in the oven)	1.12 0.18 0.01 0.04	0.56 0.10 < 0.01 < 0.01	5.32 0.93 0.09 0.12	6.72 1.18 0.11 0.14
2009 Anhui (Zhon2yu1286) Trial No. 4.1	750 SP	1.13	2	15 30 45 60	Husked rice (dried in the shade)	1.84 0.22 0.09 0.04	0.60 0.10 0.05 0.01	6.34 0.97 0.47 0.12	7.84 1.22 0.59 0.14
				15 30 45 60	Husked rice (dried in the oven)	1.84 0.27 0.09 0.03	0.73 0.11 0.04 0.01	7.32 1.10 0.39 0.11	9.14 1.37 0.49 0.13
2009 Heilongjiang (0420) Trial No. 5	300 EC	1.01	2	15 30 45 60	Husked rice (dried in the shade)	0.673 0.104 0.040 < 0.01	0.123 0.052 0.021 < 0.01	1.60 0.49 0.20 0.09	1.90 0.62 0.25 0.11
				15 30 45 60	Husked rice (dried in the oven)	0.338 0.087 0.024 < 0.01	0.042 0.035 < 0.01 < 0.01	0.65 0.35 0.10 0.09	0.76 0.44 0.12 0.11
2009 Heilongjiang (0420) Trial No. 5.1	750 SP	1.13	2	15 30 45 60	Husked rice (dried in the shade)	0.579 0.155 0.043 < 0.01	0.122 0.055 0.019 < 0.01	1.49 0.57 0.19 0.09	1.80 0.71 0.23 0.11
				15 30 45 60	Husked rice (dried in the oven)	0.698 0.126 0.025 < 0.01	0.108 0.040 < 0.01 < 0.01	1.51 0.43 0.10 0.09	1.78 0.53 0.13 0.11
2009 Jilin (0420) Trial No. 6	300 EC	1.01	2	15 30 45 60	Husked rice (dried in the shade)	0.766 0.572 0.045 < 0.01	0.171 0.190 0.025 < 0.01	2.05 2.00 0.23 0.09	2.48 2.47 0.30 0.11
				15 30 45 60	Husked rice (dried in the oven)	0.094 0.069 0.024 < 0.01	0.027 0.029 0.013 < 0.01	0.30 0.29 0.12 0.09	0.36 0.36 0.15 0.11
2009 Jilin (0420) Trial No. 6.1	750 SP	1.13	2	15 30 45 60	Husked rice (dried in the shade)	0.854 0.351 0.100 < 0.01	0.100 0.114 0.046 < 0.01	1.60 1.21 0.45 0.09	1.85 1.49 0.56 0.11
				15 30 45 60	Husked rice (dried in the oven)	0.176 0.124 0.038 < 0.01	0.035 0.041 0.023 < 0.01	0.44 0.43 0.21 0.09	0.53 0.53 0.27 0.11
2009 Hunan (Fudao-2) Trial No. 7	300 EC	1.01	2	15 30 45 60	Husked rice (dried in the shade)	1.38 0.452 0.042 < 0.025	0.532 0.215 < 0.025 < 0.025	5.37 2.06 0.23 0.21	6.70 2.60 0.29 0.28
				15 30 45 60	Husked rice (dried in the oven)	1.38 0.466 0.037 < 0.025	0.542 0.212 < 0.025 < 0.025	5.45 2.06 0.22 0.21	6.80 2.59 0.29 0.28
2009 Hunan (Fudao-2) Trial No. 7.1	750 SP	1.13	2	15 30 45 60	Husked rice (dried in the shade)	1.60 0.357 < 0.025 < 0.025	0.538 0.108 < 0.025 < 0.025	5.64 1.17 0.21 0.21	6.98 1.44 0.28 0.28

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
				15 30 45 60	Husked rice (dried in the oven)	1.49 0.432 < 0.025 < 0.025	0.494 0.192 < 0.025 < 0.025	5.20 1.87 0.21 0.21	6.43 2.35 0.28 0.28
2009 Hubei (Fudao-2) Trial No. 8.1	750 SP	1.13	2	15 30 45 60	Husked rice (dried in the shade)	0.847 0.108 < 0.025 -	0.347 0.051 < 0.025 < 0.025	3.45 0.49 0.21 -	4.32 0.62 0.28 -
				15 30 45 60	Husked rice (dried in the oven)	0.814 0.183 < 0.025 < 0.025	0.307 0.063 < 0.025 < 0.025	3.12 0.66 0.21 0.21	3.88 0.81 0.28 0.28
2009 Hubei (Fudao-2) Trial No. 8	300 EC	1.01	2	15 30 45 60	Husked rice (dried in the shade)	1.06 < 0.025 < 0.025 < 0.025	0.392 < 0.025 < 0.025 < 0.025	4.00 0.21 0.21 0.21	4.98 0.28 0.28 0.28
				15 30 45 60	Husked rice (dried in the oven)	0.952 0.024 < 0.025 < 0.025	0.337 < 0.025 < 0.025 < 0.025	3.48 0.21 0.21 0.21	4.32 0.27 0.28 0.28
2009 Guangdong (Huanhuazuan) Trial No. 1	300 EC	1.01	3	15 30 45 60	Husked rice (dried in the shade)	0.308 0.094 < 0.01 < 0.01	0.135 < 0.05 < 0.05 -		
				15 30 45 60	Husked rice (dried in the oven)	0.478 0.278 0.035 < 0.01	0.165 0.104 - -		
2009 Guangdong (Huanhuazuan) Trial No. 1.1	750 SP	1.13	3	15 30 45 60	Husked rice (dried in the shade)	0.425 0.222 0.016 < 0.01	0.128 0.103 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.497 0.587 0.023 0.016	0.208 0.307 < 0.05 -		
2009 Guangxi (Zhongzheyou-1) Trial No. 2	300 EC	1.01	3	15 30 45 60	Husked rice (dried in the shade)	0.139 0.118 0.061 < 0.01	0.135 < 0.05 < 0.05 -		
				15 30 45 60	Husked rice (dried in the oven)	0.521 0.184 0.010 < 0.01	0.206 0.189 < 0.05 < 0.05		
2009 Guangxi (Zhongzheyou-1) Trial No. 2.1	750 SP	1.13	3	15 30 45 60	Husked rice (dried in the shade)	0.421 0.138 0.152 < 0.01	0.138 0.062 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.139 0.118 0.061 < 0.01	0.135 < 0.05 < 0.05 -		
2009 Zhejiang (Jia991) Trial No. 3	300 EC	1.01	3	15 30 45 60	Husked rice (dried in the shade)	2.32 2.40 0.67 0.09	0.50 0.86 0.41 0.06		
				15 30 45 60	Husked rice (dried in the oven)	2.63 2.87 0.66 0.09	0.52 0.86 0.39 0.04		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
2009 Zhejiang (Jia991) Trial No. 3.1	750 SP	1.13	3	15 30 45 60	Husked rice (dried in the shade)	3.32 2.84 0.88 0.14	0.59 0.97 0.48 0.10		
				15 30 45 60	Husked rice (dried in the oven)	4.57 3.60 1.18 0.16	0.81 1.08 0.59 0.10		
2009 Anhui (Zhon2yu1286) Trial No. 4	300 EC	1.01	3	15 30 45 60	Husked rice (dried in the shade)	2.03 0.06 0.01 0.02	0.85 0.05 < 0.01 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	1.85 0.11 0.01 0.02	0.76 0.06 < 0.01 < 0.01		
2009 Anhui (Zhon2yu1286) Trial No. 4.1	750 SP	1.13	3	15 30 45 60	Husked rice (dried in the shade)	2.96 0.26 0.02 < 0.01	1.14 0.14 0.01 0.04		
				15 30 45 60	Husked rice (dried in the oven)	3.51 0.33 0.02 0.11	1.32 0.16 0.01 0.03		
2009 Heilongjiang (0420) Trial No. 5	300 EC	1.01	3	15 30 45 60	Husked rice (dried in the shade)	0.225 0.130 0.072 < 0.01	0.048 0.041 0.015 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.131 0.122 0.029 < 0.01	0.031 0.038 0.014 < 0.01		
2009 Heilongjiang (0420) Trial No. 5.1	750 SP	1.13	3	15 30 45 60	Husked rice (dried in the shade)	0.662 0.403 0.053 < 0.01	0.149 0.144 0.025 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.436 0.212 0.048 < 0.01	0.103 0.062 0.023 < 0.01		
2009 Jilin (0420) Trial No. 6	300 EC	1.01	3	15 30 45 60	Husked rice (dried in the shade)	1.16 0.913 0.076 < 0.01	0.223 0.315 0.041 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.392 0.102 0.037 < 0.01	0.102 0.049 0.017 < 0.01		
2009 Jilin (0420) Trial No. 6.1	750 SP	1.13	3	15 30 45 60	Husked rice (dried in the shade)	1.40 0.823 0.100 < 0.01	0.287 0.244 0.048 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.330 0.216 0.043 < 0.01	0.073 0.075 0.022 < 0.01		
2009 Hunan (Fudao-2) Trial No. 7	300 EC	1.01	3	15 30 45 60	Husked rice (dried in the shade)	2.57 0.495 < 0.025 < 0.025	0.880 0.268 < 0.025 < 0.025		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
				15 30 45 60	Husked rice (dried in the oven)	2.88 0.491 < 0.025 < 0.025	1.08 0.278 < 0.025 < 0.025		
2009 Hunan (Fudao-2) Trial No. 7.1	750 SP	1.13	3	15 30 45 60	Husked rice (dried in the shade)	2.26 0.656 < 0.025 < 0.025	0.708 0.263 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	2.39 0.677 0.034 < 0.025	0.740 0.302 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8	300 EC	1.01	3	15 30 45 60	Husked rice (dried in the shade)	0.717 0.033 < 0.025 < 0.025	0.290 < 0.025 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	0.542 0.046 < 0.025 < 0.025	0.238 < 0.025 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8.1	750 SP	1.13	3	15 30 45 60	Husked rice (dried in the shade)	0.453 0.257 < 0.025 < 0.025	0.152 0.136 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	0.507 0.285 < 0.025 < 0.025	0.150 0.086 < 0.025 < 0.025		
2009 Guangdong (Huanhuazuan) Trial No. 1	300 EC	1.01	4	15 30 45 60	Husked rice (dried in the shade)	0.328 0.070 < 0.01 < 0.01	0.156 < 0.05 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.528 0.406 0.018 < 0.01	0.171 0.128 < 0.05 -		
2009 Guangdong (Huanhuazuan) Trial No. 1.1	750 SP	1.13	4	15 30 45 60	Husked rice (dried in the shade)	0.526 0.230 0.011 < 0.01	0.114 0.098 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.506 0.313 0.075 0.011	0.205 0.148 < 0.05 -		
2009 Guangxi (Zhongzheyou-1) Trial No. 2	300 EC	1.01	4	15 30 45 60	Husked rice (dried in the shade)	0.145 0.033 0.043 < 0.01	0.108 < 0.05 < 0.05 -		
				15 30 45 60	Husked rice (dried in the oven)	0.556 0.111 < 0.01 < 0.01	0.209 0.297 < 0.05 < 0.05		
2009 Guangxi (Zhongzheyou-1) Trial No. 2.1	750 SP	1.13	4	15 30 45 60	Husked rice (dried in the shade)	0.618 0.124 0.018 < 0.01	0.299 0.042 < 0.05 -		
				15 30 45 60	Husked rice (dried in the oven)	0.145 0.033 0.043 < 0.01	0.108 < 0.05 < 0.05 -		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
2009 Zhejiang (Jia991) Trial No. 3	300 EC	1.01	4	15 30 45 60	Husked rice (dried in the shade)	2.54 3.33 0.50 0.11	0.51 1.34 0.30 0.08		
				15 30 45 60	Husked rice (dried in the oven)	2.76 3.87 0.59 0.05	0.58 1.29 0.31 0.04		
2009 Zhejiang (Jia991) Trial No. 3.1	750 SP	1.13	4	15 30 45 60	Husked rice (dried in the shade)	8.24 3.59 0.92 0.11	1.75 1.28 0.48 0.08		
				15 30 45 60	Husked rice (dried in the oven)	10.2 4.45 0.79 0.13	1.99 1.39 0.39 0.08		
2009 Anhui (Zhon2yu1286) Trial No. 4	300 EC	1.01	4	15 30 45 60	Husked rice (dried in the shade)	3.65 0.31 0.02 0.02	1.17 0.15 0.01 0.03		
				15 30 45 60	Husked rice (dried in the oven)	2.94 0.30 0.02 0.02	0.95 0.14 0.01 < 0.01		
2009 Anhui (Zhon2yu1286) Trial No. 4.1	750 SP	1.13	4	15 30 45 60	Husked rice (dried in the shade)	2.84 0.23 0.02 0.01	1.14 0.20 < 0.01 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	2.96 0.21 0.01 0.01	1.11 0.11 < 0.01 < 0.01		
2009 Heilongjiang (0420) Trial No. 5	300 EC	1.01	4	15 30 45 60	Husked rice (dried in the shade)	1.43 0.124 0.071 < 0.01	0.245 0.054 0.036 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.843 0.114 0.052 < 0.01	0.154 0.041 0.024 < 0.01		
2009 Heilongjiang (0420) Trial No. 5.1	750 SP	1.13	4	15 30 45 60	Husked rice (dried in the shade)	1.12 0.365 0.112 < 0.01	0.251 0.127 0.049 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.743 0.214 0.047 < 0.01	0.137 0.070 0.022 < 0.01		
2009 Jilin (0420) Trial No. 6	300 EC	1.01	4	15 30 45 60	Husked rice (dried in the shade)	0.742 0.308 0.083 < 0.01	0.178 0.125 0.045 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.301 0.090 0.036 < 0.01	0.081 0.039 0.021 < 0.01		
2009 Jilin (0420) Trial No. 6.1	750 SP	1.13	4	15 30 45 60	Husked rice (dried in the shade)	1.32 0.561 0.189 < 0.01	0.266 0.203 0.073 < 0.01		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
				15 30 45 60	Husked rice (dried in the oven)	0.549 0.232 0.058 < 0.05	0.121 0.083 0.028 < 0.01		
2009 Hunan (Fudao-2) Trial No. 7	300 EC	1.01	4	15 30 45 60	Husked rice (dried in the shade)	1.58 0.282 < 0.01 < 0.01	0.622 0.152 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	1.58 0.282 < 0.025 < 0.025	0.722 0.195 < 0.025 < 0.025		
2009 Hunan (Fudao-2) Trial No. 7.1	750 SP	1.13	4	15 30 45 60	Husked rice (dried in the shade)	2.26 0.346 0.027 < 0.025	0.752 0.174 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	2.15 0.282 0.067 < 0.025	0.670 0.111 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8	300 EC	1.01	4	15 30 45 60	Husked rice (dried in the shade)	0.717 0.035 0.034 < 0.01	0.262 < 0.025 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	0.812 < 0.025 < 0.025 < 0.025	0.311 < 0.025 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8.1	750 SP	1.13	4	15 30 45 60	Husked rice (dried in the shade)	1.18 0.026 < 0.025 < 0.025	0.397 0.009 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	0.710 < 0.025 < 0.025 < 0.025	0.288 < 0.025 < 0.025 < 0.025		
2009 Guangdong (Huanhuazuan) Trial No. 1	300 EC	1.52	2	15 30 45 60	Husked rice (dried in the shade)	0.508 0.144 0.013 < 0.01	0.187 0.059 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.687 0.627 0.052 < 0.01	0.253 0.203 < 0.05 -		
2009 Guangdong (Huanhuazuan) Trial No. 1.1	750 SP	1.69	2	15 30 45 60	Husked rice (dried in the shade)	0.648 1.01 0.015 < 0.01	0.149 0.423 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.496 0.909 0.053 0.082	0.309 0.377 < 0.05 < 0.05		
2009 Guangxi (Zhongzheyou-1) Trial No. 2	300 EC	1.52	2	15 30 45 60	Husked rice (dried in the shade)	0.189 0.084 0.092 < 0.01	0.115 0.053 < 0.05 -		
				15 30 45 60	Husked rice (dried in the oven)	0.548 0.170 0.021 < 0.01	0.248 0.347 < 0.05 < 0.05		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
2009 Guangxi (Zhongzheyou-1) Trial No. 2.1	750 SP	1.69	2	15 30 45 60	Husked rice (dried in the shade)	0.457 0.218 0.037 < 0.01	0.197 0.063 < 0.05 -		
				15 30 45 60	Husked rice (dried in the oven)	0.189 0.084 0.092 < 0.01	0.115 0.053 < 0.05 < 0.05		
2009 Zhejiang (Jia991) Trial No. 3	300 EC	1.52	2	15 30 45 60	Husked rice (dried in the shade)	2.98 2.84 0.73 0.14	0.55 1.15 0.45 0.10		
				15 30 45 60	Husked rice (dried in the oven)	3.42 3.61 0.96 0.14	0.59 1.21 0.48 0.08		
2009 Zhejiang (Jia991) Trial No. 3.1	750 SP	1.69	2	15 30 45 60	Husked rice (dried in the shade)	3.79 3.38 2.10 0.24	0.54 1.08 1.17 0.15		
				15 30 45 60	Husked rice (dried in the oven)	4.46 4.73 1.41 0.23	0.60 1.21 0.77 0.12		
2009 Anhui (Zhon2yu1286) Trial No. 4	300 EC	1.52	2	15 30 45 60	Husked rice (dried in the shade)	2.98 0.52 0.02 0.12	1.03 0.20 0.01 0.05		
				15 30 45 60	Husked rice (dried in the oven)	2.99 0.58 0.03 0.13	1.02 0.22 0.01 0.04		
2009 Anhui (Zhon2yu1286) Trial No. 4.1	750 SP	1.69	2	15 30 45 60	Husked rice (dried in the shade)	2.26 0.44 0.12 0.03	1.00 0.16 0.06 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	2.98 0.49 0.10 0.02	1.08 0.18 0.06 0.01		
2009 Heilongjiang (0420) Trial No. 5	300 EC	1.52	2	15 30 45 60	Husked rice (dried in the shade)	0.539 0.175 0.075 < 0.01	0.091 0.063 0.052 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.484 0.196 0.090 < 0.01	0.074 0.066 0.039 < 0.01		
2009 Heilongjiang (0420) Trial No. 5.1	750 SP	1.69	2	15 30 45 60	Husked rice (dried in the shade)	0.661 0.197 0.135 < 0.01	0.102 0.096 0.067 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.674 0.415 0.114 < 0.01	0.099 0.133 0.048 < 0.01		
2009 Jilin (0420) Trial No. 6	300 EC	1.52	2	15 30 45 60	Husked rice (dried in the shade)	0.344 0.363 0.094 < 0.01	0.080 0.133 0.049 < 0.01		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
				15 30 45 60	Husked rice (dried in the oven)	0.127 0.166 0.039 < 0.01	0.029 0.068 0.015 < 0.01		
2009 Jilin (0420) Trial No. 6.1	750 SP	1.69	2	15 30 45 60	Husked rice (dried in the shade)	1.03 0.902 0.146 < 0.01	0.197 0.234 0.076 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.321 0.306 0.084 < 0.01	0.074 0.100 0.036 < 0.01		
2009 Hunan (Fudao-2) Trial No. 7	300 EC	1.52	2	15 30 45 60	Husked rice (dried in the shade)	2.05 0.754 < 0.025 < 0.025	0.764 0.439 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	2.05 0.754 < 0.025 < 0.025	2.05 0.75 < 0.025 < 0.025		
2009 Hunan (Fudao-2) Trial No. 7.1	750 SP	1.69	2	15 30 45 60	Husked rice (dried in the shade)	2.59 0.887 0.043 0.039	0.780 0.324 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	2.94 0.873 < 0.025 < 0.025	0.800 0.336 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8	300 EC	1.52	2	15 30 45 60	Husked rice (dried in the shade)	0.648 < 0.025 < 0.025 < 0.025	0.248 < 0.025 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	0.951 0.045 < 0.025 < 0.025	0.336 < 0.025 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8.1	750 SP	1.69	2	15 30 45 60	Husked rice (dried in the shade)	0.959 0.218 0.026 < 0.025	0.382 0.082 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	1.06 0.169 < 0.025 < 0.025	0.402 0.072 < 0.025 < 0.025		
2009 Guangdong (Huanhuazuan) Trial No. 1	300 EC	1.52	3	15 30 45 60	Husked rice (dried in the shade)	0.825 0.227 0.012 < 0.01	0.439 0.099 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.758 0.507 0.056 0.012	0.285 0.15 < 0.05 -		
2009 Guangdong (Huanhuazuan) Trial No. 1.1	750 SP	1.69	3	15 30 45 60	Husked rice (dried in the shade)	1.07 0.418 < 0.01 < 0.01	0.329 0.184 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.912 0.429 0.048 0.021	0.369 0.255 < 0.05 < 0.05		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
2009 Guangxi (Zhongzheyou-1) Trial No. 2	300 EC	1.52	3	15 30 45 60	Husked rice (dried in the shade)	0.256 0.211 0.043 < 0.01	0.138 0.141 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.912 0.464 0.041 < 0.01	0.312 0.399 < 0.05 < 0.05		
2009 Guangxi (Zhongzheyou-1) Trial No. 2.1	750 SP	1.69	3	15 30 45 60	Husked rice (dried in the shade)	0.514 0.103 0.028 < 0.01	0.180 0.055 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.256 0.211 0.043 < 0.01	0.138 0.141 < 0.05 < 0.05		
2009 Zhejiang (Jia991) Trial No. 3	300 EC	1.52	3	15 30 45 60	Husked rice (dried in the shade)	3.83 2.79 0.74 0.14	0.59 1.04 0.44 0.09		
				15 30 45 60	Husked rice (dried in the oven)	3.96 3.40 0.85 0.07	0.62 1.05 0.42 0.04		
2009 Zhejiang (Jia991) Trial No. 3.1	750 SP	1.69	3	15 30 45 60	Husked rice (dried in the shade)	4.34 7.30 1.35 0.32	0.77 2.27 0.75 0.11		
				15 30 45 60	Husked rice (dried in the oven)	4.68 8.41 1.76 0.29	0.80 2.38 0.82 0.10		
2009 Anhui (Zhon2yu1286) Trial No. 4	300 EC	1.52	3	15 30 45 60	Husked rice (dried in the shade)	3.74 0.37 < 0.01 0.12	1.01 0.16 < 0.01 0.04		
				15 30 45 60	Husked rice (dried in the oven)	3.64 0.43 < 0.01 0.13	0.98 0.15 < 0.01 0.04		
2009 Anhui (Zhon2yu1286) Trial No. 4.1	750 SP	1.69	3	15 30 45 60	Husked rice (dried in the shade)	3.14 0.44 0.03 0.21	0.93 0.17 0.01 0.07		
				15 30 45 60	Husked rice (dried in the oven)	3.09 0.49 0.03 0.28	0.89 0.17 0.01 0.08		
2009 Heilongjiang (0420) Trial No. 5	300 EC	1.52	3	15 30 45 60	Husked rice (dried in the shade)	1.16 0.954 0.224 < 0.01	0.240 0.211 0.091 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.702 1.72 0.154 < 0.01	0.197 0.385 0.068 < 0.01		
2009 Heilongjiang (0420) Trial No. 5.1	750 SP	1.69	3	15 30 45 60	Husked rice (dried in the shade)	0.787 0.606 0.125 < 0.01	0.104 0.160 0.057 < 0.01		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
				15 30 45 60	Husked rice (dried in the oven)	0.741 0.996 0.094 < 0.01	0.114 0.200 0.042 < 0.01		
2009 Jilin (0420) Trial No. 6	300 EC	1.52	3	15 30 45 60	Husked rice (dried in the shade)	0.970 0.291 0.091 < 0.01	0.241 0.090 0.048 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.536 0.228 0.054 < 0.01	0.153 0.068 0.028 < 0.01		
2009 Jilin (0420) Trial No. 6.1	750 SP	1.69	3	15 30 45 60	Husked rice (dried in the shade)	0.988 1.67 0.172 < 0.01	0.219 0.385 0.084 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.608 0.599 0.058 < 0.05	0.138 0.168 0.022 < 0.01		
2009 Hunan (Fudao-2) Trial No. 7	300 EC	1.52	3	15 30 45 60	Husked rice (dried in the shade)	3.07 0.499 0.055 < 0.025	1.14 0.302 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	0.912 0.464 0.041 < 0.01	1.10 0.309 < 0.025 < 0.025		
2009 Hunan (Fudao-2) Trial No. 7.1	750 SP	1.69	3	15 30 45 60	Husked rice (dried in the shade)	3.38 0.638 < 0.025 < 0.025	1.17 < 0.025 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	3.85 0.768 < 0.025 < 0.025	1.21 0.277 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8	300 EC	1.52	3	15 30 45 60	Husked rice (dried in the shade)	1.23 0.064 < 0.025 < 0.025	0.542 0.025 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	0.734 0.049 < 0.025 < 0.025	0.345 < 0.025 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8.1	750 SP	1.69	3	15 30 45 60	Husked rice (dried in the shade)	1.27 0.029 < 0.025 < 0.025	0.568 0.012 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	1.24 0.041 < 0.025 < 0.025	0.411 < 0.025 < 0.025 < 0.025		
2009 Guangdong (Huanhuazuan) Trial No. 1	300 EC	1.52	4	15 30 45 60	Husked rice (dried in the shade)	0.921 0.192 0.014 < 0.01	0.502 0.093 0.057 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.945 0.565 0.089 < 0.01	0.358 0.167 < 0.05 -		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
2009 Guangdong (Huanhuazuan) Trial No. 1.1	750 SP	1.69	4	15 30 45 60	Husked rice (dried in the shade)	1.21 0.751 0.042 0.012	0.412 0.323 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	1.21 0.725 0.160 0.051	0.508 0.455 < 0.05 < 0.05		
2009 Guangxi (Zhongzheyou-1) Trial No. 2	300 EC	1.52	4	15 30 45 60	Husked rice (dried in the shade)	0.416 0.059 0.024 < 0.01	0.146 0.039 < 0.05 -		
				15 30 45 60	Husked rice (dried in the oven)	1.08 0.405 0.105 0.01	0.412 0.245 < 0.05 < 0.05		
2009 Guangxi (Zhongzheyou-1) Trial No. 2.1	750 SP	1.69	4	15 30 45 60	Husked rice (dried in the shade)	0.890 0.173 0.018 < 0.01	0.309 0.079 < 0.05 < 0.05		
				15 30 45 60	Husked rice (dried in the oven)	0.416 0.059 0.024 < 0.01	0.146 0.039 < 0.05 -		
2009 Zhejiang (Jia991) Trial No. 3	300 EC	1.52	4	15 30 45 60	Husked rice (dried in the shade)	5.57 3.40 0.49 0.09	1.24 1.17 0.29 0.05		
				15 30 45 60	Husked rice (dried in the oven)	6.15 4.63 0.55 0.05	1.18 1.29 0.28 0.03		
2009 Zhejiang (Jia991) Trial No. 3.1	750 SP	1.69	4	15 30 45 60	Husked rice (dried in the shade)	9.54 7.06 2.34 0.23	2.04 2.48 1.09 0.08		
				15 30 45 60	Husked rice (dried in the oven)	10.9 6.55 3.07 0.23	2.34 2.07 1.30 0.07		
2009 Anhui (Zhon2yu1286) Trial No. 4	300 EC	1.52	4	15 30 45 60	Husked rice (dried in the shade)	3.88 0.34 0.03 0.02	0.98 0.11 0.01 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	3.84 0.42 0.02 0.01	0.99 0.12 < 0.01 < 0.01		
2009 Anhui (Zhon2yu1286) Trial No. 4.1	750 SP	1.69	4	15 30 45 60	Husked rice (dried in the shade)	3.53 0.99 0.08 0.02	1.06 0.28 0.03 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	3.82 1.36 0.14 0.02	1.09 0.34 0.05 0.01		
2009 Heilongjiang (0420) Trial No. 5	300 EC	1.52	4	15 30 45 60	Husked rice (dried in the shade)	1.46 0.824 0.195 < 0.01	0.293 0.279 0.090 < 0.01		

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)			
	Form.	Rate kg ai/ha	No.			Acephate (A)	Methamidophos (M)	A+7.5M for long-term intake	A+10M for short-term intake
				15 30 45 60	Husked rice (dried in the oven)	0.566 1.20 0.160 < 0.01	0.192 0.342 0.075 < 0.01		
2009 Heilongjiang (0420) Trial No. 5.1	750 SP	1.69	4	15 30 45 60	Husked rice (dried in the shade)	3.24 0.847 0.151 < 0.01	0.499 0.237 0.059 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	1.64 1.05 0.076 < 0.01	0.279 0.253 0.042 < 0.01		
2009 Jilin (0420) Trial No. 6	300 EC	1.52	4	15 30 45 60	Husked rice (dried in the shade)	1.12 0.407 0.206 < 0.01	0.263 0.138 0.101 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	0.327 0.163 0.049 < 0.01	0.083 0.061 0.027 < 0.01		
2009 Jilin (0420) Trial No. 6.1	750 SP	1.69	4	15 30 45 60	Husked rice (dried in the shade)	1.18 0.726 0.238 < 0.01	0.281 0.253 0.113 < 0.01		
				15 30 45 60	Husked rice (dried in the oven)	1.19 0.155 0.093 < 0.01	0.252 0.052 0.047 < 0.01		
2009 Hunan (Fudao-2) Trial No. 7	300 EC	1.52	4	15 30 45 60	Husked rice (dried in the shade)	0.761 0.058 < 0.025 < 0.025	1.21 0.263 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	3.20 0.510 < 0.025 0.045	1.09 0.297 < 0.025 < 0.025		
2009 Hunan (Fudao-2) Trial No. 7.1	750 SP	1.69	4	15 30 45 60	Husked rice (dried in the shade)	4.49 0.611 0.032 < 0.025	1.37 0.246 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	4.18 0.737 0.030 < 0.025	1.26 0.346 < 0.025 < 0.025		
2009 Hubei (Fudao-2) Trial No. 8	300 EC	1.52	4	15 30 45 60	Husked rice (dried in the shade)	0.761 0.058 < 0.025 < 0.025	0.273 < 0.025 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	0.930 0.060 < 0.025 < 0.025	0.314 0.019 < 0.025 -		
2009 Hubei (Fudao-2) Trial No. 8.1	750 SP	1.69	4	15 30 45 60	Husked rice (dried in the shade)	0.899 0.044 < 0.025 < 0.025	0.288 0.015 < 0.025 < 0.025		
				15 30 45 60	Husked rice (dried in the oven)	1.09 0.046 < 0.025 < 0.025	0.313 < 0.025 < 0.025 < 0.025		

Animal feeding stuffs

Rice forage and hay

Table 5 Residues of acephate and methamidophos in straw and husk following supervised trials on rice conducted in China

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)	
	Form.	Rate kg ai/ha	No.			Acephate	Methamidophos
GAP in China	300 EC	1.01 (max)	2 (max)	45			
	750 SP	1.13 (max)	2 (max)	45			
2009 Guangdong (Huanhuazuan) Trial No. 1	300 EC	1.01	2	15 30 45 60	Straw	0.485 0.123 < 0.01 < 0.01	0.159 0.056 < 0.05 -
2009 Guangdong (Huanhuazuan) Trial No. 1.1	750 SP	1.13	2	15 30 45 60	Straw	0.732 0.030 < 0.01 -	0.251 < 0.05 < 0.05 < 0.05
2009 Guangxi (Zhongzheyou-1) Trial No. 2	300 EC	1.01	2	15 30 45 60	Straw	0.361 0.163 < 0.01 < 0.01	0.124 0.046 < 0.05 < 0.05
2009 Guangxi (Zhongzheyou-1) Trial No. 2.1	750 SP	1.13	2	15 30 45 60	Straw	0.563 0.078 < 0.01 -	0.134 < 0.05 < 0.05 < 0.05
2009 Zhejiang (Jia991) Trial No. 3	300 EC	1.01	2	15 30 45 60	Straw	2.25 0.51 0.08 0.04	0.41 0.07 0.01 < 0.01
2009 Zhejiang (Jia991) Trial No. 3.1	750 SP	1.13	2	15 30 45 60	Straw	4.65 0.88 0.06 0.02	0.42 0.11 0.01 < 0.01
2009 Anhui (Zhon2yu1286) Trial No. 4	300 EC	1.01	2	15 30 45 60	Straw	0.18 0.03 < 0.01 < 0.01	0.04 < 0.01 < 0.01 < 0.01
2009 Anhui (Zhon2yu1286) Trial No. 4.1	750 SP	1.13	2	15 30 45 60	Straw	0.38 0.02 < 0.01 0.01	0.09 < 0.01 < 0.01 < 0.01
2009 Heilongjiang (0420) Trial No. 5	300 EC	1.01	2	15 30 45 60	Straw	11.4 1.43 0.060 0.034	2.81 0.240 0.016 0.012
2009 Heilongjiang (0420) Trial No. 5.1	750 SP	1.13	2	15 30 45 60	Straw	13.7 1.24 0.103 0.089	2.78 0.229 0.038 0.029
2009 Jilin (0420) Trial No. 6	300 EC	1.01	2	15 30 45 60	Straw	3.33 1.82 0.100 < 0.01	0.412 0.265 0.026 < 0.01
2009 Jilin (0420) Trial No. 6.1	750 SP	1.13	2	15 30 45 60	Straw	4.00 6.90 0.141 0.019	0.45 0.981 0.054 < 0.01

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)	
	Form.	Rate kg ai/ha	No.			Acephate	Methamidophos
2009 Hunan (Fudao-2) Trial No. 7	300 EC	1.01	2	15 30 45 60	Straw	2.28 0.207 < 0.025 < 0.025	0.485 0.067 < 0.025 < 0.025
2009 Hunan (Fudao-2) Trial No. 7.1	750 SP	1.13	2	15 30 45 60	Straw	3.07 0.342 < 0.025 < 0.025	0.526 0.108 < 0.025 < 0.025
2009 Hubei (Fudao-2) Trial No. 8	300 EC	1.01	2	15 30 45 60	Straw	1.10 0.025 < 0.025 < 0.025	0.114 < 0.025 < 0.025 < 0.025
2009 Hubei (Fudao-2) Trial No. 8.1	750 SP	1.13	2	15 30 45 60	Straw	1.10 0.067 < 0.025 < 0.025	0.079 < 0.025 < 0.025 < 0.025
2009 Guangdong (Huanhuazuan) Trial No. 1	300 EC	1.01	2	15 30 45 60	Husk from drying in the shade	7.57 6.08 0.125 0.018	0.976 0.501 0.095 -
	300 EC	1.01	2	15 30 45 60	Husk from drying in the oven	8.26 6.45 0.178 0.016	1.01 0.475 0.125 < 0.05
2009 Guangdong (Huanhuazuan) Trial No. 1.1	750 SP	1.13	2	15 30 45 60	Husk from drying in the shade	14.3 10.9 0.217 0.028	1.01 0.581 0.091 < 0.05
	750 SP	1.13	2	15 30 45 60	Husk from drying in the oven	16.2 14.7 0.228 0.039	1.02 0.757 0.103 < 0.05
2009 Guangxi (Zhongzheyou-1) Trial No. 2	300 EC	1.01	2	15 30 45 60	Husk from drying in the shade	9.56 5.06 0.078 < 0.01	0.789 0.569 < 0.05 < 0.05
	300 EC	1.01	2	15 30 45 60	Husk from drying in the oven	9.56 4.82 0.187 0.078	1.51 0.420 0.145 < 0.05
2009 Guangxi (Zhongzheyou-1) Trial No. 2.1	750 SP	1.13	2	15 30 45 60	Husk from drying in the shade	10.3 7.11 0.109 0.010	1.93 0.658 < 0.05 < 0.05
	750 SP	1.13	2	15 30 45 60	Husk from drying in the oven	15.2 9.58 0.113 0.029	1.20 0.366 < 0.05 < 0.05
2009 Zhejiang (Jia991) Trial No. 3	300 EC	1.01	2	15 30 45 60	Husk from drying in the shade	16.7 35.2 4.20 0.53	2.50 1.90 0.43 0.08
	300 EC	1.01	2	15 30 45 60	Husk from drying in the oven	34.8 20.2 3.62 0.86	3.90 2.13 0.42 0.11
2009 Zhejiang (Jia991) Trial No. 3.1	750 SP	1.13	2	15 30 45 60	Husk from drying in the shade	16.7 35.2 4.20 0.53	2.50 1.90 0.43 0.08

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)	
	Form.	Rate kg ai/ha	No.			Acephate	Methamidophos
	750 SP	1.13	2	15 30 45 60	Husk from drying in the oven	34.8 20.2 3.62 0.86	3.90 2.13 0.42 0.11
2009 Anhui (Zhon2yu1286) Trial No. 4	300 EC	1.01	2	15 30 45 60	Husk from drying in the shade	4.77 0.27 < 0.01 0.04	0.45 < 0.01 < 0.01 < 0.01
	300 EC	1.01	2	15 30 45 60	Husk from drying in the oven	6.26 0.64 0.04 0.06	0.39 0.06 < 0.01 0.01
2009 Anhui (Zhon2yu1286) Trial No. 4.1	750 SP	1.13	2	15 30 45 60	Husk from drying in the shade	6.69 0.66 0.20 0.10	0.43 0.06 0.02 < 0.01
	750 SP	1.13	2	15 30 45 60	Husk from drying in the oven	6.42 0.64 0.26 0.07	0.52 0.08 0.03 < 0.01
2009 Heilongjiang (0420) Trial No. 5	300 EC	1.01	2	15 30 45 60	Husk from drying in the shade	13.1 2.38 0.434 0.026	2.70 0.682 0.155 0.016
	300 EC	1.01	2	15 30 45 60	Husk from drying in the oven	9.7 1.65 0.428 0.022	1.20 0.484 0.224 0.012
2009 Heilongjiang (0420) Trial No. 5.1	750 SP	1.13	2	15 30 45 60	Husk from drying in the shade	17.1 1.76 1.45 0.049	2.42 0.53 1.29 0.020
	750 SP	1.13	2	15 30 45 60	Husk from drying in the oven	13.6 1.37 1.53 0.043	2.50 0.446 0.728 0.010
2009 Jilin (0420) Trial No. 6	300 EC	1.01	2	15 30 45 60	Husk from drying in the shade	16.0 1.41 0.392 0.046	2.52 0.656 0.914 0.016
	300 EC	1.01	2	15 30 45 60	Husk from drying in the oven	10.7 1.42 0.272 0.016	1.95 0.642 0.128 0.012
2009 Jilin (0420) Trial No. 6.1	750 SP	1.13	2	15 30 45 60	Husk from drying in the shade	14.4 3.14 1.56 0.027	3.20 1.06 0.964 0.018
	750 SP	1.13	2	15 30 45 60	Husk from drying in the oven	14.6 2.70 1.78 0.031	2.80 1.05 0.93 0.013
2009 Hunan (Fudao-2) Trial No. 7	300 EC	1.01	2	15 30 45 60	Husk from drying in the shade	28.2 7.55 1.03 0.089	1.23 0.323 0.092 < 0.025
	300 EC	1.01	2	15 30 45 60	Husk from drying in the oven	34.2 7.38 0.874 0.114	1.10 0.429 0.074 < 0.025

Year *Location* (variety) Trial No.	Application			PHI	Portion analysed	Residues (mg/kg)	
	Form.	Rate kg ai/ha	No.			Acephate	Methamidophos
2009 Hunan (Fudao-2) Trial No. 7.1	750 SP	1.13	2	15 30 45 60	Husk from drying in the shade	33.2 9.32 0.091 0.353	0.730 0.795 0.046 < 0.025
	750 SP	1.13	2	15 30 45 60	Husk from drying in the oven	48.0 6.74 0.193 0.441	1.24 0.346 < 0.025 2.57
2009 Hubei (Fudao-2) Trial No. 8	300 EC	1.01	2	15 30 45 60	Husk from drying in the shade	9.05 4.89 0.054 < 0.025	0.530 0.290 < 0.025 < 0.025
	300 EC	1.01	2	15 30 45 60	Husk from drying in the oven	8.62 0.127 < 0.025 < 0.025	0.482 < 0.025 < 0.025 < 0.025
2009 Hubei (Fudao-2) Trial No. 8.1	750 SP	1.13	2	15 30 45 60	Husk from drying in the shade	13.4 1.44 0.238 < 0.025	0.537 0.079 < 0.025 < 0.025
	750 SP	1.13	2	15 30 45 60	Husk from drying in the oven	11.8 1.26 0.218 < 0.025	0.476 0.079 < 0.025 < 0.025

FATE OF RESIDUES IN STORAGE AND PRCESSING

The husked rice samples were milled into polished rice using rice mill. Corresponding husked rice and polished rice were analysed to derive processing factors. The results are shown in Table 6. No information is available for the corresponding rice bran.

Table 6 Residues of acephate and methamidophos in polished rice following supervised trials

Test site	Form.	Application rate (kg ai./ha)	No.	PHI (days)	Acephate (mg/kg)		PF	Methamidophos (mg/kg)		PF
					Rice, husked	Rice, polished		Rice, husked	Rice, polished	
Zhejiang	30% EC	1.52	3	60	0.10	0.05	0.50	0.07	0.06	0.86
Zhejiang	30% EC	1.52	3	60	0.06	0.04	0.67	0.04	0.04	1.0
Zhejiang	75% SP	1.69	3	60	0.12	0.07	0.58	0.08	0.07	0.88
Zhejiang	75% SP	1.69	3	60	0.11	0.05	0.46	0.07	0.05	0.71
Zhejiang	30% EC	1.01	3	45	0.55	0.28	0.51	0.36	0.25	0.69
Zhejiang	30% EC	1.01	3	45	0.32	0.18	0.56	0.20	0.15	0.75
Zhejiang	75% SP	1.13	3	45	0.69	0.49	0.71	0.37	0.34	0.92
Zhejiang	75% SP	1.13	3	45	0.27	0.32	1.2	0.22	0.24	1.1
Zhejiang	30% EC	1.52	3	45	0.50	0.30	0.60	0.31	0.23	0.74
Zhejiang	30% EC	1.52	3	45	0.48	0.45	0.94	0.29	0.32	1.1
Zhejiang	75% SP	1.69	3	45	0.97	0.42	0.43	0.56	0.34	0.61
Zhejiang	75% SP	1.69	3	45	0.91	0.97	1.1	0.61	0.53	0.87
Zhejiang	30% EC	1.01	3	30	2.18	1.06	0.49	0.78	0.66	0.85
Zhejiang	30% EC	1.01	3	30	1.89	0.9	0.48	0.67	0.57	0.85
Zhejiang	75% SP	1.13	3	30	1.94	1.07	0.55	0.6	0.68	1.1
Zhejiang	75% SP	1.13	3	30	1.8	1.12	0.62	0.54	0.62	1.1
Anhui	30% EC	1.52	3	60	0.07	0.08	1.1	0.04	0.04	1.0
Anhui	30% EC	1.52	3	60	0.07	0.04	0.57	0.03	0.02	0.67
Anhui	75% SP	1.69	3	60	0.16	0.09	0.56	0.06	0.05	0.83
Anhui	75% SP	1.69	3	60	0.16	0.13	0.81	0.06	0.06	1.0

Test site	Form.	Application rate (kg ai./ha)	No.	PHI (days)	Acephate (mg/kg)		PF	Methamidophos (mg/kg)		PF
					Rice, husked	Rice, polished		Rice, husked	Rice, polished	
Anhui	30% EC	1.01	3	45	0.02	0.01	0.5	< 0.01	< 0.01	-
Anhui	75% SP	1.69	3	45	0.02	0.01	0.5	0.01	< 0.01	-
Anhui	75% SP	1.69	3	45	0.06	0.03	0.5	0.05	0.02	0.4
Anhui	30% EC	1.01	3	30	0.09	0.02	0.22	0.06	0.01	0.17
Anhui	30% EC	1.01	3	30	0.07	0.05	0.71	0.03	0.05	1.7
Anhui	75% SP	1.13	3	30	0.17	0.11	0.65	0.11	0.08	0.73
Anhui	75% SP	1.13	3	30	0.20	0.09	0.45	0.12	0.07	0.58
					Mean PF		0.63	Mean PF		0.85
					Median PF		0.56	Median PF		0.85

Test site	Form.	Application rate (kg ai./ha)	No.	PHI (days)	Acephate + 7.5 × Methamidophos (mg/kg)		PF	Acephate + 10 × Methamidophos (mg/kg)		PF
					Rice, husked	Rice, polished		Rice, husked	Rice, polished	
Zhejiang	30% EC	1.52	3	60	0.63	0.50	0.80	0.80	0.65	0.81
Zhejiang	30% EC	1.52	3	60	0.36	0.34	0.94	0.46	0.44	0.96
Zhejiang	75% SP	1.69	3	60	0.72	0.60	0.83	0.92	0.77	0.84
Zhejiang	75% SP	1.69	3	60	0.64	0.43	0.67	0.81	0.55	0.68
Zhejiang	30% EC	1.01	3	45	3.25	2.16	0.66	4.15	2.78	0.67
Zhejiang	30% EC	1.01	3	45	1.82	1.31	0.72	2.32	1.68	0.72
Zhejiang	75% SP	1.13	3	45	3.47	3.04	0.88	4.39	3.89	0.89
Zhejiang	75% SP	1.13	3	45	1.92	2.12	1.10	2.47	2.72	1.10
Zhejiang	30% EC	1.52	3	45	2.83	2.03	0.72	3.60	2.60	0.72
Zhejiang	30% EC	1.52	3	45	2.66	2.85	1.07	3.38	3.65	1.08
Zhejiang	75% SP	1.69	3	45	5.17	2.97	0.57	6.57	3.82	0.58
Zhejiang	75% SP	1.69	3	45	5.49	4.95	0.90	7.01	6.27	0.89
Zhejiang	30% EC	1.01	3	30	8.03	6.01	0.75	9.98	7.66	0.77
Zhejiang	30% EC	1.01	3	30	6.92	5.18	0.75	8.59	6.60	0.77
Zhejiang	75% SP	1.13	3	30	6.44	6.17	0.96	7.94	7.87	0.99
Zhejiang	75% SP	1.13	3	30	5.85	5.77	0.99	7.20	7.32	1.02
Anhui	30% EC	1.52	3	60	0.37	0.38	1.03	0.47	0.48	1.02
Anhui	30% EC	1.52	3	60	0.30	0.19	0.64	0.37	0.24	0.65
Anhui	75% SP	1.69	3	60	0.61	0.47	0.76	0.76	0.59	0.78
Anhui	75% SP	1.69	3	60	0.61	0.58	0.95	0.76	0.73	0.96
Anhui	30% EC	1.01	3	45	0.10	0.09	0.89	0.12	0.11	0.92
Anhui	75% SP	1.69	3	45	0.10	0.09	0.89	0.12	0.11	0.92
Anhui	75% SP	1.69	3	45	0.44	0.18	0.41	0.56	0.23	0.41
Anhui	30% EC	1.01	3	30	0.54	0.10	0.18	0.69	0.12	0.17
Anhui	30% EC	1.01	3	30	0.30	0.43	1.44	0.37	0.55	1.49
Anhui	75% SP	1.13	3	30	1.00	0.71	0.71	1.27	0.91	0.72
Anhui	75% SP	1.13	3	30	1.10	0.62	0.56	1.40	0.79	0.56
					Mean PF		0.81	Mean PF		0.82
					Median PF		0.80	Median PF		0.81

APPRAISAL

Acephate, a broad spectrum organophosphorus insecticide, has been evaluated many times by JMPR since 1976. It was reviewed for residues under the Periodic Re-evaluation Programme in 2003. The 2005 JMPR established an ADI of 0–0.03 mg/kg bw and an ARfD of 0.1 mg/kg bw to replace the previous recommendations.

The 2003 JMPR recommended the following residue definition for acephate:

Definition of the residue for compliance with MRLs for plant and animal commodities: acephate

Definition of residues for estimation of dietary intake for plant and animal commodities: acephate and methamidophos

Acephate was included in the Priority List at the Forty-second Session of the CCPR in 2010 for the estimation of a maximum residue level for rice by the 2011 JMPR. Summary data were provided by the Government of People's Republic of China for estimation of an MRL for rice.

Plant metabolism

The 2003 JMPR reviewed plant metabolism studies on bean, cabbage and tomato seedlings, cotton and beans. No information was available on metabolism of acephate in rice. Taking into consideration information on metabolism of other plants and environmental fate in soil and water-sediment systems evaluated by the 2003 JMPR, the present Meeting considered that metabolism of acephate in rice would be similar to that in other plants.

Analytical methods

Analysis of acephate and methamidophos in rice involves extraction of ground husked rice with a mixture of acetonitrile and water (70:5), evaporation of the supernatant at 40 ºC, dissolving the resulting dry matter in acetone, and quantitation of acephate and methamidophos using gas chromatography equipped with FPD. This method follows a similar approach to the methods reviewed by the 2003 JMPR.

The method was tested for recovery using husked rice, husk and straw as matrices resulting in acceptable recovery and RSD. The LOQ was 0.01–0.025 mg/kg for acephate and 0.01–0.05 mg/kg for methamidophos, depending on the participating laboratories.

Stability of pesticide residues in stored analytical samples

When spiked at 1 mg/kg, acephate and methamidophos in husked rice were stable for at least 360 days, the longest storage period tested, at -15 to -20 ºC. About 85% of spiked acephate and 84% of spiked methamidophos remained after 360 days.

In the supervised residue trials, samples were analysed within one month of freezing.

Results of supervised residue trials on crops

The Meeting received information of supervised field trials of acephate on rice conducted in eight provinces in China in 2009.

The OECD MRL calculator was used as a tool to assist in the estimation of maximum residue levels from the selected residue data set obtained from the supervised residue trials. As a first step, the Meeting reviewed trial conditions and other relevant factors related to each data set to arrive at a best estimate of the maximum residue level using expert judgement. Then, the OECD calculator was employed. If the statistical calculation spreadsheet suggested a different value, a brief explanation of the derivation was supplied.

Rice

Residues of acephate and methamidophos arising from the use of acephate on rice were analysed in husked rice dried in two different ways from the applications of 2 similar formulations in the supervised trials.

The GAP in China allows the maximum of two applications at the maximum application rate of 1.01 kg ai/ha (30% EC) or 1.13 kg ai/ha (75% SP) with the PHI of 45 days.

Rice grains were harvested at their maturity and dried in two ways to reduce the moisture content to ≤ 13.5%. Immediately after the moisture content reached this level, rice grains were husked and the resulting husked rice was analysed. Husks from trials matching GAP were also analysed.

The residue concentrations in the trials conducted in Zhejiang Province were always significantly higher than those from trials conducted in other regions but this did not seem to be caused by analytical errors. The laboratory involved in the analysis of samples from the Zhejiang trials produced acceptable recoveries using the analytical method mentioned above. The Meeting agreed that there was no reason to disregard these values in the estimation of maximum residue levels.

As the Meeting considered trials in the same location with the same variety and timing, similar formulations and similar application rates not independent, the highest residue value of the four values in one location were selected and used for estimating a maximum residue level.

Residues of acephate selected as above were in rank order: < 0.025, 0.04, 0.04, 0.04, 0.07, 0.09, 0.10 and 0.69 mg/kg.

The Meeting estimated a maximum residue level at 1 mg/kg for acephate in husked rice.

The Meeting estimated a median residue at 0.055 mg/kg for acephate in husked rice for the purpose of calculating animal dietary burdens.

Residues of methamidophos selected as above were in rank order: 0.02, < 0.025, < 0.025, < 0.05, < 0.05, 0.05, 0.05 and 0.38 mg/kg.

The Meeting estimated a maximum residue level at 0.6 mg/kg for methamidophos in husked rice.

It also estimated a median residue at 0.025 mg/kg for methamidophos in husked rice for the purpose of calculating animal dietary burdens.

As the residue definition for estimation of dietary intake for plant and animal commodities was “acephate and methamidophos”, the combined adjusted residues of acephate and methamidophos were calculated after scaling the methamidophos residues to account for the difference in toxicity with the factors derived from the ratios of respective maximum ADI and ARfD values. These factors are 7.5 (maximum ADI of acephate and methamidophos, 0.03 and 0.004 mg/kg bw) and 10 (ARfD of acephate and methamidophos, 0.1 and 0.01 mg/kg bw) respectively for long-term and short-term intake estimates. The highest calculated value from each of eight locations was selected for estimating STMRs. For summing up, if acephate or methamidophos residues were below the LOQ, LOQ value of each was used.

For the estimation of long-term dietary intake, the calculated values of “acephate + 7.5× methamidophos” were: 0.20, 0.21, 0.23, 0.40, 0.41, 0.45, 0.47 and 3.54 mg/kg. The Meeting estimated an STMR of 0.405 mg/kg for the estimation of long-term dietary intake.

For the estimation of short-term dietary intake, the calculated values of “acephate + 10× methamidophos” were: 0.25, 0.28, 0.29, 0.53, 0.54, 0.56, 0.59 and 4.49 mg/kg. The Meeting estimated an STMR of 0.535 mg/kg for the estimation of short-term dietary intake.

Rice straw

Residues of acephate and methamidophos (arising from the use of acephate on rice) in straw from the application of 2 similar formulations in the supervised trials matching GAP were analysed.

Highest residues of acephate in each of the eight trial locations were in rank order: < 0.01, < 0.01, < 0.01, < 0.025, < 0.025, 0.08, 0.10 and 0.14 mg/kg.

The Meeting estimated a maximum residue level, highest residue and median residue at 0.3 mg/kg, 0.14 mg/kg and 0.025 mg/kg respectively for acephate in rice straw and fodder, dry.

Highest residues of methamidophos in each of the eight trial locations are in rank order: < 0.01, 0.01, < 0.025, < 0.025, 0.04, < 0.05, < 0.05 and 0.05 mg/kg.

The Meeting estimated a maximum residue level, highest residue and median residue at 0.1 mg/kg, 0.05 mg/kg, 0.0325 mg/kg respectively for methamidophos in rice straw and fodder, dry.

Fate of residues during processing

The Meeting received information on processing of husked rice to polished rice.

The mean processing factors were calculated for "acephate + 7.5 × methamidophos" and "acephate + 10 × methamidophos" to be 0.81 and 0.82 respectively.

STMR-Ps for polished rice were calculated using the STMRs of husked rice and these processing factors. An STMR for polished rice for long-term intake estimation was calculated to be 0.33 mg/kg. An STMR for polished rice for short-term intake estimation was calculated to be 0.44 mg/kg.

The mean processing factors were calculated for polished rice to be 0.63 and 0.85 respectively for acephate and methamidophos. An STMR of 0.021 mg/kg was calculated for methamidophos in polished rice.

No data were available to estimate processing factors or STMR-Ps for rice bran.

Residues in animal commodities

Farm animal dietary burden

Rice and/or its straw may be fed to dairy cattle, beef cattle, broilers and layers. The maximum and mean dietary burdens were calculated using the highest residue, STMR/STMR-P or median residue of acephate or methamidophos in commodities for which maximum residue levels were recommended and processed products thereof on a basis of the OECD Animal Feeding Table.

Resulting maximum and mean dietary burdens for beef and dairy cattle were smaller than those calculated for acephate in 2003 (2.2 and 1.1 ppm for maximum and mean dietary burden of beef cattle and dairy cattle respectively) because of the revision of the OECD Animal Feeding Table, or identical to those calculated for methamidophos.

Resulting maximum and mean dietary burdens for broilers and layers were larger than those calculated in 2003 (0.0067 ppm for the maximum and mean dietary burden of poultry for acephate and 0.0022 ppm for the maximum and mean dietary burden of poultry for methamidophos) but still much smaller than 3 ppm in diet dry matter, after feeding of which no residues above LOQ were found in any of edible tissues and eggs.

The Meeting concluded that there was no need to re-evaluate maximum residue levels, STMRs or HRs for commodities of animal origin.

Summary of livestock dietary burdens calculated (ppm of dry matter diet)

Acephate	US-Canada		EU		Australia		Japan	
	max	Mean	max	Mean	max	Mean	max	mean
Beef cattle	0.05	0.05	1.12	1.11	1.18[a]	1.11[b]	0.10	0.03
Dairy cattle	0.56	0.56	0.58	0.57	0.59[c]	0.57[d]	0.056	0.024
Broilers	0.02	0.02	0.04	0.04	0.05	0.05	0.01	0.01
Layers	0.02	0.02	0.02	0.02	0.05[e]	0.05[f]	0.01	0.01
Methamidophos	US-Canada		EU		Australia		Japan	
	max	Mean	max	Mean	Max	Mean	max	mean
Beef cattle	0.01	0.01	0.05	0.05	0.08[a]	0.07[b]	0.04	0.03
Dairy cattle	0.03	0.03	0.03	0.03	0.04[c]	0.04[d]	0.03	0.02
Broilers	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.01
Layers	0.01	0.01	0.01	0.01	0.02[e]	0.02[f]	0.01	0.01

[a] Suitable for estimating maximum residue levels for meat, fat and edible offal of cattle.

[b] Suitable for estimating STMRs for meat, fat and edible offal of cattle.

[c] Suitable for estimating maximum residue levels for milk of cattle.

[d] Suitable for estimating STMRs for milk of cattle.

[e] Suitable for estimating maximum residue levels for meat, fat and edible offal of poultry and eggs.

[f] Suitable for estimating STMRs for meat, fat and edible offal of poultry and eggs.

RECOMMENDATIONS

On the basis of the data from supervised trials the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits and for IEDI and IESTI assessment.

Acephate

Definition of the residue for compliance with MRLs for plant and animal commodities: *Acephate.*

Definition of residues for estimation of dietary intake for plant and animal commodities: *Acephate and methamidophos.*

Residue is not fat-soluble.

Commodity		Recommended MRL, mg/kg		STMR/STMR-P mg/kg	HR/HR-P mg/kg
CCN	Name	New	Previous		
CM 0649	Rice, husked	1		0.405 [a] 0.535 [b] 0.055 [c]	
CM 1205	Rice, polished			0.33 [a] 0.44 [b]	
AS 0649	Rice straw and fodder, dry	0.3		0.025 [c]	0.14 [c]

[a] for long term intake estimate

[b] for short-term intake estimate

[c] for calculation of animal dietary burden

Methamidophos

For methamidophos arising from the use of acephate on rice, the Meeting estimated the following maximum residue levels, STMRs, median and highest residues.

Definition of the residue for compliance with MRLs and for estimation of dietary intake plant and animal commodities: *methamidophos*.

Residue is not fat-soluble.

Commodity		Recommended MRL, mg/kg		STMR/STMR-P mg/kg	HR/HR-P mg/kg
CCN	Name	New	Previous		
CM 0649	Rice, husked	0.6 [a]	-	0.025	-
CM 1205	Rice, polished			0.021	-
AS 0649	Rice straw and fodder, dry	0.1 [a]	-	0.0325 [b]	0.05 [b]

[a] Arising from the use of acephate on rice

[b] for the calculation of animal dietary burden

DIETARY RISK ASSESSMENT

Dietary intake estimates for the combined adjusted residues utilizing the scaling factors were compared with the maximum ADI and ARfD of acephate.

Long-term intake

The International Estimated Dietary Intakes (IEDIs) of acephate were calculated for the 13 GEMS/Food cluster diets using STMRs and STMRPs estimated by the 2003, 2006 and current Meeting (see Annex 3 of the 2011 Report of the JMPR). The ADI is 0–0.03 mg/kg bw and the calculated IEDIs were 2–10% of the maximum ADI. The Meeting concluded that the long-term intake of residues of acephate (and methamidophos arising from use of acephate) resulting from the uses of acephate considered by the 2003, 2006 and current JMPR is unlikely to present a public health concern.

Short-term intake

The International Estimated Short-Term Intakes (IESTI) of acephate (and methamidophos arising from use of acephate) were calculated for husked rice and polished rice using STMRs estimated by the current Meeting (see Annex 4 of the 2011 Report of the JMPR). The ARfD is 0.1 mg/kg bw and the calculated IESTIs were 3–4% of the ARfD. The Meeting concluded that the short-term intake of residues of acephate, when used in ways that have been considered by the current JMPR, is unlikely to present a public health concern.

REFERENCES

Code	Author	Year	Title, Institute, Report reference
	Anon	June 2011	Acephate Residues in Rice, Institute of Quality and Standard for Agro-products, ZAAS, P.R. Chine,
	Anon	September 2011	Acephate Residues in Rice, Institute of Quality and Standard for Agro-products, ZAAS, P.R. Chine,