SULFOXAFLOR (252)

The first draft was prepared by Ms Monique Thomas, Pest Management Regulatory Agency, Canada

EXPLANATION

Sulfoxaflor, a sulfoximine insecticide, was first evaluated by JMPR in 2011 where an ADI and ARfD of 0–0.05 mg/kg bw and 0.3 mg/kg bw respectively were established. A residue definition of *sulfoxaflor* was established for both compliance and dietary risk assessment in plant and animal commodities.

Sulfoxaflor was also evaluated by JMPR in 2014 where the previously reviewed residue trial data on citrus fruits, pome fruits, stone fruits and tree nuts were reassessed against the registered USA GAP.

After the 2015 CCPR Meeting, the proposed MRL for tree nuts was held at Step 4 pending additional crop field trials, conducted in accordance to the USA GAP, for consideration by JMPR.

The current Meeting received additional supervised residue trials for almonds and pecans as well as new GAP information and supervised residue trials on assorted tropical and subtropical fruits, sweet corn, cereal grains and seed for beverages and sweets.

It should be noted that all uses in the USA were recently cancelled for reasons unrelated to food safety.

USE PATTERN

Information on registered uses made available to this Meeting are shown in Table 1.

Table 1 Registered uses of sulfoxaflor on avocado, rice, sorghum and cacao beans.

Crop	Country	Formulation type (sulfoxaflor guarantee)	Application					PHI (days)
			Method	Rate (g ai/ha)	No	RTI (days)	Max Rate/year (g ai/ha)	
Avocado	Colombia	Soluble Concentrate (240 g/L)	Foliar	48	NS	NS	NS	14
Rice	Indonesia	Wettable Granules (500 g/kg)	Foliar	75 - 100	NS	NS	NS	10
	Colombia	Soluble Concentrate (240 g/L)	Foliar	48	1	NA	48	14
	Malaysia	Wettable Granules (500 g/kg)	Foliar	75	4	7	300	NS
	Vietnam	Wettable Granules (500 g/kg)	Foliar	88 - 100	NS	NS	NS	3
Sorghum	Mexico	Soluble Concentrate (240 g/L)	Foliar	12 - 24	1	NA	24	7 (forage) 14 (grain)
Cacao	Ivory Coast	Soluble Concentrate (240 g/L)	Foliar	20 - 30	2	NS	60	3

ns: not stated

NA: Not applicable

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

In the trials, the average values from replicated trials or duplicate samples were reported, while the individual values are shown in parenthesis. Results have not been corrected for concurrent method recoveries unless indicated.

Residues of sulfoxaflor and its two major metabolites, X11719474 and X11721061 in all tested commodities including animal feeds were determined using Dow AgroSciences LC-MS/MS analytical method 091031. The limit of quantitation (LOQ) and limit of detection (LOD) of the method was 0.01 mg/kg and 0.003 mg/kg, respectively, for all three analytes.

While the residues of both the parent and the metabolites X11718474 and X11721061 are captured in the supervised residue trials tables, only residues of sulfoxaflor were considered as this is the residue definition for compliance with the MRL, as established at the 2011 JMPR..

Further to this, where results from separate plots with similar characteristics such as location, year of trials and treatment schedules were reported, results are listed for each plot and separated by a dashed line. However, in these cases, the higher residue should be used for calculation purposes.

All samples, collected from each of the supervised field trials, were kept under frozen storage up to a maximum of 467 days from the date of sampling to analysis. Previously conducted storage stability studies of sulfoxaflor, X11719474 and X11721061, and reviewed by the 2011 JMPR, have shown acceptable freezer stability for up to 680 days (in a wide variety of crops).

The Meeting received new information on supervised field trials involving foliar applications of sulfoxaflor to the following crops:

Crop	Tomato	Tobacco	Lettuce	Wheat			Rice		
DALA	30	17-45	7	75	75	75	119	119	119
Matrix	Fruit	Leaf	Leaf	Grain	Husks	Straw	Grain	Husks	Straw

Classification	Group	Commodity	Country	Table
FI I 0030	Assorted tropical fruits with inedible peel	Avocado	USA	2
		Pineapple	USA, Costa Rica	3
VO 0050	Fruiting vegetables except cucurbits	Sweet corn	USA	4
GC 0080	Cereal grains	Maize	USA	5
		Rice	USA	6
		Sorghum	USA	7
TN 0085	Tree nuts	Almonds	USA	8
		Pecans	USA	9
SB 0091	Seed for beverages and sweets	Cacao beans	Costa Rica	10
AF 0161	Straw, fodder and forage of cereal grains, straw and fodders dry	Stover and straw of sweet corn, maize, sorghum and rice	USA	11, 12, 13, 14
AS 0161	Straw, fodder and forage of cereal grains, forage	Forage of sweet corn, maize, sorghum and rice	USA	15, 16, 17, 18

Assorted tropical and sub-tropical fruits – inedible peel

Avocado

A total of five supervised trials on avocadoes were conducted in Florida and California, USA during the 2013 growing season (Cenni, M, 2014). A soluble concentrate formulation, containing 240 g sulfoxaflor/L, was applied 3 times at rates ranging from 91-127 g ai/ha/application, with a 7-day retreatment interval, for a maximum seasonal application rate of 286 to 314 g ai/ha. Each treatment

was made with a spray volume of approximately 2000 L/ha. The test substance was applied with a commercially available tank mix adjuvant added to the tank mixture to improve foliar coverage.

Mature avocadoes were harvested 7 days after the last application (DALA) and separated into whole fruit (pitted) and edible pulp (pitted and peeled fruit). Additional fruit samples (separated into pitted fruit and pulp) were collected at 0, 14, 21 and 28 DALA to assess residue decline.

Table 2 Sulfoxaflor residues in avocado from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg			
	Form	g ai/ha	No.	Max/ year g ai/ha		Portion analysed	Sulfoxaflor	X11719474	X11721061
Columbia GAP	240 g/L SC	48	NS	NS	14				
Canal Point, FL, USA, 2013 Trial A (Tonnage)	240 g/L SC	96	3	288	7	Pitted Fruit	0.06 (0.07, 0.05)	< 0.01 (< 0.01, < 0.01)	0.01 (0.01, 0.01)
						Pulp	0.04 (0.03, 0.04)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.05 (0.06, 0.04)		
Camarillo, CA, USA, 2013 Trial B (Haas)	240 g/L SC	96-97	3	289	7	Pitted Fruit	0.06 (0.06, 0.05)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Pulp	0.01 (0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.05 (0.05, 0.05)		
Riverside, CA, USA, 2013 Trial C (Gwen)	240 g/L SC	95-96	3	286	0	Pitted Fruit	0.11 (0.12, 0.10)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.09 (0.10, 0.08)		
					7	Pitted Fruit	0.07 (0.07, 0.07)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Pulp	0.03 (0.03, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.06 (0.06, 0.06)		
					14	Pitted Fruit	0.08 (0.08, 0.07)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.07 (0.07, 0.06)		
					21	Pitted Fruit	0.07 (0.06 0.08)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg			
	Form	g ai/ha	No.	Max/ year g ai/ha		Portion analysed	Sulfoxaflor	X11719474	X11721061
						Whole Fruit[a]	(0.06) 0.05, 0.07		
					28	Pitted Fruit	0.06 (0.06 0.05)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.05 (0.05, 0.05)		
San Luis Obispo, CA, USA, 2013 Trial D (Haas)	240 g/L SC	91-127	3	314	7	Pitted Fruit	0.02 (0.02 < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Pulp	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.02 (0.02, < 0.01)		
Nipomo, CA, USA, 2013 Trial E (Haas)	240 g/L SC	98-102	3	298	0	Pitted Fruit	0.05 (0.04, 0.05)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.04 (0.03, 0.04)		
					7	Pitted	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Pulp	0.01 (< 0.01 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.02 (0.02, 0.02)		
					14	Pitted Fruit	0.02 (0.03 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.02 (0.02, 0.01)		
					21	Pitted Fruit	0.02 (0.02 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.02 (0.02, < 0.01)		
					28	Pitted Fruit	0.02 (< 0.01 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
						Whole Fruit	0.02 (< 0.01, 0.02)		

[a] Pitted fruit and pits were weighed and the total sulfoxaflor residues were calculated on a whole fruit basis (i.e., 0.06 mg/kg in pitted fruit × 85.9% pitted fruit = 0.05 mg/kg in whole fruit). Residues of the metabolites in whole fruit were not determined

Pineapple

Eight supervised trials were conducted on pineapples during the 2012 growing season (Carringer, S., 2013), three of which were conducted in Hawaii and five in Costa Rica. The treated plots received two foliar applications of a suspension concentrate formulation containing 240 g/L of sulfoxaflor at a rate of 100 g ai/ha/application at 21 and 7 days before harvest. The spray volume ranged from 2348 to 3108 L/ha. An organosilicon non-ionic surfactant was included in the spray mixes. At all test sites, samples were harvested at 1 day and 6-8 days after the last application. Additional decline samples were taken from four of the trials at 0, 13–14, 19–21, and 25–28 days after application.

Each RAC sample consisted of 12 fruits (without crowns), which were subsampled such that each primary sample generally comprised two opposing quarters of 12 fruits.

Table 3 Sulfoxaflor residues in pineapple from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X117-19474	X117-21061
Wahiawa, HI, USA, 2012 120428-01 (MG3)	240 g/L SC	100	2	200	1	0.04 (0.03, 0.05)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					8	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Wahiawa, HI, USA, 2012 120428-02 (D-30)	240 g/L SC	100	2	200	0	0.05 (0.03, 0.07)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					1	0.07 (0.05, 0.08)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	0.04 (0.04, 0.04)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	0.02 (0.03, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					21	0.03 (0.03, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					25	0.02 (0.01, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Kunia, HI, USA, 2012 120428-03 (Sweet Gold)	240 g/L SC	100	2	200	0	0.09 (0.09, 0.09)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					1	0.06 (0.06, 0.06)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	0.05 (0.06, 0.04)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	0.03 (0.02, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					21	0.03 (0.03, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X117-19474	X117-21061
					28	0.03 (0.03, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Sarapiquí, Heredia, Costa Rica, 2012 120428-04 (MD-2)	240 g/L SC	100	2	200	0	0.03 (0.02, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					1	0.02 (0.02, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	< 0.01 (< 0.01,< 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					13	0.01 (0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					19	0.01 (< 0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					25	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Sarapiquí, Heredia, Costa Rica, 2012 120428-05 (MD-2)	240 g/L SC	100	2	200	0	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					1	0.01 (0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					13	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					19	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					25	0.01 (< 0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Siquirres, Limón, Costa Rica, 2012 120428-06 (MD-2)	240 g/L SC	100	2	200	1	0.03 (0.03, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					6	0.03 (0.03, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
El Cairo, Limón, Costa Rica, 2012 120428-07 (MD-2)	240 g/L SC	100	2	200	1	0.03 (0.02, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					6	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Río Jiménez, Limón, Costa Rica, 2012 120428-08 (MD-2)	240 g/L SC	100	2	200	1	0.03 (0.03, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					6	0.03 (0.03, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Fruiting vegetables other than Cucurbits

Sweet corn (Corn-on-the cob)

Nine supervised field trials, of which two were residue decline trials, were conducted in the USA on sweet corn crops during the 2012 growing season (Korpalski, S., 2015). Treated plots received two foliar applications of a water-dispersible granule formulation containing sulfoxaflor at a nominal concentration of 50% (w/w), at the nominal rate of 50 g ai/ha, for a total seasonal rate of 100 g ai/ha. The test substance was applied at 21 and 7 days before harvest. Application spray volumes ranged from 193 to 282 L/ha. An adjuvant was added to each tank mix.

At all trials, samples of kernels plus cob with husks removed (K+CWHR) were collected 7 days after the last application. For the decline trials, samples were also collected at 0, 14, 21, and 28 days after the last application.

Table 4 Sulfoxaflor residues in kernels plus cob with husks removed (K+CWHR) from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues[a] mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Alton, NY, USA, 2012 120425.01 (Spring Treat)	500 g/kg WG	50	2	100	8	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Jeffersonville, GA, USA, 2012 120425.02 (Sweet G-90)	500 g/kg WG	50	2	100	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Zellwood, FL, USA, 2012 120425.03 (Awesome)	500 g/kg WG	50	2	100	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Richland, IA, USA, 2012 120425.04 (Incredible)	500 g/kg WG	50-51	2	101	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Lime Springs, IA, USA, 2012 120425.05 (Incredible R/M)	500 g/kg WG	50-51	2	101	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Seymour, IL, USA, 2012 120425.06 (Gold Nugget)	500 g/kg WG	50	2	100	0	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					21	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					28	< 0.01 (< 0.01,	< 0.01 (< 0.01,	< 0.01 (< 0.01, < 0.01)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
						< 0.01)	< 0.01)	
Sanger, CA, USA, 2012 120425.07 (Jubilee)	500 g/kg WG	49-50	2	99	0	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					21	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					28	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Payette, ID, USA, 2012 120425.08 (Ambrosia)	500 g/kg WG	51	2	102	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Hillsboro, OR, USA, 2012 120425.09 (Jubilee Super-sweet)	500 g/kg WG	50	2	100	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Cereal grains

Maize

Fifteen supervised field trials, four of which were decline trials, were conducted in the USA on maize during the 2012 growing season (Korpalski, S., 2013). Treated plots each received two foliar applications of a water-dispersible granule formulation containing sulfoxaflor at a nominal concentration of 50% (w/w), at the target rate of 50 g ai/ha, and re-treatment intervals of 13-16 days. An adjuvant was added to each tank mix.

Grain samples were collected 13-15 days after the last application. For the decline trials, samples were also collected at 7-8 (or 12), 20-22 and 27-29 days after the last application.

Table 5 Sulfoxaflor residues in maize grain from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Alton, NY, USA, 2012 120426.01 (HL 20932)	500 g/kg	50	2	100	15	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Jeffersonville, GA, USA, 2012 120426.02 (P1814HR)	500 g/kg	50	2	100	12	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
					15	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					22	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					29	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Enid, OK, USA, 2012 120426.03 (DKC 65-19)	500 g/kg	49-51	2	100	14	No samples collected		
Leonard, MO, USA, 2012 120426.04 (Pioneer P1395R)	500 g/kg WG	50-51	2	101	14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
York, NE, USA, 2012 120426.05 (Pioneer P1151HR)	500 g/kg WG	50	2	100	14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Northwood, ND, USA, 2012 120426.06 (8066846 DKC 33-54)	500 g/kg WG	50	2	100	14	0.01 (0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Richland, IA, USA, 2012 120426.07 (Pioneer P1360HR)	500 g/kg WG	50	2	100	14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Stafford, KS, USA, 2012 120426.08 (P1151HR)	500 g/kg WG	49	2	98	14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Monticello, IL, USA, 2012 120426.09 (Becks 5442VTS)	500 g/kg WG	49-50	2	99	14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Seymour, IL, USA, 2012 120426.10 (Phoenix 5385A3)	500 g/kg WG	49-50	2	99	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					20	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
					28	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Cherry Grove, MN, USA, 2012 120426.11 (DKC 45-51 R1B)	500 g/kg WG	50-51	2	101	14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Lime Springs, IA, USA, 2012 120426.12 (DKC 45-51 R1B/ A102588)	500 g/kg WG	50-51	2	101	7	0.01 (< 0.01, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	0.01 (< 0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					21	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					28	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Bagley, IA, USA, 2012 120426.13 (P1395XR)	500 g/kg WG	50-51	2	101	15	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Fisk, MO, USA, 2012 120426.14 (Pioneer P1948)	500 g/kg WG	49-50	2	99	13	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
East Bernard, TX, USA, 2012 120426.15 (DKC 66-96)	500 g/kg WG	50-53	2	103	8	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					15	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					22	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					27	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Sorghum

Nine supervised field trials, two of which were residue decline trials, were conducted in the USA on sorghum during the 2012 growing season (Korpalski, S., 2013). Each treated plot received two foliar applications of a water-dispersible granule formulation containing sulfoxaflor at a nominal concentration of 50% (w/w), at a target rate of 50 g ai/ha and retreatment intervals of 13-15 days. An adjuvant was included within the tank mixture at each application.

Grain samples were collected 13-14 days after the last application. At decline trials, additional samples were collected at 7, 21 and 28 days after application.

Table 6 Sulfoxaflor residues in sorghum grain from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Mexico GAP	240 g/L SC	12-24	1	24	14			
Neelyville, MO, USA, 2012 120427.01 (DK553-67)	500 g/kg WG	49	2	98	13	0.04 (0.04, 0.03)	< 0.01 (< 0.01, < 0.01)	0.01 (0.01, 0.01)
Richland, IA, USA, 2012 120427.02 (Pioneer 84G62)	500 g/kg WG	50	2	100	14	0.04 (0.04, 0.04)	< 0.01 (< 0.01, < 0.01)	0.01 (0.01, < 0.01)
Cherry Grove, MN, USA 120427.03 (Not reported)	500 g/kg WG	50	2	100	14	0.04 (0.04, 0.04)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Seymour, IL, USA, 2012 120427.04 (Wildlife)	500 g/kg WG	49	2	98	7	0.09 (0.09, 0.09)	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.03)
					14	0.05 (0.05, 0.05)	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.02)
					21	0.03 (0.03, 0.03)	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.02)
					28	0.03 (0.03, 0.02)	< 0.01 (< 0.01, < 0.01)	0.02 (0.03, 0.01)
Hinton, OK, USA, 2012 120427.05 (SR25835)	500 g/kg WG	49	2	98	14	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
East Bernard, TX, USA, 2012 120427.06 (SR06-MH5001)	500 g/kg WG	50-51	2	101	7	0.12 (0.10, 0.14)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, 0.01)
					14	0.14 (0.13, 0.15)	< 0.01 (< 0.01, < 0.01)	0.01 (< 0.01, 0.01)
					21	0.11 (0.10, 0.13)	< 0.01 (< 0.01, < 0.01)	0.01 (< 0.01, 0.01)
					28	0.09 (0.09, 0.10)	< 0.01 (< 0.01, < 0.01)	0.01 (0.01, 0.01)
Carrington, ND, USA, 2012 120427.07 (Not reported)	500 g/kg WG	50	2	100	13	0.08 (0.07, 0.08)	< 0.01 (< 0.01, < 0.01)	< 0.01 (0.01, < 0.01)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Dill City, OK, USA, 2012 120427.08 (SR25835)	500 g/kg WG	51	2	102	14	0.03 (0.03, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, 0.01)
Larned, KS, USA, 2012 120427.09 (84G62)	500 g/kg WG	49	2	98	14	0.15 (0.15, 0.15)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Rice

Twelve supervised field trials, including two decline trials, were conducted in the USA on rice crops during the 2013 growing season (Csinos, A., 2014). The treated plots each received three foliar applications of a water-dispersible granule formulation containing sulfoxaflor at a nominal concentration of 50% (w/w), 6 to 7 days apart, at a target rate of 100 g ai/ha. An adjuvant was included within the tank mixture at each application.

Rice grain samples were collected 13–16 days after the last application. In the two decline trials, samples of grain were also collected 0, 7, 21 and 28 days after last application.

Table 7 Sulfoxaflor residues in rice grain from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Malaysia GAP	500 g/kg WG	75	4	300	NS			
Pollard, AR, USA, 2013 S13-02221-01 (CL111)	500 g/kg WG	101	3	303	14	2.1 (1.7, 2.5)	0.06 (0.05, 0.07)	0.08 (0.07, 0.10)
Malden, MO, USA, 2013 S13-02221-02 (CL-111)	500 g/kg WG	99-102	3	302	16	1.8 (1.7, 2.0)	0.04 (0.04, 0.04)	0.07 (0.07, 0.07)
Morrow, LA, USA, 2013 S13-02221-03 (Cheniere)	500 g/kg WG	100-103	3	303	14	0.86 (0.53, 1.2)	0.02 (0.01, 0.04)	0.05 (0.03, 0.06)
Cheneyville, LA, USA, 2013 S13-02221-04(CL151)	500 g/kg WG	105-109	3	319	0	2.6 (2.5, 2.8)	0.05 (0.05, 0.05)	0.05 (0.05, 0.06)
					6	1.7 (1.4, 2.0)	0.04 (0.03, 0.04)	0.08 (0.07, 0.10)
					15	1.6 (1.8, 1.4)	0.05 (0.06, 0.04)	0.09 (0.10, 0.09)
					21	1.4 (1.4, 1.3)	0.04 (0.04, 0.03)	0.08 (0.07, 0.08)
					27	1.1 (1.1, 1.2)	0.03 (0.04, 0.03)	0.09 (0.09, 0.09)
Heth, AR, USA, 2013 S13-02221-05	500 g/kg WG	98-99	3	295	13	0.47 (0.36, 0.58)	0.02 (0.02, 0.02)	0.02 (0.02, 0.03)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
(Jupiter)								
W. Memphis, AR, USA, 2013 S13-02221-06 (CL151)	500 g/kg WG	98-99	3	295	0	2.8 (2.7, 2.8)	0.10 (0.09, 0.10)	0.02 (0.02, 0.02)
					7	1.2 (1.2, 1.2)	0.06 (0.06, 0.06)	0.03 (0.03, 0.03)
					14	0.62 (0.58, 0.65)	0.04 (0.03, 0.04)	0.04 (0.04, 0.04)
					21	0.58 (0.59, 0.57)	0.04 (0.04, 0.04)	0.04 (0.05, 0.04)
					28	0.62 (0.51, 0.74)	0.05 (0.04, 0.06)	0.07 (0.06, 0.07)
Washington, LA, USA, 2013 S13-02221-07 (CL-161)	500 g/kg WG	98-102	3	300	14	0.18 (0.16, 0.20)	0.04 (0.04, 0.04)	< 0.01 (< 0.01, < 0.01)
Fisk, MO, USA, 2013 S13-02221-08 (CL-111)	500 g/kg WG	102	3	306	14	1.6 (1.9, 1.4)	0.03 (0.04, 0.02)	0.07 (0.08, 0.05)
E. Bernard, TX, USA, 2013 S13-02221-09 (Chenieve)	500 g/kg WG	98-99	3	295	14	1.5 (1.8, 1.1)	0.05 (0.07, 0.04)	0.06 (0.07, 0.06)
E. Bernard, TX, USA, 2013 S13-02221-10 (Presidio)	500 g/kg WG	98	3	294	13	1.9 (1.8, 1.9)	0.64 (0.06, 0.07)	0.09 (0.09, 0.09)
Yuba City, CA, USA, 2013 S13-02221-11 (101A)	500 g/kg WG	97-98	3	293	14	2.3 (1.6, 2.9)	0.05 (0.03, 0.07)	0.44 (0.34, 0.54)
Woodland, CA, USA. 2013 S13-02221-12 (M206)	500 g/kg WG	97	3	291	14	1.7 (2.1, 1.3)	0.04 (0.06, 0.03)	0.18 (0.23, 0.13)

Tree nuts

Almond

Five new supervised trials in established almond orchards were carried out in the USA during the 2014 growing season (Best, A., 2015). The treated plots each received three applications of a soluble concentrate formulation containing 240 g/L of sulfoxaflor, at the nominal rate of 100 g ai/ha at weekly intervals. Spray volumes were targeted at 935–3741 L/ha and a commercial adjuvant typically used for insecticide applications to almonds was included at recommended rates.

Samples of whole almond nuts were collected at maturity, 6-7 days after the last application. In addition, samples were collected at 0, 2, 7, 13 and 21 days after application from the decline trial plot. After harvesting, the almonds were processed by separating hulls then shelling the nut to remove the nutmeats.

Table 8 Sulfoxaflor residues in almond nutmeat from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Sanger, CA, USA, 2014 S14-01598-01 (Padre)	240 g/L SC	100-101	3	302	7	≤ 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Zamora, CA, USA, 2014 S14-01598-02 (Butte)	240 g/L SC	101-102	3	304	6	≤ 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Strathmore, CA, USA, 2014 S14-01598-03 (Fritz)	240 g/L SC	101-102	3	305	7	≤ 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Arbuckle, CA, USA, 2014 S14-01598-04 (Winters)	240 g/L SC	100-104	3	305	6	≤ 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Winters, CA, USA, 2014 S14-01598-05 (Butte)	240 g/L SC	100-101	3	302	0	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					2	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	≤ 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					13	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					21	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Pecans

Five new supervised trials on pecans were carried out in the USA during the 2014 growing season, in a similar manner as the trials on almonds (Best, A.). Each treated plot received three foliar applications of a soluble concentrate formulation containing 240 g/L of sulfoxaflor, at the nominal rate of 100 g ai/ha at weekly intervals. Spray volumes were 935–3741 L/ha and a commercial adjuvant typically used for insecticide applications to pecans was included in the tank mixes at recommended rates.

Samples of pecan nuts were collected at maturity, 7 to 8 days after the last application. In addition, samples were collected from the decline trial at 0, 3, 7, 14 and 22 days after the last application. After harvesting, pecans were processed by shelling the nut to remove the nutmeats.

Table 9 Sulfoxaflor residues in pecans from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Dublin, GA, USA, 2014 S14-01608-01 (Desirable)	240 g/L SC	101-108	3	314	8	0.02 (0.02, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Cordele, GA, USA, 2014 S14-01608-02 (Desirable)	240 g/L SC	98-101	3	297	0	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					3	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					22	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Port Barre, LA, USA, 2014 S14-01608-03 (Cuddo)	240 g/L SC	106-110	3	324	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Pearsall, TX, USA, 2014 S14-01608-04 (Cheyenne)	240 g/L SC	98-101	3	300	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Lubbock, TX, USA, 2014 S14-01608-05 (Western Schley)	240 g/L SC	98-99	3	296	7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Seed for beverages and sweets

Cacao beans

Eight supervised field trials were conducted in three distinct regions of Costa Rica where cacao is grown commercially (Korpalski, S., 2013). Each treated plot received 4 applications, with re-treatment intervals of 27–29 days, of a soluble concentrate formulation containing 240 g/L of sulfoxaflor at the nominal rate of 40 g ai/ha. The test substance was applied as a coarse spray to cacao tree trunks from the base of the branches to just above the soil generally below the foliage, as fruit and flowers were in various stages of development. The spray volume for all applications was 55 to 60 L/ha. A locally available spray adjuvant was included with the test substance in the application tank mixture.

Mature cacao fruit for generation of dried cacao bean RAC samples were collected at 3, 6–7 and 14–15 days after the last application. For the decline trials additional samples were collected at 0, and 20–22 days after the last application. Cacao beans were then collected from the fruit and dried in a manner reflecting local commercial practice. Cacao fruit was first cut with a knife and the seeds removed by hand. Seeds were then placed on trays, within a sheltered area, and covered with plantain leaves for fermentation. Seeds were left undisturbed for 48 hours, then mixed each day to facilitate the fermentation process. After 6 days under shelter, seeds were taken outdoors and dried under sunlight in wooden bins for at least 6 days.

Table 10 Sulfoxaflor residues in dried cacao beans from supervised trials in Costa Rica

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Ivory Coast GAP	240 g/L SC	20-30	2	60	3			
Valle La Estrella, Limón, Costa Rica, 2012 120437.01 (Trinitario)	240 g/L SC	41-43	4	167	3	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	0.04 (< 0.01, 0.07)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					15	0.03 (0.04, < 0.01)	0.02 (0.02, < 0.01)	< 0.01 (< 0.01, < 0.01)
Sara-Batán, Limón, Costa Rica, 2012 120437.02 (Trinitario hybrid)	240 g/L SC	41-42	4	167	0	0.01 (< 0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					4	0.08 (< 0.01, 0.06)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					8	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	< 0.01	< 0.01	< 0.01
					22	< 0.01	< 0.01	< 0.01
Chimurria-Upala, Alajuela, Costa Rica, 2012 120437.03 (Native variety)	240 g/L SC	41-47	4	170	3	0.02 (0.02, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
El Cairo-Siquirres, Limón, Costa Rica, 2012 120437.04 (Trinitario)	240 g/L SC	40-43	4	167	0	0.03 (0.02, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					3	0.02 (0.01, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	0.02 (< 0.01, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	0.02 (0.01, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					21	0.02 (< 0.01, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Llano Bonito-Guatuso, Alajuela, Costa Rica, 2012 120437.05 (Trinitario)	240 g/L SC	40-42	4	164	3	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					6	0.05 (0.04, 0.06)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	0.03 (0.03, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Anita Grande-Guápiles, Limón, Costa Rica 120437.06	240 g/L SC	40-43	4	165	0	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					2	0.03	< 0.01	< 0.01

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
(Trinitario hybrid)						(0.03, 0.02)	(< 0.01, < 0.01)	(< 0.01, < 0.01)
					7	0.03 (0.02, 0.04)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	0.07 (0.07, 0.07)	0.01 (0.01, 0.01)	< 0.01 (< 0.01, < 0.01)
					20	0.03 (0.03, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Rio Blanco, Limón, Costa Rica 120437.07 (Trinitario hybrid)	240 g/L SC	41-42	4	167	3	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					15	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Las Delicias-Upala, Alajuela, Costa Rica, 2012 (120437.08) (Trinitario hybrid)	240 g/L SC	40-42	4	166	0	0.02 (0.01, 0.02)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					3	0.03 (0.02, 0.03)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					7	0.03 (0.04, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					14	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					21	0.01 (0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)

Animal feeds

Residue trials on cereal grains and almonds resulted in residues in forage, straw and stover as well as almond hulls, all of which are animal feed commodities.

Sweet corn forage and stover

Nine supervised field trials, of which two were residue decline trials, were conducted in the USA on sweet corn crops during the 2012 growing season (Korpalski, S., 2015). Treated plots received two foliar applications of a water-dispersible granule formulation containing sulfoxaflor at a nominal concentration of 50% (w/w), at the nominal rate of 50 g ai/ha, for a total seasonal rate of 100 g ai/ha. The test substance was applied at 21 and 7 days before harvest. An adjuvant was added to each tank mix.

At all trials, sweet corn forage samples were collected 7–8 days following the last application, while stover was cut 7–8 days after the last application and field dried or dried under shelter for 5 to

30 days before collection. At two decline trials, four additional samples were collected at 0, 14, 21, and 28 days after the last application.

Table 11 Sulfoxaflor residues in sweet corn forage and stover from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues[a] mg/kg			
	Form	g ai/ha	No.	Max/ year g ai/ha		Portion analysed	Sulfoxaflor	X11719474	X11721061
Alton, NY, USA, 2012 120425.01 (Spring Treat)	500 g/kg WG	50	2	100	8	Forage	0.09 (0.08, 0.09)	0.01 (0.01, 0.01)	0.06 (0.05, 0.06)
						Stover	0.16 (0.14, 0.18)	0.03 (0.03, 0.04)	0.06 (0.04, 0.08)
Jeffersonville, GA, USA, 2012 120425.02 (G-90)	500 g/kg WG	50	2	100	7	Forage	0.05 (0.05, 0.06)	0.04 (0.04, 0.04)	0.05 (0.06, 0.04)
						Stover	0.09 (0.09, 0.10)	0.08 (0.09, 0.08)	0.06 (0.05, 0.07)
Zellwood, FL, USA, 2012 120425.03 (Awesome)	500 g/kg WG	50	2	100	7	Forage	0.08 (0.08, 0.07)	< 0.01 (0.01, < 0.01)	0.05 (0.05, 0.05)
						Stover	0.23 (0.10, 0.35)	0.02 (0.03, < 0.01)	0.01 (< 0.01, 0.01)
Richland, IA, USA, 2012 120425.04 (Incredible)	500 g/kg WG	50-51	2	101	7	Forage	0.23 (0.19, 0.26)	0.01 (0.01, 0.01)	0.13 (0.10, 0.16)
					14	Stover	0.06 (0.06, 0.06)	< 0.01 (< 0.01, < 0.01)	0.19 (0.20, 0.18)
Lime Springs, IA, USA, 2012 120425.05 (Incredible R/M)	500 g/kg WG	50-51	2	101	7	Forage	0.14 (0.12, 0.15)	< 0.01 (< 0.01, 0.01)	0.09 (0.08, 0.10)
					7	Stover	0.15 (0.14, 0.15)	0.02 (0.01, 0.02)	0.06 (0.06, 0.06)
Seymour, IL, USA, 2012 120425.06 (Gold Nugget)	500 g/kg WG	50	2	100	0	Forage	0.72 (0.44, 1.00)	0.01 (0.01, 0.01)	0.05 (0.03, 0.06)
					7	Forage	0.06 (< 0.01, 0.11)	0.02 (0.02, 0.02)	0.07 (0.06, 0.07)
					14	Forage	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	0.05 (0.05, 0.04)
					21	Forage	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	0.04 (0.04, 0.04)
					28	Forage	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	0.01 (< 0.01, 0.02)
					0	Stover	2.53 (2.40, 2.65)	0.11 (0.11, 0.11)	0.16 (0.15, 0.17)
					7	Stover	0.22 (0.26, 0.17)	0.04 (0.05, 0.03)	0.13 (0.18, 0.08)
					14	Stover	0.05 (0.04, 0.06)	0.02 (0.02, 0.02)	0.09 (0.09, 0.10)
					21	Stover	0.01	< 0.01	0.05

Location Year Trial ID (variety)	Application				DALA	Residues[a] mg/kg			
	Form	g ai/ha	No.	Max/ year g ai/ha		Portion analysed	Sulfoxaflor	X11719474	X11721061
							(< 0.01, 0.01)	(< 0.01, < 0.01)	(0.05, 0.05)
					28	Stover	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	0.03 (0.03, 0.03)
Sanger, CA, USA, 2012 120425.07 (Jubilee)	500 g/kg WG	49-50	2	99	0	Forage	0.66 (0.71, 0.61)	0.02 (0.02, 0.02)	0.04 (0.04, 0.04)
					7	Forage	0.24 (0.24, 0.24)	0.02 (0.02, 0.03)	0.08 (0.08, 0.07)
					14	Forage	0.07 (0.07, 0.07)	0.02 (0.02, 0.02)	0.07 (0.07, 0.07)
					21	Forage	0.05 (0.05, 0.04)	0.01 (< 0.01, 0.02)	0.06 (0.06, 0.05)
					28	Forage	0.06 (0.06, 0.06)	0.02 (0.02, 0.02)	0.08 (0.10, 0.07)
					0	Stover	0.81 (0.74, 0.87)	0.03 (0.03, 0.03)	0.07 (0.07, 0.06)
					7	Stover	0.36 (0.33, 0.38)	0.04 (0.03, 0.05)	0.11 (0.08, 0.14)
					14	Stover	0.13 (0.15, 0.12)	0.04 (0.04, 0.03)	0.11 (0.11, 0.10)
					21	Stover	0.16 (0.13, 0.20)	0.04 (0.03, 0.05)	0.13 (0.10, 0.17)
					28	Stover	0.11 (0.10, 0.12)	0.03 (0.03, 0.04)	0.14 (0.16, 0.13)
Payette, ID, USA, 2012 120425.08 (Ambrosia)	500 g/kg WG	51	2	102	7	Forage	0.37 (0.32, 0.41)	0.01 (< 0.01, 0.01)	0.08 (0.07, 0.09)
					7	Stover	0.45 (0.40, 0.51)	0.02 (0.01, 0.02)	0.09 (0.08, 0.09)
Hillsboro, OR, USA, 2012 120425.09 (Jubilee Super-sweet)	500 g/kg WG	50	2	100	7	Forage	0.14 (0.15, 0.14)	< 0.01 (< 0.01, < 0.01)	0.04 (0.05, 0.04)
					7	Stover	0.17 (0.17, 0.18)	< 0.01 (< 0.01, < 0.01)	0.06 (0.06, 0.06)

Maize forage and stover

Fifteen supervised field trials, four of which were decline trials, were conducted in the USA on maize during the 2012 growing season (Korpalski, S., 2013). Treated plots each received two foliar applications of a water-dispersible granule formulation containing sulfoxaflor at a nominal concentration of 50% (w/w), at the target rate of 50 g ai/ha, and re-treatment intervals of 13–16 days. Spray volumes ranged from 188 to 281 L/ha. An adjuvant was added to each tank mix.

Forage samples were collected 6–8 days after the last test application as well as at 14–15, 21, and 28–29 days after application for decline trials. Stover samples were cut 13–15 days after application and also at 7–8 (or 12), 20–22 and 27–29 DALA in the decline trials. After cutting, the stover was dried, if necessary, to reach a target estimated moisture content below 20%.

Table 12 Sulfoxaflor residues in maize forage and stover from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg			
	Form	g ai/ha	No.	Max/ year g ai/ha		Portion analysed	Sulfoxaflor	X11719474	X11721061
Alton, NY, USA, 2012 120426.01 (HL 20932)	500 g/kg	50	2	100	7	Forage	0.10 (0.10, 0.10)	0.02 (0.02, 0.02)	0.09 (0.09, 0.08)
					15	Stover	0.22 (0.21, 0.22)	0.01 (0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Jeffersonville, GA, USA, 2012 120426.02 (P1814HR)	500 g/kg	50	2	100	8	Forage	0.03 (0.04, 0.02)	0.06 (0.05, 0.06)	0.17 (0.16, 0.18)
					14	Forage	0.01 (0.02, 0.01)	0.03 (0.03, 0.03)	0.15 (0.14, 0.17)
					21	Forage	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.03)	0.16 (0.15, 0.17)
					29	Forage	< 0.01 (< 0.01, < 0.01)	0.01 (0.01, 0.01)	0.11 (0.12, 0.10)
					12	Stover	0.02 (0.02, 0.02)	0.06 (0.05, 0.07)	0.04 (0.04, 0.04)
					15	Stover	0.02 (0.02, 0.02)	0.10 (0.09, 0.12)	0.04 (0.04, 0.05)
					22	Stover	< 0.01 (< 0.01, 0.01)	0.08 (0.07, 0.08)	0.02 (0.02, 0.02)
					29	Stover	< 0.01 (< 0.01, < 0.01)	0.05 (0.05, 0.04)	< 0.01 (< 0.01, < 0.01)
Enid, OK, USA, 2012 120426.03 (DKC 65-19)	500 g/kg	49-51	2	100	7	Forage	0.35 (0.39, 0.30)	0.01 (0.01, 0.02)	0.03 (0.04, 0.03)
					14	Stover	0.09 (0.09, 0.09)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Leonard, MO, USA, 2012 120426.04 (Pioneer P1395R)	500 g/kg WG	50-51	2	101	7	Forage	0.15 (0.15, 0.15)	0.01 (0.01, 0.01)	0.13 (0.13, 0.13)
					14	Stover	0.43 (0.39, 0.47)	0.06 (0.06, 0.07)	0.22 (0.22, 0.22)
York, NE, USA, 2012 120426.05 (Pioneer P1151HR)	500 g/kg WG	50	2	100	7	Forage	0.08 (0.08, 0.07)	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.01)
					14	Stover	0.24 (0.26, 0.22)	< 0.01 (< 0.01, < 0.01)	0.04 (0.05, 0.04)
Northwood, ND, USA, 2012 120426.06 (8066846 DKC	500 g/kg WG	50	2	100	7	Forage	0.08 (0.10, 0.06)	< 0.01 (< 0.01, < 0.01)	0.07 (0.08, 0.07)
					14	Stover	0.20	< 0.01	0.02

Location Year Trial ID (variety)	Application Form	g ai/ha	No.	Max/ year g ai/ha	DALA	Residues, mg/kg Portion analysed	Sulfoxaflor	X11719474	X11721061
33-54)							(0.18, 0.22)	(< 0.01, < 0.01)	(0.01, 0.02)
Richland, IA, USA, 2012 120426.07 (Pioneer P1360HR)	500 g/kg WG	50-51	2	101	7	Forage	0.09 (0.09, 0.09)	< 0.01 (< 0.01, < 0.01)	0.09 (0.09, 0.08)
					14	Stover	0.54 (0.39, 0.68)	0.02 (0.02, 0.03)	0.09 (0.07, 0.11)
Stafford, KS, USA, 2012 120426.08 (P1151HR)	500 g/kg WG	49-50	2	99	7	Forage	0.05 (0.05, 0.05)	0.03 (0.03, 0.03)	0.03 (0.03, 0.04)
					14	Stover	0.11 (0.12, 0.10)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Monticello, IL, USA, 2012 120426.09 (Becks 5442VTS)	500 g/kg WG	50	2	100	7	Forage	0.13 (0.13, 0.13)	< 0.01 (< 0.01, < 0.01)	0.07 (0.08, 0.07)
					14	Stover	0.23 (0.22, 0.23)	0.03 (0.03, 0.02)	0.16 (0.17, 0.15)
Seymour, IL, USA, 2012 120426.10 (Phoenix 5385A3)	500 g/kg WG	50	2	100	7	Forage	0.11 (0.09, 0.13)	< 0.01 (< 0.01, < 0.01)	0.07 (0.05, 0.08)
					14	Forage	0.04 (0.03, 0.04)	< 0.01 (< 0.01, < 0.01)	0.06 (0.06, 0.07)
					21	Forage	0.01 (0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	0.08 (0.08, 0.07)
					28	Forage	< 0.01 (< 0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	0.05 (0.04, 0.05)
					7	Stover	0.46 (0.48, 0.44)	0.04 (0.04, 0.04)	0.16 (0.15, 0.16)
					14	Stover	0.15 (0.16, 0.14)	0.02 (0.02, 0.02)	0.06 (0.05, 0.07)
					20	Stover	0.15 (0.17, 0.13)	0.02 (0.03, 0.02)	0.14 (0.18, 0.09)
					28	Stover	0.08 (0.10, 0.07)	0.01 (0.01, < 0.01)	0.05 (0.05, 0.05)
Cherry Grove, MN, USA, 2012 120426.11 (DKC 45-51 R1B)	500 g/kg WG	50-51	2	101	7	Forage	0.11 (0.12, 0.09)	< 0.01 (< 0.01, < 0.01)	0.05 (0.06, 0.05)
					14	Stover	0.23 (0.23, 0.23)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Lime Springs, IA, USA, 2012 120426.12 (DKC 45-51 R1B/ A102588)	500 g/kg WG	51-52	2	103	7	Forage	0.12 (0.11, 0.12)	< 0.01 (< 0.01, < 0.01)	0.05 (0.05, 0.05)
					15	Forage	0.04 (0.04, 0.04)	< 0.01 (< 0.01, < 0.01)	0.05 (0.06, 0.05)
					21	Forage	0.04 (0.04, 0.04)	< 0.01 (< 0.01, < 0.01)	0.04 (0.05, 0.04)
					28	Forage	0.04 (0.02, 0.05)	< 0.01 (< 0.01,	0.05 (0.04, 0.05)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg			
	Form	g ai/ha	No.	Max/ year g ai/ha		Portion analysed	Sulfoxaflor	X11719474	X11721061
								< 0.01)	
					7	Stover	0.84 (0.72, 0.95)	0.02 (0.01, 0.02)	0.05 (0.05, 0.06)
					14	Stover	0.31 (0.30, 0.32)	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.02)
					21	Stover	0.18 (0.20, 0.15)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
					28	Stover	0.11 (0.10, 0.11)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Bagley, IA, USA, 2012 120426.13 (P1395XR)	500 g/kg WG	50-51	2	101	7	Forage	0.11 (0.12, 0.09)	< 0.01 (< 0.01, < 0.01)	0.03 (0.03, 0.03)
					15	Stover	0.06 (0.08, 0.04)	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)
Fisk, MO, USA, 2012 120426.14 (Pioneer P1948)	500 g/kg WG	49-50	2	99	7	Forage	0.22 (0.23, 0.21)	0.03 (0.03, 0.04)	0.14 (0.15, 0.12)
					13	Stover	0.18 (0.17, 0.19)	0.05 (0.04, 0.05)	0.03 (0.03, 0.03)
East Bernard, TX, USA, 2012 120426.15 (DKC 66-96)	500 g/kg WG	50-53	2	104	7	Forage	0.31 (0.34, 0.28)	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)
					15	Forage	0.25 (0.19, 0.30)	0.04 (0.04, 0.04)	< 0.01 (< 0.01, < 0.01)
					21	Forage	0.12 (0.13, 0.11)	0.03 (0.02, 0.03)	< 0.01 (< 0.01, < 0.01)
					29	Forage	0.10 (0.09, 0.10)	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)
					8	Stover	0.55 (0.59, 0.50)	0.03 (0.04, 0.03)	0.01 (0.02, < 0.01)
					15	Stover	0.41 (0.31, 0.51)	0.03 (0.03, 0.04)	< 0.01 (< 0.01, < 0.01)
					22	Stover	0.31 (0.28, 0.33)	0.03 (0.03, 0.04)	< 0.01 (< 0.01, < 0.01)
					27	Stover	0.29 (0.30, 0.27)	0.04 (0.04, 0.04)	< 0.01 (< 0.01, < 0.01)

Sorghum forage and fodder

Nine supervised field trials, two of which were residue decline trials, were conducted in the USA on sorghum during the 2012 growing season (Korpalski, S., 2013). Each treated plot received two foliar applications of a water-dispersible granule formulation containing sulfoxaflor at a nominal concentration of 50% (w/w), at a target rate of 50 g ai/ha and retreatment intervals of 13–15 days. An adjuvant was included within the tank mixture at each application.

Forage samples were harvested 7–8 days after the last application. For the decline trials, additional samples were collected at 3 (or 4), 14 and 21 days after application. Stover was cut 13–14 DALA with additional samples cut at 7, 21 and 28 days after application to assess residue decline. After cutting, stover was field dried or dried under shelter, after an estimated moisture content of 10 to 20% was reached (from 1 to 8 days of drying) and then sampled.. An adjuvant was included within the tank mixture at each application.

Table 13 Sulfoxaflor residues in sorghum forage and stover from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg			
	Form	g ai/ha	No.	Max/ year g ai/ha		Portion analysed	Sulfoxaflor	X11719474	X117-21061
Mexico GAP	240 g/L SC	12-24	1	24	7	Forage			
Neelyville, MO, USA, 2012 120427.01 (DK553-67)	500 g/kg WG	49	2	98	8	Forage	0.08 (0.09, 0.07)	0.02 (0.03, 0.02)	0.06 (0.07, 0.04)
					13	Stover	0.10 (0.09, 0.11)	0.03 (0.03, 0.04)	0.09 (0.08, 0.10)
Richland, IA, USA, 2012 120427.02 (Pioneer 84G62)	500 g/kg WG	50	2	100	7	Forage	0.09 (0.08, 0.09)	0.01 (< 0.01, 0.01)	0.07 (0.05, 0.08)
					14	Stover	0.20 (0.25, 0.14)	< 0.01 (0.01, < 0.01)	0.04 (0.05, 0.03)
Cherry Grove, MN, USA 120427.03 (Not reported)	500 g/kg WG	50	2	100	7	Forage	0.08 (0.08, 0.08)	< 0.01 (< 0.01, < 0.01)	0.05 (0.05, 0.05)
					14	Stover	0.27 (0.22, 0.32)	< 0.01 (< 0.01, < 0.01)	0.01 (0.01, 0.02)
Seymour, IL, USA, 2012 120427.04 (Wildlife)	500 g/kg WG	49	2	98	3	Forage	0.15 (0.16, 0.13)	< 0.01 (< 0.01, < 0.01)	0.05 (0.05, 0.05)
					7	Forage	0.03 (0.03, 0.03)	< 0.01 (< 0.01, < 0.01)	0.05 (0.05, 0.05)
					14	Forage	0.01 (0.01, 0.01)	< 0.01 (< 0.01, < 0.01)	0.06 (0.06, 0.05)
					21	Forage	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	0.04 (0.04, 0.04)
					7	Stover	0.09 (0.09, 0.10)	0.01 (0.01, 0.01)	0.04 (0.04, 0.05)
					14	Stover	0.05 (0.05, 0.04)	0.01 (0.01, 0.01)	0.05 (0.06, 0.04)
					21	Stover	0.02 (0.02, 0.01)	< 0.01 (0.01, < 0.01)	0.03 (0.03, 0.02)
					28	Stover	< 0.01 (< 0.01, < 0.01)	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.02)
Hinton, OK, USA, 2012 120427.05 (SR25835)	500 g/kg WG	49-52	2	101	7	Forage	0.07 (0.07, 0.06)	0.02 (0.02, 0.02)	0.04 (0.04, 0.04)
					14	Stover	0.04 (0.04, 0.03)	0.02 (0.03, 0.02)	0.07 (0.08, 0.06)
East Bernard, TX, USA,	500 g/kg WG	51	2	102	4	Forage	0.28 (0.27, 0.29)	0.02 (0.02, 0.02)	0.03 (0.03, 0.04)

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg			
	Form	g ai/ha	No.	Max/ year g ai/ha		Portion analysed	Sulfoxaflor	X11719474	X117-21061
2012 120427.06 (SR06-MH5001)					8	Forage	0.13 (0.13, 0.12)	< 0.01 (< 0.01, < 0.01)	0.05 (0.04, 0.05)
					14	Forage	0.07 (0.07, 0.06)	< 0.01 (< 0.01, < 0.01)	0.04 (0.05, 0.03)
					21	Forage	0.06 (0.06, 0.05)	< 0.01 (< 0.01, < 0.01)	0.03 (0.02, 0.04)
					7	Stover	0.47 (0.47, 0.46)	0.07 (0.08, 0.06)	0.07 (0.07, 0.07)
					14	Stover	0.29 (0.29, 0.29)	0.06 (0.05, 0.06)	0.05 (0.06, 0.05)
					21	Stover	0.28 (0.28, 0.28)	0.06 (0.08, 0.05)	0.04 (0.04, 0.04)
					28	Stover	0.14 (0.15, 0.12)	0.03 (0.03, 0.03)	0.04 (0.03, 0.04)
Carrington, ND, USA, 2012 120427.07 (Not reported)	500 g/kg WG	50	2	100	8	Forage	0.02 (0.02, 0.02)	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.03)
					13	Stover	0.60 (0.73, 0.47)	0.02 (0.02, 0.01)	0.06 (0.08, 0.04)
Dill City, OK, USA, 2012 120427.08 (SR25835)	500 g/kg WG	49-51	2	102	6	Forage	0.20 (0.19, 0.20)	0.09 (0.09, 0.09)	0.12 (0.14, 0.10)
					14	Stover	0.16 (0.14, 0.18)	0.03 (0.03, 0.04)	0.11 (0.09, 0.12)
Larned, KS, USA, 2012 120427.09 (84G62)	500 g/kg WG	50	2	100	7	Forage	0.16 (0.15, 0.17)	< 0.01 (< 0.01, < 0.01)	0.06 (0.05, 0.07)
					14	Stover	0.28 (0.26, 0.30)	0.01 (0.01, 0.02)	0.04 (0.04, 0.04)

Rice straw

Twelve supervised field trials, including two decline trials, were conducted in the USA on rice crops during the 2013 growing season (Csinos, A., 2014). The treated plots each received three foliar applications of a water-dispersible granule formulation containing sulfoxaflor at a nominal concentration of 50% (w/w), 6 to 7 days apart, at a target rate of 100 g ai/ha. An adjuvant was included within the tank mixture at each application.

Rice straw samples were collected at 13-16 days after the last application. In the two decline trials, samples of straw were collected at approximately 0, 7, 21 and 28 days after last application.

Table 14 Sulfoxaflor residues in rice straw from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
Malaysia GAP	240 g/L SC	75	4	300	NS			
Pollard, AR, USA, 2013 S13-02221-01 (CL-111)	500 g/kg WG	101	3	303	14	0.73 (0.81, 0.65)	0.14 (0.09, 0.19)	0.21 (0.26, 0.16)
Malden, MO, USA, 2013 S13-02221-02 (CL-111)	500 g/kg WG	99-102	3	302	16	0.36 (0.34, 0.38)	0.06 (0.05, 0.06)	0.19 (0.18, 0.21)
Morrow, LA, USA, 2013 S13-02221-03 (Cheniere)	500 g/kg WG	100-103	3	303	14	0.50 (0.47, 0.53)	0.14 (0.12, 0.17)	0.05 (0.05, 0.06)
Cheneyville, LA, USA, 2013 S13-02221-04 (CL-151)	500 g/kg WG	105-109	3	319	0	3.1 (2.9, 3.3)	0.21 (0.23, 0.19)	0.09 (0.09, 0.09)
					6	2.0 (2.1, 1.9)	0.22 (0.20, 0.23)	0.12 (0.12, 0.11)
					15	0.93 (0.87, 0.99)	0.18 (0.19, 0.17)	0.06 (0.07, 0.06)
					21	0.69 (0.69, 0.69)	0.08 (0.09, 0.08)	0.08 (0.08, 0.08)
					27	0.68 (0.65, 0.71)	0.20 (0.17, 0.22)	0.05 (0.04, 0.05)
Heth, AR, USA, 2013 S13-02221-05 (Jupiter)	500 g/kg WG	98-99	3	295	13	0.62 (0.71, 0.52)	0.17 (0.17, 0.18)	0.04 (0.04, 0.03)
W. Memphis, AR, USA, 2013 S13-02221-06 (CL-151)	500 g/kg WG	98-99	3	295	0	1.4 (1.3, 1.4)	0.21 (0.20, 0.21)	0.06 (0.06, 0.06)
					7	1.1 (1.0, 1.1)	0.80 (0.78, 0.82)	0.04 (0.04, 0.05)
					14	0.07 (0.07, 0.07)	0.11 (0.10, 0.11)	0.03 (0.03, 0.03)
					21	0.06 (0.06, 0.06)	0.10 (0.10, 0.09)	0.03 (0.03, 0.03)
					28	0.03 (0.03, 0.03)	0.03 (0.02, 0.04)	0.03 (0.03, 0.03)
Washington, LA, USA, 2013 S13-02221-07 (CL-161)	500 g/kg WG	98-102	3	300	14	0.17 (0.13, 0.20)	0.09 (0.08, 0.10)	0.03 (0.03, 0.03)
Fisk, MO, USA, 2013 S13-02221-08 (CL-111)	500 g/kg WG	102	3	306	14	0.53 (0.52, 0.53)	0.06 (0.07, 0.05)	0.16 (0.16, 0.16)
E. Bernard, TX, USA, 2013 S13-02221-09 (Chenieve)	500 g/kg WG	98-99	3	295	14	0.36 (0.42, 0.29)	0.13 (0.16, 0.10)	0.08 (0.08, 0.08)
E. Bernard, TX,	500 g/kg	98	3	294	13	1.1	0.18	0.20

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X11721061
USA, 2013 S13-02221-10 (Presidio)	WG					(1.1, 1.1)	(0.16, 0.20)	(0.26, 0.13)
Yuba City, CA, USA, 2013 S13-02221-11 (101-A)	500 g/kg WG	97-98	3	293	14	1.5 (1.5, 1.5)	0.08 (0.08, 0.08)	0.05 (0.04, 0.06)
Woodland, CA, USA. 2013 S13-02221-12 (M-206)	500 g/kg WG	97	3	291	14	3.6 (4.0, 3.1)	0.09 (0.10, 0.07)	0.43 (0.48, 0.39)

Almond hulls

Five new supervised trials in established almond orchards were completed in the USA during the 2014 growing season (Best, A., 2015). The treated plots each received three applications of a soluble concentrate formulation containing 240 g/L of sulfoxaflor, at the nominal rate of 100 g ai/ha at weekly intervals. Spray volumes were 935–3741 L/ha and a commercial adjuvant typically used for insecticide applications to almonds was included at recommended rates.

Samples of whole almond nuts were collected at maturity, 6–7 days after the last application. In addition, samples were collected at 0, 2, 13 and 21 days after application to assess residue decline. After harvesting, the almonds were processed by separating the hulls from the nut.

Table 15 Sulfoxaflor residues in almond hulls from supervised trials in the USA

Location Year Trial ID (variety)	Application				DALA	Residues, mg/kg		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X117-21061
Sanger, CA, USA, 2014 S14-01598-01 (Padre)	240 g/L SC	100-101	3	302	7	0.54 (0.54, 0.54)	0.03 (0.04, 0.03)	0.06 (0.05, 0.06)
Zamora, CA, USA, 2014 S14-01598-02 (Butte)	240 g/L SC	101-102	3	304	6	1.69 (1.65, 1.73)	0.02 (0.02, 0.02)	0.13 (0.12, 0.15)
Strathmore, CA, USA, 2014 S14-01598-03 (Fritz)	240 g/L SC	101-102	3	305	7	0.72 (0.82, 0.62)	0.03 (0.03, 0.03)	0.05 (0.05, 0.04)
Arbuckle, CA, USA, 2014 S14-01598-04 (Winters)	240 g/L SC	100-104	3	305	6	1.71 (1.74, 1.67)	0.02 (0.02, 0.02)	0.12 (0.13, 0.12)
Winters, CA, USA, 2014 S14-01598-05 (Butte)	240 g/L SC	100-101	3	302	0	0.70 (0.78, 0.63)	< 0.01 (< 0.01, < 0.01)	0.03 (0.03, 0.03)
					2	0.61 (0.67, 0.55)	< 0.01 (< 0.01, < 0.01)	0.03 (0.03, 0.03)
					7	0.33 (0.28, 0.38)	< 0.01 (< 0.01, < 0.01)	0.02 (0.02, 0.02)

Location Year Trial ID (variety)	Application				DALA	Residues[mg/kg]		
	Form	g ai/ha	No.	Max/ year g ai/ha		Sulfoxaflor	X11719474	X117-21061
					14	0.76 (0.74, 0.78)	0.02 (0.02, 0.02)	0.08 (0.08, 0.08)
					21	0.46 (0.53, 0.38)	0.01 (0.02, 0.01)	0.05 (0.06, 0.05)

Processing Studies

Processing studies were conducted on pineapples, maize, rice, and cacao beans. In all studies, sulfoxaflor was applied at exaggerated rates, compared with those of the crop field trials, and bulk RAC samples were harvested at shorter PHIs. Processing procedures simulated commercial practices. While residues of sulfoxaflor and its metabolites X11719474 and X11721061 were determined using Dow AgroSciences LC-MS/MS Method 091031, only residues of sulfoxaflor and the associated processing factors are reported.

Pineapple

In one supervised field trial conducted in Wahiawa, Hawaii in 2012, sulfoxaflor, formulated as a 240 g ai/L SC formulation, was applied twice as foliar applications to pineapples at a rate of 300 g ai/ha for a total seasonal rate of 600 g ai/ha (Carringer, S., 2013). Pineapple fruits were harvested 1 day after the last application and processed into peeled fruit, juice and wet bran, simulating commercial practices. Residues of sulfoxaflor in the pineapple RAC and processed commodities, along with the calculated processing factors (PFs) are reported in Table 16.

Table 16 Residues of sulfoxaflor in pineapple processed commodities

Trial No.	Processed Commodity	Application rate total (g ai/ha)	DAT (days)	Sulfoxaflor residues (mg/kg)	Processing factor
Wahiawa, HI, USA, 2012 120428-01	Pineapple Fruit (RAC)	600	1	0.157 (0.141, 0.172)	-
	Peeled fruit	600	1	0.024 (0.038, 0.011)	0.16
	Peel	600	1	0.350 (0.314, 0.385)	2.2
	Juice	600	1	0.014 (0.013, 0.014)	0.09
	Process residue (Wet bran)	600	1	0.016 (0.019, 0.013)	0.10

Maize

In two supervised field trials conducted in the USA in 2012, sulfoxaflor, formulated as a 500 g/kg WG formulation, was applied twice as foliar applications to maize plants at a rate of 246-249 g ai/ha to give a total seasonal rate of approximately 500 g ai/ha (Korpalski, S., 2013). Grain samples harvested 13–14 days after the last application were processed into aspirated grain fractions, grits, bran, germ, meal, flour, refined oil, gluten and starch, simulating commercial practices. Results showed that even at an exaggerated rate, residues of sulfoxaflor in the grain RAC were below the LOQ of 0.01 mg/kg; therefore, no processing factors could be calculated.

Rice

In one supervised field trial conducted in USA in 2013, sulfoxaflor, formulated as a 500 g/kg WG formulation, was applied three times as foliar applications to rice plants at a nominal rate of 500 g ai/ha to give a total seasonal rate of 1500 g ai/ha (Csinos, A, 2014). Rice grain RAC samples were harvested 16 days after the last application and processed.

Treated rough rice samples, collected from the bulk rice grain samples at initiation of processing, were dried in an industrial oven and then cleaned by aspiration and screening. After cleaning, each cleaned rice sample was divided into two portions, one of which was parboiled by steeping in water at 60–70 °C, pressure cooked and then dried. Samples of the parboiled rice were then collected and stored frozen. Parboiled rice was then milled.

Parboiled and non-parboiled rice were milled similarly. Using a rice mill, rice hulls were removed from the cleaned rough rice by rubber rolls rotating in opposite directions at different speeds. Hulls were separated from the remaining "brown rice" by aspiration. The same equipment was then used to separate rice bran from the white rice by friction. Bran was removed from white rice by injection of air into the milling chamber, and then screened to remove broken pieces of brown rice, white rice or hulls. White rice was subject to dry milling to produce rice flour samples.

Residues of sulfoxaflor in rice RAC and processed commodities, along with the calculated processing factors (PFs) are reported in Table 17.

Table 17 Residues of sulfoxaflor in rice processed commodities

	Sulfoxaflor Residues (mg/kg)	
Grain (RAC)[a]	4.08	-
Rice matrices from dry milling	Sulfoxaflor Residues (mg/kg)	Sulfoxaflor Processing Factors
Cleaned Grain[a]	5.63	1.4
Hulls	24.2 (23.1, 25.2)	5.9
Brown Rice	0.81 (0.80, 0.83)	0.20
Bran	3.01 (2.98, 3.03)	0.74
Polished Rice	0.56 (0.51, 0.60)	0.14
Flour	0.41 (0.28, 0.29)	0.10
Rice matrices from parboiled rice	Sulfoxaflor Residues (mg/kg)	Sulfoxaflor Processing Factors
Parboiled Rice	5.35 (4.71, 5.98)	1.3
Hulls	9.70 (9.40, 10.0)	2.4
Brown Rice	3.23 (3.17, 3.29)	0.79
Bran	4.44 (4.10, 4.77)	1.1
Polished Rice	3.50 (3.34, 3.66)	0.86
Flour	3.01 (2.99, 3.03)	0.74
	Rice matrix	Mean Processing Factor
	Cleaned Grain	1.4
	Parboiled Rice	1.3
	Hulls	4.2
	Brown Rice	0.50
	Bran	0.92
	Polished Rice	0.50
	Flour	0.42

[a] Only the mean of the duplicate treated samples was reported

Cacao beans

In one supervised field trial on cacao conducted in Costa Rica in 2012, sulfoxaflor, formulated as a 240 g/L SC formulation, was applied four times as foliar applications to cacao plants at a rate of approximately 200 g ai/ha for a total seasonal rate of 800 g ai/ha (Korpalski, S.J., 2013). Mature fruit samples were collected 11 and 21days after the last application.

Cacao fruit were first cut with a knife and the seeds removed by hand. Seeds were then placed within a sheltered area on trays and covered with plantain leaves for fermentation. Seeds were left undisturbed for 48 hours, then mixed each day to facilitate the fermentation process. After 6 days under shelter, seeds were taken outdoors and dried under sunlight in wooden bins for at least 6 days.

At the processing facility, bulk dried bean samples were processed to produce samples of roasted beans, husks, cacao butter, cacao powder and chocolate. Bulk samples were roasted in a table-top roaster at 250–300 °F (~120–150 °C) for 15–20 minutes. After a sample of roasted beans was collected from each, the remainder was fed through a winnowing machine to crack the outer shell and expose the inner nibs. Husks were separated from nibs by aspiration and the husk sample collected. The remaining nibs were then processed through a juicer to remove residual husk material and to grind the nibs releasing chocolate liquor through a screen. After several passes, a portion of the collected liquor was placed in a hydraulic press cylinder and heated to 100–130 °F (~38–54 °C). The liquor was then pressed to separate cacao butter from powder. Using a centrifuge, residual powder was removed from the butter, and the butter sample was collected.

Cacao powder, with residual butter, was then returned to the press with separation plates and filter media between each plate. The material was heated to 150–200 °F (~66–93 °C), then pressed to release remaining butter into the filter media. The cacao powder was then ground to uniform consistency in a hand-held grinder, and a sample of the powder was collected.

A semi-sweet chocolate was then produced with the remainder of the liquor. The liquor was ground in a stone melanger for 30 minutes to one hour, then granulated sugar was added (an amount of 20% of the starting weight of liquor) and grinding continued for 6–8 hours. After grinding, the resulting chocolate was poured into moulds and cooled, and then the chocolate fractions were collected and placed into frozen storage with the other samples.

Table 18 Residues of sulfoxaflor in cacao processed commodities

Cacao Matrix	Sulfoxaflor Residues [a] at 11 days after last treatment (mg/kg)	Sulfoxaflor Processing Factor
Dried Beans [b]	0.036	-
Husks	0.057	1.6
Roasted Beans	0.034	0.96
Cacao Butter	< 0.01	< 0.28
Cacao Powder	0.040	1.1
Chocolate	0.019	0.53
	Sulfoxaflor Residues [a] at 21 days after last treatment (mg/kg)	Sulfoxaflor Processing factor
Dried Beans [b]	0.037	-
Husks	0.069	1.9
Roasted Beans	0.040	1.1
Cacao Butter	< 0.01	< 0.27
Cacao Powder	0.044	1.2
Chocolate	0.026	0.70

	Cacao matrix	Mean Processing Factor
	Husks	1.7
	Roasted Beans	1.0
	Cacao Butter	< 0.28
	Cacao Powder	1.2
	Chocolate	0.61

[a] Single samples collected only

[b] Samples were collected at the processing facility as subsamples of bulk samples

APPRAISAL

Sulfoxaflor, a sulfoximine insecticide, was first evaluated by JMPR in 2011 where an ADI and AfRD of 0–0.05 mg/kg bw and 0.3 mg/kg bw respectively were established A residue definition of *sulfoxaflor* was established for both compliance and dietary risk assessment in plant and animal commodities.

Sulfoxaflor was also evaluated by JMPR in 2014 where the previously reviewed residue trial data on citrus fruits, pome fruits, stone fruits and tree nuts were reassessed against the registered USA GAP.

After the 2015 CCPR Meeting, the proposed MRL for tree nuts was held at Step 4 pending additional crop field trials, conducted in accordance to the USA GAP, for consideration by JMPR

The current Meeting received additional supervised residue trials for almonds and pecans as well as new GAP information (Columbia, Indonesia, Malaysia, Vietnam, Mexico and Ivory Coast) and supervised residue trials on assorted tropical and subtropical fruits, sweet corn, cereal grains and seed for beverages and sweets.

It should be noted that all uses in the USA were recently cancelled for reasons unrelated to food safety.

Results of supervised residue trials on crops

Supervised residue trials data were provided for cocoa beans (Costa Rica), avocadoes, rice, sorghum and cocoa beans (the USA). However, as these trials did not match the critical GAPs provided to the Meeting, and proportionality could not be applied, due the different number of applications and PHIs in the trials, the Meeting could not recommend any maximum residue levels.

The Meeting also received supervised residue trials conducted in pineapples (Cost Rica and the USA) and on sweet corn, maize and tree nuts (the USA). However, as no GAPs were provided to the Meeting for these crops, maximum residue levels could not be recommended.

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Reference Number	Author(s)	Year	Study Title
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