TRIAZOPHOS (143)

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EXPLANATION

Triazophos had been first evaluated by the JMPR for toxicology in 1982 and for residues in 1983, and since then several times. The 2002 JMPR established an ADI of 0–0.001 mg/kg bw and ARfD of 0.001 mg/kg bw. The 2007 JMPR evaluated the triazophos residues in food and withdrew its previous recommendations except for cotton seed, cotton seed oil and soya bean (immature seeds). The information provided to JMPR precluded an estimate that the dietary intake would be below the ARfD. The compound was listed for additional MRLs by 2010 JMPR at the Forty-first Session of the CCPR.

Use pattern and residue data on rice and soya beans were provided by the Chinese and Thai Governments, respectively

METHODS OF RESIDUE ANALYSIS

For rice the analytical method used involved extracting 20.0 g of ground rice with 500 mL acetonitrile, filtered, after adding 5 g NaCl and 8 g $MgSO_4$ the mixture was shaken and let it stand for separation of solid materials. 25 mL of the clear extract was evaporated to 1–2 mL and cleaned up on Silica gel column by eluting the residues with 40 mL of petroleum ether :ethyl acetate(1:1v/v). The residues were determined with capillary column GC-flame photometric detector. The recoveries were 85.6% and 99.7% at 0.05 and 1 mg/kg spike levels, respectively (Wu, H., 2010)

For soya beans, samples were extracted with ethyl acetate and the residues were determined directly with GC-FPD without cleanup. The recoveries ranged between 82–89%, the LOQ reported was 0.02 mg/kg (Pinpan, P., 2008).

USE PATTERNS

Crop	Country	Formulation	Application	Spray		PHI, days
			Rate kg ai/ha	Conc., kg ai/hl	Number	
Rice	China	EC	0.45	0.075	3	28
		ME	0.506	0.0843	3	28
Soya bean	Thailand	EC	0.5-0.625	0.08-0.1	Every 7 days	14[a]

[a] For harvesting immature seeds

RESIDUES RESULTED FROM SUPERVISED TRIALS ON CROPS

Rice

Field trials on rice with were performed in different provinces of China in 2008 and 2009 applying an 150 g/L ME and EC formulations three times at max GAP rates. Part of the 2009 trials were carried out with 4 applications typically 10 days apart Samples were collected at intervals ranging from 21 to 45 days after last application. The samples were analysed in duplicates. The trials did not comply with GLP requirements.

The residues reported are summarised in Table 1.

Table 1 Residues in rice grain treated with ME and EC formulations in China

Crop, Variety, Location,Year	Year	Application		PHI (days)	Residues (mg/kg)	Reference
		No	(kg ai/ha)			
Xiushui 09, Zhejiang Province	2008	3	0.506 (ME)	21	1.172,	200811/A-03-01
				28	0.894	
		4		21	1.20	200811/A-04-01
				28	0.817	
Boyou 253, Fujian Province	2008	3	0.506 (ME)	21	0.085	200811/A-03-02
				28	0.087	
		4		21	0.070	200811/A-04-02
				28	0.067	
Zhendao No 2, Jiangsu Province	2008	3	0.506 (ME)	21	0.857,	200811/A-03-03
				28	0.711	
		4		21	0.884	200811/A-04-03
				28	0.807	
Xiushui 09, Zhejiang Province	2009	3	0.506 (ME)	21	0.481	200811/B-03-01
				28	0.347	
				35	0.262	
				42	0.165	
Xiushui 09, Zhejiang Province	2009	3	0.506 (ME)	21	0.916	200811/B-04-01
				28	0.421	
				35	0.31	
				42	0.189	
Boyou 253, Fujian Province	2009	3	0.506 (ME)	21	0.183	200811/B-03-02
				28	0.059	
				35	0.042	
				42	0.002	
Boyou 253, Fujian Province	2009	3	0.506 (ME)	21	0.214	200811/B-04-02
				28	0.060	
				35	0.051	
				42	0.026	
Zhendao No 2, Jiangsu Province	2009	3	0.506 (ME)	21	0.825	200811/B-03-03
				28	0.683	
				35	0.576	
				42	0.179	
Zhendao No 2, Jiangsu Province	2009		0.506 (ME)	21	0.822	200811/B-04-03
				28	0.764	
				35	0.633	
	2009		0.506 (ME)	42	0.505	
Sanhuangzhan No2, Guanxi Province	2008	3	0.45 (EC)	21	1.60	200814/A-01-01
				28	1.01	
	2008	4	0.45 (EC)	21	1.34	200814/A-02-01
				28	0.60	
Songjing No7, Heilongjiang Province	2008	3	0.45 (EC)	21	0.598	200814/A-01-02
				28	0.513	
	2008	4	0.45 (EC)	21	0.796	200814/A-02-02
				28	0.216	
Weiyou 46, Hunan Province	2008	3	0.45 (EC)	21	0.478	200814/A-01-03
				28	0.343	
	2008	4	0.45 (EC)	21	0.413	200814/A-02-03
				28	0.257	

Crop, Variety, Location,Year	Year	Application		PHI (days)	Residues (mg/kg)	Reference
		No	(kg ai/ha)			
Sanhuangzhan No2, Guanxi Province	2009	3	0.45 (EC)	21	0.177	200814/B-01-01
				28	0.085	
				35	0.064	
				42	0.038	
Sanhuangzhan No2, Guanxi Province	2009	4	0.45 (EC)	21	0.207	200814/B-02-01
				28	0.128	
				35	0.085	
				42	0.046	
Songjing No7, Heilongjiang Province	2009	3	0.45 (EC)	21	1.35	200814/B-01-02
				28	1.19	
				35	0.943	
				42	0.899	
Songjing No7, Heilongjiang Province	2009	4	0.45 (EC)	21	1.10	200814/B-02-02
				28	1.05	
				35	1.03	
				42	0.845	
Weiyou 46, Hunan Province	2009	3	0.45 (EC)	21	0.08	200814/B-01-03
				28	0.059	
				35	0.01	
				42	< 0.01	
Weiyou 46, Hunan Province	2009	4	0.45 (EC)	21	0.053	200814/B-03-03
				28	0.044	
				35	0.042	
				42	0.018	

Soya beans

Two field residue trials were conducted in Thailand in 2008. The conditions of the studies (e.g., formulation, method of application, application dose, PHI) were the same as those evaluated by 2007 JMPR. Three replicate plots were treated in each trial.

Samples of whole pod (pod + seed), seed, and pod without seed were analysed in 3 replicates. The average of the results of three replicate analyses are summarised in Table 2.

Table 2 Residues in soya beans treated with triazophos in Thailand

Crop Variety, Location, Year	Application			PHI (days)	Plant parts	Residues [a] (mg/kg)	Reference
	Year	(kg ai/ha)	No				
OCB Saraburi province	2008	0.625	4	0	Whole pod	3.79, 4.5, 4.32	TRIA-VS-07
				7		1.78, 1.52, 1.87	
				10		1.75, 1.65, 1.66	
				14		0.99, 0.66, 0.96	
				18		0.50, 0.35, 0.4	
				21		0.20, 0.13, 0.15	
				28		0.12, 0.08, 0.08	
				10	Seed	0.16, 0.13, 0.17	
				14		0.15, 0.14, 0.11	
				18		0.09, 0.05, 0.04	
				21		0.07, 0.03, 0.04	
				28		0.03, 0.02, 0.01	
				10	Pod without seed	3.0, 2.29, 2.59	
				14		1.85, 1.82, 1.75	
				18		1.28, 0.76, 0.88	

Crop Variety, Location, Year	Application			PHI (days)	Plant parts	Residues [a] (mg/kg)	Reference
	Year	(kg ai/ha)	No				
				21		0.63, 0.41, 0.44	
				28		0.29,0.21, 0.28	
Than-kasem 1 Saraburi province	2008	0.625	3	0	Whole pod	6.10, 5.57, 8.65	TRIA-VS-08
				7		1.71, 1.56, 2.31	
				10		1.78, 1.02, 1.38	
				14		0.80, 0.81, 1.04	
				18		0.44, 0.45, 0.75	
				21		0.38, 0.36, 0.41	
				10	Seed	0.25, 0.15, 0.15	
				14		0.12, 0.10, 0.14	
				18		0.12, 0.11, 0.11	
				21		0.08, 0.11, 0.10	
				10	Pod without seed	1.95, 1.85, 2.82	
				14		1.65, 1.27, 2.22	
				18		1.14, 1.05, 1.39	
				21		0.62, 0.92, 1.18	

[a] Residues in samples taken from 3 replicate plots per trial site.

FATE OF RESIDUES IN STORAGE AND PROCESSING

No information was provided.

APPRAISAL

The last evaluation of triazophos residues in food was made by the 2007 JMPR within the periodic review programme. The Meeting estimated maximum residue levels only for cotton seed, cotton seed oil and soya bean (immature seeds). The information provided to 2007 JMPR precluded an estimate that the dietary intake would be below the ARfD for immature soya bean in the pod. Current use patterns and residue data from new trials on rice and soya beans, submitted by China and Thailand, were evaluated by the present Meeting.

Results of supervised trials on crops

Rice

Fifteen trials were conducted on rice in four provinces of China in 2008 and 2009, applying triazophos at the target rate of maximum GAP (3 × 0.506 kg ai/ha of an ME formulation and 0.45 kg ai/ha of an EC formulation with a 28 day PHI). Nine trials were also conducted with an additional 4th treatment at early growth stage at the same site, where the last 3 applications were made on the same days. There was little difference found between residues in rice grain obtained after either 3 or 4 treatments. Where 4 applications were made the crops were treated 2 months before the sampling, therefore the Meeting considered that the first treatment did not affect the residue level at the time of sampling, i.e., 28 days after final application. As the trials were not independent only the higher residues were selected from the side-by-side trials for estimation of residue levels. The residues in husked rice (brown rice) in ranked order were: 0.059, 0.059, 0.06, 0.128, 0.087, 0.343, 0.347, 0.421, 0.513, 0.683, 0.764, 0.807, 0.894, 1.01, 1.19 mg/kg.

The Meeting estimated a maximum residue level of 2 mg/kg, and a median residue of 0.421 mg/kg.

There was no alternative GAP to be considered.

Soya bean, immature seed

Two trials were conducted in Thailand on soya beans applying triazophos 3 to 4 times at maximum the GAP rate (0.625 kg ai/ha, with a PHI 14 days for immature seed) on three replicate plots at one site. Samples were taken at various times after last application. Whole pod, bean (immature) and pod without seed were analysed in three replicates.

The residues at 14 days PHI in whole pods in the 2008 trials were 0.99 and 1.04 mg/kg.

In trials conducted between 1992 and 2006 in Thailand residues of triazophos in whole pod including immature seeds at 14–17 days after the final application were 0.05, 0.17, 0.31, 0.43, 0.52, and 0.60 mg/kg.

Based on the two data sets (0.05, 0.17, 0.31, 0.43, 0.52, 0.60, 0.99 and 1.04) the estimated maximum residue level and median residue would be 3 mg/kg and 0.475 mg/kg.

In the two trials conducted on replicate plots in 2008, the residues in whole pod including immature seed and in the seeds were

	Trial 1			Trial 2		
	Repl.1	Repl.2	Repl.3	Repl.1	Repl.2	Repl.3
Whole pod	0.99	0.66	0.96	0.8	0.81	1.04
Seed	0.15	0.14	0.11	0.12	0.1	0.14
Ratio [a]	0.152	0.212	0.115	0.150	0.123	0.135

[a] Ratio of residues in seed and whole pod

The average ratio of residues in seed and whole pod including the seed is 0.148.

Applying the average ratio of residues, the Meeting estimated a maximum residue level of 0.5 mg/kg, STMR of 0.07 mg/kg and HR of 0.15 mg/kg in immature soya bean seed.

Residues in animal commodities

The 2007 JMPR concluded that because of the lack of appropriate animal livestock metabolism study, a residue definition for animal products could not be determined and therefore the Meeting could not make use of the results of the feeding studies. Consequently, the residues in animal products derived from the use of the compound on rice and soya beans were not considered by the present Meeting.

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 dietary intake assessment.

Definition of the residue (for compliance with the MRL and for estimation of dietary intake, for plant and animal commodities): *triazophos*

Commodity		Recommended MRL mg/kg		STMR or STMR-P, mg/kg	HR or HR-P, mg/kg
CCN	Name	New	Previous		
CM0649	Rice, husked	2		0.421	1.19
VP0541	Soya beans, (immature seeds)	0.5	-	0.07	0.15

DIETARY RISK ASSESSMENT

Long-term intake

In the current evaluation long-term intake were estimated based on four commodities (cotton seed, edible cotton seed oil, immature soya been seed and rice) for which STMR values have been recommended by JMPR in 2007 and by the present Meeting. The long term intakes for adult population were in the range of 0–50% of the maximum ADI.

The results are shown in Annex 3 of the 2010 JMPR Report.

Short-term intake

In the current evaluation short-term intakes were estimated for four commodities (cotton seed, edible cotton seed oil, immature soya been seed and rice) for which STMR values have been recommended by the 2007 JMPR and present Meeting. The estimated short-term intake derived from residues in soya bean (immature), cotton seed and cotton seed oil for general population and children ranged from 0–40% and 0–60% of the acute reference dose, respectively. However, the short-term intake from residues in rice was 260 % of the ARfD for children and general population.

There was no alternative GAP to be considered.

Studies on the effect of processing (polishing, cooking, frying) are desirable to obtain more realistic information on residue levels in food actually consumed.

The results are shown in Annex 4 of the 2010 JMPR Report.

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