

CYFLUTHRIN (157)/BETA-CYFLUTHRIN (228)

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EXPLANATION

Cyfluthrin and beta-cyfluthrin were evaluated by the JMPR under the periodic review programme for toxicology in 2006 and for residues in 2007.

The 2006 JMPR established common ADIs and ARfDs for cyfluthrin and beta-cyfluthrin of 0–0.04 mg/kg bw/day and 0.04 mg/kg bw respectively. The 2007 JMPR defined the residue for compliance with the MRL and for estimation of dietary intake for plant and animal commodities as: cyfluthrin (sum of isomers). The residue is fat-soluble.

The 2007 JMPR recommended maximum residue levels for cyfluthrin (sum of isomers) on a range of fruit, vegetable, oilseed and animal commodities, to accommodate the use of cyfluthrin or beta-cyfluthrin, but noted that for broccoli and head cabbage, the estimated short-term intakes exceeded the ARfD for children and that no residue data relating to alternative GAP were available (JMPR Report 2007, p 91).

The 2007 JMPR also noted that some supervised residue trials on sweet corn and soya bean were based on invalidated analytical data from Craven Laboratories and could not be used (JMPR Report 2007, p 225) and that the remaining trials were not sufficient to estimate maximum residue levels for these commodities (JMPR Report 2007, p 227).

At the Forty-first Session of the CCPR in 2009, the Committee agreed that if no data were available to support lower MRLs for broccoli and head cabbage (based on alternative GAP), the draft MRLs would be considered for withdrawal (ALINORM 09/32/24, para 106–107). Information on current GAP and supervised trials data for beta-cyfluthrin on head cabbage were submitted to the 2009 JMPR by the government of Indonesia but were insufficient to estimate a maximum residue level reflecting the alternative GAP. Noting that additional beta-cyfluthrin data would be available to support an alternative GAP evaluation for head cabbage, the Forty-second CCPR retained the draft MRL at Step 6, awaiting the 2012 JMPR evaluation of these additional data (ALINORM 10/33/24, para 54).

The 2012 JMPR received additional supervised trials data for beta-cyfluthrin on head cabbage from Indonesia and residue information from the manufacturer to support a new GAP in USA for beta-cyfluthrin on soya bean.

METHODS OF RESIDUE ANALYSIS***Analytical methods***

Analytical methods for residues of cyfluthrin and beta-cyfluthrin in plant and animal matrices have been evaluated by the 2007 JMPR [Ref: JMPR 2007 E] and generally involve extraction by homogenization with an organic solvent mixture (with varying proportions of polar and non-polar solvents depending upon the nature and water content of the matrix being extracted) followed by liquid–liquid partition to transfer cyfluthrin residues to less polar solvents prior to column clean-up before GC-ECD or GC-MSD analysis. Validated LOQs ranged from 0.01 to 0.05 mg/kg.

Analytical Method 108139-1 (evaluated by the 2007 JMPR as method M-059050-01-1) was used in the new soya bean residue studies. In this method, residues of cyfluthrin were first extracted with a mixture of methanol/aqueous 1.2 N HCl (4:1), followed by a second extraction using methanol. Initial clean-up was by liquid-liquid partition with acetone/dichloromethane (1:2) with further purification using a Florisil column. Cyfluthrin residues were then eluted with a mixture of hexane/acetone (9:1) and the extracts were analysed using GC-MS (selected ion monitoring mode).

Quantification (m/z 207 ion) was carried out by internal standardization using a deuterated internal standard added to the samples after the extraction step. The LOQ was 0.01 mg/kg.

Method 108139-1 validation data were provided for soya bean and its processed commodities [Ref: M-358457-01-1]. The data included procedural recoveries carried out during the residue trials and during the processing study, using samples from the field. The recoveries were corrected by the level of apparent residues in control samples. The apparent residues found in control samples used for these recoveries were < 30% LOQ, except for control samples of aspirated grain fractions.

Table 1 Summary of Method 108139-1 validation data for soya bean matrices [Refs M-358601-01-1, M-358457-01-1]

Commodity	Fortification mg/kg	n	% Recovery (range)	% Recovery (mean)	% RSD	Max residue in control samples (mg/kg)
Soya bean forage	0.01	9	87-98	93	4.2	0.0011
	0.1	3	88-97	92	5.0	0.0024
	1.0	2	91-93	92	-	0.0007
	2.0	1	90	-	-	0.0005
	5.0	3	81-85	84	2.8	0.0011
Overall				91	5.1	
Soya bean hay	0.01	10	76-95	85	7.7	0.0012
	1.0	4	85-89	87	1.9	0.0013
	4.0	1	84	-	-	0.0014
	5.0	3	75-76	76	0.8	0.0012
Overall				84	7.4	
Soya bean seed	0.01	11	78-96	85	6.5	0.0009
		4	78-85	81	3.7	0.0006
	0.05	1	90	-	-	0.0005
	0.1	2	84-85	84	-	0.0004
	0.5	1	88	-	-	0.0005
	5.0	3	71-75	73	2.7	0.0009
		3	75-76	76	0.8	0.0006
Overall				82	7.6	
Soya bean aspirated grain fractions	0.01	3	89-93	91	2.3	0.0053
	20	1	94	-	-	0.1684
	125	3	91-93	92	1.3	0.0471
Overall				92	2.0	

The analytical method used in the supervised trials from Indonesia was based on the multi-residue method published by the Netherlands Ministry of Public Health, Welfare and Sport (Analytical Methods for Residues of Pesticides in Foodstuffs, 6th edition) with the modified clean-up method for chlorophyll and sulphuric compound co-extractants published by Obana *et al.* (Analyst, 2001, 126, 1529-1534).

In this method, residues were extracted with acetone and dried with Na₂SO₄ before partitioning into dichloromethane:hexane. Clean-up was by elution through activated carbon-Na₂SO₄ using toluene:dichloromethane and residues were measured by GC-ECD. The lowest fortification level used in the validation studies was 0.014 mg/kg and procedural recovery rates were 74–105% at fortification levels of 0.013–0.026 mg/kg. These results supported an LOQ of 0.01 mg/kg.

USE PATTERN

A summary of registered uses for beta-cyfluthrin on brassica (cole) vegetables and soya bean were reported in the 2007 JMPR Evaluation and are re-presented in Table 1, together with the new GAP information for soya bean in USA.

Table 2 Registered uses of beta-cyfluthrin on brassica (cole) vegetables and soya bean

Crop	Country	Application						PHI (days)	Comments
		Form	Method	Type ^a	Max No	g ai/hL	g ai/ha		
Brassicas	Australia	EC	Spray	F		1-2	7.5-15	1 ^b	100-1000 L/ha
Brassicas	Cyprus	SC	Spray	F		1.2		7	
Brassicas	Germany	EC	Spray	F	3		7.74	7	
Brassicas	Poland	EC	Spray	F			5-10	7	200-600 L/ha
Brassicas	Spain	CS	Spray	F		0.05-0.08%	10-18	7	
Brassicas	USA	EC	Spray	F	4		7.3-28	0	
Cabbage	China	SC	Spray	F			10-12	7	
Cabbage	France	EC	Spray	F			7.5	7	
Cabbage	Indonesia	EC	Spray	F		1.2-2.5	7.5-15	7	600 L/ha
Cabbage	Portugal	SC	Spray	F		0.75-1.2		2	800 L/ha
Cabbage	Slovenia	EC	Spray	F	2		8-13	7	
Cabbage	Sweden	SC	Spray	F			10	7	200-400 L/ha
Soya bean	Brazil	SC	Spray	F			2.5-10	20	
Soya bean	Brazil	SC	Spray	F			5-12.5	21	with imidacloprid
Soya bean	Indonesia	EC	Spray	F	5	0.94-3.8	6.2-25	15	
Soya bean	Thailand	EC	Spray	F			5	14	
Soya bean	USA	EC	Spray	F	4		15-25	21 (seed) 15 (hay) 15 (forage)	max 99 g ai/season max 25 g ai/7 day interval

^a F= Outdoor or field use,

^b PHI of 3 days for broccoli

RESIDUES RESULTING FROM SUPERVISED TRIALS

Relevant data from trials with beta-cyfluthrin on head cabbage and soya bean, evaluated by JMPR in 2007 and 2009 [Ref: JMPR 2009 R] are interpreted in the light of current GAP and the Meeting received new information on supervised field trials involving beta-cyfluthrin (foliar applications) on head cabbages Indonesia) and soya bean (USA).

Commodity	Compound	Origin	Table No.
cabbage	beta-cyfluthrin	Indonesia	3
soya bean	beta-cyfluthrin	Canada, USA	4
soya bean forage	beta-cyfluthrin	Canada, USA	5
soya bean hay	beta-cyfluthrin	Canada, USA	6

The trials were documented with laboratory and field report summaries. Information was provided on method validation including procedural recoveries with spiking at residue levels similar to those occurring in samples from the supervised trials. Although trials included control plots, no control data are recorded in the tables unless residues in control samples exceeded the LOQ. Residue data are recorded unadjusted for recovery.

Results from replicated field plots are presented as individual values and mean values have been calculated from the residue results prior to rounding. When residues were not detected they are shown as below the LOQ (e.g., < 0.01 mg/kg). Residues and application rates have been rounded to two significant digits (or if residues are close to the LOQ, rounded to one significant digit). Results from trials used for the estimation of maximum residue levels have been (underlined).

Where residues were reported in control samples, these are indicated in the tables with a “c=” prefix.

Cabbages, Head–Beta-cyfluthrin

In trials conducted in Indonesia over three seasons from three geographic regions (mean temperatures 25–27 °C), beta-cyfluthrin (25 g ai/litre EC formulation) was applied to cabbages as foliar sprays, to plots with and without soil mulch (plastic) or adjuvant. Plot sizes were 1 m × 10 m (30 plants) with 10 foliar sprays being applied at 7-day intervals by knapsack sprayer, using a spray rate equivalent to 600 litres/ha. Samples of cabbage heads (5–7 kg or 5 units) were wrapped in aluminium foil, transported to the laboratory and processed the same day.

Table 3 Residue data summary of supervised trials on cabbages in Indonesia involving foliar applications of beta-cyfluthrin

CABBAGE Country, year Location (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	g ai/ha	g ai/hl	No			
GAP: Indonesia	EC		2.5		7		(High volume – 600 L/ha)
Indonesia, 2008 Kretek, Wonosobo Central Java (Samudera)	EC 25	15	2.5	10	0 1 3 5 7 10 14	0.08 0.07 0.06 < 0.01 0.03 < 0.01 <u>0.05</u>	128/SPK.J/PPK-PPI/V/2008 (Upland, with mulch)
Indonesia, 2008 Kretek, Wonosobo* Central Java (Samudera)	EC 25	15	2.5	10	0 1 3 5 7 10 14	0.03 0.02 < 0.01 0.02 < 0.01 0.02 0.02	128/SPK.J/PPK-PPI/V/2008 (Upland, without mulch)
Indonesia, 2008 Bambanglipura, Bantul Central Java (Green II)	EC 25	15	2.5	10	0 1 3 5 7 10 14	0.02 0.02 0.01 < 0.01 < <u>0.01</u> < 0.01 < 0.01	128/SPK.J/PPK-PPI/V/2008 (Lowland, with mulch)
Indonesia, 2008 Bambanglipura, Bantul* Central Java (Green II)	EC 25	15	2.5	10	0 1 3 5 7 10 14	0.02 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	128/SPK.J/PPK-PPI/V/2008 (Lowland, without mulch)
Indonesia, 2008 Telogowero, Basari* Central Java (Green Komed)	EC 25	15	2.5	10	0 1 3 5 7 10 14	0.02 0.02 0.01 0.01 < 0.01 < 0.01 < 0.01	128/SPK.J/PPK-PPI/V/2008 (Upland, with adjuvant)
Indonesia, 2008 Telogowero, Basari Central Java (Green Komed)	EC 25	15	2.5	10	0 1 3 5 7 10 14	0.03 0.03 0.03 0.02 <u>0.02</u> 0.02 0.02	128/SPK.J/PPK-PPI/V/2008 (Upland, without adjuvant)

CABBAGE Country, year Location (variety)	Application				PHI, (days)	Residues (mg/kg)	Reference & Comments
	Form	g ai/ha	g ai/hl	No			
GAP: Indonesia	EC		2.5		7		(High volume – 600 L/ha)
Indonesia, 2010 Pakem, Sleman Daerah Istimewa Yogyakarta (Summer)	EC 25	15	2.5	2	0 1 2 3 5 7 10 14	0.04 0.03 0.02 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	205.3/SPK.KPA/PPHP/X/2010
Indonesia, 2011 Kledung, Temanggung Central Java (Grand II)	EC 25	15	2.5	3	0 1 2 3 5 7 10 14	0.12 0.04 0.08 0.02 0.01 0.01 < 0.01 < 0.01	44.8/SPK.KPA/PPHP/III/2011
Indonesia, 2011 Basari, Temanggung Central Java (Green Komed)	EC 25	15	2.5	6	0 1 2 3 5 7 10 14	0.04 0.02 0.02 0.03 0.02 0.01 < 0.01 < 0.01	44.8/SPK.KPA/PPHP/III/2011
Indonesia, 2011 Kretk, Wonosobo Central Java (Grand II)	EC 25	15	2.5	6	0 1 2 3 5 7 10 14	0.05 0.05 0.04 0.03 0.04 < 0.01 < 0.01 < 0.01	44.8/SPK.KPA/PPHP/III/2011

*: trials were not independent and the results were not used for residue evaluation

Soya bean–Beta-cyfluthrin

Twenty supervised trials were conducted in USA on soya beans in 2008 [Ref: M-358601-01-1]. In these trials, four foliar applications of 25 g ai/ha (EC formulation) were applied at 5 to 9 day intervals. All applications included 0.2% non-ionic low foam wetter/spreader adjuvant and were made using tractor-mounted or backpack boom sprayers.

Each trial included one plot to generate soya bean seed samples (min 1 kg) and one to generate forage and soya bean hay samples (min 0.5 kg), with duplicate samples being collected, frozen within 4 hours of sampling and stored frozen for up to 429 days before analysis by GC-MS (using Method 108139-1). This storage period is covered by the storage stability data evaluated by the 2007 JMPR. Concurrent recoveries, corrected for apparent residues in control samples (always < 30% LOQ) ranged from 71–98% with RSDs of < 8%.

Percent dry matter of the treated samples ranged from 16% to 29% for soya bean forage, from 34% to 81% for soya bean hay (field-dried for 1–12 days) and from 71% to 100% for soya bean seed. No percent dry matter correction was made for residues found in any of the commodity samples.

Table 4 Residue data summary of supervised trials in USA, Canada on soya bean involving foliar applications of beta-cyfluthrin

SOYA BEAN Country, year Location (variety)	Application					Residues (mg/kg)				Reference Trial No
	Form	No	g ai/ha	L/ha	GS at last application	Sample	PHI (days)	Beta-cyfluthrin	mean	
GAP, USA	EC	1-4	15-25			seed	21			
USA, 2008 Seven Springs, NC (SE74480)	EC	4	24	146-161	BBCH 80	seed	21	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR001-08HA
USA, 2008 Elko, SC (Asgrow H7242RR)	EC	4	25	141-144	BBCH 97	seed	19	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR002-08HB
USA, 2008 Fisk, MO) (DG5300RR)	EC	4	25	186-188	BBCH 94	seed	21	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR003-08HA
USA, 2008 Greenville, MS (Pioneer 94M71)	EC	4	24-25	135-147	BBCH 81	seed	21	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR004-08HA
USA, 2008 Gardner, KS (395NRR)	EC	4	25	142-143	BBCH 79	seed	21	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR007-08HA
USA, 2008 Springfield, NE (GR3631)	EC	4	25	128-134	BBCH 79	seed	19	0.01, 0.01	<u>0.01</u>	M-358601-01-1 FR008-08HA
USA, 2008 Carlyle, IL (S 44-D5)	EC	4	25-26	165-178	BBCH 87	seed	22	0.02, < 0.01	<u>0.02</u>	M-358601-01-1 FR009-08HA
USA, 2008 Campbell, MN (Asgrow 0604)	EC	4	25	140-141	BBCH 79	seed	23	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR010-08HA
USA, 2008 Geneva, MN (Pioneer 91M80)	EC	4	25	164-172	BBCH 80	seed	20	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR011-08HA
USA, 2008 Sheridan, IN (NK S2916)	EC	4	24-25	115-125	BBCH 84	seed	21	0.01, 0.01	<u>0.01</u>	M-358601-01-1 FR012-08HA
USA, 2008 Bradshaw, NE (NC+ 2A45RR)	EC	4	25	141-147	BBCH 84	seed	20	0.02, 0.03	<u>0.02</u>	M-358601-01-1 FR013-08HA
USA, 2008 Northwood, ND (Asgrow AG0202)	EC	4	24-25	131-140	BBCH 88	seed	21	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR014-08HA
USA, 2008 Richland, IA (Pioneer 93M42)	EC	4	24-25	162-181	BBCH 79	seed	20	0.02, 0.02	<u>0.02</u>	M-358601-01-1 FR015-08HA
USA, 2008 Clarence, MO (DKB38-52)	EC	4	25	170-176	BBCH 79	seed	19	< 0.01, < 0.01	< <u>0.01</u>	M-358601-01-1 FR016-08HA

SOYA BEAN Country, year Location (variety)	Application					Residues (mg/kg)				Reference Trial No
	Form	No	g ai/ha	L/ha	GS at last application	Sample	PHI (days)	Beta-cyfluthrin	mean	
USA, 2008 Arkansas, WI (S14N1)	EC	4	25	176-177	BBCH 89	seed	22	< 0.01, < 0.01	< 0.01	M-358601-01-1 FR017-08HA
USA, 2008 York, NE (2A95RR)	EC	4	25	141-143	BBCH 79	seed	21	< 0.01, 0.01	0.01	M-358601-01-1 FR018-08HA
Canada, 2008 Rockwood, Ontario (Dekalb 30-07R)	EC	4	25	96-100	BBCH 79	seed	36	< 0.01, < 0.01	< 0.01	M-358601-01-1 FR019-08HA
Canada, 2008 Breslau, Canada (Pioneer 90M40)	EC	4	25-26	98-105	BBCH 79	seed	21	< 0.01, < 0.01	< 0.01	M-358601-01-1 FR020-08HA
USA, 2008 Proctor, AR (DPL4724RR)	EC	4	24-25	128-139	BBCH 80	seed	11 16 21 27 31	0.1, 0.14 0.09, 0.11 0.02, 0.01 0.01, 0.01 0.01, < 0.01	0.12 0.1 0.02 0.01 0.01	M-358601-01-1 FR005-08DA
USA, 2008 Marysville, OH (ShurGro 376RR)	EC	4	25	164-166	BBCH 88	seed	12 16 21 26 31	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	M-358601-01-1 FR006-08DA

Soya bean forage, hay and vines - Beta-cyfluthrin

In the above trials [Ref: M-358601-01-1], applications were made to single plots when the soya bean plants were between BBCH 11 (first pair of true leaves unfolded) and BBCH 70 (first pods at final length - 15 to 20 mm). Soya bean forage samples were immediately placed in freezer storage and soya bean hay samples were allowed to dry in the field before collection and freezing.

Percent dry matter of the treated samples ranged from 16% to 29% for soya bean forage and from 34% to 80% for soya bean hay. No percent dry matter correction was made for residues found in any of the commodity samples.

Table 5 Residue data summary of supervised trials in USA, Canada on soya bean forage involving foliar applications of beta-cyfluthrin

SOYA BEAN FORAGE Country, year Location (Variety)	Application					Residues (mg/kg)				Reference Trial
	Form	No	g ai/ha	L/ha	GS at last application	Sample	PHI (days)	Beta-cyfluthrin	mean	
GAP, USA	EC	4	15-25			forage	14	-		
USA, 2008 Seven Springs, NC (SE74480)	EC	4	24-25	136-162	BBCH 18	forage	14	0.53, 0.49	0.5	M-358601-01-1 FR001-08HA
USA, 2008 Elko, SC (Asgrow H7242RR)	EC	4	25	139-147	BBCH 63	forage	14	0.43, 0.42	0.42	M-358601-01-1 FR002-08HB
USA, 2008 Fisk, MO (DG5300RR)	EC	4	24-25	183-189	BBCH 59	forage	14	0.31, 0.27	0.29	M-358601-01-1 FR003-08HA

Cyfluthrin/Beta-cyfluthrin

SOYA BEAN FORAGE Country, year Location (Variety)	Application					Residues (mg/kg)				Reference Trial
	Form	No	g ai/ha	L/ha	GS at last application	Sample	PHI (days)	Beta-cyfluthrin	mean	
USA, 2008 Greenville, MS (Pioneer 94M71)	EC	4	24-25	130-131	BBCH 66	forage	14	0.25, 0.24	<u>0.25</u>	M-358601-01-1 FR004-08HA
USA, 2008 Gardner, KS (395NRR)	EC	4	24-25	135-140	BBCH 59	forage	15	0.31, 0.37	<u>0.34</u>	M-358601-01-1 FR007-08HA
USA, 2008 Springfield, NE (GR3631)	EC	4	24-25	129-132	BBCH 65	forage	14	0.34, 0.3	<u>0.32</u>	M-358601-01-1 FR008-08HA
USA, 2008 Carlyle, IL (S 44-D5)	EC	4	25	174-183	BBCH 65	forage	15	0.8, 0.8	<u>0.8</u>	M-358601-01-1 FR009-08HA
USA, 2008 Campbell, MN (Asgrow 0604)	EC	4	25	140-141	BBCH 65	forage	15	0.36, 0.39	<u>0.38</u>	M-358601-01-1 FR010-08HA
USA, 2008 Geneva, MN (Pioneer 91M80)	EC	4	25	145-162	BBCH 62	forage	13	0.46, 0.39	<u>0.42</u>	M-358601-01-1 FR011-08HA
USA, 2008 Sheridan, IN (NK S2916)	EC	4	24-25	113-132	BBCH 63	forage	13	0.76, 0.64	<u>0.7</u>	M-358601-01-1 FR012-08HA
USA, 2008 Bradshaw, NE (NC+ 2A45RR)	EC	4	25	142-145	BBCH 62	forage	14	0.83, 0.78	<u>0.8</u>	M-358601-01-1 FR013-08HA
USA, 2008 Northwood, ND (Asgrow AG0202)	EC	4	25	139-144	BBCH 14	forage	15	0.1, 0.11	<u>0.1</u>	M-358601-01-1 FR014-08HA
USA, 2008 Richland, IA (Pioneer 93M42)	EC	4	24-25	146-158	BBCH 60	forage	14	0.34, 0.34	<u>0.34</u>	M-358601-01-1 FR015-08HA
USA, 2008 Clarence, MO (DKB38-52)	EC	4	24-25	171-181	BBCH 15	forage	15	0.13, 0.13	<u>0.13</u>	M-358601-01-1 FR016-08HA
USA, 2008 Arkansaw, WI (S14N1)	EC	4	24-25	173-177	BBCH 14	forage	14	0.45, 0.41	<u>0.43</u>	M-358601-01-1 FR017-08HA
USA, 2008 York, NE (2A95RR)	EC	4	24-25	140-142	BBCH 62	forage	14	0.24, 0.34	<u>0.29</u>	M-358601-01-1 FR018-08HA
Canada, 2008 Rockwood, Ontario (Dekalb 30-07R)	EC	4	24-25	94-118	BBCH 69	forage	15	0.49, 0.45	<u>0.47</u>	M-358601-01-1 FR019-08HA
Canada, 2008 Breslau, Ontario (Pioneer 90M40)	EC	4	24-25	94-104	BBCH 70	forage	15	0.59, 0.73	<u>0.66</u>	M-358601-01-1 FR020-08HA
USA, 2008 Proctor, AR (DPL4724RR)	EC	4	25	135	BBCH 62	forage	7 11 15 19 25	0.84, 0.91 0.37, 0.37 0.3, 0.37 0.24, 0.24 0.12, 0.13	0.87 0.37 <u>0.33</u> 0.24 0.12	M-358601-01-1 FR005-08DA
USA, 2008 Marysville, OH (ShurGro 376RR)	EC	4	25	164-167	BBCH 63	forage	7 11 15 19 23	1.0, 1.1 1.0, 0.9 1.1, 0.94 0.64, 0.56 0.62, 0.51	1.1 0.95 <u>1.0</u> 0.6 0.56	M-358601-01-1 FR006-08DA

Table 6 Residue data summary of supervised trials in USA, Canada on soya bean hay involving foliar applications of beta-cyfluthrin

SOYA BEAN HAY Country, year Location (Variety)	Application					Residues (mg/kg)				Reference Trial
	Form	No	g ai/ha	L/ha	GS at last application	Sample	PHI (days)	Beta-cyfluthrin	mean	
GAP, USA	EC	1-4	15-25			hay	14	-		
USA, 2008 Seven Springs, NC (SE74480)	EC	4	24-25	136-162	BBCH 18	hay	14	1.7, 1.7	<u>1.7</u>	M-358601-01-1 FR001-08HA
USA, 2008 Elko, SC (Asgrow H7242RR)	EC	4	25	139-147	BBCH 63	hay	14	0.91, 0.86	<u>0.88</u>	M-358601-01-1 FR002-08HB
USA, 2008 Fisk, MO (DG5300RR)	EC	4	24-25	183-189	BBCH 59	hay	14	1.0, 1.2	<u>1.1</u>	M-358601-01-1 FR003-08HA
USA, 2008 Greenville, MS (Pioneer 94M71)	EC	4	24-25	130-131	BBCH 66	hay	14	0.7, 0.77	<u>0.74</u>	M-358601-01-1 FR004-08HA
USA, 2008 Gardner, KS (395NRR)	EC	4	24-25	135-140	BBCH 59	hay	15	1.1, 1.3	<u>1.2</u>	M-358601-01-1 FR007-08HA
USA, 2008 Springfield, NE (GR3631)	EC	4	24-25	129-132	BBCH 65	hay	14	0.73, 0.94	<u>0.83</u>	M-358601-01-1 FR008-08HA
USA, 2008 Carlyle, IL (S 44-D5)	EC	4	25	174-183	BBCH 65	hay	15	1.4, 1.6	<u>1.5</u>	M-358601-01-1 FR009-08HA
USA, 2008 Campbell, MN (Asgrow 0604)	EC	4	25	140-141	BBCH 65	hay	15	0.94, 0.95	<u>0.95</u>	M-358601-01-1 FR010-08HA
USA, 2008 Geneva, MN (Pioneer 91M80)	EC	4	25	145-162	BBCH 62	hay	13	1.2, 1.2	<u>1.2</u>	M-358601-01-1 FR011-08HA
USA, 2008 Sheridan, IN (NK S2916)	EC	4	24-25	113-132	BBCH 63	hay	13	1.2, 1.1	<u>1.2</u>	M-358601-01-1 FR012-08HA
USA, 2008 Bradshaw, NE (NC+ 2A45RR)	EC	4	25	142-145	BBCH 62	hay	14	2.3, 2.1 (c=0.016)	<u>2.2</u>	M-358601-01-1 FR013-08HA
USA, 2008 Northwood, ND (Asgrow AG0202)	EC	4	25	139-144	BBCH 14	hay	15	0.29, 0.31	<u>0.3</u>	M-358601-01-1 FR014-08HA
USA, 2008 Richland, IA (Pioneer 93M42)	EC	4	24-25	146-158	BBCH 60	hay	14	0.74, 0.71	<u>0.73</u>	M-358601-01-1 FR015-08HA
USA, 2008 Clarence, MO (DKB38-52)	EC	4	24-25	171-181	BBCH 15	hay	15	0.51, 0.46	<u>0.49</u>	M-358601-01-1 FR016-08HA
USA, 2008 Arkansaw, WI (S14N1)	EC	4	24-25	173-177	BBCH 14	hay	14	1.3, 1.1	<u>1.2</u>	M-358601-01-1 FR017-08HA
USA, 2008 York, NE (2A95RR)	EC	4	24-25	140-142	BBCH 62	hay	14	1.0, 1.1	<u>1.1</u>	M-358601-01-1 FR018-08HA
Canada, 2008 Rockwood, Ontario (Dekalb 30-07R)	EC	4	24-25	94-118	BBCH 69	hay	15	1.3, 1.4	<u>1.4</u>	M-358601-01-1 FR019-08HA
Canada, 2008 Breslau, Ontario (Pioneer 90M40)	EC	4	24-25	94-104	BBCH 70	hay	15	1.6, 1.4	<u>1.5</u>	M-358601-01-1 FR020-08HA

SOYA BEAN HAY Country, year Location (Variety)	Application					Residues (mg/kg)				Reference Trial
	Form	No	g ai/ha	L/ha	GS at last application	Sample	PHI (days)	Beta-cyfluthrin	mean	
USA, 2008 Proctor, AR (DPL4724RR)	EC	4	25	135	BBCH 62	hay	7	2.8, 2.7	2.7	M-358601-01-1 FR005-08DA
							11	0.96, 0.94	0.95	
							15	1.1, 1.1	1.1	
							19	0.63, 0.73	0.68	
							25	0.4, 0.38	0.39	
USA, 2008 Marysville, OH (ShurGro 376RR)	EC	4	25	164-167	BBCH 63	hay	7	2.3, 2.1	2.2	M-358601-01-1 FR006-08DA
							11	2.8, 2.7	2.7	
							15	1.5, 1.5	1.5	
							19	1.2, 1.3	1.3	
							23	1.3, 1.3	1.3	

FATE OF RESIDUES IN PROCESSING

The fate of cyfluthrin residues during processing was evaluated by the 2007 JMPR. In one soya bean study with cyfluthrin, field treated soya beans were processed into hulls, meal, crude oil, refined oil, and soap stock using simulated typical commercial practices. Cyfluthrin residues in dry seeds were 0.09 mg/kg and < 0.05 mg/kg in all processed commodities.

A beta-cyfluthrin processing study was conducted in 2008 [Ref: M-358457-01-1] where a soya bean crop in USA was treated with four foliar applications of 0.12 kg ai/ha (EC formulation at 5× label rate) from BBCH 79 to BBCH 89 at 6–7 day intervals using about 175 litres water/ha, mixed with 0.2% nonionic adjuvant and applied using a tractor-mounted boom sprayer.

Single composite bulk seed samples (635 kg) were collected 24 days after the last application, frozen within 20 minutes and stored frozen for about 4 weeks before processing. The dry soya bean samples (12–13% moisture content) were processed using procedures that simulated commercial practices, being aspirated to remove and classify light impurities (grain dust) through a series of sieves. All samples passing through the 2360 micron (8 mesh) sieve were recombined to produce one aspirated grain fraction (AGF).

The soya bean seed (RAC) samples and aspirated grain fractions samples (ash content 11–12%) were stored frozen for up 314 days before analysis by GC-MS using Method 108139-1 to determine cyfluthrin residues. Concurrent recoveries, corrected for the apparent residues in control samples (< 30% LOQ in the seed and < 1% of the residues found in the AGF from treated seed) averaged 78% (RSD 0.8%) in the seed and 92% (RSD 2%) in the AGF.

Table 7 Residues in soya bean seed and aspirated grain fractions from a supervised trial in USA, involving four foliar applications of beta-cyfluthrin

SOYA BEAN Country, year Location (Variety)	Application				Residues (mg/kg)			Reference Trial
	Form	g ai/ha	L/ha	GS at last application	Sample	PHI (days)	Beta-cyfluthrin	
USA, 2008 Arkansaw, WI (S14N1)	EC	0.122-0.124	174-177	BBCH 89	seed (89% DM)	24	0.017, 0.018, 0.017* mean 0.017	M-358457-01-1 FR021-08PA
					asp grain fraction (87% DM)		37.5, 39.0, 36.6* mean 37.7 (c=0.168)	

* Triplicate analyses of the same sample

Based on the above, a processing factor (residues in processed commodities / residues in the RAC) of 2218 was calculated for cyfluthrin in soya bean - aspirated grain fraction.

This new processing factor, together with those reported in the 2007 JMPR Evaluation are summarized in the following table.

Table 8 Summary of processing factors for cyfluthrin

Raw agricultural commodity	Processed commodity	Calculated processing factors ^a	Processing factor (mean or median)
Tomato	Juice	0.3	0.3
	Ketchup	0.8	0.8
	Pulp, wet	6.5	6.5
	Pulp, dry	22	22
	Purée	0.7	0.7
	Paste	1.8	1.8
Soya bean	Aspirated grain fraction	2218	2218
Orange	Pulp, dry	5.3	5.3
	Peel	1.2	1.2
	Oil	5.3	0.01
	Molasses	2.9	16
	Juice	< 0.05	< 0.05
Apples	Pomace, dry	0.11, 16	16 (best estimate)
	Sauce	< 0.2, 0.23	0.23 (best estimate)
	Fruit, washed	0.54, 0.8	0.67 (mean)
	Fruit, dried	0.2, < 0.38	0.2 (best estimate)
	Juice	< 0.08, 0.06, < 0.2	< 0.06 (median)
	Juice, concentrated	< 0.2	< 0.2
Cotton seed	Hulls	1.9	1.9
	Fuzzy seed	0.3	0.3
	Meal	0.08	0.08
	Oil, native	1.9	1.9
	Oil, refined	1.2	1.2
	Oil, refined, deodorised	1.4	1.4
	Soap stock	< 0.08	< 0.08
Sunflower seed	Hulls	1.1	< 0.01
	Meal	< 0.05	< 0.05
	Oil, crude	2.3	2.3
	Oil, refined	1.1	1.1

^a Each value represents a separate study where residues were above the LOQ in the RAC. The factor is the ratio of the total residue in the processed item divided by the total residue in the RAC.

Residues in animal commodities

Farm animal feeding studies

The 2007 JMPR evaluated information on the residue levels arising in dairy cow and poultry tissues, eggs and milk following daily dosing with cyfluthrin for 28 days.

When dairy cows were dosed with cyfluthrin for 28 days at the equivalent of 4.5, 13 and 40 ppm in the diet, average residues in milk of the 40 ppm dose group were 0.22 mg/kg at day 14 and 0.14 mg/kg at day 28. Cyfluthrin residues in the fat were higher than in other tissues. Transfer factors (average residue level in tissue ÷ residue level in feed) identified by the 2007 JMPR for each tissue and milk for the three dosing levels (3 animals per dose group) were: fat, 0.056, 0.054, 0.066; muscle, < 0.002, < 0.001, 0.00075; kidney, 0.0042; liver, 0.0032; milk 28 days, 0.0037, 0.0036, 0.0036.

In an additional dosing study conducted at levels equivalent to 11, 36 and 112 ppm in the diet average residues in milk at day 28 were 0.45 mg/kg for the 112 ppm dose group. As for the previous study, residues were highest in fat with only low levels of cyfluthrin detected in other tissues. Transfer factors identified by the 2007 JMPR for each tissue and milk for the three dosing levels (3 animals per dose group) were: fat, 0.11, 0.074, 0.061; muscle, < 0.0009, 0.001, 0.0006; kidney, < 0.0009, < 0.0008, 0.0005; liver, < 0.004, < 0.0003, 0.0002; milk 28 days, 0.0055, 0.0033, 0.0041.

When laying hens were dosed with cyfluthrin for 28 days at the equivalent of 6 and 20 ppm in the diet, residues in eggs were below the LOQ for both feed levels. At the 2 ppm feeding level the residues in tissues were below the LOQ of the analytical methods. For the 20 ppm feed level, residues in fat were substantially higher than residues in other tissues (0.05 mg/kg compared to <0.01–0.01 mg/kg). Transfer factors identified by the 2007 JMPR, based on residues for fat were 0.0025 for the 20 ppm feed levels and for muscle and liver were both <0.0005 for the 20 ppm feeding level while that for skin was 0.0005.

APPRAISAL

Cyfluthrin and beta-cyfluthrin were evaluated for toxicology (JMPR 2006) and residues (JMPR 2007) under the periodic review programme, and maximum residue levels for cyfluthrin, arising from the use of either cyfluthrin or beta-cyfluthrin on a number of commodities, were recommended.

The definition of the residue (for compliance with MRL and for estimation of dietary intake) for plant and animal commodities is: cyfluthrin (sum of isomers). The residue is fat-soluble.

The 2007 JMPR estimated short-term intakes for children that exceeded the ARfD for cyfluthrin and beta-cyfluthrin of 0.04 mg/kg bw for broccoli and head cabbage and noted that there was insufficient data to support an estimation of lower maximum residue levels based on alternative GAPs for these commodities.

At the Forty-first Session of the CCPR in 2009, the Committee agreed that if no data were available to support lower MRLs for broccoli and head cabbage (based on alternative GAP), the draft MRLs would be considered for withdrawal at the 2010 session (ALINORM 09/32/24, para 106–107). While additional information on head cabbage was provided to the 2011 JMPR, this information was insufficient to support an Alternative GAP evaluation and the Forty-second CCPR agreed to retain the draft MRL of 4 mg/kg on cabbages, head awaiting the evaluation of additional data by JMPR in 2012.

The Meeting received additional supervised trials data from Indonesia for beta-cyfluthrin on head cabbages and also received information from the manufacturer to support a new GAP in USA for beta-cyfluthrin on soya bean.

Methods of residue analysis

Analytical methods for residues of cyfluthrin and beta-cyfluthrin in plant and animal matrices, including the methods used in the new soya bean studies, have been evaluated by the 2007 JMPR and generally involve extraction by homogenization with an organic solvent mixture (with varying proportions of polar and non-polar solvents) and liquid–liquid partition and column clean-up before GC-ECD or GC-MSD analysis. Validated LOQs ranged from 0.01 to 0.05 mg/kg. Validation data were provided for soya bean and its processed commodities, including procedural recoveries carried out during the residue trials and during the processing study.

The analytical method used in the supervised trials from Indonesia was based a multi-residue method with the modified clean-up method for chlorophyll and sulphuric compound co-extractants. The validation and procedural recovery rates support an LOQ of 0.01 mg/kg.

Results of supervised trials on crops

Cabbages, Head - beta-cyfluthrin

Based on US GAP and residue data for cyfluthrin, the 2007 JMPR estimated a maximum residue level of 4 mg/kg, an STMR of 0.25 mg/kg and an HR of 2.1 mg/kg for cyfluthrin in cabbage (head) but estimated that the short-term intake for children was 240% of the ARfD (0.04 mg/kg bw).

Critical GAP in Indonesia is 15 g ai/ha with a PHI of 7 days. In three trials with beta-cyfluthrin evaluated by the 2007 JMPR and in four more recent trials, all matching the GAP in Indonesia, residues were: < 0.01, < 0.01, < 0.01, 0.01, 0.01, 0.02 and 0.05 mg/kg (n = 7).

The Meeting estimated a maximum residue level of 0.08 mg/kg, an STMR of 0.01 mg/kg and an HR of 0.05 mg/kg for cyfluthrin on head cabbage to support the Alternative GAP in Indonesia and agreed to withdraw the previous maximum residue level recommendation of 4 mg/kg.

Soya bean - beta-cyfluthrin

Revised GAP in USA for beta-cyfluthrin on soya bean is a maximum of four applications/season of up to 25 g ai/ha, PHI 21 days..

In trials from USA, matching this GAP, residues in soya bean seed were: < 0.01 (12), 0.01 (3), 0.02, 0.02, 0.02 and 0.02 mg/kg (n = 19)

The Meeting estimated a maximum residue level of 0.03 mg/kg and an STMR of 0.01 mg/kg for cyfluthrin on soya bean (dry).

Animal feeds

Soya bean forage - beta-cyfluthrin

Revised GAP in USA for beta-cyfluthrin on soya bean is a maximum of four applications/season of up to 25 g ai/ha with a 15-day livestock withholding period for hay and forage.

In trials from USA, matching this GAP, residues in soya bean forage (fresh weight) were: 0.1, 0.13, 0.25, 0.29, 0.29, 0.32, 0.33, 0.34, 0.34, 0.38, 0.42, 0.42, 0.43, 0.47, 0.5, 0.66, 0.7, 0.8, 0.8 and 1.0 mg/kg (n = 20).

The Meeting estimated a median residue of 0.4 mg/kg and a highest residue of 1.0 mg/kg for cyfluthrin on soya bean forage (fresh weight).

Soya bean hay - beta-cyfluthrin

Revised GAP in USA for beta-cyfluthrin on soya bean is a maximum of four applications/season of up to 25 g ai/ha, PHI 21 days and with a 15-day livestock withholding period for hay and forage.

In trials from USA, matching this GAP, residues in soya bean hay (fresh weight) were: 0.3, 0.49, 0.73, 0.74, 0.83, 0.88, 0.95, 1.1, 1.1, 1.1, 1.2, 1.2, 1.2, 1.2, 1.4, 1.5, 1.5, 1.5, 1.7 and 2.2 mg/kg (n = 20).

The Meeting estimated a maximum residue level of 4 mg/kg for soya bean hay (after correcting for 85% dry matter) and estimated a median residue of 1.15 mg/kg (fresh weight) and a highest residue of 2.2 mg/kg (fresh weight).

Fate of residues during processing

The 2007 JMPR reviewed the results of processing studies and estimated processing factors and STMR-Ps for cyfluthrin in a range of commodities and a new beta-cyfluthrin processing study on soya beans was provided to the Meeting. The only processed commodity of relevance to the commodities considered at the Meeting is soya bean aspirated grain fraction. The Meeting estimated a processing factor of 2218 for cyfluthrin in soya bean aspirated grain fraction and based on the STMR of 0.01 mg/kg established for soya bean (dry) the Meeting estimated an STMR-P of 22 mg/kg.

Residues in animal commodities

Livestock dietary burdens

The Meeting estimated the dietary burden of cyfluthrin in farm animals on the basis of the diets listed in Annex 6 of the 2009 JMPR Report (OECD Feedstuffs Derived from Field Crops) and using information on cyfluthrin residues in animal feedstuffs reported by the 2007 JMPR.

Dietary burden calculations for beef and dairy cattle, calculated using the animal diets from US-Canada, EU and Australia in the OECD Table (Annex 6 of the 2006 JMPR Report) are summarized below.

	Animal dietary burden, cyfluthrin, ppm of dry matter diet							
	US-Canada		EU		Australia		Japan	
	Max	Mean	Max	Mean	Max	Mean	Max	Mean
Beef cattle	1.35	1.35	0.16	0.11	2.43a	1.22c	0.002	0.002
Dairy cattle	0.69	0.39	0.21	0.16	1.55b	0.88d	0.001	0.001
Poultry – broiler	0.011	0.011	0.017e	0.017f	0.005	0.005	–	–
Poultry – layer	0.011	0.011	0.39f	0.22g	0.005	0.005	–	–

^a Highest maximum beef or dairy cattle dietary burden suitable for MRL estimates for mammalian tissues

^b Highest maximum dairy cattle dietary burden suitable for MRL estimates for mammalian milk

^c Highest mean beef or dairy cattle dietary burden suitable for STMR estimates for mammalian tissues.

^d Highest mean dairy cattle dietary burden suitable for STMR estimates for milk.

^e Highest maximum poultry dietary burden suitable for MRL estimates for poultry tissues.

^f Highest mean poultry dietary burden suitable for STMR estimates for poultry tissues.

^g Highest maximum poultry dietary burden suitable for MRL estimates for poultry eggs.

^h Highest mean poultry dietary burden suitable for STMR estimates for poultry eggs.

Livestock feeding studies

The 2007 JMPR reviewed feeding studies with cyfluthrin on lactating dairy cows and laying hens and the conclusions from these residue transfer studies were used to estimate residue levels of fluopyram and its metabolites in milk, eggs and livestock tissues, based on the above dietary burdens. The maximum and mean residues identified by the 2007 JMPR in milk, fat and muscle following 28 daily doses of cyfluthrin corresponding to 4.5 ppm in the diet and in liver and kidney from animals in the 40 ppm dose group (where samples were subjected to strong extraction required to release the majority of cyfluthrin residues) were used to estimate transfer of residues to livestock tissues and milk.

Animal commodity maximum residue levels

Cattle

Maximum and mean residues expected in milk and tissues were obtained by using the residue transfer factors estimated by the 2007 JMPR.

For maximum residue estimation, the high residues of cyfluthrin were calculated by extrapolating the maximum dietary burden (2.43 ppm) from the 4.5 ppm feeding level (40 ppm for liver and kidney) in the dairy cow feeding study and using the highest tissue concentrations of cyfluthrin from individual animals within those feeding groups.

The STMR values for the tissues were calculated by extrapolating the STMR dietary burden (1.22 ppm from the same feeding levels (4.5 ppm for muscle and fat, 40 ppm for liver and kidney) and using the mean tissue concentrations of cyfluthrin from those feeding groups.

For milk MRL estimation, the high residues in the milk were calculated by extrapolating the maximum dietary burden for dairy cattle (1.55 ppm) from the feeding level (4.5 ppm) in the dairy cow feeding study and using the mean milk concentrations of cyfluthrin from this feeding group.

The STMR value for milk was calculated by extrapolating the mean dietary burden for dairy cows (0.88 ppm) from the 4.5 ppm feeding level and using the mean milk concentrations of cyfluthrin from this feeding group.

	Feed level (mg/kg) for milk residues	Residues (mg/kg) in milk	Feed level (mg/kg) for tissue residues	Residues (mg/kg)			
				Muscle	Liver	Kidney	Fat
MRL beef or dairy cattle							
Feeding study a	4.5	0.02	4.5 40	< 0.01	0.14c	0.18c	0.3
Dietary burden and residue estimate	1.55b	0.007	2.43a	< 0.01	0.009	0.011	0.16
STMR beef or dairy cattle							
Feeding study b	4.5	0.02	4.5 40	< 0.01	0.14c	0.18c	0.25
Dietary burden and residue estimate	0.88d	0.004	1.22c	< 0.01	0.004	0.005	0.067

^a Highest residues for tissues and mean residues for milk

^b Mean residues for tissues and for milk

^c Residue values for kidney and liver were obtained from the dosing level equivalent to 40 ppm in the feed as only these samples were subject to reanalysis using a stronger extraction process

Residues of cyfluthrin expected in cattle milk and tissues for use in estimating maximum residue levels are: 0.16 mg/kg (fat), < 0.01 mg/kg (muscle), 0.009 mg/kg (liver) and 0.011 mg/kg (kidney) and the mean residue for milk is 0.007 mg/kg.

The Meeting estimated maximum residue levels of 0.2 mg/kg (fat) for cyfluthrin in meat (from mammals other than marine mammals), 0.02 mg/kg for edible offal (mammalian) and 0.01 mg/kg for milks.

Estimated HRs for cyfluthrin are 0.16 mg/kg for mammalian fat, 0.01 mg/kg for mammalian muscle, 0.01 mg/kg for edible offal and STMRs are 0.07 mg/kg for mammalian fat, 0.01 mg/kg for mammalian muscle, 0.005 mg/kg for edible offal and 0.004 mg/kg for milks.

The Meeting also agreed to withdraw the previous recommended maximum residue levels of 1 mg/kg (fat) for meat (from mammals other than marine mammals), 0.05 mg/kg for liver of cattle, goats, pigs and sheep, 0.05 mg/kg for kidney of cattle, goats, pigs and sheep and 0.04 mg/kg for milks.

Poultry

The highest maximum and the mean dietary burdens for poultry are 0.39 ppm and 0.22 ppm respectively. No residues above the LOQ of the analytical method used were observed in the feeding study for laying hens at the lowest dose level equivalent to 2 ppm in the diet (about five times higher than the maximum burden in poultry). Maximum residues expected in muscle, fat, liver, kidney and eggs are all < 0.01 mg/kg.

The Meeting confirmed the 2007 JMPR recommended maximum residue levels for poultry meat of 0.01(*) mg/kg (fat); poultry offal 0.01(*) and eggs 0.01 (*) mg/kg.

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 assessment.

Definition of the residue (for compliance with the MRL and for estimation of dietary intake for plant and animal commodities: *cyfluthrin (sum of isomers)*).

The residue is fat-soluble.

CCN	Commodity	MRL (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
		New	Previous		
VB 0041	Cabbages, head	0.08	4	0.01	0.05
MO 0105	Edible offal (mammalian)	0.02		0.005	0.01
MO 0098	Kidney of cattle, goats, pigs and sheep	W	0.05		
MO 0099	Liver of cattle, goats, pigs and sheep	W	0.05		
MM 0095	Meat (from mammals other than marine mammals)	0.2 fat	1.0	0.07 fat 0.01 muscle	0.16 fat 0.01 muscle
ML 0106	Milks	0.01	0.04	0.004	
VD 0541	Soya bean (dry)	0.03		0.01	
AL 0541	Soya bean fodder (hay)	4		1.15 (fw)	2.2 (fw)
	Soya bean aspirated grain fraction			22	
AL 1265	Soya bean forage (green) (fw)			0.4	1.0

DIETARY RISK ASSESSMENT

Long-term intake

The International Estimated Daily Intake (IEDI) for cyfluthrin was calculated for the food commodities for which STMRs or HRs were estimated and for which consumption data were available. The results are shown in Annex 3 of the 2012 JMPR Report.

The International Estimated Daily Intakes of cyfluthrin for the 13 GEMS/Food regional diets, based on estimated STMRs were 0–2% of the maximum ADI of 0.04 mg/kg bw (Annex 3). The Meeting concluded that the long-term intake of residues of cyfluthrin from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The International Estimated Short-term Intake (IESTI) for cyfluthrin was calculated for the food commodities for which STMRs or HRs were estimated and for which consumption data were available (see Annex 4 of the 2012 JMPR Report).

For cyfluthrin the IESTI varied from 0–6% of the ARfD (0.04 mg/kg bw) and the Meeting concluded that the short-term intake of residues of cyfluthrin from uses considered by the Meeting is unlikely to present a public health concern.

REFERENCES

Reference	Author	Year	Title, Source
JMPR 2007 R	Anon	2008	Pesticide residues in food – 2007. Report of the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Core Assessment Group. FAO Plant Production and Protection Paper 191, 2008. Published.
JMPR 2007 E	Anon	2008	Pesticide residues in food – 2007 Evaluations. Part I. Residues. Cyfluthrin (157)/Beta-cyfluthrin (228), pp 121-252. FAO Plant Production and Protection Paper 192, 2008. Published.

Reference	Author	Year	Title, Source
JMPR 2009	Anon	2008	Pesticide residues in food – 2009. Report of the Joint Meeting of the FAO Panel of Experts on Pesticide Residues in Food and the Environment and the WHO Core Assessment Group. FAO Plant Production and Protection Paper 196, 2009. Published.
128/SPK.J/PPK-PPI/V/2008	Dr Noegrohati, S	2008	Estimation of national MRL for beta-cyfluthrin in cabbage (<i>Brassica oleracea</i>). Trial Identity: 128/SPK.J/PPK-PPI/V/2008. Centre of Permit and Investigation, Department of Agriculture, Jakarta, Indonesia and Gadjah Mada University, Yogyakarta, Indonesia. Unpublished
205.3/SPK.KPA/PPHP/X/2010	Dr Noegrohati, S	2010	Estimation of national MRL for beta-cyfluthrin in cabbage (<i>Brassica oleracea</i>). Trial Identity: 205.3/SPK.KPA/PPHP/X/2010. Directorate General of Processing and Marketing of Agricultural Product, Department of Agriculture, Jakarta, Indonesia and Gadjah Mada University, Yogyakarta, Indonesia. Unpublished
44.8/SPK.KPA/PPHP/III/2011	Dr Noegrohati, S	2011	Estimation of national MRL for beta-cyfluthrin in cabbage (<i>Brassica oleracea</i>). Trial Identity: 44.8/SPK.KPA/PPHP/III/2011. Directorate General of Processing and Marketing of Agricultural Product, Department of Agriculture, Jakarta, Indonesia and Gadjah Mada University, Yogyakarta, Indonesia. Unpublished
M-358601-01-1	Fischer, D & Helfrich, K	2009	Baythroid XL - Magnitude of the residue in/on < 0.s. Bayer CropScience LP, Stilwell, KS, USA. Report No.: RAFRX019, 2009-11-06. GLP. Unpublished
M-358457-01-1	Fischer, D.	2003	Baythroid XL - Magnitude of the residue in/on < 0. aspirated grain fractions and < 0. processed commodities. Bayer CropScience LP, Stilwell, KS, USA. Report No.: RAFRY006, 2009-11-05. GLP. Unpublished