SPIROTETRAMAT (234)

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EXPLANATION

Spirotetramat was first evaluated by the JMPR in 2008. An ADI of 0–0.05 mg/kg bw and an acute reference dose of 1.0 mg/kg bw were established. MRLs were recommended for many crops and animal commodities.

The manufacturer has submitted additional data for mangoes, kiwifruit, papaya, litchi, avocado, guava, onions, edible podded beans and peas, succulent shelled beans and peas, pulses including soya beans and cotton. Animal feed residues data have been provided for legumes and pulses. Cotton and soya bean processing studies have also been submitted.

RESIDUE ANALYSIS

Analytical Methods

Suitable methods were available for quantifying residues of spirotetramat and its major metabolites. In the submitted supervised residues trials, Method 00857 was used for the determination of spirotetramat, the metabolites spirotetramat-enol, spirotetramat-ketohydroxy, spirotetramat-monohydroxy and spirotetramat-enol-glucoside (enol-Glc) in avocados, guava, lychee, papaya, snap beans, snow peas, garden peas, Lima beans, dry bean seed, forage and hay, dry pea seed, hay and vines, soya bean seed, forage and hay and cotton seed and gin by-products by HPLC-MS/MS using isotopically labelled internal standards. It was also used in the cotton and soya bean processing studies. This method was previously reported and evaluated by the 2008 JMPR. The limits of quantification (LOQ) for plant commodities are generally (as parent equivalents): spirotetramat 0.01 mg/kg; -enol 0.012 mg/kg; -ketohydroxy 0.012 mg/kg; -monohydroxy 0.012 mg/kg; -enol-glucoside 0.008 mg/kg; total residue calc. 0.055 mg/kg.

Method ATM-0034 is a method used for the quantitative determination of residues of spirotetramat (and total residue of spirotetramat), spirotetramat-enol, spirotetramat-ketohydroxy, spirotetramat-monohydroxy and spirotetramat-enol-Glc in onions. Residues in samples were extracted with 0.02% formic acid in 9:1 acetonitrile: water. The extract was filtered using a polyethylene frit and then diluted with 0.02% formic acid in water. Quantitation is by HPLC-MS/MS using stable-labelled internal standards. The LOQ is 0.02 mg/kg for each analyte and the LOQ is 0.11 mg/kg for total spirotetramat equivalents.

ATM-0019 is a similar method used for the determination of residues of spirotetramat (and total residue of spirotetramat), spirotetramat -enol, spirotetramat -ketohydroxy, spirotetramat -monohydroxy and spirotetramat -enol-Glc in onions using HPLC-MS/MS using internal standards. Residues in samples were extracted with acetonitrile and 0.02% formic acid solution. The extract was filtered using a polyethylene frit and then diluted with 0.02% formic acid in acetonitrile. The LOQ is 0.02 mg/kg for each analyte and the LOQ is 0.11 mg/kg for total spirotetramat equivalents.

Method 11776 is used for the determination of residues of spirotetramat (and total residue of spirotetramat), spirotetramat -enol, spirotetramat -ketohydroxy, spirotetramat -monohydroxy and spirotetramat -enol-Glc in kiwifruit using HPLC-MS/MS. Residues in samples were extracted by homogenisation with acidified acetonitrile (QuEChERS method). Clean-up was by dispersive Solid Phase Extraction (dSPE). The LOQ is 0.01 mg/kg for each analyte.

A summary of the method validation and procedural recoveries for commodities for which residues trials are reported are provided in Table 1. Average method and concurrent recoveries were generally within the acceptable range of 70–120%, with relative standard deviations (RSD) below 20%. However for kiwifruit, the recovery of spirotetramat-enol glucoside at both spiking levels was found to be low. This was thought to be due to the water solubility of the compound. The RSD was

27% for spirotetramat -enol at the 0.01 mg/kg spiking level. This was due to a few anomalous high recoveries in the data set.

Table 1 Summary of validation and concurrent recovery data

Crop	Analyte	Fortification mg/kg	n	Range Recovery (%)	Mean recovery (%)	% RSD	Method	Reference
Avocados	Spirotetramat	0.01–0.50	15	88–111	98.6	7.3		RAFNP042
	Enol	0.01–0.50	15	76–98	84.7	7.0		
	Ketohydroxy	0.01–0.50	15	80–109	93.5	10.1	00857	
	Mono-hydroxy	0.01–0.50	15	69–109	92.6	13.9		
	Enol-Glc	0.01–0.50	15	73–111	90.7	11.6		
Guava	Spirotetramat	0.01–1.0	6	93–111	102.3	7.3	00857	
	Enol	0.01–1.0	6	80–112	96.8	12.5		
	Ketohydroxy	0.01–1.0	6	90–115	103.5	9.6		
	Mono-hydroxy	0.01–1.0	6	94–112	104.2	7.4		
	Enol-Glc	0.01–1.0	6	72–88	79	8.7		
Lychee	Spirotetramat	0.01–9.0	6	92–100	95.5	3.4	00857	
	Enol	0.01–9.0	6	76–87	84	4.9		
	Ketohydroxy	0.01–9.0	6	88–107	96.3	8.7		
	Mono-hydroxy	0.01–9.0	6	87–100	95.3	5.0		
	Enol-Glc	0.01–0.05	6	68–79	71.8	5.7		
Papaya	Spirotetramat	0.01–0.50	11	87–108	97.1	5.2	00857	
	Enol	0.01–0.50	11	88–116	102.3	9.0		
	Ketohydroxy	0.01–0.50	11	95–118	106.5	7.4		
	Mono-hydroxy	0.01–0.50	11	94–119	104.2	6.7		
	Enol-Glc	0.01–0.50	11	93–119	103.5	9.5		
Kiwifruit*	Spirotetramat	0.01	25		90	16	11776	GLP-298
		0.1	27		95	14		
	Enol	0.01	25		74	27		
		0.1	27		84	15		
	Ketohydroxy	0.01	23		80	19		
		0.1	25		92	8		
	Mono-hydroxy	0.01	25		84	17		
		0.1	27		91	10		
	Enol-Glc	0.01	25		55	20		
		0.1	27		63	19		
Mango*	Spirotetramat	0.02	≥ 2	86–104	93	8	ATM-0034	BCS-0142
		1.0	≥ 2	85–91	88	3		
	Enol	0.02	≥ 2	74–79	76	3		
		1.0	≥ 2	79–87	82	4		
	Ketohydroxy	0.02	≥ 2	78–86	81	5		
		1.0	≥ 2	90–103	95	6		
	Mono-hydroxy	0.02	≥ 2	80–90	86	5		
		1.0	≥ 2	79–84	81	3		
	Enol-Glc	0.02	≥ 2	78–91	85	6		
		1.0	≥ 2	80–89	86	5		
Snap Beans	Spirotetramat	0.01–1.0	13	94–106	98.2	4.1	00857	RAFNP043
	Enol	0.01–1.0	13	84–103	95.6	6.1		
	Ketohydroxy	0.01–1.0	13	87–115	97	8.1		
	Mono-hydroxy	0.01–1.0	13	84–112	99.6	6.8		
	Enol-Glc	0.01–1.0	13	75–112	92.5	14.4		
Snow Peas	Spirotetramat	0.01–1.0	7	87–101	96.7	5.0	00857	
	Enol	0.01–1.0	7	87–104	94.6	7.1		
	Ketohydroxy	0.01–1.0	7	80–111	94.4	11.4		
	Mono-hydroxy	0.01–1.0	7	86–106	93.4	6.8		
	Enol-Glc	0.01–1.0	7	80–117	92.9	14.5		
Garden Pea	Spirotetramat	0.01–1.0	12	96–106	100.6	3.0	00857	RAFNP044
	Enol	0.01–1.0	12	89–103	94.6	4.5		
	Ketohydroxy	0.01–1.0	12	85–120	99.2	10.2		
	Mono-hydroxy	0.01–1.0	12	92–109	100.3	5.2		
	Enol-Glc	0.01–1.0	12	98–127	109.8	7.1		
Lima Bean	Spirotetramat	0.01–1.0	8	89–108	111.5	8.0	00857	

Crop	Analyte	Fortification mg/kg	n	Range Recovery (%)	Mean recovery (%)	% RSD	Method	Reference
	Enol	0.01–1.0	8	81–98	90.1	6.3		
	Ketohydroxy	0.01–1.0	8	88–104	94.1	6.3		
	Mono-hydroxy	0.01–1.0	8	93–112	101.3	5.9		
	Enol-Glc	0.01–1.0	8	100–116	105.1	5.7		
Dry Bean Forage	Spirotetramat	0.01–6.14	15	81–118	100.8	12.9	00857	RAFNP045
	Enol	0.01–6.15	15	79–119	101.9	14.0		
	Ketohydroxy	0.01–6.05	15	82–112	99.9	9.6		
	Mono-hydroxy	0.01–6.14	15	81–118	97.9	9.1		
	Enol-Glc	0.01–6.05	15	73–118	94.4	13.2		
Dry Bean Hay	Spirotetramat	0.01–5.15	14	73–98	87.3	10.2	00857	
	Enol	0.01–5.12	14	70–107	89.9	12.7		
	Ketohydroxy	0.01–5.04	14	82–110	93.4	10.1		
	Mono-hydroxy	0.01–5.07	14	79–99	85.8	7.1		
	Enol-Glc	0.01–5.07	14	72–112	84.6	13.9		
Dry Bean Seed	Spirotetramat	0.01–2.00	14	73–117	97.7	15.5	00857	
	Enol	0.01–2.00	14	85–118	104.8	9.7		
	Ketohydroxy	0.01–2.00	14	84–118	102.7	11.1		
	Mono-hydroxy	0.01–2.00	14	83–111	95.4	8.5		
	Enol-Glc	0.01–2.00	14	80–109	95.8	7.9		
Dry Pea Hay	Spirotetramat	0.01–6.14	13	76–113	97	15.5	00857	
	Enol	0.01–6.15	13	70–118	94.3	15.4		
	Ketohydroxy	0.01–6.05	13	74–104	90.3	9.4		
	Mono-hydroxy	0.01–6.14	13	76–112	92.8	11.0		
	Enol-Glc	0.01–6.05	13	73–119	90.5	16.9		
Dry Pea Vines	Spirotetramat	0.01–4.00	13	83–118	103.7	12.4	00857	
	Enol	0.01–4.00	13	89–119	107	10.1		
	Ketohydroxy	0.01–4.00	13	92–119	108.5	8.4		
	Mono-hydroxy	0.01–4.00	13	87–116	97.2	7.6		
	Enol-Glc	0.01–4.00	13	71–104	87.8	12.4		
Dry Pea Seed	Spirotetramat	0.01–2.00	14	78–110	97.4	10.6	00857	
	Enol	0.01–2.00	14	71–99	88.5	12.1		
	Ketohydroxy	0.01–2.00	14	84–119	101.6	10.5		
	Mono-hydroxy	0.01–2.00	14	80–102	92.9	6.3		
	Enol-Glc	0.01–2.00	14	81–112	90.6	10.0		
Undelinted Cottonseed	Spirotetramat	0.01–1.0	15	87–98	92.3	3.6	00857	RAFNP013
	Enol	0.01–1.0	15	75–101	90.1	8.4		
	Ketohydroxy	0.01–1.0	15	83–99	88.1	5.6		
	Mono-hydroxy	0.01–1.0	15	86–106	93.6	6.1		
	Enol-Glc	0.01–1.0	15	82–102	90.3	6.7		
Cotton Gin By-products	Spirotetramat	0.01–7.0	15	74–101	86.2	8.9	00857	
	Enol	0.01–7.0	15	61–100	77.5	14.5		
	Ketohydroxy	0.01–7.0	15	66–96	81.1	8.6		
	Mono-hydroxy	0.01–7.0	15	77–110	92.5	8.4		
	Enol-Glc	0.01–7.0	15	73–105	90	10.3		
Undelinted Cottonseed	Spirotetramat	0.5	1	92	-	-	00857	RAFNP014–1
	Enol	0.5	1	94	-	-		
	Ketohydroxy	0.5	1	86	-	-		
	Mono-hydroxy	0.5	1	100	-	-		
	Enol-Glc	0.5	1	98	-	-		
Cottonseed Meal	Spirotetramat	0.01–1.0	7	87–102	93.6	6.4	00857	
	Enol	0.01–1.0	7	69–85	76	8.0		
	Ketohydroxy	0.01–1.0	7	78–107	91	12.3		
	Mono-hydroxy	0.01–1.0	7	81–121	94	14.3		
	Enol-Glc	0.01–1.0	7	74–110	91.3	14.0		
Cottonseed Hulls	Spirotetramat	0.01–5.0	7	90–95	92.9	2.1	00857	
	Enol	0.01–5.0	7	78–98	87.3	8.3		
	Ketohydroxy	0.01–5.0	7	84–92	89.4	3.3		
	Mono-hydroxy	0.01–5.0	7	86–102	93.7	6.4		
	Enol-Glc	0.01–5.0	7	83–104	94.1	8.0		

Crop	Analyte	Fortification mg/kg	n	Range Recovery (%)	Mean recovery (%)	% RSD	Method	Reference
Cottonseed Refined Oils	Spirotetramat	0.01–2.0	7	89–119	98	10.2	00857	
	Enol	0.01–2.0	7	81–108	89.3	9.8		
	Ketohydroxy	0.01–2.0	7	92–116	100.6	8.7		
	Mono-hydroxy	0.01–2.0	7	84–111	96.6	9.7		
	Enol-Glc	0.01–2.0	7	86–105	98	6.3		
Soya bean Forage	Spirotetramat	0.01–6.0	27	77.5–125	101.3	9.7	00857	RAFNP015
	Enol	0.01–3.0	25	72.2–119	92.3	10.0		
	Ketohydroxy	0.01–1.2	26	69.4–115	92.9	14.7		
	Mono-hydroxy	0.01–0.1	25	79.1–117	96.3	8.1		
	Enol-Glc	0.01–0.2	24	83.9–119	96.4	8.3		
Soya bean Hay	Spirotetramat	0.01–10.0	31	67.2–102	83.6	11.1	00857	
	Enol	0.01–5.0	24	62.5–86.8	74.9	9.0		
	Ketohydroxy	0.01–5.0	25	60.7–101	84.6	13.7		
	Mono-hydroxy	0.01–0.2	25	64.7–91.8	80.5	10.1		
	Enol-Glc	0.1–1.0	21	57.0–90.7	70.4	12.9		
Soya bean Seed	Spirotetramat	0.01–0.1	20	76.0–118	96.4	10.0	00857	
	Enol	0.01–2.0	20	65.8–102	82.2	11.5		
	Ketohydroxy	0.01–0.5	20	67.4–101	87.1	11.2		
	Mono-hydroxy	0.01–0.1	20	81.8–102	90.6	6.2		
	Enol-Glc	0.01–0.5	20	71.7–119	92.0	14.2		
Soya bean Seed	Spirotetramat	0.1	1	107	107	-	00857	RAFNP016
	Enol	0.1	1	99.3	99	-		
	Ketohydroxy	0.1	1	108	108	-		
	Mono-hydroxy	0.1	1	97.1	97	-		
	Enol-Glc	0.1	1	91.5	92	-		
Aspirated grain fraction (AGF)	Spirotetramat	0.01–1.0	6	74.3–109	96.3	13.2	00857	
	Enol	0.01–1.0	6	77.4–91.7	87.4	6.2		
	Ketohydroxy	0.01–1.0	6	76.1–100	90.4	9.0		
	Mono-hydroxy	0.01–1.0	6	79.8–95.7	88.0	6.7		
	Enol-Glc	0.01–1.0	6	65.6–125	85.3	24		
Soya bean Meal	Spirotetramat	0.01–0.6	6	58.9–74.3	69.0	8.1	00857	
	Enol	0.01–0.6	6	80.2–113	95.4	13.7		
	Ketohydroxy	0.01–0.6	6	54.6–85.4	71.8	14.0		
	Mono-hydroxy	0.01–0.6	6	71.2–86.2	78.9	8.8		
	Enol-Glc	0.01–0.6	6	62.9–76.1	67.7	7.3		
Soya bean Hulls	Spirotetramat	0.01–1.0	6	56.1–84.1	73.0	15.1	00857	
	Enol	0.01–1.0	6	80.5–90.1	87.3	4.0		
	Ketohydroxy	0.01–1.0	6	74.3–110	90.2	15.2		
	Mono-hydroxy	0.01–1.0	6	70.2–95.1	84.0	12.1		
	Enol-Glc	0.01–1.0	6	71.5–127	95.6	25.6		
Refined Oil	Spirotetramat	0.01–1.0	6	89.1–113	100.4	12.4	00857	
	Enol	0.01–1.0	6	88.3–109	97.2	9.5		
	Ketohydroxy	0.01–1.0	6	87.7–105	98.4	5.9		
	Mono-hydroxy	0.01–1.0	6	83.4–114	100.4	10.9		
	Enol-Glc	0.01–1.0	6	67.6–115	90.5	18.5		
Defatted Flour	Spirotetramat	0.01–1.0	6	58.2–72.8	63.4	9.3	00857	
	Enol	0.01–1.0	6	60.5–67.1	63.2	3.7		
	Ketohydroxy	0.01–1.0	6	49.0–72.8	65.3	13.0		
	Mono-hydroxy	0.01–1.0	6	54.6–70.3	64.0	8.7		
	Enol-Glc	0.01–1.0	6	55.1–77.7	62.0	14.7		
Soymilk	Spirotetramat	0.01–1.0	6	91.5–111	102.5	8.0	00857	
	Enol	0.01–1.0	6	77.2–108	93.5	15.6		
	Ketohydroxy	0.01–1.0	6	93.8–109	102.8	5.3		
	Mono-hydroxy	0.01–1.0	6	91.9–113	102.9	8.6		
	Enol-Glc	0.01–1.0	6	84.1–108	94.2	10.5		
Onion Bulb	Spirotetramat	0.02		63–84	77	9	ATM-0034 (revision 3)	BCS-0184
		1.0		72–95	87	10		
	Enol	0.02		96–113	103	5		
		1.0		75–96	90	10		
	Ketohydroxy	0.02–1.0		80–108	97	9		

Crop	Analyte	Fortification mg/kg	n	Range Recovery (%)	Mean recovery (%)	% RSD	Method	Reference
		1.0		75–100	89	10		
	Mono-hydroxy	0.02–1.0		76–106	96	11		
		1.0		73–96	87	9		
	Enol-Glc	0.02–1.0		90–106	97	7		
		1.0		72–98	89	11		
Onion Bulb	Spirotetramat	0.02		81–105	91	8	ATM-0034 (revision 2)	BCS-0183
		1.0		83–101	91	7		
	Enol	0.02		94–114	101	6		
		1.0		89–117	100	11		
	Ketohydroxy	0.02–1.0		87–109	95	7		
		1.0		83–98	91	5		
	Mono-hydroxy	0.02–1.0		84–109	92	8		
		1.0		76–101	88	10		
	Enol-Glc	0.02–1.0		86–99	91	6		
		1.0		84–100	91	4		
Onion Bulb	Spirotetramat	0.02		83–88	85	3	ATM-0034 (revision 3) for BYI-08330 enol; ATM-0019 (draft) for other analytes	BCS-0180
		1.0		95–97	96	1		
	Enol	0.02		97–108	103	5		
		1.0		91–96	94	2		
	Ketohydroxy	0.02–1.0		76–83	79	4		
		1.0		87–89	88	1		
	Mono-hydroxy	0.02–1.0		90–95	93	2		
		1.0		94–100	97	3		
	Enol-Glc	0.02–1.0		100–116	108	8		
		1.0		95–96	95	1		

Stability of pesticide residues in stored analytical samples

Samples from the submitted studies were stored for periods less than the period of stability reported by the 2008 JMPR. Since the storage stability data from JMPR 2008 cover a diverse range of crops and demonstrated stability of all analytes for up to 2 years, it is considered that these data should be sufficient to cover the storage stability of all commodities in this evaluation.

USE PATTERN

The following GAPs are summarized by commodity and country in Table 2 and have been assembled from labels or translations of labels provided by the manufacturer.

Table 2 Summary of foliar uses of spirotetramat

Crop	Country	Formulation	Application				PHI Days/ Comment
			g ai/ha	g ai/hL	Retreatment interval (days)	No. or max (kg ai/ha/ season)	
Avocado	Chile	100g/L SC	200–300	10	14	3	3
Avocado, Mango, Papaya	Mexico	150g/L OD	288		14	3	1
Brussels sprouts	Australia	240g/L SC	48–96	4.8–9.6	7	3	3
Brussels sprouts (Cabbage Vegetables)	Austria	150g/L OD	75	7.5–15	14	2	3
Brussels sprouts	Ireland	150g/L OD	75			2	3
Brussels sprouts	UK	150g/L OD	75			2	3
Brussels sprouts	USA	240g/L SC	53–88		7	Max. 175g ai/ha per season	1
Brussels sprouts	Mexico	150g/L OD	45–60		7	2	3
Brussels sprouts	Belgium	100g/L SC	75		14	2	3

Crop	Country	Formulation	Application				PHI Days/ Comment
			g ai/ha	g ai/hL	Retreatment interval (days)	No. or max (kg ai/ha/ season)	
Brussels sprouts	Canada	150g/L OD	52–88		7	Max. 175g ai/ha per season	1
Cotton	Australia	240g/L SC	72–96		14	2	21
Cotton	Pakistan	240g/L SC	74				21
Cotton	USA	240g/L SC	44–88		7	Max. 175g ai/ha per season	21
Kiwifruit	New Zealand	240g/L SC	96	4.8		3	Do not apply later than 3 weeks after fruit set
Legume Vegetables (including edible podded and succulent shelled peas and beans and dried shelled peas and beans)	Canada	240g/L SC	44–66		7	Max. 175g ai/ha per season	1 (edible podded and succulent shelled peas and beans) 7 (dried shelled peas and beans)
Legume Vegetables (including edible podded and succulent shelled peas and beans and dried shelled peas and beans)	Canada	150g/L OD	45–66		7	Max. 175g ai/ha per season	1 (edible podded and succulent shelled peas and beans) 7 (dried shelled peas and beans)
Legume Vegetables (including edible podded and succulent shelled peas and beans and dried shelled peas and beans)	USA	240g/L SC	53–88		7	Max. 175g ai/ha per season	1 (edible podded and succulent shelled peas and beans) 7 (dried shelled peas and beans)
Mangoes	Australia	240g/L SC		7.2–9.6	21–35	2 post-flowering	14
Onions	Australia	240g/L SC	48		14	2	7
Onions	Mexico	150g/L OD	45–75		7	3	7
Soya beans	Canada	240g/L	44–66		7	Max. 175g ai/ha per season	21
Soya beans	Canada	150g/L OD	45–66		7	Max. 175g ai/ha per season	21
Soya beans	USA	240g/L SC	44–88		7	Max. 175g ai/ha per season	21
Tropical Fruit	USA	240g/L SC	140–175		14	Max. 438g ai/ha per season	1

RESIDUES RESULTING FROM SUPERVISED TRIALS

Residues data were made available for mangoes, papaya, litchi, avocado, guava and kiwifruit to support the establishment of MRLs for tropical fruits, onions, edible podded beans and peas, succulent shelled beans and peas, pulses including soya beans and cotton. Animal feed residues data have been provided for legumes and pulses.

Trials were well documented with laboratory and field reports. The former included method validation including procedural recoveries with spiking at residue levels similar to those occurring in samples from the supervised trials. Dates of analyses or duration of sample storage were also provided. Trials were carried out in appropriately sized plots and sample sizes were within acceptable weights. Samples were collected and stored frozen immediately or soon after sampling. Although trials included control plots, no control data are recorded in the Tables because, unless noted, no residues in control samples exceeded the LOQ.

When residues were not detected they are shown as below the LOQ. Residues, application rates and spray concentrations have generally been rounded to two significant figures. Residues from the trials conducted according to maximum GAP have been used for the estimation of maximum residue levels. Where multiple samples were taken from a single plot, each value is reported. Where results from separate plots were reported, results are listed for each plot. For replicate samples (from the same plot), the highest value was used for maximum residue level estimation. For multiple plots (from the same trial location), results from the plot yielding the highest residue were utilized for maximum residue level estimation. In the decline trials the highest values were selected for spirotetramat + enol residues (used for maximum residue level estimation) and total spirotetramat residues (used for dietary calculations), regardless of whether these were at the same PHI. Multiple plots sometimes involved testing of different formulations (OD *vs* SC) or spray volumes but only the highest residue was utilized for maximum residue level estimation.

For animal feed trials in which a dry matter content was provided, the results chosen for maximum residue level estimation/ dietary calculations were those which gave the highest dry weight residues, even if they were not the highest residues on a wet weight basis. For animal feed trials in which a dry matter content was not provided but was provided for another sample at a different timing from the same trial, this dry matter content was used to calculate dry weight residues.

Total spirotetramat equivalents, *i.e.*, total spirotetramat equivalents, are the sum of all components converted to spirotetramat equivalents by multiplying by the following conversion factors: enol ×1.239, ketohydroxy ×1.177, monohydroxy ×1.231, enol-glucoside ×0.806. Where a component is reported as a <'value', the <'value' is added into the calculation of the total equivalents. The following example illustrates this.

Residues as spirotetramat equivalents (mg/kg)						
spirotetramat	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total residue	spirotetramat + enol
0.15	0.30	< 0.012	< 0.012	< 0.008	0.48	0.45
0.55	0.68	0.012	0.022	0.010	1.3	1.2
< 0.01	< 0.012	< 0.012	< 0.012	< 0.008	< 0.055	< 0.022

The results of the supervised trials are shown in the following tables:

Group	Commodity	Country/ Countries	Table No.
Assorted tropical and sub-tropical fruits-inedible peel	Avocado	USA, Mexico and Chile	3
	Guava	USA	4
	Litchi	Mexico	5
	Papaya	Mexico	6
	Kiwifruit	New Zealand	7
	Mangoes	Australia	8
Bulb vegetables	Onions	Australia	9
Brassica vegetables	Brussels sprouts	Europe	10
	Brussels sprouts	Australia	11
Legume vegetables	Edible podded peas	USA	12
	Edible podded beans	USA	13
	Shelled peas	USA	14

Group	Commodity	Country/ Countries	Table No.
	Shelled beans	USA	15
Pulses	Soya beans	USA and Canada	16
	Dried shelled beans	USA	17
	Dried shelled peas	USA	18
Oilseeds	Cotton seed	USA	19
Animal Feeds	Dry bean forage	USA	20
	Dry bean hay	USA	21
	Dry pea hay	USA	22
	Dry pea vines	USA	23
	Soya bean forage	USA and Canada	24
	Soya bean hay	USA and Canada	25
	Cotton gin by-products	USA	26

Assorted tropical and sub-tropical fruits – inedible peel

Table 3 Residues from the foliar application of spirotetramat to avocado in the USA, Mexico and Chile (Hoag and Harbin 2009, RAFNP042)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI (d)	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval (d)	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	Spiro + enol
RAFNP042 FN070-07BA USA (San Luis Obispo, California) 2008 (Haas)	150OD	3	14 14	290 289 286	456 446 364	64 65 79	1	0.082 0.083	0.064 0.068	0.011 0.010	< 0.01 < 0.01	< 0.01 < 0.01	0.18 0.18	0.15 0.15
							3	0.047 0.049	0.052 0.054	0.016 0.015	< 0.01 < 0.01	< 0.01 < 0.01	0.14 0.14	0.099 0.10
	150OD	3	14 14	294 292 289	2254 2217 2086	13 13 14	1	0.10 0.10	0.099 0.098	0.017 0.016	< 0.01 < 0.01	< 0.01 < 0.01	0.24 0.23	0.20 0.20
							3	0.12 0.12	0.083 0.080	0.021 0.021	< 0.01 < 0.01	0.013 0.011	0.25 0.24	0.20 0.20
	240SC	3	14 14	305 290 288	475 444 367	64 65 78	1	0.12 0.11	0.080 0.075	0.012 0.011	< 0.01 < 0.01	< 0.01 < 0.01	0.23 0.22	0.20 0.19
							3	0.049 0.048	0.061 0.061	0.014 0.014	< 0.01 < 0.01	< 0.01 < 0.01	0.14 0.14	0.11 0.11
RAFNP042 FN071-07DA USA (Arroyo Grande, California) 2008 (Haas)	150OD	3	14 13	285 286 289	471 479 517	60 60 56	0	0.031 0.023	0.061 0.051	0.015 0.011	< 0.01 < 0.01	< 0.01 < 0.01	0.13 0.11	0.092 0.074
							1	0.042 0.031	0.067 0.057	0.012 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.14 0.12	0.11 0.088
							3	0.030 0.026	0.041 0.032	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.10 0.088	0.071 0.058
							5	0.031 0.039	0.034 0.040	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.095 0.11	0.065 0.079
							7	0.018 0.050	0.045 0.081	< 0.01 0.013	< 0.01 < 0.01	< 0.01 < 0.01	0.093 0.16	0.063 0.13
	150OD	3	14 13	289 291 286	1992 2179 2404	15 13 12	1	0.036 0.035	0.083 0.062	0.022 0.013	< 0.01 < 0.01	< 0.01 < 0.01	0.16 0.13	0.12 0.097
							3	0.032 0.037	0.057 0.066	0.015 0.012	< 0.01 < 0.01	< 0.01 < 0.01	0.12 0.14	0.089 0.10
RAFNP042 FN072-07HA Mexico (Nuevo Parangaricutiro, Michoacan) 2008 (Haas)	150OD	3	12 12	404 340 280	638 686 626	63 50 45	1	< 0.01 0.019	0.011 0.050	< 0.01 0.012	< 0.01 < 0.01	< 0.01 < 0.01	0.051 0.10	0.021 0.069
							3	< 0.01 < 0.01	0.018 0.036	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.058 0.076	0.028 0.046

Study No. Trial No. Country Year (Variety)	Form	Application					PHI (d)	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval (d)	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	Spiro + enol
	150OD	3	12 12	317 280 289	2147 2010 1943	15 14 15	1	< 0.01 < 0.01	0.018 0.017	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.058 0.057	0.028 0.027
							3	< 0.01 < 0.01	0.031 0.011	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.071 0.051	0.041 0.021
RAFNP042 FN073-07BB Chile (Llay Llay, Valparaiso) 2008 (Hass)	150OD	3	14 13	293 295 286	626 616 599	47 48 48	1	0.19 0.22	0.080 0.070	0.013 0.012	< 0.01 < 0.01	< 0.01 < 0.01	0.30 0.32	0.27 0.29
							3	0.20 0.15	0.088 0.082	0.012 0.011	< 0.01 < 0.01	< 0.01 < 0.01	0.32 0.26	0.29 0.23
	150OD	3	14 13	286 288 283	1930 1971 1979	15 15 14	1	0.14 0.19	0.058 0.070	0.011 0.016	< 0.01 < 0.01	< 0.01 < 0.01	0.23 0.30	0.20 0.26
							3	0.17 0.19	0.097 0.090	0.017 0.019	< 0.01 < 0.01	< 0.01 < 0.01	0.30 0.32	0.27 0.28
	240SC	3	14 13	289 307 285	606 613 603	48 50 47	1	0.16 0.25	0.081 0.098	0.011 0.014	< 0.01 < 0.01	< 0.01 < 0.01	0.27 0.38	0.24 0.35
							3	0.22 0.13	0.12 0.087	0.017 0.012	< 0.01 < 0.01	< 0.01 < 0.01	0.38 0.25	0.34 0.22
RAFNP042 FN074-07HA Chile (Ocoa, Valparaiso) 2008 (Hass)	150OD	3	14 14	284 285 288	474 645 584	60 44 49	1	0.059 0.068	0.075 0.072	0.019 0.016	< 0.01 < 0.01	< 0.01 < 0.01	0.17 0.18	0.13 0.14
							3	0.066 0.079	0.071 0.097	0.020 0.026	< 0.01 < 0.01	< 0.01 < 0.01	0.18 0.22	0.14 0.18
	150OD	3	14 14	291 285 287	2378 2028 2325	12 14 12	1	0.087 0.080	0.083 0.092	0.024 0.025	< 0.01 < 0.01	< 0.01 < 0.01	0.21 0.22	0.17 0.17
							3	0.064 0.068	0.073 0.076	0.022 0.021	< 0.01 < 0.01	< 0.01 < 0.01	0.18 0.19	0.14 0.14

Table 4 Residues from the foliar application of spirotetramat to guava in Mexico (Hoag and Harbin 2009, RAFNP042)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP042 FN075-07BA Mexico (Municipio Jaurez, Michoacan) 2008 (Media China)	150OD	3	13 12	292 297 287	485 478 478	60 62 56	0	0.19 0.22	0.20 0.15	0.046 0.041	< 0.01 < 0.01	< 0.01 < 0.01	0.46 0.43	0.39 0.37
							1	0.065 0.091	0.14 0.16	0.029 0.028	< 0.01 < 0.01	< 0.01 < 0.01	0.25 0.30	0.21 0.25
							3	0.058 0.43	0.12 0.11	0.029 0.029	0.012 < 0.01	< 0.01 < 0.01	0.23 0.59	0.18 0.54
							5	0.049 0.041	0.12 0.10	0.042 0.032	< 0.01 0.013	< 0.01 < 0.01	0.23 0.20	0.17 0.51
							7	0.024 0.021	0.10 0.083	0.041 0.035	< 0.01 0.012	< 0.01 < 0.01	0.19 0.16	0.12 0.10
	150OD	3	13 12	286 284 302	1903 1887 1931	15 15 16	1	0.17 0.21	0.22 0.26	0.029 0.042	< 0.01 < 0.01	< 0.01 < 0.01	0.44 0.53	0.39 0.47
							3	0.056 0.075	0.13 0.12	0.032 0.037	< 0.01 < 0.01	< 0.01 < 0.01	0.24 0.31	0.19 0.20
	240SC	3	13 12	289 274	481 455	60 60	1	0.31 0.19	0.14 0.12	0.042 0.030	< 0.01 < 0.01	< 0.01 < 0.01	0.51 0.36	0.45 0.31

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
				291	484	60	3	0.11 0.21	0.082 0.16	0.033 0.036	< 0.01 < 0.01	< 0.01 < 0.01	0.25 0.43	0.19 0.37
RAFNP042 FN076-07HA Mexico (Calvillo, AG) 2007 (China)	150OD	3	14 13	283 294 309	555 464 475	51 63 65	1	0.35 0.35	0.21 0.20	0.020 0.018	0.011 0.010	< 0.01 < 0.01	0.60 0.59	0.56 0.55
							3	0.43 0.43	0.34 0.33	0.023 0.030	0.016 0.016	< 0.01 < 0.01	0.82 0.82	0.77 0.76
	150OD	3	14 13	287 287 281	2248 2055 2050	13 14 14	1	0.56 0.56	0.34 0.36	0.026 0.026	0.024 0.028	< 0.01 < 0.01	0.96 0.98	0.90 0.92
							3	0.26 0.26	0.17 0.16	0.018 0.016	< 0.01 < 0.01	< 0.01 < 0.01	0.47 0.46	0.43 0.42

Table 5 Residues from the foliar application of spirotetramat to litchi in Mexico (Hoag and Harbin 2009, RAFNP042)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP042 FN077-07BA Mexico (San Jose Chiltepec Oaxaca) 2008 (Brewster)	150OD	3	12 14	284 280 288	474 473 499	60 59 58	1	2.8 2.9	0.39 0.46	0.10 0.11	1.5 1.7	0.17 0.022	5.0 5.2	3.2 3.4
							3	1.0 1.0	0.24 0.23	0.15 0.15	2.0 2.0	0.018 0.022	3.4 3.4	1.2 1.2
	150OD	3	12 14	285 289 285	1914 1908 1916	15 15 15	1	1.2 0.22	0.32 0.31	0.089 0.088	1.4 1.4	0.017 0.015	3.0 2.0	1.5 0.53
							3	0.33 0.33	0.11 0.13	0.058 0.055	1.0 0.95	0.018 0.022	1.5 1.5	0.44 0.46
	240SC	3	12 14	286 284 280	477 480 487	60 59 58	1	4.7 4.8	0.38 0.39	0.064 0.065	0.75 0.78	0.012 0.012	5.9 <u>6.0</u>	5.1 <u>5.2</u>
							3	0.92 0.21	0.084 0.098	0.036 0.37	0.39 0.43	< 0.01 < 0.01	1.4 1.1	1.0 0.31
RAFNP042 FN078-07DA Mexico (Tuxtepec, Oaxaca) 2008 (Brewster)	150OD	3	14 14	280 282 291	491 488 504	57 58 58	1	0.67	0.22	0.057	0.46	0.011 c0.019	1.4	0.89
	150OD	3	14 14	282 284 282	2426 2839 2429	12 10 12	1	0.56	0.29	0.093	0.65	0.015 c0.019	<u>1.6</u>	<u>0.85</u>

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP042 FN079-07HA FN080-07HA Mexico (Nautla, Veracruz) 2008 (Local)	150OD	3	14 14	286 288 291	461 558 570	62 52 51	1	0.093	0.028	0.016	0.10	0.014 c0.019	0.25	0.12
	150OD	3	14 14	286 290 288	2380 2155 2163	12 14 13	1	0.10	0.065	0.035	0.17	0.017 c0.019	0.39	0.17
	150OD	3	14 14	288 290 285	604 589 588	48 49 49	1	0.42	0.12	0.045	0.15	0.022 c0.02	0.76	0.54
	150OD	3	14 14	290 293 296	2533 2323 2147	11 13 14	1	0.50	0.26	0.14	0.33	0.020 c0.02	1.3	0.76

Table 6 Residues from the foliar application of spirotetramat to papaya in Mexico (Hoag and Harbin 2009, RAFNP042)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP042 FN081-07BA Mexico (Tierra Blanca, Veracruz) 2008 (Maradol)	150OD	3	14 14	287 292 297	547 537 570	53 54 52	1	0.025 0.024	0.14 0.14	0.027 0.028	< 0.01 < 0.01	0.012 < 0.01	0.21 0.21	0.17 0.16
							3	0.024 0.027	0.087 0.12	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.14 0.18	0.11 0.15
	150OD	3	14 14	299 272 289	2095 1938 2065	14 14 14	1	0.016 0.015	0.069 0.073	0.018 0.021	< 0.01 < 0.01	< 0.01 < 0.01	0.12 0.13	0.085 0.088
							3	0.020 0.014	0.072 0.057	0.015 0.013	< 0.01 < 0.01	< 0.01 < 0.01	0.13 0.10	0.092 0.071
	240SC	3	14 14	294 287 296	558 531 569	53 54 52	1	0.014 0.022	0.12 0.10	< 0.01 0.011	< 0.01 < 0.01	0.01 < 0.01	0.16 0.15	0.13 0.12
							3	0.033 0.051	0.10 0.12	0.021 0.022	< 0.01 < 0.01	< 0.01 < 0.01	0.17 0.21	0.13 0.17
RAFNP042 FN082-07HA Mexico (Cotaxtla, Veracruz) 2008 (Maradol)	150OD	3	14 14	286 288 284	525 560 510	55 51 56	1	0.035 0.030	0.14 0.13	0.024 0.022	< 0.01 < 0.01	0.011 0.013	0.22 0.21	0.18 0.16
							3	0.042 0.035	0.11 0.11	0.017 0.017	< 0.01 < 0.01	0.011 0.012	0.19 0.18	0.15 0.15
	150OD	3	14 14	274 290 287	2250 2441 2306	12 12 12	1	0.020 0.019	0.11 0.10	0.024 0.021	< 0.01 < 0.01	< 0.01 < 0.01	0.17 0.16	0.13 0.12
							3	0.020 0.024	0.084 0.085	0.018 0.017	< 0.01 < 0.01	< 0.01 < 0.01	0.14 0.15	0.10 0.11
RAFNP042 FN083-07HA Mexico (Paso San Juan, Veracruz) 2008 (Maradol)	150OD	3	14 14	292 283 289	539 568 568	54 50 51	1	< 0.01	0.039	0.014	< 0.01	0.031	0.10	0.049
							3	< 0.01	0.080	< 0.01	< 0.01	0.021	0.13	0.09
	150OD	3	14 14	279 293 298	2611 2419 2512	11 12 12	1	< 0.01	0.059	0.011	< 0.01	0.011	0.10	0.069
							3	< 0.01	0.033	0.012	< 0.01	0.013	0.078	0.043

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP042 FN084-07HA Mexico (Soledad de Dobaldo, Veracruz) 2008 (Maradol)	150OD	3	14 14	291 286 288	598 504 573	49 57 50	1	< 0.01	0.086	< 0.01	< 0.01	0.011	0.13	0.096
							3	0.012	0.063	< 0.01	< 0.01	0.011	0.11	0.075
	150OD	3	14 14	283 290 292	2284 2367 2420	12 12 12	1	0.017	0.032	0.022	0.018	0.024	0.11	0.049
							3	< 0.01	0.033	< 0.01	< 0.01	< 0.01	0.073	0.043

Table 7 Residues from the foliar application of spirotetramat (240 SC formulation) to kiwifruit in New Zealand (Clague 2009, GLP298)

Study No. Trial No. Country Year (Variety)	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
	No	Int (days)	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
GLP-298 R-1019-08-HE New Zealand (Mangle Estate, Patumahoe) 2008 (Hort 16 A)	2	31	96 96	2000 2000	4.8 4.8	50 72 93 114 135 155H	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	0.024 0.047 0.024 0.024 < 0.012 0.012	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	< 0.008 0.008 < 0.008 < 0.008 < 0.008 0.008	0.066 0.089 0.066 0.066 < 0.055 0.054	0.022 < 0.022 < 0.022 < 0.022 < 0.022 < 0.022
GLP-298 R-1020-08-HE New Zealand (Andrew Stevenson) 2008 (Hort 16 A)	2	30	96 96	2000 2000	4.8 4.8	49 76 103 121 146 156H	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	0.024 0.012 < 0.012 < 0.012 < 0.012 < 0.012	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	< 0.008 < 0.008 < 0.008 < 0.008 < 0.008 < 0.008	0.066 0.054 < 0.055 < 0.055 < 0.055 < 0.055	0.022 < 0.022 < 0.022 < 0.022 < 0.022 < 0.022
GLP-298 R-1021-08-HE New Zealand (Wise's Orchard, Ardmore) 2008 (Hayward)	2	35	96 96	2000 2000	4.8 4.8	57 74 94 114 131 145H	0.02 < 0.01 0.01 < 0.01 < 0.01 < 0.01	0.025 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	0.035 < 0.012 0.024 < 0.012 < 0.012 < 0.012	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	< 0.008 < 0.008 < 0.008 < 0.008 < 0.008 < 0.008	0.10 < 0.055 0.066 < 0.055 < 0.055 < 0.055	0.045 < 0.022 0.022 < 0.022 < 0.022 < 0.022
GLP-298 R-1022-08-HE New Zealand (Swayne Road, Cambridge) 2008 (Hayward)	2	35	96 96	2000 2000	4.8 4.8	51 67 84 99 115 129H	0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	0.037 0.012 < 0.012 0.012 0.012 < 0.012	0.047 0.035 0.012 0.024 0.024 0.024	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	0.008 0.008 < 0.008 0.016 0.016 0.008	0.11 0.077 0.054 0.074 0.074 0.066	0.047 0.022 < 0.022 0.022 0.022 < 0.022
GLP-298 R-1024-08-HE New Zealand (Honnor Block 2) 2008 (Hayward)	2	40	96 96	2000 2000	4.8 4.8	51 66 84 99 115 129H	< 0.01 < 0.01 < 0.01 < 0.01 0.03 < 0.01	0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	0.035 0.024 0.012 0.024 < 0.012 < 0.012	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	< 0.008 < 0.008 < 0.008 < 0.008 < 0.008 < 0.008	0.078 0.066 0.054 0.066 0.074 < 0.054	0.022 < 0.022 < 0.022 < 0.022 0.042 < 0.022

Values for spirotetramat-enol glucoside were corrected for low recoveries (about 50%) in the QuECHERS method used. A correction was not applied to the other metabolites. The applied correction has negligible effect on the total spirotetramat residues and no effect of the sum of spirotetramat + enol

H= DALT close to harvest

Table 8 Residues in mangoes (unwashed and washed) from the foliar application of spirotetramat to mangoes in Australia (Radunz 2008, BCS-0142) Individual metabolites are expressed as analysed and not as spirotetramat equivalents. Total residues and spirotetramat+enol are expressed in spirotetramat equivalents

Study No. Trial No. Country Year (Variety)	Form	Application				PHI Days	Residues (mg/kg)								
		No	Interval Days	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro equiv. pulp and skin	Total spiro equiv whole fruit	spiro + enol – pulp and skin	spiro + enol – whole fruit basis
BCS-0142 C212 Australia (Spring Creek, Queensland) 2007 (Brooks) Unwashed fruit	240SC	2	21	1357 1490	9.7 9.7	14 20 27 34	0.16 0.03 0.04 0.06	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.25 0.12 0.13 0.15	0.22 0.10 0.11 0.13	0.18 0.05 0.06 0.08	0.16 0.05 0.06 0.07
	240SC	2	7	1547 1263	7.3 7.3	0 6 13 20	0.07 0.02 0.02 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.16 0.11 0.11 0.11	0.14 0.09 0.09 0.09	0.09 0.04 0.04 0.04	0.08 0.04 0.04 0.04
	240SC	2	7	1686 1553	9.7 9.7	0 6 13 20	0.09 0.07 0.06 0.07	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.18 0.17 0.15 0.16	0.15 0.15 0.13 0.14	0.11 0.11 0.08 0.09	0.10 0.09 0.07 0.08
	240SC	2	7	1686 1626	14.5 14.5	0 6 13 20	0.13 0.17 0.09 0.06	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.22 0.31 0.18 0.15	0.19 0.27 0.15 0.13	0.15 0.24 0.11 0.08	0.13 0.21 0.10 0.07
	240SC	3	7, 7	1477 1515 1244	9.7 9.7 9.7	0 6 13 20	0.17 0.12 0.08 0.07	0.03 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.27 0.21 0.17 0.16	0.23 0.18 0.15 0.14	0.21 0.14 0.10 0.09	0.18 0.13 0.09 0.08
	150OD	2	7	1263 1269	9.6 9.6	0 6 13 20	0.08 0.03 0.03 0.02	0.03 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.18 0.12 0.12 0.11	0.16 0.10 0.10 0.09	0.12 0.05 0.05 0.04	0.10 0.05 0.05 0.04
BCS-0142 C212 Australia (Spring Creek, Queensland) 2007 (Brooks) Washed fruit	240SC	2	21	1357 1490	9.7 9.7	27	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1547 1263	7.3 7.3	13	0.03	< 0.02	< 0.02	< 0.02	< 0.02	0.12	0.10	0.05	0.05
	240SC	2	7	1686 1553	9.7 9.7	13	0.03	< 0.02	< 0.02	< 0.02	< 0.02	0.12	0.10	0.05	0.05
	240SC	2	7	1686 1626	14.5 14.5	13	0.04	< 0.02	< 0.02	< 0.02	< 0.02	0.13	0.11	0.06	0.06
	240SC	3	7, 7	1477 1515 1244	9.7 9.7 9.7	13	0.12	0.02	< 0.02	< 0.02	< 0.02	0.21	0.18	0.14	0.13
	150OD	2	7	1263 1269	9.6 9.6	13	0.02	0.02	< 0.02	< 0.02	< 0.02	0.11	0.09	0.04	0.04
BCS-0142 C213 Australia (Mt Dangar, Queensland) 2006 (Kensington Pride) Unwashed fruit	240SC	2	21	1136 1149	9.7 9.7	14 21 28 35	0.04 0.06 0.04 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 0.04 < 0.02 < 0.02	< 0.02 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.13 0.18 0.13 < 0.11	0.11 0.16 0.11 < 0.09	0.06 0.08 0.06 < 0.04	0.06 0.07 0.06 < 0.04
	240SC	2	7	1141– 1151	7.3 7.3	0 7 14 21	0.14 0.10 0.03 0.06	0.03 0.03 < 0.02 0.02	< 0.02 0.02 < 0.02 0.03	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.24 0.20 0.12 0.16	0.21 0.17 0.10 0.14	0.18 0.14 0.05 0.08	0.15 0.12 0.05 0.07
	240SC	2	7	1141– 1151	9.7 9.7	0 7 14 21	0.10 0.06 0.07 0.03	0.03 < 0.02 < 0.02 < 0.02	0.04 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.22 0.15 0.16 0.12	0.19 0.13 0.14 0.10	0.14 0.08 0.09 0.05	0.12 0.07 0.08 0.05
	240SC	2	7	1141–	14.5	0	0.28	0.09	< 0.02	< 0.02	< 0.02	0.46	0.39	0.39	0.34

Study No. Trial No. Country Year (Variety)	Form	Application				PHI Days	Residues (mg/kg)								
		No	Interval Days	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro equiv. pulp and skin	Total spiro equiv whole fruit	spiro + enol – pulp and skin	spiro + enol – whole fruit basis
				1151	14.5	7 14 21	0.16 0.12 0.10	0.03 0.05 0.04	< 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02	0.26 0.25 0.21	0.23 0.21 0.18	0.20 0.18 0.15	0.17 0.16 0.13
	240SC	3	7, 7	1141–1151	9.7 9.7 9.7	0 7 14 21	0.16 0.09 0.08 0.11	0.04 < 0.02 0.03 0.03	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.27 0.18 0.18 0.21	0.24 0.15 0.16 0.18	0.21 0.11 0.12 0.15	0.18 0.10 0.10 0.13
	150OD	2	7	1141–1151	9.6 9.6	0 7 14 21	0.10 0.04 0.05 0.06	0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.19 0.13 0.14 0.15	0.16 0.11 0.12 0.13	0.12 0.06 0.07 0.08	0.11 0.06 0.06 0.07
BCS-0142 C213 Australia (Mt Dangar, Queensland) 2006 (Kensington Pride) Washed fruit	240SC	2	21	1136 1149	9.7 9.7	28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1141–1151	7.3 7.3	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1141–1151	9.7 9.7	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1141–1151	14.5 14.5	14	0.04	< 0.02	0.03	< 0.02	< 0.02	0.14	0.12	0.06	0.06
	240SC	3	7, 7	1141–1151	9.7 9.7 9.7	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	150OD	2	7	1141–1151	9.6 9.6	14	0.04	0.02	< 0.02	< 0.02	< 0.02	0.13	0.11	0.06	0.06
BCS-0142 C214 Australia (Delta, Queensland) 2007 (Keitt) Unwashed fruit	240SC	2	21	1019 1025	9.7 9.7	14 21 28 35	0.05 < 0.02 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.14 < 0.11 0.11 < 0.11	0.12 < 0.09 0.09 < 0.09	0.07 < 0.04 0.04 < 0.04	0.06 < 0.04 0.04 < 0.04
	240SC	2	7	1023–1028	7.3 7.3	0 7 14 21	0.19 0.02 < 0.02 < 0.02	0.03 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.29 0.11 < 0.11 < 0.11	0.25 0.09 < 0.09 < 0.09	0.23 0.04 < 0.04 < 0.04	0.20 0.04 < 0.04 < 0.04
	240SC	2	7	1023–1028	9.7 9.7	0 7 14 21	0.15 < 0.02 < 0.02 < 0.02	0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.24 < 0.11 < 0.11 < 0.11	0.21 < 0.09 < 0.09 < 0.09	0.17 < 0.04 < 0.04 < 0.04	0.15 < 0.04 < 0.04 < 0.04
	240SC	2	7	1023–1028	14.5 14.5	0 7 14 21	0.24 0.02 < 0.02 < 0.02	0.04 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.35 0.11 < 0.11 < 0.11	0.31 0.09 < 0.09 < 0.09	0.29 0.04 < 0.04 < 0.04	0.25 0.04 < 0.04 < 0.04
	240SC	3	7, 7	1022–1028	9.7 9.7 9.7	0 7 14 21	0.12 0.03 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.21 0.12 < 0.11 < 0.11	0.18 0.10 < 0.09 < 0.09	0.14 0.05 < 0.04 < 0.04	0.13 0.05 < 0.04 < 0.04
	150OD	2	7	1023–1028	9.6 9.6	0 7 14 21	0.11 < 0.02 < 0.02 < 0.02	0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.20 < 0.11 < 0.11 < 0.11	0.17 < 0.09 < 0.09 < 0.09	0.13 < 0.04 < 0.04 < 0.04	0.12 < 0.04 < 0.04 < 0.04
BCS-0142 C214 Australia (Delta, Queensland) 2007 (Keitt)	240SC	2	21	1019 1025	9.7 9.7	28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1023–1028	7.3 7.3	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1023–1028	9.7 9.7	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04

Study No. Trial No. Country Year (Variety)	Form	Application				PHI Days	Residues (mg/kg)								
		No	Interval Days	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro equiv. pulp and skin	Total spiro equiv whole fruit	spiro + enol – pulp and skin	spiro + enol – whole fruit basis
Washed fruit	240SC	2	7	1023– 1028	14.5 14.5	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	3	7	1022– 1028	9.7 9.7 9.7	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	150OD	2	7	1023– 1028	9.6 9.6	14	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
BCS-0142 C215 Australia (Walkamin, Queensland) 2007 (Palmer) Unwashed fruit	240SC	2	21	1010 1010	9.7 9.7	14 21 28 35	0.02 0.02 < 0.02 0.03	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.11 0.11 < 0.11 0.12	0.09 0.09 < 0.09 0.10	0.04 0.04 < 0.04 0.05	0.04 0.04 < 0.04 0.05
	240SC	2	7	1010 1010	7.3 7.3	0 7 14 21	0.09 0.06 0.04 0.03	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.18 0.15 0.13 0.12	0.15 0.13 0.11 0.10	0.11 0.08 0.06 0.05	0.10 0.07 0.06 0.05
	240SC	2	7	1010 1010	9.7 9.7	0 7 14 21	0.17 0.07 0.02 0.03	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.26 0.16 0.11 0.12	0.22 0.14 0.09 0.10	0.19 0.09 0.04 0.05	0.17 0.08 0.04 0.05
	240SC	2	7	1010 1010	14.5 14.5	0 7 14 21	0.18 0.17 0.1 0.06	0.02 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.27 0.26 0.19 0.15	0.23 0.22 0.16 0.13	0.20 0.19 0.12 0.08	0.18 0.17 0.11 0.07
	240SC	3	7, 7	1010 1010 1010	9.7 9.7	0 7 14 21	0.21 0.12 0.05 0.05	0.03 0.03 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.31 0.22 0.14 0.14	0.27 0.19 0.12 0.12	0.25 0.16 0.07 0.07	0.21 0.14 0.06 0.06
	150OD	2	7	1010 1010	9.6 9.6	0 7 14 21	0.1 0.05 0.03 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	< 0.02 < 0.02 < 0.02 < 0.02	0.19 0.14 0.12 0.11	0.16 0.12 0.10 0.09	0.12 0.07 0.05 0.04	0.11 0.06 0.05 0.04
BCS-0142 C215 Australia (Walkamin, Queensland) 2007 (Palmer) Washed fruit	240SC	2	21	1010 1010	9.7 9.7	28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1010 1010	7.3 7.3	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1010 1010	9.7 9.7	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	240SC	2	7	1010 1010	14.5 14.5	14	0.02	< 0.02	< 0.02	< 0.02	< 0.02	0.12	0.10	0.04	0.04
	240SC	3	7, 7	1010 1010 1010	9.7 9.7	14	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04
	150OD	2	7	1010 1010	9.6 9.6	14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.09	< 0.04	< 0.04

Bulb vegetables

Table 9 Residues from the foliar application of spirotetramat to onions in Australia (Radunz 2008, BCS-0180, BCS-0183 and BCS-0184)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg)						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro (spiro equiv.)	spiro + enol (spiro equiv.)
BCS-0180 C190 Australia Abbotsham, 7315 Tasmania 2006 (Cream Gold)	240SC	1	-	48	232		10	< 0.02	0.05	< 0.02	< 0.02	< 0.02	0.15	0.08
							16	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							23	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							30	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							37	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							44	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
		1	-	54	263		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							6	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							13	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							27	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							34	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	10	46 52	225 255		0	< 0.02	0.04	< 0.02	< 0.02	< 0.02	0.13	0.07
							6	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							13	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							20	< 0.02	0.05	< 0.02	< 0.02	< 0.02	0.15	0.08
							27	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							34	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
	240SC	1	-	71	231		10	< 0.02	0.04	< 0.02	< 0.02	< 0.02	0.13	0.07
							16	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							23	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							30	< 0.02	0.04	< 0.02	< 0.02	< 0.02	0.13	0.07
							37	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							44	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
		1	-	79	255		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							6	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							13	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							20	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							27	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							34	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	10	73 81	237 263		0	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							6	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							13	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							20	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							27	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							34	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
BCS-0183 C203 Australia Kindred, 7310 Tasmania 2007 (Cream Gold)	240SC	1	-	R1 49 R2 53	R1 258 R2 275		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							14	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
								< 0.02	0.04	< 0.02	< 0.02	< 0.02	0.13	0.07
							22	< 0.02	0.04	< 0.02	< 0.02	< 0.02	0.13	0.07
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	0.04	< 0.02	< 0.02	< 0.02	0.13	0.07
								< 0.02	0.04	< 0.02	< 0.02	< 0.02	0.13	0.07
							35	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	14	R1 46 53 R2	R1 240 275 R2		0	< 0.02	0.05	< 0.02	< 0.02	< 0.02	0.15	0.08
								< 0.02	0.06	< 0.02	< 0.02	< 0.02	0.16	0.09
							7	< 0.02	0.14	< 0.02	< 0.02	< 0.02	0.26	0.19
								< 0.02	0.09	< 0.02	< 0.02	< 0.02	0.20	0.13
							14	< 0.02	0.06	< 0.02	< 0.02	< 0.02	0.16	0.09

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg)						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro (spiro equiv.)	spiro + enol (spiro equiv.)
				51	268			< 0.02	0.13	< 0.02	< 0.02	< 0.02	0.25	0.18
				53	275		22	< 0.02	0.11	< 0.02	< 0.02	< 0.02	0.22	0.16
								< 0.02	0.08	< 0.02	< 0.02	< 0.02	0.18	0.12
							28	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
								< 0.02	0.08	< 0.02	< 0.02	< 0.02	0.18	0.12
							35	< 0.02	0.15	< 0.02	< 0.02	< 0.02	0.27	0.21
								< 0.02	0.11	< 0.02	< 0.02	< 0.02	0.22	0.16
		1	-	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				77	268			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							7	< 0.02	0.05	< 0.02	< 0.02	< 0.02	0.15	0.08
				R2	R2			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				68	237		14	< 0.02	0.08	< 0.02	< 0.02	< 0.02	0.18	0.12
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							22	< 0.02	0.06	< 0.02	< 0.02	< 0.02	0.16	0.09
								< 0.02	0.07	< 0.02	< 0.02	< 0.02	0.17	0.11
							28	< 0.02	0.05	< 0.02	< 0.02	< 0.02	0.15	0.08
								< 0.02	0.04	< 0.02	< 0.02	< 0.02	0.13	0.07
							35	< 0.02	0.06	< 0.02	< 0.02	< 0.02	0.16	0.09
								< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
		2	14	R1	R1		0	< 0.02	0.06	< 0.02	< 0.02	< 0.02	0.16	0.09
				68	237			< 0.02	0.02	< 0.02	< 0.02	< 0.02	0.11	0.04
				73	255		7	< 0.02	0.15	< 0.02	< 0.02	< 0.02	0.27	0.21
								< 0.02	0.07	< 0.02	< 0.02	< 0.02	0.17	0.11
				R2	R2		14	< 0.02	0.06	< 0.02	< 0.02	< 0.02	0.16	0.09
				77	268			< 0.02	0.09	< 0.02	< 0.02	< 0.02	0.20	0.13
				77	268		22	< 0.02	0.21	< 0.02	< 0.02	< 0.02	0.34	0.28
								< 0.02	0.07	< 0.02	< 0.02	< 0.02	0.17	0.11
							28	< 0.02	0.06	< 0.02	< 0.02	< 0.02	0.16	0.09
								< 0.02	0.13	< 0.02	< 0.02	< 0.02	0.25	0.18
							35	< 0.02	0.07	< 0.02	< 0.02	< 0.02	0.17	0.11
								< 0.02	0.05	< 0.02	< 0.02	< 0.02	0.15	0.08
BCS-0183 C204 Australia Jerilderie, 2716 New South Wales 2007 (Long Keeper Red)	240SC	1	-	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				50	260			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				R2	R2			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				55	288		15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							32	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	12	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				46	240			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				58	300		7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				R2	R2		15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				46	240			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				50	260		21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							32	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		1	-	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				79	273			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				R2	R2			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				78	270		15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg)						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro (spiro equiv.)	spiro + enol (spiro equiv.)
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							32	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	12	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				70	243			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				81	280		7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				R2	R2		15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				73	253			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				79	273		21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							32	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
BCS-0183 C205 Australia Murray Bridge, 5252 South Australia 2007 (Sandridge Brown)	240SC	1	-	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				53	275			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				R2	R2			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				51	265		14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							34	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	15	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				65	340			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				59	308		7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				R2	R2		14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				52	270			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				49	255		21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							34	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		1	-	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				75	260			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				R2	R2			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				86	298		14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							34	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	15	R1	R1		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				66	230			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				75	260		7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				R2	R2		14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg)						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro (spiro equiv.)	spiro + enol (spiro equiv.)
				75	260			< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				73	255		21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							28	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							34	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
								< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
BCS-0184 C266 Australia 7301 Longford, Tasmania 2007 (Tanya red)	240SC	1	-	53	333		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							14	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	14	56	352		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				49	303		7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							14	< 0.02	0.02	< 0.02	< 0.02	< 0.02	0.11	0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		1	-	75	314		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							7	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							14	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							21	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
		2	14	83	345		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				73	305		7	< 0.02	0.02	< 0.02	< 0.02	< 0.02	0.11	0.04
							14	< 0.02	0.02	< 0.02	< 0.02	< 0.02	0.11	0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
BCS-0184 C267 Australia 2703 Yanco, Tasmania 2007 (Terranova Cream Gold)	240SC	1	-	50	260		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							15	0.06	0.03	< 0.02	< 0.02	< 0.02	0.16	0.10
							22	0.05	0.03	< 0.02	< 0.02	< 0.02	0.15	0.09
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							36	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	13	57	295		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				50	260		8	0.05	0.04	< 0.02	< 0.02	< 0.02	0.16	0.10
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							22	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	0.04	0.03	< 0.02	< 0.02	< 0.02	0.14	0.08
							36	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		1	-	78	273		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							15	0.06	0.04	< 0.02	< 0.02	< 0.02	0.17	0.11
							22	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							36	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	13	78	270		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
				69	240		8	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							22	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							36	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
BCS-0184 C268 Australia 2716 Jerilderie, New South Wales 2007 (Cream Gold)	240SC	1	-	47	244		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							22	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							36	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	13	55	287		0	0.07	0.03	< 0.02	< 0.02	< 0.02	0.17	0.11
				50	262		8	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							22	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							36	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg)						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro (spiro equiv.)	spiro + enol (spiro equiv.)
		1	-	68	238		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							22	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							36	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	13	73 74	255 256		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							22	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							36	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
BCS-0184 C281 Australia 2315 Gawler, Tasmania 2008 (Red)	240SC	1	-	55	343		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							35	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	17	50 53	314 333		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							21	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							35	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		1	-	75	314		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							15	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							21	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							29	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							35	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
		2	17	80 66	333 276		0	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04
							8	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							15	< 0.02	0.03	< 0.02	< 0.02	< 0.02	0.12	0.06
							21	< 0.02	0.02	< 0.02	< 0.02	< 0.02	0.11	0.04
							29	< 0.02	0.02	< 0.02	< 0.02	< 0.02	0.11	0.04
							35	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.11	< 0.04

Note: C203-205 had replicate plots R1 and R2

Brassica vegetables

Table 10 Residues from the foliar application of spirotetramat to Brussels sprouts in Europe (JMPR evaluation 2008)

Study No. Trial No. Country Year	Form.	Application				PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No. Appls	Int days	kg ai/ha	kg ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + Enol
RA-2039/04 R 2004 0160 4 0160-04 Germany D-53773 Hennef (Nordrhein-Westfalen) 2004	OD 100	3	7	0.0720	0.01440	0[a]	0.01	0.022	0.012	< 0.012	< 0.008	0.064	0.032
						0	0.03	0.044	0.016	< 0.012	< 0.008	0.11	0.074
						3	0.01	0.041	0.013	< 0.012	< 0.008	0.084	0.051
						7	0.01	0.051	0.025	< 0.012	< 0.008	0.11	0.061
						14	0.01	0.053	0.014	< 0.012	< 0.008	0.097	0.063
RA-2039/04 R 2004 0161 2 0161-04	OD 100	3	7	0.0720	0.01440	0[a]	< 0.01	0.012	0.012	< 0.012	< 0.008	0.055	0.013
						0	0.01	0.018	0.013	< 0.012	< 0.008	0.055	0.019
						3	0.01	0.021	0.012	< 0.012	< 0.008	0.055	0.031

Study No. Trial No. Country Year	Form.	Application				PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No. Appls	Int days	kg ai/ha	kg ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + Enol
Germany D-40764 Langenfeld, Hof Weitz 2004						7 14	0.01 0.01	0.035 0.041	0.018 0.017	< 0.012 < 0.012	< 0.008 < 0.008	0.074 0.088	0.036 0.051
RA-2039/04 R 2004 0162 0 0162-04 France F-27340 Criquebeuf sur Seine (Haute-Normandie) 2004	OD 100	3	3/10	0.0720	0.01440	0[a] 0 3 8 14 21	0.01 0.02 0.01 < 0.01 < 0.01 < 0.01	0.023 0.043 0.039 0.069 0.051 0.051	0.023 0.034 0.025 0.032 0.023 0.016	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	< 0.008 < 0.008 < 0.008 < 0.008 < 0.008 < 0.008	0.076 0.12 0.094 0.13 0.10 0.097	0.033 0.063 0.049 0.079 0.061 0.061
RA-2039/04 R 2004 0163 9 0163-04 France F-62390 Fontaine L'etalon 2004	OD 100	3	7/8	0.0720	0.01440	0 0 3 7 14 21	< 0.01 0.01 0.01 0.01 < 0.01 < 0.01	0.042 0.051 0.075 0.099 0.098 0.13	0.014 0.023 0.032 0.045 0.043 0.058	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	< 0.008 < 0.008 < 0.008 < 0.008 < 0.008 < 0.008	0.086 0.10 0.14 0.18 0.17 0.22	0.052 0.061 0.085 0.11 0.11 0.14
RA-2066/05 R 2005 0369 5 0369-05 Germany D-59457 Werl-Westönnen (Nordrhein-Westfalen) 2005	150 OD	3	14	0.0720	0.01440	-14 -11 0 3 8 14	0.01 0.01 0.02 0.01 < 0.01 < 0.01	0.032 0.036 0.049 0.029 0.026 0.024	0.029 0.038 0.039 0.030 0.021 0.019	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	0.008 0.009 0.011 0.008 0.008 0.008	0.091 0.11 0.13 0.089 0.077 0.073	0.042 0.046 0.069 0.039 0.036 0.034
RA-2066/05 R 2005 0370 9 0370-05 France F-27340 Criquebeuf sur Seine (Haute-Normandie) 2005	150 OD	3	14	0.0720	0.01440	-14 -11 0 3 7 14	0.01 0.01 0.01 0.01 < 0.01 0.01	0.043 0.041 0.045 0.035 0.041 0.041	0.027 0.023 0.020 0.020 0.017 0.018	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	0.008 0.008 0.008 0.008 0.008 0.008	0.10 0.094 0.095 0.085 0.088 0.089	0.053 0.051 0.055 0.045 0.051 0.051
RA-2066/05 R 2005 0371 7 0371-05 Germany D-53332 Bornheim (Nordrhein-Westfalen) 2005	150 OD	3	14	0.0720	0.01440	-14 -11 0[a] 0 3 7 14 21	0.01 0.01 0.02 < 0.01 0.01 0.01 0.01 0.01	0.030 0.033 0.071 0.057 0.057 0.064 0.064 0.060	0.020 0.025 0.046 0.023 0.046 0.034 0.039 0.027	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	< 0.008 0.012 0.008 0.008 0.008 < 0.008 0.008 0.030	0.080 0.092 0.16 0.11 0.13 0.13 0.13 0.14	0.040 0.043 0.091 0.067 0.067 0.074 0.074 0.070
RA-2066/05 R 2005 0372 5 0372-05 United Kingdom GB-IP17 3BS Saxmundham/ Suffolk IP17 3BS (Suffolk) 2005	150 OD	3	14	0.0720	0.01440	-15 -11 0[a] 0 3 7 14 21	0.02 0.01 0.02 < 0.01 0.01 0.01 0.01 < 0.01	0.032 0.033 0.059 0.044 0.053 0.068 0.062 0.065	0.012 0.012 0.012 0.012 0.012 0.012 0.012 0.012	< 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012 < 0.012	0.008 0.008 < 0.008 0.008 < 0.008 < 0.008 < 0.008 < 0.008	0.084 0.075 0.11 0.086 0.095 0.11 0.10 0.11	0.052 0.043 0.079 0.054 0.063 0.078 0.072 0.075

[a] Before final treatment.

Table 11 Residues from the foliar application of spirotetramat to Brussels sprouts in Australia (JMPR evaluation 2008)

Study No. Trial No. Trial SubID Country Year	Application				PHI (days)	Residues [each component, not spirotetramat equivalents] (mg/kg)						
	No.	Int days	kg ai/ha	kg ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro (spiro equiv)	spiro + enol (spiro equiv)
BCS-0087 SA24 AUS-BCS-0087-SA24-B Nairne Australia 2005	3	5-7	0.096	0.013	0[a] 0 1 3 7	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	< 0.02 0.02 0.04 < 0.02 0.03	0.16 0.20 0.17 0.27 0.21	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0.03 0.06 0.04 0.20 0.06	0.25 0.32 0.28 0.48 0.32	< 0.02 < 0.04 0.07 < 0.04 0.06
BCS-0087 SA24 AUS-BCS-0087-SA24-D Nairne Australia 2005	3	5-7	0.0864	0.00480	0[a] 0 1 3 7	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0.06 0.03 0.04 0.11 0.02	0.26 0.29 0.33 0.24 0.33	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0.36 0.18 0.26 0.16 0.35	0.72 0.53 0.64 0.55 <u>0.69</u>	0.09 0.06 0.07 <u>0.15</u> 0.04
BCS-0087 VC30 AUS-BCS-0087-VC30-B Coldstream Australia 2005	3	6-8	0.092	0.010	0[a] 0 1 3 7	< 0.02 0.02 < 0.02 < 0.02 < 0.02	< 0.02 0.03 0.04 0.04 0.02	0.10 0.35 0.39 0.56 0.41	< 0.02 < 0.02 < 0.02 < 0.02 < 0.02	0.03 0.05 0.06 0.15 0.18	0.15 0.52 0.56 <u>0.83</u> 0.65	< 0.04 0.06 0.07 <u>0.07</u> 0.04

[a] Before final treatment.

Legume vegetables

Table 12 Residues in edible podded peas from the foliar application of spirotetramat to peas in the USA (Brungardt and Beedle 2009, RAFNP043)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP043 FN041-07BA USA (Gardner, North Dakota) 2007 (Dwarf Grey)	150OD	2	6	88 91	141 151	62 60	1	0.079 0.079	1.1 0.93	0.089 0.061	< 0.01 < 0.01	0.012 0.010	<u>1.3</u> 1.1	<u>1.2</u> 1.0
	240SC	2	6	90 91	144 152	63 60	1	0.13 0.11	1.1 1.1	0.069 0.058	< 0.01 < 0.01	0.013 0.011	1.3 1.3	1.2 1.2
RAFNP043 FN042-07HA USA (Arkansaw, Wisconsin) 2007 (Oregon Sugar Pod II)	150OD	2	7	90 90	177 178	51 51	1	0.32 0.26	0.34 0.32	0.049 0.043	< 0.01 < 0.01	0.016 0.014	<u>0.74</u> 0.65	<u>0.66</u> 0.58
RAFNP043 FN043-07HA USA (Parkdale, Oregon) 2007 (Green Arrow)	150OD	2	7	88 90	150 128	59 70	1	0.18 0.16	0.40 0.38	0.034 0.032	< 0.01 < 0.01	< 0.01 < 0.01	<u>0.63</u> 0.59	<u>0.58</u> 0.54

Table 13 Residues in common beans (pods and/or immature seeds) from the foliar application of spirotetramat to snap beans in the USA (Brungardt and Beedle 2009, RAFNP043)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP043 FN035-07BA USA (Germansville, Pennsylvania) 2007 (Savannah)	150OD	2	7	91 91	184 184	49 49	1	0.058 0.085	0.44 0.44	0.18 0.29	< 0.01 < 0.01	< 0.01 < 0.01	0.70 0.84	0.50 0.53
	240SC	2	7	91 91	184 181	49 50	1	0.053 0.040	0.37 0.20	0.17 0.12	< 0.01 < 0.01	< 0.01 < 0.01	0.61 0.38	0.42 0.24
RAFNP043 FN036-07HA USA (Athens, Georgia) 2007 (Contender)	150OD	2	7	89 88	111 100	80 88	1	0.27 0.21	0.40 0.37	0.094 0.086	< 0.01 < 0.01	0.025 0.023	0.80 0.70	0.67 0.58
RAFNP043 FN037-07HA USA (Plant City, Florida) 2007 (Blue Lake)	150OD	2	6	91 90	153 122	59 74	1	0.14 0.21	0.16 0.22	0.069 0.085	< 0.01 < 0.01	< 0.01 0.011	0.39 0.54	0.30 0.43
RAFNP043 FN038-07DA USA (Springfield Nebraska) 2007 (Bush Blue Lake)	150OD	2	6	88 89	128 126	69 71	0	0.087 0.12	0.21 0.25	0.065 0.075	< 0.01 < 0.01	< 0.01 < 0.01	0.38 0.47	0.30 0.37
							1	0.052 0.044	0.17 0.20	0.088 0.087	< 0.01 < 0.01	< 0.01 < 0.01	0.33 0.35	0.22 0.24
							5	< 0.01 < 0.01	0.31 0.36	0.097 0.080	< 0.01 < 0.01	0.013 0.013	0.44 0.47	0.32 0.37
							9	< 0.01 < 0.01	0.26 0.23	0.063 0.048	< 0.01 < 0.01	0.019 0.014	0.36 0.31	0.27 0.24
							13	< 0.01 < 0.01	0.13 0.13	0.045 0.048	< 0.01 < 0.01	0.016 0.015	0.21 0.21	0.14 0.14
RAFNP043 FN039-07BA USA (Richland Iowa) 2007 (Bush Blue Lake)	150OD	2	6	91 91	160 161	57 57	1	< 0.01 < 0.01	0.049 0.038	0.073 0.058	< 0.01 < 0.01	< 0.01 < 0.01	0.15 0.13	0.059 0.048
	240SC	2	6	91 90	157 160	58 56	1	< 0.01 < 0.01	0.043 0.030	0.045 0.026	< 0.01 < 0.01	< 0.01 < 0.01	0.12 0.086	0.053 0.040
RAFNP043 FN040-07HA USA (Rupert Idaho) 2007 (Bush Blue Lake 274)	150OD	2	7	87 90	96 95	91 95	1	0.032 0.012	0.14 0.10	0.068 0.039	< 0.01 < 0.01	< 0.01 < 0.01	0.26 0.17	0.17 0.11

Table 14 Residues on succulent seeds from shelled peas from the foliar application of spirotetramat to garden peas in the USA (Brungardt and Beedle 2009, RAFNP044)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP044 FN050-07HA USA (Chula, Georgia) 2007 (Garden Knight)	150OD	2	7	87 88	170 162	51 54	1	< 0.01 < 0.01	0.58 0.39	0.15 0.26	< 0.01 < 0.01	< 0.01 < 0.01	0.76 0.68	0.59 0.40

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP044 FN051-07DA USA (Richland Iowa) 2007 (Laxton's Progress #9)	150OD	2	7	88 88	130 150	68 59	0	< 0.01 < 0.01	0.28 0.24	0.037 0.060	< 0.01 < 0.01	< 0.01 < 0.01	0.35 0.33	0.29 0.25
							1	< 0.01 < 0.01	0.39 0.36	0.11 0.11	< 0.01 < 0.01	< 0.01 < 0.01	0.53 0.50	0.40 0.37
							4	< 0.01 < 0.01	0.42 0.36	0.097 0.086	< 0.01 < 0.01	< 0.01 < 0.01	0.55 0.48	0.43 0.37
							10	< 0.01 < 0.01	0.21 0.23	0.042 0.053	< 0.01 < 0.01	< 0.01 < 0.01	0.28 0.31	0.22 0.24
							13	< 0.01 < 0.01	0.10 0.12	0.014 0.019	< 0.01 < 0.01	< 0.01 < 0.01	0.14 0.17	0.11 0.13
RAFNP044 FN052-07BA USA (Springfield, Nebraska) 2007 (Lincoln)	150OD	2	7	89 89	132 126	67 71	1	< 0.01 < 0.01	0.53 0.55	0.18 0.15	< 0.01 < 0.01	< 0.01 < 0.01	0.74 0.73	0.54 0.56
	240SC	2	7	89 89	131 126	68 71	1	< 0.01 < 0.01	0.42 0.35	0.11 0.12	< 0.01 < 0.01	< 0.01 < 0.01	0.56 0.50	0.43 0.36
RAFNP044 FN053-07HA USA (Arkansaw, Wisconsin) 2007 (Lazor)	150OD	2	7	88 89	174 176	51 51	1	< 0.01 < 0.01	0.35 0.35	0.070 0.058	< 0.01 < 0.01	< 0.01 < 0.01	0.45 0.44	0.36 0.36
RAFNP044 FN054-07BA USA (Rupert, Idaho) 2007 (Little Marvel)	150OD	2	7	86 92	163 159	53 58	1	< 0.01 < 0.01	0.38 0.39	0.081 0.067	< 0.01 < 0.01	< 0.01 < 0.01	0.49 0.49	0.39 0.40
	240SC	2	7	84 90	161 157	52 57	1	< 0.01 < 0.01	0.31 0.28	0.047 0.043	< 0.01 < 0.01	< 0.01 < 0.01	0.39 0.35	0.32 0.29
RAFNP044 FN055-07HA USA (Cornelius, Oregon) 2007 (Sugar Snap)	150OD	2	5	87 91	151 141	58 65	1	< 0.01 < 0.01	0.45 0.51	0.085 0.078	< 0.01 < 0.01	< 0.01 < 0.01	0.57 0.62	0.46 0.52

Table 15 Residues on succulent seeds from shelled beans from the foliar application of spirotetramat to Lima beans in the USA (Brungardt and Beedle 2009, RAFNP044)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP044 FN044-07DA USA (Sycamore, Georgia) 2007 (Fordhook 242)	150OD	2	7	90 90	162 167	56 54	0	< 0.01 < 0.01	0.30 0.27	0.039 0.040	< 0.01 < 0.01	0.054 0.053	0.41 0.38	0.31 0.28
							1	< 0.01 < 0.01	0.32 0.31	0.040 0.051	< 0.01 < 0.01	0.059 0.059	0.44 0.44	0.33 0.32
							5	< 0.01 < 0.01	0.21 0.18	0.027 0.024	< 0.01 < 0.01	0.063 0.054	0.32 0.28	0.22 0.19
							10	< 0.01 < 0.01	0.12 0.038	0.024 0.015	0.011 < 0.01	0.070 0.047	0.24 0.12	0.13 0.048
							14	< 0.01 < 0.01	0.055 0.11	0.019 0.025	0.012 0.013	0.056 0.067	0.15 0.23	0.065 0.12
RAFNP044 FN045-07BA USA (Athens, Georgia) 2007 (Jackson Wonder)	150OD	2	7	89 89	105 133	85 67	1	< 0.01 < 0.01	0.082 0.093	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.12 0.13	0.092 0.10
	240SC	2	7	90 88	105 131	86 67	1	< 0.01 < 0.01	0.066 0.077	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.11 0.12	0.076 0.087

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP044 FN046-07HA USA (Seven Springs, North Carolina) 2007 (Thorogreen Bush)	150OD	2	7	88 90	158 164	56 55	1	< 0.01 < 0.01	0.16 0.17	0.039 0.039	< 0.01 < 0.01	0.012 0.013	0.23 0.24	0.17 0.18
RAFNP044 FN047-07BA USA (Springfield, Nebraska) 2007 (Fordhook)	150OD	2	6	88 89	126 129	70 69	1	< 0.01 < 0.01	0.21 0.22	0.039 0.041	< 0.01 < 0.01	0.025 0.024	0.29 0.31	0.22 0.23
	240SC	2	6	90 88	129 129	70 68	1	< 0.01 < 0.01	0.17 0.17	0.029 0.028	< 0.01 < 0.01	0.021 0.017	0.24 0.24	0.18 0.18
RAFNP044 FN048-07HA USA (Live Oak, California) 2007 (Lee)	150OD	2	7	89 88	142 140	63 63	1	< 0.01 < 0.01	0.17 0.18	0.032 0.034	< 0.01 < 0.01	0.020 0.020	0.24 0.25	0.18 0.19
RAFNP044 FN049-07HA USA (Jerome Idaho) 2007 (Fordhook)	150OD	2	6	89 88	172 172	52 51	1	< 0.01 < 0.01	0.069 0.055	< 0.01 0.011	< 0.01 < 0.01	< 0.01 < 0.01	0.11 0.096	0.079 0.065

Pulses

Table 16 Residues on soya bean seed (dry) from the foliar application of spirotetramat to soya bean in the USA and Canada (Dallstream and Krolski 2009, RAFNP015)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP015 FN014-07BA Seven Springs North Carolina 2007 (Pioneer 95M50)	150OD	2	7	88 89	150 152	59 59	21	< 0.01 < 0.01	0.23 0.26	0.045 0.043	< 0.01 < 0.01	< 0.01 < 0.01	0.31 0.33	0.24 0.27
	240SC	2	7	89 90	151 154	59 58	21	< 0.01 < 0.01	0.38 0.27	0.070 0.065	< 0.01 < 0.01	< 0.01 < 0.01	0.48 0.37	0.39 0.28
RAFNP015 FN015-07HA USA Athens Georgia 2007 (S76-L9)	150OD	2	8	88 89	169 168	52 53	21	< 0.01 < 0.01	0.044 0.061	< 0.01 0.018	< 0.01 < 0.01	< 0.01 < 0.01	0.084 0.11	0.054 0.071
RAFNP015 FN016-07BA USA Proctor Arkansas 2007 (AG4403RR)	150OD	2	7	89 89	132 132	67 67	21	< 0.01 < 0.01	1.6 2.2	0.18 0.21	0.037 0.048	0.21 0.24	2.0 2.7	1.6 2.2
	240SC	2	7	89 89	132 132	67 67	21	< 0.01 < 0.01	0.90 1.3	0.12 0.14	0.022 0.033	0.11 0.13	1.2 1.6	0.91 1.3
RAFNP015 FN017-07HA USA Newport Arkansas 2007 (SG4680NRR)	150OD	2	7	89 89	188 187	47 48	21	< 0.01 < 0.01	0.12 0.10	0.012 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.16 0.14	0.13 0.11
RAFNP015 FN018-07HA USA Scott Arkansas 2007 (Armor 4767)	150OD	2	7	89 85	185 163	48 52	21	< 0.01 < 0.01	0.033 0.035	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.073 0.075	0.043 0.045

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP015 FN019-07DA Canada Rockwood Ontario 2007 (Dekalb 26-02R)	150OD	2	7	90 89	165 167	55 53	7	< 0.01 < 0.01	0.47 0.54	0.023 0.026	< 0.01 < 0.01	< 0.01 < 0.01	0.52 0.60	0.48 0.55
							14	< 0.01 < 0.01	1.1 0.67	0.040 0.013	< 0.01 < 0.01	< 0.01 < 0.01	1.2 0.71	1.1 0.68
							21	< 0.01 < 0.01	1.5 1.5	0.043 0.048	< 0.01 < 0.01	0.012 0.012	1.6 1.6	1.5 1.5
							28	< 0.01 < 0.01	0.92 0.93	0.028 0.029	< 0.01 < 0.01	< 0.01 < 0.01	0.98 0.99	0.93 0.94
							34	< 0.01 < 0.01	1.1 1.3	0.036 0.035	< 0.01 < 0.01	< 0.01 < 0.01	1.2 1.4	1.1 1.3
RAFNP015 FN020-07DA USA Gardner North Dakota 2007 (4238491)	150OD	2	7	90 91	150 138	60 66	7	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 < 0.05	< 0.02 < 0.02
							13	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 < 0.05	< 0.02 < 0.02
							21	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 < 0.05	< 0.02 < 0.02
							27	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 < 0.05	< 0.02 < 0.02
							35	< 0.01 < 0.01	< 0.01 0.019	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 0.059	< 0.02 0.029
RAFNP015 FN024-07HA USA Gardner North Dakota 2007 (S030153)	150OD	2	7	90 90	144 143	63 63	20	< 0.01 < 0.01	2.0 1.7	0.11 0.086	< 0.01 < 0.01	0.021 0.018	2.2 1.8	2.0 1.7
RAFNP015 FN021-07BA Canada Metz Ontario 2007 (Dekalb 26-5R)	150OD	2	7	89 90	168 165	53 55	21	< 0.01 < 0.01	0.28 0.32	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.32 0.36	0.29 0.33
	240SC	2	7	89 89	169 163	53 55	21	< 0.01 < 0.01	0.26 0.26	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.30 0.30	0.27 0.27
RAFNP015 FN022-07BA USA Springfield Nebraska 2007 (NKS32G5)	150OD	2	7	89 88	127 129	70 68	19	< 0.01 < 0.01	0.39 0.40	0.018 0.021	< 0.01 < 0.01	< 0.01 < 0.01	0.44 0.45	0.40 0.41
	240SC	2	7	90 88	128 127	70 69	19	< 0.01 < 0.01	0.33 0.33	0.012 0.014	< 0.01 < 0.01	< 0.01 < 0.01	0.37 0.37	0.34 0.34
RAFNP015 FN023-07BA USA York Nebraska 2007 (Midland 316RS)	150OD	2	6	89 89	187 187	48 48	20	< 0.01 < 0.01	1.3 1.4	0.075 0.076	< 0.01 < 0.01	0.022 0.025	1.4 1.5	1.3 1.4
	240SC	2	6	89 88	187 189	48 47	20	< 0.01 < 0.01	1.4 1.5	0.075 0.088	< 0.01 < 0.01	0.026 0.026	1.5 1.6	1.4 1.5
RAFNP015 FN025-07HA USA Campbell Minnesota 2007 (DynaGro 33T06)	150OD		7	89 89	140 140	64 64	18	< 0.01 < 0.01	0.75 0.71	0.020 0.020	< 0.01 < 0.01	0.025 0.028	0.82 0.78	0.76 0.72
RAFNP015 FN026-07HA USA Ollie Iowa 2007 (Asgrow 3802)	150OD	2	7	88 88	164 154	54 57	19	< 0.01 < 0.01	0.14 0.14	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.18 0.18	0.15 0.15
RAFNP015 FN027-07HA USA New Holland Ohio 2007 (Crop Plan 3935)	150OD	2	7	91 91	150 150	61 61	20	< 0.01 < 0.01	0.74 0.74	0.024 0.023	< 0.01 < 0.01	0.058 0.052	0.84 0.84	0.75 0.75
RAFNP015 FN028-07HA	150OD	2	7	88 87	140 139	63 63	21	< 0.01 < 0.01	0.043 0.051	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.083 0.091	0.053 0.061

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
USA Gardner Kansas 2007 (NK-S39-K6 RR)														
RAFNP015 FN029-07HA USA Carlyle Illinois 2007 (5N382RR)	150OD	2	7	90 91	150 149	60 61	21	< 0.01 < 0.01	0.026 0.032	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.066 0.072	0.036 0.042
RAFNP015 FN030-07HA USA Richwood Ohio 2007 (Shur Grow 354 RR)	150OD	2	7	88 89	163 164	54 54	21	< 0.01 < 0.01	1.1 1.1	0.042 0.035	< 0.01 < 0.01	< 0.01 < 0.01	1.2 1.2	1.1 1.1
RAFNP015 FN031-07HA FN031-07HA-B USA Clarence Missouri 2007 (Pioneer 93M95)	150OD	2	7	89 89	169 167	53 53	19	< 0.01 < 0.01	0.99 0.96	0.029 0.029	< 0.01 < 0.01	< 0.01 < 0.01	1.0 1.0	1.0 0.97
RAFNP015 FN032-07HA USA Ellendale Minnesota 2007 (Pioneer 91M70)	150OD	2	7	90 89	167 165	54 54	21	< 0.01 < 0.01	0.26 0.24	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.30 0.28	0.27 0.25
RAFNP015 FN033-07HA USA Arkansaw Wisconsin 2007 (Brunner 2101 RR Grp 2)	150OD	2	7	91 87	180 172	51 51	21	< 0.01 < 0.01	0.12 0.11	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.16 0.15	0.13 0.12

Table 17 Residues on shelled beans (dry) from the foliar application of spirotetramat to cowpeas in the USA (Dallstream and Beedle 2009, RAFNP045)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN057-07BA USA Springfield, Nebraska 2007 (Blackeyed Peas)	150OD	2	7	88 89	128 128	69 70	7	< 0.01 < 0.01	0.053 0.050	< 0.01 < 0.01	0.074 0.076	0.019 0.019	0.17 0.17	0.063 0.060
	240SC	2	7	88 89	127 129	69 69	7	< 0.01 < 0.01	0.041 0.040	0.011 < 0.01	0.068 0.053	0.016 0.016	0.15 0.13	0.051 0.050
RAFNP045 FN058-07BA USA Saginaw, Michigan 2007 (Vista Navy)	150OD	2	7	89 89	164 165	54 54	7	< 0.01 < 0.01	0.082 0.088	0.010 0.011	< 0.01 < 0.01	< 0.01 < 0.01	0.12 0.13	0.092 0.098
	240SC	2	7	89 89	164 165	54 54	7	< 0.01 < 0.01	0.085 0.095	0.013 0.012	< 0.01 < 0.01	< 0.01 < 0.01	0.13 0.14	0.095 0.11
RAFNP045 FN059-07HA USA Geneva, Minnesota 2007 (Great Northern)	150OD	2	7	89 89	163 163	55 55	7	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 < 0.05	< 0.02 < 0.02

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN060-07HA USA Grand Island, Nebraska 2007 (Black Eye Southern)	150OD	2	7	89 88	187 185	48 48	7	< 0.01 < 0.01	0.046 0.057	0.011 0.024	0.076 0.071	0.025 0.020	0.17 0.18	0.056 0.067
RAFNP045 FN061-07HA USA Levelland, Texas 2007 (Vision)	150OD	2	6	89 91	144 142	62 64	7	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 < 0.05	< 0.02 < 0.02
RAFNP045 FN064-07HA USA Jerome, Idaho 2007 (Purple Hull Pinkeye) [a]	150OD	2	5	89 89	174 167	51 53	7	< 0.01 < 0.01	0.53 0.51	0.047 0.047	0.49 0.46	0.15 0.10	1.2 1.1	0.54 0.52
RAFNP045 FN062-07HA USA Jerome, Idaho 2007 (Othello Pinto) [a]	150OD	2	7	89 89	172 172	52 52	7	< 0.01 < 0.01	0.67 0.72	0.032 0.029	< 0.01 < 0.01	0.039 0.031	0.76 0.80	0.68 0.73
RAFNP045 FN063-07HA USA Fresno, California 2007 (Othello Pinto)	150OD	2	7	89 88	142 141	63 62	7	< 0.01 < 0.01	< 0.01 0.016	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 0.056	< 0.02 0.026
RAFNP045 FN056-07DB USA Gardner, North Dakota 2008 (Navigator)	150OD	2	5	91 88	176 177	52 50	0	0.011 < 0.01	0.040 0.047	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.081 0.087	0.051 0.057
							3	< 0.01 < 0.01	0.079 0.079	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.12 0.12	0.089 0.089
							7	< 0.01 < 0.01	0.27 0.25	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.31 0.29	0.28 0.26
							10	< 0.01 < 0.01	0.32 0.35	0.012 0.014	< 0.01 < 0.01	< 0.01 < 0.01	0.36 0.39	0.33 0.36
							14	< 0.01 < 0.01	0.47 0.45	0.015 0.016	< 0.01 < 0.01	< 0.01 < 0.01	0.52 0.50	0.48 0.46

[a] independent trials for estimation of maximum residue levels. Different crop varieties, different application dates (15/8 and 22/8 for one trial and 23/7 and 30/7 for the other, different growth stages for applications BBCH 64/70, BBCH 80/87 for one trial and BBCH 39/55 and BBCH 79/83 for the other)

Table 18 Residues on shelled peas (dry) from the foliar application of spirotetramat to peas in the USA (Dallstream and Beedle 2009, RAFNP045)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN065-07DB USA Rupert, Idaho 2008 (Early Alaska)	150OD	2	6	91 91	188 180	48 51	0	0.050 0.032	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.09 0.072	0.06 0.042
							3	0.040 0.041	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.080 0.081	0.05 0.051
							7	0.027 0.021	0.012 0.012	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.069 0.063	0.039 0.033
							10	0.020 0.020	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.060 0.060	0.030 0.030
							13	0.020 0.027	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.060 0.067	0.030 0.037

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN066-07BA USA Parkdale, Oregon 2007 (Green Arrow)	150OD	2	7	84 89	176 149	48 60	7	0.016 0.013	0.14 0.12	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.19 0.16	0.16 0.13
	240SC	2	7	87 90	183 148	48 61	7	0.015 < 0.01	0.11 0.22	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.16 0.26	0.13 0.23
RAFNP045 FN067-07HA USA Ephrata, Washington 2007 (Tonic)	150OD	2	7	90 89	181 179	50 50	7	< 0.01 < 0.01	0.97 1.0	0.020 0.021	< 0.01 < 0.01	< 0.01 < 0.01	1.0 1.1	0.98 1.0
RAFNP045 FN068-07HA USA Jerome, Idaho 2007 (Pendelton)	150OD	2	7	89 89	174 171	51 52	7	0.011 0.036	0.66 0.68	0.020 0.034	< 0.01 < 0.01	< 0.01 0.015	0.71 0.78	0.67 0.72
RAFNP045 FN069-07HA USA Payette, Idaho 2007 (Austrian Winter Peas)	150OD	2	7	87 88	185 188	47 47	7	0.016 0.015	0.19 0.14	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.24 0.19	0.21 0.16

Oilseeds

Table 19 Residues in cotton seed from the foliar application of spirotetramat to cotton in the USA (Krolski and Helfrich 2009, RAFNP013)

Study No. Trial No. Country Year (Variety)	Form	Application					Portion analysed	PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP013 FN001-07HA USA (Corapeake, North Carolina) 2007 (DP444BR)	150OD	2	8	89 90	98 99	91 91	Fuzzy seed	32	< 0.01 < 0.01	< 0.01 < 0.01	0.016 0.023	< 0.01 < 0.01	< 0.01 < 0.01	0.056 0.063	< 0.02 < 0.02
RAFNP013 FN002-07HA USA (Proctor, Arkansas) 2007 (ST4554B2RF)	150OD	2	7	88 89	90 91	98 98	Fuzzy seed	21	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 < 0.05	< 0.02 < 0.02
	240SC	2	7	88 88	90 91	98 97	Fuzzy seed	21	< 0.01 < 0.01	< 0.01 < 0.01	0.011 < 0.01	< 0.01 < 0.01	0.014 < 0.01	0.055 < 0.05	< 0.02 < 0.02
RAFNP013 FN003-07HA USA (Newport, Arkansas) 2007 (DP 143 B2RF)	150OD	2	7	88 88	93 93	95 95	Fuzzy seed	20	< 0.01 < 0.01	< 0.01 < 0.01	0.017 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.057 < 0.05	0.02 < 0.02
RAFNP013 FN004-07HA USA (Cheneyville, Louisiana) 2007 (Phytogen 370 WR)	150OD	2	7	89 92	139 141	64 65	Fuzzy seed	21	< 0.01 < 0.01	0.020 0.012	0.027 0.022	< 0.01 < 0.01	< 0.01 < 0.01	0.077 0.064	0.030 0.022
RAFNP013 FN005-07HA USA (Uvalde, Texas) 2007 (DP 143 B2RF)	150OD	2	7	90 89	133 144	68 62	Fuzzy seed	21	< 0.01 < 0.01	0.023 0.023	0.015 0.019	0.032 0.037	< 0.01 < 0.01	0.090 0.099	0.033 0.033

Study No. Trial No. Country Year (Variety)	Form	Application					Portion analysed	PHI days	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP013 FN009-07HA USA (Uvalde, Texas) 2007 (DPL 434)	150OD	2	6	89 90	155 174	57 52	Fuzzy seed	18	< 0.01 < 0.01	0.042 0.039	0.055 0.060	< 0.01 < 0.01	< 0.01 < 0.01	0.13 0.13	0.052 0.049
RAFNP013 FN006-07DA USA (Levelland, Texas) 2007 (FM9063B2F)	150OD	2	8	89 88	94 94	95 94	Fuzzy seed	0	0.095 0.073	0.050 0.049	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.18 0.15	0.15 0.12
								3	0.086 0.13	0.029 0.045	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.15 0.21	0.12 0.18
								19	0.24 0.17	0.016 0.011	< 0.01 0.011	< 0.01 < 0.01	< 0.01 < 0.01	0.29 0.21	0.26 0.18
								27	0.16 0.19	0.019 0.015	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.21 0.24	0.18 0.21
								32	0.11 0.12	0.014 0.015	< 0.01 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.15 0.17	0.12 0.14
	240SC	2	8	88 84	94 93	94 90	Fuzzy seed	19	0.21 0.22	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.25 0.26	0.22 0.23
RAFNP013 FN007-07HA USA (Hinton Oklahoma) 2007 (ST 4554B2RF)	150OD	2	7	90 89	139 118	65 75	Fuzzy seed	21	< 0.01 0.012	0.036 0.037	0.030 0.038	< 0.01 < 0.01	< 0.01 < 0.01	0.096 0.11	0.046 0.049
RAFNP013 FN008-07HA USA (Larned, Kansas) 2007 (FiberMax958LL)	150OD	2	7	88 88	167 169	53 52	Fuzzy seed	19	< 0.01 < 0.01	0.023 0.021	0.026 0.027	< 0.01 < 0.01	< 0.01 < 0.01	0.079 0.078	0.033 0.031
RAFNP013 FN010-07HA USA (Sanger, California) 2007 (FM 966LL)	150OD	2	7	88 90	142 142	62 63	Fuzzy seed	21	0.050 0.011	0.044 < 0.01	0.014 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.13 0.051	0.094 0.021
	240SC	2	7	92 90	148 141	62 64	Fuzzy seed	21	0.011 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.051 < 0.05	0.021 < 0.02
RAFNP013 FN011-07HA USA (Tulare, California) 2007 (Phytogen 725 RR)	150OD	2	7	89 89	157 160	57 56	Fuzzy seed	22	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 < 0.05	< 0.02 < 0.02
RAFNP013 FN012-07HA USA (Kettleman City, California) 2007 (Delta P & L 340 Pima)	150OD	2	7	90 91	164 162	55 56	Fuzzy seed	18	0.076 0.064	0.016 0.023	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.12 0.12	0.092 0.087

Animal Feeds

Note: Animal feed residues are expressed on a wet weight basis. Dry matter content values are tabulated.

Table 20 Residues on dry bean forage from the foliar application of spirotetramat to cowpeas in the USA (Dallstream and Beedle 2009, RAFNP045)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	%DM	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Int Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN057-07BA USA Springfield, Nebraska 2007 (Blackeyed peas)	150OD	2	7	89 89	132 126	67 71	3	28	1.1 0.90	0.42 0.33	0.26 0.19	1.5 1.1	0.11 0.11	3.4 2.6	1.5 1.2
							6	31	0.44 0.54	0.12 0.16	0.068 0.076	0.64 0.71	0.081 0.077	1.3 1.6	0.56 0.70
	240SC	2	7	90 88	132 125	68 70	3	46	1.5 1.6	0.40 0.40	0.19 0.21	0.95 0.98	0.043 0.062	3.1 3.3	1.9 2.0
							6	18	0.83 1.0	0.20 0.22	0.078 0.087	0.47 0.50	0.035 0.044	1.6 1.9	1.0 1.2
RAFNP045 FN058-07BA USA Saginaw, Michigan 2007 (Vista Navy)	150OD	2	7	89 89	161 163	55 55	3	33	0.37 0.48	0.62 0.77	0.36 0.44	< 0.01 < 0.01	0.047 0.044	1.4 1.7	0.99 1.3
							7	41	0.71 0.85	0.71 0.90	0.38 0.54	< 0.01 < 0.01	0.035 0.035	1.8 2.3	1.4 1.8
	240SC	2	7	89 89	161 163	55 55	3	49	1.2 0.32	1.1 0.45	0.56 0.28	< 0.01 < 0.01	0.075 0.021	2.9 1.1	2.3 0.77
							7	59	1.5 1.9	1.1 1.4	0.61 0.74	< 0.01 < 0.01	0.044 0.046	3.3 4.1	2.6 3.3
RAFNP045 FN059-07HA USA Geneva, Minnesota 2007 (Great Northern)	150OD	2	6	88 90	155 158	57 57	3	38	0.66 0.41	0.50 0.36	0.82 0.56	< 0.01 < 0.01	0.035 0.043	2.0 1.4	1.2 0.77
							7	28	0.023 0.049	0.058 0.084	0.14 0.21	< 0.01 < 0.01	0.023 0.043	0.25 0.40	0.081 0.13
RAFNP045 FN060-07HA FN060-07HA-A USA Grand Island, Nebraska 2007 (Black Eye Southern)	150OD	2	7	90 87	189 184	48 47	3	43	0.28 0.25	0.38 0.36	0.33 0.28	1.1 1.0	0.073 0.051	2.2 1.9	0.66 0.61
							6	39	0.041 0.047	0.041 0.051	0.064 0.064	0.48 0.58	0.038 0.040	0.66 0.78	0.082 0.098
RAFNP045 FN064-07HA USA Jerome, Idaho 2007 (Purple Hull Pinkeye)	150OD	2	5	90 89	174 170	52 52	3	34	0.73 1.3	0.14 0.22	0.048 0.078	0.60 1.0	0.037 0.089	1.6 2.7	0.87 1.5
							7	45	0.039 0.034	0.025 0.020	0.020 0.015	0.47 0.43	0.051 0.056	0.61 0.56	0.064 0.054
RAFNP045 FN056-07DB USA Gardner, North Dakota 2008 (Navigator)	150OD	2	6	91 91	188 180	48 51	0	45	1.5 2.1	1.5 2.2	0.39 0.39	< 0.01 < 0.01	0.015 0.020	3.4 4.7	3.0 4.3
							3	27	1.1 1.1	1.2 1.2	0.35 0.39	< 0.01 < 0.01	0.030 0.039	2.7 2.7	2.3 2.3
							7	45	0.77 0.91	0.63 0.85	0.28 0.31	< 0.01 < 0.01	0.028 0.042	1.7 2.1	1.4 1.8
							10	35	0.22 0.21	0.48 0.55	0.20 0.18	< 0.01 < 0.01	0.045 0.048	0.96 1.0	0.70 0.76
							14	36	0.089 0.090	0.31 0.22	0.11 0.081	< 0.01 < 0.01	0.029 0.023	0.55 0.42	0.40 0.31

Note: Forage was harvested at 3 and 6–7 days PHI at between BBCH 30–59 growth stages.

Table 21 Residues on dry bean hay from the foliar application of spirotetramat to cowpeas in the USA (Dallstream and Beedle 2009, RAFNP045)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	%DM	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN057-07BA USA Springfield, Nebraska 2007 (Blackeyed peas)	150OD	2	7	88 89	128 128	69 70	3	63	0.075 0.054	0.16 0.11	0.34 0.20	0.38 0.30	0.089 0.089	1.0 0.75	0.24 0.16
							7	67	0.048 0.019	0.067 0.063	0.15 0.11	0.16 0.075	0.097 0.042	0.52 0.31	0.12 0.082
	240SC	2	7	88 89	127 129	69 69	3	63	0.018 0.012	0.15 0.073	0.26 0.15	0.11 0.082	0.049 0.044	0.59 0.36	0.17 0.085
							7	61	< 0.01 0.011	0.084 0.042	0.13 0.11	0.062 0.096	0.027 0.055	0.31 0.31	0.094 0.053
RAFNP045 FN058-07BA USA Saginaw, Michigan 2007 (Vista Navy)	150OD	2	7	89 89	164 165	54 54	3	57	0.24 0.15	0.26 0.25	0.47 0.52	< 0.01 < 0.01	0.10 0.13	1.1 1.1	0.50 0.40
							7	58	0.14 0.045	0.31 0.20	0.42 0.24	< 0.01 < 0.01	0.089 0.037	0.97 0.53	0.45 0.25
	240SC	2	7	89 89	164 165	54 54	3	63	0.021 0.039	0.069 0.19	0.16 0.34	< 0.01 < 0.01	0.032 0.058	0.29 0.64	0.090 0.23
							7	61	0.023 0.060	0.16 0.22	0.29 0.52	< 0.01 < 0.01	0.042 0.047	0.53 0.86	0.18 0.28
RAFNP045 FN059-07HA USA Geneva, Minnesota 2007 (Great Northern)	150OD	2	7	89 89	163 163	55 55	3	72	0.032 0.021	0.088 0.050	0.13 0.093	< 0.01 < 0.01	0.016 < 0.01	0.28 0.18	0.12 0.071
							7	73	0.019 < 0.01	0.063 0.040	0.12 0.089	< 0.01 < 0.01	0.018 < 0.01	0.23 0.16	0.082 0.050
RAFNP045 FN060-07HA USA Grand Island, Nebraska 2007 (Black Eye Southern)	150OD	2	7	89 88	187 185	48 48	3	81	0.67 0.62	0.22 0.24	0.73 0.87	0.025 0.28	0.071 0.13	1.7 2.1	0.89 0.86
							7	71	0.029 0.051	0.040 0.048	0.21 0.28	0.11 0.16	0.035 0.089	0.42 0.63	0.069 0.099
RAFNP045 FN064-07HA USA Jerome, Idaho 2007 (Purple Hull Pinkeye)	150OD	2	5	89 89	174 167	51 53	3	58	0.40 0.49	0.17 0.26	0.11 0.19	0.57 0.78	0.097 0.15	1.3 1.9	0.57 0.75
							7	67	0.73 0.65	0.26 0.36	0.21 0.26	1.2 1.1	0.22 0.17	2.6 2.5	0.99 1.0
RAFNP045 FN056-07DB USA Gardner, North Dakota 2008 (Navigator)	150OD	2	5	91 88	176 177	52 50	0	85	2.5 1.8	1.4 1.1	0.68 0.51	< 0.01 < 0.01	< 0.01 < 0.01	4.6 3.4	3.9 2.9
							3	83	0.28 0.24	0.40 0.40	0.36 0.28	< 0.01 < 0.01	< 0.01 < 0.01	1.1 0.94	0.68 0.64
							7	82	0.24 0.12	0.32 0.27	0.41 0.34	< 0.01 < 0.01	0.010 0.011	0.99 0.75	0.56 0.39
							10	86	0.20 0.17	0.37 0.33	0.49 0.41	< 0.01 < 0.01	0.015 0.013	1.1 0.93	0.57 0.50
							14	63	0.12 0.084	0.15 0.16	0.19 0.20	< 0.01 < 0.01	0.019 0.014	0.49 0.47	0.27 0.24

Note: Hay was cut at 3 and 6–7 days PHI at between BBCH 85–89 growth stages. The hay was allowed to dry 3 to 12 days to reach commercial dryness prior to sampling.

Table 22 Residues on dry pea hay from the foliar application of spirotetramat to peas in the USA (Dallstream and Beedle 2009, RAFNP045)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	%DM	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN065-07DB USA Rupert, Idaho 2008	150OD	2	6	91 88	176 177	52 50	0	84	3.5 4.0	0.82 0.97	0.29 0.33	0.042 0.058	0.019 0.019	4.7 5.4	4.3 5.0
							3	77	0.51 0.30	0.53 0.30	0.28 0.15	0.068 0.033	0.034 0.021	1.4 0.80	1.0 0.6

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	%DM	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
(Early Alaska)							7	79	0.12 0.29	0.050 0.090	0.056 0.092	0.012 0.021	0.014 0.024	0.25 0.52	0.17 0.38
							10	84	0.12 0.077	0.052 0.046	0.064 0.051	0.014 < 0.01	0.026 0.018	0.28 0.20	0.17 0.12
							14	77	0.030 0.034	0.012 0.015	0.015 0.021	< 0.01 < 0.01	0.015 0.019	0.082 0.099	0.042 0.049
RAFNP045 FN066-07BA USA Parkdale, Oregon 2007 (Green Arrow)	150OD	2	7	88 87	163 163	54 53	3	67	0.26 0.20	0.12 0.14	0.29 0.14	< 0.01 < 0.01	0.025 0.012	0.71 0.50	0.38 0.34
							7	60	0.088 0.027	0.21 0.16	0.14 0.075	< 0.01 < 0.01	0.019 0.015	0.47 0.29	0.30 0.19
	240SC	2	7	92 87	170 162	54 54	3	58	0.16 0.10	0.28 0.12	0.14 0.12	< 0.01 < 0.01	0.022 0.015	<u>0.61</u> 0.37	0.44 0.22
							7	63	0.079 0.099	0.16 0.11	0.078 0.074	< 0.01 < 0.01	< 0.01 0.017	0.34 0.31	0.24 0.21
RAFNP045 FN067-07HA FN067-07HA-A Ephrata, Washington 2007 (Tonic)	150OD	2	7	89 89	178 178	50 50	3	56	0.026 0.013	0.31 0.32	0.13 0.11	< 0.01 < 0.01	< 0.01 < 0.01	<u>0.49</u> 0.46	0.34 0.33
							7	76	< 0.01 0.015	0.42 0.40	0.062 0.085	< 0.01 < 0.01	0.014 0.012	0.52 0.52	0.43 0.42
RAFNP045 FN068-07HA USA Jerome, Idaho 2007 (Pendelton)	150OD	2	6	88 88	175 169	50 52	3	59	2.5 4.6	0.62 0.79	0.21 0.26	< 0.01 < 0.01	0.017 0.025	3.4 <u>5.7</u>	3.1 5.4
							7	68	1.2 1.0	0.26 0.26	0.31 0.31	< 0.01 < 0.01	0.036 0.039	1.8 1.6	1.5 1.3
RAFNP045 FN069-07HA USA Payette, Idaho 2007 (Austrian Winter Peas)	150OD	2	6	88 87	186 184	47 47	3	65	4.4 4.4	0.61 0.68	0.080 0.084	< 0.01 < 0.01	0.025 0.031	5.1 <u>5.2</u>	5.0 5.1
							7	77	2.9 4.1	0.38 0.43	0.096 0.088	< 0.01 < 0.01	0.029 0.019	3.4 4.6	3.3 4.5

Note: Pea hay was harvested at 3 and 6–7 days PHI at a target BBCH 70 growth stage. The hay was allowed to dry 3 to 9 days to reach commercial dryness prior to sampling.

Table 23 Residues on dry pea vines from the foliar application of spirotetramat to peas in the USA (Dallstream and Beedle 2009, RAFNP045)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN065-07DB USA Rupert, Idaho 2008 (Early Alaska)	150OD	2	6	91 88	176 177	52 50	0	41	1.8 1.7	0.89 0.85	0.10 0.12	0.011 0.012	< 0.01 < 0.01	2.8 2.7	2.7 2.6
							3	31	0.090 0.16	0.56 0.51	0.14 0.15	0.020 0.021	< 0.01 < 0.01	0.82 <u>0.85</u>	0.65 0.67
							7	22	0.033 0.046	0.089 0.15	0.041 0.064	< 0.01 0.012	< 0.01 < 0.01	0.18 0.28	0.12 0.20
							10	17	0.017 0.014	0.036 0.046	0.020 0.021	< 0.01 < 0.01	< 0.01 < 0.01	0.093 0.10	0.053 0.06
							14	16	< 0.01 < 0.01	< 0.01 0.012	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.05 0.052	< 0.02 0.022
RAFNP045 FN066-07BA USA Parkdale, Oregon 2007 (Green Arrow)	150OD	2	7	88 87	163 163	54 53	3	44	0.079 0.050	0.082 0.088	0.098 0.10	< 0.01 < 0.01	< 0.01 0.011	0.28 0.27	0.16 0.14
							7	42	0.024 0.037	0.088 0.081	0.024 0.044	< 0.01 < 0.01	< 0.01 0.011	0.16 0.18	0.11 0.12
	240SC	2	7	92 87	170 162	54 54	3	27	0.10 0.086	0.094 0.067	0.084 0.058	< 0.01 < 0.01	0.017 < 0.01	<u>0.31</u> 0.23	0.19 0.15
							7	42	0.069 0.077	0.050 0.055	0.041 0.038	< 0.01 < 0.01	0.014 0.010	0.18 0.19	0.12 0.13

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP045 FN067-07HA USA Ephrata, Washington 2007 (Tonic)	150OD	2	7	89 89	178 178	50 50	3	43	0.014 0.015	0.20 0.16	0.045 0.041	< 0.01 < 0.01	< 0.01 < 0.01	0.28 0.24	0.21 0.18
							7	29	< 0.01 < 0.01	0.14 0.14	0.021 0.024	< 0.01 < 0.01	< 0.01 < 0.01	0.19 0.19	0.15 0.15
RAFNP045 FN068-07HA USA Jerome, Idaho 2007 (Pendelton)	150OD	2	6	88 88	175 169	50 52	3	36	1.1 1.4	0.36 0.37	0.10 0.13	< 0.01 < 0.01	< 0.01 < 0.01	1.6 1.9	1.5 1.8
							7	43	0.26 0.32	0.14 0.15	0.092 0.10	< 0.01 < 0.01	0.011 0.010	0.51 0.59	0.40 0.47
RAFNP045 FN069-07HA USA Payette, Idaho 2007 (Austrian Winter Peas)	150OD	2	6	88 87	186 184	47 47	3	28	2.4 2.5	0.43 0.51	0.086 0.099	< 0.01 < 0.01	0.012 0.011	2.9 3.1	2.8 3.0
							7	38	1.8 1.7	0.22 0.27	0.067 0.059	< 0.01 < 0.01	0.011 0.024	2.1 2.1	2.0 2.0

Note: Pea vines were harvested at 3 and 6–7 days PHI at a target BBCH 70 growth stage.

Table 24 Residues on soya bean forage from the foliar application of spirotetramat to soya bean in the USA and Canada (Dallstream and Krolski 2009, RAFNP015)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP015 FN014-07BA Seven Springs North Carolina 2007 (Pioneer 95M50)	150OD	2	7	88 89	157 161	56 55	3	25	1.4 1.2	1.1 0.81	0.86 0.73	0.040 0.036	0.067 0.052	3.5 2.8	2.5 2.0
							7	ND	0.55 0.49	0.40 0.41	0.46 0.42	0.047 0.046	0.098 0.081	1.6 1.4	0.95 0.90
	240SC	2	7	88 88	156 162	56 54	3	19	0.98 1.3	0.44 0.63	0.66 0.72	0.020 0.027	0.038 0.045	2.1 2.7	1.4 1.9
							7	25	1.3 0.35	0.35 0.20	0.60 0.32	0.036 0.021	0.075 0.052	2.4 0.94	1.7 0.55
RAFNP015 FN015-07HA USA Athens Georgia 2007 (S76-L9)	150OD	2	7	89 88	149 155	60 57	3	29	2.5 2.4	0.60 0.55	0.40 0.37	0.019 0.020	0.053 0.049	3.6 3.4	3.1 3.0
							7	22	1.9 2.1	0.32 0.34	0.32 0.38	0.027 0.031	0.048 0.051	2.6 2.9	2.2 2.4
RAFNP015 FN016-07BA USA Proctor Arkansas 2007 (AG4403RR)	150OD	2	7	89 89	133 132	67 67	3	14	2.4 3.0	0.60 0.78	0.44 0.65	< 0.01 0.016	0.036 0.046	3.5 4.5	3.0 3.8
							7	ND	0.77 0.63	0.36 0.33	0.51 0.45	0.015 0.013	0.055 0.059	1.7 1.5	1.1 0.96
	240SC	2	7	89 89	133 132	67 67	3	ND	5.0 4.6	0.94 1.2	0.54 0.57	0.023 0.026	0.056 0.066	6.6 6.5	5.9 5.8
							7	23	1.4 0.97	0.51 0.34	0.60 0.43	0.021 0.015	0.065 0.064	2.6 1.8	1.9 1.3
RAFNP015 FN017-07HA USA Newport Arkansas 2007 (SG4680NCR)	150OD	2	7	89 90	188 190	47 47	3	23	2.0 0.70	0.70 0.59	0.89 0.62	0.038 0.020	0.066 0.047	3.7 2.0	2.7 1.3
							7	24	1.4 1.2	0.48 0.42	0.83 0.74	0.048 0.043	0.093 0.072	2.9 2.5	1.9 1.6
RAFNP015 FN018-07HA USA Scott Arkansas 2007 (Armor 47G7)	150OD	2	7	89 90	137 145	65 62	3	23	1.9 2.4	0.30 0.45	0.54 0.71	0.014 0.033	0.022 0.038	2.8 3.6	2.2 2.9
							7	18	1.4 1.4	0.21 0.26	0.45 0.44	0.026 0.025	0.040 0.043	2.1 2.2	1.6 1.7

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP015 FN019-07DA Canada Rockwood Ontario 2007 (Dekalb 26-02R)	150OD	2	7	87 86	159 156	55 55	0	13	3.2 3.7	2.1 2.8	0.69 0.87	0.018 0.020	0.036 0.044	6.0 7.4	5.3 6.5
							3	12	1.9 2.2	1.3 1.9	0.52 0.61	0.025 0.036	0.053 0.073	3.8 4.8	3.2 4.1
							7	14	1.0 1.5	0.80 0.83	0.38 0.50	0.027 0.036	0.068 0.081	2.3 2.9	1.8 2.3
							10	14	0.16 0.14	0.77 0.69	0.25 0.23	0.026 0.025	0.068 0.067	1.3 1.2	0.93 0.83
							14	22	0.090 0.072	0.31 0.40	0.11 0.13	0.017 0.019	0.052 0.058	0.58 0.68	0.40 0.47
RAFNP015 FN020-07DA USA Gardner North Dakota 2007 (4238491)	150OD	2	7	89 89	139 144	64 62	0	13	4.5 4.4	1.7 1.6	0.55 0.46	< 0.01 < 0.01	0.020 0.019	6.8 6.5	6.2 6.0
							3	12	2.3 1.9	0.84 0.85	0.70 0.70	0.011 < 0.01	0.028 0.030	3.9 3.5	3.1 2.8
							7	19	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.017 0.012	0.057 0.052	< 0.02 < 0.02
							10	11	0.16 0.27	0.11 0.14	0.17 0.19	< 0.01 < 0.01	0.041 0.038	0.49 0.65	0.27 0.41
							13	14	0.21 0.20	0.073 0.068	0.17 0.14	< 0.01 < 0.01	0.042 0.041	0.51 0.46	0.28 0.27
RAFNP015 FN021-07BA Canada Metz Ontario 2007 (Dekalb 26-5R)	150OD	2	7	85 90	155 164	55 55	3	24	4.6 4.5	1.2 1.1	0.73 0.76	0.022 0.024	0.059 0.061	6.6 6.4	5.8 5.6
							7	ND	2.9 3.9	0.95 0.90	0.90 0.98	0.022 0.024	0.065 0.066	4.8 5.9	3.9 4.8
	240SC	2	7	86 85	156 155	55 55	3	ND	1.5 1.7	0.34 0.32	0.28 0.31	< 0.01 < 0.01	0.030 0.029	2.2 2.4	1.8 2.0
							7	17	2.7 1.3	0.88 0.34	0.76 0.43	0.026 < 0.01	0.082 0.037	4.4 2.1	3.6 1.6
RAFNP015 FN022-07BA USA Springfield Nebraska 2007 (NKS32G5)	150OD	2	7	89 90	127 128	70 70	3	12	0.77 0.85	0.94 0.99	0.44 0.43	0.020 0.018	0.045 0.042	2.2 2.3	1.7 1.8
							7	ND	0.24 0.27	0.33 0.35	0.23 0.27	0.021 0.020	0.044 0.039	0.87 0.95	0.57 0.62
	240SC	2	7	88 89	126 127	70 70	3	ND	1.2 0.98	0.65 0.66	0.39 0.34	0.017 0.018	0.036 0.024	2.3 2.0	1.9 1.6
							7	20	0.30 0.25	0.23 0.25	0.24 0.26	0.014 0.016	0.029 0.032	0.81 0.81	0.53 0.50
RAFNP015 FN023-07BA USA York Nebraska 2007 (Midland 316RS)	150OD	2	7	90 89	189 186	48 48	3	ND	0.22 0.22	0.51 0.54	0.36 0.37	0.013 0.014	0.038 0.040	1.1 1.2	0.73 0.76
							7	11	0.056 0.058	0.23 0.21	0.19 0.19	0.012 0.012	0.035 0.034	0.52 0.50	0.29 0.27
	240SC	2	7	88 88	187 186	47 47	3	16	0.12 0.079	0.61 0.54	0.50 0.31	0.023 0.014	0.041 0.035	1.3 0.98	0.73 0.62
							7	ND	0.021 0.018	0.19 0.19	0.17 0.16	0.010 0.013	0.027 0.036	0.42 0.42	0.21 0.21
RAFNP015 FN024-07HA USA Gardner North Dakota 2007 (S030153)	150OD	2	6	91 89	142 145	64 61	3	61	1.3 0.10	0.50 0.46	0.70 0.35	0.029 < 0.01	0.050 0.032	2.6 0.95	1.8 0.56
							7	16	0.048 0.055	0.15 0.12	0.18 0.15	< 0.01 < 0.01	0.026 0.024	0.41 0.36	0.20 0.18
RAFNP015 FN025-07HA USA Campbell Minnesota 2007 (Dyna Gro 33T06)	150OD	2	7	89 89	142 141	63 63	3	19	1.1 1.2	0.78 0.80	0.58 0.68	< 0.01 0.010	0.040 0.036	2.5 2.7	1.9 2.0
							7	12	0.80 0.81	0.31 0.36	0.40 0.44	0.015 0.013	0.033 0.043	1.6 1.7	1.1 1.2
RAFNP015 FN026-07HA USA Ollie Iowa 2007 (Asgrow 3802)	150OD	2	7	89 88	175 172	51 51	3	11	0.63 0.71	0.71 0.48	0.77 0.67	0.012 < 0.01	0.029 0.028	2.2 1.9	1.3 1.2
							7	17	0.081 0.084	0.16 0.17	0.17 0.15	< 0.01 < 0.01	0.037 0.037	0.46 0.45	0.24 0.25

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP015 FN027-07HA USA New Holland Ohio 2007 (Crop Plan 3935)	150OD	2	7	88 89	147 149	60 60	3	21	1.5 2.9	0.70 1.2	0.71 0.88	0.024 0.063	0.039 0.055	3.0 5.1	2.2 4.1
							7	13	0.54 0.36	0.56 0.32	0.40 0.31	0.045 0.029	0.078 0.048	1.6 1.1	1.1 0.68
RAFNP015 FN028-07HA USA Gardner Kansas 2007 (NK-S39-K6 RR)	150OD	2	7	89 90	143 147	62 61	3	25	2.1 2.9	0.74 0.72	0.89 0.92	0.024 0.031	0.028 0.040	3.8 4.6	2.8 3.6
							7	16	0.55 0.48	0.28 0.28	0.36 0.33	0.025 0.026	0.040 0.040	1.3 1.2	0.83 0.76
RAFNP015 FN029-07HA USA Carlyle Illinois 2007 (5N382RR)	150OD	2	7	88 90	131 122	67 74	3	24	3.2 3.4	0.85 0.91	0.39 0.36	0.020 0.019	0.036 0.033	4.5 4.7	4.1 4.3
							7	19	2.2 2.7	0.43 0.53	0.34 0.35	0.029 0.038	0.042 0.054	3.0 3.7	2.6 3.2
RAFNP015 FN030-07HA USA Richwood Ohio 2007 (Shur Grow 354 RR)	150OD	2	7	88 89	160 160	55 56	3	13	1.4 1.1	0.86 0.67	0.92 0.72	0.041 0.034	0.040 0.031	3.3 2.6	2.3 1.8
							7	24	0.21 0.14	0.31 0.28	0.29 0.27	0.029 0.020	0.038 0.034	0.88 0.74	0.52 0.42
RAFNP015 FN031-07HA USA Clarence Missouri 2007 (Pioneer 93M95)	150OD	2	7	91 91	178 177	51 51	3	19	1.6 1.6	0.96 0.99	0.69 0.67	0.011 0.012	0.040 0.039	3.3 3.3	2.6 2.6
							7	21	0.95 0.92	0.34 0.38	0.36 0.39	< 0.01 < 0.01	0.035 0.036	1.7 1.7	1.3 1.3
RAFNP015 FN032-07HA USA Ellendale Minnesota 2007 (Pioneer 91M70)	150OD	2	7	89 89	154 146	58 61	3	23	0.36 0.30	0.96 0.83	0.31 0.27	0.019 0.017	0.037 0.040	1.7 1.5	1.3 1.1
							7	22	0.10 0.10	0.27 0.25	0.19 0.18	0.014 0.013	0.036 0.036	0.61 0.58	0.37 0.35
RAFNP015 FN033-07HA USA Arkansaw Wisconsin 2007 (Brunner 2101 RR Grp 2)	150OD	2	7	88 91	174 180	51 51	3	22	0.11 0.14	0.24 0.29	0.17 0.17	< 0.01 < 0.01	0.029 0.049	0.56 0.66	0.35 0.43
							7	14	0.044 0.047	0.10 0.10	0.091 0.090	< 0.01 < 0.01	0.045 0.041	0.29 0.29	0.14 0.15

Note: Forage was cut at 3 and 6–7 days PHI at between BBCH 30–59 growth stages.

Table 25 Residues on soya bean hay from the foliar application of spirotetramat to soya bean in the USA and Canada (Dallstream and Krolski 2009, RAFNP015)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP015 FN014-07BA Seven Springs North Carolina 2007 (Pioneer 95M50)	150OD	2	7	88 89	157 161	56 55	3	ND [a]	2.9 2.6	1.1 1.0	1.6 1.6	0.095 0.11	0.15 0.15	5.8 5.5	4.0 3.6
							7	ND	0.28 0.21	0.48 0.32	1.2 0.72	0.12 0.067	0.17 0.11	2.3 1.4	0.76 0.53
	240SC	2	7	88 88	156 162	56 54	3	60	0.54 0.75	0.80 0.56	1.1 1.0	0.051 0.051	0.11 0.10	2.6 2.5	1.3 1.3
							7	68	0.11 0.19	0.26 0.27	0.67 0.63	0.064 0.052	0.11 < 0.10	1.2 1.2	0.37 0.46
RAFNP015 FN015-07HA USA Athens Georgia 2007 (S76-L9)	150OD	2	7	89 88	149 155	60 57	3	76	4.4 6.3	1.2 1.1	1.5 1.4	0.063 0.054	0.11 0.10	7.3 9.0	5.6 7.4
							7	77	4.5 4.8	0.73 0.78	1.1 1.2	0.081 0.079	0.12 0.14	6.5 7.0	5.2 5.6

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP015 FN016-07BA USA Proctor Arkansas 2007 (AG4403RR)	150OD	2	7	89 89	133 132	67 67	3	ND	4.3 4.2	1.8 1.6	1.9 1.6	0.063 0.060	0.18 0.19	8.2 7.7	6.1 5.8
							7	53	2.1 1.7	0.73 0.81	1.2 0.92	0.038 0.025	0.18 0.11	4.2 3.6	2.8 2.5
	240SC	2	7	89 89	133 132	67 67	3	61	5.4 4.3	0.84 1.5	0.93 1.2	0.036 0.048	0.11 0.18	7.3 7.2	6.2 5.8
							7	53	3.0 3.4	0.69 0.79	1.3 1.5	0.040 0.042	0.14 0.13	5.2 5.9	3.7 4.2
RAFNP015 FN017-07HA USA Newport Arkansas 2007 (SG4680NRR)	150OD	2	7	89 90	188 190	47 47	3	83	5.2 3.8	1.5 1.1	3.2 2.6	0.19 0.13	0.27 0.22	10 7.9	6.7 4.9
							7	78	3.4 3.7	0.88 0.90	2.3 2.3	0.14 0.18	0.20 0.24	6.9 7.3	4.3 4.6
RAFNP015 FN018-07HA USA Scott Arkansas 2007 (Armor 47G7)	150OD	2	7	89 90	137 145	65 62	3	69	5.9 6.9	0.67 0.67	1.9 1.8	0.066 0.071	0.11 0.12	8.6 9.6	6.6 7.6
							7	69	1.9 1.9	0.22 0.19	0.63 0.52	0.032 0.033	< 0.10 0.11	2.9 2.8	2.1 2.1
RAFNP015 FN019-07DA Canada Rockwood Ontario 2007 (Dekalb 26-02R)	150OD	2	7	87 86	159 156	55 55	0	76	7.3 6.5	4.3 4.3	5.4 4.1	0.12 0.13	0.26 0.25	17 15	12 11
							3	56	2.1 0.75	2.4 1.1	3.7 3.0	0.10 0.065	0.21 0.18	8.5 5.1	4.5 1.9
							7	78	0.47 0.42	0.97 1.1	1.1 1.2	0.066 0.076	0.22 0.24	2.8 3.0	1.4 1.5
							10	73	0.26 0.27	0.60 0.95	0.82 0.97	0.083 0.087	0.24 0.23	2.0 2.5	0.86 1.2
							14	45	0.057 0.12	0.91 0.55	0.40 0.40	0.052 0.048	0.13 0.12	1.5 1.2	0.97 0.67
RAFNP015 FN020-07DA USA Gardner North Dakota 2007 (4238491)	150OD	2	7	89 89	139 144	64 62	0	78	6.6 7.7	2.9 3.1	3.2 4.1	0.056 0.064	0.27 0.22	13 15	9.5 11
							3	71	5.9 2.6	2.1 1.7	2.2 1.7	0.045 0.038	0.10 0.17	10 6.2	8.0 4.3
							7	67	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.18 < 0.10	0.22 < 0.14	< 0.02 < 0.02
							10	86	0.69 0.64	0.22 0.21	0.58 0.56	0.024 0.024	0.15 < 0.10	1.7 1.5	0.91 0.85
							13	60	0.52 0.52	0.18 0.15	0.41 0.38	0.021 0.018	< 0.10 < 0.10	1.2 1.2	0.70 0.67
RAFNP015 FN024-07HA USA Gardner North Dakota 2007 (S030153)	150OD	2	6	91 89	142 145	64 61	3	75	0.36 0.32	1.0 0.90	1.3 1.1	0.034 0.029	< 0.10 < 0.10	2.8 2.4	1.4 1.2
							7	77	0.12 0.13	0.23 0.26	0.59 0.60	0.026 0.028	< 0.10 0.15	1.1 1.2	0.35 0.39
RAFNP015 FN021-07BA Canada Metz Ontario 2007 (Dekalb 26-5R)	150OD	2	7	85 90	155 164	55 55	3	71	4.8 5.3	2.1 2.9	2.7 3.9	0.038 0.055	0.22 0.24	9.9 12	6.9 8.2
							7	70	2.6 3.1	0.82 1.1	2.0 2.9	0.051 0.059	0.24 0.27	5.7 7.4	3.4 4.2
	240SC	2	7	86 85	156 155	55 55	3	74	3.7 1.2	1.6 0.67	2.4 1.5	0.025 0.012	0.19 0.12	7.9 3.5	5.3 1.9
							7	71	0.16 1.3	0.082 0.43	0.41 1.4	< 0.01 0.018	0.17 < 0.10	0.83 3.2	0.24 1.7
RAFNP015 FN022-07BA USA Springfield Nebraska 2007 (NKS32G5)	150OD	2	7	89 90	127 128	70 70	3	ND	2.9 2.0	2.1 1.7	1.3 0.84	0.073 0.056	< 0.10 0.12	6.5 4.7	5.0 3.7
							7	61	0.58 0.45	0.43 0.36	0.54 0.46	0.043 0.043	0.11 0.11	1.7 1.4	1.0 0.81
	240SC	2	7	88 89	126 127	70 70	3	56	3.0 2.4	1.4 1.3	0.96 0.91	0.041 0.039	< 0.10 < 0.10	5.5 4.7	4.4 3.7
							7	61	0.91 0.59	0.47 0.39	0.72 0.57	0.047 0.042	0.11 0.12	2.3 1.7	1.4 0.98

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP015 FN023-07BA USA York Nebraska 2007 (Midland 316RS)	150OD	2	7	90 89	189 186	48 48	3	72	0.50 0.46	0.82 0.75	0.87 0.73	0.052 0.044	0.14 0.12	2.4 2.1	1.3 1.2
							7	72	0.16 0.20	0.45 0.47	0.55 0.59	0.038 0.046	0.13 < 0.10	1.3 1.4	0.61 0.67
	240SC	2	7	88 88	187 186	47 47	3	53	0.22 0.19	0.71 0.65	0.80 0.72	0.044 0.046	0.11 0.14	1.9 1.7	0.93 0.84
							7	72	0.050 0.045	0.32 0.34	0.41 0.44	0.027 0.030	< 0.10 0.10	0.91 0.96	0.37 0.39
RAFNP015 FN025-07HA USA Campbell Minnesota 2007 (Dyna Gro 33T06)	150OD	2	7	89 89	142 141	63 63	3	69	2.4 3.6	1.5 2.1	1.9 0.64	0.041 0.072	< 0.10 0.13	5.9 6.5	3.9 5.7
							7	50	2.1 1.9	1.7 0.69	0.97 0.90	0.042 0.032	0.10 < 0.10	4.9 3.6	3.8 2.6
RAFNP015 FN026-07HA USA Ollie Iowa 2007 (Asgrow 3802)	150OD	2	7	89 88	175 172	51 51	3	71	2.0 2.2	0.99 1.0	2.2 2.0	0.062 0.061	0.14 0.14	5.4 5.4	3.0 3.2
							7	62	0.25 0.26	0.38 0.41	0.47 0.54	0.032 0.035	0.12 0.14	1.3 1.4	0.63 0.67
RAFNP015 FN027-07HA USA New Holland Ohio 2007 (Crop Plan 3935)	150OD	2	7	88 89	147 149	60 60	3	55	1.8 2.0	0.83 0.98	1.6 1.8	0.074 0.083	0.13 0.11	4.4 5.0	2.6 3.0
							7	77	0.68 0.46	0.69 0.56	1.3 1.1	0.12 0.094	0.17 0.15	3.0 2.4	1.4 1.0
RAFNP015 FN028-07HA USA Gardner Kansas 2007 (NK-S39-K6 RR)	150OD	2	7	89 90	143 147	62 61	3	79	6.2 7.6	1.6 1.7	2.2 2.3	0.11 0.10	0.14 0.12	10 12	7.8 9.3
							7	76	1.4 1.2	0.52 0.48	1.0 1.1	0.086 0.081	0.14 0.18	3.1 3.0	1.9 1.7
RAFNP015 FN029-07HA USA Carlyle Illinois 2007 (5N382RR)	150OD	2	7	88 90	131 122	67 74	3	70	1.9 7.0	0.30 0.72	0.72 0.93	0.086 0.10	0.12 0.13	3.1 8.9	2.2 7.7
							7	57	4.0 3.4	1.6 1.6	0.70 2.3	0.081 0.054	0.12 0.14	6.5 7.5	5.6 5.0
RAFNP015 FN030-07HA USA Richwood Ohio 2007 (Shur Grow 354 RR)	150OD	2	7	88 89	160 160	55 56	3	61	1.7 2.0	0.62 0.72	1.0 1.3	0.079 0.098	0.14 0.14	3.5 4.3	2.3 2.7
							7	74	0.35 0.58	0.42 0.46	0.52 0.73	0.071 0.093	0.16 0.18	1.5 2.0	0.77 1.0
RAFNP015 FN031-07HA USA Clarence Missouri 2007 (Pioneer 93M95)	150OD	2	7	91 91	178 177	51 51	3	77	5.0 4.9	2.7 2.3	2.4 2.1	0.058 0.049	0.17 0.15	10 9.5	7.7 7.2
							7	69	3.3 3.1	0.96 0.86	1.3 1.1	0.047 0.041	0.16 0.14	5.8 5.2	4.3 4.0
RAFNP015 FN032-07HA FN032-07HA-A USA Ellendale Minnesota 2007 (Pioneer 91M70)	150OD	2	7	89 89	154 146	58 61	3	58	0.53 0.57	0.48 0.48	0.54 0.53	0.046 0.043	0.11 0.11	1.7 1.7	1.0 1.1
							7	68	0.16 0.16	0.17 0.15	0.40 0.37	0.033 0.027	0.11 0.11	0.87 0.82	0.33 0.31
RAFNP015 FN033-07HA USA Arkansaw Wisconsin 2007 (Brunner 2101 RR Grp 2)	150OD	2	7	88 91	174 180	51 51	3	69	0.48 0.48	0.50 0.54	0.50 0.54	0.032 0.036	< 0.10 < 0.10	1.6 1.7	0.98 1.0
							7	86	0.16 0.12	0.27 0.20	0.28 0.22	0.026 0.021	< 0.10 0.12	0.84 0.68	0.43 0.32

Note: Hay was cut at 3 and 6-7 days PHI at between BBCH 85-89 growth stages. The hay was allowed to dry 3 to 12 days to reach commercial dryness prior to sampling.

Note: LOQ for enol-glucoside in soya bean hay is 0.10 mg/kg.

[a] Used average DM content from same trial (64%) in calculation to dry weight

Table 26 Residues in cotton gin byproducts (gin trash) from the foliar application of spirotetramat to cotton in the USA (Krolski and Helfrich 2009, RAFNP013)

Study No. Trial No. Country Year (Variety)	Form	Application					PHI days	% Dry Matter	Residues (mg/kg) expressed as spirotetramat equivalents						
		No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL			spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP013 FN001-07HA USA (Corapeake, North Carolina) 2007 (DP444BR)	150OD	2	8	89 90	98 99	91 91	32	86.9	< 0.01 0.013	0.055 0.083	0.32 0.48	< 0.01 < 0.01	< 0.01 < 0.01	0.41 0.60	0.065 0.096
RAFNP013 FN002-07HA USA (Proctor, Arkansas) 2007 (ST4554B2RF)	150OD	2	7	88 89	90 91	98 98	21	85.1	0.045 0.021	0.12 0.13	0.26 0.28	< 0.01 < 0.01	0.23 0.21	0.67 0.65	0.17 0.15
	240SC	2	7	88 88	90 91	98 97	21	82.8	0.034 0.035	0.12 0.12	0.25 0.25	< 0.01 < 0.01	0.13 0.17	0.54 0.59	0.15 0.16
RAFNP013 FN003-07HA USA (Newport, Arkansas) 2007 (DP 143 B2RF)	150OD	2	7	88 88	93 93	95 95	20	85.2	0.015 0.019	0.070 0.072	0.36 0.40	< 0.01 < 0.01	< 0.01 < 0.01	0.47 0.51	0.085 0.091
RAFNP013 FN005-07HA USA (Uvalde, Texas) 2007 (DP 143 B2RF)	150OD	2	7	90 89	133 144	68 62	21	79.8	0.021 0.016	0.023 0.030	0.040 0.052	0.022 0.020	0.046 0.038	0.15 0.16	0.044 0.046
RAFNP013 FN006-07DA USA (Levelland, Texas) 2007 (FM9063B2F)	150OD	2	8	89 88	94 94	95 94	0	48.4	3.6 3.5	2.1 3.4	0.23 0.40	< 0.01 < 0.01	0.59 0.63	6.5 7.9	5.7 6.9
							3	66.9	5.1 3.6	1.0 1.0	0.17 0.14	< 0.01 < 0.01	0.28 0.24	6.6 5.0	6.1 4.6
							19	80.2	2.5 2.5	0.11 0.11	0.071 0.073	< 0.01 < 0.01	0.078 0.075	2.8 2.8	2.6 2.6
							27	79.8	1.4 2.1	0.11 0.14	0.065 0.10	< 0.01 < 0.01	0.041 0.070	1.6 2.4	1.5 2.2
							32	82.4	2.5 4.2	0.17 0.26	0.13 0.23	< 0.01 < 0.01	0.099 0.17	2.9 4.9	2.7 4.5
	240SC	2	8	88 84	94 93	94 90	19	81.5	2.8 2.5	0.088 0.081	0.055 0.047	< 0.01 < 0.01	0.053 0.040	3.0 2.7	2.9 2.6
RAFNP013 FN007-07HA USA (Hinton Oklahoma) 2007 (ST 4554B2RF)	150OD	2	7	90 89	139 118	65 75	21	81.2	0.19 0.17	0.53 0.54	0.47 0.41	< 0.01 < 0.01	0.047 0.048	1.2 1.2	0.72 0.71

FATE OF RESIDUES IN STORAGE AND PROCESSING

In storage

No information was provided on the fate of spirotetramat residues under commercial storage conditions.

In processing

A cotton processing study was conducted in the USA to determine residues in cottonseed, cottonseed meal, cottonseed hulls and cottonseed refined oil following two foliar spray applications of spirotetramat to cotton plants at 443 and 444 g ai/ha (approximately 5× the maximum seasonal rate) with 7 days between applications. The first application was made at growth stage BBCH 42 (about 20% of bolls open) with the second application made at growth stage BBCH 84 (about 40% of bolls open). A single composite sample was collected from both the treated and untreated plots 21 days

after the final application at the normal growth stage for commercial harvest and ginned. Sub-samples of the undelinted cottonseed raw agricultural commodity (RAC) were removed and the remaining cottonseed (approximately 24 kg) was used to generate the required processed commodities of meal, hulls and oil (refined, bleached and deodorised). Processing was performed using procedures which simulated commercial processing practices. Undelinted cottonseed (ginned) samples were delinted to remove of the most remaining lint and produce delinted cottonseed with approximately 3% lint remaining on the seed. Delinting produced delinted cottonseed, linters and linter motes. The delinted seed was mechanically cracked and the hull material was then separated from the kernel. Kernel material was processed into meal and crude oil. Crude oil was sequentially converted to refined oil, bleached oil, deodorized oil and deodorizer distillates.

Results are summarised in Table 27. Processing factors were 1.25 and 1.05 (based on total parent equivalents residues for cotton meal and hulls respectively) and 2.28 and 0.55 (based on residues of parent + enol for cotton meal and hulls respectively). Processing factors were < 1 for refined oil.

Table 27 Residues on cotton processed fractions from the foliar application of spirotetramat to cotton in the USA (Dallstream and Krolski 2009, RAFNP014–1)

Study No. Trial No. Country Year (Variety)	Application					Portion analysed	Residues (mg/kg) expressed as spirotetramat equivalents						
	No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP014–1 FN013-07PA USA (Uvalde, Texas) 2007 (DP 143 B2RF)	2	7	443 446	131 144	338 310	Fuzzy seed	< 0.01 < 0.01 < 0.01	0.16 0.17 0.17	0.10 0.12 0.12	0.25 0.29 0.27	0.049 0.044 0.051	0.57 0.63 0.62 Av. 0.61	0.17 0.18 0.18 Av. 0.18
						Meal	< 0.01 < 0.01 < 0.01	0.37 0.43 0.41	0.10 0.10 0.097	0.17 0.20 0.19	0.060 0.058 0.060	0.71 0.80 0.77 Av. 0.76 TF = 1.25	0.38 0.44 0.42 Av. 0.41 TF = 2.28
						Hull	< 0.01 < 0.01 < 0.01	0.076 0.10 0.094	0.12 0.15 0.14	0.33 0.45 0.40	0.011 0.015 0.013	0.55 0.73 0.65 Av. 0.64 TF = 1.05	0.086 0.11 0.10 Av. 0.099 TF = 0.55
						Oil, refined	< 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	< 0.05 < 0.05 < 0.05 Av. < 0.05 TF = <1	< 0.02 < 0.02 < 0.02 Av. < 0.02 TF = <1

Undelinted cotton seed 8.98% moisture. Cottonseed meal 6.20% moisture. Cottonseed hulls 11.6% moisture.

A soya bean processing study was conducted in the USA to determine residues in soya bean seed, aspirated grain fractions and various soya bean processed commodities following two foliar spray applications of spirotetramat to soya beans at 435 and 439 g ai/ha (5× the maximum seasonal rate) with 5 days between applications. The first application was made at growth stage BBCH 75 (about 50% of pods have reached final length) with the second application made at growth stage BBCH 77 (about 70% of pods have reached final length). A single composite sample was collected from both the treated and untreated plots 18 days after the final application at the normal growth stage for commercial harvest. Prior to processing, sub-samples of the soya bean seed were removed and the remaining seed (approximately 45 kg) was used to firstly generate aspirated grain fractions and the required processed commodities of meal, hulls and oil (refined, bleached and deodorised). In addition defatted flour and milk were generated. Processing was performed using procedures which simulated commercial processing practices. Whole soya beans were cleaned by aspiration and screening and a portion was removed for soymilk production. The whole soya beans were mechanically cracked and the hull material was then separated from the kernel. Kernel material was processed into soya bean meal, soya bean flour and crude oil. Crude oil was sequentially converted to refined oil, bleached oil, de-odorized oil and deodorizer distillates.

Results are summarised in Table 28. Processing factors were 4.12 and 1.37 (based on total parent equivalents residues for aspirated grain fractions and meal respectively) and 3.0 and 1.33 (based on residues of spirotetramat + enol for aspirated grain fractions and meal respectively). Processing factors were < 1 for hulls, refined oil, milk and 1.0 for defatted flour (based on total spirotetramat equivalents) and < 1 (based on residues of spirotetramat + enol).

Table 28: Residues on soya bean processed fractions from the foliar application of spirotetramat to cotton in the USA (Dallstream and Krolski 2009, RAFNP016)

Study No. Trial No. Country Year (Variety)	Application					Portion analysed	Residues (mg/kg) expressed as spirotetramat equivalents						
	No	Interval Days	g ai/ha	Water (L/ha)	g ai/hL		spiro	enol	keto-hydroxy	mono-hydroxy	enol-glucoside	Total spiro	spiro + enol
RAFNP016 FN034-07PA USA Richland Idaho 2007 (Pioneer 93M11)	2	5	435 439	120 166	363 264	seed	< 0.01 < 0.01 < 0.01	0.63 0.59 0.63	0.030 0.032 0.032	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	0.69 0.65 0.69 Av. 0.68	0.64 0.60 0.64 Av. 0.63
						Aspirated grain fractions	1.4 1.2 1.2	0.69 0.63 0.67	0.94 0.81 0.84	0.020 0.016 0.017	0.020 c0.011 0.017 c0.011 0.020	3.1 2.7 2.7 Av. 2.8 (4.12)	2.1 1.8 1.9 Av. 1.9 (3.0)
						Meal	< 0.01 < 0.01 < 0.01	0.87 0.85 0.88	0.033 0.033 0.033	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	0.93 0.91 0.94 Av. 0.93 TF = 1.37	0.88 0.86 0.89 Av. 0.88 TF = 1.33
						Hull	< 0.01 < 0.01 < 0.01	0.56 0.50 0.53	0.040 0.031 0.042	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	0.63 0.56 0.60 Av. 0.60 TF = < 1	0.57 0.51 0.54 Av. 0.54 TF = < 1
						Oil, refined	< 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	< 0.05 < 0.05 < 0.05 Av. < 0.05 TF = < 1	< 0.02 < 0.02 < 0.02 Av. < 0.02 TF = < 1
						Defatted flour	< 0.01 < 0.01 < 0.01	0.62 0.59 0.58	0.061 0.063 0.058	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	0.71 0.68 0.67 Av. 0.69 TF = 1.01	0.63 0.60 0.59 Av. 0.61 TF = < 1
						Milk	< 0.01 < 0.01 < 0.01	0.046 0.046 0.046	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	0.086 0.086 0.086 Av. 0.086 TF = < 1	0.056 0.056 0.056 Av. 0.086 TF = < 1

AGF 12.4% moisture. Soya bean meal 6.76% moisture. Soya bean hulls 11.9% moisture. Soya bean defatted flour 11.0% moisture.

RESIDUES IN ANIMAL COMMODITIES

No information was provided.

APPRAISAL

Spirotetramat was first evaluated by the JMPR in 2008. An ADI of 0-0.05 mg/kg bw and an acute reference dose of 1.0 mg/kg bw were established. Maximum residue levels were recommended for many crops and animal commodities.

The manufacturer has submitted additional data for mangoes, kiwifruit, papaya, litchi, avocado, guava, onions, edible beans and peas with pods, succulent shelled beans and peas, pulses

including soya beans and cotton. Animal feed residues data have been provided for legumes and pulses. Cotton and soya bean processing studies have also been submitted.

Analytical methods

Suitable analytical methods were available for quantifying spirotetramat residues including the metabolites spirotetramat -enol, spirotetramat -ketohydroxy, spirotetramat -mono-hydroxy and spirotetramat enol-Glc in plant matrices by HPLC-MS/MS. The limits of quantification (LOQ) for plant commodities are generally 0.01 to 0.02 mg/kg (as parent equivalents) for each analyte.

Stability of pesticide residues in stored analytical samples

Samples from the residue trials were stored for periods less than the period of stability demonstrated in studies submitted to JMPR 2008. Since the storage stability data from JMPR 2008 cover a diverse range of crops and demonstrated stability of all analytes for up to 2 years, it is considered that these data should be sufficient to cover the storage stability of all the samples.

Results of supervised trials on crops

The Meeting received supervised trials data from the foliar application of spirotetramat as an oil dispersion (OD) or suspension concentrate formulation (SC) to a variety of tropical fruit crops, legume vegetables, pulses and cotton. Brussels sprouts data which were submitted for the 2008 JMPR are also re-evaluated here as revised GAP has become available.

The 2008 JMPR established the following residue definitions for spirotetramat.

Residue for enforcement plant commodities: *spirotetramat plus spirotetramat enol, expressed as spirotetramat.*

Residue for dietary intake plant commodities: *spirotetramat plus the metabolites enol, ketohydroxy, enol glucoside, and monohydroxy, expressed as spirotetramat*.

Residue for enforcement and dietary intake animal commodities: *spirotetramat enol, expressed as spirotetramat.*

Consequently, in the discussions below residues of spirotetramat plus enol are considered first for estimation of maximum residue levels followed by total residues (spirotetramat plus the metabolites enol, ketohydroxy, enol glucoside, and monohydroxy, expressed as spirotetramat) for estimation of STMR and HR values for dietary risk assessment.

Assorted tropical and sub-tropical fruits – inedible peel

Residue trials were conducted in avocado at five sites in the USA (2), Mexico (1) and Chile (2). Residues of spirotetramat plus enol in two trials from Chile, matching GAP of that country (3 × 300 g ai/ha, PHI 3 days) were 0.18 and 0.35 mg/kg. In three trials from Mexico and the USA that matched the GAP of Mexico (3 applications at 288 g ai/ ha with a 14-day retreatment interval, 1-day PHI) residues of spirotetramat plus enol were 0.069, 0.13, and 0.20 mg/kg. There are insufficient data to estimate a maximum residue level for avocado.

Residue trials were conducted in guava at two sites in Mexico according to the GAP for USA for various tropical fruits (3 applications at 175 g ai/ ha with a 14-day retreatment interval, 1-day PHI). The ranked order of residues of spirotetramat plus enol from supervised trials collected 1 day after the last application is 0.54 and 0.92 mg/kg.

The Meeting considered the number of trials insufficient to estimate a maximum residue level.

Residue trials were conducted in litchi at three sites in Mexico according to the GAP for USA for various tropical fruits (3 applications at 175 g ai/ ha with a 14-day retreatment interval, 1-day PHI). The ranked order of residues of spirotetramat plus enol from supervised trials collected 1 day

after the last application was 0.76, 0.85 and 5.2 mg/kg. The Meeting estimated a maximum residue level of 15 mg/kg for litchi.

The ranked order of total residues of spirotetramat from supervised trials collected 1 day after the last application was 1.3, 1.6 and 6.0 mg/kg. The Meeting estimated an STMR of 1.6 mg/kg and an HR of 6.0 mg/kg for total residues of spirotetramat for use in dietary intake calculations.

Residue trials were conducted in papaya at four sites in Mexico according to Mexican GAP (3 applications at 288 g ai/ha with a 14-day retreatment interval, 1-day PHI). The ranked order of residues of spirotetramat plus enol from supervised trials collected 1 day after the last application was 0.09, 0.096, 0.17 and 0.18 mg/kg. The Meeting estimated a maximum residue level of 0.4 mg/kg for papaya.

The ranked order of total residues of spirotetramat from supervised trials collected 1 day after the last application was 0.13, 0.13, 0.21 and 0.22 mg/kg. The Meeting estimated an STMR of 0.17 mg/kg and an HR of 0.22 mg/kg for total residues of spirotetramat in papaya for use in dietary intake calculations.

Four supervised trials on mango conducted in Australia that complied with GAP in that country (2 × 9.6 g ai/hL, 21-day intervals with a 14-day PHI) were made available to the Meeting. The ranked order of residues of spirotetramat-plus-enol, on a whole fruit basis, from trials matching Australian GAP is 0.05, 0.06, 0.07 and 0.16 mg/kg. The Meeting estimated a maximum residue level of 0.3 mg/kg for mango.

The ranked order of total residues of spirotetramat on a pulp and skin basis from trials matching Australian GAP was 0.12, 0.14, 0.18 and 0.25 mg/kg. The Meeting estimated an STMR of 0.16 mg/kg and an HR of 0.25 mg/kg for total residues of spirotetramat in mango for use in dietary intake calculations.

Five supervised trials were conducted in kiwifruit in New Zealand in which 2 applications of spirotetramat were made at 4.8 g ai/hL. The GAP in New Zealand consists of 3 applications of spirotetramat at 4.8 g ai/hL. The first application should be pre-flowering, the 2nd at fruit set and the 3rd application at 21 days after fruit set. The trials can be considered as matching this GAP.

No residues of either spirotetramat or -enol were detected at harvest (129–156 days after last application); individual compound LOQs were both 0.02 mg/kg. The Meeting estimated a maximum residue level of 0.02* mg/kg for residues of spirotetramat in kiwifruit.

The ranked order of total residues of spirotetramat from supervised trials collected at harvest (129–156 days) after the last application was < 0.054, 0.054, < 0.055, < 0.055 and 0.066 mg/kg. The Meeting estimated an STMR of 0.055 mg/kg and an HR of 0.066 mg/kg for total residues of spirotetramat in kiwifruit for use in dietary intake calculations.

Onions, bulb

Trials were conducted on onions in Australia according to GAP (2 applications at 48g ai/ha with a PHI of 7 days). The ranked order of residues of spirotetramat plus enol from supervised trials according to Australian GAP were: < 0.04 (3), 0.04, 0.08, 0.10 and 0.21 mg/kg. The Meeting estimated a maximum residue level of 0.4 mg/kg for residues of spirotetramat in bulb onions.

The ranked order of total residues of spirotetramat from supervised trials according to GAP was < 0.11 (3), 0.11, 0.15 and 0.16 and 0.27 mg/kg (STMR = 0.11 mg/kg). For onions, bulb the HR is 0.27 mg/kg and the STMR is 0.11 mg/kg.

Brussels sprouts

Eight supervised trials (seven locations) were conducted in Europe (Germany, France and the United Kingdom) during 2004–2005, in which 3 applications of spirotetramat were made to Brussels sprouts at 72g ai/ha. The GAP for the United Kingdom, Belgium, Ireland and Austria allows 2 applications at 75 g ai/ha with a PHI of 3 days.

The Meeting considered the influence of two sprays compared to three sprays on the final residue in determining whether or not the trials matched GAP and noted only a slow decline in residues. As three foliar applications were used in the trials and the additional application would affect the final residue, none of the trials are considered to approximate GAP.

Trials were also conducted at two sites in Australia in which 3 applications of spirotetramat were made to Brussels sprouts according to Australian GAP (3 applications at 96 g ai/ha with a PHI of 3 days). The ranked order of residues of spirotetramat plus enol from supervised trials according to Australian GAP was 0.07 and 0.15 mg/kg. The Meeting considered the number of trials inadequate to estimate a maximum residue level.

Legume vegetables

Residue trials were conducted in peas with pods at three different sites in the USA and in beans with pods (snap beans, podded) at six different sites in the USA according to the critical US GAP (application at 88 g ai/ha – maximum of 175 g ai/ha per season with a 1-day PHI).

The ranked order of residues of spirotetramat plus enol in beans with pods at a 1-day PHI from supervised trials was 0.059, 0.17, 0.37, 0.43, 0.53 and 0.67 mg/kg.

The ranked order of total residues of spirotetramat in beans with pods at a 1-day PHI from supervised trials was 0.15, 0.26, 0.47, 0.54, 0.80 and 0.84 mg/kg.

The ranked order of residues of spirotetramat plus enol in peas with pods at a 1-day PHI was 0.58, 0.66 and 1.2 mg/kg.

The ranked order of total residues of spirotetramat in peas with pods at a 1-day PHI from supervised trials was 0.63, 0.74 and 1.3 mg/kg.

Residue trials were also conducted in garden peas (succulent seeds of shelled peas) and Lima beans at 6 different sites in the USA according to the critical US GAP (application at 88 g ai/ha – maximum of 175 g ai/ha per season with a 1-day PHI).

The ranked order of residues of spirotetramat plus enol in succulent seeds of shelled peas at a 1-day PHI from supervised trials was 0.36, 0.40, 0.43, 0.52, 0.56 and 0.59 mg/kg.

The ranked order of total residues of spirotetramat in succulent seeds of shelled peas at a 1-day PHI from supervised trials was 0.45, 0.49, 0.55, 0.62, 0.74 and 0.76 mg/kg.

The ranked order of residues of spirotetramat plus enol in succulent seeds of shelled Lima beans at a 1-day PHI from supervised trials was 0.079, 0.10, 0.18, 0.19, 0.23 and 0.33 mg/kg.

The ranked order of total residues of spirotetramat in succulent seeds of shelled beans at a 1-day PHI from supervised trials was 0.11, 0.13, 0.24, 0.25, 0.31 and 0.44 mg/kg.

The Meeting noted residue trial data are available from the USA for peas with pods, beans with pods as well as shelled peas and beans, all members of the legume vegetables crop group. The USA use pattern is for the crop group legume vegetables. The Meeting decided to estimate a maximum residue level for legume vegetables based on spirotetramat residues in beans with pods. The Meeting estimated a maximum residue level of 1.5 mg/kg for residues of spirotetramat in legume vegetables. For the purpose of dietary intake assessment the HR is 0.84 mg/kg and the STMR is 0.505 mg/kg for legume vegetables, also based on residues in common beans.

Soya bean

Residue trials were conducted at nineteen different sites in the USA and Canada, according to the critical US GAP (application at 88g ai/ha – maximum of 175g ai/ha per season with a 21-day PHI).

The ranked order of total spirotetramat plus enol residues found in soya bean seeds according to the critical US GAP was 0.042, 0.045, 0.061, 0.071, 0.13, 0.13, 0.15, 0.27, 0.33, 0.39, 0.41, 0.75, 0.76, 1.0, 1.1, 1.5, 1.5, 2.0 and 2.2 mg/kg. The Meeting estimated a maximum residue level for spirotetramat on soya bean (dry) of 4 mg/kg.

The ranked order of total residues of spirotetramat in soya bean seeds according to the critical US GAP was 0.072, 0.075, 0.091, 0.11, 0.16, 0.16, 0.18, 0.30, 0.36, 0.45, 0.48, 0.82, 0.84, 1.0, 1.2, 1.6, 1.6, 2.2 and 2.7 mg/kg. The HR is 2.7 mg/kg and the STMR is 0.45 mg/kg.

Dried shelled peas and beans

Trials in peas were conducted in USA during 2007–2008 at five different sites, according to US GAP (application at 88g ai/ha – maximum of 175g ai/ha per season with a 7-day PHI).

The ranked order of residues of spirotetramat plus enol in dry shelled pea seeds at a 7-day PHI from supervised trials was 0.039, 0.21, 0.23, 0.72, and 1.0 mg/kg.

The ranked order of total residues of spirotetramat in dry shelled pea seeds at a 7-day PHI from supervised trials was 0.069, 0.24, 0.26, 0.78 and 1.1 mg/kg.

Trials in beans (cowpeas) were conducted in USA during 2007–2008 at eight different sites, according to US GAP (application at 88g ai/ha – maximum of 175g ai/ha per season with a 7-day PHI).

The ranked order of residues of spirotetramat plus enol in dry shelled bean seeds at USA GAP (7-day PHI) from supervised trials was < 0.02, < 0.02, 0.026, 0.063, 0.067, 0.11, 0.48, 0.54 and 0.73 mg/kg.

The ranked order of total residues of spirotetramat in dry shelled bean seeds at USA GAP (7-day PHI) from supervised trials was < 0.05, 0.05, 0.056, 0.14, 0.17, 0.18, 0.52, 0.80 and 1.2 mg/kg.

The Meeting considered the residue data for beans (dry) and peas (dry) can be combined (Mann-Whitney test) to recommend a maximum residue level for the group pulses (except soya bean).

The ranked order of residues of spirotetramat plus enol in dry shelled bean and pea seeds at USA GAP from supervised trials were: < 0.02, < 0.02, 0.026, 0.039, 0.063, 0.067, 0.11, 0.21, 0.23, 0.48, 0.54, 0.72, 0.73 and 1.0 mg/kg. The Meeting estimated a maximum residue level for spirotetramat in pulses (except soya beans) of 2 mg/kg. The ranked order of total residues of spirotetramat in dry shelled bean and pea seeds at USA GAP from supervised trials was < 0.05, 0.05, 0.056, 0.069, 0.14, 0.17, 0.18, 0.24, 0.26, 0.52, 0.78, 0.80, 1.1 and 1.2 mg/kg. The HR is 1.2 mg/kg and the STMR is 0.21 mg/kg.

Cotton seed

Residue trials were conducted at eleven different sites in the USA, ten according to the critical US GAP (application at 88 g ai/ha – maximum of 175 g ai/ha per season with a 21-day PHI).

The ranked order of total spirotetramat plus enol residues found in cotton seeds according to the critical US GAP was (n = 10): < 0.02, < 0.02, 0.02, 0.030, 0.033, 0.049, 0.052, 0.092, 0.094 and 0.26 mg/kg. The Meeting estimated a maximum residue level for spirotetramat on cotton seed of 0.4 mg/kg.

The ranked order of total residues of spirotetramat in cotton seeds according to the critical US GAP was < 0.05, 0.055, 0.057, 0.077, 0.079, 0.11, 0.12, 0.13, 0.13 and 0.29 mg/kg. The STMR is 0.095 mg/kg.

Animal feeds

The Meeting received supervised trials data for a variety of animal feeds (soya bean forage and hay, various legume animal feeds and cotton gin by-products).

Legume animal feeds (bean hay and forage, pea hay and vines)

Residue trials on soya beans were conducted at nineteen different sites in the USA and Canada, according to the critical US GAP (application at 88g ai/ha – maximum of 175g ai/ha per season with a 3-day PHI for forage and hay). The ranked order of total residues of spirotetramat found in soya bean forage (wet weight), according to the critical US GAP, were: 0.66, 1.2, 1.7, 2.2, 2.3, 2.7, 2.7, 2.9, 3.3,

3.3, 3.6, 3.7, 3.9, 4.6, 4.7, 4.8, 5.1, 6.6 and 6.6 mg/kg. Correcting the data for dry matter contents the ranked order of total residues of spirotetramat found in soya bean forage (dry weight) according to the critical US GAP was 3.0, 7.4, 11,13, 14, 14, 16, 16, 17, 19, 19, 20, 20, 24, 25, 28, 29, 33 and 40 mg/kg. The highest and median residues for calculating livestock dietary burden are 40 and 19 mg/kg respectively (dry weight basis).

The ranked order of total residues of spirotetramat found in soya bean hay (wet weight) according to the critical US GAP was 1.7, 1.7, 1.9, 4.3, 4.9, 5.0, 5.4, 5.8, 6.5, 8.2, 8.5, 8.9, 9.0, 9.6, 10, 10, 10, 12 and 12 mg/kg. Correcting the data for reported dry matter contents results in total residues of spirotetramat found in soya bean hay (dry weight) of 2.5, 2.9, 3.6, 7.0, 7.6, 9.1, 9.1, 9.8, 11, 12, 12, 13, 13, 14, 14, 15, 15, 15 and 17 mg/kg.

The ranked order of total residues of spirotetramat found in cowpea forage (wet weight) according to the critical US GAP was 2.0, 2.2, 2.7, 2.7, 3.4 and 4.1 mg/kg. When corrected for dry matter, total residues of spirotetramat found in cowpea forage (dry weight) were 5.1, 5.3, 6.9, 7.9, 10 and 12 mg/kg.

The ranked order of total residues of spirotetramat found in cowpea hay (wet weight) matching the critical US GAP were: 0.28, 1.0, 1.1, 1.1, 2.1 and 2.6 mg/kg. On correcting for dry matter, total residues of spirotetramat were 0.39, 1.3, 1.6, 1.9, 2.6 and 3.9 mg/kg.

The ranked order of total residues of spirotetramat found in pea hay (wet weight) according to the critical US GAP *mg/kg* was 0.49, 0.61, 1.4, 5.2 and 5.7 mg/kg and when converted to a dry matter basis 0.88, 1.1, 1.8, 8.0 and 9.7 mg/kg.

The ranked order of total residues of spirotetramat found in pea vines (wet weight) according to the critical US GAP was 0.19, 0.31, 0.85, 1.9 and 3.1 mg/kg. On correction for dry mater content, the ranked order of total residues of spirotetramat were: 0.66, 1.1, 2.7, 5.3 and 11 mg/kg.

The Meeting considered the legume animal feed residue data could support a maximum residue level for the group legume animal feeds based on the commodity with the highest residues, i.e., soya bean hay. The ranked order of total residues of spirotetramat in soya bean hay (dry weight) were 2.5, 2.9, 3.6, 7.0, 7.6, 9.1, 9.1, 9.8, 11, 12, 12, 13, 13, 14, 14, 15, 15, 15 and 17 mg/kg. The Meeting estimated a maximum residue level for spirotetramat on legume animal feed of 30 mg/kg (dry weight). The highest residue is 17 mg/kg and the median is 12 mg/kg.

Cotton gin by-products (gin trash)

The ranked order of total residues of spirotetramat in cotton gin by-products (wet weight) according to the critical US GAP was 0.16, 0.51, 0.67, 1.2 and 4.9 mg/kg and when corrected for dry matter content were: 0.20, 0.60, 0.79, 1.5 and 5.9 mg/kg. The highest residue is 5.9 mg/kg and the median is 0.79 mg/kg.

Fate of residues during processing

The Meeting received processing studies for cottonseed and soya beans.

The processing factors derived from the processing studies and the resulting STMR-Ps and HR-Ps are summarized in the table below. The processing factors are the ratio of the residue in the processed commodity divided by the residue in the raw agricultural commodity (RAC). Processing factors were calculated for total spirotetramat residues, required for estimating residues in processed commodities for dietary risk assessment and also for spirotetramat +enol required for estimating residues for compliance. For most commodities the two processing factors were comparable.

Of the traded commodities, the only commodity for which there was significant increase in residues measured using the compliance definition was cottonseed meal. Based on the maximum residue level of 0.4 mg/kg (spirotetramat + enol) in cottonseed and a processing factor of 2.28 for cottonseed meal, (0.4 × 2.3 = 0.92 mg/kg) the Meeting estimated a maximum residue level for spirotetramat in cotton seed meal of 1 mg/kg.

Processing factors (PF) from the processing of cottonseed and soya beans

	Processed Commodity	PF Total residue [a]	STMR/ STMR-P or median	HR/ HR-P or highest	PF spirotetramat + enol[b]
Cottonseed	Cottonseed	-	0.095	0.29	-
	Meal	1.25	0.12	0.36	2.28
	Hull	1.05	0.10	0.30	0.55
	Oil, refined	< 1	0	0	< 1
Soya bean	Soya bean	-	0.45	2.7	-
	Aspirated Grain Fractions	4.12	1.9	11.1	3.0
	Meal	1.37	0.62	3.7	1.33
	Hull	< 1	0.40	2.4	< 1
	Oil, refined	< 1	0	0	< 1
	Defatted flour	1.01	0.46	2.7	< 1
	Soya milk	< 1	0.06	0.34	< 1

[a] The factor is the ratio of the total residue (parent spirotetramat plus four metabolites, calculated as spirotetramat) in the processed item divided by the total residue in the RAC

[b] The factor is the ratio of the spirotetramat + enol in the processed item divided by spirotetramat + enol in the RAC

Processed commodity STMR-Ps and HR-Ps were calculated on the basis of the total parent residue PF.

Residues in animal commodities

Farm animal dietary burden

Dietary burden calculations for beef cattle and dairy cattle and poultry are provided below. The dietary burdens were estimated using the OECD diets listed in Appendix IX of the 2009 edition of the FAO Manual.

Potential cattle feed items include: almond hulls, apple pomace, citrus pulp, grape pomace, potato culls and dried pulp, cabbage heads, cotton seed, cotton seed meal and hulls, cotton gin by-products, soya bean forage and fodder (hay), soya beans, soya bean meal and hulls, soya bean aspirated grain fractions, bean and pea seed, bean vines and pea vines and hay.

Potential poultry feed items include: potato culls and dried pulp, cabbage heads, cotton seed meal, soya bean forage and hay, soya beans, soya bean meal and hulls, bean and pea seed, pea vines and hay.

Summary of livestock dietary burden (ppm of dry matter diet)

	US-Canada		EU		Australia		Japan	
	max	mean	Max	mean	max	Mean	max	Mean
Beef cattle	1.2	0.43	6.3	3.3	40[a]	19[c]	0.51	0.51
Dairy cattle	9.00	4.6	6.2	3.2	22[b]	11[d]	0.45	0.45
Poultry Broiler	1.02	0.27	0.59	0.43	0.39	0.39	0.24	0.24
Poultry Layer	1.02	0.27	4.8[e]	2.3[f]	0.39	0.39	0.20	0.20

[a] Highest maximum beef or dairy cattle dietary burden suitable for MRL estimates for mammalian meat

[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 meat.

[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 meat and eggs.

[f] Highest mean poultry dietary burden suitable for STMR estimates for poultry meat and eggs.

Animal commodity maximum residue levels

A lactating dairy cow feeding study was reported by the 2008 JMPR where cows were dosed orally for 29 consecutive days with spirotetramat at target dose rates (based on feed dry weight) of 3, 9 or 30 ppm. The maximum dietary burden for beef cattle is 40 ppm and is higher than the highest dose

level in the feeding study of 30 ppm. Residues in kidney (the tissue with highest residues) in the cattle feeding study show a linear relationship (R^2 = 0.9998) with dose. The Meeting considered it acceptable to assume proportionality of dose *vs.* residues for the tissues and milk and extrapolate the results from the 30 pm feed level to estimate residues in tissues at a dietary burden of 40 ppm.

	Feed level	Residues	Feed level	Residues (mg/kg) in			
	(ppm) for milk residues	(mg/kg) in milk	(ppm) for tissue residues	Muscle	Liver	Kidney	Fat
MRL beef or dairy cattle							
Feeding study [a]	30	0.005	30	0.014	0.038	0.41	0.032
Dietary burden and residue estimate	22	< 0.005	40	0.019	0.051	0.55	0.043
STMR beef or dairy cattle							
Feeding study [b]	9 30	< 0.005 < 0.005	9 30	0.0034 0.0088	0.012 0.030	0.072 0.26	0.008 0.016
Dietary burden and residue estimate	11	< 0.005	19	0.006	0.021	0.16	0.012

[a] highest residues for tissues and mean residues for milk

[b] mean residues for tissues and mean residues for milk

The Meeting estimated the following STMR values: milk 0.005 mg/kg; muscle 0.006 mg/kg; edible offal (based on kidney) 0.16 mg/kg and fat 0.012 mg/kg.

The Meeting estimated the following HR values: milk 0.005 mg/kg; muscle 0.019 mg/kg; edible offal (based on kidney) 0.55 mg/kg and fat 0.043 mg/kg.

The Meeting estimated the following maximum residue levels: milk – 0.01 mg/kg; meat (mammalian except marine) – 0.05 mg/kg and edible offal – 1 mg/kg to replace its previous recommendations of: milk – 0.005* mg/kg; meat (mammalian except marine) – 0.01* mg/kg and edible offal – 0.03 mg/kg.

A poultry feeding study was not available however, in the poultry metabolism study evaluated by the 2008 JMPR where laying hens were dosed at 1.01 mg/kg bw day (12.9 ppm in the diet), residues of spirotetramat-enol in muscle (0.001 mg/kg), fat (0.001 mg/kg) and liver (0.009 mg/kg) were all < 0.01 mg/kg. Residues in eggs were 0.013 mg/kg.

The maximum dietary burden of poultry is 4.8 ppm. Scaling the results of the metabolism study for the poultry dietary burden the Meeting estimated the following HR values: muscle 0.00037 mg/kg, fat 0.00037 mg/kg, liver 0.0033 mg/kg and eggs 0.0048 mg/kg.

The Meeting estimated the following maximum residue levels for poultry commodities: poultry meat 0.01 (*) mg/kg; poultry edible offal 0.01 mg/kg and eggs 0.01 mg/kg.

The mean dietary burden of poultry is 2.3 ppm. The Meeting estimated the following STMR values: poultry meat 0 mg/kg; poultry fat 0 mg/kg; poultry edible offal (based on liver) 0.0016 mg/kg and eggs 0.0023 mg/kg.

RECOMMENDATIONS

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

Residue definition for enforcement plant commodities: *spirotetramat plus spirotetramat enol, expressed as spirotetramat.*

Residue definition for dietary intake plant commodities: *spirotetramat plus the metabolites enol, ketohydroxy, enol glucoside, and monohydroxy, expressed as spirotetramat*.

Residue definition for enforcement and dietary intake animal commodities: *spirotetramat enol, expressed as spirotetramat*

Commodity		MRL, mg/kg		STMR or	HR or
CCN	Name	New	Previous	STMR-P, mg/kg	HR-P, mg/kg
SO 0691	Cotton seed	0.4		0.095	
AB 1203	Cotton seed meal	1		0.12	0.36
MO 0105	Edible offal (Mammalian)	1	0.03	0.16	0.55
PE 0112	Eggs	0.01		0.0023	0.0048
AL 0157	Legume animal feeds	30		12	17
VP 0060	Legume vegetables	1.5		0.505	0.84
FI 0343	Litchi	15		1.6	6
FI 0341	Kiwifruit	0.02*		0.055	0.066
FI 0345	Mango	0.3		0.16	0.25
MM 0095	Meat (from mammals other than marine mammals)	0.05	0.01 *	0.006 muscle 0.012 fat	0.019 muscle 0.043 fat
ML 0106	Milks	0.01	0.005 *	0.005	0.005
VA 0385	Onion, bulb	0.4		0.11	0.27
FI 0350	Papaya	0.4		0.17	0.22
PM 0110	Poultry meat	0.01 *		0 muscle 0 fat	0.00037 muscle 0.00037 fat
PO 0111	Poultry, Edible offal of	0.01		0.0016	0.0033
VD 0070	Pulses [except Soybean (dry)]	2		0.21	
VD 0541	Soya bean (dry)	4		0.45	
	Cotton gin by-products			0.79	5.9
AB 0691	Cotton seed hulls			0.10	0.30
OR 0691	Cotton seed oil, edible			0	0
	Soya bean aspirated grain fractions			1.9	11.1
AL 1265	Soya bean forage (green) (dry weight)			19	40
AB 0541	Soya bean hulls			0.4	2.4
OR 0541	Soya bean oil, refined			0	0
	Soya bean flour (defatted)			0.46	2.7
	Soya bean milk			0.06	0.34

DIETARY RISK ASSESSMENT

Long-term intake

The evaluation of spirotetramat has resulted in recommendations for MRLs and STMRs for raw and processed commodities. Consumption data were available for 37 food commodities and were used in the dietary intake calculation. The results are shown in Annex 3. The International Estimated Daily Intakes for the 13 GEMS/Food regional diets, based on estimated STMRs were in the range 2–20% of the maximum ADI of 0.05 mg/kg bw (see Annex 3 of the 2011 JMPR Report).

The Meeting concluded that the long-term intake of residues of spirotetramat 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 spirotetramat was calculated for the food commodities (and their processing fractions) for which maximum residue levels and HRs were estimated and for which consumption data were available. The results are shown in Annex 4 of the 2011 JMPR Report. The IESTI was a maximum of 40% of the ARfD (1.0 mg/kg bw).

The Meeting concluded that the short-term intake of residues of spirotetramat from uses that have been considered by the JMPR is unlikely to present a public health concern.

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