

**FENPYROXIMATE (193)**

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**EXPLANATION**

Fenpyroximate is a pyrazole non-systemic acaricide. It was first evaluated by JMPR in 1995 and then in 1999 and 2010 for maximum residue levels, and in 2004 and 2007 for toxicology. The currently standing recommendations of JMPR are as follows:

ADI: 0–0.01 mg/kg bw (1995)

ARfD: 0.02 mg/kg bw (2007)

Residue definition—Fenpyroximate for compliance with the MRL and for estimation of dietary intake (both for animal and plant commodities). The residue is fat soluble. (1999)

A number of maximum residue levels have been recommended by the 1995, 1999 and 2010 JMPR including those for citrus fruits, pome fruits, grapes, fruiting vegetables other than cucurbits (except sweet corn and mushroom), cucumber, melon (except water melon), tree nuts, dry hops, dried grapes, dried chilli pepper, and cattle liver meat and milk.

The current Meeting received information on the latest use pattern and the supervised residue trials on stone fruits, strawberry, avocado, cucumber, common bean (pods and/or immature seeds and bean fodder), potato, and mints conducted in the USA.

**USE PATTERNS**

The authorized uses relevant to the supervised trials data submitted to the current Meeting are summarized in Table 1. They can be applied when pests are immature or at a susceptible stage and populations are building, before crop damage occurs.

Table 1 Registered use of fenpyroximate in the USA relevant to the residue evaluation by the current Meeting

Crop	Form g ai/L	F or G	Application					Interval days	PHI days
			Method	Rate kg ai/ha	Water L/ha	Seasonal kg ai/ha	No.		
Stone fruits (Cherry (sweet and tart), peach & plum)	50 EC	F	Foliar	0.117	≥ 748 (ground only)	≤ 0.234	≤ 2	14	7
Low-growing berry (Strawberry)	50 EC	F	Foliar	0.058–0.117	≥ 234 (ground only)	≤ 0.234	≤ 2	14	1
Avocado	50 EC	F	Foliar	0.058–0.117	≥ 889 (ground) ≥ 468 (air)	≤ 0.234	≤ 2	14	1
Cucumber	50 EC	F	Foliar	0.058–0.117	≥ 374 (ground) ≥ 93.5 (air)	≤ 0.234	≤ 2	14	1
		G <sup>a</sup>	Foliar	0.117	≥ 374	≤ 0.117	≤ 1	14	7
Snap beans <sup>b</sup>	50 EC	F	Foliar	0.117	≥ 281 (ground) ≥ 47 (air)	≤ 0.234	≤ 2	14	1
Potato	50 EC	F	Foliar	0.117	≥ 187 (ground) ≥ 47 (air)	≤ 0.234	≤ 2	7	7
Mint (Peppermint, spearmint)	50 EC	F	Foliar	0.058–0.117	≥ 234 (ground only)	≤ 0.234	≤ 2	7	1

<sup>a</sup> Do not apply in ultra-low volume equipment

<sup>b</sup> Common beans in the Codex Classification.

## RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

The Meeting considered residue data from supervised field trials conducted in the USA on stone fruits, strawberry, avocado, cucumber, common bean (pods and/or immature seeds and bean fodder), potato, and mints with foliar applications of the fenpyroximate emulsion concentrate (EC) formulation (50 g ai/L nominal concentration).

Application rates and residue concentrations were reported as fenpyroximate. Residue concentrations are recorded unadjusted for recoveries or for residue values in control samples. Where multiple samples were taken from a single plot, individual results are reported, and the calculated average concentration (in parentheses) is used for estimation of maximum residue level. Where trials were conducted in the same location, with the same or similar varieties, same or similar formulations, and same equipment, and at the same or similar timing, they are not regarded as independent and only one result from these trials was chosen for the estimation of a maximum residue level.

Residues from the trials conducted according to maximum GAP have been used for the estimation of maximum residue levels and they are underlined.

Crop Group	Commodity	Table No.
Stone fruits	Cherry	Table 2
	Peach	Table 3
	Plum	Table 4
Berries and other small fruits	Strawberry	Table 5
Assorted tropical and subtropical fruit - inedible peel	Avocado	Table 6
Fruiting vegetables, Cucurbits	Cucumber	Table 7
Legume vegetables	Common beans	Table 8
Root and tuber vegetables	Potato	Table 9
Herbs	Mints	Table 10
Legume animal feeds	Bean fodder	Table 11

### *Stone fruits*

#### *Cherry*

A total of eight supervised trials on cherries were conducted in California (one), Colorado (one), Michigan (three), New York (one), and Washington (two) in the USA in 2010 (Samoil, 2012a).

In each trial, two foliar applications of the fenpyroximate EC formulation (56 g ai/L) were made at a rate of approximately 0.11 to 0.12 kg ai/ha per application. An adjuvant (e.g. Induce, Silwet L-77, Activator 90, Ad Wet 90, JMS Stylet oil, Nu-Film 17, or Dyne-Amic) was added to the spray solutions, as appropriate. Applications were made on a 13- to 14- day interval, and the cherries were harvested 7 to 8 days after the last treatment.

Two samples of cherries were collected from each treated plot and untreated plot. Specimens were stored frozen and shipped frozen to the analytical laboratory. Samples were processed with dry ice in a Robot Coupe RSI 10U. Processed samples were stored frozen until analysis.

The method of analysis was based LC-MS/MS using multiple reaction monitoring (MRM) in +ESI mode. The LOQ was 0.05 mg/kg for each analyte. Average recovery of cherries at all fortifications was  $96.0 \pm 8.8\%$  and  $92.8 \pm 6.0\%$  for fenpyroximate and M-1, respectively (n=18). No control samples contained residues at or above the LOQ of the method.

Table 2 Residues of fenpyroximate in cherries from supervised trials conducted with foliar spray in the USA in 2010

CHERRY Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>b</sup>	M-1	
US GAP (stone fruits)	EC 50	0.117	≥ 748 (ground only)	≤ 2	7				Seasonal Max= 0.234 kg ai/ha Interval=14 days
2010 Tulare, CA (Tulare)	EC 56	0.11 0.11	1330 1320	2	7	Fruits without pits and stems	0.33 0.32 (0.325)	< 0.05 < 0.05	Induce 10438.10-CA90
	EC 56	0.11 0.11	1340 1320	2	7	Fruits without pits and stems	0.41 0.51 (0.46)	< 0.05 < 0.05	Silwet L-77 organo-silicone
	EC 56	0.11 0.11	1330 1310	2	7	Fruits without pits and stems	0.28 0.27 (0.275)	< 0.05 < 0.05	None
2010 Hotchkiss, Co (Montmorency)	EC 56	0.11 0.12	907 982	2	7	Fruits without pits and stems	0.62 0.75 (0.685)	0.0921 0.108	Activator 90 10438.10-CO03
2010 Fennville, MI <sup>a</sup> (Montmorency)	EC 56	0.11 0.11	982 991	2	7	Fruits without pits and stems	0.59 0.58 (0.585)	0.081 0.066	Dyne-Amic modified vegetable oil and organo-silicone surfactant blend 10438.10-MI24
2010 Fennville, MI <sup>a</sup> (Montmorency)	EC 56	0.11 0.11	991 991	2	7	Fruits without pits and stems	0.84 0.90 (0.87)	0.112 0.123	Dyne-Amic modified vegetable oil and organo-silicone surfactant blend 10438.10-MI25
2010 Fennville, MI <sup>a</sup> (Heidelfingen)	EC 56	0.11 0.11	1000 1000	2	7	Fruits without pits and stems	0.36 0.36 (0.36)	< 0.05 < 0.05	Dyne-Amic modified vegetable oil and organo-silicone surfactant blend 10438.10-MI26
2010 Lansing, NY (Galaxy)	EC 56	0.11 0.11	561 561	2	7	Fruits without pits and stems	0.76 0.85 (0.805)	0.122 0.120	Induce 10438.10-NY12
2010 Prosser, WA (Bing)	EC 56	0.11 0.11	1070 1120	2	7	Fruits without pits and stems	0.09 0.10 (0.095)	< 0.05 < 0.05	Ad wet 90 10438.10-WA22
	EC 56	0.11 0.11	1030 1070	2	7	Fruits without pits and stems	0.35 0.33 (0.34)	< 0.05 < 0.05	JMS Stylet oil
	EC 56	0.11 0.11	1060 1100	2	7	Fruits without pits and stems	0.31 0.29 (0.30)	< 0.05 < 0.05	None
2010 Moxee, WA (Bing)	EC 56	0.11 0.11	1050 1320	2	7	Fruits without pits and stems	0.28 0.25 (0.265)	< 0.05 < 0.05	Agri-Dex 10438.10-WA23

DALT: days after the last application

<sup>a</sup> Same location<sup>b</sup> Average in parentheses

*Peach*

A total of ten supervised trials on peaches were conducted in Arkansas (one), California (three), Michigan (one), North Carolina (two), New Jersey (two), and Texas (one) in the USA in 2010 (Samoil, 2012b).

In each trial, two foliar applications of the fenpyroximate EC formulation (56 g ai/L) were made at a rate of approximately 0.11 to 0.12 kg ai/ha per application. An adjuvant (Silglow, Induce, Silwet L-77, Pro 90, Agri-Dex, Super Spread 7000, Tricard Silicone, Attach, or Spreader 90) was added to the spray solutions, as appropriate. Applications were made on a 13- to 15- day interval, except for the trials located in Winters, California in which the applications were made on a 7- day interval. The peaches were harvested 6 to 8 days after the last treatment, except for the trials located in Winters, California where samples were collected on DALTs of 2, 7, 11, and 14 days.

Two samples of peaches were collected from each treated plot and untreated plot. Specimens were stored frozen and shipped frozen to the analytical laboratory. Samples were processed with dry ice in a Robot Coupe RSI 10B. Processed samples were stored frozen until analysis.

The method of analysis was based on LC-MS/MS. The LOQ was 0.05 mg/kg for each analyte. Average recovery of peaches at all fortifications was  $97.2 \pm 15.5\%$  and  $99.8 \pm 10.9\%$  for fenpyroximate and M-1, respectively (n=21). No control samples contained residues at or above the LOQ of the method.

Table 3 Residues of fenpyroximate in peaches from supervised trials conducted with foliar spray in the USA in 2010

PEACH Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>c</sup>	M-1	
US GAP (stone fruits)	EC 50	0.117	≥ 748 (ground only)	≤ 2	7				Seasonal Max= 0.234 kg ai/ha Interval = 14 days
2010 Clarksville, AR (Cresthaven)	EC 56	0.12 0.12	1200 1210	2	7	Fruits without pits	0.09 0.06 (0.075)	< 0.05 < 0.05	Agri-Dex 10468.10-AR04
2010 Parlier, CA <sup>a</sup> (Crimson Lady)	EC 56	0.11 0.11	804 804	2	7	Fruits without pits	0.09 0.11 (0.10)	< 0.05 < 0.05	Silglow 10468.10-CA93
2010 Parlier, CA <sup>a</sup> (Henry II)	EC 56	0.11 0.11	1070 1080	2	7	Fruits without pits	0.13 0.16 (0.145)	< 0.05 < 0.05	Induce 10468.10-CA94
	EC 56	0.11 0.12	1050 1080	2	7	Fruits without pits	0.16 0.20 (0.18)	< 0.05 < 0.05	Silwet L-77 organo-silicone
	EC 56	0.11 0.11	1060 1070	2	7	Fruits without pits	0.10 0.10 (0.10)	< 0.05 < 0.05	None
2010 Winters, CA (O'Henry)	EC 56	0.11 0.12	1210 1360	2	2	Fruits without pits	0.24 0.28 (0.260)	< 0.05 < 0.05	Pro 90 (interval: 7 days) 10468.10-CA95
					7		0.19 0.20 (0.195)	< 0.05 < 0.05	
					11		0.16 0.16 (0.16)	< 0.05 < 0.05	
					14		0.10 0.16 (0.13)	< 0.05 < 0.05	
	EC 56	0.11 0.12	1200 1380	2	7	Fruits without pits	0.13 0.16 (0.145)	< 0.05 < 0.05	Silwet L-77 organosilicone (interval: 7 days)

PEACH Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>c</sup>	M-1	
2010 Fennville, MI (Red Haven)	EC 56	0.11 0.11	1040 1040	2	7	Fruits without pits	0.13 0.13 (0.13)	< 0.05 < 0.05	Super Spread 7000 10468.10-mi27
2010 Jackson Springs, NC (Contender)	EC 56	0.11 0.11	1090 1080	2	6	Fruits without pits	0.08 0.09 (0.085)	< 0.05 < 0.05	Induce 10468.10-NC18
	EC 56	0.11 0.11	1090 1090	2	6	Fruits without pits	0.11 0.12 (0.115)	< 0.05 < 0.05	Tricard Silicone organo-silicone
	EC 56	0.11 0.11	1090 1070	2	6	Fruits without pits	0.06 0.06 (0.06)	< 0.05 < 0.05	None
2010 Clayton, NC (Contender)	EC 56	0.11 0.11	1060 1080	2	6	Fruits without pits	0.17 0.13 (0.15)	< 0.05 < 0.05	Induce 10468.10-NC19
2010 Cream Ridge, NJ <sup>b</sup> (Suncrest)	EC 56	0.11 0.11	1310 1320	2	7	Fruits without pits	0.12 0.13 (0.125)	< 0.05 < 0.05	Attach 10468.10-NJ09
2010 Cream Ridge, NJ <sup>b</sup> (Loring)	EC 56	0.11 0.12	1320 1260	2	7	Fruits without pits	0.10 0.08 (0.09)	< 0.05 < 0.05	Attach 10468.10-NJ10
2010 Fredericksburg, TX (Sentinel)	EC 56	0.11 0.11	945 926	2	7	Fruits without pits	0.08 0.07 (0.075)	< 0.05 < 0.05	Spreader 90 10468.10-TX12

DALT: days after the last application

<sup>a</sup> Same location

<sup>b</sup> Same location

<sup>c</sup> Average in parentheses

### Plum

A total of six supervised trials on plums were conducted in California (four), Michigan (one), and Oregon (one) in the USA in 2010 (Samoil, 2012c).

In each trial, two foliar applications of the fenpyroximate EC formulation (56 g ai/L) were made at a rate of approximately 0.11 to 0.12 kg ai/ha per application, except the CA97 trial in California where an additional treated plot received two foliar applications made at a rate of approximately 0.57 kg ai/ha, 5× exaggerated rate. An adjuvant (Latron B-1956, Induce, Silglow, Pro 90, Super Spread 7000, or Preference) was added to the tank mix, as appropriate. Applications were made 13 to 15 days apart and the plums were harvested 7 days after the last treatment, except that in the trial in Oregon (OR23 trial), plums were collected 6 days after the last treatment.

Two samples of plums were collected from each treated plot and untreated plot. Specimens were stored frozen and shipped frozen to the analytical laboratory. Samples were processed with dry ice in a Robot Coupe RSI 10B. Processed samples were stored frozen until analysis.

The method of analysis was based on LC-MS/MS. The LOQ was 0.05 mg/kg for each analyte. Average recovery of all fortifications for fenpyroximate was  $87.2 \pm 10.1$  (n=17). Average recovery of all fortifications for M-1 was  $87.7 \pm 7.4$  (n=17). No control samples contained residues at or above the LOQ of the method.

Table 4 Residues of fenpyroximate in plums from supervised trials conducted with foliar spray in the USA in 2010

PLUM Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>b</sup>	M-1	
US GAP (stone fruits)	EC 50	0.117	≥ 748 (ground only)	≤ 2	7				Seasonal Max= 0.234 kg ai/ha Interval=14 days
2010 Parlier, CA <sup>a</sup> (John W)	EC 56	0.11 0.11	832 842	2	7	Fruits without pits	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Latron B-1956 10469.10-CA96
2010 Parlier, CA <sup>a</sup> (French Prune)	EC 56	0.11 0.11	1330 1320	2	7	Fruits without pits	0.25 0.29 (0.27)	< 0.05 < 0.05	Induce 10469.10-CA97
	EC 56	0.57 0.57	1330 1330	2	7	Fruits without pits	1.84	0.208	Induce (5x rate)
2010 Reedley, CA (Owen T)	EC 56	0.11 0.11	814 823	2	7	Fruits without pits	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Silglow 10469.10-CA98
2010 Gridley, CA (French Prune)	EC 56	0.12 0.12	1150 1160	2	7	Fruits without pits	0.22 0.18 (0.20)	< 0.05 < 0.05	Pro 90 10469.10-CA99
2010 Fennville, MI (Early Golden)	EC 56	0.11 0.11	1070 1060	2	7	Fruits without pits	0.12 0.14 (0.13)	< 0.05 < 0.05	Super Spread 7000 10469.10-MI28
2010 Brooks, OR (Brooks)	EC 56	0.11 0.11	1140 1210	2	6	Fruits without pits	0.08 0.09 (0.085)	< 0.05 < 0.05	Preference 10469.10-OR23

DALT: days after the last application

<sup>a</sup> Same location

<sup>b</sup> Average in parentheses

### *Berries and other small fruits*

#### *Strawberry*

A total of three supervised trials on strawberries were conducted in California (two) and Florida (one) in the USA in 2008 (Hattermann, 2008). In each trial, two foliar applications of the fenpyroximate SC or EC formulation (50 g ai/L nominal) were made at a rate of approximately 0.11 to 0.12 kg ai/ha per application. Applications were made 14 to 15 days apart and the strawberries were harvested 1 day after the last treatment.

Two samples of strawberries were collected from each treated plot and one untreated plot. Specimens were stored frozen and shipped frozen to the analytical laboratory and were processed with dry ice in a HCM-61 Food Processor. Processed samples were stored frozen until analysis.

The method of analysis was based on gas chromatography with nitrogen/phosphorous detection (GC-NPD). The LOQ was 0.01 mg/kg for each analyte. Average recovery of all fortifications was 91.9 ± 12.0% for strawberry (n=14). No control samples contained residues at or above the LOQ of the method.

A total of five supervised trials on strawberry were conducted in New York (one), North Carolina (one), Minnesota (one), California (one), and Oregon (one) in the USA in 2010 (Carringer, 2011). In each trial, two foliar applications of the fenpyroximate EC formulation (56 g ai/L) were made at a rate of approximately 0.11 to 0.12 kg ai/ha per application. An adjuvant (Induce, Dyne-Amice, or Silwet) was added to the spray solutions, as appropriate. Applications were made 14 to 15 days apart and the strawberries were harvested 1 day after the last treatment.

Two samples of strawberries were collected from each treated plot and one sample of strawberries was collected from each untreated plot. Specimens were stored frozen and shipped frozen to the analytical laboratory and were processed with dry ice in a Hobart food processor equipped with a 1/8 inch plate or a Robot Coupe RSI 45B grinder. Processed samples were stored frozen until analysis.

The method of analysis was based on LC-MS/MS. The LOQ was 0.01 mg/kg and the LOD was 0.003 mg/kg. Average recovery of all fortifications was  $88.9 \pm 9.6\%$  for strawberry (n=37). No control samples contained residues at or above the LOQ of the method.

Table 5 Residues of fenpyroximate in strawberries from supervised trials conducted with foliar spray in the USA in 2008 and 2010.

STRAWBERRY Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sub>a</sub>	M-1	
US GAP (Low-growing berry)	EC 50	0.058- 0.117	≥ 234 (ground only)	≤ 2	1				Seasonal Max = 0.234 kg ai/ha Interval = 14 days
2008 Oviedo, FL (Camarosa)	EC 52	0.11 0.11	273 281	2	1	Fruits	0.61 0.38 (0.495)	0.081 0.049	None 860.1500-08-520- 03c-01
	SC 49	0.11 0.11	273 280	2	1	Fruits	0.59 0.47 (0.53)	0.015 0.014	None
2008 Porterville, CA (Diamante)	EC 52	0.11 0.11	186 187	2	1	Fruits	0.29 0.27 (0.28)	0.057 0.050	None (Water volume less than the GAP minimum) 860.1500-08-520- 03c-02
	SC 49	0.11 0.11	187 187	2	1	Fruits	0.18 0.19 (0.185)	< 0.01 < 0.01	None (Water volume less than the GAP minimum)
2008 Salinas, CA (Albion)	EC 52	0.11 0.11	846 865	2	1	Fruits	0.24 0.18 (0.21)	0.017 0.012	None 860.1500-08-520- 03c-03
	SC 49	0.11 0.12	842 883	2	1	Fruits	0.24 0.23 (0.235)	< 0.01 < 0.01	None
2010 East Williamson, NY (Idea)	EC 56	0.11 0.11	281 281	2	1	Fruits	0.04 0.05 (0.045)	< 0.01 < 0.01	None TCI-10-273-01
	EC 56	0.11 0.11	281 281	2	1	Fruits	0.08 0.03 (0.055)	0.010 < 0.01	Induce
	EC 56	0.11 0.11	281 281	2	1	Fruits	0.06 0.06 (0.06)	< 0.01 < 0.01	Dyne-Amic MSO
	EC 56	0.11 0.11	281 281	2	1	Fruits	0.08 0.07 (0.075)	< 0.01 0.011	Silwet L77 Organo-silicone
2010 Seven Springs, NC (Camino Real)	EC 56	0.11 0.11	1040 1040	2	1	Fruits	0.10 0.10 (0.10)	< 0.01 < 0.01	None TCI-10-273-02
	EC 56	0.11 0.11	421 402	2	1	Fruits	0.16 0.18 (0.17)	< 0.01 < 0.01	Induce
	EC 56	0.11 0.11	421 412	2	1	Fruits	0.11 0.17 (0.14)	< 0.01 < 0.01	Dyne-Amic MSO

## Fenpyroximate

STRAWBERRY Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>a</sup>	M-1	
	EC 56	0.11 0.11	421 402	2	1	Fruits	0.21 0.16 (0.185)	< 0.01 < 0.01	Silwet L77 Organo-silicone
2010 St. Stephen, MN (Honeyoye)	EC 56	0.11 0.11	225 243	2	1	Fruits	0.06 0.04 (0.05)	< 0.003 < 0.003	None TCI-10-273-03
	EC 56	0.11 0.11	225 243	2	1	Fruits	0.03 0.03 (0.03)	< 0.003 < 0.003	Induce
	EC 56	0.11 0.12	225 243	2	1	Fruits	0.07 0.06 (0.065)	< 0.003 < 0.003	Dyne-Amic MSO
	EC 56	0.11 0.11	225 243	2	1	Fruits	0.02 0.04 (0.03)	< 0.003 < 0.003	Silwet L77 Organo-silicone
2010 Salinas, CA (Albion)	EC 56	0.11 0.11	449 477	2	1	Fruits	0.16 0.18 (0.17)	0.033 0.038	None TCI-10-273-04
	EC 56	0.11 0.11	458 477	2	1	Fruits	0.22 0.21 (0.215)	0.037 0.036	Induce
	EC 56	0.11 0.11	449 477	2	1	Fruits	0.23 0.25 (0.24)	0.025 0.026	Dyne-Amic MSO
	EC 56	0.11 0.11	458 468	2	1	Fruits	0.18 0.24 (0.21)	0.033 0.036	Silwet L77 Organo-silicone
2010 Elmira, OR (Benton)	EC 56	0.12 0.12	243 243	2	1	Fruits	0.20 0.18 (0.19)	0.034 0.029	None TCI-10-273-05
	EC 56	0.11 0.12	234 243	2	1	Fruits	0.20 0.18 (0.19)	0.022 0.025	Induce
	EC 56	0.11 0.12	234 243	2	1	Fruits	0.10 0.15 (0.125)	< 0.01 < 0.01	Dyne-Amic MSO
	EC 56	0.12 0.12	243 243	2	1	Fruits	0.14 0.23 (0.185)	0.016 0.034	Silwet L77 Organo-silicone

DALT: days after the last application

<sup>a</sup> Average in parentheses

*Assorted tropical and subtropical fruit—inedible peel*

*Avocado*

A total of five supervised trials on avocados were conducted in California (four) and Florida (one) in the USA in 2008 and 2009 (Samoil, 2011b).

In each trial, two foliar applications of the fenpyroximate EC formulation (52 g ai/L) were made at a rate of approximately 0.10 to 0.12 kg ai/ha per application. An adjuvant, Omni Supreme Spray (petroleum oil) or First Choice Narrow Range 415 Spray Oil, was added to the tank mix, as appropriate. Applications were made 13 to 17 days apart and the avocados were harvested 1 day after the last treatment.

Two samples each of avocado were collected from each treated plot and untreated plot. Specimens were stored frozen and shipped frozen to the analytical laboratory. Samples were



processed with dry ice in a Hobart food processor. Processed samples were stored frozen until analysis.

The method of analysis was based on gas chromatography coupled to a Mass Selective Detector (MSD) operating in selective ion monitoring (SIM) mode. The LOQ was 0.05 mg/kg. Average recovery of all fortifications was  $104.3 \pm 7.3\%$  for avocado (n=18). No control samples contained residues at or above the LOQ of the method.

Table 6 Residues of fenpyroximate in avocado from supervised trials conducted with foliar spray in the USA in 2008 and 2009

AVOCADO Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)	Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>b</sup>	
US GAP	EC 50	0.058- 0.117	$\geq 889$ (ground) $\geq 468$ (air)	$\leq 2$	1			Seasonal Max = 0.234 kg ai/ha Interval=14 days
2008 San Luis Obispo, CA (Haas)	EC 52	0.11 0.11	889 907	2	1	Fruits	0.06 < 0.05 (0.055)	Omni Supreme Spray Petroleum Oil 10007.08-CA13
2008 Nipoma, CA (Haas)	EC 52	0.11 0.11	1110 1000	2	1	Fruits	< 0.05 < 0.05 (< 0.05)	Omni Supreme Spray Petroleum Oil 10007.08-CA14
2009 Porterville, CA <sup>a</sup> (Haas)	EC 52	0.12 0.11	917 936	2	1	Fruits	< 0.05 < 0.05 (< 0.05)	First Choice Narrow Range 415 Spray Oil 10007.08-CA15
2009 Porterville, CA <sup>a</sup> (Haas)	EC 52	0.12 0.11	1340 1320	2	1	Fruits	< 0.05 < 0.05 (< 0.05)	First Choice Narrow Range 415 Spray Oil 10007.08-CA16
2008 Homestead, FL (Simmonds)	EC 52	0.10 0.10	1020 1280	2	1	Fruits	0.10 0.10 (0.10)	Omni Supreme Spray Petroleum Oil 10007.08-FL48

DALT: days after the last application

<sup>a</sup> Same location

<sup>b</sup> Average in parentheses

### *Fruiting vegetables, Cucurbits*

#### *Cucumber*

The 2010 Meeting reviewed the data from supervised trials on cucumbers conducted indoor in European countries following GAP for cucumber (indoor) in the USA with PHI of 7 days. The current Meeting received data from supervised trials on cucumber conducted outdoor following US GAP for cucumber (outdoor) with PHI of 1 day.

A total of nine supervised trials on cucumber were conducted in North Carolina (one), South Carolina (two), Georgia (two), Ohio (two), Texas (one), and California (one) in the USA in 2009 (Leonard, 2011a).

In each trial, two foliar applications of the fenpyroximate EC formulation (56 g ai/L) were made at a rate of approximately 0.11 kg ai/ha per application. An adjuvant, Induce, Activator 90, UAP 80/20, Top Surf, or Kinetic, was added to the tank mix, as appropriate. Applications were made on a 13- to 16-day interval and the cucumbers were harvested 1 day after the last treatment.

Two samples of cucumber were collected from each treated plot and untreated plot. Specimens were stored frozen and shipped frozen to the analytical laboratory. Samples were processed with dry ice in a Hobart food processor. Processed samples were stored frozen until analysis.

The method of analysis was based on LC-MS/MS. The LOQ was 0.05 mg/kg for each analyte, and the LOD was 0.01 mg/kg. Average recovery of all fortifications was  $109.7 \pm 8.2\%$  and  $96.4 \pm 10.4\%$  for fenpyroximate and M-1, respectively, for cucumber (n=19). No control samples contained residues at or above the LOQ of the method.

Table 7 Residues of fenpyroximate in cucumbers from supervised trials conducted with foliar spray outdoor in the USA in 2009

CUCUMBER Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sub>a</sub>	M-1	
US GAP (field)	EC 50	0.058– 0.117	≥ 374 (ground) ≥ 93.5 (air)	≤ 2	1				Seasonal Max= 0.234 kg ai/ha Interval=14 days
Cucumber for fresh consumption									
2009 Charleston, SC (Poinsett 76)	EC 56	0.11 0.11	440 427	2	1	Fruits	0.19 0.15 (0.17)	< 0.05 < 0.05	Activator 90 09032.09-SC*06
2009 Tifton, GA (Straight 8)	EC 56	0.11 0.11	414 413	2	1	Fruits	0.05 0.06 (0.055)	< 0.05 < 0.05	UAP 80/20 09032.09- GA*03
2009 Fremont, OH (Dasher II)	EC 56	0.11 0.11	496 506	2	1	Fruits	< 0.05 < 0.05 (< 0.05)	< 0.05 < 0.05	Top Surf 09032.09-OH*01
2009 Weslaco, TX (Poinsett 76)	EC 56	0.11 0.11	403 399	2	1	Fruits	0.08 0.07 (0.075)	< 0.05 < 0.05	Kinetic 09032.09-TX*21
2009 Holtville, CA (Cobra)	EC 56	0.11 0.11	485 490	2	1	Fruits	0.06 0.07 (0.065)	< 0.05 < 0.05	Induce 09032.09-CA44
Pickling cucumber									
2009 Clinton, NC (Cross Country)	EC 56	0.11 0.11	383 381	2	1	Fruits	0.06 0.09 (0.075)	< 0.05 < 0.05	Induce 09032.09- NC08
2009 Charleston, SC (Calypso Hybrid)	EC 56	0.11 0.11	443 428	2	1	Fruits	0.10 0.12 (0.11)	< 0.05 < 0.05	Activator 90 09032.09-SC*05
2009 Tifton, GA (National Pickling)	EC 56	0.11 0.11	413 411	2	1	Fruits	0.07 0.060 (0.065)	< 0.05 < 0.05	UAP 80/20 09032.09-GA*02
2009 Fremont, OH (Sassy)	EC 56	0.11 0.11	500 525	2	1	Fruits	< 0.05 < 0.05 (< 0.05)	< 0.05 < 0.05	Top Surf 09032.09- OH*02

DALT: days after the last application

### Legume vegetables

#### Common beans (pods and/or immature seeds)

A total of eight supervised trials on common beans were conducted in California (one), Florida (one), Georgia (one), New York (one), Ohio (two), Washington (one), and Wisconsin (one) in the USA in 2008 (Samoil, 2011a).

In each trial, two foliar applications of the fenpyroximate EC formulation (52 g ai/L) were made at a rate of approximately 0.11 kg ai/ha per application. An adjuvant (Crop Oil COC, Chemnut 80-20 NIS, UAP Surfactant 80/20, Induce, Top Surf, 90 Plus, or Liberate) was added to the spray solutions, as appropriate. Applications were made 13 to 15 days apart and the unshelled immature

beans were harvested 1 day after the last treatment, except for the CA38 trial in which unshelled beans were harvested additionally on 3, 8 and 10 days after the last treatment.

Two samples of unshelled beans were collected from each treated plot and untreated plot; at the CA38 trial, two additional samples were collected from each of the treated plots on each day of harvest. Specimens were stored frozen and shipped frozen to the analytical laboratory. Samples were processed with dry ice in a Hobart Food Chopper. Processed samples were stored frozen until analysis.

The method of analysis was based on LC-MS/MS. The LOQ was 0.05 mg/kg for each analyte. Average recovery of all fortifications was 100.1±12.1% bean (n=38). No control samples contained residues at or above the LOQ of the method.

Table 8 Residues of fenpyroximate in pods and immature beans from supervised trials on common beans conducted with foliar spray in the USA in 2008

COMMON BEANS Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>a</sup>	M-1	
US GAP	EC 50	0.117	≥ 281 (ground) ≥ 47 (air)	≤ 2	1				Seasonal Max = 0.234 kg ai/ha Interval = 14 days
2008 Davis, CA (Blue Lake bush 274)	EC 52	0.11 0.11	299 290	2	1	Pods with seeds	0.19 0.17 (0.18)	< 0.05 < 0.05	TGI Crop Oil 09942.08-CA38
					3	Pods with seeds	0.12 0.08 (0.10)	< 0.05 < 0.05	
					8	Pods with seeds	0.06 0.07 (0.065)	< 0.05 < 0.05	
					10	Pods with seeds	0.08 0.06 (0.07)	< 0.05 < 0.05	
2008 Citra, FL (Dusky)	EC 52	0.11 0.11	374 365	2	1	Pods with seeds	0.07 0.10 (0.085)	< 0.05 < 0.05	Chemnut 80-20 09942.08-FL37
2008 Tifton, GA (Blue Lake Bush 274)	EC 52	0.11 0.11	449 449	2	1	Pods with seeds	0.13 0.16 (0.145)	< 0.05 < 0.05	Surfactant 80/20 09942.08-GA*13
2008 Freeville, NY (Hystyle)	EC 52	0.11 0.11	318 318	2	1	Pods with seeds	0.08 0.10 (0.09)	< 0.05 < 0.05	Induce 09942.08-NY24
2008 Fremont, OH <sup>a</sup> (Sea Biscuit)	EC 52	0.11 0.11	374 364	2	1	Pods with seeds	< 0.05 < 0.05 (< 0.05)	< 0.05 < 0.05	Top Surf 09942.08-OH*09
2008 Fremont, OH <sup>a</sup> (Brio)	EC 52	0.11 0.11	365 374	2	1	Pods with seeds	< 0.05 < 0.05 (< 0.05)	< 0.05 < 0.05	Top Surf 09942.08-OH*10
2008 Moxee, WA (Jade)	EC 52	0.11 0.11	374 365	2	1	Pods with seeds	0.19 0.18 (0.185)	< 0.05 < 0.05	90 Plus 09942.08-WA*07
2008 Arlington, WI (Hystyle)	EC 52	0.11 0.11	393 384	2	1	Pods with seeds	0.10 0.07 (0.085)	< 0.05 < 0.05	Liberate 09942.08-WI*17

DALT: days after the last application

<sup>a</sup> Average in parentheses

*Root and tuber vegetables**Potato*

A total of sixteen supervised trials on potatoes were conducted in the USA: in New York (two), North Carolina (one), Ohio (one), Michigan (one), Wisconsin (two), New Mexico (one), California (one), Washington (four), and Idaho (two) in 2009 and in Florida (one) in 2010 (Leonard, 2011b).

In each trial, two foliar applications of the fenpyroximate EC formulation (56 g ai/L) were made at a rate of approximately 0.11 to 0.13 kg ai/ha per application. In the ID12 trial, an additional treated plot received two foliar applications made at the 5× exaggerated rate. An adjuvant (Induce, Chem Nut 80/20, Top Surf, Activator 90, Ad Wet 90, or 90 Plus) was added to the spray solutions, as appropriate. Applications were made on a 6- to 8-day interval and the potatoes were harvested 6-7 days after the last treatment, except that in the MI11 and NC18 trials, potatoes were harvested on 0, 3, 7, 11, and 14 or 0, 3, 6, 9, and 12, respectively after the last treatment.

Two samples of potato were collected from each treated plot and untreated plot. In the two decline trials, two additional samples were collected from the treated plot on each day of harvest. Specimens were stored frozen and shipped frozen to the analytical laboratory. Samples were processed with dry ice in a Hobart food processor. Processed samples were stored frozen until analysis.

The method of analysis was based on LC-MS/MS. The LOQ was 0.05 mg/kg for each analyte. Average recovery of all fortifications was  $98.3 \pm 6.2\%$  for potatoes (n=58). No control samples contained residues at or above the LOQ of the method.

Table 9 Residues of fenpyroximate in potatoes from supervised trials conducted with foliar spray in the USA in 2009 and 2010

POTATO Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sub>a</sub>	M-1	
US GAP (field)	EC 50	0.117	≥ 187 (ground) ≥ 47 (air)	≤ 2	7				Seasonal Max = 0.234 kg ai/ha Interval = 7 days
2009 Freeville, NY (Yukon Gold)	EC 56	0.11 0.11	321 333	2	6	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Induce 10173.09-NY10
2009 North Rose, NY (Superior)	EC 56	0.12 0.11	376 375	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Induce 10173.09-NY11
2009 Clinton, NC (Atlantic)	EC 56	0.11 0.11	292 298	2	0	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Induce 10173.09-NC18
					3		< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	
					6		< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	
2010 Citra, FL (Red Pontiac)	EC 56	0.11 0.11	375 375	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Chemnut 10173.09-FL07
2009 Laingsburg, MI (FL 1879)	EC 56	0.11 0.11	282 279	2	0	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Activator 90 10173.09-MI11
					3		< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	
					7		< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	
					11		< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	
				14		< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05		

POTATO Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>a</sup>	M-1	
2009 Arlington, WI <sup>b</sup> (Superior)	EC 56	0.11 0.11	395 399	2	6	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Activator 90 10173.09-WI12
2009 Arlington, WI <sup>b</sup> (Superior)	EC 56	0.11 0.11	200 212	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Activator 90 10173.09-WI16
2009 Wooster, OH (Norland Red)	EC 56	0.13 0.12	354 356	2	6	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Top Surf 10173.09-OH*09
2009 Las Cruces, NM (Red Pontiac)	EC 56	0.12 0.11	288 356	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Induce 10173.09-NM17
2009 Kimberly, ID (Russet Burbank)	EC 56	0.11 0.11	423 428	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Activator 90 10173.09-ID12
	EC 56	0.57 0.57	425 427	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	
2009 Kimberly, ID (Russet Burbank)	EC 56	0.11 0.11	469 470	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Activator 90 10173.09-ID13 (Close to the above)
2009 Prosser, WA (Yukon Gold)	EC 56	0.11 0.11	341 328	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Ad wet 90 10173.09-WA05
2009 Prosser, WA (Russet Burbank)	EC 56	0.12 0.11	274 256	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Ad Wet 90 10173.09-WA06
2009 Moxee, WA <sup>c</sup> (Red Norland)	EC 56	0.12 0.12	388 384	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	90 Plus 10173.09-WA*07
2009 Moxee, WA <sup>c</sup> (Russet (Dillon))	EC 56	0.11 0.11	377 370	2	7	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	90 Plus 10173.09-WA*08
2010 Holtville, CA (Cal White)	EC 56	0.11 0.11	295 293	2	1	Tubers	< 0.05 < 0.05 ( < 0.05)	< 0.05 < 0.05	Activator 90 10173.09-CA97

DALT: days after the last application

<sup>a</sup> Average in parentheses

<sup>b</sup> Same location

<sup>c</sup> Same location

## Herbs

### Mints

A total of six supervised trials on mint were conducted in the USA: Washington (three), and Idaho (one) in 2002 (Dorschner, 2005 PR No. 08452), and Wisconsin (two) in 2004 (Dorschner, 2007 PR No.A8542).

In each trial, two foliar applications of the fenpyroximate EC formulation (52 g ai/L) were made at a rate of approximately 0.11 to 0.13 kg ai/ha per application. Applications were made 6 to 8 days apart and the mint was harvested 1 day after the last treatment.

Two samples of mint were collected from each treated plot and untreated plot. Specimens were stored frozen and shipped frozen to the analytical laboratory. Samples were processed with dry ice in a Hobart food processor. Processed samples were stored frozen until analysis.

The method of analysis was based on GC-NPD. The LOQ was 0.05 mg/kg for combined residues of fenpyroximate and M-1. Average recovery of all fortifications was  $107.0 \pm 10.4\%$  for mint (n=25). No control samples contained residues at or above the LOQ of the method.

As the method analyses fenpyroximate and M-1 as M-1, no information was available on the concentrations of fenpyroximate alone.

Table 10 Residues of fenpyroximate in mints from supervised trials conducted with foliar spray in the USA

MINT Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)	Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate +M1 <sup>a</sup>	
US GAP	EC 50	0.058-0.117	≥ 234 (ground only)	≤ 2	1			Seasonal Max=0.234 kg ai/ha Interval=7 days
2002 Prosser, WA (Spearmint, Native)	EC 52	0.12 0.11	294 286	2	1	Leaves	1.1 1.2 (1.15)	None 08452.02-WA44
2002 Paterson, WA (Peppermint, Black Mitcham)	EC 52	0.12 0.12	279 290	2	1	Leaves	1.9 2.5 (2.2)	None 08452.02-WA45
2002 Prosser, WA (Spearmint, Native)	EC 52	0.13 0.12	475 460	2	1	Leaves	0.56 0.54 (0.55)	None 08452.02-WA46 (different site from 08452.02-WA44)
2002 Nampa, ID (Peppermint, Black Mitcham)	EC 52	0.12 0.12	232 234	2	1	Leaves	2.4 2.5 (2.45)	None 08452.02-ID16
2004 Portage, WI <sup>b</sup> (Spearmint, Scotch)	EC 52	0.12 0.12	322 317	2	1	Leaves	1.0 1.1 (1.05)	None A8542.04-WI23
2004 Protage, WI <sup>b</sup> (Peppermint, Black Mitcham)	EC 52	0.11 0.11	315 304	2	1	Leaves	2.4 2.1 (2.25)	None A8542.04-WI24

DALT: days after the last application

<sup>a</sup> Average in parentheses

<sup>b</sup> Same location

### *Legume animal feeds*

#### *Bean forage*

Common bean plants with pods were sampled one day after the last application (except in one decline study) by cutting the whole plant at soil level. Each of the collected plants were cut into three pieces, top, middle and bottom and shipped frozen to the analytical laboratory and kept frozen until analysis.

The method of analysis was based on LC-MS/MS. The LOQ was 0.05 mg/kg for each analyte. Average recovery of all fortifications was  $99.7 \pm 9.8\%$  (n=44). No control samples contained residues at or above the LOQ of the method. Fresh foliage (with pods) samples were analysed.

Table 11 Residues of fenpyroximate in bean forage from supervised trials on common beans conducted with foliar spray in the USA (Samoil, 2011a; PR No. 09942)

COMMON BEANS Year, Location (variety)	Application				DALT	Portion analysed	Residues (mg/kg)		Notes (adjuvant, deviation, etc.) Trial ID
	Form. g ai/L	Rate kg ai/ha	Water L/ha	No			Fenpyroximate <sup>a</sup>	M-1	
US GAP	EC 50	0.117	≥ 281 (ground) ≥ 47 (air)	≤ 2	1				Seasonal Max =0.234 kg ai/ha Interval=14 days
2008 Davis, CA (Blue Lake bush 274)	EC 52	0.11 0.11	299 290	2	1	Foliage	2.07 1.76 (1.915)	1.28 1.15	TGI Crop Oil 09942.08-CA38
					3		1.69 1.61	1.61 1.43	
					8		0.88 0.99	0.79 0.84	
					10		0.83 0.74	0.62 0.52	
2008 Citra, FL (Dusky)	EC 52	0.11 0.11	374 365	2	1	Foliage	0.96 0.83 (0.895)	0.37 0.31	Chemnut 80-20 09942.08-FL37
2008 Tifton, GA (Blue Lake Bush 274)	EC 52	0.11 0.11	449 449	2	1	Foliage	2.16 2.73 (2.445)	0.55 0.53	Surfactant 80/20 09942.08-GA*13
2008 Freeville, NY (Hystyle)	EC 52	0.11 0.11	318 318	2	1	Foliage	3.38 3.45 (3.415)	1.01 1.05	Induce 09942.08-NY24
2008 Fremont, OH <sup>b</sup> (Sea Biscuit)	EC 52	0.11 0.11	374 364	2	1	Foliage	< 0.05 < 0.05 (< 0.05)	< 0.05 < 0.05	Top Surf 09942.08-OH*09
2008 Fremont, OH <sup>b</sup> (Brio)	EC 52	0.11 0.11	365 374	2	1	Foliage	< 0.05 < 0.05 (< 0.05)	< 0.05 < 0.05	Top Surf 09942.08-OH*10
2008 Moxee, WA (Jade)	EC 52	0.11 0.11	374 365	2	1	Foliage	1.70 2.04 (1.87)	0.62 0.77	90 Plus 09942.08-WA*07
2008 Arlington, WI (Hystyle)	EC 52	0.11 0.11	393 384	2	1	Foliage	5.10 6.50 (5.80)	0.93 1.01	Liberate 09942.08-WI*17

DALT: days after the last application

<sup>a</sup> Average in parentheses

<sup>b</sup> Same location

## FATES OF RESIDUES IN STORAGE AND PROCESSING

### *In processing*

#### *Plum*

A processing study was conducted using fresh plum samples taken 7 days after the last treatment in one field trial in Parlier, California, with two applications of fenpyroximate at a rate of 0.57 kg ai/ha each, 5× the GAP rate (Samoil, 2012c). Dried plums were prepared from fresh plums simulating commercial practices by pitting and placing them in dryers set at around 57 °C to 60 °C for 15 to 17 hours until the moisture level reached around 25 to 26%. Fresh and dried samples were shipped frozen to the laboratory, where the samples remained frozen until analysis.

Residues of fenpyroximate and M-1 were analysed in the different plum matrices were determined by LC-MS/MS. The method was validated prior to analysis with a LOQ of 0.05 mg/kg for

fenpyroximate and M-1 in fresh and dried plums. The recoveries of fenpyroximate were 72–107% in fresh plums, and 92–118% in dried plums.

As shown in Table 12, residues of fenpyroximate concentrated during the processing of dried plums.

Table 12 Residues of fenpyroximate in fresh and dried plums

Commodity	Fenpyroximate mg/kg	Processing factor for Fenpyroximate	M-1 mg/kg
Fresh plum	1.84	–	0.208
Dried plum	3.18	1.73	0.316

### Potato

A processing study was conducted using potato samples taken 7 days after the last treatment in one field trial in Kimberly, Idaho, with two applications of fenpyroximate at a rate of 0.57 kg ai/ha each, 5× the GAP rate. (Leonard 2011b). Potatoes were processed into flakes, chips, and wet peels by steam peeling, scrubbing, pressing, trimming, cutting, rinsing free starch, precooking in a steam jacketed kettle, cooling, cooking in a steam jacketed kettle, mashing, mixing with additives, drying in a drum dryer, breaking in a mill, and drying, using a procedure that simulated commercial practice. Processed samples and a retained whole potato sample were shipped frozen to the laboratory, where the samples remained frozen until analysis.

Residues of fenpyroximate and M-1 were determined by LC-MS/MS. The method was validated prior to analysis with a LOQ of 0.05 mg/kg for fenpyroximate and M-1 in all matrices. The recoveries for fenpyroximate were 110% in potato tubers, 83% in potato flakes, 90% in potato chips, and 99% in potato wet peels.

The results of the processing study are summarized in Table 13. As residues in fresh and processed potato samples are all less than the LOQ, it was not possible to calculate processing factors.

Table 13 Residues of fenpyroximate in potatoes and their processed commodities

Commodity	Fenpyroximate mg/kg	M-1 mg/kg
Potato (RAC)	< 0.05, < 0.05	< 0.05, < 0.05
Potato flakes	< 0.05, < 0.05	< 0.05, < 0.05
Potato chips	< 0.05, < 0.05	< 0.05, < 0.05
Potato wet peels	< 0.05, < 0.05	< 0.05, < 0.05

### Mint

A processing study was conducted using mint samples taken 1 day after the last application in two field trials (one in Prosser, Washington, and the other in Portage, Wisconsin) with two applications of fenpyroximate at a rate of 0.11 to 0.12 kg ai/ha each complying with the GAP rate (Dorschner 2005 and Dorschner 2007). Samples were processed into oil by distilling using a mint still, a procedure that simulated commercial practice. Processed samples and a retained whole mint sample were shipped frozen to the laboratory, where the samples remained frozen until analysis.

Residues of fenpyroximate and M-1 in the different mint matrices were analysed as M-1 by GC with a nitrogen phosphorous detector. The method was validated prior to analysis with a LOQ of 0.05 mg/kg for mint leaves and 0.10 mg/kg for mint oil. The recoveries were 108% and 100% for mint leaves and 97% and 106% for mint oil as reported in Dorschner 2005 and Dorschner 2007, respectively.

The results of the processing study are summarized in Table 14. Although it was not possible to calculate a processing factor for fenpyroximate alone as no concentrations of fenpyroximate alone were reported, the sum of fenpyroximate and M-1 decreased during processing into oil.



Table 14 Residues of fenpyroximate in mint leaves and mint oil

Commodity	Fenpyroximate +M-1 mg/kg	Processing factor for Fenpyroximate +M-1	Reference
Fresh mint	1.1	–	Dorschner 2005 (PR No. 08452)
Mint oil	< 0.10	< 0.09	
Fresh mint	1.01, 1.05	–	Dorschner 2007 (PR No. A8452)
Mint oil	0.254, 0.206	0.25, 0.20	
	Best estimate	0.20	

## APPRAISAL

Fenpyroximate is a pyrazole non-systemic acaricide. It was first evaluated by JMPR in 1995 and then in 1999 and 2010 for maximum residue levels, and in 2004 and 2007 for toxicology. The currently standing recommendations of JMPR are as follows:

ADI: 0–0.01 mg/kg bw (1995)

ARfD: 0.02 mg/kg bw (2007)

Residue definition: Fenpyroximate for compliance with the MRL and for estimation of dietary intake (both for animal and plant commodities). The residue is fat soluble. (1999)

The current Meeting received information on the latest use pattern and the supervised residue trials on stone fruits, strawberry, avocado, cucumber, common bean (pods and/or immature seeds and bean fodder), potato and mints conducted in the USA.

### *Results of supervised residue trials on crops*

The Meeting received supervised trial data for fenpyroximate conducted in the USA on stone fruits, strawberry, avocado, cucumber, common bean (pods and/or immature seeds; and bean fodder), potato and mints with foliar applications of the fenpyroximate emulsion concentrate (EC) formulation.

For estimating HR or highest residue, the highest individual residue concentration from the trials conducted in accordance with GAP was used.

#### *Stone fruits*

The approved use of fenpyroximate on stone fruits in the USA consists of up to two foliar spray applications with an interval of 14 days at a maximum rate of 0.117 kg ai/ha and a minimum of 748 L/ha of water, the PHI is 7 days. In supervised residue trials, various adjuvants were used with the result that there were no significant difference or trend found between the different adjuvants.

A total of eight supervised trials on cherries were conducted in the USA in 2010. The residues of fenpyroximate in cherries from six independent trials in accordance with US GAP were in rank order: 0.27, 0.34, 0.46, 0.69, 0.81 and 0.87 mg/kg.

The Meeting estimated an STMR of 0.57 mg/kg for cherries.

A total of ten supervised trials on peach were conducted in the USA in 2010. The residues from seven trials in accordance with US GAP were in rank order: 0.08, 0.08, 0.12, 0.13, 0.13, 0.15 and 0.18 mg/kg.

The Meeting estimated an STMR of 0.13 mg/kg for peach.

A total of six supervised trials on plum were conducted in the USA in 2010. The residues from five trials in accordance with US GAP were in rank order: < 0.05, 0.09, 0.13, 0.20 and 0.27 mg/kg.

The Meeting estimated an STMR of 0.13 mg/kg for plum.

The GAP in the USA covers the group of stone fruits; and the STMRs for cherries, peach and plum were within five-fold difference. However, the Meeting decided to estimate two maximum

residue levels, one for cherries and the other for stone fruits except cherries, in order to avoid probability of IESTI for children calculated for peach exceeding the ARfD.

The Meeting therefore estimated a maximum residue level, STMR and HR of 2, 0.57 and 0.90 mg/kg, respectively for cherries.

As the residue populations of peach and plum were similar according to the Mann-Whitney U test, the Meeting decided to combine the data to recommend a maximum residue level for stone fruits except cherries. The combined residues were in rank order (n=12): < 0.05, 0.08, 0.08, 0.09, 0.12, 0.13, 0.13, 0.13, 0.15, 0.18, 0.20 and 0.27 mg/kg.

The Meeting estimated a maximum residue level, STMR and HR at 0.4, 0.13 and 0.29 mg/kg, respectively, for stone fruits, except cherries.

#### *Strawberry*

The approved use of fenpyroximate on strawberry in the USA consists of up to two foliar spray applications with an interval of 14 days at a maximum rate of 0.117 kg ai/ha and a minimum of 234 L/ha of water. PHI is 1 day.

A total of three supervised trials on strawberry were conducted in the USA in 2008. In a trial in Porterville, California, the water volume was less than the minimum specified in GAP. However, as the Meeting considered that difference in spray volume would have little impact on terminal residues, the Meeting used the residue data from this trial for the estimation of maximum residue level.

A total of five supervised trials on strawberry were also conducted in the USA in 2010.

The residues of fenpyroximate in strawberry from eight independent trials in accordance with US GAP were in rank order: 0.07, 0.08, 0.19, 0.19, 0.24, 0.24, 0.28 and 0.53 mg/kg.

The Meeting estimated a maximum residue level, STMR and HR at 0.8, 0.215 and 0.59 mg/kg, respectively for strawberry.

#### *Avocado*

The approved use of fenpyroximate on avocado in the USA consists of up to two foliar spray applications with an interval of 14 days at a maximum rate of 0.117 kg ai/ha and a minimum of 889 L/ha of water (for ground spray). PHI is 1 day.

A total of five supervised trials on avocado were conducted in the USA in 2008 and 2009. The residues of fenpyroximate in avocado from four independent trials in accordance with US GAP were in rank order: < 0.05 (2), 0.06 and 0.10 mg/kg.

The Meeting estimated a maximum residue level, STMR and HR at 0.2, 0.055 and 0.10 mg/kg respectively for avocado.

#### *Cucumber*

The current approved use of fenpyroximate on field grown cucumber in the USA consists of up to two foliar spray applications with an interval of 14 days at a maximum rate of 0.117 kg ai/ha and a minimum of 374 L/ha of water (for ground spray). PHI is 1 day.

A total of nine supervised trials on cucumber were conducted outdoor in the USA in 2009. The residues of fenpyroximate in cucumber from nine independent trials in accordance with US GAP were in rank order: < 0.05 (2), 0.06, 0.07, 0.07, 0.08, 0.08, 0.11 and 0.17 mg/kg.

The Meeting estimated a maximum residue level, STMR and HR at 0.3, 0.07 and 0.19 mg/kg respectively for cucumber. The new recommendation replaces that of the 2010 JMPR (maximum residue level of 0.03 mg/kg).

*Common beans (pods and/or immature seeds)*

The approved use of fenpyroximate on common beans (US GAP for snap beans) in the USA consists of up to two foliar spray applications with an interval of 14 days at a maximum rate of 0.117 kg ai/ha and a minimum of 281 L/ha of water (for ground spray). PHI is 1 day.

A total of eight supervised trials on common beans were conducted in the USA in 2008. The residues of fenpyroximate in common beans (pods and/or immature seeds) from seven independent trials in accordance with US GAP were in rank order: < 0.05, 0.09, 0.09, 0.09, 0.15, 0.18 and 0.19 mg/kg.

The Meeting estimated a maximum residue level, STMR and HR at 0.4, 0.09 and 0.19 mg/kg respectively for common beans (pods and/or immature seeds).

*Potato*

The approved use of fenpyroximate on potato in the USA consists of up to two foliar spray applications with an interval of 7 days at a maximum rate of 0.117 kg ai/ha and a minimum of 187 L/ha of water (for ground spray). PHI is 7 days.

A total of sixteen supervised trials on potato were conducted in the USA. The residues of fenpyroximate in potato from fourteen independent trials in accordance with US GAP were in rank order: < 0.05 (14) mg/kg. The residues of fenpyroximate from one trial in which the application rate was 5 times the GAP rate were also < 0.05 mg/kg.

The Meeting estimated a maximum residue level, STMR and HR at 0.05 \*, 0 and 0 mg/kg respectively for potato.

*Mints*

The approved use of fenpyroximate on mint in the USA consists of up to two foliar spray applications with an interval of 7 days at a maximum rate of 0.117 kg ai/ha and a minimum of 234 L/ha of water (for ground spray). PHI is 1 day.

A total of six supervised trials on mint were conducted in the USA. As the method used analyses fenpyroximate and M-1 as M-1, no information was available on the concentrations of fenpyroximate alone. In general, the concentrations of M-1 in food commodities were much lower than those of fenpyroximate but the data from supervised residue trials provided to JMPR so far indicate that M-1 can be present up to 30% of fenpyroximate. The Meeting considered that the information was insufficient to estimate a maximum residue level for mints.

***Legume animal feeds****Bean forage*

Common bean plants with pods were sampled by cutting the whole plant at soil level.

The residues of fenpyroximate in foliage of common bean plant from seven independent trials in accordance with US GAP were in rank order: < 0.05, 0.90, 1.87, 1.92, 2.45, 3.42 and 5.80 mg/kg on a fresh weight basis.

The Meeting estimated a median residue and highest residue at 1.92 and 6.50 mg/kg respectively for bean forage (on a fresh weight basis) for the purpose calculating livestock dietary burdens.

***Fate of residues during processing***

The Meeting received information on the processing of plum into dried plums; potato into potato flakes, chips and wet peels; and mint into mint oils.

As concentration of fenpyroximate was observed in the processing of plums, there was a need to estimate a maximum residue level for dried plum. Using the processing factor of 1.73 shown below, a maximum residue level for dried plum was estimated to be 0.7 mg/kg.

Commodity	Fenpyroximate mg/kg	Processing factor for Fenpyroximate	STMR-(P)	HR-(P)
Fresh plum	1.84	-	0.11	0.29
Dried plum	3.18	<b>1.73</b>	<b>0.18</b>	<b>0.50</b>

As for processing of potato, no processing factors could be calculated as the residues of fenpyroximate were all below the LOQ of 0.05 mg/kg in fresh potato and processed potato products (flakes, chips and wet peels).

As for processing of mint, since no information was available for the concentration of fenpyroximate alone was available, processing factor of fenpyroximate could not be calculated. The best estimate of processing factor for the sum of fenpyroximate and M-1 in the processing of mint to mint oil was 0.20.

### *Residues in animal commodities*

#### *Estimation of dietary burdens*

Among commodities reviewed by the 1999, 2010 and the current JMPR, apple wet pomace (STMR-P, 0.05 mg/kg), dry citrus pulp (STMR-P, 0.64 mg/kg), wet grape pomace (STMR-P, 0.06 mg/kg), wet tomato pomace (STMR-P, 0.03 mg/kg), bean forage (median residue, 1.89 mg/kg; and highest residue, 3.415 mg/kg on a fresh weight basis) and potato wet peel (STMR-P, 0.05 mg/kg) can be fed to beef and dairy cattle. There have been no feed items for poultry.

The maximum and mean dietary burdens were calculated using the highest residue and STMR/median residue of fenpyroximate in the above-mentioned commodities on a basis of the OECD Animal Feeding Table. The summary of calculated dietary burdens of fenpyroximate is shown in the following table.

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

	US-Canada		EU		Australia		Japan	
	max	mean	max	Mean	max	mean	Max	mean
Beef cattle	0.15	0.15	0.18	0.18	11.35	3.50	-	-
Dairy cattle	0.07	0.07	3.90 <sup>a</sup>	1.28 <sup>b</sup>	13.21	4.05	-	-

<sup>a</sup> Suitable for estimating maximum residue levels for meat, fat, edible offal and milk of cattle (see below).

<sup>b</sup> Suitable for estimating STMRs for meat, fat, edible offal and milk of cattle (see below).

### *Residues in milk and mammalian tissues*

The 1999 JMPR reviewed a cattle feeding study conducted at levels equivalent to 1, 3 and 10 ppm in the feed. In the study, fenpyroximate in milk or tissues was measured together with M-1. No information was available on the concentration of fenpyroximate alone. Nonetheless, the 1999 JMPR and 2010 JMPR used the results of this study as the dietary burdens were lower than 1 ppm and the residue concentrations in the tissues and milk were also very low.

In the animal metabolism study, residues of M-1 in tissues and milk were < 0.001 mg/kg and less than fenpyroximate except in the case of liver in which M-1 was present at much higher concentrations. In the animal feeding study, the sum of fenpyroximate and M-1 in kidney was higher than that in liver, and as such, the residue in kidney would be the basis for a maximum residue level for edible offal. In kidney, the concentration of fenpyroximate was significantly higher than that of M-

1. Therefore, the Meeting decided to use the results of animal feeding study recognizing that it would lead to some overestimate of maximum residue level.

The maximum and mean dietary burdens in cattle were 13.21 and 4.05 ppm of dry matter diet respectively. The Meeting noted that the highest maximum dietary burden in cattle, based on animal feed ration in Australia, was higher than the highest feeding level of 10 ppm in feed in the cattle feeding study by about 30%.

As fenpyroximate has not been authorized for use for common beans in Australia, and bean forage is not generally traded internationally, the Meeting decided to use the second highest maximum dietary burden based on the animal feed ration in Europe, where use of fenpyroximate for common bean has been authorized, together with residue levels in tissues and milk at 1, 3 and 10 ppm dose groups. The maximum dietary burden calculated for cattle using the feed ration in Australia without bean forage was 0.21 ppm in dry matter diet.

	Feed level (ppm) for milk residues	Fenpyroximate+M-1 (mg/kg) in milk	Feed level (ppm) for Tissue residues	Fenpyroximate+M-1 (mg/kg) in			
				Muscle	Liver	Kidney	Fat
Maximum residue level beef or dairy cattle							
Feeding study <sup>a</sup>	3	0.0062	3	0.017	< 0.003	< 0.01	0.073
	10	0.013	10	0.049	0.011	0.019	0.159
Dietary burden and highest residue	3.90	0.007	3.90	0.021	0.004	0.011	0.084
STMR beef or dairy cattle							
Feeding study <sup>b</sup>	1	-	1	< 0.01	< 0.003	< 0.003	0.015
	3	0.0062	3	0.015	< 0.003	< 0.003	0.056
Dietary burden and mean residue	1.28	< 0.005	1.28	0.011	< 0.003	< 0.003	0.021

<sup>a</sup> highest residues for tissues and mean residue for milk

<sup>b</sup> mean residues for tissues and mean residue for milk

The Meeting estimated STMR of 0.005, 0.011, 0.003, 0.003 and 0.021 mg/kg for milk, muscle, liver, kidney and fat, respectively; and HR of 0.021, 0.004, 0.011 and 0.084 mg/kg for muscle, liver, kidney and fat, respectively.

The Meeting estimated maximum residue levels of 0.01\* mg/kg for milks, 0.02 mg/kg for edible offal (mammalian) and 0.2 mg/kg (fat) for meat (from mammals other than marine mammals) and withdrew the existing CXLs for cattle milk, kidney, liver and meat.

## RECOMMENDATIONS

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

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

The residue is fat soluble.

Commodity		Recommended MRL, mg/kg		STMR/STMR-P mg/kg	HR/HR-P mg/kg
CCN	Name	New	Previous		
FI 0326	Avocado	0.2	-	0.055	0.10
MO 1280	Cattle kidney	W	0.01*		
MO 1281	Cattle liver	W	0.01*		

Commodity		Recommended MRL, mg/kg		STMR/STMR-P mg/kg	HR/HR-P mg/kg
CCN	Name	New	Previous		
MM 0812	Cattle meat	W	0.02 (fat)		
ML 0812	Cattle milk	W	0.005* F		
FS 0013	Cherries	2	-	0.57	0.90
VP 0526	Common bean (pods and/or immature seeds)	0.4	-	0.09	0.19
VC 0424	Cucumber	0.3	0.03	0.07	0.19
MO 0105	Edible offal (mammalian)	0.02	-	Liver, 0.003 Kidney, 0.003	Liver, 0.004 Kidney, 0.011
MM 0095	Meat (from mammals other than marine mammals)	0.2 (fat)	-	Muscle, 0.011 Fat, 0.021	Muscle, 0.021 Fat, 0.084
ML 0106	Milks	0.01*	-	0.005	-
VR 0589	Potato	0.05	-	0	0
DF 0014	Prunes	0.7	-	0.18	0.50
FS 0012	Stone fruits (except cherries)	0.4	-	0.13	0.29
FB 0275	Strawberry	0.8	-	0.215	0.59

For calculating animal dietary burden

Commodity		Recommended MRL, mg/kg		STMR/STMR-P mg/kg	HR/HR-P mg/kg
CCN	Name	New	Previous		
AL 1030	Bean forage			1.92 <sup>a</sup>	5.80 <sup>a</sup>

<sup>a</sup> for the purpose of calculating animal dietary burdens. Expressed on an "as received" basis.

## DIETARY RISK ASSESSMENT

### *Long-term intake*

The International Estimated Dietary Intakes (IEDIs) of fenpyroximate were calculated for the 13 GEMS/Food cluster diets using STMRs and STMRPs estimated by the 1999, 2010 and current Meetings, see Annex 3 of the 2013 JMPR Report. The ADI is 0–0.01 mg/kg bw and the calculated IEDIs were 1–7% of the maximum ADI. The Meeting concluded that the long-term intake of residues of fenpyroximate resulting from the uses considered by the JMPR is unlikely to present a public health concern.

### *Short-term intake*

The International Estimated Short-Term Intakes (IESTI) of fenpyroximate were calculated for commodities and their processed commodities using STMRs/STMR-Ps estimated by the current Meeting, see Annex 4 of the 2013 JMPR Report. The ARfD is 0.02 mg/kg and the calculated IESTIs were 0–80% of the ARfD. The Meeting concluded that the short-term intake of residues of fenpyroximate, when used in ways that have been considered by the JMPR, is unlikely to present a public health concern.

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