PROFENOFOS (171)

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EXPLANATION

Profenofos, an organophosphorus insecticide, was first evaluated in 1990 as a new compound. It was re-evaluated in the 2007 JMPR for toxicology and in the 2008 JMPR for residues. The 2007 JMPR evaluated profenofos for toxicology under the Periodic Review Programme and recommended the current ADI of 0–0.03 mg/kg bw and ARfD of 1 mg/kg bw. The 2008 JMPR evaluated profenofos for residue under the Periodic Review Programme and concluded that the definition of residue for compliance with MRLs and for estimation of dietary intake was profenofos. That Meeting recommended five new and two revised maximum residue levels, maintained three previously recommended maximum residue levels, and withdrew six previous recommendations including peppers, chili and peppers, chili (dried).

At its Forty-first Session, the CCPR agreed to maintain the CXLs for peppers, chili and peppers, chili (dry) for four years under the periodic review procedure, as the Delegation of Thailand had indicated data would be submited to support those commodities.

The current Meeting received information on GAP from Thailand and residue trial data on peppers, chili from Singapore and Thailand.

USE PATTERN

Profenofos is commonly applied as a foliar treatment and is currently registered for use on a range of fruits and vegetables. Profenofos is recommended for use in the cultivation of chili pepper with foliar application.

The registered use of profenofos on chili pepper as described on the Thai label is summarized in Table 1.

Table 1 Registered uses of profenofos on chili pepper

Crop	Country	Formulation		Application of profenofos					PHI days
		Type	Conc. of profenofos g ai/L	Method	Rate kg ai/ha	Volume[a] L/ha	Spray conc. kg ai/hL	Number max	
Pepper, chili	Thailand	EC	500	Foliar		run-off	0.10	3	21

[a] Spray volume has the additional recommendation for 500 L/ha spraying by Knapsack sprayer from Department of Agriculture, Ministry of Agriculture and Cooperatives, Thailand.

RESIDUES RESULTING FROM SUPERVISED TRIALS

The trials were conducted between 2007 and 2009, two in Singapore in 2009 and six in Thailand in 2007 and 2008. Applications made as foliar spraying to run-off with a EC formulation containing 500 g/L profenofos.

Chili fruit samples were collected at their harvesting stage and analysed on the same day. For trials in Thailand, residues of profenofos were extracted from chili fruit samples with acetone and liquid-liquid partitioned with dichloroomethane. The organic phase was dehydrated with anhydrous sodium sulphate and evaporated. For trials in Singapore, profenofos residues were extracted from samples with ethyl acetate. The extract was filtered through glass wool. The final solution from the samples in both countries was analysed using gas chromatography with flame photometric detection (FPD). The analytical method was validated with analyses by spiking control samples with profenofos at fortification levels ranging from 0.01 to 3.2 mg/kg for Thai trials, 0.05 and 0.1 mg/kg for

Singapore's trials. The LOQ was 0.02 mg/kg for analytical method of Thailand, 0.05 mg/kg for that of Singapore.

The data from these trials are summarized in Table 2. Residue data are recorded as mg/kg parent profenofos and not corrected for recovery or control. Residue values from the trials according to Thai GAP were used for the estimation of maximum residue level.

Table 2 Profenofos residues on chili peppers from supervised trials in Singapore and Thailand

Chili peppers country, year (variety)	Application					PHI Days	Residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hL	water, L/ha	no.			
GAP, Thailand	*EC*	*0.50*	*0.10*	*500*	*3*	*21*		
Thailand, 2007	EC	0.648	0.10	648	3	0 1 3 7 10 14 17 21 25	4.08 3.02 2.69 1.9 1.66 1.03 0.8 <u>0.56</u> 0.33	Poomongkutchai, 2007, PR-CH-01
Thailand, 2007	EC	0.590	0.10	590	3	0 1 3 7 10 14 17 21 25	8.28 5.47 3.96 3.47 1.81 1.49 1.08 <u>0.86</u> 0.39	Poomongkutchai, 2007, PR-CH-02
Thailand, 2008	EC	0.600	0.10	600	3	0 1 3 7 10 14 17 21 25	2.73 2.43 1.17 1.8 2.0 1.54 1.83 <u>1.12</u> 0.96	Poomongkutchai, 2008, PR-CH-03
Thailand, 2008	EC	0.595	0.10	595	3	0 1 3 7 10 14 17 21 25	5.62 3.66 3.54 2.92 2.71 1.48 0.89 <u>0.44</u> 0.14	Poomongkutchai, 2008, PR-CH-04
Thailand, 2008	EC	0.573	0.10	573	3	0 1 3 7 10 14 17 21 25	9.78 4.8 5.02 3.94 3.72 3.09 1.67 <u>1.17</u> 0.46	Poomongkutchai, 2008, PR-CH-05
Thailand, 2008	EC	0.595	0.10	595	3	0 1 3 7 10 14 17 21	4.56 4.58 3.21 3.01 3.8 3.54 2.07 <u>1.42</u>	Poomongkutchai, 2008, PR-CH-06

Chili peppers country, year (variety)	Application					PHI Days	Residues, mg/kg	Ref
	Form	kg ai/ha	kg ai/hL	water, L/ha	no.			
						25	0.65	
Singapore, 2009 (Chi-Fa)	EC	0.589	0.10	589	3	0 1 3 7 15 21 28	2.34 1.65 1.43 1.23 1.56 <u>0.70</u> 0.55	Keng Ho et al, 2009, PHL-09
Singapore, 2009 (Chi-Fa)	EC	0.517	0.10	517	3	0 1 3 7 15 21 28	1.16 0.71 0.73 0.77 0.95 <u>0.56</u> 0.54	Chiew et al, 2009, HB-09

APPRAISAL

Profenofos, an organophosphorus insecticide, was first evaluated in 1990 as a new compound. It was re-evaluated in the 2007 JMPR for toxicology and in the 2008 JMPR for residue. The 2007 JMPR evaluated profenofos for toxicology under the Periodic Review Programme and recommended the current ADI of 0–0.03 mg/kg bw and ARfD of 1 mg/kg bw. The 2008 JMPR evaluated profenofos for residue under the Periodic Review Programme and concluded that the definition of residue for compliance with MRLs and for estimation of dietary intake was profenofos. It recommended the withdrawal of previously recommended maximum residue levels for peppers, chili and peppers, chili (dried) due to insufficient data provided to the Meeting. The current Meeting received information on GAP from Thailand and residue trial data on chili peppers from Singapore and Thailand.

Results of supervised trials on crops

Chili peppers

Profenofos is registered for use on chili peppers in Thailand at a foliar application of 0.10 kg ai/hL with a PHI of 21 days. Residues in chili peppers from Singapore's trials matching GAP of Thailand were 0.56 and 0.70 mg/kg. Residues in chili peppers from Thai trials, matching the GAP of Thailand, were: (n = 6): 0.44, 0.56, 0.86, 1.12, 1.17 and 1.42 mg/kg. The residues evaluated according to the Thai GAP in ranked order, were: 0.44, 0.56, 0.56, <u>0.70, 0.86</u>, 1.12, 1.17 and 1.42 mg/kg.

Based on the trials for chili peppers in Singapore and Thailand, the Meeting estimated a maximum residue level, an STMR value and an HR value for profenofos in chili peppers of 3, 0.78 and 1.42 mg/kg respectively.

The OECD calculator estimated a maximum residue level of 3 mg/kg, which coincides with the recommendation of the current Meeting.

On the basis of the STMR and HR for chili peppers and the default dehydration factor of 7, the Meeting estimated an STMR value and an HR value for dried chili peppers of 5.46 and 9.94 mg/kg respectively. Based on the maximum residue level of chili peppers, the Meeting recommended a maximum residue level of 20 mg/kg for chili peppers (dry).

RECOMMENDATIONS

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

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

Commodity		Recommended MRL, mg/kg		STMR or STMR-P, mg/kg	HR or HR-P, mg/kg
CCN	Name	New	Previous		
VO 0444	Peppers, Chili	3	5 [a]	0.78	1.42
HS 0444	Peppers, Chili, dried	20	50 [a]	5.46	9.94

[a] The Codex MRLs were retained under the four year rule awaiting evaluation of data by the 2011 Meeting of the JMPR

DIETARY RISK ASSESSMENT

Long-term intake

The International Estimated Dietary Intakes (IEDIs) of profenofos were calculated for the 13 GEMS/Food cluster diets using STMRs/STMR-Ps estimated by the current Meeting (see Annex 3 in the 2011 JMPR Report). The ADI is 0–0.03 mg/kg bw and the calculated IEDIs were 2–10% of the maximum ADI (0.3 mg/kg bw). The Meeting concluded that the long-term intake of residues of profenofos resulting from the uses considered by current JMPR is unlikely to present a public health concern.

Short-term intake

The International Estimated Short-Term Intakes (IESTI) of profenofos were calculated for food commodities and their processed commodities using HRs/HR-Ps or STMRs/STMR-Ps estimated by the current Meeting (see Annex 4 in the 2011 JMPR Report). The ARfD is 1 mg/kg and the calculated IESTI was 0% of the ARfD. The Meeting concluded that the short-term intake of residues of profenofos, when used in ways that have been considered by the JMPR, is unlikely to present a public health concern.

REFERENCES

Code	Author	Year	Title, Institution, Report reference
PR-CH-01	Jintana Poomongkutchai	2007	Report on pesticide residue trial
PR-CH-02	Jintana Poomongkutchai	2007	Report on pesticide residue trial
PR-CH-03	Jintana Poomongkutchai	2008	Report on pesticide residue trial
PR-CH-04	Jintana Poomongkutchai	2008	Report on pesticide residue trial
PR-CH-05	Jintana Poomongkutchai	2008	Report on pesticide residue trial
PR-CH-06	Jintana Poomongkutchai	2008	Report on pesticide residue trial
PHL-09	Ong Keng Ho, Yik Choi Pheng, Mohd Ali, Gloria Ong, Jimmy Oh, Foo Chin Lui, Mabel Tan and Chua Gek Cheng	2009	Report on pesticide residue trial in chilli pepper
HB-09	Paul Chiew, Lam-Chan Lee Tiang, Leong Weng Hoy, Tay Jwee Boon, Fadhlina, Tan Thiam Seng, Mabel Tan and Luk Seow Cheng	2009	Report on pesticide residue trial in chilli pepper